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NSSDC

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NATIONAL SPACE SCIENCE DATA CENTER

NASA

National Aeronautics and Space Administration

Goddard Space Flight Center,
Greenbelt, Maryland 20771

catalog of ionospheric and atmospheric data

November 1975

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DEFINITIONS OF DISCIPLINES

ASTRONOMY — This category includes all observations of astronomical objects, both outside and within the solar system, made at various wavelengths (i.e., gamma rays through radio waves). Observed objects outside the solar system include stars, nebulae, galaxies, and all other matter. Observed objects within the solar system include zodiacal light sources, meteoroids, asteroids, dust, micrometeorites, and planetary radio emission sources. Other planetary observations (see Planetary Atmospheres, Planetology, or Ionospheric Physics) and solar observations (see Solar Physics) are excluded. Observations of cosmic-ray particles are listed under Particles and Fields. Celestial mechanics measurements are included under Geodesy and Gravimetry.

GEODESY AND GRAVIMETRY — This category includes experiments that measure size, shape, mass, coordinates, altitudes, or gravity fields or experiments concerned with the mapping of a body. It includes the mechanics of orbiting artificial and natural bodies.

IONOSPHERIC PHYSICS — This category includes observations of the ionosphere, which is defined as that region of a planetary atmosphere which contains a significant number of free thermal electrons on a daily basis and which has a free electron density maximum in the vertical direction. Its upper and lower extents are roughly defined as the areas in which densities approach 10^{-4} of the peak values. Included are all in situ and remotely sensed observations of ionospheric charged particles with thermal energies. This category is used for remotely sensed propagation experiments that primarily focus on the ionosphere, including very low frequency (VLF) and extremely low frequency (ELF) experiments; for other remotely sensed propagation experiments, an appropriate category, such as Particles and Fields, is used.

METEOROLOGY — This category includes observations made in the Earth's hydrosphere and atmosphere up to the mesopause or D region.

PARTICLES AND FIELDS — The subcategory Particles includes all in situ charged-particle measurements except those of thermal plasma in terrestrial or other planetary ionospheres (see Ionospheric Physics). It includes all neutron measurements and electromagnetic signal propagation experiments designed to measure columnar electron densities (except those in which the most significant portion of the free electrons within the column is within an ionosphere). The subcategory Fields includes all in situ measurements of electric and magnetic fields. It includes VLF and ELF experiments other than those primarily concerned with observing ionospheric properties. It excludes electromagnetic radiation (radio waves through gamma waves) propagating away from remote sources. (In such cases, either Solar Physics or Astronomy is used, as appropriate.)

PLANETARY ATMOSPHERES — This category includes all observations of the gaseous envelope above the surface of a planet. For the Earth the lower limit for observations that belong in this category is about 65 km, the height of the mesopause or D region. (For studies below this altitude, Meteorology is used.) The upper limit is defined as the transition level to the lightest gas. This region overlaps the ionosphere for planets which have an ionosphere; however, ionospheric observations are restricted to observations related to the charge aspects of matter, while Planetary Atmospheres relates to the mass aspects of matter (e.g., composition measurements). For cases in which both atmospheric and ionospheric categories apply, both may be used.

PLANETOLOGY — This category includes experiments for the purpose of deriving and analyzing data from the solid or liquid parts (excluding the oceans of the Earth) of any solar system body. Chemical, physical, and geologic studies of properties of gross or small surface features, materials of the surface, internal properties, magnetic properties, etc., are included. Gravitational and geodetic experiments are excluded from this category (see Geodesy and Gravimetry). When the primary purpose of the study is to measure the residual effects of some external phenomena (such as meteorite or cosmic-ray impacts), the external phenomena should determine the choice of category. If necessary, the experiment may be assigned to more than one category.

SOLAR PHYSICS — This category includes all solar observations regardless of the wavelength being observed. The source region considered here extends outward from the Sun to include that area observed with solar coronagraphs (nominally to 10 solar radii). All in situ measurements of electric or magnetic fields and of particles for which the source is believed to be the Sun are considered to fall in the domain of Particles and Fields.

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technical coordinator:
LELAND L. DUBACH

editor:
JOHN N. LILES

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PREFACE

Many individuals have participated in some way toward producing this catalog and deserve recognition for their efforts. I would like to both acknowledge and thank the many spacecraft experimenters and their colleagues who have submitted their documented data. In addition, a number of National Space Science Data Center (NSSDC) personnel have interacted with experimenters in bringing to NSSDC the data announced and have generated the many descriptions in this catalog. Of the present staff, these persons include L. L. Dubach, R. Horowitz, and Capt. J. C. Lease. A great many other NSSDC personnel, too numerous to name, have also been involved in the data and information handling necessary to produce this catalog. Most of these personnel are associated with the Data Center's onsite contractor, PMI Facilities Management Corporation. To all these, my thanks are extended.

The Data Center is continually striving to increase the usefulness of its data holdings, supporting indexes, and documentation. Scientists are invited to submit their space science data and comments to NSSDC. Catalog recipients are urged to inform potential data users of its availability.

Leland L. Dubach

CONTENTS

1. INTRODUCTION

1.1 NSSDC MISSION

The National Space Science Data Center (NSSDC) was established by the National Aeronautics and Space Administration (NASA) to provide data and information from space science experiments in support of additional studies beyond those performed by principal investigators. NASA Policy Directive (NPD) 8030.3, January 7, 1967, specifies further details of the NSSDC mission. Available data from planetary atmospheres and ionospheric physics (aeronomy), as defined inside the front cover, are announced in this catalog. Data available in other disciplines comprise additional catalogs.

1.2 CATALOG ORGANIZATION

Most of the data sets identified by NSSDC result from individual experiments carried on board "individual" spacecraft. To maintain information on these data, the Data Center has developed a spacecraft Automated Internal Management (AIM) File utilizing a spacecraft/experiment/data set hierarchy. To maintain information not conforming to this hierarchy, a three-level hierarchy of data type, data content, and data set information is used for a Nonsatellite Data File (NSDF). (This file includes satellite data relating to groups of spacecraft, i.e., models, listings of orbit elements, programs, etc.) The major part of this catalog consists of two photoreduced reports, produced by these information files. The primary report from the AIM File is sorted by spacecraft common name, then by the principal investigator's last name. The other report (NSDF) is short enough to allow identification of desired data from a listing of contents that precedes the report.

In addition to the actual photoreduced reports, this catalog contains a variety of user-oriented indexes to assist in finding specific information.

1.3 NSSDC FACILITIES AND SERVICES

NSSDC provides facilities for data reproduction and for onsite data use. Resident and visiting scientists are invited to study the data while at the Data Center. The Data Center staff will assist users with additional data searches and with the use of equipment. In addition to satellite and space probe data, the Data Center maintains some supporting information and other supporting data that may be related to the needs of such scientists. See section 2.1.1 of this catalog and the *NSSDC Handbook of Correlative Data*, NSSDC 71-05, for further details on supporting data. In addition to its main function of providing selected data from space science flight experiments for further analysis, the Data Center maintains a reference listing of space science related literature accessible through the spacecraft and experiment identifier and discipline keywords, as well as through standard library identifications. The Data Center also produces a wide spectrum of publications. Among these are reports on active and planned spacecraft and experiments, reports of recent sounding rocket launchings, lunar and planetary photographic data user notes, and users guides. For additional information on NSSDC document availability and distribution services, write to the appropriate address in section 1.4 and request document NSSDC/WDC-A-R&S 74-10.

1.4 DATA AVAILABILITY, COSTS, AND ORDERING PROCEDURES

The services provided by NSSDC are available to any individual or organization resident in the United States and to scientists outside the United States. Normally a charge is made for the requested data to cover the cost of reproduction and processing. The requester will be notified of the charge, and payment must be received prior to processing the request. The Director of NSSDC may waive, as resources permit, the charge for modest amounts of data for use in scientific studies or specific educational purposes, and when they are requested by an individual affiliated with: (1) U.S. Government agencies, their contractors, or their grantees, (2) universities and colleges, (3) state and local governments, or (4) nonprofit organizations. A user may obtain data by a letter or telephone request, by an onsite visit, or by use of the NSSDC Data Request Form (contained at the end of this document).

Anyone wishing to obtain data for a scientific study should specify the NSSDC identification number, the common name of the satellite, the form of data, the time span, and location (as appropriate) of interest. A requester should also specify why the data are needed, the subject of his work, his affiliation, and any Government contracts he may have for performing his study. Data can often be provided in a format or

medium other than that noted in the data set descriptions. For example, reformatted computer printout or microfilmed listings can be produced from magnetic tape data sets, enlarged paper prints are available from data sets on photographic film and microfilm, etc. The Data Center will provide the requester with an estimate of the response time and, when appropriate, the charge for such requests. When requesting data on magnetic tape, the user should specify whether he will supply new tapes prior to the processing, return the original NSSDC tapes after the data have been copied, or pay for new tapes.

The Data Center's address for requests is:

National Space Science Data Center
Code 601.4
Goddard Space Flight Center
Greenbelt, Maryland 20771
Phone: (301) 982-6695

Users who reside outside the U.S. should direct requests for data to:

World Data Center A for Rockets and Satellites
Code 601
Goddard Space Flight Center
Greenbelt, Maryland 20771 U.S.A.
Phone: (301) 982-6695

Since the World Data Center A for Rockets and Satellites (WDC-A-R&S) also maintains listings of rocket experiments, requests for information concerning rocket launchings and the experiments flown may be directed to this institution.

1.5 DATA ACQUISITION

NSSDC invites members of the scientific community to contribute data from satellite experiments. The Data Center assigns a specialist in the appropriate scientific discipline for each experiment to arrange for data acquisition with the principal investigator. Acquired data are cataloged and made available to users according to established procedures. Scientists who have not been contacted by one of the subject specialists and who have analyzed or reduced data available for contribution are requested to contact NSSDC so that transfer of the data may be discussed.

2. AUTOMATED REPORTS

2.1 CONTENT AND ORGANIZATION

The first of the following two reports from the automated information files of NSSDC is concerned with data, programs, models, etc., which cannot be conveniently identified by a relationship to one or a limited number of specific spacecraft (NSDF File). The second report concerns data which can conveniently be related to a satellite (AIM File). Both reports contain information at three levels as shown below to preclude repetition of information.

	Satellite (AIM)	Nonsatellite (NSDF)	LEGEND
level 1	satellite	data type	————
level 2	experiment	data content	————
level 3	data set	data set	————

2.1.1 NONSATELLITE DATA SETS

Since these data sets are very limited in number, a listing by title on the first page is sufficient to find the desired item. Content of the information listed at each level is similar in principle to that described in the following paragraphs.

2.1.2 SATELLITE DATA SETS

This report is sorted by spacecraft common name, then by principal investigator's last name, and finally by a data set identification number. Because spacecraft common names (the first sort parameter) are not universally common, the Spacecraft Name Index (section 3.1) contains all known alternate names of relevant spacecraft. The Investigator Name Index (section 3.3) may also assist the user in finding data from a given experimenter (the second sort parameter). The third sort parameter, data set ID, consists of a spacecraft ID; e.g., IMP 7 = 72-073A, with both an experiment sequence number (72-073A-01) and a data set sequence letter (72-073A-01A) attached.

For a few spacecraft listed in these reports, there are ephemeris data sets (numbered as experiment 00) needed for use with some other listed data set(s). For many other spacecraft, NSSDC has available ephemeris data sets or world maps (primarily listings of position at 1-minute, or other short time, intervals), which are not specifically identified in this catalog.

Each entry in these reports consists of two parts: a heading and a brief description. Each level of entry, i.e., spacecraft, experiment, and data set, contains its own heading. The headings list generic characteristics of satellites, experiments, and data sets.

2.1.2.1 CONTENTS OF SPACECRAFT ENTRIES

The heading for each spacecraft description contains the following information about the spacecraft: launch date, weight in orbit, status of operation, and, for inoperable or operationally off spacecraft, the date last spacecraft data were recorded or, if available, the date last usable spacecraft data were recorded. Orbiting spacecraft also have the following orbital parameters included in the heading: epoch date, orbit type, orbit period, inclination, apoapsis, and periapsis. For satellites with heliocentric orbits, the ecliptic plane is used in lieu of the equatorial plane.

Each spacecraft brief description contains a concise summary of the spacecraft mission, specifically outlining the overall objectives of the mission and the scientific studies being performed. Information about the operational performance and status of the spacecraft during a given period of time is also included, and is updated as new information becomes available.

2.1.2.2 CONTENTS OF EXPERIMENT ENTRIES

Each experiment entry heading lists the name of the original experiment institution and the name and present affiliation of the principal investigator (PI) for the experiment. The names and present affiliations of other investigators (OI) associated with the experiment are also listed. The experiment status of operation is then listed as "normal," "partial," "operational off," or "inoperable." For inoperable or operationally off experiments, the date last experiment data were recorded or, if available, the date last usable experiment data were recorded, is also presented. In addition, if the experiment is functioning in other than a normal mode, the brief description explains the circumstances of, and periods affected by, the change.

The experiment brief description contains a concise summary of the experiment purpose and instrument characteristics, emphasizing those relevant to the scientific use of the resulting data. Information about the operational performance and status of the experiment

during a given period of time is also included and is frequently updated.

2.1.2.3 CONTENTS OF DATA SET ENTRIES

Each data set entry contains three elements in the heading: the time period covered by the data, the quantity of data and medium on which the data are stored, and an indicator describing the availability of the data. The time period covered is annotated with one of two additional comments: "as verified by NSSDC" – identifying that portion of the data set for which the period of data coverage has been verified; or "as reported by the experimenter" – identifying the period of coverage provided by the experimenter, regardless of the amount held or verified by NSSDC. Several indicators are used to describe the status of data availability to requesters:

- "Data at NSSDC Ready for Distribution" – designates a data set for which cataloging, verification, and documentation are sufficient to provide a comprehensible set of data to satisfy requests.

- "Data in Published Reports" – indicates that either all or a significant portion of the data is contained in a published report or journal, or that the only accessible source of any reduced data from an experiment is the published document. The publications cited in the brief descriptions for spacecraft, experiment, or data set entries normally are available through scientific libraries or document distribution centers. NSSDC provides copies of publications only if they cannot be obtained through such libraries or centers. These reports or samples of such data are usually available to NSSDC visitors for reference.

- "Data at NSSDC" – identifies data sets for which documentation and verification activities are in process. These data are usually sufficiently documented and verified to satisfy routine requests.

- "Data at NSSDC Processing Deferred" – indicates that the verifying, documenting, or cataloging of the data set is not complete, and that no additional work will be performed unless specifically requested. NSSDC may be able to supply the data from such a data set in a suitable form, depending upon the completeness of the processing and documentation and the particular requirements of the user. The completeness of the data set is indicated in its brief description.

- "Data Available from Experimenter" – used for data sets that NSSDC does not plan to acquire and that the experimenter is willing to make available, usually in limited amounts, to other scientists. These data sets are not feasible for storing at NSSDC, either because they are large in volume or because they require special equipment to process. Requests for data sets carrying this indicator should be addressed directly to the experimenter. The experimenter's name and address and the expected date that the data will be ready for processing are given in the brief description of such a data set.

- "Data at Another Center" – used for data sets stored and distributed by any other data center. Requests for data sets with this indicator should be made directly to the organization identified in the brief description. Published reports of this type or samples of such data are usually available to NSSDC visitors for reference.

- "Data at Another Center that NSSDC can Process" – denotes a data set held by another data center, but to which NSSDC has access for limited processing. Requests for this type of data set should be submitted to NSSDC.

For information on the procedures for ordering data, please refer to section 1.4 of the Introduction.

Nonsatellite Data Sets

2.2 NONSATELLITE DATA SETS (for explanation see section 2.1.1)

NOTES:

- Data sets in this section are identified by a code of the form AB-12C, where:

  AB-1 represents data type (level 1)
  AB-12 represents data content (level 2)
  AB-12C represents data set (level 3)

- Position "A" is coded: G(ground-based data), M(model), or P(program). Position "B" is discipline coded: G(geomagnetic), or I(ionospheric).

- All descriptive material for each data type (level 1) applies to all data content (level 2) within that data type, and is not repeated for each data set (level 3). Data content (level 2) is occasionally omitted when not deemed useful for indexing needs.

NSSDC ID- GG-4

DATA TYPE NAME- DST INDICES

THE DST INDEX PROVIDES AN INDIRECT MEASURE OF MAGNETOSPHERIC RING CURRENTS AND IS SPECIALLY USEFUL DURING GEOMAGNETIC STORMS. AT EACH OF SEVERAL LOW-LATITUDE STATIONS, THE IRREGULAR VARIATION CONTRIBUTION (D) TO THE H-COMPONENT OF THE GEOMAGNETIC FIELD IS DETERMINED. DST IS THEN THE GLOBAL AVERAGE, OVER CONTRIBUTING STATIONS, OF "D." SEE SUGIURA, ANN. IGY, VOL 35, PP 9-45, 1964, FOR FURTHER DETAILS.

NSSDC ID- GG-41

DATA CONTENTS NAME- HOURLY EQUATORIAL DST VALUES

THE EQUATORIAL DST VALUE PROVIDES A PLANETARY MAGNETIC ACTIVITY INDEX ON AN HOURLY BASIS. THE DST IS OBTAINED BY TAKING THE GLOBAL AVERAGES OF THE TRANSIENT VARIATION OF THE H-COMPONENT OF THE GEOMAGNETIC FIELD RECORDED AT SEVERAL LOW LATITUDE STATIONS. IT IS, THEN, NORMALIZED BY A FUNCTION OF THE MEAN GEOMAGNETIC LATITUDE OF THE CONTRIBUTING STATIONS TO PRODUCE THE EQUATORIAL VALUE GIVEN IN UNITS OF GAMMA. FOR FURTHER DETAILS, SEE SUGIURA AND PORDS, GSFC PUBLICATION X-645-71-270.

NSSDC ID- GG-41A

DATA SET NAME- HOURLY DST VALUES, HARDCOPY

TIME PERIOD COVERED- 01/0 '57 TO 04/30/75

QUANTITY OF DATA- 2 BOOK(S) OR BOUND VOLUME(S)

VALUES OF DST BEGINNING IN JANUARY 1957, AND EXTENDING TO THE PRESENT (WITH A FEW MONTHS OF TIME LAG), HAVE BEEN GENERATED BY NASA/GSFC PERSONNEL, AND HAVE BEEN PUBLISHED IN VARIOUS LOCATIONS FOR VARIOUS TIME PERIODS. DATA UP TO DECEMBER 1972 ARE AVAILABLE IN TWO VOLUMES OF BOUND HARDCOPY DOCUMENTS. DATA BEYOND DECEMBER 1972 ARE AVAILABLE AS UNBOUND HARDCOPY SHEETS, ONE FOR EACH MONTH.

NSSDC ID- GG-41B

DATA SET NAME- EQUATORIAL DST VALUES ON MAGNETIC TAPE

TIME PERIOD COVERED- 01/01/57 TO 12/31/74

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF A 7-TRACK, 556-BPI, IBM 7094 BINARY MAGNETIC TAPE. IT CONTAINS HOURLY DST VALUES FROM JANUARY 1957 THROUGH DECEMBER 1974. UPDATED DST VALUES WILL BE ADDED TO THE TAPE AT THE END OF EACH YEAR.

NSSDC ID- GI-1

DATA TYPE NAME- SWEEP FREQUENCY IONOSONDE

A SWEEP FREQUENCY IONOSONDE IS A COMBINATION RADIO RECEIVER AND PULSED TRANSMITTER. A PULSE IS TRANSMITTED AT A KNOWN TIME, FREQUENCY, AND SIGNAL STRENGTH. AND THE RETURN OF THIS PULSE IS RECORDED. AT A LATER PRESCRIBED TIME, THIS PROCESS IS REPEATED, USING A SLIGHTLY HIGHER FREQUENCY. THIS PROCESS IS REITERATED UNTIL THE ENTIRE FREQUENCY SPECTRUM OF THE IONOSONDE HAS BEEN TRAVERSED. USEFUL INFORMATION CAN BE DERIVED BY USING THE FREQUENCY DEPENDENCE OF THE ROUND-TRIP TRAVEL TIME OF THE PULSE FROM TRANSMISSION TO RECEPTION, AND BY COMPARING PULSE SIGNAL LOSS ALONG THE PROPAGATION PATH. A COMPLETE SWEEP USUALLY REQUIRES ABOUT 2 MINUTES, AND THE NORMAL SPECTRUM SCANNED IS FROM ABOUT 0.5 TO 20 MHZ.

NSSDC ID- GI-11

DATA CONTENTS NAME- IONOGRAMS

A SWEEP FREQUENCY IONOGRAM IS A GRAPH OF PROPAGATION TIME (ALSO CALLED ECHO DELAY, VIRTUAL HEIGHT, OR VIRTUAL RANGE) VS RADIO PULSE SIGNAL FREQUENCY. THE FREQUENCY VALUES ALONG THE ABSCISSA ARE LOGARITHMICALLY SPACED, AND RANGE MARKERS ALONG THE ORDINATE ARE LINEARLY SPACED. INFORMATION ABOUT ABSORPTION LOSS TO THE REFLECTED SIGNAL IS NOT CLEARLY SHOWN IN THE MORE COMMON (O SCAN) IONOGRAM. SIGNAL PROPAGATION TIME IS NOT CONVERTIBLE IN A SIMPLE WAY TO DISTANCE OF THE IONOSONDE FROM THE REFLECTING LAYER. THIS IS DUE TO THE FACT THAT THE SIGNAL IS SLOWED DURING PROPAGATION THROUGH THE REGIONS CONTAINING FREE ELECTRONS. MORE COMPLETE INFORMATION CAN BE FOUND IN THE "HANDBOOK OF CORRELATIVE DATA," NSSDC 71-05, PP 103-106.

NSSDC ID- GI-11A

DATA SET NAME- SWEEP FREQUENCY IONOGRAMS ON 35-MM MICROFILM

TIME PERIOD COVERED- 02/03/65 TO 06/30/75

QUANTITY OF DATA- 1376 REEL(S) OF MICROFILM

A SWEEP FREQUENCY IONOGRAM IS A PLOT OF VIRTUAL RANGE VS FREQUENCY. NORMALLY, A STATION GENERATES ONE IONOGRAM EVERY 15TH MIN AND TWO ON THE HOUR. BOTTOMSIDE SWEEP FREQUENCY IONOGRAMS FROM THE WALLOPS ISLAND STATION, AND FROM MANY OTHER STATIONS, ARE AVAILABLE FROM THE NOAA EDS STP DATA CENTER IN BOULDER, CO. WALLOPS ISLAND IONOGRAMS FOR THE PERIOD BEGINNING FEBRUARY 3, 1965, AND EXTENDING TO THE PRESENT, ARE ALSO AVAILABLE FROM NSSDC FOR NASA AND NASA CONTRACTOR PERSONNEL SINCE THE WALLOPS STATION IS FUNDED BY NASA.

NSSDC ID- GI-17

DATA CONTENTS NAME- PROFILES OF ELECTRON NUMBER DENSITY VS GEOMETRIC HEIGHT, MONTHLY BY HOUR

ELECTRON NUMBER DENSITY PROFILES ARE OBTAINED BY IONOGRAM ANALYSIS. THE IONOGRAM IS A GRAPH OF ROUND-TRIP TRAVEL TIME OF AN RF PULSE VS ITS FREQUENCY. A COMPOSITE PROFILE IS MADE BY CONSTRUCTING A SYNTHETIC "O" TRACE FROM ALL TRACES OBSERVED AT A GIVEN TIME OF DAY, DURING 1 MONTH AT ONE STATION. SEVERAL (15 TO 25) COORDINATE PAIRS OF THE GRAPHED VALUES ARE READ (SCALED) FROM THIS SYNTHETIC "MEDIAN" TRACE, OR THE TRACE FROM A SINGLE IONOGRAM, WITH THESE VALUES, AN INDIVIDUAL OR COMPOSITE PROFILE CAN BE COMPUTED BY INVERSION OF AN INTEGRAL EQUATION. THE PROGRAMS NORMALLY USED FOR THIS PURPOSE PROVIDE INTERPOLATION SO THAT DENSITY VALUES ARE AVAILABLE AT CONVENIENT HEIGHT INCREMENTS. THE "HANDBOOK OF CORRELATIVE DATA," NSSDC 71-05, PP 108-109, CONTAINS MORE DETAILS AND REFERENCES. COMPOSITE AND INDIVIDUAL PROFILES FOR MANY STATIONS CAN BE OBTAINED THROUGH THE NOAA EDS STP DATA CENTER AT BOULDER, CO. COMPOSITE PROFILES FROM WALLOPS ISLAND ARE AVAILABLE FROM NSSDC.

NSSDC ID- GI-17A

DATA SET NAME- COMPOSITE WALLOPS ISLAND, VA PROFILES OF ELECTRON NUMBER DENSITY VS UNINTERPOLATED GEOMETRIC HEIGHTS (HARDCOPY)

TIME PERIOD COVERED- 01/01/74 TO 03/31/75

QUANTITY OF DATA- 360 PAGE(S) OF COMPUTER PRINTOUT

THESE N(H) COMPOSITE PROFILES HAVE BEEN PREPARED USING A PROGRAM DEVELOPED AND MAINTAINED BY DR. A. K. PAUL, NOAA, BOULDER, CO. EACH PAGE OF DATA SUMMARIZES 1 MONTH'S IONOGRAM DATA AT WALLOPS ISLAND FOR A PARTICULAR HOUR. HEIGHTS FOR DATA CORRESPOND TO THE SCALED VALUES OF VIRTUAL HEIGHT (TRAVEL TIME). SEVERAL RELATED PARAMETERS OF INTEREST ARE LISTED ALONG WITH THE N(H) VALUES. SUCH PROFILES FOR WALLOPS ISLAND AND OTHER STATIONS ARE AVAILABLE FROM THE NOAA EDS STP DATA CENTER IN BOULDER, CO. SINCE THE WALLOPS STATION IS FUNDED BY NASA, NASA AND NASA CONTRACTOR PERSONNEL MAY ALSO OBTAIN THESE DATA FROM NSSDC. FOR IDENTICAL DATA OF EARLIER DATES, SEE DATA SET GI-17C.

NSSDC ID- GI-17B

DATA SET NAME- COMPOSITE WALLOPS ISLAND, VA PROFILES OF ELECTRON NUMBER DENSITY VS INTERPOLATED (10-KM INTERVALS) GEOMETRIC HEIGHTS

TIME PERIOD COVERED- 07/00/71 TO 03/00/75

QUANTITY OF DATA- 109 PAGE(S) OF COMPUTER PRINTOUT

THESE (N)H COMPOSITE PROFILES HAVE BEEN PREPARED USING A PROGRAM DEVELOPED AND MAINTAINED BY DR. A. K. PAUL, NOAA, BOULDER, CO. EACH PAGE OF DATA SUMMARIZES 1 MONTH'S IONOGRAM DATA AT WALLOPS ISLAND FOR A PARTICULAR HOUR. HEIGHTS FOR (N)H DATA ARE EACH 10 KM. SUCH PROFILES FOR WALLOPS ISLAND AND OTHER STATIONS ARE AVAILABLE FROM THE NOAA EDS STP DATA CENTER IN BOULDER, CO. SINCE THE WALLOPS STATION IS FUNDED BY NASA, NASA AND NASA CONTRACTOR PERSONNEL MAY ALSO OBTAIN THESE DATA FROM NSSDC. FOR IDENTICAL DATA OF EARLIER DATES, SEE DATA SET GI-17D.

NSSDC ID- GI-17C

DATA SET NAME- COMPOSITE WALLOPS ISLAND, VA PROFILES OF ELECTRON NUMBER DENSITY VS UNINTERPOLATED GEOMETRIC HEIGHT (MICROFILM)

TIME PERIOD COVERED- 06/00/64 TO 12/00/73

QUANTITY OF DATA- 3 REEL(S) OF MICROFILM

THESE (N)H COMPOSITE PROFILES HAVE BEEN PREPARED USING A PROGRAM DEVELOPED AND MAINTAINED BY DR. A. K. PAUL, NOAA, BOULDER, CO. EACH PAGE OF DATA SUMMARIZES 1 MONTH'S IONOGRAM DATA AT WALLOPS ISLAND FOR A PARTICULAR HOUR. HEIGHTS FOR DATA CORRESPOND TO THE SCALED VALUES OF VIRTUAL HEIGHT (TRAVEL TIME). SEVERAL RELATED PARAMETERS OF INTEREST ARE LISTED ALONG WITH THE (N)H VALUES. SUCH PROFILES FOR WALLOPS ISLAND AND OTHER STATIONS ARE AVAILABLE FROM THE NOAA EDS STP DATA CENTER IN BOULDER, CO. SINCE THE WALLOPS ISLAND STATION IS FUNDED BY NASA, NASA AND NASA CONTRACTOR PERSONNEL MAY ALSO OBTAIN THESE DATA FROM NSSDC. FOR IDENTICAL DATA OF MORE RECENT DATES, SEE DATA SET GI-17A.

NSSDC ID- GI-17D

DATA SET NAME- COMPOSITE WALLOPS ISLAND, VA PROFILES OF ELECTRON NUMBER DENSITY VS INTERPOLATED (10-KM INTERVALS) GEOMETRIC HEIGHTS

TIME PERIOD COVERED- 01/00/59 TO 02/00/68

QUANTITY OF DATA- 34 REEL(S) OF MICROFILM

THESE (N)H COMPOSITE PROFILES HAVE BEEN PREPARED USING A PROGRAM DEVELOPED AND MAINTAINED BY DR. A. K. PAUL, NOAA, BOULDER, CO. EACH PAGE OF DATA SUMMARIZES 1 MONTH'S IONOGRAM DATA AT WALLOPS ISLAND FOR A PARTICULAR HOUR. HEIGHTS FOR N(H) DATA ARE EACH 10 KM. SUCH PROFILES FOR WALLOPS ISLAND AND OTHER STATIONS ARE AVAILABLE FROM THE NOAA EDS STP DATA CENTER IN BOULDER, CO. SINCE THE WALLOPS ISLAND STATION IS FUNDED BY NASA, NASA AND NASA CONTRACTOR PERSONNEL MAY ALSO OBTAIN THESE DATA FROM NSSDC. FOR IDENTICAL DATA OF MORE RECENT DATES, SEE DATA SET GI-17B.

NSSDC ID- MG-1

DATA TYPE NAME- INTERNAL SOURCE GEOMAGNETIC FIELD MODELS

THESE FIELD MODELS CONSIST OF THE SPECIFICATION OF THE COEFFICIENTS (AND OFTEN OF THEIR TIME DERIVATIVES) IN THE LEGENDRE POLYNOMIAL EXPANSION OF THE SCALAR POTENTIAL WHOSE GRADIENT GIVES THE GEOMAGNETIC FIELD VECTOR. THE COEFFICIENTS ARE CHOSEN TO MAXIMIZE AGREEMENT OF THE MODEL WITH THE GEOMAGNETIC FIELD AS OBSERVED AT THE EARTH'S SURFACE OR AT SATELLITE ALTITUDES OF LESS THAN 1000 KM. THE MODELS DIFFER IN THE DATA BASE USED AND IN THE DEGREE OF THE POLYNOMIAL (RELATED TO NUMBER OF COEFFICIENTS) USED.

NSSDC ID- MG-11A

DATA SET NAME- 48 COEFFICIENT JENSEN-CAIN FIELD MODEL ON TAPE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET IS A CARD DECK STORED ON TAPE THAT CONTAINS THE COEFFICIENTS ASSOCIATED WITH THE SCHMIDT-NORMALIZED LEGENDRE POLYNOMIALS IN THE POTENTIAL EXPANSION FOR THE JENSEN-CAIN GEOMAGNETIC FIELD MODEL. THE COEFFICIENTS ARE FOR EPOCH 1960.0, AND ARE BASED ON DATA GATHERED BETWEEN 1945 AND 1962. THERE ARE 48 NONZERO COEFFICIENTS EXTENDING UP TO N=M=6. NO TIME DERIVATIVES OF THE COEFFICIENTS ARE INCLUDED. THE OBLATENESS OF THE EARTH HAS NOT BEEN CONSIDERED IN THE DETERMINATION OF THE COEFFICIENTS. COMPARED WITH MORE RECENT MODELS, THE ACCURACY OF THIS MODEL IS POOR, THEREFORE, ITS USE IS NOT RECOMMENDED WHERE ACCURACY IS IMPORTANT. A DISCUSSION OF THIS FIELD MODEL CAN BE FOUND IN JGR, VOL 67, P 3586, 1962.

NSSDC ID- MG-12A

DATA SET NAME- 99 COEFFICIENT GSFC (9/65) FIELD MODEL ON TAPE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET IS A CARD DECK STORED ON TAPE THAT CONTAINS THE COEFFICIENTS ASSOCIATED WITH THE SCHMIDT-NORMALIZED LEGENDRE POLYNOMIALS IN THE POTENTIAL EXPANSION FOR THE GSFC (9/65) GEOMAGNETIC FIELD MODEL. THE COEFFICIENTS ARE FOR EPOCH 1960.0, AND ARE BASED ON DATA GATHERED BETWEEN 1945 AND 1964. THERE ARE 99 NONZERO COEFFICIENTS EXTENDING UP TO N=M=9. FIRST TIME DERIVATIVES OF THE COEFFICIENTS ARE INCLUDED. THE OBLATENESS OF THE EARTH HAS BEEN CONSIDERED IN THE DETERMINATION OF THE COEFFICIENTS. A DISCUSSION OF THIS FIELD MODEL CAN BE FOUND IN JGR, VOL 71, P 346, 1966.

NSSDC ID- MG-13A

DATA SET NAME- 120 COEFFICIENT GSFC (12/66) FIELD MODEL ON TAPE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET IS A CARD DECK STORED ON TAPE THAT CONTAINS THE COEFFICIENTS ASSOCIATED WITH THE SCHMIDT-NORMALIZED LEGENDRE POLYNOMIALS IN THE POTENTIAL EXPANSION FOR THE GSFC (12/66) GEOMAGNETIC FIELD MODEL. THE COEFFICIENTS ARE FOR EPOCH 1960.0, AND ARE BASED ON DATA GATHERED BETWEEN 1900 AND 1966. THERE ARE 120 NONZERO COEFFICIENTS EXTENDING UP TO N=M=10. FIRST AND SECOND TIME DERIVATIVES OF THE COEFFICIENTS ARE INCLUDED. THE OBLATENESS OF THE EARTH HAS BEEN CONSIDERED IN THE DETERMINATION OF THE COEFFICIENTS. A DISCUSSION OF THIS FIELD MODEL CAN BE FOUND IN J. GEOMAG. AND GEOELECT., VOL 19, P 335, 1967.

NSSDC ID- MG-14A

DATA SET NAME- 80 COEFFICIENT IGRF 1965.0 (GEOGRAPHIC) FIEL. MODEL ON TAPE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET IS A CARD DECK STORED ON TAPE THAT CONTAINS THE COEFFICIENTS ASSOCIATED WITH THE SCHMIDT-NORMALIZED LEGENDRE POLYNOMIALS IN THE POTENTIAL EXPANSION FOR THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IGRF) GEOMAGNETIC FIELD MODEL. THE COEFFICIENTS ARE FOR EPOCH 1965.0. THERE ARE 80 NONZERO COEFFICIENTS EXTENDING UP TO N=M=8. FIRST TIME DERIVATIVES OF THE COEFFICIENTS ARE INCLUDED. THE OBLATENESS OF THE EARTH HAS BEEN CONSIDERED IN THE DETERMINATION OF THE COEFFICIENTS. A DISCUSSION OF THIS FIELD MODEL CAN BE FOUND IN JGR, VOL 74, P 4407, 1969.

NSSDC ID- MG-15A

DATA SET NAME- 80 COEFFICIENT IGRF 1965.0 (GEOMAGNETIC) FIELD MODEL ON TAPE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET IS A CARD DECK STORED ON TAPE THAT CONTAINS THE COEFFICIENTS ASSOCIATED WITH THE SCHMIDT-NORMALIZED LEGENDRE POLYNOMIALS IN THE POTENTIAL EXPANSION (IN GEOMAGNETIC DIPOLE COORDINATES) FOR THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IGRF) GEOMAGNETIC FIELD MODEL. THE COEFFICIENTS ARE FOR EPOCH 1965.0. THERE ARE 80 NONZERO COEFFICIENTS EXTENDING UP TO N=M=8. FIRST TIME DERIVATIVES OF THE COEFFICIENTS ARE INCLUDED. THE OBLATENESS OF THE EARTH HAS BEEN CONSIDERED IN THE DETERMINATION OF THE COEFFICIENTS. A DISCUSSION OF THIS FIELD MODEL CAN BE FOUND IN JGR, VOL 75, P 4372, 1970.

NSSDC ID- MG-16A

DATA SET NAME- 99 COEFFICIENT POGO (3/68) FIELD MODEL ON TAPE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET IS A CARD DECK STORED ON TAPE THAT CONTAINS THE COEFFICIENTS ASSOCIATED WITH THE SCHMIDT-NORMALIZED LEGENDRE POLYNOMIALS IN THE POTENTIAL EXPANSION FOR THE POGO (3/68) GEOMAGNETIC FIELD MODEL. THE COEFFICIENTS ARE FOR EPOCH 1960.0, AND ARE BASED ON POLAR ORBITING GEOPHYSICAL OBSERVATORY (POGO) SATELLITE DATA. THERE ARE 99 NONZERO COEFFICIENTS EXTENDING UP TO N=M=9. FIRST TIME DERIVATIVES OF THE COEFFICIENTS ARE INCLUDED. THE OBLATENESS OF THE EARTH HAS BEEN CONSIDERED IN THE DETERMINATION OF THE COEFFICIENTS. LATER POGO MODELS (10/68 AND 8/69) ARE ALSO AVAILABLE FROM NSSDC.

NSSDC ID- MG-17A

DATA SET NAME- 143 COEFFICIENT POGO (10/68) FIELD MODEL ON TAPE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET IS A CARD DECK STORED ON TAPE THAT CONTAINS THE COEFFICIENTS ASSOCIATED WITH THE SCHMIDT-NORMALIZED LEGENDRE POLYNOMIALS IN THE POTENTIAL EXPANSION FOR THE POGO (10/68) GEOMAGNETIC FIELD MODEL. THE COEFFICIENTS ARE FOR EPOCH 1960.0, AND ARE BASED ON POLAR ORBITING GEOPHYSICAL OBSERVATORY (POGO) SATELLITE DATA. THERE ARE 143 NONZERO COEFFICIENTS EXTENDING UP TO N=M=11. FIRST TIME DERIVATIVES OF THE COEFFICIENTS ARE INCLUDED. THE OBLATENESS OF THE EARTH HAS BEEN CONSIDERED IN THE DETERMINATION OF THE COEFFICIENTS. A LATER POGO MODEL (8/69) IS ALSO AVAILABLE FROM NSSDC.

NSSDC ID- MG-18A

DATA SET NAME- 120 COEFFICIENT POGO (8/69) FIELD MODEL ON TAPE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET IS A CARD DECK STORED ON TAPE THAT CONTAINS THE COEFFICIENTS ASSOCIATED WITH THE SCHMIDT-NORMALIZED LEGENDRE POLYNOMIALS IN THE POTENTIAL EXPANSION FOR THE POGO (8/69) GEOMAGNETIC FIELD MODEL. THE COEFFICIENTS ARE FOR EPOCH 1960.0, AND ARE BASED ON POLAR ORBITING GEOPHYSICAL OBSERVATORY (POGO) SATELLITE DATA GATHERED BETWEEN 1965.7 AND 1968.4. THERE ARE 120 NONZERO COEFFICIENTS EXTENDING UP TO N=M=10. FIRST TIME DERIVATIVES OF THE COEFFICIENTS ARE INCLUDED. THE OBLATENESS OF THE EARTH HAS BEEN CONSIDERED IN THE DETERMINATION OF THE COEFFICIENTS. A DISCUSSION OF THIS FIELD MODEL CAN BE FOUND IN JGR, VOL 75, P 4360, 1970.

NSSDC ID- MG-19A

DATA SET NAME- 120 COEFFICIENT POGO (8/71) FIELD MODEL ON TAPE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF CARD IMAGES STORED ON TAPE CONTAINING COEFFICIENTS ASSOCIATED WITH THE SCHMIDT-NORMALIZED LEGENDRE POLYNOMIALS IN THE POTENTIAL EXPANSION OF THE POGO (8/71) GEOMAGNETIC FIELD MODEL. THE COEFFICIENTS ARE FOR EPOCH 1960.0, AND ARE BASED ON POGO SATELLITE DATA COLLECTED FROM DECEMBER 1965 TO MARCH 1970. THE SELECTED DATA INCLUDE PERIODS WITH KP LESS THAN OR EQUAL TO 1 WHEN NO DISTURBANCES WERE PRESENT. THERE ARE 120 COEFFICIENTS EXTENDING TO N=M=10. FIRST TIME DERIVATIVES OF THE COEFFICIENTS ARE INCLUDED. THE OBLATENESS OF THE EARTH WAS CONSIDERED IN DETERMINATION OF THE COEFFICIENTS. THIS MODEL IS DISCUSSED IN JGR, VOL 79, P 2363, 1974.

NSSDC ID- PG-1

DATA TYPE NAME- PACKAGES TO CALCULATE THE GEOMAGNETIC FIELD FROM INTERNAL SOURCES

THIS DATA TYPE INCLUDES COMPUTER PROGRAMS THAT CAN BE USED TO CALCULATE THE GEOMAGNETIC FIELD OR OTHER FIELD PARAMETERS, SUCH AS MCILWAIN'S "L" SHELL, AT GIVEN POINTS IN SPACE. THESE PROGRAMS ARE GIVEN COEFFICIENTS THAT DEFINE SPECIFIC FIELD MODELS AND USE THEM IN EXPANSIONS THAT ARE USED TO CALCULATE FIELD VALUES. MOST OF THE PROGRAMS USE SPHERICAL HARMONIC EXPANSIONS. WHERE A PROGRAM IS USED TO EVALUATE ONLY ONE SPECIFIC FIELD MODEL AND IS THE PRIMARY SOURCE FOR THAT FIELD MODEL, IT IS INCLUDED UNDER "INTERNAL SOURCE GEOMAGNETIC FIELD MODELS" (MG-1) OR "EXTERNAL SOURCE GEOMAGNETIC FIELD MODELS" (MG-2).

NSSDC ID- PG-11A

DATA SET NAME- FIELD/FIELDG PACKAGE TO CALCULATE THE MAIN GEOMAGNETIC FIELD

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THE FIELD/FIELDG PACKAGE WAS GENERATED BY DR. J. C. CAIN AT GSFC. SUBROUTINE FIELDG INITIALIZES CONSTANTS, READS COEFFICIENTS, AND EXECUTES TRANSFORMATIONS BETWEEN GEODETIC COORDINATES AND GEOCENTRIC COORDINATES. THE NUMBER OF COEFFICIENTS USED IN THE COMPUTATION IS AN INPUT PARAMETER TO FIELD. SUBROUTINE FIELD, WHICH MAY BE CALLED BY FIELDG, COMPUTES THE GEOMAGNETIC FIELD VECTOR AND ITS MAGNITUDE FOR A SPECIFIED SPATIAL POINT AND TIME. THERE ARE TWO VERSIONS OF FIELD -- ONE EXECUTES FASTER, AND THE OTHER REQUIRES LESS STORAGE. SUBROUTINE CONVRT CAN BE USED TO CONVERT GAUSS-NORMALIZED COEFFICIENTS TO SCHMIDT-NORMALIZED COEFFICIENTS, THE FORMER BEING USED INTERNALLY FOR COMPUTATIONS. COEFFICIENT CARD DECKS FOR THE GSFC (12/66), IGRF 1965.0, AND POGO (8/69) GEOMAGNETIC FIELD MODELS ARE SENT WITH THE FIELDG PACKAGE TO REQUESTERS. THE FULL PACKAGE CONSISTS OF 542 CARDS. THE SUBROUTINES IN THE FIELDG PACKAGE ARE WRITTEN IN FORTRAN IV AND AVAILABLE IN IBM 7094 AND 360 COMPATIBLE CARD DECKS. THIS PACKAGE IS DESCRIBED IN "COMPUTATION OF THE MAIN GEOMAGNETIC FIELD FROM SPHERICAL HARMONIC EXPANSIONS." DATA USERS NOTE, NSSDC 68-11.

NSSDC ID- PG-12A

DATA SET NAME- THE ALLMAG PACKAGE TO CALCULATE THE GEOMAGNETIC FIELD

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THE ALLMAG PACKAGE, GENERATED BY MR. E. G. STASSINOPOULOS AND DR. G. D. MEAD OF GSFC, CONDENSES SEVEN SELECTED INTERNAL SOURCE FIELD MODELS INTO ONE OPERATIONAL ASSEMBLY, PERMITTING SUCCESSIVE SELECTION OF MODELS AND TIME PERIODS DURING EXECUTION OF A SINGLE PROGRAM. THE MODELS INCLUDED ARE THE GSFC 9/65 MODEL OF HENDRICKS AND CAIN, THE GSFC 12/66 MODEL OF CAIN, ET AL., THE POGO 11/68 MODEL OF CAIN AND LANGEL, THE POGO 8/69 MODEL OF CAIN AND SWEENEY, THE IGRF 1965.0 MODEL, THE LEATON, MALIN, EVANS 1965 MODEL, AND THE US COAST AND GEODETIC SURVEY MODEL OF HURWITZ. GOALMAG CAN BE USED FOR INPUT AND OUTPUT IN GEODETIC COORDINATES. BOTH 029 AND 026 PUNCH VERSIONS ARE AVAILABLE. THE 029 VERSION HAS

BEEN USED EXTENSIVELY ON IBM 360 COMPUTERS. THE 026 VERSION HAS BEEN TESTED ON CDC 6600 AND UNIVAC 1108 COMPUTERS. THERE ARE TWO VERSIONS OF ALLMAG, ONE EXECUTING THREE TIMES FASTER THAN THE OTHER BUT REQUIRING MORE CORE.

NSSDC ID- PG-12B

DATA SET NAME- THE LINTRA PACKAGE FOR TRACING GEOMAGNETIC FIELD LINES

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

A GEOMAGNETIC FIELD-LINE TRACING AND CONJUGATE-INTERSECT CALCULATION ROUTINE. LINTRA, GENERATED BY MR. E. G. STASSINOPOULOS OF NSSDC, CAN BE USED TO TRACE A FIELD LINE PASSING THROUGH ANY GIVEN POINT ON OR ABOVE THE EARTH'S SURFACE TO ITS CONJUGATE INTERSECT OR THE INTERSECT WITH A SPECIFIED ALTITUDE LEVEL. LINTRA CAN USE ANY OF THE FIELD MODELS INCLUDED IN ALLMAG. THE PROGRAM WAS DESIGNED WITH THE INTENTION OF FOLLOWING THE PATH OF A LINE OF FORCE THAT STARTS FROM A SELECTED POSITION AND MOVES IN A DIRECTION THAT LEADS TOWARD THE OPPOSITE GEOMAGNETIC HEMISPHERE. THE GEOCENTRIC COORDINATES OF THE INTERSECTS, WITH THE FIELD STRENGTH AND THE FIELD VECTOR COMPONENTS AT THESE LOCATIONS, ARE CALCULATED BY LINTRA. THE METHOD USED IN THESE CALCULATIONS IS DESCRIBED IN THE NASA-GSFC DOCUMENT, "COMPUTER CODES FOR GEOMAGNETIC FIELD LINE TRACING AND CONJUGATE INTERSECT PROGRAM," X-642-68-429, NOVEMBER 1968. THE LINTRA CODE WAS WRITTEN IN FORTRAN IV, THE CARD DECKS ARE AVAILABLE FOR USE ON AN IBM 360/91, AND LINTRA IS INCLUDED IN THE ALLMAG (DATA SET PG-12A) PACKAGE. AN 026 VERSION IS ALSO AVAILABLE.

NSSDC ID- PG-13A

DATA SET NAME- PACKAGE TO CALCULATE B AND L FROM INTERNAL SOURCES

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THE FELD/SHELL PACKAGE AND THE INTEL PACKAGE WERE GENERATED PRINCIPALLY BY DR. G. KLUGE OF ESRO/ESOC. THE PACKAGES ACCEPT AS INPUT GEOCENTRIC CARTESIAN OR GEODETIC POLAR COORDINATES. THE FELD ROUTINE ALLOWS CALCULATION OF THE FIELD THROUGH THE USE OF COEFFICIENTS STORED BY A BLOCK DATA SUBPROGRAM. A ROUTINE IS PROVIDED THAT ALLOWS GENERATION OF THIS SUBPROGRAM USING ANY MODEL GIVEN IN "INTERNAL SOURCE FIELD MODELS" (DATA TYPE NG-1) FOR AN ARBITRARY EPOCH. THE SHELL PACKAGE CALCULATES MCILWAIN'S "L" PARAMETER USING A COORDINATE SYSTEM IN WHICH TWO OF THE INDEPENDENT VARIABLES ARE CONSTANT ALONG DIPOLE FIELD LINES. THE LIMITED VARIATION OF THESE VARIABLES ALONG REAL FIELD LINES LEADS TO A REDUCED NUMBER OF CALLS FROM SHELL TO FELD. INTEL PERFORMS THE "L" CALCULATION IN THIS SAME COORDINATE SYSTEM USING AN INTERPOLATION TECHNIQUE WITH A CONDENSED DATA TABLE. INTEL CALLS FELD FOR THE REQUIRED "B" COMPUTATION. "L" TABLES FOR INTEL ARE AVAILABLE ONLY FOR THE IGRF 1965, GSFC (12/66) AND POGO (10/68) MODELS. EXECUTION TIMES OF INVAR, SHELL, AND INTEL UNDER IDENTICAL CONDITIONS ARE IN THE RATIO OF 70 MSEC, 46 MSEC AND 12 MSEC PER CALL USING AN IBM 360/75 COMPUTER.

NSSDC ID- PG-14A

DATA SET NAME- IGRF/SPHRC PACKAGE FOR GEOMAGNETIC FIELD CALCULATIONS USING THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD 1965

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THE IGRF/SPHRC SUBROUTINE PACKAGE, GENERATED PRINCIPALLY BY DR. J. C. CAIN OF GSFC, PROVIDES THE CAPABILITY OF EVALUATING THE IGRF 1965.0 GEOMAGNETIC FIELD (DATA SET NG-14A) WITH A HIGH DEGREE OF EFFICIENCY. SUBROUTINE IGRF INITIALIZES COEFFICIENTS AND EXECUTES TRANSFORMATIONS BETWEEN INPUT AND OUTPUT GEODETIC COORDINATES AND INTERNALLY USED GEOCENTRIC COORDINATES. THE NUMBER OF COEFFICIENTS USED CAN BE VARIED, IF NEEDED, TO SPEED UP CALCULATIONS. THE FIELD IS CALCULATED IN SPHRC, CALLED BY IGRF, IN GEOCENTRIC COORDINATES. THE SUBROUTINES IN THE IGRF/SPHRC PACKAGE ARE WRITTEN IN FORTRAN IV AND AVAILABLE IN IBM 360 COMPATIBLE CARD DECKS. AN 026 VERSION IS ALSO AVAILABLE.

NSSDC ID- PG-16A

DATA SET NAME- MCILWAIN'S INVAR PACKAGE FOR B AND L CALCULATIONS

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THE INVAR PACKAGE, GENERATED BY PROF. C. E. MCILWAIN OF THE UNIVERSITY OF CALIFORNIA AT SAN DIEGO, CAN BE USED TO COMPUTE VALUES OF "B" AND "L" AT ANY DESIRED SPATIAL POINT (SPECIFIED IN GEOCENTRIC SPHERICAL POLAR COORDINATES) WITH A SPECIFIED ACCURACY, WITHIN LIMITS. SUBROUTINE INVAR CONTROLS THE OVERALL EXECUTION OF THE PROGRAM. SUBROUTINE NEWMAG (REPLACING THE EARLIER SUBROUTINE MAGNET) COMPUTES THE MAGNETIC FIELD VECTOR AT A SPECIFIED SPATIAL POINT. THIS SUBROUTINE IS CALLED EXTENSIVELY BY SUBROUTINES START AND LINES. FOR A SPECIFIED SPATIAL POINT, SUBROUTINE START FINDS TWO ADDITIONAL SPATIAL POINTS ON THE SAME FIELD LINE, AND SUBROUTINE LINES FINDS ADDITIONAL POINTS ON THAT FIELD LINE. THESE POINTS EXTEND ESSENTIALLY FROM THE POINT OF INTEREST TO ITS CONJUGATE POINT. THE INPUT ACCURACY PARAMETER CONTROLS THE NUMBER OF POINTS (UP TO A MAXIMUM OF 200). SUBROUTINE INTEG DETERMINES THE VALUE OF THE INTEGRAL INVARIANT, "I", FOR THE SPECIFIED POINT OF INTEREST BY NUMERICALLY INTEGRATING AT THE POINTS CHOSEN BY START AND LINES. FINALLY, SUBROUTINE CARMEL COMPUTES THE SHELL PARAMETER, "L", FROM THE INTEGRAL INVARIANT, "I", AND FROM "B". NSSDC HAS AVAILABLE FOR DISTRIBUTION IBM 7094 AND 360 COMPATIBLE CODE DECKS IN FORTRAN IV FOR THIS PACKAGE. USING AN IBM 7094, COMPUTATION TIME FOR ONE VALUE OF "L" IS SEVERAL HUNDRED MILLISECONDS. FOR A DISCUSSION OF "B" AND "L", SEE JGR, VOL 66, P 3681, 1951.

NSSDC ID- PG-17A

DATA SET NAME- TSFORM/DIPFLD GEOMAGNETIC FIELD PACKAGE

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

TSFORM AND DIPFLD SUBROUTINES, GENERATED BY DR. G. D. HEAD OF GSFC, CAN BE USED TO MEET THE REQUIREMENTS OF THOSE INVESTIGATORS PERFORMING STUDIES IN WHICH THE USE OF GEOMAGNETIC DIPOLE COORDINATES IS CONVENIENT. SUBROUTINE TSFORM EFFECTS TRANSFORMATIONS BETWEEN GEOGRAPHIC AND GEOMAGNETIC DIPOLE COORDINATES FOR EITHER POSITIONS OR VECTOR COMPONENTS. SUBROUTINE DIPFLD COMPUTES THE VECTOR MAGNETIC FIELD AT ANY SPATIAL POINT, SPECIFIED IN GEOMAGNETIC DIPOLE COORDINATES, USING COEFFICIENTS FOR THE IGRF 1965.0 GEOMAGNETIC FIELD MODEL APPROPRIATE TO THOSE COORDINATES. (SEE JGR, VOL 75, P 4372, 1970, FOR A DISCUSSION OF THIS MODEL.) NSSDC HAS A DECK OF THESE COEFFICIENTS. THUS, USED AS A PACKAGE, THESE SUBROUTINES ACCEPT AN INPUT POSITION GIVEN IN GEOGRAPHIC OR GEOMAGNETIC COORDINATES AND RETURN VECTOR MAGNETIC FIELD COMPONENTS IN GEOGRAPHIC OR GEOMAGNETIC COORDINATES. NSSDC HAS A FORTRAN IV IBM 7094 PROGRAM DECK AVAILABLE FOR DISTRIBUTION.

NSSDC ID- PG-19A

DATA SET NAME- INVARA PACKAGE FOR THE CALCULATION OF B AND L FROM INTERNAL SOURCE FIELDS

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

INVARA IS A VERSION OF MCILWAIN'S INVAR THAT HAS BEEN ADAPTED FOR USE WITH ALLMAG (DATA SET PG-12A). THE OPERATION OF INVARA IS THE SAME AS INVAR EXCEPT THAT MORE FLEXIBILITY IN FIELD MODEL SELECTION IS AVAILABLE.

NSSDC ID- PG-2

DATA TYPE NAME- STUDIES THAT SUMMARIZE AND COMPARE THE USE OF SEVERAL GEOMAGNETIC FIELD PACKAGES

REPORTS DESCRIBING STUDIES WHICH COMPARE AND SUMMARIZE GEOMAGNETIC FIELD PROGRAMS ARE INCLUDED TO PROVIDE INFORMATION THAT WILL HELP IN DECIDING THE BEST ROUTINE FOR A PARTICULAR APPLICATION. THESE STUDIES PROVIDE BOTH LISTS OF ROUTINES, THEIR SPECIFIC PURPOSES, AND THE COST OF USING THEM IN TERMS OF CORE AND SPEED.

NSSDC ID- PG-21A

DATA SET NAME- MAGNETIC SHELL PARAMETER CALCULATIONS

QUANTITY OF DATA- 1 CARD(S) OF B/W MICROFICHE

THIS REPORT DESCRIBES A STUDY COMPARING THE ESRO/ESCC ROUTINES FELDG, INTELG, AND SHELLG (DATA SET PG-12A) WITH FIELD/FIELDG AND INVAR (DATA SETS PG-11A AND PG-16A). THE AVERAGE SHELLG, INTELG AND INVAR EXECUTION TIMES WERE 46, 12, AND 70 MILLISECONDS PER CALL. QUESTIONS REGARDING ACCURACY WERE POINTED OUT WHERE DISCONTINUITIES IN THE INVAR 'L' VALUES WERE SEEN.

NSSDC ID- PI-1

DATA TYPE NAME- PACKAGE FOR REDUCTION OF GROUND-BASED IONOGRAM SCALED VALUES TO ELECTRON DENSITY - GEOMETRIC HEIGHT PROFILES

IONOSONDES ARE RADIO RANGING EQUIPMENT WHICH COMMONLY PRODUCE IONOGRAMS -- A GRAPH OF RADIO SIGNAL ROUND-TRIP TRAVEL TIME VS RADIO FREQUENCY FOR EACH FREQUENCY TRANSMITTED. THE REFLECTING REGION RETURNS THE SIGNAL FOR REASONS RELATING TO THE DENSITY OF FREE ELECTRONS THERE. SINCE THE TRAVEL OF THE SIGNAL IS SLOWED IN THE REGION WHERE FREE ELECTRONS EXIST, THE TRAVEL TIME IN TERMS OF HEIGHT MUST BE INTERPRETED ACCORDINGLY. THESE PROGRAMS WILL CONVERT THE TRAVEL TIME VS FREQUENCY DATA RECORDED ON AN IONOGRAM INTO GEOMETRIC HEIGHT AND ELECTRON DENSITY. HEIGHT PROFILES OF ELECTRON DENSITY BELOW THE F2 MAXIMUM ARE THUS COMPUTED FROM A NUMBER OF REPRESENTATIVE POINTS.

NSSDC ID- PI-11A

DATA SET NAME- JACKSON'S PACKAGE FOR GROUND-BASED IONOGRAM REDUCTION

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS REDUCTION PACKAGE, DEVELOPED BY J. E. JACKSON AT GSFC, IS ONE OF SEVERAL BASIC PROGRAMS THAT HAVE BEEN USED FOR THE REDUCTION OF GROUND-BASED IONOSONDE OBSERVATIONS TO ELECTRON DENSITY PROFILES. THE PROGRAM REQUIRES A NUMBER OF VIRTUAL RANGE VS FREQUENCY INPUTS (ORDINARILY 15 TO 20) FROM THE IONOGRAM O- AND X-TRACES, AS WELL AS THE TIME OF OBSERVATION AND THE SOUNDER LOCATION. A MAGNETIC FIELD MODEL, CONTRIBUTED BY DR. J. C. CAIN, IS CALLED BY AND PROVIDED WITH THE PROGRAM. THIS FIELD MODEL COMPUTES THE FIELD VALUES NECESSARY FOR THE REDUCTION. THE ELECTRON DENSITY VS TRUE HEIGHT IS COMPUTED FROM THE O-TRACE VALUES. THE X-TRACE IS THEN COMPUTED FROM THIS REDUCTION FOR VARIOUS STARTING DENSITIES (AND E-VALLEYS FOR DAYTIME DATA). THE RESULTS ARE COMPARED WITH THE X-TRACE INPUT DATA BY COMPUTING DIFFERENCES AND STANDARD DEVIATIONS. THE MOST INTERNALLY CONSISTENT PROFILE CAN BE SELECTED BY REVIEWING THESE STATISTICS. AN INTERPOLATION PROGRAM PROVIDES VALUES OF ELECTRON DENSITY, AT 10-KM INTERVALS OF TRUE HEIGHT, FOR PROFILE POINTS ABOVE THE E-VALLEY. THIS PROGRAM ALSO PROVIDES INTERPOLATED VALUES OF TRUE HEIGHT AT SELECTED ELECTRON DENSITIES. THE OUTPUT FOR EACH COMPUTATION ALSO INCLUDES PARABOLIC EXTRAPOLATION OF THE PROFILE UP TO THE F2 MAXIMUM. THIS REDUCTION PROGRAM USES THE PARABOLIC-IN-LOG (N) LAMINATION PROCEDURE AND ASSUMES VERTICAL PROPAGATION. THE PROGRAM WAS WRITTEN IN FORTRAN IV AND CAN OPERATE ON AN IBM 360/75 OR 360/91. MORE COMPLETE BACKGROUND MATERIAL CAN BE FOUND IN A NASA-GSFC DOCUMENT (X-625-71-186) BY J. E. JACKSON AND IN RADIO SCIENCE, VOL 2, P 10, OCT. 1967.

NSSDC ID- PI-2

DATA TYPE NAME- PACKAGE FOR REDUCTION OF SATELLITE-BORNE IONOGRAM SCALED VALUES TO ELECTRON DENSITY - - GEOMETRIC HEIGHT PROFILES

IONOSONDES ARE RADIO RANGING EQUIPMENT WHICH COMMONLY PRODUCE IONOGRAMS — A GRAPH OF RADIO SIGNAL ROUND-TRIP TRAVEL TIME VS RADIO FREQUENCY FOR EACH FREQUENCY TRANSMITTED. THIS REFLECTING REGION RETURNS THE SIGNAL FOR REASONS RELATED TO THE DENSITY OF THE FREE ELECTRONS IN THAT REGION. SINCE THE TRAVEL OF THE SIGNAL IS SLOWED IN THE REGION WHERE FREE ELECTRONS EXIST, THE TRAVEL TIME IN TERMS OF GEOMETRIC DISTANCE MUST BE INTERPRETED ACCORDINGLY. THESE PROGRAMS WILL CONVERT FREQUENCY AND TRAVEL TIME RECORDED ON A SATELLITE-BORNE IONOGRAM INTO GEOMETRIC DISTANCE FROM THE SATELLITE SOUNDER AND ELECTRON DENSITY. SPACECRAFT POSITION IS ALSO REQUIRED SO THAT THE RESULTING PROFILE DISTANCE SCALE CAN BE CONVERTED TO ALTITUDE ABOVE THE GROUND. HEIGHT PROFILES OF ELECTRON DENSITY ABOVE THE F2 MAXIMUM ARE THUS COMPUTED FROM A NUMBER OF REPRESENTATIVE POINTS.

NSSDC ID- PI-21A

DATA SET NAME- JACKSON'S PACKAGE FOR SATELLITE-BORNE IONOGRAM REDUCTION, SHORT VERSION

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS REDUCTION PACKAGE FOR TOPSIDE IONOGRAMS WAS DEVELOPED BY J. E. JACKSON AND IS QUITE SIMILAR TO THE PROGRAM USED FOR THE REDUCTION OF GROUND-BASED IONOSPHERIC SOUNDINGS. THE PROGRAM REQUIRES A NUMBER OF VIRTUAL RANGE VS FREQUENCY INPUTS (ORDINARILY 10 TO 20) FROM THE TOPSIDE IONOGRAM X-TRACE, AS WELL AS THE TIME OF OBSERVATION AND THE SATELLITE LOCATION (USUALLY OBTAINED FROM EPHEMERIS DATA). A MAGNETIC FIELD MODEL, CONTRIBUTED BY DR. J. C. CAIN, IS CALLED BY AND PROVIDED WITH THE BASIC PROGRAM. THIS FIELD MODEL COMPUTES THE FIELD VALUES NECESSARY FOR THE REDUCTION. THE OUTPUT PARAMETERS ARE VALUES OF ELECTRON DENSITY AND TRUE HEIGHT FOR EACH PAIR OF INPUT VALUES. AN INTERPOLATION SUBPROGRAM PROVIDES VALUES OF ELECTRON DENSITY AT 50-KM INTERVALS OF TRUE HEIGHT AND VALUES OF TRUE HEIGHT AT SELECTED ELECTRON DENSITIES. THE REDUCTION PROGRAM USES THE PARABOLIC-IN-LOG (N) LAMINATION PROCEDURE AND ASSUMES VERTICAL SIGNAL PROPAGATION. THIS PROGRAM WAS WRITTEN IN FORTRAN IV AND WILL OPERATE ON AN IBM 360/75 OR 360/91. A MORE COMPLETE DESCRIPTION OF THIS PROGRAM IS GIVEN IN IEEE PROCEEDINGS, VOL 57, NO. 6, PP 960-976, 1969.

NSSDC ID- PI-21B

DATA SET NAME- JACKSON'S PACKAGE FOR SATELLITE-BORNE IONOGRAM REDUCTION, LONG VERSION

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS REDUCTION PACKAGE FOR TOPSIDE IONOGRAMS WAS DEVELOPED BY J. E. JACKSON AND IS QUITE SIMILAR TO THE PROGRAM USED FOR THE REDUCTION OF GROUND-BASED IONOSPHERIC SOUNDINGS. THE PROGRAM REQUIRES A NUMBER OF VIRTUAL RANGE VS FREQUENCY INPUTS (ORDINARILY 10 TO 20) FROM THE TOPSIDE IONOGRAM X-TRACE, AS WELL AS THE TIME OF OBSERVATION AND THE SATELLITE LOCATION (USUALLY OBTAINED FROM EPHEMERIS DATA). A MAGNETIC FIELD MODEL, CONTRIBUTED BY DR. J. C. CAIN, IS CALLED BY AND PROVIDED WITH THE BASIC PROGRAM. THIS FIELD MODEL COMPUTES THE FIELD VALUES NECESSARY FOR THE REDUCTION. THE OUTPUT PARAMETERS ARE VALUES OF ELECTRON DENSITY AND TRUE HEIGHT FOR EACH PAIR OF INPUT VALUES. AN INTERPOLATION SUBPROGRAM PROVIDES VALUES OF ELECTRON DENSITY AT 50-KM INTERVALS OF TRUE HEIGHT AND VALUES OF TRUE HEIGHT AT SELECTED ELECTRON DENSITIES. THE REDUCTION PROGRAM USES THE PARABOLIC-IN-LOG (N) LAMINATION PROCEDURE AND ASSUMES VERTICAL SIGNAL PROPAGATION. THE PROGRAM CAN, IF DESIRED, MAKE ALLOWANCE FOR SATELLITE MOTION. THIS OPTION REQUIRES AS ADDITIONAL INPUT THAT WORLD MAP DATA (ALTITUDE, LATITUDE AND LONGITUDE) BE PROVIDED FOR THE 4 VALUES OF WORLD MAP TIMES NEAREST TO THE IONOGRAM TIME. THE IONOGRAM REDUCTION CAN ALSO BE DONE WHEN THE LOW FREQUENCY END OF THE X-TRACE IS MISSING (UNKNOWN FXS) WITH OR WITHOUT ALLOWANCE FOR SATELLITE MOTION. IF FXS IS KNOWN, AND ALLOWANCE FOR SATELLITE MOTION IS NOT DESIRED, THE PI-21B PROGRAM BECOMES EQUIVALENT TO THE PI-21A PROGRAM. THIS PROGRAM WAS WRITTEN IN FORTRAN IV AND WILL OPERATE ON AN IBM 360/75 OR 360/91. A MORE COMPLETE DESCRIPTION OF THIS PROGRAM IS GIVEN IN IEEE PROCEEDINGS, VOL 57, NO. 6, PP 960-976, 1969.

NSSDC ID- PI-3

DATA TYPE NAME- PROGRAMS FOR DATA FROM IONOSPHERIC BEACONS

PROGRAMS IN THIS GROUP WILL INCLUDE ANY WHICH MAY BE USED IN CALCULATIONS RELATING TO USE OF RADIO BEACONS IN SCIENTIFIC STUDIES OF THE IONOSPHERE. COMPUTATION OF TOTAL ELECTRON CONTENT FROM KNOWLEDGE OF THE NUMBER OF FARADAY ROTATIONS OF A POLARIZED SATELLITE SIGNAL IS PROBABLY THE MOST COMMON USE OF BEACONS MADE FOR THIS PURPOSE.

NSSDC ID- PI-31A

DATA SET NAME- H-FACTOR CALCULATION PROGRAM -- 'HFACT'

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

H-FACTOR IS A QUANTITY REQUIRED TO COMPUTE TOTAL ELECTRON CONTENT USING FARADAY ROTATION OBSERVATIONS OF A POLARIZED RADIO SIGNAL FROM A SATELLITE. IT IS THE MAGNETIC FIELD EFFECT ON THE ROTATION, AND IS RELATED TO THE GEOGRAPHIC FACTORS OF HEIGHT, LATITUDE, AND LONGITUDE. SINCE MOST OF THE ROTATION OCCURS IN THE REGION OF THE F2 MAXIMUM, H-FACTOR IS NOT VARIED ALONG THE ENTIRE PROPAGATION PATH, BUT IS CALCULATED AND USED FOR A VALUE OF F2 HEIGHT WHICH IS KNOWN TO BE REASONABLE FOR THE LOCATION, TIME, AND SEASON. OUTPUT PROVIDES H-FACTOR (AND OTHER DATA OF INTEREST) FOR VARIOUS LATITUDES ALONG A SELECTED LONGITUDE FOR A GIVEN OBSERVING STATION LOCATION, SATELLITE ALTITUDE, AND ASSUMED HEIGHT OF IONOSPHERIC MAXIMUM. THIS PROGRAM IS CONTAINED AND DISCUSSED IN "H FACTOR CALCULATION USING THE GENERALIZED FIELD PROGRAM FOR IONOSPHERIC APPLICATIONS," NSSDC 70-13.

Satellite Data Sets

2.3 SATELLITE DATA SETS

For explanation see section 2.1.2.

SPACECRAFT COMMON NAME- 1972-032A

ALTERNATE NAMES- 06003, SESP 71-3

NSSDC ID- 72-032A

LAUNCH DATE- 04/19/72 WEIGHT- KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/09/72

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- / /
ORBIT PERIOD- 88.8 MIN INCLINATION- 81.5 DEG
PERIAPSIS- 155. KM ALT APOAPSIS- 277. KM ALT

THIS SPACECRAFT CONTAINED TWO KNOWN EXPERIMENTS, A NEUTRAL DENSITY GAUGE AND NIGHTGLOW PHOTOMETERS. LITTLE INFORMATION IS AVAILABLE ON THE SPACECRAFT, BUT ORBIT ADJUSTMENTS (PRESUMABLY BY FIRING AN ONBOARD MOTOR) WERE MADE TO EXTEND THE SATELLITE LIFETIME. THREE-AXIS STABILIZATION WAS REQUIRED TO KEEP THE DENSITY GAUGE APERTURE PERPENDICULAR TO THE VELOCITY VECTOR.

CARTER, 1972-032A

EXPERIMENT NAME- NEUTRAL DENSITY (MAGNETRON) GAUGE

NSSDC ID- 72-032A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/10/72

PERSONNEL
PI - V.L. CARTER ..... TANDEN PRODUCTIONS
LOS ANGELES, CA

THE OBJECTIVE OF THIS EXPERIMENT WAS TO SIGNIFICANTLY INCREASE THE AMOUNT OF NEUTRAL DENSITY DATA AVAILABLE, OVER A WIDE RANGE OF POSITIONS AND TIMES -- ALSO OVER A RANGE IN VARIATION/ACTIVITY OF THE SUN, AURORA, GEOMAGNETIC FIELD, AND PARTICLE FLUX. NOON-MIDNIGHT OBSERVATIONS WERE TAKEN DURING THE SPRING. OBSERVATIONS WERE MADE WITH A REDHEAD (MAGNETRON) GAUGE, WHICH MEASURES ION CURRENT TO A COLLECTOR, AFTER INCOMING PARTICLES HAVE BEEN IONIZED JUST INSIDE THE ENTRANCE APERTURE. DETAILS OF INSTRUMENT STRUCTURE AND CALIBRATION ARE IN CHING, ET AL, "UPPER ATMOSPHERIC DENSITY INFERRED FROM MAGNETRON DATA FROM THE SATELLITE 1972-032A." THIS PUBLICATION ALSO CONTAINS DATA SET A FOR THIS EXPERIMENT. IT WAS INTENDED TO LINK DENSITY VARIATIONS WITH VARIOUS OTHER PARAMETERS TO FIND WAYS OF IMPROVING DENSITY PREDICTIONS.

DATA SET NAME- DENSITY OBSERVATIONS FROM 160 TO 300 KM
NEAR NOON + MIDNIGHT IN APR + MAY, 1972

NSSDC ID- 72-032A-01A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 04/21/72 TO 05/09/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 BOOK(S) OR BOUND VOLUME(S)

THESE ARE REDUCED DATA PREPARED BY THE EXPERIMENTER. THE DATA ARE PUBLISHED AS PLOTS IN TWO FORMS -- DENSITY VS. UT, AND DENSITY VS. ALTITUDE (ON THE ALTITUDE PLOTS, POSTPERIGEE DATA ARE PLOTTED ONE DECADE BELOW THE CORRECT SCALE, TO AVOID OVERLAP OF THE PLOTS). JACCHIA -71 MODEL DENSITIES ARE INCLUDED ON THE PLOTS FOR COMPARISON. DATA ARE AVAILABLE DURING SOME PART OF ABOUT 90 ORBITS. DETAILS OF DATA REDUCTION ARE INCLUDED IN THE DOCUMENT BY CHING, PALMER, AND CARTER, "UPPER ATMOSPHERIC DENSITY INFERRED FROM THE SATELLITE 1972-32A."

SPACECRAFT COMMON NAME- AE-A

ALTERNATE NAMES- EXPLORER 17, S 6
ATMOSPHERE EXPLORER-A, 00564

NSSDC ID- 63-009A

LAUNCH DATE- 04/03/63 WEIGHT- 184. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/10/63

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 04/03/63
ORBIT PERIOD- 96.39 MIN INCLINATION- 57.626 DEG
PERIAPSIS- 255.000 KM ALT APOAPSIS- 916.000 KM ALT

EXPLORER 17 WAS A SPIN-STABILIZED SPHERE 0.95 M IN DIAMETER. THE SPACECRAFT WAS VACUUM SEALED IN ORDER TO PREVENT CONTAMINATION OF THE LOCAL ATMOSPHERE. EXPLORER 17 CARRIED FOUR PRESSURE GAUGES FOR THE MEASUREMENT OF TOTAL NEUTRAL PARTICLE DENSITY, TWO MASS SPECTROMETERS FOR THE MEASUREMENT OF CERTAIN NEUTRAL PARTICLE CONCENTRATIONS, AND TWO ELECTROSTATIC PROBES FOR ION CONCENTRATION AND ELECTRON TEMPERATURE MEASUREMENTS. BATTERY POWER FAILED ON JULY 10, 1963. THREE OF THE FOUR PRESSURE GAUGES AND BOTH ELECTROSTATIC PROBES OPERATED NORMALLY. ONE SPECTROMETER MALFUNCTIONED, AND THE OTHER OPERATED INTERMITTENTLY.

BRACE, AE-A

EXPERIMENT NAME- LANGMUIR PROBES

NSSDC ID- 63-009A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/10/63

PERSONNEL
PI - L.H. BRACE ..... NASA-GSFC
GREENBELT, MD
OI - N.W. SPENCER ..... NASA-GSFC
GREENBELT, MD

THE EXPLORER 17 EXPERIMENT PAYLOAD INCLUDED TWO INDEPENDENT LANGMUIR PROBE SYSTEMS. ONE OF THE SENSORS WAS USED TO PROVIDE MEASUREMENTS OF THE POSITIVE ION DENSITY, AND THE OTHER MEASURED ELECTRON TEMPERATURE. EACH SYSTEM USED A TWO-ELEMENT SENSOR CONSISTING OF AN OUTER CYLINDRICAL GUARD ELECTRODE 10-CM LONG WHICH WAS CONCENTRIC WITH AN INNER COLLECTOR ELECTRODE 0.056 CM IN DIAMETER AND 23-CM LONG. THE POTENTIALS OF THE ELECTRODES WERE VARIED WITH RESPECT TO THE SATELLITE SHELL. THE ELECTRON TEMPERATURE PROBE WAS SWEPT AT A RATE OF 10 SWEEPS PER SECOND OVER TWO DIFFERENT VOLTAGE INTERVALS, 0 TO 0.75 V AND 0 TO 1.5 V. THE ION DENSITY PROBE WAS SWEPT FROM MINUS 3 TO PLUS 2 V IN 2 SEC. THE CURRENTS TO THE COLLECTORS WERE MEASURED AND TELEMETERED. THE ION CONCENTRATION AND ELECTRON TEMPERATURE COULD BE DETERMINED FROM THE CURRENT VS VOLTAGE INFORMATION. THE EXPERIMENT OPERATED NORMALLY FROM LAUNCH UNTIL JULY 10, 1963, WHEN THE SPACECRAFT BATTERIES FAILED.

DATA SET NAME- TABLES OF ELECTRON TEMPERATURES AND ION
DENSITIES ON MICROFILM

NSSDC ID- 63-009A-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/04/63 TO 04/04/63
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THE ANALYZED DATA SET, WHICH WAS RECEIVED FROM THE EXPERIMENTER, CONSISTS OF ELECTRON TEMPERATURE AND ION DENSITY VALUES IN TABULAR FORM ON 35-MM MICROFILM. THE TABLES ALSO INCLUDE TIME (UT AND LOCAL), PASS NUMBER, STATION, GEOGRAPHIC POSITION, ALTITUDE, AND SOLAR AND MAGNETIC INDICES. THE RESULTS FROM 412 4-MIN INTERROGATIONS BY GROUND STATIONS ARE ORDERED BOTH BY STATION AND BY TIME. A DESCRIPTION OF THE DATA IS CONTAINED IN A DATA USERS NOTE (NSSDC 67-12). "EXPLORER 17 (1963 9A) ELECTROSTATIC PROBE EXPERIMENT."

NEWTON, AE-A

EXPERIMENT NAME- PRESSURE GAUGE

NSSDC ID- 63-009A-03

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/08/63

PERSONNEL
PI - G.P. NEWTON ..... NASA-GSFC
GREENBELT, MD

TWO REDHEAD (COLD CATHODE) AND TWO BAYARD-ALPERT (HOT FILAMENT) IONIZATION VACUUM GAUGES WERE USED TO MEASURE THE

NEUTRAL PARTICLE DENSITY AND AMBIENT PRESSURE OF THE UPPER ATMOSPHERE BETWEEN 260 KM AND 900 KM. THE PRESSURE GAUGES WERE OPERATED FOR 4-MIN PERIODS WHEN THE SATELLITE WAS WITHIN RANGE OF A GROUND TELEMETRY STATION. THE NEUTRAL PARTICLES WERE IONIZED BY ELECTRON BOMBARDMENT, AND THE RESULTING ION CURRENTS WERE DETECTED AND CONVERTED TO VOLTAGES SUITABLE FOR TELEMETRY. THESE TWO TYPES OF SENSORS TOGETHER WERE CAPABLE OF MEASURING OVER THE PRESSURE RANGE 10 TO THE MINUS 4 POWER TORR (10 TO THE 12 POWER MOLECULES/CUBIC CM) TO 10 TO THE MINUS 11 POWER TORR (10 TO THE 5 POWER MOLECULES/CUBIC CM). ONE BAYARD-ALPERT GAUGE SUFFERED A LOSS IN SENSITIVITY, AND NO USEFUL DATA WERE OBTAINED FROM IT. THE REMAINING THREE GAUGES OPERATED NORMALLY AND YIELDED DATA DURING THE PERIOD APRIL 3 TO JUNE 8, 1963. A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN "PLANETARY AND SPACE SCIENCE," VOL 13, NO. 7, P 599, JULY 1965.

DATA SET NAME- NEUTRAL DENSITY DATA IN TABULAR FORM ON MICROFICHE

NSSDC ID- 63-009A-03A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 04/03/63 TO 06/08/63
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 CARD(S) OF B/W MICROFICHE

THE ANALYZED DATA SET, BASED ON IONIZATION VACUUM GAUGE INFORMATION BETWEEN 260 KM AND 900 KM, IS IN PRINTED FORM AS NASA TECHNICAL NOTE TN-D-5447. THE DOCUMENT, ENTITLED "ATMOSPHERIC DENSITIES MEASURED BY THE EXPLORER 17 DENSITY GAUGES. ANALYSIS OF ERRORS AND THEIR EFFECTS UPON THE MEASUREMENTS," BY G.P. NEWTON AND R. HOROWITZ, WAS PUBLISHED IN NOVEMBER 1969. IT LISTS, IN TABULAR FORM, THE BEGINNING AND END DENSITIES FOR 4-MIN PASSES OVER TRACKING STATIONS. IN ADDITION, DENSITIES CORRECTED FOR UNCERTAINTIES IN GAS COMPOSITION AND FOR SYSTEMATIC ERRORS ARE ALSO LISTED FOR THESE SAME PASSES. USEFUL DATA WERE OBTAINED FROM THREE OF THE FOUR INDEPENDENT GAUGE SYSTEMS (TWO REDHEAD AND TWO BAYARD-ALPERT GAUGES) FOR 170 PASSES DURING THE PERIOD APRIL 3 TO JUNE 8, 1963. THIS TIME PERIOD REPRESENTS 65 PERCENT OF THE 100-DAY SATELLITE LIFETIME. ONE BAYARD-ALPERT GAUGE SUFFERED A LOSS IN SENSITIVITY AND YIELDED NO USEFUL DATA.

REBER, AE-A

EXPERIMENT NAME- MASS SPECTROMETER

NSSDC ID- 63-009A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/01/63

PERSONNEL
PI - C.A. REBER ..... NASA-GSFC
GREENBELT, MD

TWO IDENTICAL DOUBLE-FOCUSING MAGNETIC MASS SPECTROMETERS WERE USED TO MEASURE THE CONCENTRATIONS OF THE MAJOR NEUTRAL PARTICLE CONSTITUENTS OF THE UPPER ATMOSPHERE, NAMELY, ATOMIC AND MOLECULAR OXYGEN, ATOMIC AND MOLECULAR NITROGEN, HELIUM, AND WATER VAPOR. THESE NEUTRAL PARTICLES WERE IONIZED BY ELECTRON BOMBARDMENT. MEASUREMENTS OF THE SIX DIFFERENT ION CURRENTS AND THE TOTAL CURRENT WERE MADE SEQUENTIALLY FOR 4 SEC IN HIGH SENSITIVITY AND 4 SEC IN LOW SENSITIVITY. A PERIOD OF 64 SEC WAS REQUIRED FOR THE ENTIRE MEASUREMENT CYCLE. INCLUDED IN THE CYCLE WAS AN OPERATION TO CORRECT ANY DC DRIFT OF THE ZERO VOLTAGE LEVEL IN THE OUTPUT SIGNAL. ONE SPECTROMETER PRODUCED USELESS DATA DUE TO A MALFUNCTION. THE OTHER DETECTOR SYSTEM EXPERIENCED INTERMITTENT DEGENERATION OF THE AMPLIFIER OUTPUT, AND, CONSEQUENTLY, THE DATA WERE GOOD ONLY DURING CERTAIN PERIODS. THIS DEGENERATION WAS NOT A RESULT OF INSTRUMENT MALFUNCTION BUT OF AN UNEXPECTED SPACECRAFT ATTITUDE WHICH ORIENTED THE SENSOR TOWARD THE SUN AND CAUSED IT TO OVERHEAT. A MORE COMPLETE DESCRIPTION OF THE EXPERIMENT, THE INSTRUMENTATION, AND THE CALIBRATION PROCEDURES CAN BE FOUND IN "PLANETARY AND SPACE SCIENCE," VOL 13, NO. 7, P 617, JULY 1965.

DATA SET NAME- ATMOSPHERIC COMPOSITION DENSITY DATA IN TABULAR FORM ON MICROFICHE

NSSDC ID- 63-009A-01A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 04/03/63 TO 06/01/63
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 CARD(S) OF B/W MICROFICHE

THE ANALYZED DATA SET, WHICH CONTAINS NUMBER DENSITIES OF HELIUM, MOLECULAR NITROGEN, AND ATOMIC OXYGEN BETWEEN 260 KM AND 850 KM, IS IN TABULAR FORM ON SIX PRINTED PAGES OF A PUBLISHED ARTICLE. THE ARTICLE, AUTHORED BY C. A. REBER, THE EXPERIMENTER, AND M. NICOLET, IS IN PLANETARY AND SPACE SCIENCE, VOL 13, NO. 7, P 617, JULY 1965. IT IS ENTITLED "INVESTIGATION OF THE MAJOR CONSTITUENTS OF THE APRIL-MAY 1963 HETEROSPHERE BY THE EXPLORER XVII SATELLITE." ADDITIONAL INFORMATION GIVEN IN THE REPORT INCLUDES LOCAL TIME, PASS NUMBER, STATION, GEOGRAPHIC POSITION, ALTITUDE, ANGLE OF ATTACK, AND SOLAR AND MAGNETIC INDICES. THE RESULTS FROM 114 4-MIN INTERROGATIONS BY GROUND STATIONS ARE ORDERED BY TIME. DATA ARE AVAILABLE FOR APRIL 3 TO 22, 1963, AND MAY 20 TO JUNE 1, 1963, WHICH REPRESENT ABOUT 30 PERCENT COVERAGE BASED ON THE SATELLITE 3-MONTH LIFETIME.

SPACECRAFT COMMON NAME- AE-B

ALTERNATE NAMES- S 6A, ATMOSPHERE EXPLORER-B
EXPLORER 32, 02183

NSSDC ID- 66-044A

LAUNCH DATE- 05/25/66 WEIGHT- 225. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/22/67

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 05/25/66
ORBIT PERIOD- 116. MIN INCLINATION- 64.672 DEG
PERIAPSIS- 276.000 KM ALT APOAPSIS- 2725.00 KM ALT

EXPLORER 32 WAS AN AERONOMY SATELLITE WHICH WAS DESIGNED TO DIRECTLY MEASURE TEMPERATURES, COMPOSITION, DENSITIES, AND PRESSURES IN THE UPPER ATMOSPHERE ON A GLOBAL BASIS. THE SATELLITE WAS A STAINLESS STEEL, VACUUM-SEALED SPHERE, 0.889 M IN DIAMETER. THE EXPERIMENTAL PAYLOAD INCLUDED ONE ION AND TWO NEUTRAL MASS SPECTROMETERS, THREE MAGNETRON DENSITY GAUGES, AND TWO ELECTROSTATIC PROBES. ADDITIONAL EQUIPMENT INCLUDED OPTICAL AND MAGNETIC ASPECT SENSORS, MAGNETIC ATTITUDE AND SPIN RATE CONTROL SYSTEMS, AND A TAPE RECORDER FOR DATA ACQUISITION AT LOCATIONS REMOTE FROM GROUND RECEIVING STATIONS. POWER WAS SUPPLIED BY SILVER-ZINC BATTERIES AND A SOLAR CELL ARRAY MOUNTED ON THE SATELLITE EXTERIOR. TWO IDENTICAL PM TELEMETRY SYSTEMS AND A CANTED TURNSTILE ANTENNA WERE EMPLOYED. THE TWO NEUTRAL-PARTICLE MASS SPECTROMETERS FAILED ABOUT 5 DAYS AFTER LAUNCH. THE REMAINING EXPERIMENTS OPERATED SATISFACTORILY AND PROVIDED USEFUL DATA FOR MOST OF THE 10-MONTH SATELLITE LIFETIME. THE FINAL DATA WERE OBTAINED ON MARCH 22, 1967, AT WHICH TIME THE SPACECRAFT CEASED TO FUNCTION DUE TO BATTERY FAILURES WHICH RESULTED FROM DEPRESSURIZATION OF THE SPHERE.

BRINTON, AE-B

EXPERIMENT NAME- ION MASS SPECTROMETER

NSSDC ID- 66-044A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/22/67

PERSONNEL
PI - H.C. BRINTON ..... NASA-GSFC
GREENBELT, MD
CI - H.A. TAYLOR, JR. ..... NASA-GSFC
GREENBELT, MD
CI - R.A. PICKETT ..... NASA-GSFC
GREENBELT, MD

THIS EXPERIMENT WAS DESIGNED TO OBTAIN A DESCRIPTION OF THE CONCENTRATIONS OF THE ION SPECIES IN THE TOPSIDE IONOSPHERE (PRINCIPALLY ATOMIC HYDROGEN, HELIUM, NITROGEN, AND OXYGEN) AS A FUNCTION OF TIME, LOCATION, AND SOLAR AND GEOMAGNETIC ACTIVITY. THE EXPERIMENT OPERATED NOMINALLY FROM LAUNCH UNTIL MARCH 22, 1967. THESE DATA WERE ACQUIRED IN REAL TIME BY 13 GROUND STATIONS AND OVER REMOTE AREAS BY USE OF A SPACECRAFT TAPE RECORDER. THE USEFUL SATELLITE LIFETIME OF 10 MONTHS PERMITTED A GLOBAL STUDY OF THE DIURNAL VARIATION OF THE ATMOSPHERE DURING NEARLY TWO COMPLETE DIURNAL CYCLES, SINCE THE ORBIT PLANE PRECESSED ONE REVOLUTION EACH 5.5 MONTHS. WITH THE DATA OBTAINED, SEVERAL STUDIES WERE UNDERTAKEN INCLUDING -- (1) THE DIURNAL AND SEASONAL VARIATION OF ATMOSPHERIC ION COMPOSITION, (2) THE EFFECT OF ATMOSPHERIC WINDS ON THE ATOMIC HYDROGEN-ATOMIC OXYGEN ION TRANSITION LEVEL, (3) THE DENSITY AND TEMPORAL VARIATION OF THERMOSPHERIC ATOMIC HYDROGEN, AND (4) THE ALTITUDE VARIATION OF ION COMPOSITION IN THE MIDLATITUDE TROUGH REGION. THE INSTRUMENT

FLOWN WAS SIMILAR IN DESIGN TO ION SPECTROMETERS FLOWN ON THE OGO SATELLITE SERIES. THE SPECTROMETER SENSOR CONSISTED OF A 5-3 CYCLE CERAMIC TUBE WITH 5-MM GRID SPACING AND AN EXTERNAL GUARD RING ASSEMBLY. TWO RF FREQUENCIES, 3.7 AND 9.0 MHZ, WERE USED WITH A TRAPEZOIDAL-SHAPED SWEEP VOLTAGE TO COVER THE ION MASS RANGE 12 TO 19 AMU AND 1 AND 4 AMU, ASSURING DETECTION OF THE PRIMARY IONIC CONSTITUENTS OF THE TOPSIDE IONOSPHERE. AN EXPERIMENT TURN-ON CONSISTED OF ONE COMPLETE MASS SCAN IN 208 SEC, FOLLOWED BY RECYCLING OF THE SWEEP VOLTAGE AND A SECOND MEASUREMENT OF THE HIGH MASS RANGE. THE STOPPING POTENTIAL AND THE GUARD RING POTENTIAL CONTROLLED THE SENSITIVITY OF THE SPECTROMETER, AND EACH VOLTAGE WAS COMMANDABLE FROM THE GROUND. THE ION CURRENT REACHING THE SPECTROMETER WAS MEASURED BY A SERIES OF FIVE-DECADE AMPLIFIERS WITH A PARTICLE SENSITIVITY RANGE OF FROM ABOUT 10 TO 1.E5 IONS PER CUBIC CM. AN AUTOMATIC CALIBRATOR FUNCTIONED ONCE DURING EACH TURN-ON TO SUPPLY TWO KNOWN SIGNALS TO THE AMPLIFIER SYSTEM AND TO THE SWEEP MONITOR. AMPLIFIER CHARACTERISTICS WERE CALCULATED FROM THE RESPONSE TO THESE PULSES. THE SPECTROMETER TUBE WAS MOUNTED ON THE EQUATOR OF THE NEARLY SPHERICALLY-SHAPED SPACECRAFT. THE SPACECRAFT SPIN PERIOD AND ATTITUDE WERE MAGNETICALLY CONTROLLED SO THAT THE SPIN AXIS REMAINED ESSENTIALLY NORMAL TO THE ORBIT PLANE AND, CONSEQUENTLY, THE SPECTROMETER ORIFICE WAS ALIGNED WITH THE SATELLITE VELOCITY VECTOR ONCE EACH ROTATION. THE SPIN RATE WAS 29 PLUS OR MINUS 1 RPM. SINCE THE MASS RANGE WAS SCANNED SLOWLY COMPARED WITH THE SPIN PERIOD, EACH PEAK IN THE ION SPECTRUM WAS MODULATED AT THE SPIN FREQUENCY. WITH THE ION CURRENT MAXIMA OCCURING WHEN THE ANGLE BETWEEN THE SPECTROMETER AXIS AND VELOCITY VECTOR WAS A MINIMUM.

DATA SET NAME- ION MASS SPECTROMETER DATA ON MAGNETIC TAPE

NSSDC ID- 66-044A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/09/66 TO 01/17/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS 9-TRACK, BINARY, 1600 BPI, MAGNETIC TAPE DATA SET WAS SUPPLIED BY THE EXPERIMENTER. EACH RECORD CONTAINS TIME-ORDERED DATA FROM ONE EXPERIMENT TURN-ON (ON THE ORDER OF 4 MIN). EXPRESSED IN UNITS OF THE NUMBER OF IONS/CC, VALUES ARE GIVEN FOR THE CONCENTRATIONS OF THE SEVERAL ION SPECIES PRESENT. THE TAPE ALSO CONTAINS VALUES FOR THE MEASUREMENT TIME EXPRESSED BY DAY, UT, AND LOCAL TIME. THE SATELLITE LOCATION IS IDENTIFIED BY THE VALUES GIVEN FOR GEODETIC AND MAGNETIC LATITUDE AND LONGITUDE, ALTITUDE, AND THE MCILWAIN 'L' PARAMETER. OTHER PARAMETERS PRESENTED INCLUDE THE SOLAR-ZENITH ANGLE, AND SATELLITE VELOCITY. THESE DATA ARE ON MICROFILM IN DATA SET 66-044A-01B.

DATA SET NAME- ION MASS SPECTROMETER DATA ON MICROFILM

NSSDC ID- 66-044A-01B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/09/66 TO 01/17/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS 35-MM FILM DATA SET WAS SUPPLIED BY THE EXPERIMENTER. EACH FILM FRAME CONTAINS TIME-ORDERED DATA FROM THREE EXPERIMENT TURN-ONS (ABOUT 4 MIN PER TURN-ON). FOR EACH TURN-ON, A TWO-LINE HEADING IS GIVEN, BENEATH WHICH ARE 15 COLUMNS. INCLUDED IN THE FIRST LINE ARE VALUES FOR THE TURN-ON NUMBER AND THE DAY OF MEASUREMENT. THE SECOND LINE CONTAINS LOCATION CODES INCLUDING MONTH, LOCAL HOUR, ALTITUDE, AND GEOGRAPHIC AND MAGNETIC LATITUDE AND LONGITUDE VALUES. THE COLUMN HEADINGS ARE -- MASS NUMBER (AMU), UT (SEC), D-A FLAG, SATELLITE VELOCITY (KM/SEC), SOLAR-ZENITH ANGLE, ALTITUDE (KM), GEODETIC LATITUDE, GEODETIC LONGITUDE, DIPOLE LATITUDE, DIPOLE LONGITUDE, MCILWAIN 'L' PARAMETER (EARTH RADII), LOCAL TIME (SEC), DATA FLAG, CURRENT (AMP), AND NUMBER DENSITY (IONS/CC). A SAMPLE TURN-ON MIGHT CONTAIN SEVERAL ROWS WITH THE MASS NUMBER COLUMN SHOWING VALUES OF 14, 16, 4, 1, 14, 16. D-A AND DATA FLAG NUMBERS ARE EXPLAINED AT THE BOTTOM OF THE FRAME. THESE DATA ARE ALSO ON TAPE IN DATA SET 66-044A-01A.

REBER, AE-B

EXPERIMENT NAME- NEUTRAL PARTICLE MAGNETIC MASS SPECTROMETER

NSSDC ID- 66-044A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/31/66

PERSONNEL
PI - C.A. REBER ..... NASA-GSFC
GREENBELT, MD
OI - J.E. COOLEY ..... NASA-GSFC
GREENBELT, MD

TWO DOUBLE-FOCUSING MAGNETIC MASS SPECTROMETERS WERE USED TO MEASURE THE COMPOSITION OF THE NEUTRAL ATMOSPHERE BETWEEN 285 KM AND 1000 KM. ONE WAS MOUNTED ON THE EQUATOR OF THE SPHERICAL SATELLITE NORMAL TO THE SPIN AXIS, AND THE OTHER WAS MOUNTED ON THE TOP OF THE SATELLITE PARALLEL TO THE SPIN AXIS. THE NEUTRAL PARTICLES WERE IONIZED BY ELECTRON BOMBARDMENT AND SEPARATED ACCORDING TO MASS TO CHARGE RATIO (M/E) IN THE ANALYZER SECTION OF THE INSTRUMENT. THERE WAS ONE COLLECTOR CUP FOR EACH OF SEVEN DIFFERENT ION SPECIES. AN ELECTROMETER AMPLIFIER, WHICH HAD TWO SENSITIVITY RANGES DIFFERING BY A FACTOR OF 100, SAMPLED THE SEVEN COLLECTORS SEQUENTIALLY. THE DWELL TIME ON A SPECIFIC MASS AND SENSITIVITY RANGE WAS 2.4 SEC. THE FIRST FOUR OF THE FIFTEEN 2.4-SEC STEPS OF A CYCLE WERE DEVOTED TO CORRECTING ANY ZERO DRIFT OF THE ELECTROMETER AND TO RECORDING THE LOW- AND HIGH-SENSITIVITY ZERO LEVELS. THE ION CURRENTS WERE THEN MEASURED IN HIGH SENSITIVITY FOR M/E EQUAL TO 2 (MOLECULAR HYDROGEN), 4 (HELIUM), AND 14 (ATOMIC NITROGEN) AND IN HIGH AND LOW SENSITIVITY FOR M/E EQUAL TO 28 (MOLECULAR NITROGEN), 32 (MOLECULAR OXYGEN), 16 (ATOMIC OXYGEN), AND 18 (WATER VAPOR). THE TIME FOR ONE COMPLETE CYCLE WAS 36 SEC. REAL-TIME DATA WERE OBTAINED AT 10 STADAN STATIONS IN PROGRAMMED 4-MIN TURN-ONS. THE EXPERIMENT WAS ALSO OPERATED FOR 4-MIN PERIODS IN A TAPE RECORDER MODE AT ABOUT 10 REMOTE LOCATIONS. INFORMATION WAS PLAYED BACK AT STADAN STATIONS. ELECTRONIC MALFUNCTIONS OF THE LOGIC OF THE TWO SPECTROMETERS CAUSED ONE INSTRUMENT TO FAIL AFTER 4 DAYS IN ORBIT AND THE OTHER AFTER 7 DAYS.

DATA SET NAME- NEUTRAL PARTICLE DENSITIES IN TABULAR FORM

NSSDC ID- 66-044A-02A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 05/26/66 TO 05/31/66
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 BOOK(S) OR BOUND VOLUME(S)

THIS ANALYZED DATA SET CONSISTS OF NUMBER DENSITIES OF ATOMIC HYDROGEN, HELIUM, MOLECULAR NITROGEN, AND ATOMIC OXYGEN. THE DATA ARE IN TABULAR FORM ON 10 PP OF NASA DOCUMENT (X-621-70-222), "NEUTRAL COMPOSITION AND DENSITY RESULTS FROM THE EXPLORER 32 MASS SPECTROMETERS," BY C. A. REBER, A. E. HEDIN, J.E. COOLEY, AND D. N. HARPOLD, PUBLISHED IN MAY 1970. THE DATA PRESENTED ARE BASED ON ABOUT EIGHTEEN 4-MIN TURN-ONS. THESE TURNONS YIELDED THE BEST DATA DURING THE 7-DAY LIFETIME OF THE EXPERIMENT. PART OF THE DATA SET (EIGHT PP) CONTAINS LISTINGS OF NUMBER DENSITIES AND THE ASSOCIATED PERCENTAGE ERROR VALUES RECORDED BY BOTH SPECTROMETERS FOR THE SPECIES PREVIOUSLY REFERRED TO. ALSO LISTED ARE WEIGHTED AVERAGES OF THE TWO SPECTROMETER DENSITY VALUES. THE TABULATIONS ALSO INCLUDE DATE, UT AND LOCAL SOLAR TIME, TURN-ON NUMBER, ALTITUDE, LATITUDE, AND LONGITUDE. IN THIS PART OF THE DATA SET, THE INFORMATION IS ORDERED ACCORDING TO TIME FOR EACH OF THE FOUR ATMOSPHERIC SPECIES. ANOTHER PART OF THE DATA SET (TWO PAGES) CONTAINS A LISTING OF THE PREVIOUSLY MENTIONED WEIGHTED AVERAGE DENSITY VALUES FOR EACH SPECIES, INTERPOLATED TO A COMMON ALTITUDE, NAMELY, THE ALTITUDE OF THE MOLECULAR NITROGEN DENSITY MEASUREMENT. ALSO INCLUDED IN THIS LIST ARE THE TOTAL MASS DENSITY AND THE MEAN MOLECULAR WEIGHT OF THE SPECIES IN THE NEUTRAL ATMOSPHERE, AND THE TIME AND LOCATION INFORMATION AS STATED ABOVE.

SPACECRAFT COMMON NAME- ALOUETTE 1

ALTERNATE NAMES- 1962 BETA ALPHA 1, S 27
ALOUETTE-A, 00424
S 27A

NSSDC ID- 62-049A

LAUNCH DATE- 09/29/62 WEIGHT- 145.7 KG

ALOUETTE 1

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/29/72

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC — EPOCH DATE- 09/28/62
ORBIT PERIOD- 105.41 MIN — INCLINATION- 80.4726 DEG
PERIAPSIS- 1002. KM ALT — APOAPSIS- 1026. KM ALT

ALOUETTE 1 WAS A SMALL IONOSPHERIC OBSERVATORY INSTRUMENTED WITH AN IONOSPHERIC SOUNDER, A VLF RECEIVER, AN ENERGETIC PARTICLE DETECTOR, AND A COSMIC NOISE EXPERIMENT. EXTENDED FROM THE SATELLITE SHELL WERE TWO DIPOLE ANTENNAS (45.7- AND 22.8-M LONG, RESPECTIVELY) WHICH WERE SHARED BY THREE OF THE EXPERIMENTS ON THE SPACECRAFT. THE SATELLITE WAS SPIN-STABILIZED AT ABOUT 1.4 RPM AFTER ANTENNA EXTENSION. AFTER ABOUT 500 DAYS, THE SPIN SLOWED MORE THAN HAD BEEN EXPECTED, TO ABOUT 0.6 RPM WHEN SATELLITE SPIN-STABILIZATION FAILED. IT IS BELIEVED THAT THE SATELLITE GRADUALLY PROGRESSED TOWARD A GRAVITY GRADIENT STABILIZATION WITH THE LONGER ANTENNA POINTING EARTHWARD. ATTITUDE INFORMATION WAS DEDUCED ONLY FROM A SINGLE MAGNETOMETER AND TEMPERATURE MEASUREMENTS ON THE UPPER AND LOWER HEAT SHIELDS. (ATTITUDE DETERMINATION MAY BE IN ERROR BY AS MUCH AS 10 DEG.) THERE WAS NO TAPE RECORDER, SO DATA WERE AVAILABLE ONLY FROM THE VICINITY OF TELEMETRY STATIONS. TELEMETRY STATIONS WERE LOCATED TO PROVIDE PRIMARY DATA COVERAGE NEAR THE 80 DEG W MERIDIAN PLUS AREAS NEAR HAWAII, SINGAPORE, AUSTRALIA, EUROPE, AND CENTRAL AFRICA. INITIALLY, DATA WERE RECORDED FOR ABOUT 6 HR PER DAY. IN SEPTEMBER 1972, THE SPACECRAFT WAS PLACED ON STANDBY STATUS DUE TO BATTERY DEGRADATION, AND HAS SINCE BEEN OPERATED OCCASIONALLY TO CHECK ITS OPERATING CONDITION.

DATA SET NAME- GSFC REFINED WORLD MAPS ON MICROFILM

NSSDC ID- 62-049A-00B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/29/62 TO 06/20/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 27 REEL(S) OF MICROFILM

THESE DATA, PREPARED AT GSFC, ARE LISTINGS OF SATELLITE POSITION FOR EACH MINUTE (4-MIN INTERVALS AFTER SEPTEMBER 13, 1970) OF GMT. POSITION IS DESCRIBED BY GEOGRAPHIC LATITUDE, LONGITUDE, AND ALTITUDE ABOVE AN ELLIPSOID OF REVOLUTION CLOSELY APPROXIMATING THE MEAN EARTH SURFACE. POSITION DATA FOR SPECIAL TIMES (EQUATOR CROSSING, THE NORTHERNMOST AND SOUTHERNMOST POINTS, AND SUN ENTRANCE AND EXIT) ARE ALSO LISTED. THE LISTINGS ARE ORGANIZED INTO "BOOKS" OF ABOUT 2 WEEKS OF POSITION/TIME DATA HEADED BY ORBIT ELEMENTS AND CONSTANTS USED IN THE COMPUTATION OF THE POSITIONS. AS EXTENDED WORLD MAPS ARE PREPARED, THE REFINED MAPS DUPLICATING THIS INFORMATION ARE NORMALLY DISCARDED, HENCE, IF TIMES REQUIRED ARE NOT FOUND IN THIS DATA SET, SEE DATA SET 62-049A-00C. TIME COVERAGE OF DATA SET 62-049A-00B IS CONTINUOUS FROM LAUNCH TO JULY 1, 1964. SUBSEQUENT TIME COVERAGE IS NOT CONTINUOUS.

DATA SET NAME- GSFC EXTENDED WORLD MAPS ON MICROFILM

NSSDC ID- 62-049A-00C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/01/64 TO 02/28/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 70 REEL(S) OF MICROFILM

THESE DATA, PREPARED AT GSFC, ARE LISTINGS OF SATELLITE POSITION AND SUPPORTING INFORMATION FOR EACH MINUTE (EVERY 4 MIN AFTER SEPTEMBER 1970) OF GMT. THE INFORMATION PROVIDED INCLUDES LOCAL TIME, GEODETIC LOCATION, SEVERAL VARIETIES OF MAGNETIC FIELD REFERENCED LOCATION, SUN POSITION, AND SPECIAL POINT IDENTIFICATION (EQUATOR CROSSING, NORTH OR SOUTH POINTS, SUNLIGHT EXIT OR ENTRANCE, AND OTHERS). FOR ALOUETTE 1 EXTENDED MAP COVERAGE PRIOR TO JULY 1, 1964, SEE DATA SET 62-049A-00H.

DATA SET NAME- CRC INDEX OF EXPERIMENT "DATA AVAILABLE" ON TAPE

NSSDC ID- 62-049A-00G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/01/66 TO 12/31/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THESE DATA, PREPARED BY THE COMMUNICATIONS RESEARCH CENTRE, OTTAWA, CANADA, INDEX THE START AND STOP TIMES FOR THE OPERATION OF ALL FOUR SATELLITE EXPERIMENTS. THE INFORMATION INCLUDES TELEMETRY STATION, TELEMETRY TAPE IDENTIFICATION, DAY OF YEAR, START AND STOP TIMES FOR EACH EXPERIMENT, START AND STOP VALUES FOR EACH TELEMETRY STATION PASS OF GMT, DIP LATITUDE AND GYROFREQUENCY AT THE SATELLITE, LOCAL MEAN TIME, HEIGHT ABOVE THE SPHEROID, AND GEODETIC POSITION. THE DATA ARE ON REELS OF 556-BPI, 7-TRACK, BCD MAGNETIC TAPE, ONE REEL FOR EACH YEAR.

DATA SET NAME- CRPL EXTENDED WORLD MAPS ON MICROFILM

NSSDC ID- 62-049A-00H

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/29/62 TO 06/30/64
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 16 REEL(S) OF MICROFILM

THESE DATA, PREPARED AT CENTRAL RADIO PROPAGATION LABORATORIES (CRPL), BOULDER, COLORADO, ARE LISTINGS OF SATELLITE POSITION AND SUPPORTING INFORMATION FOR EACH IONOGRAM SCHEDULED FOR TRANSMISSION, I.E., FOR APPROXIMATELY EVERY 18 SEC DURING EACH TELEMETRY STATION PASS SCHEDULED FOR SATELLITE TRANSMISSION. ON JULY 1, 1964, RESPONSIBILITY FOR EXTENDED WORLD MAP PREPARATION WAS TRANSFERRED TO GSFC (REFERENCE DATA SET 62-049A-00C), AND A DIFFERENT COMPUTATIONAL PROCEDURE AND FORMAT WAS ADOPTED. THE CRPL MAPS INCLUDE, FOR THE SATELLITE POSITION, THE LOCAL MEAN SOLAR TIME, GEODETIC LOCATION, GYROFREQUENCY, DIP, GEOMAGNETIC LATITUDE, AND SOLAR ZENITH ANGLE, FOR GROUND-BASED IONOSONDE STATIONS WITHIN 500 KM OF THE SUBSATELLITE LOCATION. STATION INFORMATION IS ALSO LISTED. THE DATA ARE ON 100-FT REELS OF 16-HR MICROFILM.

DATA SET NAME- CRC PUBLISHED INDEX OF EXPERIMENT "DATA AVAILABLE"

NSSDC ID- 62-049A-00I

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 01/01/66 TO 12/31/68
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 BOOK(S) OR BOUND VOLUME(S)

THESE DATA INDEX THE START AND STOP TIMES FOR THE OPERATION OF ALL FOUR SATELLITE EXPERIMENTS. THE INFORMATION PRESENTED INCLUDES TELEMETRY STATION, TELEMETRY TAPE IDENTIFICATION, DAY OF YEAR, START AND STOP TIMES FOR EACH EXPERIMENT, START AND STOP VALUES FOR EACH PASS OF GMT, LOCAL MEAN TIME, HEIGHT ABOVE THE SPHEROID, DIP LATITUDE AND GYROFREQUENCY AT THE SATELLITE, AND GEODETIC POSITION. THE DATA ARE IN TWO VOLUMES (ONE PER YEAR) ENTITLED "ALOUETTE 1 DATA AVAILABLE," PUBLISHED BY THE DEPARTMENT OF COMMUNICATIONS, COMMUNICATIONS RESEARCH CENTRE, OTTAWA, CANADA. THESE SAME DATA ARE ON TAPE AS DATA SET 62-049A-00G.

BELROSE, ALOUETTE 1

EXPERIMENT NAME- VLF RECEIVER

NSSDC ID- 62-049A-03

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/29/72

PERSONNEL
PI - J.S. BELROSE ..... COMMUN RESEARCH CENTRE, OTTAWA, ONTARIO, CANADA
OI - F.W. PALMER ..... COMMUN RESEARCH CENTRE, OTTAWA, ONTARIO, CANADA

THE VLF EXPERIMENT WAS A WIDEBAND HIGH-GAIN RECEIVER WITH A PASSBAND FROM 0.4 TO 10 KHZ USING ONLY THE LONGEST (150-FT) SOUNDER ANTENNA. THE RECEIVER OUTPUT, WHICH SENSED THE ELECTRIC FIELD COMPONENT OF THE SIGNAL STRENGTH, WAS

MAINTAINED CONSTANT BY MEANS OF AN AGC LOOP. THE STANDARD VLF DATA FORM WAS A SONOGRAM (GRAPH) SHOWING SIGNALS AS A FUNCTION OF TIME AND FREQUENCY. WHISTLERS AND RADIO NOISE OF VARIOUS ORIGINS WERE OBSERVED IN THIS REGION OF RADIO FREQUENCIES. PERFORMANCE HAD BEEN NOMINAL SINCE LAUNCH, EXCEPT FOR INTERFERENCE FROM THE SOUNDER WHICH HAD NOT PREVENTED OBSERVATION OF USEFUL DATA. THE SOUNDER OPERATION WAS MOST FREQUENT, BUT A SMALL PERCENTAGE OF OBSERVATIONS WERE VLF ONLY OR BOTH VLF AND SOUNDER. A PARTIAL INDEX OF OPERATION TIMES AND LOCATIONS FOR THIS EXPERIMENT IS AVAILABLE IN DATA SETS 62-049A-00G AND 62-049A-00I.

[redacted]

DATA SET NAME- VLF SPECTROGRAMS

NSSDC ID- 62-049A-03A

AVAILABILITY OF DATA SET- DATA AVAILABLE FROM EXPERIMENTER

TIME PERIOD COVERED- 11/00/62 TO 09/00/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 REEL(S) OF MICROFILM

THIS DATA SET IS IN A STANDARD GRAPHIC FORM (FREQUENCY VERSUS TIME) FOR RAW VLF DATA. THESE SONOGRAMS ON 35-MM FILM WERE PREPARED BY THE EXPERIMENTER FROM ANALOG DATA ON MAGNETIC TAPE, RECORDED AT TELEMETRY STATIONS IN REAL TIME. APPROXIMATELY 16,000 PASSES WERE RECORDED. FROM WHICH SONOGRAMS HAVE BEEN PREPARED FOR ABOUT 1500 PASSES. MOST OF THE SONOGRAMS HAVE BEEN COMPILED FROM PASSES OVER THE OTTAWA STATION, ALTHOUGH OVER HALF OF THE DATA OBSERVED WERE FROM OTHER LOCATIONS. BY SPECIAL ARRANGEMENT, ANY DATA STILL AVAILABLE ON TAPE (SOME OLDER TAPES ARE BEING ERASED) CAN BE PROVIDED IN LIMITED QUANTITIES IN SONOGRAM FORM. EACH PASS PROCESSED INTO SONOGRAMS CONSISTS OF THREE PARTS, EACH USING DIFFERENT RANGES ON THE FREQUENCY SCALES, I.E., NOMINALLY 0 TO 20, 0 TO 10, AND 0 TO 2.5 KHZ. THE TIME SCALE FOR THE FIRST TWO PARTS IS 0.25 IN./SEC, AND IS 0.125 IN./SEC FOR THE 0- TO 2.5-KHZ SONOGRAMS. IDENTIFICATION INFORMATION IS NOTED PRIOR TO EACH PASS OVER A STATION. TIME IS SHOWN (IN UT) AT 10-SECOND INTERVALS ALONG THE EDGE OF THE SONOGRAMS. AN ANALOG REPRESENTATION OF THE VLF-RECEIVER AGC LEVEL IS ALSO SHOWN ALONG THE EDGE OF THE SONOGRAMS. THESE DATA CAN BE MADE AVAILABLE FOR VIEWING BY CONTACTING THE EXPERIMENTER, DR. R. E. DARRINGTON, COMMUNICATIONS RESEARCH CENTRE, DEPT OF COMMUNICATIONS, PO BOX 490, STATION A, OTTAWA, ONTARIO, CANADA, K1N 8T5.

[redacted]

WHITTEKER, ALOUETTE 1

EXPERIMENT NAME- SWEEP-FREQUENCY SOUNDER

NSSDC ID- 62-049A-01

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST USABLE DATA RECORDED- 09/29/72

PERSONNEL

PI -	J.H.	WHITTEKER	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	J.E.	JACKSON	NASA-GSFC GREENBELT, MD
OI -	L.	COLIN	NASA-ARC MOFFETT FIELD, CA
OI -	J.W.	KING	APPLETON LAB SLOUGH, BERKS, ENGLAND
OI -	R.W.	KNECHT	NOAA BOULDER, CO
OI -	G.L.	NELMS	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA

THE SWEEP FREQUENCY IONOSONDE WAS A RADIO TRANSMITTER/RECEIVER THAT RECORDED THE TIME DELAY BETWEEN A TRANSMITTED AND RETURNED RADIO PULSE. A CONTINUUM OF FREQUENCIES BETWEEN 0.5 AND 12 MHZ WAS SAMPLED ONCE EVERY 18 SEC. SEVERAL DELAY TIMES WERE USUALLY OBSERVED FOR EACH FREQUENCY DUE TO GROUND REFLECTIONS, PLASMA RESONANCES, BIREFRINGENCE OF THE IONOSPHERE, NONVERTICAL PROPAGATION, ETC. DELAY TIME WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL, ELECTRON DENSITY ALONG THE PROPAGATION PATH, AND THE MODE OF PROPAGATION. THE STANDARD DATA FORM WAS AN IONOGRAM (GRAPH) SHOWING TIME (VIRTUAL DISTANCE OF SIGNAL REFLECTION FROM THE SATELLITE) VS RADIO FREQUENCY. TWO OTHER COMMON FORMS OF DATA WERE PREPARED FROM THE IONOGRAMS. THEY WERE (1) DIGITAL FREQUENCY DATA AND/OR VIRTUAL HEIGHT VALUES OF CHARACTERISTIC IONOSPHERIC FEATURES AND (2) COMPUTATIONS OF ELECTRON DENSITY PROFILES. PERFORMANCE FAR EXCEEDED EXPECTATIONS FOR THE EXPERIMENT. INITIALLY, OBSERVATIONS WERE RECORDED FOR ABOUT 6 HR PER DAY. THE EXPERIMENT PROVIDED DATA FOR 10 FULL YEARS. AN INDEX OF OPERATION TIMES AND LOCATIONS FOR THIS EXPERIMENT IS AVAILABLE IN DATA SETS 62-049A-00G AND 62-049A-00I.

[redacted]

DATA SET NAME- SWEEP-FREQUENCY REDUCED IONOGRAMS ON MICROFILM

NSSDC ID- 62-049A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/29/62 TO 11/30/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 5067 REEL(S) OF MICROFILM

THESE IONOGRAMS ARE REDUCED DATA PLOTS ON 35-MM MICROFILM SHOWING FREQUENCY VS ECHO TIME DELAY (VIRTUAL RANGE) OF PULSED RADIO SIGNALS. THEY ARE AN ORIGINAL FORM OF THE DATA PREPARED DIRECTLY FROM THE TELEMETRY TAPE. THE DATA ARE AS COMPLETE AS PERMITTED BY THE LIMITATIONS OF SPACECRAFT POWER, LACK OF ONBOARD TAPE RECORDING (TELEMETRY STATION LOCATION, TELEMETRY STATION SCHEDULING, ETC.), AND DATA PROCESSING FACILITIES. THE DATA COVERAGE IS PRIMARILY NEAR THE 80 DEG W MERIDIAN FOR PERIODS OF TIME UP TO 7 HR PER DAY. SINCE ONLY TIME IS NOTED ON EACH IONOGRAM, POSITION AND OTHER RELATED DATA MUST BE OBTAINED FROM WORLD MAPS (NSSDC DATA SETS INCLUDED UNDER 62-049A-00). A PROGRAM FOR THE REDUCTION OF TOPSIDE IONOGRAMS TO ELECTRON DENSITY PROFILES IS AVAILABLE FROM NSSDC (NSSDC DATA SET NSDF PI-21A).

[redacted]

DATA SET NAME- ALOUETTE SYNOPTIC (ALOSYN) SCALED DATA ON TAPE

NSSDC ID- 62-049A-01C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/29/62 TO 06/30/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 6 REEL(S) OF MAGNETIC TAPE

THESE ALOSYN DATA ARE SCALED DATA ON 7-TRACK, ONE-FILE IN TWO FORMS. SOME ARE 556-BPI, BCD MAGNETIC TAPES PRODUCED ON AN IBM 7094 COMPUTER AND THE REMAINING TAPES ARE 800 BPI, EBCDIC PRODUCED ON AN IBM 360. THEY ARE TABULATIONS OF SELECTED IONOSPHERIC PARAMETERS WHICH WERE READ (SCALED) FROM THE IONOGRAM AND, IN SOME CASES, CALCULATED FROM OTHER SCALED VALUES. FOUR PARAMETERS ARE PRESENTED -- (1) PLASMA FREQUENCY AT THE SATELLITE, (2) PLASMA FREQUENCY AT THE F2 MAXIMUM, (3) MAXIMUM FREQUENCY OF OBSERVED SPORADIC E, AND (4) STRENGTH OF GROUND ECHOES. SUPPORTING INFORMATION INCLUDES SATELLITE LOCAL TIME, LOCATION (INCLUDING DIP), SOLAR ZENITH ANGLE AT THE SATELLITE, KP, AND QUALITY AND ACCURACY NOTATIONS FOR SOME OF THE SCALINGS. ABOUT 1/4 OF THE ALOUETTE 1 IONOGRAMS WERE SCALED.

[redacted]

DATA SET NAME- RSRS ELECTRON DENSITY VALUES AT 10-KM INTERVALS ON MICROFICHE

NSSDC ID- 62-049A-01E

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 11/26/62 TO 07/31/63
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 7 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF ELECTRON DENSITY PROFILES, COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT, WHICH HAVE IN TURN BEEN SCALED FROM THE IONOGRAMS. THESE DATA ARE ANALYZED DATA IN THREE BOUND VOLUMES ON MICROFICHE THAT HAVE BEEN PREPARED FROM COMPUTER PRINTOUT. VOLUMES 1 AND 3 CONTAIN PROFILES OF EIGHT PASSES (254 PROFILES) OVER SINGAPORE, AND VOLUME 2 CONTAINS PROFILES OF FOUR PASSES (123 PROFILES) OVER PT. STANLEY, FALKLAND ISLANDS. THERE ARE LISTINGS OF ELECTRON DENSITIES FOR REAL GEOMETRIC HEIGHTS ABOVE THE ELLIPSOID AT 10-KM INTERVALS AND PLOTS (INCLUDING DIGITAL VALUES) OF GEOPOTENTIAL HEIGHT VS ELECTRON DENSITY FOR EACH 20 KM. THESE ARE ONLY A VERY SMALL SAMPLE OF THE TOTAL DATA OBSERVED. THESE DATA WERE PUBLISHED BY OSIR, RADIO AND SPACE RESEARCH STATION, SLOUGH, BUCKS, U.K., AND TITLED "HEIGHT DISTRIBUTION OF ELECTRON CONCENTRATION IN THE TOPSIDE IONOSPHERE AS DEDUCED FROM TOPSIDE SOUNDER SATELLITE IONOGRAMS."

ALOUETTE 1

DATA SET NAME- CRC ELECTRON DENSITY VALUES AT LAMINA BOUNDARIES IN BOOKS

NSSDC ID- 62-049A-01F

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 09/30/62 TO 07/28/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 11 BOOK(S) OR BOUND VOLUME(S)

THIS DATA SET CONSISTS OF ANALYZED ELECTRON DENSITY PROFILES COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT THAT WERE SCALED FROM IONOGRAMS. THESE ARE ANALYZED DATA IN BOUND BOOKS THAT WERE PREPARED BY THE DEFENSE RESEARCH BOARD, TELECOMMUNICATIONS ESTABLISHMENT (NOW CRC) IN OTTAWA, CANADA. WITHIN EACH VOLUME (TWO BOOKS PER VOLUME), THE DATA ARE ORDERED CHRONOLOGICALLY, BUT TIME COVERAGE FOR DIFFERENT VOLUMES IS OVERLAPPING. TELEMETRY STATIONS ARE NOT IDENTIFIED, BUT SATELLITE LOCATION, TIME OF OBSERVATION, SOLAR ZENITH ANGLE AT THE SATELLITE, DIP LATITUDE AT THE SATELLITE, TOTAL ELECTRON CONTENT DOWN TO ALTITUDE OF HIGHEST IONOSPHERICALLY REFLECTED FREQUENCY, AND OTHER RELEVANT INFORMATION ARE LISTED FOR EACH PROFILE. PROFILE DATA CONSIST OF ELECTRON DENSITY AND REAL HEIGHT VALUES FOR EACH POINT SCALED FROM THE IONOGRAM. FOR INTERPOLATED VALUES OF ELECTRON DENSITY AT STANDARD INCREMENTS OF REAL HEIGHT, SEE DATA SET 62-049A-01L. EACH PROFILE OCCUPIES ABOUT FOUR LINES OF PRINT, AND A CHRONOLOGICAL INDEX OF ALL DATA FROM ALL VOLUMES APPEARS IN THE FRONT OF EACH BOOK. THE 1033 IONOGRAMS REDUCED WERE SELECTED FOR THEIR SCIENTIFIC INTEREST AND COVER TIMES FROM SEPTEMBER 30, 1962, TO JULY 28, 1968. THESE REDUCTIONS ARE FROM LESS THAN 0.2 PERCENT OF THE TOTAL OF OVER 1 MILLION ALOUETTE 1 IONOGRAMS OBSERVED. DATA FOR MOST LATITUDES ARE INCLUDED, BUT THOSE DATA FROM LONGITUDES NEAR 80 DEG W ARE MORE NUMEROUS THAN THOSE FROM OTHER LONGITUDES. THE BOOKS ARE TITLED "ALOUETTE 1 IONOSPHERIC DATA N(H)."

DATA SET NAME- NASA-ARC ELECTRON DENSITY VALUES AT 50-KM INTERVALS IN BOOKS

NSSDC ID- 62-049A-01H

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 11/01/62 TO 01/28/64
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 6 BOOK(S) OR BOUND VOLUME(S)

THESE DATA WERE COMPUTED FROM DIGITAL VALUES THAT WERE SCALED FROM IONOGRAMS. THEY ARE ANALYZED DATA IN PUBLISHED BOOKS PREPARED FROM COMPUTER PRINTOUT. THE VOLUMES INCLUDE DIGITAL ELECTRON DENSITY VALUES AT THE SATELLITE AND FOR EACH 50 KM FROM 1000-KM ALTITUDE DOWN TO THE LOWEST HEIGHT OF SIGNAL REFLECTION (NORMALLY IN THE TOPSIDE IONOSPHERE NEAR THE F2 MAXIMUM). PLASMA SCALE HEIGHTS ARE TABULATED FOR EACH 50 KM FROM 950 KM DOWN TO THE LOWEST REFLECTION HEIGHT. TOTAL ELECTRON CONTENT FROM LOWEST REFLECTION TO 1000 KM IS ALSO INCLUDED. SUPPORTING INFORMATION INCLUDES LOCATION, TIME, MAGNETIC DIP, INVARIANT LATITUDE, L-SHELL, KP, SUNLIGHT OCCURRENCE AT SATELLITE, AND IONOGRAM QUALITY. MACHINE PLOTTED DATA SUMMARY GRAPHS ARE INCLUDED WITH THE DATA TABULATIONS. THE AREAS COVERED ARE HAWAII AND THE AMERICAN CONTINENTS. DATA ARE TABULATED FOR 14,635 IONOGRAMS OBSERVED FROM NOVEMBER 1962 THROUGH JANUARY 1964. THESE PUBLICATIONS ARE AVAILABLE FROM THE US GOVERNMENT PRINTING OFFICE (AS NASA SP-3026, 3038, 3027, 3032, 3033, AND 3034) OR FROM THE NATIONAL TECHNICAL INFORMATION SERVICE (AS N66-27056, N67-18948, N66-33197, N66-38867, N67-14933, AND N67-36446).

DATA SET NAME- NASA-ARC ELECTRON DENSITY VALUES AT 100-KM INTERVALS

NSSDC ID- 62-049A-01I

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 10/31/62 TO 01/27/64
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE ANALYZED DATA ON MAGNETIC TAPE WERE COMPUTED FROM DIGITAL VALUES SCALED FROM IONOGRAMS. SELECTION WAS ONLY IN ORDER TO OBTAIN A REPRESENTATIVE LISTING OF OBSERVATIONS FOR THE TIME PERIOD AND LOCATIONS NOTED. DIGITAL ELECTRON DENSITY VALUES ARE LISTED AT THE SATELLITE AND FOR EACH 100 KM FROM 1000-KM ALTITUDE DOWN TO THE LOWEST HEIGHT OF SIGNAL REFLECTION (NORMALLY IN THE TOPSIDE IONOSPHERE NEAR THE F2 MAXIMUM). SCALE HEIGHTS AT 900, 700, AND 500 KM ARE LISTED ALONG WITH LOCAL TIME AND SATELLITE LOCATIONS. ABOUT 15,000 PROFILES ARE PRESENTED. THESE ARE A VERY SMALL PORTION (LESS THAN 0.1 PERCENT) OF THE IONOGRAMS OBSERVED BY ALOUETTE 1. DATA WERE RECORDED ON AN IBM 7094 COMPUTER ON A 7-TRACK BCD TAPE IN ONE FILE AT 556 BPI. THE AREAS COVERED ARE HAWAII AND THE AMERICAN CONTINENTS FROM NOVEMBER 1962 THROUGH JANUARY 1964. THESE DATA ARE AVAILABLE ON MICROFICHE AS DATA SET 62-049A-01J.

DATA SET NAME- ALOUETTE SYNOPTIC (ALOSYN) SCALED DATA ON MICROFICHE

NSSDC ID- 62-049A-01K

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 09/29/62 TO 12/31/68
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 BOOK(S) OR BOUND VOLUME(S)

THESE ALOSYN DATA ARE AVAILABLE IN PUBLISHED FORM AND CONSIST OF TABULATIONS OF SELECTED IONOSPHERIC PARAMETERS THAT WERE READ (SCALED) FROM THE IONOGRAM AND, IN SOME CASES, ALSO CALCULATED FROM OTHER SCALED VALUES. FOUR PARAMETERS ARE PRESENTED -- (1) PLASMA FREQUENCY AT THE SATELLITE, (2) PLASMA FREQUENCY AT THE F2 MAXIMUM, (3) MAXIMUM FREQUENCY OF OBSERVED SPORADIC E, AND (4) STRENGTH OF GROUND ECHOES. SUPPORTING INFORMATION INCLUDES SATELLITE LOCAL TIME, LOCATION (INCLUDING DIP), SOLAR ZENITH ANGLE AT THE SATELLITE, KP, AND QUALITY AND ACCURACY NOTATIONS FOR SOME OF THE SCALINGS. A MAJOR PORTION OF THE IONOGRAMS HAVE BEEN SCALED. ALL LISTINGS ARE CHRONOLOGICALLY SORTED AND CONTAIN DATA FROM MORE THAN 12 STATIONS. AN INDEX BY PASS APPEARS AT THE FRONT OF EACH BOOK, AND EACH BOOK CONTAINS DATA FOR 2 WEEKS OR MORE. THE BOOKS, PUBLISHED BY THE DEPARTMENT OF COMMUNICATIONS, COMMUNICATIONS RESEARCH CENTRE (FORMERLY DRTE), OTTAWA, CANADA, ARE TITLED "ALOUETTE 1 IONOSPHERIC DATA ALOSYN." THESE DATA ARE ALSO AVAILABLE ON TAPE (69-049A-01C) AND MICROFILM (69-049A-01B).

DATA SET NAME- CRC ELECTRON DENSITY VALUES AT 50-KM INTERVALS ON MICROFICHE

NSSDC ID- 62-049A-01L

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 09/30/62 TO 07/28/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 47 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF ELECTRON DENSITY PROFILES COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT THAT WERE SCALED FROM IONOGRAMS. THESE ARE ANALYZED DATA IN BOUND BOOKS THAT WERE PREPARED BY THE DEFENSE RESEARCH BOARD, TELECOMMUNICATIONS ESTABLISHMENT (NOW CRC) IN OTTAWA, CANADA. WITHIN EACH VOLUME, DATA ARE ORDERED CHRONOLOGICALLY. TELEMETRY STATIONS ARE NOT IDENTIFIED, BUT SATELLITE LOCATION, UT OF OBSERVATION, SATELLITE LOCAL TIME, DIP LATITUDE AT THE SATELLITE, AND OTHER RELEVANT INFORMATION ARE LISTED FOR EACH PROFILE. PROFILE DATA CONSIST OF ELECTRON DENSITY AND REAL HEIGHT VALUES FOR EACH 50 KM FROM 1000 KM DOWN TO THE LOWEST HEIGHT FROM WHICH IONOSPHERIC REFLECTIONS WERE OBSERVED (NO LOWER THAN 250 KM). FOR VALUES AT POINTS FROM WHICH INTERPOLATIONS WERE MADE, SEE DATA SET 62-049A-01F. TWENTY-FOUR PROFILES ARE LISTED ON EACH PAGE. A CUMULATIVE CHRONOLOGICAL INDEX OF ALL DATA AVAILABLE AT PUBLISHING DATE APPEARS IN THE FRONT OF EACH BOOK. THE 1033 IONOGRAMS REDUCED WERE SELECTED FOR THEIR SCIENTIFIC INTEREST AND COVER TIMES FROM SEPTEMBER 30, 1962, TO JULY 28, 1968. THESE REDUCTIONS ARE FROM LESS THAN 0.2 PERCENT OF THE TOTAL OF OVER 1 MILLION ALOUETTE 1 IONOGRAMS OBSERVED. MOST LATITUDES ARE INCLUDED, BUT DATA FROM LONGITUDES NEAR 80 DEG W ARE MORE NUMEROUS THAN FROM OTHER LONGITUDES. THESE BOOKS ARE TITLED "ALOUETTE 1 IONOSPHERIC DATA INTERPOLATED N(H)."

DATA SET NAME- CRC ELECTRON DENSITY PROFILES AT LAMINA BOUNDARIES ON TAPE

NSSDC ID- 62-049A-01M

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/22/63 TO 07/28/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE ANALYZED DATA CONSIST OF ELECTRON DENSITY PROFILES, COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT, WHICH HAVE IN TURN BEEN SCALED FROM THE IONOGRAMS. PROFILES WERE SELECTED BECAUSE OF THEIR SCIENTIFIC INTEREST. TELEMETRY STATIONS ARE NOT IDENTIFIED, BUT SATELLITE LOCATION, TIME OF OBSERVATION, SOLAR ZENITH ANGLE AT THE SATELLITE, DIP AT THE SATELLITE, TOTAL CONTENT DOWN TO THE ALTITUDE OF HIGHEST IONOSPHERICALLY REFLECTED FREQUENCY, AND OTHER RELEVANT INFORMATION ARE LISTED FOR EACH PROFILE. VALUES OF ELECTRON DENSITY INTERPOLATED FOR STANDARD 50-KM INCREMENTS OF GEOMETRIC HEIGHT HAVE BEEN PREPARED FROM THIS DATA SET AND ARE AVAILABLE AS DATA SET 62-049A-01L. THIS DATA SET CONSISTS OF ONE TAPE INCLUDING CHRONOLOGICALLY ORDERED OBSERVATIONS FROM JANUARY 22, 1963, TO JULY 28, 1968. THIS PROVIDES ABOUT 300 PROFILES. THE FORMAT GIVES SEQUENCES OF NUMBERS FOR EACH POINT SCALED FROM THE IONOGRAM. THESE SEQUENCES INCLUDE ELECTRON DENSITY AT THE POINT AND ONE OR MORE COEFFICIENTS FROM WHICH GEOMETRIC HEIGHTS CAN BE CALCULATED. THESE DATA MAKE UP A VERY SMALL PORTION OF THE RECORDED ALOUETTE 1 IONOGRAMS. LATITUDINAL COVERAGE IS WIDESPREAD, BUT DATA AT LONGITUDES NEAR 80 DEG W ARE MORE NUMEROUS THAN OTHERS. DATA WERE RECORDED ON AN IBM 7094 COMPUTER ON 7-TRACK BCD TAPE IN ONE FILE AT 556 BPI.

[redacted]

DATA SET NAME- CRC ELECTRON DENSITY PROFILES AT 50-KM INTERVALS ON TAPE

NSSDC ID- 62-049A-01N

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/29/62 TO 03/30/66
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MAGNETIC TAPE

THESE ANALYZED DATA CONSIST OF ELECTRON DENSITY PROFILES, COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT, WHICH HAVE IN TURN BEEN SCALED FROM THE IONOGRAMS. TELEMETRY STATIONS ARE NOT IDENTIFIED, BUT SATELLITE LOCATION, TIME OF OBSERVATION, SOLAR ZENITH ANGLE AT THE SATELLITE, DIP AT THE SATELLITE, TOTAL CONTENT DOWN TO THE ALTITUDE OF THE HIGHEST IONOSPHERICALLY REFLECTED FREQUENCY, AND OTHER RELEVANT INFORMATION ARE LISTED FOR EACH PROFILE. VALUES OF ELECTRON DENSITY INTERPOLATED FOR STANDARD 50-KM INCREMENTS OF GEOMETRIC HEIGHT HAVE BEEN PREPARED FROM THIS DATA SET AND ARE AVAILABLE AS DATA SET 62-049A-01L. THIS DATA SET CONSISTS OF THREE TAPES INCLUDING CHRONOLOGICALLY ORDERED OBSERVATIONS FROM SEPTEMBER 29, 1962, TO MARCH 30, 1966. THIS PROVIDES ABOUT 1400 PROFILES. THE FORMAT GIVES PAIRS OF ELECTRON DENSITY AND REAL HEIGHT VALUES FOR EACH POINT SCALED FROM THE IONOGRAM. THESE DATA MAKE UP A VERY SMALL PORTION OF THE RECORDED ALOUETTE 1 IONOGRAMS. LATITUDINAL COVERAGE IS WIDESPREAD, BUT DATA AT LONGITUDES NEAR 80 DEG W ARE MORE NUMEROUS THAN OTHERS. DATA WERE RECORDED ON AN IBM 7094 COMPUTER ON 7-TRACK BCD TAPE IN ONE FILE AT 556 BPI.

[redacted]

DATA SET NAME- IONOGRAM INVENTORY ON TAPE

NSSDC ID- 62-049A-01O

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/29/62 TO 11/30/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 6 REEL(S) OF MAGNETIC TAPE

THIS FILE INDEXES THE ALOUETTE 1 IONOGRAMS (DATA SET 62-049A-01A) BY STATION PASS. INFORMATION IN THE DATA SET FOR WHICH IONOGRAMS CAN BE IDENTIFIED INCLUDES TELEMETRY STATION, START AND STOP TIME FOR THE PASS, AND ORBIT NUMBER. THE INDEX, WHICH IS PREPARED FROM A PHYSICAL INVENTORY OF FILM RECEIVED AND SATELLITE EPHEMERIDES, IS MAINTAINED ON 556-BPI, 7-TRACK, BCD MAGNETIC TAPE AND IS UPDATED MONTHLY UNLESS FEW DATA ARE RECEIVED. THE TIME SPAN OF DATA IS CURRENT AS OF JANUARY 1973.

[redacted]

DATA SET NAME- UCLA INTERPOLATED ELECTRON DENSITY PROFILES AT 25-KM INTERVALS ON TAPE

NSSDC ID- 62-049A-01P

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/30/62 TO 05/02/64
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF ANALYZED ELECTRON DENSITY PROFILES COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT THAT WERE SCALED FROM IONOGRAMS. THESE ARE ANALYZED DATA ON TAPES THAT WERE PREPARED BY THE UCLA DEPARTMENT OF METEOROLOGY. SATELLITE LOCATION, SATELLITE HEIGHT, AND TIME (UT) OF OBSERVATION ARE LISTED FOR EACH PROFILE. FOR MANY PROFILES THE EXTRAPOLATED FXF2 AND ITS REAL HEIGHT ARE INCLUDED. PROFILE INTERVALS ARE LISTED FOR EACH 25N-KM ALTITUDE OF REAL HEIGHT (N IS AN INTEGER), WHERE 25N RANGES FROM THE CLOSEST VALUE ABOVE THE REFLECTION ALTITUDE OF THE HIGHEST X TRACE FREQUENCY REFLECTED AND THE CLOSEST VALUE BELOW SATELLITE ALTITUDE. ELECTRON DENSITY IS ALSO PROVIDED AT SATELLITE ALTITUDE. THIS DATA SET CONSISTS OF TAPES THAT INCLUDE CHRONOLOGICALLY ORDERED OBSERVATIONS FROM SEPTEMBER 30, 1962, TO MAY 2, 1964, PROVIDING ABOUT 43,781 PROFILES. THE TAPES ARE IBM 360, BINARY, 7 TRACK WRITTEN AT 800 BPI.

[redacted]

DATA SET NAME- INDEX OF IONOGRAMS SHOWING DUCTED ECHOES

NSSDC ID- 62-049A-01Q

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 12/01/62 TO 12/31/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, PROVIDED BY THE EXPERIMENTER'S OFFICE, IS AN INDEX TO QUITO IONOGRAMS CONTAINING DUCTED ECHOES. THE CRITERION FOR SELECTION WAS THAT AT LEAST ONE TRACE FROM THE CONJUGATE HEMISPHERE APPEARS ON THE IONOGRAM. THIS TRACE HAS A POSITIVE SLOPE AS OPPOSED TO THE NEGATIVE SLOPE OF THE NORMAL X OR O TRACE. EACH RECORD CONTAINS THE SATELLITE IDENTIFICATION, GROUND STATION (QUITO=5), PASS START TIME (UT), THE NUMBER OF IONOGRAMS IN THE PASS SHOWING DUCTED ECHOES, AND THE NUMBER NOT SHOWING DUCTED ECHOES. THE TIME PERIOD COVERED IS FROM 1962 THROUGH 1968 (1966 MISSING). FOR 209 PASSES (ABOUT 6000 IONOGRAMS), 116 IONOGRAMS WITH DUCTED ECHOES ARE IDENTIFIED. THE DATA ARE AVAILABLE ON 9-TRACK, 800-BPI, EBCDIC MAGNETIC TAPE. SIMILAR DATA FOR OTHER TIMES AND FOUR OTHER STATIONS ARE STORED ON THE SAME TAPE AND ARE DESCRIBED IN DATA SETS 65-098A-01N, 69-009A-01E, AND 71-024A-01E.

[redacted]

DATA SET NAME- RSRS ELECTRON DENSITY (AND SCALE HEIGHT) PLOTS AND LISTINGS WITH PASS SUMMARY PLOTS

NSSDC ID- 62-049A-01R

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 10/03/62 TO 09/04/66
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 7 REEL(S) OF MICROFILM

THESE DATA CONSIST OF SEVERAL DIFFERENT DIGITAL AND PLOTTED FORMS PREPARED FROM THE SINGAPORE, WINKFIELD, AND FALKLAND ISLAND (UK-OPERATED) STATIONS RECEIVING ALOUETTE 1 IONOGRAMS. FOR EACH PASS, A NUMBER OF IONOGRAMS HAVE BEEN DIGITIZED AND PLOTTED (THREE FRAMES PER IONOGRAM). AT THE END OF DATA FOR EACH PASS, THERE APPEARS A THREE-FRAME PASS SUMMARY IN TWO PLOTS AND A LISTING. FRAME 1 FOR EACH IONOGRAM SHOWS THE SUBSATELLITE LOCATION WITH CORRESPONDING LOCAL TIME AND UT. TRACE USED FOR ANALYSIS AND GYROFREQUENCY AT THE SATELLITE (CALCULATED AND OBSERVED) MAY ALSO BE SHOWN. ON FRAME 2 ARE THE INPUT SCALINGS FOR THE RAW (UNINTERPOLATED) AND INTERPOLATED (EACH 10 KM) PROFILES APPEARING ON FRAME 1. FRAME 2 ALSO CONTAINS INTERPOLATED GEOPOTENTIAL SCALE HEIGHTS (EACH 10 KM), AND TOTAL CONTENT VALUES FOR THREE LAYERS FROM 350, 400, AND 450 KM UP TO 950 KM. ON FRAME 3 IS A LOG PLOT OF N(H) VS GEOPOTENTIAL HEIGHT (LINEAR SCALE). THE PASS SUMMARY CONTAINS A PLOT OF SELECTED STANDARD N(H) VALUES FROM EACH PROFILE VS GEOGRAPHIC LATITUDE, AND A SIMILAR PLOT FOR SCALE HEIGHTS. FINALLY, LISTINGS ARE GIVEN OF TOTAL N, BY LATITUDE, FOR EACH OF THE THREE LAYERS.

ALOUETTE 2

SPACECRAFT COMMON NAME- ALOUETTE 2

ALTERNATE NAMES- ALOUETTE-B. S 27B
ISIS-Y- 01804

NSSDC ID- 65-098A

LAUNCH DATE- 11/29/65 WEIGHT- 145. KG

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST USABLE DATA RECORDED- 06/03/73

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 11/29/65
ORBIT PERIOD- 121. MIN INCLINATION- 79.724 DEG
PERIAPSIS- 529.000 KM ALT APOAPSIS- 2956.00 KM ALT

ALOUETTE 2 WAS A SMALL IONOSPHERIC OBSERVATORY INSTRUMENTED WITH A SWEEP FREQUENCY IONOSPHERIC SOUNDER, A VLF RECEIVER, TWO ENERGETIC PARTICLE EXPERIMENTS, A COSMIC NOISE EXPERIMENT, AND AN ELECTROSTATIC PROBE. THE SPACECRAFT USED TWO LONG DIPOLE ANTENNAS (70.9 M AND 22.8 M LONG, RESPECTIVELY) FOR THE SOUNDER, VLF, AND COSMIC NOISE EXPERIMENTS. THE SATELLITE WAS SPIN-STABILIZED AT ABOUT 2.25 RPM AFTER ANTENNA DEPLOYMENT. BY JANUARY 1970, THE SPIN HAD DECAYED TO 1.04 RPM. END PLATES ON THE LONG ALOUETTE 2 ANTENNA SEEM TO HAVE CORRECTED THE RAPID DESPIN OCCURRING ON ALOUETTE 1, WHICH WAS BELIEVED TO RESULT FROM THERMAL DISTORTION OF THE ANTENNA AND FROM RADIATION PRESSURE. THERE WAS NO TAPE RECORDER, SO THAT DATA ARE AVAILABLE ONLY FROM WHEN THE SPACECRAFT WAS IN LINE OF SIGHT OF TELEMETRY STATIONS. TELEMETRY STATIONS ARE LOCATED SO THAT PRIMARY DATA COVERAGE IS NEAR THE 80 DEG W MERIDIAN PLUS AREAS NEAR HAWAII, SINGAPORE, AUSTRALIA, ENGLAND, INDIA, NORWAY, AND CENTRAL AFRICA. INITIALLY, DATA WERE RECORDED FOR ABOUT 7-1/2 HR PER DAY. IN 1972, OBSERVATIONS WERE MADE FOR ABOUT 2 HR PER DAY. ROUTINE SPACECRAFT OPERATION WAS DISCONTINUED AFTER JUNE 3, 1973, BUT SPECIAL REQUEST OPERATION HAS OCCURRED OCCASIONALLY SINCE THEN.

DATA SET NAME- GSFC EXTENDED WORLD MAPS ON MICROFILM

NSSDC ID- 65-098A-00C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/29/65 TO 03/31/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 63 REEL(S) OF MICROFILM

THESE DATA, PREPARED AT GSFC, ARE LISTINGS OF SATELLITE POSITION AND SUPPORTING INFORMATION FOR EACH MINUTE (EVERY 2 MIN AFTER SEPTEMBER 1970) OF GMT. THE INFORMATION IN THE LISTINGS INCLUDES LOCAL SOLAR TIME, GEODETIC LOCATION, SEVERAL VARIETIES OF MAGNETIC FIELD REFERENCED LOCATION, AND SUN POSITION. DATA ARE ALSO GIVEN FOR SPECIAL TIMES (EQUATOR CROSSINGS, NORTHERNMOST AND SOUTHERNMOST POINTS, SUNLIGHT ENTRANCE AND EXIT, ETC.).

DATA SET NAME- CRC INDEX OF EXPERIMENT "DATA AVAILABLE" ON TAPE

NSSDC ID- 65-098A-00E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/29/65 TO 12/31/66
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE DATA PREPARED BY THE COMMUNICATIONS RESEARCH CENTRE, OTTAWA, CANADA, INDEX THE START AND STOP TIMES FOR THE OPERATION OF ALL FIVE SATELLITE EXPERIMENTS. THE INFORMATION PRESENTED INCLUDES TELEMETRY STATION, TELEMETRY TAPE IDENTIFICATION, DAY OF YEAR, START TIME DIP LATITUDE AND GYROFREQUENCY AT THE SATELLITE, START AND STOP VALUES OF GMT FOR EACH PASS, LOCAL MEAN TIME, HEIGHT ABOVE THE SPHEROID, AND GEODETIC POSITION. THE DATA ARE ON 800 BPI, 7- AND 9-TRACK, BCD MAGNETIC TAPE.

DATA SET NAME- CRC PUBLISHED INDEX OF EXPERIMENT "DATA AVAILABLE"

NSSDC ID- 65-098A-00F

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 11/29/65 TO 12/31/66
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 BOOK(S) OR BOUND VOLUME(S)

THESE DATA INDEX THE START AND STOP GMT FOR THE OPERATION OF ALL FIVE SATELLITE EXPERIMENTS. THE INFORMATION PRESENTED INCLUDES TELEMETRY STATION, TELEMETRY TAPE IDENTIFICATION, START VALUES OF DIP LATITUDE AND GYROFREQUENCY AT THE SATELLITE, DAY OF YEAR, AND FOR EACH TELEMETRY PASS STATION, START AND STOP VALUES OF LOCAL MEAN TIME, HEIGHT ABOVE THE SPHEROID, AND GEODETIC POSITION. THE DATA ARE IN ONE VOLUME ENTITLED "ALOUETTE II DATA AVAILABLE," PUBLISHED BY THE DEPARTMENT OF COMMUNICATIONS, COMMUNICATIONS RESEARCH CENTRE, OTTAWA, CANADA.

BELROSE, ALOUETTE 2

EXPERIMENT NAME- VLF RECEIVER

NSSDC ID- 65-098A-02

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST USABLE DATA RECORDED- 06/03/73

PERSONNEL
PI - J.S. BELROSE ..... COMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - F.W. PALMER ..... COMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

THE VLF EXPERIMENT WAS A WIDEBAND HIGH-GAIN RECEIVER WITH A PASSBAND FROM 0.05 TO 30 KHZ THAT USED THE LONG SOUNDER ANTENNA. THE INSTRUMENT WAS A CONSIDERABLY IMPROVED VERSION OF THE ALOUETTE 1 RECEIVER. THE STANDARD VLF DATA FORM WAS A SONOGRAM (GRAPH) WHICH SHOWED SIGNAL AS A FUNCTION OF TIME AND FREQUENCY. WHISTLERS, IONOSPHERIC NOISE, VLF NOISE, ETC. WERE OBSERVED IN THIS VERY LOW REGION OF THE RADIO FREQUENCY SPECTRUM. PERFORMANCE WAS NOMINAL EXCEPT FOR INTERFERENCE FROM THE SOUNDER. THIS INTERFERENCE DID NOT PREVENT OBSERVATIONS OF USEFUL DATA. THE SOUNDER OPERATION WAS PREDOMINANT, BUT A SMALL PERCENTAGE OF OBSERVATIONS WERE VLF ONLY OR BOTH VLF AND SOUNDER. A PARTIAL INDEX OF OPERATION TIMES AND LOCATIONS FOR THIS EXPERIMENT APPEARS IN DATA SET 65-098A-00E.

DATA SET NAME- VLF SPECTROGRAMS

NSSDC ID- 65-098A-02A

AVAILABILITY OF DATA SET- DATA AVAILABLE FROM EXPERIMENTER

TIME PERIOD COVERED- 12/00/65 TO 06/00/73
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 REEL(S) OF MICROFILM

THIS DATA SET IS IN A STANDARD GRAPHIC FORM (FREQUENCY VERSUS TIME) FOR RAW VLF DATA. THESE SONOGRAMS ON 35-MM FILM WERE PREPARED BY THE EXPERIMENTER FROM ANALOG DATA ON MAGNETIC TAPE, RECORDED AT TELEMETRY STATIONS IN REAL TIME. APPROXIMATELY 9000 PASSES WERE RECORDED, FROM WHICH SONOGRAMS HAVE BEEN PREPARED FOR ABOUT 1500 PASSES. MOST OF THE SONOGRAMS HAVE BEEN COMPILED FROM PASSES OVER THE OTTAWA STATION, ALTHOUGH OVER HALF OF THE DATA OBSERVED WERE FROM OTHER LOCATIONS. BY SPECIAL ARRANGEMENT, ANY DATA AVAILABLE ON TAPE CAN BE PROVIDED IN LIMITED QUANTITIES IN SONOGRAM FORM. EACH PASS PROCESSED INTO SONOGRAMS CONSISTS OF THREE PARTS, EACH USING DIFFERENT RANGES ON THE FREQUENCY SCALES, I.E., NOMINALLY 0 TO 20, 0 TO 10, AND 0 TO 2.5 KHZ. THE TIME SCALE FOR THE FIRST TWO PARTS IS 0.25 IN./SEC AND IS 0.125 IN./SEC FOR THE 0- TO 5-KHZ SONOGRAMS. IDENTIFICATION INFORMATION IS NOTED PRIOR TO EACH PASS OVER A STATION. TIME IS SHOWN (IN UT) AT 10-SEC INTERVALS ALONG THE EDGE OF THE SONOGRAMS. AN ANALOG REPRESENTATION OF THE VLF-RECEIVER-AGC LEVEL IS ALSO SHOWN ALONG THE EDGE OF THE SONOGRAMS. THESE DATA CAN BE MADE AVAILABLE FOR VIEWING BY CONTACTING THE EXPERIMENTER, DR. R. E. BARRINGTON, COMMUNICATIONS RESEARCH CENTRE, DEPT. OF COMMUNICATIONS, P. O. BOX 490, STATION A, OTTAWA, ONTARIO, CANADA, K1N 8T5.

GRACE, ALOUETTE 2

EXPERIMENT NAME- CYLINDRICAL ELECTROSTATIC PROBE

NSSDC ID- 65-098A-05

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST USABLE DATA RECORDED- 06/03/73

PERSONNEL
PI - L.H. GRACE ..... NASA-GSFC
GREENBELT, MD

THIS CYLINDRICAL ELECTROSTATIC PROBE OBSERVED ELECTRON DENSITY IN THE IONOSPHERE. IT WAS A TYPE OF LANGMUIR PROBE CONSISTING OF A COLLECTOR ELECTRODE EXTENDING FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING EXTENDED 23 CM FROM THE SPACECRAFT AND THE COLLECTOR ELECTRODE EXTENDED 46 CM. TWO SENSORS WERE MOUNTED ON OPPOSITE SIDES OF THE LOWER PORTION OF THE SATELLITE AND BOTH EXTENDED DOWNWARD AT AN ANGLE OF 45 DEG TO THE SPACECRAFT SPIN AXIS, WHICH WAS ORIENTED IN A NORTHWARD DIRECTION IN THE ORBITAL PLANE. THE SENSORS WERE OPERATED SEQUENTIALLY. THIS EXPERIMENT OPERATED NOMINALLY FROM LAUNCH. AN INDEX OF OPERATION TIMES AND LOCATIONS FOR THIS EXPERIMENT IS AVAILABLE IN DATA SETS 65-098A-00E (TAPE) OR 65-098A-00F (HARDCOPY).

DATA SET NAME- ELECTRON DENSITY AND TEMPERATURE ON TAPE

NSSDC ID- 65-098A-05A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/21/66 TO 11/13/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE REDUCED DATA, PREPARED BY THE EXPERIMENTER, LIST ABOUT 21 MONTHS OF ELECTRON NUMBER DENSITIES AND ELECTRON TEMPERATURES OBSERVED AT THE SATELLITE. THE DATA HAVE BEEN CALCULATED FROM THE TELEMETERED RETARDING POTENTIAL CURVES. INCLUDED IN THE LISTINGS FOR EACH DATA POINT ARE TELEMETRY STATION, ORBIT NUMBER, DATA AND TIME (UT AND LOCAL), GEOGRAPHIC AND MAGNETIC (MCILWAIN, DIP, INVARIANT, AND DIPOLE MODEL) LOCATIONS, HEIGHT ABOVE THE REFERENCE ELLIPSOID, SOLAR ZENITH ANGLE, SOLAR (F10.7) AND PLANETARY (AP) INDEXES, SATELLITE POTENTIAL, AND RECORD COUNT. TEMPERATURE DATA ARE AVAILABLE FOR ONLY ABOUT 5 PERCENT OF THE DATA POINTS AND ARE SCATTERED THROUGHOUT THE OBSERVING PERIOD. ELECTRON DENSITY VALUES ARE PRESENT AT NEARLY ALL DATA POINTS. GAPS IN TIME COVERAGE ARE USUALLY A FEW ORBITS OR LESS. THE DATA HAVE GAPS IN COVERAGE CAUSED PRIMARILY BY LACK OF A TAPE RECORDER ON THE SATELLITE AND LIMITATIONS OF EXPERIMENT SCHEDULING. THESE SAME DATA ARE AVAILABLE ON MICROFILM AS DATA SET 65-098A-05B. THIS DATA SET IS ON BCD, 800-BPI, 9-TRACK MAGNETIC TAPE.

DATA SET NAME- ELECTRON DENSITY AND TEMPERATURE ON MICROFILM

NSSDC ID- 65-098A-05B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/21/66 TO 11/13/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THESE REDUCED DATA, ON 35-MM MICROFILM, WERE PREPARED BY THE EXPERIMENTER AND LIST ABOUT 21 MONTHS OF ELECTRON NUMBER DENSITIES AND ELECTRON TEMPERATURES OBSERVED AT THE SATELLITE. THE DATA HAVE BEEN CALCULATED FROM THE TELEMETERED RETARDING POTENTIAL CURVES. INCLUDED IN THE LISTING FOR EACH DATA POINT ARE TELEMETRY STATION, ORBIT NUMBER, DATE AND TIME (UT AND LOCAL), GEOGRAPHIC AND MAGNETIC (MCILWAIN, DIP, DIPOLE, AND INVARIANT) LOCATIONS, HEIGHT ABOVE THE REFERENCE ELLIPSOID, SOLAR ZENITH ANGLE, SOLAR (F10.7) AND PLANETARY (AP) INDEXES, SATELLITE POTENTIAL, AND RECORD COUNT. TEMPERATURE DATA ARE AVAILABLE FOR ONLY ABOUT 5 PERCENT OF THE DATA POINTS AND ARE SCATTERED THROUGHOUT THE OBSERVING PERIOD. ELECTRON DENSITY VALUES ARE PRESENT AT NEARLY ALL DATA POINTS. GAPS IN TIME COVERAGE ARE USUALLY A FEW ORBITS OR LESS. THE DATA GAPS IN COVERAGE ARE CAUSED PRIMARILY BY LACK OF A TAPE RECORDER ON THE SATELLITE AND LIMITATIONS OF EXPERIMENT SCHEDULING. THESE SAME DATA ARE AVAILABLE ON MAGNETIC TAPE AS DATA SET 65-098A-05A.

DATA SET NAME- ELECTRON DENSITY AND TEMPERATURE PLOTS ON MICROFILM

NSSDC ID- 65-098A-05C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/21/66 TO 03/01/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THESE DATA PLOTS ON 35-MM MICROFILM WERE PREPARED BY THE EXPERIMENTER FROM THE DATA IN DATA SET 65-098A-05A (OR 65-098A-05B). EACH PLOT SHOWS ABOUT 1 WEEK OF ELECTRON DENSITY OBSERVATIONS. THE ELECTRON NUMBER DENSITY (LOG SCALE) ORDINATE IS PLOTTED AGAINST AN ABSCISSA OF LINEARLY-SPACED DIP LATITUDE. THE FULL RANGE OF DIP FROM -90 TO +90 AND BACK TO -90 DEG IS SHOWN ON THE ABSCISSA IN ORDER THAT THE OBSERVATIONS FROM OPPOSITE SIDES OF THE ORBIT ARE NOT MIXED. PRECESSION OF PERIGEE PROGRESSES SLOWLY ENOUGH (-1.89 DEG/DAY) SO THAT SATELLITE ALTITUDE CHANGES OVER THE 1-WEEK PERIOD (FOR A GIVEN LOCATION) CAN BE CONSIDERED TO BE ONLY A MINOR CAUSE OF ELECTRON DENSITY VARIATION. THE ORBIT PLANE PRECESSION IS ALSO SLOW ENOUGH (-0.79 DEG/DAY) THAT, FOR MOST PRACTICAL PURPOSES, THE LOCAL TIME OF DAY FOR OBSERVATIONS AT EACH LATITUDE AS PLOTTED WOULD NOT CHANGE SIGNIFICANTLY OVER THE 1-WEEK PERIOD.

WHITTEKER, ALOUETTE 2

EXPERIMENT NAME- SWEEP-FREQUENCY SOUNDER

NSSDC ID- 65-098A-01

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST DATA RECORDED- 06/03/73

PERSONNEL

PI -	J.H.	WHITTEKER	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	J.E.	JACKSON	NASA-GSFC GREENBELT, MD
OI -	J.W.	KING	APPLETON LAB SLOUGH, BERKS, ENGLAND
OI -	L.	COLIN	NASA-ARC MOFFETT FIELD, CA
OI -	J.	TURNER	AUST DEPT OF INTERIOR SYDNEY, AUSTRALIA
OI -	C.	TAIEB	CNET PARIS, FRANCE
OI -	O.	HOLT	AURORAL OBS TROMSO, NORWAY
OI -	G.L.	NELMS	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	Y.	OGATA	RADIO RESEARCH LAB TOKYO, JAPAN
OI -	R.	RAGHAVARAO	PHYSICAL RESEARCH LAB AHMEDABAD, INDIA
OI -	E.S.	WARREN	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	G.E.K.	LOCKWOOD	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA

THE SWEEP FREQUENCY IONOSONDE WAS A RADIO TRANSMITTER/RECEIVER THAT RECORDED THE TIME DELAY BETWEEN A TRANSMITTED AND RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF FREQUENCIES BETWEEN 0.12 AND 14.5 MHZ WERE SAMPLED ONCE EVERY 32 SEC. A MULTIPLICITY OF DELAY TIMES WAS USUALLY OBSERVED DUE TO BIREFRINGENCE OF THE IONOSPHERE, NONVERTICAL PROPAGATION, GROUND ECHOES, PLASMA RESONANCES, ETC. DELAY TIME WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL, ELECTRON DENSITY ALONG THE PROPAGATION PATH, AND MODE OF PROPAGATION. THE STANDARD DATA FORM IS AN IONOGRAM (GRAPH) SHOWING DELAY TIME (VIRTUAL DISTANCE OF SIGNAL REFLECTION FROM THE SATELLITE) VERSUS FREQUENCY. TWO OTHER COMMON FORMS OF DATA WERE PREPARED FROM THE IONOGRAMS. THEY ARE DIGITAL FREQUENCY AND/OR VIRTUAL HEIGHT VALUES OF CHARACTERISTIC IONOSPHERIC FEATURES AND COMPUTATIONS OF ELECTRON DENSITY PROFILES. PERFORMANCE WAS EXCELLENT. INITIALLY, ABOUT 7-1/2 HR OF OBSERVATIONS PER DAY WERE RECORDED. IN FEBRUARY 1973, ABOUT 1 HR PER DAY WAS BEING RECORDED. AN INDEX OF OPERATION TIMES AND LOCATIONS FOR THIS EXPERIMENT IS AVAILABLE IN DATA SET 65-098A-00E.

DATA SET NAME- SWEEP-FREQUENCY IONOGRAMS ON MICROFILM

NSSDC ID- 65-098A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

ALOUETTE 2

TIME PERIOD COVERED- 11/29/65 TO 04/23/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2554 REEL(S) OF MICROFILM

THESE IONOGRAMS ARE REDUCED DATA PLOTS ON 35-MM MICROFILM SHOWING FREQUENCY VS ECHO TIME DELAY (VIRTUAL RANGE) OF PULSED RADIO SIGNALS. THEY ARE AN ORIGINAL FORM OF THE DATA PREPARED DIRECTLY FROM THE TELEMETRY TAPE. THE DATA ARE AS COMPLETE AS IS PERMITTED BY THE LIMITATIONS OF SPACECRAFT POWER, LACK OF ONBOARD TAPE RECORDING (TELEMETRY STATION LOCATION, TELEMETRY STATION SCHEDULING, ETC.), AND DATA PROCESSING FACILITIES. THE DATA COVERAGE IS PRIMARILY NEAR THE 80 DEGREE W MERIDIAN FOR PERIODS OF TIME UP TO 7-1/2 HR PER DAY. SINCE ONLY TIME IS NOTED ON EACH IONOGRAM, SATELLITE POSITION AND OTHER RELATED DATA MUST BE OBTAINED FROM ANOTHER SOURCE. (NSSDC DATA SET 65-098A-00C). A PROGRAM FOR THE REDUCTION OF TOPSIDE IONOGRAMS TO ELECTRON DENSITY PROFILES IS AVAILABLE FROM NSSDC (NSSDC DATA SET NSDP PI-21A).

[redacted]

DATA SET NAME- RRL PUBLISHED ELECTRON DENSITY AND SCALE HEIGHT PROFILES ON MICROFICHE

NSSDC ID- 65-098A-01D

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 10/12/66 TO 12/27/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 20 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF ELECTRON DENSITY PROFILES COMPUTED FROM THE DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT THAT WERE SCALED FROM IONOGRAMS. THESE ARE ANALYZED DATA ON MICROFICHE, PUBLISHED BY THE RADIO RESEARCH LABORATORIES, MINISTRY OF POSTS AND TELECOMMUNICATIONS, TOKYO, JAPAN. WITHIN THE VOLUME, DATA ARE ORDERED CHRONOLOGICALLY. ALL DATA WERE OBSERVED FROM THE JAPANESE TELEMETRY STATION AT KASHIMA. SATELLITE LOCATION, OBSERVATION TIME, SOLAR ZENITH ANGLE AT THE SATELLITE, HEIGHT OF THE F2 MAXIMUM, DENSITY AT THE F2 MAXIMUM, TOTAL ELECTRON CONTENT BETWEEN THE SATELLITE AND THE F2 MAXIMUM, KP, AND AN INDICATION OF PROFILE QUALITY ARE INCLUDED WITH EACH PROFILE. HEIGHT OF MAXIMUM, ELECTRON DENSITY AT MAXIMUM, AND TOTAL ELECTRON CONTENT ARE MISSING FROM A MAJORITY OF THE PROFILES BECAUSE OF THE LACK OF IONOSPHERIC REFLECTIONS ON THE IONOGRAMS NEAR THE F2 CRITICAL FREQUENCIES. THIS HAPPENS FREQUENTLY DUE TO WEAK SIGNALS WHEN THE SATELLITE ALTITUDE IS HIGH, I.E., ABOVE 1200 TO 1500 KM. PROFILE DATA CONSIST OF ELECTRON DENSITY AND REAL HEIGHT VALUES INTERPOLATED FOR EACH 50 KM AND EXTENDING FROM THE NEXT STANDARD LEVEL BELOW THE SATELLITE DOWN TO THE LOWEST STANDARD LEVEL FROM WHICH REFLECTIONS WERE OBSERVED. TEN PROFILES ARE LISTED ON EACH PAGE. AN INDEX OF THE PASSES, BY PASS, IS INCLUDED WITH THE EXPLANATORY TEXT. SIMILARLY FORMATTED SCALE HEIGHT PROFILES ARE ALSO INCLUDED. THESE APPEAR TO INCLUDE ALL OBSERVATIONS MADE FROM KASHIMA DURING THE LAST QUARTER OF 1966, ALL OF 1967, AND 1968. THEY REPRESENT A VERY SMALL PORTION OF THE TOTAL ALOUETTE 2 IONOSONDE OBSERVATIONS.

[redacted]

DATA SET NAME- INDEXING INFORMATION FOR SWEEP-FREQUENCY IONOGRAMS WITH DUCTED ECHOES

NSSDC ID- 65-098A-01E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/01/65 TO 08/13/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF REELS OF 7-TRACK, 556 BPI, BCD MAGNETIC TAPE THAT IDENTIFY IONOGRAMS SHOWING DUCTED ECHOES. THESE ARE CONSIDERED AS ANALYZED DATA SINCE THE CASES PRESENTED IN THE DATA SET WERE SELECTED FROM A LARGE NUMBER OF IONOGRAMS REVIEWED AND SINCE THE LISTINGS PROVIDE SEVERAL FREQUENCY CHARACTERISTICS OF THE DUCTED ECHOES THAT HAVE BEEN SCALED FROM THE IONOGRAMS. THESE DATA WERE PREPARED AT NASA'S ELECTRONICS RESEARCH CENTER FROM MOST OF THE ALOUETTE 2 IONOGRAMS OBSERVED FROM LAUNCH UNTIL APRIL 21, 1969. THERE ARE TWO DIFFERENT FORMATS FOR THE IONOGRAMS. INFORMATION INCLUDED ON BOTH FORMATS CONTAIN UNIVERSAL TIME AND LOCAL SOLAR OBSERVATION TIME, GEODETIC AND GEOMAGNETIC LOCATION OF THE SATELLITE, TELEMETRY STATION, GYROFREQUENCY AT THE SATELLITE LOCATION, AND DISCRETE FREQUENCIES RELATING TO THE DUCTED ECHOES. ONE FORMAT ALSO CONTAINS ADDITIONAL INFORMATION RELATING TO THE DUCTED ECHO CHARACTERISTICS. ONE TAPE INDEXES 6171 IONOGRAMS FROM OVER 100 DIFFERENT ROLLS (100 FT) OF IONOGRAMS FROM 17 DIFFERENT TELEMETRY STATIONS. THE SECOND TAPE PROVIDES MORE DETAILED INFORMATION ON 2922 OF THESE IONOGRAMS FROM SANTIAGO, SINGAPORE, AND ORRORAL. THE SECOND TAPE IS ORDERED CHRONOLOGICALLY, BY STATION.

[redacted]

DATA SET NAME- PHOTOGRAPHIC PRINTS OF SWEEP-FREQUENCY IONOGRAMS WITH DUCTED ECHOES

NSSDC ID- 65-098A-01F

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/01/65 TO 08/13/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2451 B/W PRINT(S)

THIS DATA SET IS A SUBSET OF DATA SET 65-098A-01A. IT CONSISTS OF 8- BY 10-IN. PHOTOGRAPHIC PRINTS PREPARED FROM THE IONOGRAM FILM, WHICH SHOW DUCTED ECHOES, WHICH ARE DESCRIBED AS ECHOES HAVING UNUSUALLY LONG DELAY TIMES OR LARGE VIRTUAL RANGES. EACH PRINT COVERS FREQUENCIES FROM BELOW .5 MHZ TO OVER 5 MHZ. THE DATA CONSIST OF 80 BOOKS OF APPROXIMATELY 40 IONOGRAMS PER BOOK, FROM REGIONS NEAR 17 DIFFERENT TELEMETRY STATIONS. THESE DATA WERE OBTAINED FROM IONOGRAMS TAKEN BETWEEN NOVEMBER 29, 1965 AND APRIL 21, 1969. THESE DATA ARE A RELATIVELY COMPLETE COLLECTION OF DUCTED ECHO IONOGRAMS OBSERVED BY ALOUETTE 2 DURING THIS TIME PERIOD, BUT MAKE UP ONLY A VERY SMALL PORTION OF THE TOTAL NUMBER OF ALOUETTE 2 IONOGRAMS OBSERVED DURING THAT PERIOD. A PUBLISHED DESCRIPTION OF THE DATA AND SOME OF ITS USE IS CONTAINED IN NASA TN-D5332. SINCE ONLY TIME IS NOTED ON EACH IONOGRAM, SATELLITE POSITION AND OTHER RELATED DATA MUST BE OBTAINED FROM ANOTHER SOURCE. (SEE DATA SET 65-098A-00C OR 65-098A-00E.)

[redacted]

DATA SET NAME- CRC INTERPOLATED ELECTRON DENSITY PROFILES ON MICROFICHE

NSSDC ID- 65-098A-01G

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 12/15/65 TO 03/09/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 6 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF ELECTRON DENSITY PROFILES COMPILED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT THAT WERE SCALED FROM IONOGRAMS. THESE ARE ANALYZED DATA PRESENTLY IN ONE BOUND BOOK PREPARED BY THE COMMUNICATIONS RESEARCH CENTRE, DEPARTMENT OF COMMUNICATIONS, OTTAWA, CANADA. MORE VOLUMES ARE PLANNED. DATA ARE ORDERED CHRONOLOGICALLY WITHIN THE VOLUME. TELEMETRY STATIONS ARE NOT IDENTIFIED, BUT SATELLITE LOCATION, UT OF OBSERVATION, SATELLITE LOCAL TIME, DIP LATITUDE AT THE SATELLITE, AND OTHER RELEVANT INFORMATION IS LISTED FOR EACH PROFILE. PROFILE DATA CONSIST OF ELECTRON DENSITY AND REAL HEIGHT VALUES FOR THE SATELLITE HEIGHT AND FOR STANDARD HEIGHTS FROM THE SATELLITE DOWN TO THE LOWEST HEIGHT FROM WHICH IONOSPHERIC REFLECTIONS WERE OBSERVED (NOT BELOW 250 KM). STANDARD HEIGHTS ARE FOR 50-KM INTERVALS UP TO 500 KM, FOR 100-KM INTERVALS UP TO 1600 KM, AND FOR 200-KM INTERVALS UP TO 3000 KM. EACH PAGE IS DESIGNED TO ACCOMMODATE 24 PROFILES. THERE ARE 2440 SOUNDINGS LISTED FROM 107 PASSES. OF THESE, 194 OF THE SOUNDINGS LISTED NO PROFILE DATA AT STANDARD HEIGHTS. AN INDEX BYPASS APPEARS IN THE FRONT OF THE VOLUME. THE IONOGRAMS REDUCED WERE SELECTED FOR THEIR SCIENTIFIC INTEREST AND COMPRISE A VERY SMALL SAMPLE OF THE ALOUETTE 2 SOUNDINGS TAKEN. PROFILES FROM NUMEROUS LONGITUDES AND LATITUDES ARE INCLUDED, BUT THOSE FROM NORTHERN HEMISPHERE LATITUDES NEAR 80 DEG W ARE MOST NUMEROUS.

[redacted]

DATA SET NAME- CRC ELECTRON DENSITY VALUES AT LANIHA BOUNDRIES-REDUCED IONOGRAMS ON MICROFICHE

NSSDC ID- 65-098A-01H

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 12/29/65 TO 03/09/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 10 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF ANALYZED ELECTRON DENSITY PROFILES COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT THAT WERE SCALED FROM IONOGRAMS. THESE ARE ANALYZED DATA IN BOUND BOOKS THAT WERE PREPARED BY THE COMMUNICATIONS RESEARCH CENTRE IN OTTAWA, CANADA. WITHIN EACH VOLUME (TWO

BOOKS PER VOLUME). THE DATA ARE ORDERED CHRONOLOGICALLY. TELEMETRY STATIONS ARE NOT IDENTIFIED, BUT SATELLITE LOCATION, TIME OF OBSERVATION, SOLAR ZENITH ANGLE AT THE SATELLITE, DIP LATITUDE AT THE SATELLITE, TOTAL ELECTRON CONTENT DOWN TO ALTITUDE OF HIGHEST IONOSPHERICALLY REFLECTED FREQUENCY, AND OTHER RELEVANT INFORMATION ARE LISTED FOR EACH PROFILE. PROFILE DATA CONSIST OF ELECTRON DENSITY AND REAL HEIGHT VALUES FOR EACH POINT SCALED FROM THE IONOGRAM. FOR INTERPOLATED VALUES OF ELECTRON DENSITY AT STANDARD INCREMENTS OF REAL HEIGHT, SEE DATA SET 65-098A-01G. EACH PROFILE OCCUPIES ABOUT FOUR LINES OF PRINT, AND A CHRONOLOGICAL INDEX OF ALL DATA FROM ALL VOLUMES APPEARS IN THE FRONT OF EACH BOOK. THE IONOGRAMS REDUCED WERE SELECTED FOR THEIR SCIENTIFIC INTEREST AND COVER TIMES FROM DECEMBER 1965, TO DECEMBER 1967. THESE REDUCTIONS ARE FROM A VERY SMALL PORTION OF THE TOTAL OF NEARLY 1 MILLION ALOUETTE 2 IONOGRAMS OBSERVED. DATA FOR MOST LATITUDES ARE INCLUDED BUT THOSE DATA FROM LONGITUDES NEAR 80 DEG W ARE MORE NUMEROUS THAN THOSE FROM OTHER LONGITUDES.

DATA SET NAME- IONOGRAM INVENTORY ON TAPE

NSSDC ID- 65-098A-01I

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/29/65 TO 04/23/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MAGNETIC TAPE

THIS FILE INDEXES THE ALOUETTE 2 IONOGRAMS (DATA SET 65-098A-01A) IN UNITS OF STATION PASS. THE INDEX CAN BE SORTED BY STATION, BY TIME, OR BY OTHER METHODS, AS DESIRED. INFORMATION IN THE DATA SET INCLUDES TELEMETRY STATION AND START AND STOP TIME FOR THE PASSES AND ORBIT NUMBER. THE INDEX, WHICH IS BEING PREPARED FROM A PHYSICAL INVENTORY OF FILM RECEIVED AND SATELLITE EPHEMERIDES, IS MAINTAINED ON 556-BPI, 7-TRACK, BCD MAGNETIC TAPES AND IS UPDATED MONTHLY UNLESS FEW DATA ARE RECEIVED.

DATA SET NAME- NASA-ARC ELECTRON DENSITIES INTERPOLATED TO 100-KM INTERVALS ON (PACKED) TAPE

NSSDC ID- 65-098A-01J

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/29/65 TO 02/15/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THESE ANALYZED DATA ON MAGNETIC TAPE, SUPPLIED BY THE EXPERIMENTER, WERE COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL RANGE THAT WERE SCALED FROM IONOGRAMS. DIGITAL ELECTRON DENSITY VALUES WERE LISTED FOR THE SATELLITE LOCATION AND FOR EACH 100 KM FROM 3500 KM ALTITUDE DOWN TO THE LOWEST HEIGHT OF SIGNAL REFLECTIONS (NORMALLY NEAR 300 KM). THERE ARE 17,315 PROFILES LISTED FOR TIMES BETWEEN NOVEMBER 1965 AND APRIL 1970, FROM THE VICINITY OF 18 DIFFERENT GROUND STATIONS. THESE DATA ARE A SMALL BLOCK OF THE TOTAL ALOUETTE 2 IONOGRAM DATA (LESS THAN 1 PERCENT) BUT FORM ONE OF THE LARGEST BLOCKS OF REDUCED SATELLITE IONOGRAMS AVAILABLE. THESE REDUCTIONS ARE OF OPTIMUM QUALITY BECAUSE BOTH X AND Y TRACE VALUES WERE CHECKED AGAINST ONE ANOTHER DURING COMPUTATION OF THE DENSITY VALUES. THESE DATA ARE PACKED ON TAPE WRITTEN IN EXTENDED BCD INTERCHANGE (EBCDIC) CODE IN ODD PARITY. THE TAPE IS 800-BPI, 7-TRACK, AND AN UNPACKING ROUTINE (CALLED "TAPE") IS AVAILABLE FOR THIS DATA SET. DATA SET 65-098A-01K CONTAINS THE SAME DATA ON MICROFILM.

DATA SET NAME- AMES INTERPOLATED ELECTRON NUMBER DENSITY VERSUS REAL HEIGHT PROFILES ON MICROFILM

NSSDC ID- 65-098A-01K

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/29/65 TO 03/11/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 8 REEL(S) OF MICROFILM

THESE ANALYZED DATA WERE COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL RANGE THAT WERE SCALED FROM IONOGRAMS. DIGITAL ELECTRON DENSITY VALUES WERE LISTED AT THE SATELLITE AND FOR EACH 100 KM FROM 3500 KM ALTITUDE DOWN TO THE LOWEST HEIGHT OF SIGNAL REFLECTIONS (NORMALLY NEAR 300 KM). THERE ARE 17,315 PROFILES LISTED FROM THE VICINITY OF 18 DIFFERENT GROUND STATIONS. THESE DATA ARE A SMALL BLOCK OF THE TOTAL ALOUETTE 2 IONOGRAM DATA (LESS THAN 1 PERCENT) BUT FORM ONE OF THE LARGEST BLOCKS OF REDUCED SATELLITE IONOGRAMS AVAILABLE. THESE REDUCTIONS ARE OF OPTIMUM QUALITY BECAUSE BOTH X AND Y TRACE VALUES WERE CHECKED AGAINST ONE ANOTHER DURING COMPUTATION OF THE DENSITY VALUES. THIS DATA SET ON 16-MM MICROFILM IS A MICROFILM VERSION OF DATA SET 65-098A-01J ON TAPE.

DATA SET NAME- INDEX OF IONOGRAMS SHOWING DUCTED ECHOES

NSSDC ID- 65-098A-01N

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 11/29/65 TO 10/30/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, PROVIDED BY THE EXPERIMENTER'S OFFICE, IS AN INDEX TO LOW-LATITUDE IONOGRAMS CONTAINING DUCTED ECHOES. THE CRITERION FOR SELECTION WAS THAT AT LEAST ONE TRACE FROM THE CONJUGATE HEMISPHERE APPEARED ON THE IONOGRAM. THIS TRACE HAD A POSITIVE SLOPE, AS OPPOSED TO THE NEGATIVE SLOPE OF THE NORMAL X OR O TRACE. EACH RECORD CONTAINED THE SATELLITE IDENTIFICATION, GROUND STATION (QUITO=5, SANTIAGO=8, FT. MEYER=3, DARWIN=21, SINGAPORE=48), PASS START TIME (UT), THE NUMBER OF IONOGRAMS IN THE PASS SHOWING DUCTED ECHOES, AND THE NUMBER NOT SHOWING DUCTED ECHOES. THE TIME COVERED WAS FROM 1965 THROUGH OCTOBER 1971. FOR 4452 PASSES (ABOUT 110,000 IONOGRAMS), APPROXIMATELY 2000 IONOGRAMS WITH DUCTED ECHOES WERE IDENTIFIED. THE DATA ARE AVAILABLE ON 9-TRACK, 800-BPI, EBCDIC MAGNETIC TAPE. SIMILAR DATA FOR OTHER TIMES ARE STORED ON THE SAME TAPE AND ARE DESCRIBED UNDER DATA SETS 62-049A-01Q, 69-009A-01E, AND 71-024A-01E.

DATA SET NAME- CRC ELECTRON DENSITY PROFILES AT SCALED POINTS ON MAGNETIC TAPES

NSSDC ID- 65-098A-01O

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/15/65 TO 07/10/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF ELECTRON DENSITY PROFILES COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT, SCALED FROM IONOGRAMS. THESE ARE ANALYZED DATA ON 800-BPI, 9-TRACK MAGNETIC TAPE, WRITTEN IN EBCDIC AND PREPARED BY THE COMMUNICATIONS RESEARCH CENTRE (CRC), OTTAWA, CANADA. TELEMETRY STATIONS ARE NOT IDENTIFIED, BUT SATELLITE LOCATION, TIME OF OBSERVATION, SOLAR ZENITH ANGLE AT THE SATELLITE, DIP LATITUDE AT THE SATELLITE, TOTAL ELECTRON CONTENT DOWN TO THE ALTITUDE OF HIGHEST IONOSPHERICALLY REFLECTED FREQUENCY, AND OTHER RELEVANT INFORMATION IS NOTED WITH EACH PROFILE. PROFILE DATA CONSIST OF ELECTRON DENSITY AND GEOMETRIC HEIGHT VALUES FOR EACH POINT SCALED FROM THE IONOGRAM. FOR INTERPOLATED VALUES OF ELECTRON DENSITY AT STANDARD INCREMENTS OF GEOMETRIC HEIGHT, A CRC INTERPOLATION PROGRAM (AVAILABLE AT NSSDC) CAN BE RUN WITH THIS DATA SET. THESE IONOGRAMS WERE SELECTED FOR THEIR SCIENTIFIC INTEREST AND COMPRISE ONLY A VERY SMALL PORTION OF REDUCTIONS POSSIBLE FROM THE AVAILABLE IONOGRAMS.

DATA SET NAME- RSRS ELECTRON DENSITY (AND SCALE HEIGHT) PLOTS AND LISTINGS WITH PASS SUMMARY PLOTS

NSSDC ID- 65-098A-01P

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/12/65 TO 08/11/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 5 REEL(S) OF MICROFILM

THESE DATA CONSIST OF SEVERAL DIFFERENT DIGITAL AND PLOTTED FORMS PREPARED FROM THE SINGAPORE, WINKFIELD, AND FALKLAND ISLAND (UK-OPERATED) STATIONS RECEIVING ALOUETTE 2

IONOGRAMS. FOR EACH PASS, A NUMBER OF IONOGRAMS HAVE BEEN DIGITIZED AND PLOTTED (THREE FRAMES PER IONOGRAM). AT THE END OF DATA FOR EACH PASS, THERE APPEARS A THREE-FRAME PASS SUMMARY IN TWO PLOTS AND A LISTING. FRAME 1 FOR EACH IONOGRAM SHOWS THE SUBSATELLITE LOCATION WITH CORRESPONDING LOCAL TIME AND UT. THE TRACE USED FOR ANALYSIS AND THE GYROFREQUENCY AT THE SATELLITE (CALCULATED AND OBSERVED) MAY ALSO BE SHOWN. ON FRAME 2 ARE THE INPUT SCALINGS FOR THE RAW (UNINTERPOLATED) AND INTERPOLATED (EACH 10 KM) PROFILES APPEARING ON FRAME 1. FRAME 2 ALSO CONTAINS INTERPOLATED GEOPOTENTIAL SCALE HEIGHTS (EACH 10 KM), AND TOTAL CONTENT VALUES FOR THREE LAYERS FROM 350, 400, AND 450 KM UP TO 950 KM. ON FRAME 3 IS A SEMI-LOGARITHMIC PLOT OF N(H) VS GEOPOTENTIAL HEIGHT. THE PASS SUMMARY CONTAINS A PLOT OF SELECTED STANDARD N(H) VALUES FROM EACH PROFILE VS GEOGRAPHIC LATITUDE, AND A SIMILAR PLOT FOR SCALE HEIGHTS. FINALLY, LISTINGS ARE GIVEN OF TOTAL N, BY LATITUDE, FOR EACH OF THE THREE LAYERS.

SPACECRAFT COMMON NAME- APOLLO 9

ALTERNATE NAMES- PL-69IN, SA-504
03769

NSSDC ID- 69-018A

LAUNCH DATE- 03/03/69 WEIGHT- 11205. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/13/69

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 03/03/69
ORBIT PERIOD- 88.49 MIN INCLINATION- 33.63 DEG
PERIAPSIS- 166. KM ALT APOAPSIS- 166. KM ALT

APOLLO 9, WHICH WAS COMPOSED OF A COMMAND MODULE (CM), A COMMAND SERVICE MODULE (CSM), A LUNAR MODULE (LM), AND AN INSTRUMENT UNIT (IU), WAS LAUNCHED BY A SATURN V ROCKET ON MARCH 3, 1969, FROM CAPE KENNEDY INTO A NOMINAL ORBIT OF 102.3 BY 103.9 N.M. (166 BY 166 KM). THE CREW WERE COMMANDER J.A. MCDIVITT, CM PILOT D.R. SCOTT, AND LM PILOT R.L. SCHWEIKART. THE VEHICLE ROCKET HAD THREE STAGES, S-IC, S-II, AND S-IVB. THE CM, A CONE-SHAPED CRAFT ABOUT 390 CM IN DIAMETER AT THE LARGE END, SERVED AS A COMMAND, CONTROL, AND COMMUNICATIONS CENTER. SUPPLEMENTED BY THE SM, IT PROVIDED ALL LIFE SUPPORT ELEMENTS FOR THE THREE CREWMEN. THE CM WAS CAPABLE OF ATTITUDE CONTROL ABOUT THREE AXES AND SOME LATERAL LIFT TRANSLATION. IT PERMITTED LM ATTACHMENT AND CM/LM INGRESS AND EGRESS AND SERVED AS A BUOYANT VESSEL AT SEA. THE CSM PROVIDED THE MAIN PROPULSION AND MANEUVERING CAPABILITY. IT WAS JETTISONED JUST BEFORE CM REENTRY. THE CSM WAS A CYLINDER 390 CM IN DIAMETER. THE LM WAS A TWO-STAGE VEHICLE THAT ACCOMMODATED TWO MEN AND COULD TRANSPORT THEM TO THE LUNAR SURFACE. ON APOLLO 9 THE CM AND LM WERE SEPARATED AND SOME MANEUVERS, INCLUDING DOCKING, WERE COMPLETED, BUT THE LM DID NOT LAND BECAUSE THIS WAS AN EARTH-CIRCLING MISSION. THE LM HAD ITS OWN PROPULSION, COMMUNICATION, AND LIFE SUPPORT SYSTEMS. ALL SYSTEMS WORKED NEARLY NORMALLY.

ALLENBY, JR., APOLLO 9

EXPERIMENT NAME- 70-MM HASSELBLAD SPECTRAL TERRAIN PHOTOGRAPHS

NSSDC ID- 69-018A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/13/69

PERSONNEL
PI - R.J. ALLENBY, JR. ..... NASA HEADQUARTERS
WASHINGTON, DC

THE 3065 MULTISPECTRAL TERRAIN PHOTOGRAPHY EXPERIMENT WAS DESIGNED (1) TO OBTAIN MULTISPECTRAL PHOTOGRAPHS FROM SPACE OVER SELECTED LAND AND OCEAN AREAS, (2) TO DETERMINE THE USEFULNESS OF THIS TYPE OF PHOTOGRAPHY FOR EARTH RESOURCES, AND (3) TO DEFINE FUTURE MULTISPECTRAL PHOTOGRAPHIC SYSTEMS. A TOTAL OF 504 PICTURES WERE OBTAINED BY FOUR ELECTRICALLY DRIVEN, MODEL 500-EL HASSELBLAD CAMERAS, EACH WITH DIFFERENT FILM-FILTER COMBINATIONS AND FITTED WITH ZEISS F/2.8 80-MM PLANAR LENSES. THE CAMERAS WERE OPERATED SIMULTANEOUSLY, AND A MANUAL INTERVALOMETER WAS USED TO OBTAIN SYSTEMATIC OVERLAPPING (STEREO) PHOTOGRAPHS. THE CAMERAS WERE MOUNTED COAXIALLY ON A METAL BRACKET DESIGNED TO FIT THE CIRCULAR COMMAND MODULE HATCH WINDOW. THE CAMERAS WERE PRESET, AND THUS NO ADJUSTMENTS WERE MADE BY THE CREW. THE SHUTTERS WERE TRIGGERED SIMULTANEOUSLY AT PREDETERMINED INTERVALS (BETWEEN 5 AND 10 SEC) BY A MANUAL ELECTRIC SWITCH CONTROLLED BY AN ASTRONAUT. FILM-FILTER COMBINATIONS (AND NUMBER OF PHOTOS OBTAINED) WERE AS FOLLOWS - (1) INFRARED EKTACHROME TYPE SO-180 COLOR IR FILM - PHOTAR 15 FILTER SENSITIVE TO 510 TO 900 MU (139). (2) PANATOMIC-X TYPE 3400 BLACK AND WHITE PANCHROMATIC FILM - PHOTAR 58 FILTER SENSITIVE TO 460 TO 610 MU (159). (3) INFRARED AEROGRAPHIC TYPE SO-246 BLACK AND WHITE INFRARED FILM - PHOTAR 89B FILTER SENSITIVE TO 700 TO 900 MU (127), AND (4) PANATOMIC-X TYPE 3400 BLACK AND WHITE PANCHROMATIC FILM - PHOTAR 25A FILTER SENSITIVE TO 580 MU INTO THE IR REGION (159). THE REGIONS PHOTOGRAPHED INCLUDED THE SOUTHWESTERN UNITED STATES (SOUTH OF 34 DEG N LAT), NORTHWESTERN MEXICO, THE SOUTH CENTRAL AND SOUTHEASTERN UNITED STATES, SOUTHERN MEXICO, AND THE CARIBBEAN-ATLANTIC REGION. THE HANDHELD PHOTOGRAPHY WAS OBTAINED SIMULTANEOUSLY WITH THE FOUR-CAMERA MULTISPECTRAL PHOTOGRAPHY. THE EXPERIMENT WAS VERY SUCCESSFUL AS TO QUANTITY AND QUALITY OF PHOTOGRAPHS OBTAINED. A MORE COMPLETE DESCRIPTION OF THIS EXPERIMENT IS AVAILABLE IN "APOLLO 9 MULTISPECTRAL PHOTOGRAPHIC INFORMATION." NASA TM X-1957, APRIL 1970.

DATA SET NAME- COMPLETE SET OF COLOR POSITIVE 70-MM PHOTOS

NSSDC ID- 69-018A-01A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 03/03/69 TO 03/13/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET CONSISTS OF 786 FRAMES FROM SIX MAGAZINES OF PHOTOGRAPHS TAKEN DURING THE FLIGHT OF APOLLO 9. THE PHOTOS WERE TAKEN USING A HANDHELD HASSELBLAD 000C CAMERA LOADED WITH EKTACHROME SO-368 FILM. THESE MAGAZINES CONTAIN TERRAIN PHOTOS TAKEN SIMULTANEOUSLY WITH THE FOUR-CAMERA MULTISPECTRAL PHOTOGRAPHY EXPERIMENT. ALSO ON THE FILM ARE PHOTOS OF DOCKING AND EVA MANEUVERS, THE CM AND LM, AND CLOUD FORMATIONS. REQUESTS FOR THE PHOTOGRAPHY MAY BE MADE TO TECHNOLOGY APPLICATION CENTER, UNIVERSITY OF NEW MEXICO, ALBUQUERQUE, NEW MEXICO 87106.

DATA SET NAME- MULTISPECTRAL POSITIVE 70-MM INFRARED PHOTOS

NSSDC ID- 69-018A-01B

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 03/03/69 TO 03/13/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET CONTAINS ONE MAGAZINE (139 PHOTOS) OF INFRARED EKTACHROME TYPE SO-180 COLOR POSITIVE FILM, ONE MAGAZINE (127 PHOTOS) OF INFRARED AEROGRAPHIC TYPE SO-246 BLACK AND WHITE POSITIVE FILM, AND TWO MAGAZINES (318 PHOTOS) OF PANATOMIC-X TYPE 3400 BLACK AND WHITE POSITIVE FILM MAINTAINED ON ONE 70-MM REEL. THESE MAGAZINES CONTAIN ALL THE DATA RETURNED BY THE MULTISPECTRAL PHOTOGRAPHY EXPERIMENT - 127 FOUR-CAMERA SETS OF PHOTOGRAPHS SHOWING A SIGNIFICANT PORTION OF CLOUD-FREE LAND MASS AREAS. THE MAGAZINES INCLUDE FRAMES OF NORTHERN MEXICO, THE COLORADO, YUKA, CHIHUAHUA, AND SONORA DESERTS, THE FORESTED MOUNTAINS, THE GREAT PLAINS, THE MISSISSIPPI VALLEY, THE SOUTHERN APPALACHIANS AND THE ADJACENT PIEDMONT, AND THE SOUTH EASTERN COASTAL PLAIN. THE QUALITY OF THESE PHOTOGRAPHS RANGES FROM VERY GOOD TO EXCELLENT. THESE DATA ARE AVAILABLE TO INVESTIGATORS IN THE NASA EARTH RESOURCES PROGRAM FROM THE EARTH RESOURCES DIVISION, NASA-JSC, HOUSTON, TEXAS. OTHER REQUESTS SHOULD BE MADE TO TECHNOLOGY APPLICATION CENTER, UNIVERSITY OF NEW MEXICO, ALBUQUERQUE, NEW MEXICO, 87106.

SPACECRAFT COMMON NAME- APOLLO 12 LM/ALSEP

ALTERNATE NAMES- 04246, ALSEP 12
LEM 12, APOLLO 12C

NSSDC ID- 69-099C

LAUNCH DATE- 11/14/69 WEIGHT- 4379. KG

STATUS OF OPERATION- PARTIAL

THE LUNAR MODULE (LM) WAS A TWO-STAGE VEHICLE DESIGNED FOR SPACE OPERATIONS NEAR AND ON THE MOON. THE LM STOOD 7 M HIGH AND WAS 9.4 M WIDE (DIAGONALLY ACROSS THE LANDING GEAR). THE ASCENT AND DESCENT STAGES OF THE LM OPERATED AS A UNIT UNTIL STAGING, WHEN THE ASCENT STAGE FUNCTIONED AS A SINGLE

SPACECRAFT FOR RENDEZVOUS AND DOCKING WITH THE COMMAND MODULE (CM). THE ALSEP EXPERIMENTS INCLUDED -- (1) THE PASSIVE SEISMOGRAPH, WHICH WAS DESIGNED TO MEASURE SEISMIC ACTIVITY AND PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR. (2) THE SUPRATHERNAL ION DETECTOR, DESIGNED TO MEASURE THE FLUX COMPOSITION, ENERGY, AND VELOCITY OF LOW-ENERGY POSITIVE IONS. (3) THE COLD CATHODE ION GAUGE, DESIGNED TO MEASURE THE ATMOSPHERE AND ANY VARIATIONS WITH TIME OR SOLAR ACTIVITY SUCH ATMOSPHERE MAY HAVE. (4) THE CHARGED PARTICLE LUNAR ENVIRONMENT EXPERIMENT, DESIGNED TO MEASURE PARTICLE ENERGIES OF SOLAR PROTONS AND ELECTRONS THAT REACH THE LUNAR SURFACE AND TO PROVIDE DATA ON ENERGY DISTRIBUTION OF THESE SOLAR PARTICLES. (5) THE LUNAR SURFACE MAGNETOMETER (LSM), DESIGNED TO MEASURE THE MAGNETIC FIELD AT THE LUNAR SURFACE, AND (6) THE SOLAR WIND SPECTROMETER, WHICH MEASURED THE FLUXES AND SPECTRA OF THE ELECTRONS AND PROTONS THAT EMANATE FROM THE SUN AND REACH THE LUNAR SURFACE. THE LM ITSELF WAS ON THE LUNAR SURFACE NOVEMBER 19-20, 1969.

FREEMAN, APOLLO 12 LM/ALSEP

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR

NSSDC ID- 69-099C-05

STATUS OF OPERATION- PARTIAL

PERSONNEL
PI - J.W. FREEMAN ..... RICE U
HOUSTON, TX
OI - F.C. MICHEL ..... RICE U
HOUSTON, TX

THIS EXPERIMENT, WHICH WAS PART OF THE ALSEP PACKAGE, STUDIED THE IONIC ENVIRONMENT OF THE MOON BY DETECTING FREE-STREAMING AND THERMALIZED SOLAR WIND IONS AND THOSE IONS WHICH RESULT FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE. A LOW-ENERGY CURVED-PLATE MASS ANALYZER (MA), WITH A VELOCITY FILTER OF CROSSED ELECTRIC AND MAGNETIC FIELDS, DETERMINED THE PARTICLE FLUX IN 20 INTERVALS OVER THE RANGE 0.2 TO 48.6 EV PER UNIT CHARGE, WITH SPECIES DISCRIMINATION OF MASSES UP TO 1000 AMU. ANOTHER ANALYZER (TOTAL ION DETECTOR-TID) WITHOUT A VELOCITY FILTER DETECTED HIGHER-ENERGY PARTICLES IN 20 ENERGY INTERVALS BETWEEN 10 AND 3500 EV. THE POTENTIAL OF ONE INSTRUMENT (FOR EACH INSTRUMENT PLATE) RELATIVE TO THE LUNAR SURFACE IS VARIED THROUGH 24 STEPS EVERY 9.6 MIN, AND FOR EACH STEP THE POTENTIAL OF THE OTHER INSTRUMENT PLATE RELATIVE TO THE FIRST IS VARIED THROUGH 20 STEPS. DUE TO ITS ORIENTATION, THIS INSTRUMENT DID NOT OBSERVE SOLAR WIND PARTICLES EXCEPT IN THE SHEATH AND TAIL. HOWEVER, IT DID SEE UPSTREAMING PARTICLES FROM THE EARTH'S BOW SHOCK. HIGH-VOLTAGE POWER SUPPLY ARCING CAUSED SOME LOSS OF DATA AFTER MARCH 18, 1970. THE INSTRUMENT WAS NOT OPERATED WHEN SENSOR TEMPERATURE EXCEEDED 85 DEG C.

DATA SET NAME- PLOTS OF MASS ANALYZER AND TOTAL ION DATA ON 16-MM MICROFILM, 24-SEC RES DATA

NSSDC ID- 69-099C-05A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/14/71 TO 02/01/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 22 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED MICROFILM REELS CONTAIN PLOTS OF THE TOTAL ION DATA IN 20 CHANNELS FROM 3500 EV/Q TO 10 EV/Q, THE MASS SPECTROMETER DATA IN SIX ENERGY RANGES FROM 48.6 EV TO 0.2 EV, AND IN 20 MASS RANGES FROM 10 TO 1000 AMU PLOTTED AGAINST FRAME NUMBER. (BOTH SPECTRA ARE ON THE SAME PLOT). EACH SET OF SPECTRA REQUIRES 24 SEC TO COMPLETE IN THE NORMAL EXPERIMENT MODE. INTERPRETATION OF THESE PLOTS REQUIRES REFERENCE TO HOUSEKEEPING DATA IN DATA SET 69-099C-05B. DATA EARLIER THAN SEPTEMBER 14, 1971, ARE AVAILABLE IN HARDCOPY. CURRENTLY HELD BY THE EXPERIMENTER.

DATA SET NAME- LISTS OF MASS ANALYZER AND TOTAL ION DATA ON 16-MM MICROFILM, 24-SEC RES DATA

NSSDC ID- 69-099C-05B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/14/71 TO 02/03/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 37 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED 16-MM MICROFILM REELS CONTAIN LISTINGS OF THE 20-CHANNEL TOTAL ION SPECTRA FROM 3500 EV/Q TO 10 EV/Q, THE MASS SPECTROMETER DATA FROM SIX ENERGY RANGES FROM 48.6 EV TO 0.2 EV, AND IN 20 MASS RANGES OF 10 TO 1000 AMU LISTED AGAINST FRAME NUMBER AND TIME. ALSO INCLUDED ARE HOUSEKEEPING DATA NEEDED TO INTERPRET THESE LISTINGS AND THE PLOTS IN DATA SET 69-099C-05A. EACH SET OF TOTAL ION SPECTRA AND MASS ANALYZER SPECTRA REQUIRES 24 SEC TO COMPLETE. DATA EARLIER THAN SEPTEMBER 14, 1971, ARE AVAILABLE IN HARDCOPY, CURRENTLY HELD BY THE EXPERIMENTER.

DATA SET NAME- MASS ANALYZER DATA ON TAPE

NSSDC ID- 69-099C-05C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/19/69 TO 03/03/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 14 REEL(S) OF MAGNETIC TAPE

THESE DATA ARE ON SEVEN TRACK 800 BPI ODD PARITY IBM COMPATIBLE TAPES. WORDS ARE 24 BIT BINARY INTEGERS WITH NEGATIVE NUMBERS REPRESENTED AS 2'S COMPLEMENT. 28 WORDS PER LOGICAL RECORD AND 100 LOGICAL RECORDS BLOCKED INTO EACH PHYSICAL RECORD. TWO STANDARD TAPEMARKS ARE WRITTEN AFTER THE LAST PHYSICAL RECORD TO SIGNIFY THE END OF THE DATA ON THE TAPE. WHEN RELIABLE DATA ARE NOT AVAILABLE, -1'S ARE INSERTED. EACH 28-WORD LOGICAL RECORD CONTAINS TIME, THE 20 CHANNELS OF ACCUMULATED COUNTS FOR A GIVEN INSTRUMENT-TO-LUNAR SURFACE POTENTIAL, AND HOUSEKEEPING PARAMETERS FOR THE TOTAL ION DETECTOR.

DATA SET NAME- TOTAL ION ENERGY ANALYZER DATA

NSSDC ID- 69-099C-05F

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/19/69 TO 03/14/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 14 REEL(S) OF MAGNETIC TAPE

THESE DATA ARE ON SEVEN TRACK 800 BPI ODD PARITY IBM COMPATIBLE TAPES. WORDS ARE 24 BIT BINARY INTEGERS WITH NEGATIVE NUMBERS REPRESENTED AS 2'S COMPLEMENT. 28 WORDS PER LOGICAL RECORD AND 100 LOGICAL RECORDS BLOCKED INTO EACH PHYSICAL RECORD. TWO STANDARD TAPEMARKS ARE WRITTEN AFTER THE LAST PHYSICAL RECORD TO SIGNIFY THE END OF THE DATA ON THE TAPE. WHEN RELIABLE DATA ARE NOT AVAILABLE, -1'S ARE INSERTED. EACH 28-WORD LOGICAL RECORD CONTAINS TIME, THE 20 CHANNELS OF ACCUMULATED COUNTS FOR A GIVEN INSTRUMENT-TO-LUNAR SURFACE POTENTIAL, AND HOUSEKEEPING PARAMETERS FOR THE TOTAL ION DETECTOR.

SNYDER, APOLLO 12 LM/ALSEP

EXPERIMENT NAME- SOLAR WIND SPECTROMETER

NSSDC ID- 69-099C-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/16/74

PERSONNEL
PI - C.W. SNYDER ..... NASA-JPL
PASADENA, CA
OI - D.R. CLAY ..... NASA-JPL
PASADENA, CA
OI - H.H. NEUGEBAUER ..... NASA-JPL
PASADENA, CA

THE SOLAR WIND SPECTROMETER WAS PART OF THE APOLLO 12 ALSEP PACKAGE LEFT ON THE LUNAR SURFACE. IT CONSISTED OF SEVEN MODULATED FARADAY CUPS OPENED TOWARD DIFFERENT, BUT SLIGHTLY OVERLAPPING, PORTIONS OF THE LUNAR SKY. THE INSTRUMENT WAS USED TO OBSERVE THE DIRECTIONAL INTENSITIES OF THE ELECTRON (6-1330 EV) AND POSITIVE ION (16-9760 EV) COMPONENTS OF THE SOLAR WIND AND MAGNETOTAIL PLASMA THAT STRIKE THE SURFACE OF THE MOON. THE SOLAR WIND SPECTROMETER OPERATED WELL FROM TURN-ON UNTIL NOVEMBER 5, 1971, WHEN TROUBLE WAS ENCOUNTERED IN TWO OF THE SPECTRAL ENERGY LEVELS. USEFUL DATA WERE OBTAINED UNTIL MAY 16, 1974, WHEN THE DETECTOR FAILED.

DATA SET NAME- 28-SEC TIME RESOLUTION
PLASMA PARAMETERS ON MAGNETIC TAPE

NSSDC ID- 69-099C-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/19/69 TO 02/21/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 13 REEL(S) OF MAGNETIC TAPE

THESE TAPES CONTAIN THE HIGHEST TIME RESOLUTION PLASMA DATA AVAILABLE FROM THIS EXPERIMENT (28 SEC PER SPECTRUM). THE TAPES ARE 7 TRACK, 800 BPI AND EVEN PARITY, AND WERE WRITTEN IN BCD ON A UNIVAC 1108. PHYSICAL RECORDS ARE BLOCKED TO 384 WORDS. EACH PHYSICAL RECORD CONTAINING 32 LOGICAL RECORDS OF 12 WORDS EACH, AT 72 BCD CHARACTERS TO EVERY 12 WORDS. CONTAINED IN EACH RECORD ARE -- TIME, PROTON DENSITY, ALPHA-TO-PROTON RATIO, BULK SPEED, ANGLE OF FLOW, MOST PROBABLE THERMAL SPEED, AND VARIOUS HOUSEKEEPING AND FIT PARAMETERS RELATING TO THE RELIABILITY OF THE CALCULATED PLASMA PARAMETERS. THE FIRST RECORD(S) ON EACH TAPE CONTAINS LABELING INFORMATION TO IDENTIFY THE TAPE CONTENTS TO A USER. EACH TAPE CONTAINS ONE FILE.

DATA SET NAME- HOURLY AVERAGED PLASMA PARAMETERS ON
MAGNETIC TAPE

NSSDC ID- 69-099C-02B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/19/69 TO 02/10/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 4 REEL(S) OF MAGNETIC TAPE

THESE EXPERIMENTER-SUPPLIED TAPES CONTAIN HOURLY AVERAGED PLASMA PARAMETERS. THE TAPES ARE 7 TRACK, 800 BPI AND EVEN PARITY, AND WERE WRITTEN IN BCD ON A UNIVAC 1108. EACH SET OF AVERAGES IS IN TWO LOGICAL RECORDS, WITH TWO LOGICAL RECORDS PER PHYSICAL RECORD. THERE ARE 216 BCD CHARACTERS PER PHYSICAL RECORD. FOUR SETS OF HOURLY AVERAGED PARAMETERS ARE COMPUTED, USING AS INPUT DATA -- (1) ALL FINE-TIME SCALE PARAMETERS (FTSP), (2) ALL FTSP COMPUTED FROM SPECTRA WITH SMALL RMS ERROR ON CURVE FITTING AND THERMAL SPEEDS LESS THAN ONE-HALF THE BULK VELOCITY, (3) ALL FTSP COMPUTED FROM SPECTRA THAT SATISFY THE REQUIREMENTS OF CRITERION 2 AS WELL AS HAVING ONLY ONE FLOW ANGLE THAT CAN BE DIRECTLY MEASURED, AND (4) ALL FTSP COMPUTED FROM SPECTRA THAT SATISFY THE REQUIREMENTS OF CRITERION 2 AS WELL AS HAVING BOTH FLOW ANGLES DIRECTLY MEASURABLE. EACH TAPE CONTAINS ONE FILE. CONTAINED IN EACH OF THE FOUR SETS OF AVERAGES ARE THE PROTON DENSITY, ALPHA-TO-PROTON RATIO, BULK SPEED, ANGLE OF FLOW, NUMBER OF SPECTRA, AND RMS DEVIATIONS OF EACH AVERAGE.

DATA SET NAME- PLOTS OF HOURLY AVERAGED PLASMA
PARAMETERS

NSSDC ID- 69-099C-02C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/20/69 TO 05/16/74
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED PLOTS CONTAIN HOURLY AVERAGED PLASMA PARAMETERS AS FUNCTIONS OF TIME, WITH 22 DAYS PER FRAME. CONTAINED IN EACH PLOT ARE THE HOURLY AVERAGED PROTON BULK SPEED, MOST PROBABLE THERMAL SPEED, PROTON DENSITY, AND ANGLE OF FLOW FROM THE HOURLY AVERAGED DATA IN DATA SET 69-099C-02B THAT SATISFIED CRITERION 2, I.E., WHICH HAD SMALL RMS ERROR ON CURVE FITTING AND THERMAL SPEEDS LESS THAN ONE-HALF THE BULK SPEED.

SPACECRAFT COMMON NAME- APOLLO 14 LM/ALSEP

ALTERNATE NAMES- ALSEP 14, LEM 14
04905, APOLLO 14C

NSSDC ID- 71-008C

LAUNCH DATE- 01/31/71 WEIGHT- 4857. KG

STATUS OF OPERATION- PARTIAL

THE APOLLO 14 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT AND AN APOLLO LUNAR SURFACE EXPERIMENT PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE LUNAR HIGHLANDS (3 DEG 39 MIN 1 SEC S LATITUDE, 17 DEG 27 MIN 55 SEC W LONGITUDE). THE NUCLEAR-POWERED ALSEP WAS DEPLOYED AT THE LANDING SITE AND INCLUDED EXPERIMENTS TO STUDY THE SEISMIC WAVES, MAGNETIC FIELDS, SOLAR WIND COMPOSITION AND INTERACTION WITH THE MOON, LUNAR ATMOSPHERE, AND IONIC ENVIRONMENT. THE LM WAS ON THE LUNAR SURFACE FEBRUARY 5-6, 1971. IN FEBRUARY 1975, UPLINK COMMAND CAPABILITY WAS LOST. ENGINEERING AND HOUSEKEEPING DATA ARE STILL BEING RECEIVED AS OF APRIL 17, 1975.

FREEMAN, APOLLO 14 LM/ALSEP

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR

NSSDC ID- 71-008C-06

STATUS OF OPERATION- PARTIAL

PERSONNEL
PI - J.W. FREEMAN ..... RICE U
HOUSTON, TX
OI - F.C. MICHEL ..... RICE U
HOUSTON, TX

THE ALSEP SUPRATHERMAL ION DETECTOR EXPERIMENT MEASURED IONS GENERATED FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE AND THE FREE-STREAMING SOLAR WIND/LUNAR SURFACE INTERACTION. FROM THE DATA OBTAINED, FLUX, NUMBER DENSITY, VELOCITY, AND ENERGY PER UNIT CHARGE CAN BE DETERMINED. A CURVED-PLATE MASS ANALYZER (MA) AND AN E-CROSS-B VELOCITY SELECTOR DETECTED IONS WITH NORMAL VELOCITIES FROM 0.4 TO 93.5 KM/SEC AND ENERGIES FROM 0.2 TO 48.6 EV IN 20 STEPS, ENABLING SPECIES DISCRIMINATION OF MASSES UP TO 750 AMU. A SEPARATE CURVED-PLATE ANALYZER (TOTAL ION DETECTOR-TID) COUNTED PROTONS IN 20 ENERGY INTERVALS FROM 10 TO 3500 EV. THE POTENTIAL OF ONE INSTRUMENT (FOR EACH INSTRUMENT PLATE) RELATIVE TO THE LUNAR SURFACE IS VARIED THROUGH 24 STEPS EVERY 9.6 MINUTES, AND FOR EACH SUCH STEP THE POTENTIAL OF THE OTHER INSTRUMENT PLATE RELATIVE TO THE FIRST IS VARIED THROUGH 20 STEPS. DUE TO THE ORIENTATION OF THESE DIRECTIONAL INSTRUMENTS, SOLAR WIND IONS WERE NOT OBSERVED DIRECTLY EXCEPT IN THE TAILWARD SHEATH. HOWEVER, IONS FROM THE BOW SHOCK WERE OBSERVED. ON APRIL 5, 1971, SOME ENGINEERING DATA WERE LOST DUE TO THE PARTIAL FAILURE OF AN ANALOG-TO-DIGITAL CONVERTER. THE EXPERIMENT RETURNED GOOD CONTINUOUS SCIENTIFIC DATA UNTIL OCTOBER 20, 1971, WHEN ARCING IN THE HIGH-VOLTAGE POWER SUPPLY LIMITED OPERATION NEAR LUNAR NOON. AFTER DECEMBER 16, 1971, OPERATION WAS DISCONTINUED WHEN INSTRUMENT TEMPERATURE EXCEEDED 65 DEG C. ALL DATA TAKEN AFTER MARCH 29, 1972, WERE TAKEN IN AN ANOMALOUS STANDBY MODE, AND DATA COVERAGE WAS VERY POOR.

DATA SET NAME- PLOTS OF MASS ANALYZER AND TOTAL ION
DATA ON 16-MM MICROFILM, 24-SEC RES DATA

NSSDC ID- 71-008C-06A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/26/72 TO 03/03/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 47 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED MICROFILM REELS CONTAIN PLOTS OF THE TOTAL ION DATA IN 20 CHANNELS FROM 3500 EV/Q TO 10 EV/Q, THE MASS SPECTROMETER DATA IN SIX ENERGY RANGES FROM 48.6 EV TO 0.2 EV, AND IN 20 MASS RANGES FROM 6 TO 750 AMU PLOTTED AGAINST FRAME NUMBER. (BOTH SPECTRA ARE ON THE SAME PLOT). EACH SET OF SPECTRA REQUIRES 24 SEC TO COMPLETE IN THE NORMAL EXPERIMENT MODE. INTERPRETATION OF THESE PLOTS REQUIRES REFERENCE TO HOUSEKEEPING DATA IN DATA SET 71-008C-06B. DATA TAKEN PRIOR TO AUGUST 26, 1972, ARE AVAILABLE IN HARDCOPY CURRENTLY HELD BY THE EXPERIMENTER.

DATA SET NAME- LISTS OF MASS ANALYZER AND TOTAL ION DATA ON 16-MM MICROFILM. 24-SEC RES DATA

NSSDC ID- 71-008C-06B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/26/72 TO 02/28/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 41 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED 16-MM MICROFILM REELS CONTAIN LISTINGS OF THE 20-CHANNEL TOTAL ION SPECTRA FROM 3500 EV/Q TO 10 EV/Q. THE MASS SPECTROMETER DATA FROM SIX ENERGY RANGES FROM 48.6 EV TO 0.2 EV. AND IN 20 MASS RANGES OF 6 TO 750 AMU LISTED AGAINST FRAME NUMBER AND TIME. EACH SET OF TOTAL ION SPECTRA AND MASS ANALYZER SPECTRA REQUIRES 24 SEC TO COMPLETE. ALSO INCLUDED ARE HOUSEKEEPING DATA NEEDED TO INTERPRET THESE LISTINGS AND THE PLOTS IN DATA SET 71-008C-06A. DATA TAKEN PRIOR TO AUGUST 26, 1972, ARE AVAILABLE IN HARDCOPY CURRENTLY HELD BY THE EXPERIMENTER.

DATA SET NAME- MASS ANALYZER DATA ON MAGNETIC TAPE

NSSDC ID- 71-008C-06C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/06/71 TO 04/11/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 14 REEL(S) OF MAGNETIC TAPE

THESE DATA ARE ON SEVEN TRACK 800 BPI ODD PARITY IBM COMPATIBLE TAPES. WORDS ARE 24 BIT BINARY INTEGERS WITH NEGATIVE NUMBERS REPRESENTED AS 2'S COMPLEMENT. 28 WORDS PER LOGICAL RECORD AND 100 LOGICAL RECORDS BLOCKED INTO EACH PHYSICAL RECORD. TWO STANDARD TAPEMARKS ARE WRITTEN AFTER THE LAST PHYSICAL RECORD TO SIGNIFY THE END OF THE DATA ON THE TAPE. WHEN RELIABLE DATA ARE NOT AVAILABLE, -1'S ARE INSERTED. EACH 28-WORD LOGICAL RECORD CONTAINS TIME, THE 20 CHANNELS OF ACCUMULATED COUNTS FOR A GIVEN INSTRUMENT-TO-LUNAR SURFACE POTENTIAL, AND HOUSEKEEPING PARAMETERS FOR THE TOTAL ION DETECTOR.

DATA SET NAME- TOTAL ION DETECTOR DATA ON MAGNETIC TAPE

NSSDC ID- 71-008C-06F

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/06/71 TO 04/11/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 14 REEL(S) OF MAGNETIC TAPE

THESE DATA ARE ON SEVEN TRACK 800 BPI ODD PARITY IBM COMPATIBLE TAPES. WORDS ARE 24 BIT BINARY INTEGERS WITH NEGATIVE NUMBERS REPRESENTED AS 2'S COMPLEMENT. 28 WORDS PER LOGICAL RECORD AND 100 LOGICAL RECORDS BLOCKED INTO EACH PHYSICAL RECORD. TWO STANDARD TAPEMARKS ARE WRITTEN AFTER THE LAST PHYSICAL RECORD TO SIGNIFY THE END OF THE DATA ON THE TAPE. WHEN RELIABLE DATA ARE NOT AVAILABLE, -1'S ARE INSERTED. EACH 28-WORD LOGICAL RECORD CONTAINS TIME, THE 20 CHANNELS OF ACCUMULATED COUNTS FOR A GIVEN INSTRUMENT-TO-LUNAR SURFACE POTENTIAL, AND HOUSEKEEPING PARAMETERS FOR THE TOTAL ION DETECTOR.

JOHNSON, APOLLO 14 LM/ALSEP

EXPERIMENT NAME- COLD CATHODE ION GAUGE EXPERIMENT

NSSDC ID- 71-008C-07

STATUS OF OPERATION- PARTIAL

PERSONNEL
PI - F.S. JOHNSON ..... U OF TEXAS, DALLAS
DALLAS, TX
OI - D.E. EVANS ..... NASA-JSC
HOUSTON, TX

THE ALSEP COLD CATHODE GAUGE EXPERIMENT DETERMINED PRESSURES FROM 1.E-6 TO 1.E-12 TORR OF THE AMBIENT LUNAR ATMOSPHERE. THE RESULTS OF THIS EXPERIMENT, COMBINED WITH THOSE OF THE SUPRATHERMAL ION DETECTOR, WERE USED TO MEASURE THE DENSITY AND PRESSURE OF THE LUNAR NEUTRAL ATMOSPHERE. ON APRIL 5, 1971, SOME ENGINEERING DATA WERE LOST DUE TO THE PARTIAL FAILURE OF AN A/D CONVERTER. NOISY AND ERRATIC NIGHTTIME OPERATION BEGAN IN FEBRUARY 1972, AND CONTINUED UNTIL NOVEMBER 1972 WHEN NIGHTTIME DATA WERE LOST. OPERATION CONTINUED WITH LITTLE OR NO NIGHTTIME COVERAGE UNTIL APRIL 15, 1973, WHEN THE EXPERIMENT ANOMALOUSLY WENT INTO STANDBY CONDITION. LITTLE USABLE DATA ARE EXPECTED AFTER APRIL 15, 1973.

DATA SET NAME- PLOTS OF LUNAR ATMOSPHERE DENSITY MEASUREMENTS VERSUS TIME

NSSDC ID- 71-008C-07A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/09/71 TO 12/31/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED 35-MM MICROFILM REELS CONTAIN PLOTS OF LUNAR ATMOSPHERE DENSITY MEASUREMENTS FROM 1.E5 TO 1.E11 PARTS/CC ON A LOGARITHMIC SCALE, AND GAUGE TEMPERATURE FROM 0- TO 400-DEG K ON A LINEAR SCALE. QUARTER-MINUTE AVERAGES ARE PLOTTED AGAINST TIME, WITH 15 HOURS OF DATA ON EACH FRAME. ALL TIME VALUES ARE GMT.

SPACECRAFT COMMON NAME- APOLLO 15 CSM

ALTERNATE NAMES- 05351

NSSDC ID- 71-063A

LAUNCH DATE- 07/26/71 WEIGHT- 97760. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/07/71

ORBIT PARAMETERS
ORBIT TYPE- SELENOCENTRIC EPOCH DATE- 07/31/71
ORBIT PERIOD- 118.8 MIN INCLINATION- 26. DEG
PERIAPSIS- 93. KM ALT APOAPSIS- 120. KM ALT

APOLLO 15 WAS THE FIFTH SPACECRAFT (FOURTH ACCOMPLISHED) AND THE FIRST OF THE J-SERIES APOLLO MISSIONS DESIGNED TO LAND MEN ON THE MOON. THE LUNAR LANDING SITE FOR THE 12-DAY SCIENTIFIC MISSION WAS THE HADLEY RILLE-APENNINE MOUNTAIN REGION AT 26 DEG 06 MIN 54 SEC N, 3 DEG 39 MIN 30 SEC E ON THE LUNAR SURFACE. THE DATE OF LAUNCH WAS JULY 26, 1971. THE LUNAR MODULE (LM) CARRYING ASTRONAUTS DAVID SCOTT AND JAMES IRWIN AND THE LUNAR ROVING VEHICLE (LRV) LANDED ON THE MOON ON JULY 31, 1971. THE COMMAND MODULE (CM) PILOTED BY ALFRED WORDEN REMAINED IN A SLIGHTLY ELLIPTICAL ORBIT AT AN ALTITUDE OF 93 BY 120 KM WITH AN INCLINATION OF 23 DEG. THE PROJECTS CARRIED OUT ON THE SURFACE INCLUDED THE DEPLOYMENT OF THE APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP), GEOLOGICAL FIELD EXPLORATION IN THREE EVA EXCURSIONS, DOCUMENTING PHOTOGRAPHY, AND ACQUISITION OF SAMPLES OF THE LUNAR TERRAIN. PHOTOGRAPHS USING 16- AND 70-MM FILM WERE OBTAINED FROM BOTH THE SURFACE AND FROM ORBIT, AND 35-MM AND TWO KINDS OF 5-IN. FILM PHOTOGRAPHS WERE OBTAINED FROM ORBIT. SPECIAL UV AND DIM-LIGHT PHOTOGRAPHIC EXPERIMENTS WERE PERFORMED DURING ORBIT. BEFORE LEAVING THE LUNAR ENVIRONMENT, A SUBSATELLITE WITH AN EXPERIMENTS PACKAGE WAS RELEASED FROM THE COMMAND SERVICE MODULE (CSM) ON AUGUST 4, 1971, INTO AN ORBIT 135 BY 97 KM. THE LRV WAS USED TO EXPLORE REGIONS WITHIN 5 KM OF THE LM LANDING SITE. THIS WAS THE FIRST TIME A VEHICLE OF THIS TYPE HAD BEEN USED, AND ITS PERFORMANCE ON THE LUNAR TERRAIN WAS VERY SUCCESSFUL. THE CM AND LM VEHICLES REJOINED ON AUGUST 2, 1971, PERFORMED FURTHER PHOTOGRAPHIC EXPERIMENTS IN ORBIT AROUND THE MOON FOR 2 DAYS, THE LM WAS SEPARATED FOR LUNAR IMPACT, AND THE CSM WAS PLACED IN EARTHBOUND TRAJECTORY. ENROUTE THE SERVICE MODULE (SM) WAS SEPARATED, AND THE CM RETURNED TO EARTH ON AUGUST 7, 1971. MORE INFORMATION ON THE LM MAY BE FOUND UNDER SPACECRAFT 71-063C.

HOFFMAN, APOLLO 15 CSM

EXPERIMENT NAME- MASS SPECTROMETER

NSSDC ID- 71-063A-13

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/07/71

APOLLO 15

PERSONNEL
PI - J.H. HOFFMAN ..... U OF TEXAS, DALLAS
DALLAS, TX
OI - V.H. DAUPHIN ..... NASA-JSC
HOUSTON, TX

THE LUNAR ORBITAL SCIENCE EXPERIMENTS PACKAGE INCLUDED A MASS SPECTROMETER EXPERIMENT WHOSE OBJECTIVE WAS TO USE THE MEASURED COMPOSITION DATA TO STUDY THE SOURCES, SINKS, AND TRANSPORT MECHANISMS OF THE AMBIENT LUNAR ATMOSPHERE. FROM JULY 26 TO AUGUST 7, 1971, THE DURATION OF THE APOLLO 15 FLIGHT, 90 HR OF DATA WERE OBTAINED -- 40 HR WHILE IN LUNAR ORBIT AND 50 HR DURING TRANSEARTH COAST. THE ANALYZER FLOWN, A DUAL-COLLECTOR, SINGLE-FOCUSING, SECTOR-FIELD SPECTROMETER, WAS MOUNTED ON A RETRACTABLE BOOM. WHEN FULLY EXTENDED, THE BOOM PLACED THE SPECTROMETER 7.3 M FROM THE SPACECRAFT, A DISTANCE ANTICIPATED TO BE BEYOND THE OUTGASSED MOLECULAR CLOUD. CONTROL OF THE EXPERIMENT FUNCTIONS AND BOOM MOTION WAS PROVIDED BY A SET OF FIVE SWITCHES IN THE COMMAND MODULE, WHICH WERE OPERATED BY A CREW MEMBER ACCORDING TO THE MISSION TIME LINE OR BY INSTRUCTION FROM THE GROUND CONTROLLER. INSTRUMENT WEIGHT WAS 11 KG, AND ITS DIMENSIONS WERE APPROXIMATELY 30 X 32 X 23 CM. A SCOOP MOUNTED ON THE TOP OF THE PACKAGE WAS THE GAS INLET PLENUM. THIS INLET WAS ORIENTED ALONG THE SPACECRAFT VELOCITY VECTOR FOR MAXIMUM RAM WHEN AMBIENT MEASUREMENTS WERE OBTAINED, AND IT WAS ORIENTED IN THE WAKE DIRECTION TO DETERMINE BACKGROUND SPECTRA AND INSTRUMENT OUTGASSING. THE PLENUM CONTAINED THE SPECTROMETER ION SOURCE, WHICH HAD REDUNDANT FILAMENTS MOUNTED ON EITHER SIDE OF THE IONIZATION CHAMBER. SEVERAL OUTGASSING OPERATIONS DURING FLIGHT MAINTAINED THE ION SOURCE IN A REASONABLY OUTGASSED STATE. USE OF A TWO-COLLECTOR SYSTEM IN THE ANALYZER PERMITTED THE SIMULTANEOUS SCANNING OF TWO MASS RANGES -- 12 TO 28 AND 28 TO 66 AMU. MASS RESOLUTION WAS THE ORDER OF A 1-PERCENT VALLEY AT MASS 40 AMU. THE MASS SWEEP WAS ACHIEVED BY VARYING THE APPLIED HIGH VOLTAGE IN A SERIES OF 590 STEPS OVER THE RANGE FROM 620 TO 1560 V WITH A DWELL TIME OF APPROXIMATELY 0.1 SEC. THIRTY ADDITIONAL STEPS AT ZERO VOLTS WERE USED TO DETERMINE BACKGROUND COUNTING RATE AND TO APPLY INTERNAL CALIBRATION, SO THAT 62 SEC WERE REQUIRED TO COMPLETE A MASS SCAN. THE VOLTAGE STEP NUMBER THAT DETERMINED THE MASS NUMBER OF THE ION BEING MEASURED WAS IDENTIFIED BY COUNTING FROM STEP ONE -- A SWEEP START FLAG. BENDIX ELECTRON MULTIPLIERS WERE USED AS PULSE AMPLIFIERS TO DETERMINE THE COUNTING RATE OF IONS PASSING EACH COLLECTOR SLIT FOR EACH VOLTAGE STEP. PRELAUNCH EXPERIMENT CALIBRATION INCLUDED OPERATION IN A MOLECULAR BEAM FACILITY. MORE DETAILS OF THIS EXPERIMENT CAN BE FOUND IN "LUNAR ORBITAL MASS SPECTROMETER," J. H. HOFFMAN, "INT. J. MASS SPECTROM. ION PHYS.," VOL 8, PP 403-416, 1972.

DATA SET NAME- MASS SPECTROMETER DATA ON MAGNETIC TAPE

NSSDC ID- 71-063A-12A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/30/71 TO 08/07/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MAGNETIC TAPE

DATA PROCESSING RESULTED IN BLOCKING THE DATA INTO COMPLETE MASS SPECTRA ON MAGNETIC TAPE. REDUCED DATA INCLUDE THE BACKGROUND COUNT LEVEL OF EACH ANALYZER CHANNEL, THE AMPLITUDE OF EACH MASS PEAK, DECOMMUTATED HOUSEKEEPING DATA, AND PERTINENT SPACECRAFT TRAJECTORY INFORMATION, INCLUDING -- ORBIT NUMBER, LATITUDE AND LONGITUDE, VELOCITY, ALTITUDE, AND RELATIVE SUN POSITION. THIS DATA SET CONSISTS OF IBM 360, 800-BPI, AND 7-TRACK, VARIABLE-LENGTH RECORD TAPES HAVING NO LABELS. ALL INTEGERS AND REAL NUMBERS ARE INTERNAL 360 BINARY AND FLOATING-POINT REPRESENTATION. EACH SPECTRA OF DATA IS CONTAINED IN THREE RECORDS.

DATA SET NAME- MASS SPECTROMETER DATA ON MICROFILM

NSSDC ID- 71-063A-13B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/30/71 TO 08/07/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 6 REEL(S) OF MICROFILM

THESE MICROFILM RECORDS ARE FORMATTED OUTPUTS OF THE DATA ON MAGNETIC TAPE. THE FORMAT PRESENTS SEQUENTIAL PAIRS OF MASS SPECTRA (HIGH- AND LOW-MASS CHANNELS) ALONG WITH BACKGROUND, PEAK AMPLITUDE, HOUSEKEEPING, AND TRAJECTORY DATA. IN ADDITION, THERE ARE SOME TABULATED SUMMARIES OF PEAK AMPLITUDES, TRAJECTORY DATA, AND HOUSEKEEPING MEASUREMENTS AS A FUNCTION OF GROUND ELAPSED TIME (GET). EACH SUMMARY CHART COVERS SEVERAL HOURS OF EXPERIMENT OPERATION.

SPACECRAFT COMMON NAME- APOLLO 15 LM/ALSEP

ALTERNATE NAMES- APOLLO 15C, ALSEP 15
LEM 15, ROVER 15
05366

NSSDC ID- 71-063C

LAUNCH DATE- 07/26/71 WEIGHT- 12700. KG

STATUS OF OPERATION- PARTIAL

THE APOLLO 15 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV), AND AN APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE MOON AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE NORTH CENTRAL PART OF THE MOON (26 DEG 4 MIN 54 SEC N LATITUDE, 3 DEG 39 MIN 30 SEC E LONGITUDE), AT THE FOOT OF THE APENNINE MOUNTAIN RANGE. THE ALSEP WAS DEPLOYED AT THE LANDING SITE. THE LRV WAS USED DURING THE EXTRAVEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXPLORATION. THE NUCLEAR-POWERED ALSEP CONTAINED SEISMIC, MAGNETIC FIELDS, LUNAR ATMOSPHERIC COMPOSITION, ION COMPOSITION, LUNAR DUST, SOLAR WIND COMPOSITION, HEAT LOSS, AND SOLAR CELL RADIATION DAMAGE EXPERIMENTS. THE LM WAS ON THE LUNAR SURFACE JULY 30-AUGUST 2, 1971.

FREEMAN, APOLLO 15 LM/ALSEP

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR

NSSDC ID- 71-063C-05

STATUS OF OPERATION- PARTIAL

PERSONNEL
PI - J.W. FREEMAN ..... RICE U
HOUSTON, TX
OI - F.C. MICHEL ..... RICE U
HOUSTON, TX

THE ALSEP SUPRATHERMAL ION DETECTOR EXPERIMENT MEASURED IONS GENERATED FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE AND FROM THE FREE-STREAMING SOLAR WIND/LUNAR SURFACE INTERACTION. FLUX, NUMBER DENSITY, VELOCITY, AND ENERGY PER UNIT CHARGE WERE DETERMINED FROM THE DATA OBTAINED. A CURVED-PLATE ANALYZER AND E-CROSS-B VELOCITY SELECTOR DETECTED IONS WITH NORMAL VELOCITIES FROM 0.4 TO 93.5 KM/SEC AND ENERGIES FROM 0.2 TO 48.6 EV. SPECIES DISCRIMINATION OF MASSES UP TO 120 AMU WAS POSSIBLE. A SEPARATE CURVED-PLATE ANALYZER COUNTED SOLAR WIND PROTONS IN 20 ENERGY INTERVALS FROM 10 TO 3500 EV. THE POTENTIAL OF ONE INSTRUMENT (FOR EACH INSTRUMENT PLATE) RELATIVE TO THE LUNAR SURFACE IS VARIED THROUGH 24 STEPS EVERY 9.6 MIN, AND FOR EACH SUCH STEP THE POTENTIAL OF THE OTHER INSTRUMENT PLATE RELATIVE TO THE FIRST IS VARIED THROUGH 20 STEPS. OPERATION WAS NORMAL UNTIL LUNAR NOON ON DECEMBER 16, 1971, WHEN SENSOR TEMPERATURE EXCEEDED 85 DEG C. OPERATION WAS CURTAILED DUE TO POWER SUPPLY ARCING. DATA FROM OTHER PERIODS OF OPERATION WERE NORMAL.

DATA SET NAME- PLOTS OF MASS ANALYZER AND TOTAL ION DATA
ON 16-MM MICROFILM, 24-SEC RES DATA

NSSDC ID- 71-063C-05A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/24/72 TO 01/01/74
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 99 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED MICROFILM CONTAIN PLOTS OF THE TOTAL ION DATA IN 20 CHANNELS FROM 3500 DOWN TO 10 EV/CHARGE, THE 20-CHANNEL MASS SPECTROMETER DATA IN 6 ENERGY RANGES FROM 48.6 TO 0.2 EV, AND IN MASS RANGES FROM 1-90 AMU PLOTTED AGAINST FRAME NUMBER. (BOTH SPECTRA ARE ON THE SAME PLOT). EACH SET OF SPECTRA REQUIRES 24 SEC TO COMPLETE IN THE NORMAL EXPERIMENT MODE. PRACTICALLY ALL DATA TAKEN BY THE INSTRUMENT ARE INCLUDED. INTERPRETATION OF THESE PLOTS REQUIRES REFERENCE TO HOUSEKEEPING DATA IN DATA SET 71-063C-05B.

DATA SET NAME- LISTS OF MASS ANALYZER AND TOTAL ION DATA
ON 16-MM MICROFILM, 24-SEC RES DATA

NSSDC ID- 71-063C-05B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/26/72 TO 12/31/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 117 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED 16-MM MICROFILM CONTAIN LISTINGS OF THE 20-CHANNEL TOTAL ION SPECTRA FROM 3500 TO 10 EV/CHARGE. THE 20-CHANNEL MASS SPECTROMETER DATA FROM SIX ENERGY RANGES FROM 48.6 TO 0.2 EV, AND IN MASS RANGES OF 1-90 AMU LISTED AGAINST FRAME NUMBER AND TIME. ALSO INCLUDED ARE HOUSEKEEPING DATA NEEDED TO INTERPRET THESE LISTINGS AND THE PLOTS IN DATA SET 71-063C-05A. EACH SET OF TOTAL ION SPECTRA AND MASS ANALYZER SPECTRA REQUIRES 24 SEC TO COMPLETE.

DATA SET NAME- MASS ANALYZER DATA ON TAPE

NSSDC ID- 71-063C-05C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/03/71 TO 08/02/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 10 REEL(S) OF MAGNETIC TAPE

THESE DATA ARE ON SEVEN-TRACK 800 BPI, ODD PARITY, IBM COMPATIBLE TAPES. WORDS ARE 24-BIT BINARY INTEGERS WITH NEGATIVE NUMBERS REPRESENTED AS 2'S COMPLEMENT. 28 WORDS PER LOGICAL RECORD AND 100 LOGICAL RECORDS BLOCKED INTO EACH PHYSICAL RECORD. TWO STANDARD TAPEMARKS ARE WRITTEN AFTER THE LAST PHYSICAL RECORD TO SIGNIFY THE END OF THE DATA ON THE TAPE. WHEN RELIABLE DATA ARE NOT AVAILABLE, -1'S ARE INSERTED. EACH 28-WORD LOGICAL RECORD CONTAINS TIME, THE 20 CHANNELS OF ACCUMULATED COUNTS FOR A GIVEN INSTRUMENT-TO-LUNAR SURFACE POTENTIAL, AND HOUSEKEEPING PARAMETERS FOR THE MASS ANALYZER TOTAL ION DETECTOR.

DATA SET NAME- TOTAL ION DETECTOR DATA ON TAPE

NSSDC ID- 71-063C-05F

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/03/71 TO 12/29/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 10 REEL(S) OF MAGNETIC TAPE

THESE DATA ARE ON SEVEN-TRACK 800 BPI, ODD PARITY, IBM COMPATIBLE TAPES. WORDS ARE 24-BIT BINARY INTEGERS WITH NEGATIVE NUMBERS REPRESENTED AS 2'S COMPLEMENT. 28 WORDS PER LOGICAL RECORD AND 100 LOGICAL RECORDS BLOCKED INTO EACH PHYSICAL RECORD. TWO STANDARD TAPEMARKS ARE WRITTEN AFTER THE LAST PHYSICAL RECORD TO SIGNIFY THE END OF THE DATA ON THE TAPE. WHEN RELIABLE DATA ARE NOT AVAILABLE, -1'S ARE INSERTED. EACH 28-WORD LOGICAL RECORD CONTAINS TIME, THE 20 CHANNELS OF ACCUMULATED COUNTS FOR A GIVEN INSTRUMENT-TO-LUNAR SURFACE POTENTIAL, AND HOUSEKEEPING PARAMETERS FOR THE TOTAL ION DETECTOR.

JOHNSON, APOLLO 15 LM/ALSEP

EXPERIMENT NAME- COLD CATHODE ION GAUGE EXPERIMENT

NSSDC ID- 71-063C-07

STATUS OF OPERATION- PARTIAL

PERSONNEL
PI - F.S. JOHNSON ..... U OF TEXAS, DALLAS
DALLAS, TX
OI - D.E. EVANS ..... NASA-JSC
HOUSTON, TX

THE ALSEP COLD CATHODE GAUGE EXPERIMENT WAS DESIGNED TO MEASURE THE DENSITY OF NEUTRAL ATOMS AND TO DETERMINE PRESSURES OF THE AMBIENT LUNAR ATMOSPHERE FROM 1.E-6 TO 1.E-12 TORR. THE DATA ARE TO COMPLEMENT MEASUREMENTS MADE BY THE ALSEP SUPRATHERMAL ION DETECTOR. THE INSTRUMENT WAS NOT OPERATED FOR PROLONGED PERIODS DURING THE LUNAR DAY BECAUSE OF VOLTAGE RESTRICTIONS PLACED ON THE HIGH-VOLTAGE POWER SUPPLY IN THE SIDE PACKAGE. HOWEVER, SUFFICIENT DAYSIDE OPERATION WAS CARRIED OUT OVER THE INSTRUMENT LIFETIME TO ALLOW CONSTRUCTION OF THE AVERAGE DAYSIDE DENSITY AND PRESSURE PROFILES.

DATA SET NAME- PLOTS OF LUNAR ATMOSPHERE DENSITY
MEASUREMENTS VERSUS TIME

NSSDC ID- 71-063C-07A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/71 TO 12/09/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED, 35-MM MICROFILM REELS CONTAIN PLOTS OF LUNAR ATMOSPHERE DENSITY MEASUREMENTS FROM 1.E5 TO 1.E11 PARTICLES/CC ON A LOGARITHMIC SCALE, AND GAUGE TEMPERATURE FROM 0 TO 400 DEG K ON A LINEAR SCALE. QUARTER-MINUTE AVERAGES ARE PLOTTED AGAINST TIME, WITH 15 HOURS OF DATA ON EACH FRAME. ALL TIME VALUES ARE GMT.

SNYDER, APOLLO 15 LM/ALSEP

EXPERIMENT NAME- SOLAR WIND SPECTROMETER

NSSDC ID- 71-063C-04

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/30/72

PERSONNEL
PI - C.W. SNYDER ..... NASA-JPL
PASADENA, CA

THE SOLAR WIND SPECTROMETER WAS DESIGNED TO MEASURE ENERGIES, DENSITIES, INCIDENCE ANGLES, AND TEMPORAL VARIATIONS OF THE ELECTRON AND PROTON COMPONENTS OF THE SOLAR WIND PLASMA THAT STRIKE THE SURFACE OF THE MOON. SEVEN FARADAY CUP SENSORS MEASURED ELECTRONS IN THE ENERGY RANGE 10 TO 1480 EV AND PROTONS IN THE ENERGY RANGE 50 TO 10,400. THE EXPERIMENT PERFORMED WELL UNTIL NOVEMBER 5, 1971, WHEN INTERMITTENT MODULATION DROPPING IN PROTON CHANNELS 13 AND 14 OCCURRED. THIS INTERMITTENT, THOUGH SCIENTIFICALLY USABLE, BEHAVIOR CONTINUED UNTIL INSTRUMENT FAILURE ON JUNE 30, 1972.

DATA SET NAME- 28-SEC TIME RESOLUTION
PLASMA PARAMETERS ON MAGNETIC TAPE

NSSDC ID- 71-063C-04A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/71 TO 08/30/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MAGNETIC TAPE

THESE TAPES CONTAIN THE HIGHEST TIME-RESOLUTION PLASMA DATA AVAILABLE FROM THIS EXPERIMENT (28 SEC PER SPECTRUM). THE TAPES ARE 7 TRACK, AT 800 BPI AND EVEN PARITY, AND WERE WRITTEN IN BCD ON A UNIVAC 1108. PHYSICAL RECORDS ARE BLOCKED TO 384 WORDS, EACH PHYSICAL RECORD CONTAINING 32 LOGICAL RECORDS OF 12 WORDS EACH, AT 72 BCD CHARACTERS TO EVERY 12 WORDS. CONTAINED IN EACH RECORD ARE -- TIME, PROTON DENSITY, ALPHA-TO-PROTON RATIO, BULK SPEED, ANGLE OF FLOW, MOST PROBABLE THERMAL SPEED, AND VARIOUS HOUSEKEEPING AND FIT PARAMETERS RELATING TO THE RELIABILITY OF THE CALCULATED PLASMA PARAMETERS. THE FIRST RECORD(S) ON EACH TAPE CONTAIN LABELING INFORMATION TO IDENTIFY THE TAPE CONTENTS TO A USER. EACH TAPE CONTAINS ONE FILE.

DATA SET NAME- HOURLY AVERAGED PLASMA PARAMETERS ON
MAGNETIC TAPE

NSSDC ID- 71-063C-04B

AVAILABILITY OF DATA SET- DATA AT NSSDC

APOLLO 15/APOLLO 16

TIME PERIOD COVERED- 07/31/71 TO 12/08/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE EXPERIMENTER-SUPPLIED TAPES CONTAIN HOURLY AVERAGED PLASMA PARAMETERS. THE TAPES ARE 7 TRACK, AT 800 BPI AND EVEN PARITY, AND WERE WRITTEN IN BCD ON A UNIVAC 1108. EACH SET OF AVERAGES IS IN TWO LOGICAL RECORDS, WITH TWO LOGICAL RECORDS PER PHYSICAL RECORD. THERE ARE 216 BCD CHARACTERS PER PHYSICAL RECORD. FOUR SETS OF HOURLY AVERAGED PARAMETERS ARE COMPUTED, USING AS INPUT DATA -- (1) ALL FINE-TIME SCALE PARAMETERS (FTSP), (2) ALL FTSP COMPUTED FROM SPECTRA WITH SMALL RMS ERROR ON CURVE FITTING AND THERMAL SPEEDS LESS THAN ONE-HALF THE BULK VELOCITY, (3) ALL FTSP COMPUTED FROM SPECTRA THAT SATISFY THE REQUIREMENTS OF CRITERION 2 AS WELL AS HAVING ONLY ONE FLOW ANGLE THAT CAN BE DIRECTLY MEASURED, AND (4) ALL FTSP COMPUTED FROM SPECTRA THAT SATISFY THE REQUIREMENTS OF CRITERION 2 AS WELL AS HAVING BOTH FLOW ANGLES DIRECTLY MEASUREABLE. EACH TAPE CONTAINS ONE FILE. CONTAINED IN EACH OF THE FOUR SETS OF AVERAGES ARE THE PROTON DENSITY, ALPHA-TO-PROTON RATIO, BULK SPEED, ANGLE OF FLOW, NUMBER OF SPECTRA, AND RMS DEVIATIONS OF EACH AVERAGE.

DATA SET NAME- PLOTS OF HOURLY AVERAGED PLASMA PARAMETERS

NSSDC ID- 71-063C-04C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/02/71 TO 08/30/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THESE EXPERIMENTER-GENERATED PLOTS CONTAIN HOURLY AVERAGED PLASMA PARAMETERS AS FUNCTIONS OF TIME, WITH 22 DAYS PER FRAME. CONTAINED IN EACH PLOT ARE THE HOURLY AVERAGED PROTON BULK SPEED, MOST PROBABLE THERMAL SPEED, PROTON DENSITY, AND ANGLE OF FLOW FROM THE HOURLY AVERAGED DATA IN DATA SET 71-063C-04B THAT SATISFIED CRITERION 2, I.E., WHICH HAD SMALL RMS ERROR ON CURVE FITTING AND THERMAL SPEEDS LESS THAN ONE-HALF THE BULK SPEED.

SPACECRAFT COMMON NAME- APOLLO 16 CSM

ALTERNATE NAMES- 66000

NSSDC ID- 72-031A

LAUNCH DATE- 04/16/72 WEIGHT- 48606. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 04/27/72

ORBIT PARAMETERS
ORBIT TYPE- SELENOCENTRIC EPOCH DATE- 04/20/72
ORBIT PERIOD- 120. MIN INCLINATION- 12. DEG
PERIAPSIS- 94. KM ALT APOAPSIS- 120. KM ALT

APOLLO 16 WAS THE FIFTH MISSION IN THE APOLLO SERIES IN WHICH MEN LANDED ON THE MOON. THE 11-DAY SCIENTIFIC MISSION BEGAN ON APRIL 16, 1972, AT 1754 UT. (THE LAUNCH WAS POSTPONED FROM THE ORIGINALLY SCHEDULED DATE, MARCH 17, OWING TO A DOCKING RING JETTISON MALFUNCTION.) NAVY CAPT JOHN W. YOUNG AND AIR FORCE LT CHARLES M. DUKE LANDED ON THE LUNAR SURFACE IN THE LUNAR MODULE (LM) ON APRIL 21. NAVY LT THOMAS K. MATTINGLY REMAINED IN THE COMMAND MODULE (CM) PERFORMING SCIENTIFIC EXPERIMENTS WHILE THE CM WAS IN AN EQUATORIAL ORBIT ABOUT THE MOON. THE LM LANDED IN THE DESCARTES REGION OF THE MOON AT APPROXIMATELY 9 DEG S 16 DEG E. AN APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) WAS DEPLOYED ON THE SURFACE. TERRAIN SAMPLES WERE ACQUIRED, AND PHOTOGRAPHS WERE OBTAINED BY THE SURFACE ASTRONAUTS AND FROM THE CM USING 16-, 35-, AND 70-MM FILM, 5- BY 48-IN. PANORAMIC FILM, AND 9- BY 9-IN. MAPPING FILM. THE SURFACE ASTRONAUTS ALSO TESTED THE SECOND LUNAR ROVING VEHICLE TO BE TAKEN TO THE MOON BY EXPLORING REGIONS WITHIN 4 KM OF THE LM LANDING SITE. A SUBSATELLITE CARRYING AN EXPERIMENT PACKAGE WAS LAUNCHED INTO LUNAR ORBIT ON APRIL 24, 1972, AND IMPACTED WITH THE MOON AFTER 425 REVOLUTIONS ON MAY 29, 1972. THE APOLLO 16 SPACECRAFT WAS LAUNCHED ON APRIL 16, 1972, AND WAS INJECTED INTO LUNAR ORBIT ON APRIL 19. THE LM LANDED ON THE MOON ON APRIL 21 AND RETURNED TO THE CM ON APRIL 24. THE CM LEFT LUNAR ORBIT ON APRIL 26 AND RETURNED TO EARTH ON APRIL 27, 1972.

HOFFMAN, APOLLO 16 CSM

EXPERIMENT NAME- ORBITAL MASS SPECTROMETER

NSSDC ID- 72-031A-11

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 04/24/72

PERSONNEL
PI - J.H. HOFFMAN ..... U OF TEXAS, DALLAS
DALLAS, TX

THE OBJECTIVE OF THIS COMPOSITION EXPERIMENT WAS TO USE THE MEASURED CONCENTRATIONS TO STUDY THE SOURCES, SINKS, AND TRANSPORT MECHANISMS OF THE LUNAR AMBIENT ATMOSPHERE. THE FLIGHT NEUTRAL MAGNETIC MASS SPECTROMETER WAS SIMILAR TO THAT FLOWN ON APOLLO 15 (71-063A-13). IT WAS MOUNTED AT THE END OF A RETRACTABLE BOOM, WHICH, WHEN FULLY EXTENDED, MEASURED 7.3 M. THIS DISTANCE WAS EXPECTED TO BE BEYOND THE OUTGASSED MOLECULAR CLOUD. CONTROL OF THE EXPERIMENT FUNCTIONS AND THE BOOM MOTION WAS PROVIDED BY A SET OF COMMAND MODULE SWITCHES THAT WERE OPERATED BY A CREW MEMBER ACCORDING TO THE MISSION TIME LINE OR BY INSTRUCTION FROM THE GROUND CONTROLLER. A SCOOP MOUNTED ON THE TOP OF THE PACKAGE WAS THE GAS INLET PLENUM. THIS INLET WAS ORIENTED ALONG THE SPACECRAFT VELOCITY VECTOR FOR MAXIMUM RAM EFFECT WHEN AMBIENT MEASUREMENTS WERE OBTAINED, AND IT WAS ORIENTED IN THE WAKE DIRECTION TO DETERMINE BACKGROUND SPECTRA AND INSTRUMENT OUTGASSING. FOR THIS FLIGHT, THE INLET STRUCTURE WAS FITTED WITH A THERMALLY CONTROLLED INNER PLENUM, WHICH WAS HEATED TO APPROXIMATELY 250 DEG C FOR 1 HR BEFORE OPERATION TO OUTGAS THE STRUCTURE. SUBSEQUENTLY, THE TEMPERATURE WAS KEPT AT 70 DEG C DURING DATA COLLECTION. TWO MASS RANGES, 12 TO 28 AND 28 TO 67 AMU, WERE SCANNED SIMULTANEOUSLY BECAUSE THIS ANALYZER HAD TWO COLLECTORS. IONS OF A GIVEN MASS, WHEN FOCUSED ON ONE OF THE COLLECTORS, WERE COUNTED FOR A PERIOD OF 0.1 SEC, AND THEN THE ACCUMULATED COUNT WAS TELEMETERED. FORMATION OF THE IONS AT THE JUNCTION OF THE GAS INLET PLENUM AND ANALYZER WAS ACCOMPLISHED BY AN ELECTRON BEAM WITH 70-EV ENERGY. THE FLIGHT INSTRUMENT WAS CALIBRATED IN A MOLECULAR BEAM FACILITY TO DETERMINE THE ABSOLUTE SENSITIVITY FACTORS. FOR MOST GASES, ONE COUNT CORRESPONDED TO 260 MOLECULES/CC. AN IMPORTANT EXCEPTION WAS NEON, FOR WHICH ONE COUNT CORRESPONDED TO 1100 ATOMS/CC IN THE LUNAR ATMOSPHERE. THESE SENSITIVITY NUMBERS WERE APPLICABLE ONLY WHEN THE INLET FACED IN THE DIRECTION OF MOTION. OWING TO A BOOM MALFUNCTION APPROXIMATELY 200 HR AFTER LAUNCH, THE MASS SPECTROMETER WAS JETTISONED BEFORE TRANSEARTH INJECTION. SOME PRELIMINARY RESULTS AND MORE EXPERIMENT DETAIL CAN BE FOUND IN "APOLLO 16 - LUNAR ORBITAL MASS SPECTROMETER EXPERIMENT," R. R. HODGES, J. H. HOFFMAN, AND D. E. EVANS, IN THE APOLLO 16 PRELIMINARY SCIENCE REPORT, JULY 19, 1972.

DATA SET NAME- MASS SPECTROMETER DATA ON MAGNETIC TAPE

NSSDC ID- 72-031A-11A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/20/72 TO 04/24/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 4 REEL(S) OF MAGNETIC TAPE

DATA PROCESSING RESULTED IN BLOCKING THE DATA INTO COMPLETE MASS SPECTRA ON MAGNETIC TAPE. REDUCED DATA INCLUDE THE BACKGROUND COUNT LEVEL OF EACH ANALYZER CHANNEL, THE AMPLITUDE OF EACH MASS PEAK, DECOMMUTATED HOUSEKEEPING DATA, AND PERTINENT SPACECRAFT TRAJECTORY INFORMATION, INCLUDING -- ORBIT NUMBER, LATITUDE AND LONGITUDE, VELOCITY, ALTITUDE, AND RELATIVE SUN POSITION. THIS DATA SET CONSISTS OF IBM 360, 800-BPI, AND 7-TRACK, VARIABLE-LENGTH RECORD TAPES HAVING NO LABELS. ALL INTEGERS AND REAL NUMBERS ARE INTERNAL 360 BINARY AND FLOATING-POINT REPRESENTATION. EACH SPECTRA OF DATA IS CONTAINED IN THREE RECORDS.

DATA SET NAME- MASS SPECTROMETER DATA ON MICROFILM

NSSDC ID- 72-031A-11B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/20/72 TO 04/24/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 4 REEL(S) OF MICROFILM

THE MICROFILM RECORDS ARE FORMATTED OUTPUTS OF THE DATA ON MAGNETIC TAPE. THE FORMAT PRESENTS SEQUENTIAL PAIRS OF MASS SPECTRA (HIGH- AND LOW-MASS CHANNELS) ALONG WITH BACKGROUND, PEAK AMPLITUDE, HOUSEKEEPING, AND TRAJECTORY DATA.

IN ADDITION, THERE ARE SOME TABULATED SUMMARIES OF PEAK AMPLITUDES, TRAJECTORY DATA, AND HOUSEKEEPING MEASUREMENTS AS A FUNCTION OF GROUND ELAPSED TIME (GET). EACH SUMMARY CHART COVERS SEVERAL HOURS OF EXPERIMENT OPERATION.

SPACECRAFT COMMON NAME- APOLLO 16 LM/ALSEP

ALTERNATE NAMES- ALSEP 16, LEM 16
ROVER 16, 06005
APOLLO 16C

NSSDC ID- 72-031C

LAUNCH DATE- 04/16/72 WEIGHT- 5040. KG

STATUS OF OPERATION- PARTIAL

THE APOLLO 16 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV), AND AN APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE DESCARTES HIGHLAND REGION JUST NORTH OF THE CRATER DOLLAND AT 8 DEG 59 MIN 55 SEC S LATITUDE, AND 15 DEG 31 MIN 12 SEC E LONGITUDE. THE ALSEP WAS DEPLOYED AT THE LANDING SITE. THE LRV WAS USED DURING EXTRAVEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXPLORATION. THE NUCLEAR-POWERED ALSEP PACKAGE CONTAINED SEISMIC, MAGNETIC FIELD, AND HEAT FLOW EXPERIMENTS. THE LM ITSELF WAS ON THE LUNAR SURFACE APRIL 21-24, 1972.

CARRUTHERS, APOLLO 16 LM/ALSEP

EXPERIMENT NAME- FAR-ULTRAVIOLET CAMERA/SPECTROSCOPE

NSSDC ID- 72-031C-10

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 04/23/72

PERSONNEL
PI - G.R. CARRUTHERS ..... US NAVAL RESEARCH LAB
WASHINGTON, DC
OI - T. PAGE ..... NASA-JSC
HOUSTON, TX

THIS EXPERIMENT CONSTITUTED THE FIRST PLANETARY-BASED ASTRONOMY OBSERVATORY AND CONSISTED OF A TRIPOD-MOUNTED 3-IN. ELECTRONOGRAPHIC SCHMIDT CAMERA WITH A CESIUM IODIDE CATHODE AND FILM CARTRIDGE. SPECTROSCOPIC DATA WERE PROVIDED IN THE 300- TO 1350-A RANGE (30-A RESOLUTION), AND IMAGERY DATA WERE PROVIDED IN TWO PASSBANDS (1050 TO 1260 A AND 1200 TO 1550 A). DIFFERENCE TECHNIQUES ALLOWED LYMAN-ALPHA (1216-A) RADIATION TO BE IDENTIFIED. THE ASTRONAUTS DEPLOYED THE CAMERA IN THE SHADOW OF THE LM AND THEN POINTED IT TOWARD OBJECTS OF INTEREST. SPECIFIC PLANNED TARGETS WERE THE GEOCORONA, THE EARTH'S ATMOSPHERE, THE SOLAR WIND, VARIOUS NEBULAE, THE MILKY WAY, GALACTIC CLUSTERS AND OTHER GALACTIC OBJECTS, INTERGALACTIC HYDROGEN, SOLAR DUST CLOUD, THE LUNAR ATMOSPHERE, AND LUNAR VOLCANIC GASES (IF ANY). AT THE END OF THE MISSION, THE FILM WAS REMOVED FROM THE CAMERA AND RETURNED TO EARTH.

DATA SET NAME- 2ND GENERATION COPY OF ULTRAVIOLET IMAGERY AND SPECTRA ON FILM

NSSDC ID- 72-031C-10A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/72 TO 04/23/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 209 FRAMES

THIS DATA SET CONSISTS OF 70-MM FILM CONTAINING A SECOND-GENERATION NEGATIVE COPY OF THE 35-MM FILM RETURNED FROM THE DESCARTES LANDING SITE, APOLLO 16 MISSION, EXPERIMENT S201. INCLUDED ARE PRE-FLIGHT CALIBRATION EXPOSURES (MISSION FRAME NUMBERS 1-18), A BLACK FRAME (MISSION FRAME NUMBER 19), AND THE 190 EXPOSURES TAKEN FROM THE LUNAR SURFACE (MISSION FRAME NUMBERS 20 - 209). THE MISSION FRAME NUMBER FOR EACH PICTURE IS ON THE FILM, BUT NO OTHER INFORMATION IS GIVEN. THE LUNAR SURFACE EXPOSURES ARE DISTRIBUTED OVER 10 SPECIFIC TARGET POINTINGS. THERE ARE BOTH IMAGERY AND SPECTRAL FRAMES. IMAGERY WAS DONE WITH A LITHIUM FLUORIDE OR A CALCIUM FLUORIDE CORRECTOR PLATE, WHILE THE SPECTRA WERE TAKEN USING EITHER THE LITHIUM FLUORIDE CORRECTOR PLATE OR NO CORRECTOR PLATE. (NOTE -- COMPLETE DATA ON EACH OF THE MISSION FRAMES IS CONTAINED IN THE SEPARATE NSSDC DATA SET 72-031C-10C. THIS DATA SET WILL BE SENT AUTOMATICALLY TO THOSE REQUESTING THIS DATA SET).

DATA SET NAME- DIGITIZED SCANS OF THE FAR-UV CAMERA/SPECTROSCOPE FRAMES ON MAG TAPE

NSSDC ID- 72-031C-10B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/72 TO 04/23/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 31 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF MAGNETIC TAPES CONTAINING THE DIGITIZED RESULTS OF MICRODENSITOMETERING THE 209 MISSION FRAMES FROM THE APOLLO 16 FAR-UV CAMERA EXPERIMENT OF CARRUTHERS AND PAGE. THESE SCANS WERE ALL PERFORMED ON THE DICOMED MODEL 37 MICRODENSITOMETER USING A SPOT SIZE OF 38 MICRONS AND A SCAN INTERVAL OF 32 MICRONS. THE TAPES CONTAIN A TOTAL OF 476 SCANS. THERE ARE 288 SCANS OF THE 190 MISSION PICTURE FRAMES, 58 SCANS OF THE 19 MISSION CALIBRATION-FRAMES, AND 130 SCANS OF THE SPECIAL FRAMES USED FOR CALIBRATION CONTROL DURING THE SCANNING PROCESS. ALL TAPES IN THIS DATA SET WERE WRITTEN IN BINARY (9-TRACK) AT ODD PARITY AT 800 BPI, AND WERE PACKED AT 8 BITS/BYTE. EACH TAPE CONTAINS MORE THAN ONE FILE. THE TAPES HAVE NO INFORMATION ON THEM OTHER THAN THE DIRECT SCANNING DATA. THE DATA ON THE TAPES ARE BLOCKED OUT IN THE FOLLOWING MANNER -- (1) THE SCAN OF ONE COMPLETE FRAME IS CONTAINED IN ONE FILE. THERE ARE APPROXIMATELY 15 FILES/TAPE, (2) EACH RECORD WITHIN A FILE REPRESENTS ONE SCAN LINE OF DATA RECORDED LEFT TO RIGHT. THE FULL SCAN OF ONE MISSION FRAME IS EQUIVALENT TO 1024 RECORDS, AND (3) EACH BYTE (8 BITS) WITHIN A RECORD REPRESENTS THE LIGHT TRANSMITTANCE VALUE RECORDED BY THE SCANNER FOR ONE INCREMENT OF THE SCAN INTERVAL. THE 8-BIT A/D DIGITIZATION ALLOWS FOR A POSSIBLE RANGE FROM 0 TO 255 IN THE RECORDED TRANSMITTANCE VALUES ALONG THE SCAN LINE. THE MAXIMUM NUMBER OF ELEMENTS (BYTES) PER SCAN LINE FOR A MISSION FRAME IS 1024. (NOTE - TO LOCATE THE SCAN OF PARTICULAR FRAMES ON THESE TAPES, AND TO KNOW HOW THAT SCAN WAS PERFORMED REQUIRES USE OF THE NSSDC DATA SET 72-031C-10C. DATA SET 72-031C-10C WILL BE SENT AUTOMATICALLY TO THOSE REQUESTING DATA SET 72-031C-10B.)

DATA SET NAME- CATALOG OF INFORMATION ON MISSION FRAMES AND HOW THEY WERE MICRODENSITOMETERED

NSSDC ID- 72-031C-10C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/72 TO 04/23/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET IS A MICROFILM OF THE 476 PAGES SUBMITTED BY DR. T. PAGE TO ACCOMPANY THE MAGNETIC TAPES THAT CONTAIN THE MICRODENSITOMETER (DICOMED MODEL 37) SCAN RESULTS OF THE 209 MISSION FRAMES GATHERED ON THE LUNAR SURFACE BY THE APOLLO 16 FAR-UV CAMERA/ SPECTROMETER EXPERIMENT. THE 209 MISSION FRAMES THAT WERE SCANNED INCLUDE 190 UV PICTURES AND 19 CALIBRATION FRAMES. A NUMBER OF THESE FRAMES WERE SCANNED MORE THAN ONCE. IN ADDITION, DURING THE MICRODENSITOMETER SCANS MANY PASSES WERE MADE OF A GRAY-SCALE, STEP-WEDGE AS A QUALITATIVE CONTROL VARIABLE ON THE SCANNING PROCEDURE. IN ALL, 476 SCANS WERE MADE, AND THE INFORMATION ON EACH SCAN IS CONTAINED ON A SINGLE CATALOG PAGE. THE NATURE OF THE INFORMATION GIVEN ON EACH SCAN MAKES THIS CATALOG USEFUL FOR THREE PURPOSES -- (1) AS THE SOURCE OF GENERAL INFORMATION ON EACH OF THE MISSION FRAMES, SINCE THE PAGES GIVE DATA ON CAMERA POINTING, FILTER(S) USED, EXPOSURE TIME, OBJECTS VISIBLE, ETC., (2) AS A USEFUL ADJUNCT TO THE VIEWING OF THE MISSION FRAMES, AND (3) AS AN ESSENTIAL GUIDE IN DETERMINING THE LOCATION OF THE MICRODENSITOMETER SCAN (S) OF THE MISSIONS FRAMES ON THE DIGITIZED-SCAN MAGNETIC TAPES, AND AS THE SOURCE OF INFORMATION ON HOW THE SCANS WERE PERFORMED AND THE SIZE OF THE SCANS. COPIES OF THE MISSION FRAMES AND THE DIGITIZED-SCAN MAGNETIC TAPES ARE AVAILABLE THROUGH NSSDC AS DATA SETS 72-031C-10A AND 72-031C-10B, RESPECTIVELY.

APOLLO 17

SPACECRAFT COMMON NAME- APOLLO 17 CSM

ALTERNATE NAMES- APOL17A, APOLLO 17A
06300

NSSDC ID- 72-096A

LAUNCH DATE- 12/07/72 WEIGHT- 48606. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/19/72

ORBIT PARAMETERS
ORBIT TYPE- SELENOCENTRIC EPOCH DATE- 12/12/72
ORBIT PERIOD- 118.8 MIN INCLINATION- 23. DEG
PERIAPSIS- 100. KM ALT APOAPSIS- 130. KM ALT

THE APOLLO 17 MISSION WAS THE SIXTH AND LAST OF THE MANNED LUNAR LANDING MISSIONS IN THE APOLLO SERIES. THE CREWMEN WERE COMMANDER EUGENE A. CERNAN, COMMAND MODULE (CM) PILOT RONALD E. EVANS, AND LUNAR MODULE (LM) PILOT (THE FIRST SCIENTIST TO GO TO THE MOON) HARRISON H. SCHMITT. THE LUNAR MODULE LM CARRYING ASTRONAUTS CERNAN AND SCHMITT LANDED ON THE MOON ON THE MORNING OF DECEMBER 11, IN THE TAURUS-LITTROW AREA AT 20 DEG 10 MIN N 30 DEG 48 MIN E AND, IN A VALLEY 11 KM WIDE BETWEEN MOUNTAINS 1500 M HIGH IN THE NORTH AND 2000 M HIGH IN THE SOUTHWEST. THIS LOCATION IS ON THE SE RIM OF MARE SERENITATIS. THE ASTRONAUTS REMAINED ON THE SURFACE FOR 73 HR. ASTRONAUT EVANS REMAINED IN THE CM IN ORBIT AND CONDUCTED EXPERIMENTS WHILE THE OTHERS WERE ON THE SURFACE. ASTRONAUTS CERNAN AND SCHMITT HAD A LUNAR ROVING VEHICLE (LRV) AND RODE TO DISTANCES UP TO ABOUT 3 KM FROM THE LM. THERE WERE THREE PERIODS OF EXTRAVEHICULAR ACTIVITY (EVA) ON THE SURFACE IN WHICH THE ASTRONAUTS DEPLOYED THE APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) AND CONDUCTED GEOLOGICAL STUDIES OF A VARIETY OF LUNAR FEATURES. ORANGE-COLORED MATERIAL WAS FOUND FOR THE FIRST TIME ON ANY OF THE APOLLO MISSIONS. THE APOLLO 17 SPACECRAFT WAS LAUNCHED ON DECEMBER 7, 1972, AND WAS INJECTED INTO LUNAR ORBIT ON DECEMBER 10. THE LM (72-096C) LANDED ON THE MOON ON DECEMBER 11 AND RETURNED TO THE CM ON DECEMBER 14. THE CM LEFT LUNAR ORBIT ON DECEMBER 16 AND RETURNED TO EARTH ON DECEMBER 19, 1972.

FASTIE, APOLLO 17 CSM

EXPERIMENT NAME- FAR-ULTRAVIOLET SPECTROMETER

NSSDC ID- 72-096A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/19/72

PERSONNEL
PI - W.G. FASTIE ..... JOHNS HOPKINS U
BALTIMORE, MD

THE UV SPECTROMETER OPERATED PROPERLY DURING THE MISSION AND PROVIDED OBSERVATIONS OF THE LUNAR SURFACE, LUNAR ATMOSPHERE, ZODIACAL LIGHT, SOLAR ATMOSPHERE EMISSIONS, EARTH MISSIONS, AND GALACTIC AND STELLAR EMISSIONS. THE SENSOR WAS AN EBERT SPECTROMETER, WITH A HALF-METER FOCAL LENGTH THAT MEASURED THE RADIATION INTENSITY AS A FUNCTION OF WAVELENGTH FROM 1180 TO 1660 A. ITS OPTICAL COMPONENTS INCLUDED AN EXTERNAL BAFFLE, ENTRANCE SLIT, EBERT MIRROR, SCANNING DIFFRACTION GRATING, EXIT SLIT, EXIT SLIT MIRRORS, AND A PHOTOMULTIPLIER. THE GRATING HAD AN AREA OF APPROXIMATELY 100 SQ CM WITH 3600 GROVES PER MM. A GRATING MECHANISM INCLUDED A ROTATING CAM, WITH A CAM FOLLOWER THAT TILTED THE GRATING BACK AND FORTH WITHIN THE SPECTRAL REGION. THE COMPLETE SCAN FROM 1180 A WAS ACHIEVED ONCE EVERY 12 SEC. A FIDUCIAL MARK INDICATED THE END OF THE SCAN AND ITS OUTPUT SYNCHRONIZED THE DATA WORD FORMAT. THE PHOTOMULTIPLIER TUBE PRODUCED AN ELECTRICAL SIGNAL THAT WAS RELATED TO THE INTENSITY OF THE INCIDENT LIGHT. AN ELECTRONICS MODULE INCLUDED ALL THE SIGNAL-PROCESSING CIRCUITRY FOR TELEMETRY.

DATA SET NAME- FAR-UV SPECTROMETER DATA ON MAGNETIC TAPE

NSSDC ID- 72-096A-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/10/72 TO 12/19/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 9 REEL(S) OF MAGNETIC TAPE

THIS DATA SET WAS PROVIDED BY THE EXPERIMENTER AND CONTAINS 7-TRACK MAGNETIC TAPES WRITTEN AT 556 BPI ON AN IBM 7094. EACH TAPE CONTAINS ONE FILE OF DATA. EACH 12-SEC SPECTROMETER SCAN IS REPRESENTED BY A PHYSICAL RECORD CONTAINING ONE HUNDRED AND TWENTY-FIVE 36-BIT INTEGER WORDS. RECORD WORDS NUMBERED 6 TO 120 ARE DATA WORDS AND REPRESENT THE NUMBER OF PHOTOELECTRONS PER 0.1 SECOND, AND THE WAVELENGTH INTERVAL CORRESPONDING TO EACH DATA WORD IS IDENTIFIED. CALIBRATION INFORMATION IS PROVIDED SO THAT THE OUTPUTS CAN BE CONVERTED TO BRIGHTNESS IN RAYLEIGHS. SOME OF THE PARAMETERS INCLUDED IN THE ASPECT DATA ARE THE DISTANCE TO THE EARTH, RIGHT ASCENSION AND DECLINATION OF THE UV SPECTROMETER'S (UVS) OPTIC AXIS, THE ANGLE BETWEEN THE UVS OPTIC AXIS AND SUN, THE ANGLE BETWEEN THE UVS OPTIC AXIS AND EARTH, AND THE ANGLE BETWEEN THE UVS OPTIC AXIS AND MOON. THE DATA ARE TIME ORDERED.

DATA SET NAME- FAR-ULTRAVIOLET SPECTROMETER DATA ON MICROFILM

NSSDC ID- 72-096A-02B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/10/72 TO 12/19/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 5 REEL(S) OF MICROFILM

THIS 16-MM FILM DATA SET WAS SUPPLIED BY THE EXPERIMENTER AND DISPLAYS GRAPHICALLY SOME OF THE DATA CONTAINED IN THE TAPE DATA SET 72-096A-02A. THE DATA ARE NOT IN TEMPORAL ORDER. THEY ARE DISPLAYED IN TWO FORMS -- AVERAGES OF THE SPECTRA, AND TIME VARIATIONS IN THE INTENSITIES OBSERVED AT THE FOLLOWING WAVELENGTHS -- 1216, 1275, 1304, 1470, 1556, AND 1657 A. THE FRAMES SHOWING SPECTRA ARE LABELED IDENTIFYING THE FIVE SPECTRA USED IN THE DISPLAY AND THE ACTUAL ELAPSED TIME IN HOURS, MINUTES, AND SECONDS OF THE FIRST SPECTRA. THE ORDINATE SHOWS AVERAGE COUNTS PER BIN, AND THE ABSCISSA DISPLAYS BIN NUMBER (WAVE-LENGTH INTERVAL). THE COUNTS SHOWN ARE THE AVERAGE OVER 5 SPECTRA. THE AVERAGE COUNTS/BIN VALUE CAN BE CONVERTED TO BRIGHTNESS IN RAYLEIGHS. THE TIME-VARIATION PLOTS SHOW THE BRIGHTNESS IN RAYLEIGHS (ORDINATE) AS A FUNCTION OF ACTUAL ELAPSED TIME EXPRESSED IN DECIMAL HOURS. EACH FRAME HERE COVERS 1 HR OF DATA, AND HAS THE WAVELENGTH OF THE MEASUREMENT PRINTED. THE ACCOMPANYING ASPECT DATA CONTAINS VALUES FOR SEVERAL PARAMETERS INCLUDING RIGHT ASCENSION AND DECLINATION OF THE UV SPECTROMETER (UVS) OPTIC AXIS, DISTANCE TO THE EARTH, THE ANGLE BETWEEN THE UVS OPTIC AXIS AND THE SUN, THE ANGLE BETWEEN THE UVS OPTIC AXIS AND EARTH, AND THE ANGLE BETWEEN THE UVS OPTIC AXIS AND THE MOON.

SPACECRAFT COMMON NAME- APOLLO 17 LM/ALSEP

ALTERNATE NAMES- APOLLO 17C, 06307
LEM 17, ROVER 17
ALSEP 17

NSSDC ID- 72-096C

LAUNCH DATE- 12/07/72 WEIGHT- 5050. KG

STATUS OF OPERATION- PARTIAL

THE APOLLO 17 LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) WAS DEPLOYED BY THE ASTRONAUTS IN THE NORTHEASTERN PORTION OF THE MOON (LATITUDE 20 DEG 10 MIN N, LONGITUDE 30 DEG 46 MIN E) ON THE SOUTHEASTERN RIM OF MARE SERENITATIS IN A DARK DEPOSIT BETWEEN MASSIVE UNITS OF THE SOUTHWESTERN TAURUS MOUNTAINS SOUTH OF LITTROW CRATER. THE ALSEP EXPERIMENTS WERE POWERED BY A NUCLEAR POWER SOURCE AND INCLUDED STUDY OF THE ATMOSPHERIC AND IONIC ENVIRONMENT OF THE MOON, HEAT LOSS FROM THE LUNAR INTERIOR, LUNAR EJECTA AND METEORITES, LUNAR SEISMIC PROFILING, AND LUNAR SURFACE GRAVIMETER FINDINGS. THE LM WAS ON THE LUNAR SURFACE DECEMBER 11-13, 1972.

HOFFMAN, APOLLO 17 LM/ALSEP

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION

NSSDC ID- 72-096C-08

STATUS OF OPERATION- INOPERABLE
DATE LAST DATA RECORDED- 10/17/73

PERSONNEL
PI - J.H. HOFFMAN ..... U OF TEXAS, DALLAS
DALLAS, TX

THE OBJECTIVES OF THE LUNAR ATMOSPHERIC COMPOSITION EXPERIMENT INCLUDED -- (1) OBTAINING DATA TO IDENTIFY THE

GASES IN THE NATIVE LUNAR ATMOSPHERE AT THE LUNAR SURFACE AND DETERMINING THEIR CONCENTRATIONS. (2) OBTAINING DATA TO DETERMINE THE VARIATIONS IN THESE GAS CONCENTRATIONS OVER TWO OR MORE LUNATIONS, AND (3) OBTAINING DATA ON SHORT-TERM TRANSIENT CHANGES IN THE LUNAR ATMOSPHERIC COMPOSITION. THE LUNAR ATMOSPHERIC COMPOSITION EXPERIMENT INCLUDED A MINIATURE MAGNETIC DEFLECTION ANALYZER THAT SIMULTANEOUSLY SCANNED THE MASS RANGES (EXPRESSED IN ATOMIC MASS UNITS (AMU)) 1 TO 4, 12 TO 48, AND 27 TO 110. THE SPECTRUM SCAN TIME WAS 13.5 MIN. THE REMAINING COMPONENTS OF THE MASS SPECTROMETER UNIT WERE THE ELECTRONICS, HEATERS, DEPLOYABLE DUST COVER, AND A RIBBON CABLE CONNECTOR TO THE ALSEP CENTRAL STATION. AN ASTRONAUT TRANSFERRED AND EMPLACED THE MASS SPECTROMETER UNIT ON THE LUNAR SURFACE APPROXIMATELY 15 M NORTHEAST OF THE ALSEP CENTRAL STATION. LEVEL TO IT TO WITHIN PLUS OR MINUS 15 DEG, AND MATED THE CABLE TO THE CENTRAL STATION.

DATA SET NAME- TABLES OF MASS PEAKS ON MICROFILM

NSSDC ID- 72-096C-08B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/02/73 TO 10/04/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 54 REEL(S) OF MICROFILM

THIS DATA SET IS ON 16-MM FILM, PROVIDED BY THE EXPERIMENTER, AND ALSO ON MAGNETIC TAPE (72-096C-08C). EACH MASS SPECTRUM PRODUCES SIX PAGES OF DATA, TWO EACH FOR THE LOW-, MID-, AND HIGH-MASS RANGES. VALUES FOR SEVERAL OTHER PARAMETERS ARE ALSO GIVEN INCLUDING THE MEASUREMENT DATES AND TIMES, THE MASS RANGE, THE SUN'S ELEVATION, AZIMUTH, AND ZENITH ANGLE, LUNAR SURFACE TEMPERATURE, AND EXPERIMENT MONITORS.

DATA SET NAME- TABLES OF MASS PEAKS ON MAGNETIC TAPE

NSSDC ID- 72-096C-08C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/02/73 TO 10/04/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 10 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, PROVIDED BY THE EXPERIMENTER, CONTAINS 9-TRACK MAGNETIC TAPES WRITTEN AT 1600 BPI ON AN IBM 360. RECORD FORMAT IS VARIABLE SPAN. THESE DATA ARE ON FILM IN DATA SET 72-096C-08B. FLAG WORDS FILL DATA TIME GAPS TO INSURE PROPER SPECTRA IDENTIFICATION. IN ADDITION TO MASS PEAK DATA, THERE ARE SEVERAL OTHER PARAMETERS PRESENTED INCLUDING -- MEASUREMENT TIME, AZIMUTH, ZENITH, THE SUN'S ELEVATION, LUNAR SURFACE TEMPERATURE, AND EXPERIMENT MONITORS.

SPACECRAFT COMMON NAME- ARIEL 1

ALTERNATE NAMES- S 51, UK 1
1962 OMICRON 1, 00285

NSSDC ID- 62-015A

LAUNCH DATE- 04/26/62 WEIGHT- 62. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 11/09/64

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 04/26/62
ORBIT PERIOD- 101. MIN INCLINATION- 53.87C DEG
PERIAPSIS- 390.000 KM ALT APOAPSIS- 1214.00 KM ALT

ARIEL 1 WAS DESIGNED TO CONTRIBUTE TO THE CURRENT KNOWLEDGE OF THE IONOSPHERE AND OF THE COMPLEX SUN-IONOSPHERE RELATIONSHIPS. THE SATELLITE WAS A 52-KG CYLINDER WITH A 58-CM DIAMETER AND A HEIGHT OF 22 CM. A TAPE RECORDER AND INSTRUMENTATION FOR ONE COSMIC-RAY, TWO SOLAR EMISSIONS, AND THREE IONOSPHERIC EXPERIMENTS WERE ON BOARD THE SATELLITE. EXCEPT FOR FAILURE AT LAUNCH OF THE SOLAR LYMAN-ALPHA EXPERIMENT, THE SPACECRAFT OPERATED NOMINALLY UNTIL JULY 9, 1962, BETWEEN THAT DATE AND SEPTEMBER 6, 1962, SPACECRAFT OPERATION WAS LIMITED. THE SPACECRAFT WAS OPERATED AGAIN FROM AUGUST 25, 1964, TO NOVEMBER 9, 1964, TO OBTAIN DATA CONCURRENT IN TIME WITH EXPLORER 20 (64-051A).

SAYERS, ARIEL 1

EXPERIMENT NAME- RADIO FREQUENCY CAPACITANCE PROBE

NSSDC ID- 62-015A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/31/62

PERSONNEL
PI - J.A. SAYERS ..... U OF BIRMINGHAM
BIRMINGHAM, ENGLAND
OI - P.H.H.ROTHWELL ..... U OF SOUTHAMPTON
SOUTHAMPTON, ENGLAND
OI - J.H. MAGER ..... U OF BIRMINGHAM
BIRMINGHAM, ENGLAND

THIS EXPERIMENT CONSISTED OF A CAPACITANCE PROBE USED TO OBSERVE THE DENSITY OF THERMAL ELECTRONS IN THE TOPSIDE IONOSPHERE. THE PROBE CONSISTED OF TWO FLAT, CIRCULAR WIRE MESH GRIDS PLACED PARALLEL TO EACH OTHER. IT COULD OBSERVE ELECTRON NUMBER DENSITIES FROM 0.25 TIMES 10 TO THE 4 POWER TO 0.08 TIMES 10 TO THE 6 POWER CM CUBED. THE PERFORMANCE WAS NOMINAL UNTIL JULY 8, 1962, AFTER WHICH TIME THE STARFISH EXPLOSION CAUSED OBSERVATIONS TO BE INTERMITTENT AND OF DEGRADED QUALITY. THE LAST USEFUL DATA WERE RECEIVED ON JULY 31, 1962, JUST PRIOR TO FAILURE OF THE TAPE RECORDER.

DATA SET NAME- ANALYZED ELECTRON DENSITY DATA ON TAPE

NSSDC ID- 62-015A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/27/62 TO 07/08/62
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE ANALYZED ELECTRON DENSITY DATA ARE ON 7-TRACK, 556-BPI, IBM 7094, BCD MAGNETIC TAPE. THEY ARE MERGED WITH STANDARD EPHEMERIDES, GEOPOTENTIAL ALTITUDE, LOCAL SOLAR TIME, AND B AND L. THE VALUES ARE GLOBAL IN COVERAGE UP TO PLUS OR MINUS 54 DEG LAT AND WERE OBSERVED FROM APRIL 27 THROUGH JULY 8, 1962. THEY COVER ALL TIMES OF DAY. THE SAME DATA ARE AVAILABLE ON MICROFILM AS DATA SET 62-015A-01B.

DATA SET NAME- ANALYZED ELECTRON DENSITY DATA ON MICROFILM

NSSDC ID- 62-015A-01B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/27/62 TO 07/08/62
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THESE ELECTRON DENSITY DATA ARE ON MICROFILM MERGED WITH STANDARD EPHEMERIDES, GEOPOTENTIAL ALTITUDE, LOCAL SOLAR TIME, AND B AND L. THE VALUES ARE GLOBAL IN COVERAGE UP TO PLUS OR MINUS 54 DEG LAT AND WERE OBSERVED FROM APRIL 27 THROUGH JULY 8, 1962. THEY COVER ALL TIMES OF DAY. THE SAME DATA ARE AVAILABLE ON DIGITAL MAGNETIC TAPE AS DATA SET 62-015A-01A.

SPACECRAFT COMMON NAME- ARIEL 3

ALTERNATE NAMES- UK 3, UK-E
02773, S 53

NSSDC ID- 67-042A

LAUNCH DATE- 05/05/67 WEIGHT- 89.8 KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/00/69

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 05/05/67
ORBIT PERIOD- 95. MIN INCLINATION- 80.181 DEG
PERIAPSIS- 494.000 KM ALT APOAPSIS- 600.000 KM ALT

ARIEL 3 WAS DESIGNED TO FURTHER THE PREVIOUS UK SATELLITE INVESTIGATIONS IN SPACE. IT WAS A SMALL OBSERVATORY WITH FIVE EXPERIMENTS. THE SPACECRAFT CONSISTED OF A

ARIEL 3

57-CM-HIGH, 12-SIDED PRISM WITH 69.6 CM BETWEEN ANY PAIR OF PARALLEL SIDES. A 24.2-CM-HIGH CONICAL STRUCTURE BEARING VARIOUS ANTENNAS WAS MATED TO THE TOP OF THE PRISM. FROM THE LOWER END OF THE PRISM, FOUR PADDLES EXTENDED DIAGONALLY DOWNWARD AT AN ANGLE OF 25 DEG FROM THE SPIN AXIS NORMAL. TWO SETS OF ANTENNAS WERE STRUNG AROUND THE OUTER ENDS OF THESE PADDLES. THE PADDLES ALSO SERVED AS MOUNTS FOR SOME OF THE INSTRUMENT SENSORS. SOLAR CELLS FOR POWER WERE MOUNTED ON BOTH THE SIDES OF THE PRISM AND THE PADDLES. THE SPACECRAFT WAS INITIALLY SPIN STABILIZED AT ABOUT 31 RPM BUT SLOWED TO ABOUT 12 RPM BY THE END OF THE FIRST YEAR IN ORBIT. ATTITUDE AND SPIN WERE MONITORED BY A COMBINATION OF ONBOARD SUN SENSORS AND BY OPTICAL OBSERVATIONS OF SOLAR REFLECTION FROM A SERIES OF SIX MIRRORS MOUNTED NEAR THE SATELLITE EQUATOR. A TAPE RECORDER WAS INCLUDED TO OBTAIN DATA FOR GLOBAL SURVEYS OF OBSERVED VARIABLES. EXPERIMENT OUTPUT FOR OVER ONE ORBIT COULD BE RECORDED IN A LOW-SPEED MODE, WITH ONE COMPLETE SET OF SENSOR DATA EACH 0.9 SEC. A HIGH-SPEED MODE OF OBSERVATION PROVIDED FOR REAL-TIME TELEMETRY WITH A COMPLETE SET OF SENSOR SAMPLING 55 TIMES PER SECOND. THE DATA WERE DUMPED IN 140 SEC IN THE HIGH-SPEED MODE. ALL EXPERIMENTS OPERATED WELL. A MOLECULAR OXYGEN EXPERIMENT DETERIORATED RAPIDLY, AS EXPECTED, AND AFTER NOVEMBER 21, 1967, THE USEFULNESS OF THE DATA IS HIGHLY QUESTIONABLE. ON OCTOBER 24, 1967, THE TAPE RECORDER BEGAN TO MALFUNCTION. IT OPERATED SPORADICALLY UNTIL ITS COMPLETE FAILURE ON FEBRUARY 6, 1968. REAL-TIME OPERATION PROVIDED CONSIDERABLE DATA UNTIL A SATELLITE POWER FAILURE IN DECEMBER 1968 RESTRICTED OPERATION TO DAYLIGHT HOURS ONLY. BY APRIL 1969, OPERATIONS HAD DECREASED TO ABOUT 15 PASSES PER WEEK, AND OBSERVATIONS WERE MADE ONLY FROM WINKFIELD, ENGLAND. AT THIS TIME, THE SATELLITE SPIN HAD DECAYED TO 1 RPM. THE SATELLITE WAS TURNED OFF IN SEPTEMBER 1969 AND DECAYED ON DECEMBER 14, 1970.

[redacted]

KAISER, ARIEL 3

EXPERIMENT NAME- VLF RECEIVER, FIXED-FREQUENCY SIGNAL STRENGTH

NSSDC ID- 67-042A-05

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/00/69

PERSONNEL

PI -	T.R. KAISER	U OF SHEFFIELD	SHEFFIELD, ENGLAND
OI -	A.R.W.HUGHES	U OF SHEFFIELD	SHEFFIELD, ENGLAND
OI -	K. BULLOUGH	U OF SHEFFIELD	SHEFFIELD, ENGLAND

THE PURPOSE OF THIS EXPERIMENT WAS TO MAKE A WORLDWIDE SURVEY OF CERTAIN VLF SIGNALS AND TO STUDY THE EFFECTS OF THE PROPAGATION PATH ON A 16-KHZ GROUND-BASED VLF TRANSMITTER. THE EXPERIMENT CONSISTED OF A FIXED FREQUENCY VLF RECEIVER OPERATING ON FREQUENCIES OF 3.2, 9.6, AND 16 KHZ. BANDWIDTHS WERE 1 KHZ ON ALL FREQUENCIES WITH AN ADDITIONAL NARROW BAND (NB) OF 0.1 KHZ AT 16 KHZ. THE OBSERVED PARAMETERS WERE MINIMUM, MEAN, AND MAXIMUM SIGNAL STRENGTHS AT EACH FREQUENCY, EXCEPT FOR THE NB 16-KHZ CHANNEL WHICH OBSERVED MINIMUM SIGNAL STRENGTH ONLY. TIME CONSTANTS WERE 30 SEC FOR THE MEAN VALUES, 1 SEC FOR THE NB MINIMUM, 0.1 SEC FOR THE OTHER THREE MINIMUM READINGS, AND 0.01 SEC FOR THE THREE MAXIMA READINGS. IMPULSIVE NOISE PRODUCED LARGE VARIATIONS IN MINIMUM, MAXIMUM, AND MEAN READINGS IN CONTRAST TO SMALL VARIATIONS FOR CONTINUOUS SIGNALS. THESE SIGNAL STRENGTH OBSERVATIONS WERE RECORDED EACH 28 SEC (ABOUT 2 DEG) ALONG THE ORBITAL PATH AND READ OUT ON COMMAND EACH ORBIT. THE EXPERIMENT OPERATED NORMALLY AFTER LAUNCH AND WAS OPERABLE UNTIL SATELLITE REENTRY ON DECEMBER 14, 1970. A MORE EXTENSIVE DESCRIPTION OF THIS EXPERIMENT WAS WRITTEN BY K. BULLOUGH ET AL. IN THE "JOURNAL OF SCIENTIFIC INSTRUMENTS," VOL 1, PP 77-83, 1968.

[redacted]

DATA SET NAME- MINIMUM, MAXIMUM, AND MEAN VLF SIGNAL STRENGTH VALUES ON MICROFILM

NSSDC ID- 67-042A-05A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 05/05/67 TO 09/30/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 4 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF FOUR 100-FT REELS OF 35-MM MICROFILM PREPARED BY THE EXPERIMENTERS AND IS AN ORIGINAL FORM OF THE DATA. ONE SET OF SIX FRAMES CONTAINS DATA FOR UP TO 90 MIN OF SATELLITE OPERATION. THE FIRST FOUR FRAMES CONSIST OF GRAPHS, ONE EACH FOR DATA FROM EACH OF THE THREE FIXED-RECEIVER FREQUENCIES AND A SECOND GRAPH FOR THE 16-KHZ RECEIVER. ON THE LATTER GRAPH, THE SIGNAL STRENGTHS OF THE NARROW-BAND AND WIDE-BAND SIGNALS ARE PLOTTED. ON THE OTHER THREE GRAPHS, MINIMUM, MEAN, AND MAXIMUM SIGNAL STRENGTHS ARE PLOTTED IN DECIBELS ABOVE 1 MICROGAMMA VS TIME AFTER START TIME. VALUES OF INVARIANT LATITUDE, GEOGRAPHIC POSITION, LOCAL TIME, MAGNETIC LATITUDE, AND SOLAR ZENITH ANGLE, WHICH CORRESPOND TO THE TIME AFTER START TIME, ARE SHOWN BELOW THE GRAPH. THE FIFTH FRAME CONTAINS REFERENCE VALUES FOR ALL OBSERVATION TIMES OF MAGNETIC FIELD STRENGTH, OF THE 16-KHZ REFERENCE INDEX, AND OF THE GEOCENTRIC ALTITUDE OF THE SATELLITE. THE LAST FRAME IS A MAP OF THE SUBSATELLITE TRACK WITH APPROPRIATE TIME TICKS ALONG THE PLOTTED PATH.

[redacted]

DATA SET NAME- MINIMUM, MAXIMUM, AND MEAN VLF SIGNAL STRENGTH VALUES ON TAPE

NSSDC ID- 67-042A-05B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 05/05/67 TO 04/14/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 29 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF IBM TAPES PREPARED BY THE EXPERIMENTERS AND IS AN ORIGINAL FORM OF THE DATA. TWO DIFFERENT TYPES OF INFORMATION APPEAR ON THE TAPES. AT THE BEGINNING OF EACH TAPE IS AN INDEX OF THE DATA THAT INCLUDES A HEADER LABEL. FOLLOWING THE INDEX INFORMATION ARE THE DATA RECORDS. WITHIN THESE DATA RECORDS, EACH DUMP OF DATA FROM THE SATELLITE TAPE RECORDER IS PRECEDED BY A HEADER LABEL. PRIMARY DATA GIVEN ARE MAXIMUM, MEAN, AND MINIMUM SIGNAL STRENGTHS FOR EACH OF THREE FREQUENCIES AND MINIMUM SIGNAL STRENGTH FOR THE 16-KHZ, NARROW-BAND RECEIVER. AUXILIARY DATA INCLUDED ARE UT, LOCAL TIME, GEOGRAPHIC AND GEOMAGNETIC LOCATION, INVARIANT LATITUDE, GEOMAGNETIC FIELD STRENGTH, GEOCENTRIC DISTANCE, SOLAR ZENITH ANGLE, AND AMBIENT ELECTRON DENSITY. THE TAPES ARE 7 TRACK, BCD, EVEN PARITY, WRITTEN AT 556 BPI.

[redacted]

SAYERS, ARIEL 3

EXPERIMENT NAME- LANGMUIR PROBE

NSSDC ID- 67-042A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/01/69

PERSONNEL

PI -	J. SAYERS	U OF BIRMINGHAM	BIRMINGHAM, ENGLAND

ELECTRON TEMPERATURES WERE DETERMINED BY EMPLOYING AN EXTENSION OF THE LANGMUIR PROBE TECHNIQUE. TWO IDENTICAL RHODIUM PLATED SPHERICAL PROBES, 3.2 CM IN DIAMETER AND WITH A 6.4-CM CENTER-TO-CENTER DISTANCE, WERE LINEARLY SWEPT FROM -6.0 TO +6.0 V IN 5.2 SEC. THIS SWEEP VOLTAGE WAS MODULATED BY A LOW-LEVEL SINE WAVE SIGNAL OF 6.0 KHZ. THE TWO PROBES, HOWEVER, WERE KEPT AT SLIGHTLY DIFFERENT POTENTIALS WITH RESPECT TO THE SPACECRAFT. THE DIFFERENTIAL CURRENTS TO EACH PROBE WERE COMPARED, AND AUTOMATICALLY KEPT IN A FIXED RATIO BY ADJUSTMENT OF THIS VOLTAGE DIFFERENCE BETWEEN THE TWO PROBES. UNDER THESE CONDITIONS, THE ELECTRON TEMPERATURE WAS A FUNCTION OF THIS KNOWN RATIO AND THE VALUE OF THE VOLTAGE DIFFERENCE AS THE PROBES WERE SWEPT THROUGH THE RETARDING REGION. (THE RETARDING REGION IS THAT VOLTAGE INTERVAL JUST BELOW SPACE POTENTIAL DURING WHICH THE CURRENT INCREASES FROM ALMOST ZERO TO JUST BELOW THE VALUE THAT WOULD BE CAUSED BY AMBIENT CONDITIONS.) THE EXPERIMENT WAS OPERATED FOR 5.2 SEC AND THEN TURNED OFF FOR THE SAME AMOUNT OF TIME WHILE THE ELECTRON DENSITY EXPERIMENT WAS TURNED ON. THE EXPERIMENT OPERATED NORMALLY, AND USEFUL DATA WAS OBTAINED. A MORE DETAILED EXPLANATION OF THE EXPERIMENT CAN BE FOUND IN "THE RADIO AND ELECTRONIC ENGINEER," VOL 35, NO. 1, JANUARY 1968, PP 55-63.

[redacted]

DATA SET NAME- ELECTRON TEMPERATURE VALUES ON MAGNETIC TAPE

NSSDC ID- 67-042A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 05/05/67 TO 10/12/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS ANALYZED DATA SET IS CONTAINED ON EVEN-PARITY BCD

MAGNETIC TAPES RECORDED AT 800 BPI. THE ELECTRON TEMPERATURE VALUES ARE EXPRESSED IN DEGREES KELVIN. THERE IS NORMALLY A FIXED TIME INTERVAL OF 27.92 SEC BETWEEN RECORDS. INFORMATION GIVEN AT THE BEGINNING OF EACH FILE CONSISTS OF DAY NUMBER (JANUARY 1, 1967, IS DAY NUMBER 1), APPROXIMATE UNIVERSAL TIME IN WHOLE HOURS, TELEMETRY STATION NAME, AND AN ERROR CODE. ADDITIONAL INFORMATION IN EACH RECORD CONSISTS OF LOCAL AND UNIVERSAL TIME, LATITUDE AND LONGITUDE (DEG). THESE LAST TWO PARAMETERS WERE OBTAINED FROM NOAA IONOSPHERIC PREDICTION MAPS. (INSTITUTE OF TELECOMMUNICATIONS, SCIENCE AND AERONOMY, U.S. DEPT. OF COMMERCE).

[redacted]

DATA SET NAME- ELECTRON TEMPERATURE PLOTS ON MICROFILM

NSSDC ID- 67-042A-01B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 05/05/67 TO 04/14/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 11 REEL(S) OF MICROFILM

THIS ANALYZED DATA SET ON 35-MM MICROFILM CONSISTS OF PLOTS OF ELECTRON TEMPERATURE IN DEGREES KELVIN VS LATITUDE AND TIME. THIS IS A GRAPHICAL VERSION OF THE DATA THAT ARE ON MAGNETIC TAPE (DATA SET 67-042A-01A). INCLUDED ON THE FILM ARE THE ELECTRON DENSITY EXPERIMENT DATA (DATA SET 67-042A-06B) AND THE THUNDERSTORM NOISE EXPERIMENT DATA (DATA SET 67-042A-04B). THERE ARE USUALLY FIVE FRAMES OF DATA FOR EACH PASS. THE TITLE FOR EACH FRAME GIVES TELEMETRY STATION NAME, APPROXIMATE UT IN WHOLE HOURS, SATELLITE ORBIT NUMBER, DAY NUMBER (JANUARY 1, 1967, IS DAY NUMBER 1), RIGHT ASCENSION AND DECLINATION OF THE SATELLITE SPIN AXIS, CORRECTED ZURICH SUNSPOT NUMBER, AND KP INDEX. THE FIRST TWO FRAMES (AND THE FOURTH, WHICH IS A CONTINUATION OF THE SECOND) CONTAIN THUNDERSTORM NOISE DATA. THE THIRD FRAME (AND THE FIFTH, WHICH IS A CONTINUATION OF THE THIRD) CONTAINS THE ELECTRON TEMPERATURE AND DENSITY DATA. ADDITIONAL DATA ON THESE FRAMES INCLUDE PLOTS OF SATELLITE HEIGHT (KM) VS LATITUDE AND TIME, CRITICAL FREQUENCY FXF2 (MHZ), AND HEIGHT OF THE F2 MAXIMUM (KM).

[redacted]

DATA SET NAME- ELECTRON DENSITY AND TEMPERATURE PLOTS ON MICROFILM

NSSDC ID- 67-042A-01C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 05/05/67 TO 04/15/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 6 REEL(S) OF MICROFILM

THIS DATA SET, PREPARED BY THE EXPERIMENTER, IS ORGANIZED IN PAIRS OF MICROFILM FRAMES, ONE PAIR PER SATELLITE ORBIT. THE SECOND FRAME IN EACH PAIR IS A GRAPHIC REPRESENTATION OF THE SUBSATELLITE PATH, LATITUDE AND LONGITUDE ARE SHOWN ON LINEAR SCALES ALONG WITH CONTINENTAL OUTLINES AND ORBIT PATH FOR WHICH DATA ARE PLOTTED ON THE COMPANION FRAME. DATA START AND STOP POSITIONS ALONG THE ORBIT PATH EVERY MINUTE AND EVERY 10 MINUTES, ARE MARKED. THE FIRST OF EACH PAIR OF FRAMES CONSISTS OF A PLOT WHICH MAY BE DIVIDED INTO THREE PARTS. THE CENTER PART IS A LOGARITHMIC PLOT (10E3 TO 2X10E6) OF ELECTRON NUMBER DENSITY PER CC VS A LINEAR PLOT OF TIME FROM DATA START. THE UPPER PORTION OF THE FRAMES CONSISTS OF A LINEAR PLOT OF ELECTRON TEMPERATURE (0-4500 DEG K) VS A LINEAR PLOT OF TIME. THE LOWER PORTION OF THE FRAMES PROVIDES SCALING OF THE TIME COORDINATE SO THAT ONE CAN READ CORRESPONDING VALUES OF GEOGRAPHIC LONGITUDE AND LATITUDE, INVARIANT LATITUDE, LOCAL AND MAGNETIC LOCAL TIME, AND SOLAR ZENITH ANGLE. THE FRAME PAIRS ARE NOT IN A USEFUL SEQUENCE, SO AN INDEX OF THE ENTIRE DATA SET IS AVAILABLE ON THE FRONT OF EACH MICROFILM REEL. THIS INDEX SHOWS TIME SEQUENCE OF THE DATA AND A SEQUENCE OF EQUATOR CROSSING LONGITUDES.

[redacted]

DATA SET NAME- ELECTRON DENSITY AND TEMPERATURE LISTINGS ON MICROFILM

NSSDC ID- 67-042A-01D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 05/06/67 TO 12/31/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF CHRONOLOGICAL MICROFILMED MACHINE LISTINGS OF ELECTRON NUMBER DENSITY (ELECTRONS PER CC) AND ELECTRON TEMPERATURE (DEG KELVIN). INCLUDED IN THE LISTING FOR EACH SET OF THESE VALUES ARE UT (DECIMAL HRS), GEOGRAPHIC AND MAGNETIC LONGITUDES AND LATITUDES, ALTITUDE (KM), SOLAR ZENITH ANGLE, AND MCILWAIN MAGNETIC FIELD MODEL SHELL AND INTENSITY VALUES. THESE DATA WERE REDUCED AND PROVIDED BY THE EXPERIMENTER.

[redacted]

SAYERS, ARIEL 3

EXPERIMENT NAME- RADIO FREQUENCY CAPACITANCE PROBE

NSSDC ID- 67-042A-06

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/01/69

PERSONNEL
PI - J. SAYERS ..... U OF BIRMINGHAM
BIRMINGHAM, ENGLAND

ELECTRON DENSITY DETERMINATIONS WERE MADE BY MEASURING THE PERMITTIVITY ACROSS A PARALLEL-PLATE CAPACITOR. THE CAPACITOR, COMPOSED OF TWO CIRCULAR GRIDS 7.6 CM IN DIAMETER AND 5.7 CM APART, WAS OPERATED AT 29 MHZ. THE ELECTRON DENSITY COULD BE OBTAINED FROM THE OBSERVED PERMITTIVITY WHEN THESE GRIDS WERE AT SPACE POTENTIAL. TO ENSURE THAT AT SOME TIME THE POTENTIAL ON THE GRIDS WOULD BE EQUIVALENT TO THE SPACE POTENTIAL, A LINEAR SWEEP VOLTAGE FROM -6 V TO +6 V WAS APPLIED TO THE SENSOR IN 5.2 SEC. THE PERMITTIVITY AT SPACE POTENTIAL, WHEN THE AREA BETWEEN THE GRIDS WAS FILLED WITH AMBIENT ELECTRONS, WAS MEASURED IN TERMS OF THE CURRENT FLOWING BETWEEN THE TWO ELECTRODES. THE EXPERIMENT WAS OPERATED FOR 5.2 SEC AND THEN TURNED OFF FOR THE SAME AMOUNT OF TIME WHILE THE ELECTRON TEMPERATURE EXPERIMENT WAS TURNED ON. THERE WERE TWO OUTPUTS, ONE LOW SPEED TO A TAPE RECORDER AND THE OTHER HIGH SPEED REAL TIME, AVAILABLE ONLY WITHIN RANGE OF A TELEMETRY STATION. ONLY THE MAXIMUM VALUES OF EACH SWEEP WERE TAPE RECORDED WHILE THE ENTIRE SWEEP COULD BE READ OUT IN REAL TIME. THE EXPERIMENT OPERATED NORMALLY, AND USEFUL DATA WERE OBTAINED. A MORE DETAILED EXPLANATION OF THE EXPERIMENT CAN BE FOUND IN "RADIO AND ELECTRONIC ENGINEER," VOL 35, NO. 1, PP 55-63, JANUARY 1968.

[redacted]

DATA SET NAME- PLASMA FREQUENCY VALUES ON MAGNETIC TAPE

NSSDC ID- 67-042A-06A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 05/05/67 TO 04/14/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 53 REEL(S) OF MAGNETIC TAPE

THIS ANALYZED DATA SET IS CONTAINED ON 7-TRACK, 556-BPI, EVEN-PARITY, BCD MAGNETIC TAPES GENERATED AT THE RADIO AND SPACE RESEARCH STATION, SLOUGH, ENGLAND. THERE IS NORMALLY A FIXED TIME INTERVAL OF 27.92 SEC BETWEEN RECORDS. THE ELECTRON DENSITY DATA ARE EXPRESSED IN EACH RECORD IN TERMS OF PLASMA FREQUENCY VALUES IN MHZ. THE ELECTRON DENSITY CAN BE EASILY COMPUTED FROM THE PLASMA FREQUENCY. ALSO ON THESE TAPES ARE THE ARIEL 3 ELECTRON TEMPERATURE EXPERIMENT DATA (67-042A-01A) AND THE ARIEL 3 THUNDERSTORM NOISE EXPERIMENT DATA (67-042A-04A). INFORMATION GIVEN AT THE BEGINNING OF EACH FILE CONSISTS OF DAY NUMBER (JANUARY 1, 1967, IS DAY NUMBER ONE), APPROXIMATE UNIVERSAL TIME IN WHOLE HOURS, TELEMETRY STATION NAME, AND AN ERROR CODE. ADDITIONAL DATA IN EACH RECORD ARE LOCAL AND UNIVERSAL TIME, LATITUDE AND LONGITUDE IN DEGREES, HEIGHT OF THE SATELLITE IN KILOMETERS, GYROFREQUENCY IN MEGAHERTZ, CRITICAL FREQUENCY FXF2 IN MEGAHERTZ, AND HEIGHT OF THE F2 MAXIMUM LAYER IN KILOMETERS. THESE LAST TWO PARAMETERS WERE OBTAINED FROM THE NOAA (FORMERLY ESSA) IONOSPHERIC PREDICTION MAPS.

[redacted]

DATA SET NAME- PLASMA FREQUENCY PLOTS ON MICROFILM

NSSDC ID- 67-042A-06B

AVAILABILITY OF DATA SET- DATA AT NSSDC

ARIEL 3/BE-B/DME-A

TIME PERIOD COVERED- 05/05/67 TO 04/14/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 11 REEL(S) OF MICROFILM

THIS ANALYZED DATA SET CONSISTS OF PLOTS OF PLASMA FREQUENCY (MHZ) VS LATITUDE AND TIME. IT IS A GRAPHICAL VERSION OF THE DATA ON MAGNETIC TAPE (DATA SET 67-042A-06A). THE ELECTRON DENSITY CAN BE EASILY COMPUTED FROM THE PLASMA FREQUENCY. THE ENTIRE DATA SET IS CONTAINED ON 35-MM MICROFILM, TOGETHER WITH THE ELECTRON TEMPERATURE EXPERIMENT DATA (DATA SET 67-042A-01B) AND THE THUNDERSTORM NOISE EXPERIMENT DATA (DATA SET 67-042A-04B). THERE ARE USUALLY FIVE FRAMES OF DATA FOR EACH PASS. THE TITLE TO EACH FRAME GIVES TELEMETRY STATION NAME, APPROXIMATE UT IN WHOLE HOURS, SATELLITE ORBIT NUMBER, DAY NUMBER (JANUARY 1, 1967, IS DAY NUMBER 1), RIGHT ASCENSION AND DECLINATION OF THE SATELLITE SPIN AXIS, CORRECTED ZURICH SUNSPOT NUMBER, AND KP INDEX. THE FIRST TWO FRAMES (AND THE FOURTH, WHICH IS A CONTINUATION OF THE SECOND) CONTAIN THUNDERSTORM NOISE DATA. THE THIRD FRAME (AND THE FIFTH, WHICH IS A CONTINUATION OF THE THIRD) CONTAINS THE PLASMA FREQUENCY AND ELECTRON TEMPERATURE DATA. ADDITIONAL DATA ON THESE FRAMES INCLUDE PLOTS OF THE SATELLITE HEIGHT (KM) VS LATITUDE AND TIME, THE CRITICAL FREQUENCY FXF2 (MHZ), AND THE HEIGHT OF THE F2 MAXIMUM LAYER (K3). THESE LAST TWO PARAMETERS WERE OBTAINED FROM NOAA PREDICTION MAPS.

SPACECRAFT COMMON NAME- DE-B

ALTERNATE NAMES- EXPLORER 22, S 668
00899

NSSDC ID- 64-064A

LAUNCH DATE- 10/10/64 WEIGHT- 52.0 KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 02/00/70

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 10/10/64
ORBIT PERIOD- 105. MIN INCLINATION- 79.693 DEG
PERIAPSIS- 874.000 KM ALT APOAPSIS- 1077.00 KM ALT

EXPLORER 22 WAS A SMALL IONOSPHERIC RESEARCH SATELLITE INSTRUMENTED WITH AN ELECTROSTATIC PROBE, A 20-, 40-, AND 41-MZ RADIO BEACON, AND A PASSIVE LASER TRACKING REFLECTOR. ITS OBJECTIVE WAS TO OBTAIN WORLDWIDE OBSERVATIONS OF TOTAL ELECTRON CONTENT BETWEEN THE SPACECRAFT AND THE EARTH. THE SATELLITE WAS INITIALLY SPIN-STABILIZED, BUT IT WAS DESPUN AFTER SOLAR PADDLE ERECTION. SUBSEQUENT STABILIZATION ORIENTED THE SATELLITE AXIS SYMMETRY WITH THE LOCAL MAGNETIC FIELD BY MEANS OF A STRONG BAR MAGNET AND DAMPING BOOMS. A THREE-AXIS MAGNETOMETER AND SUN SENSORS PROVIDED INFORMATION ON THE SATELLITE ATTITUDE AND SPIN RATE. THERE WAS NO TAPE RECORDER ABOARD SO THAT SATELLITE PERFORMANCE DATA AND ELECTROSTATIC PROBE DATA COULD BE OBSERVED ONLY WHEN THE SATELLITE WAS WITHIN RANGE OF A GROUND TELEMETRY STATION. CONTINUOUS TRANSMITTERS ALSO OPERATED AT 162 AND 324 MZ TO PERMIT PRECISE TRACKING BY "TRANSIT" TRACKING STATIONS FOR NAVIGATION AND GEODETIC STUDIES. IN AUGUST 1968, DATA ACQUISITION FROM THE SATELLITE TELEMETRY CHANNELS WAS DISCONTINUED. IN JULY 1969, TRACKING AND WORLD MAP PRODUCTION WAS DISCONTINUED BY GSFC, AND WORLD MAP PRODUCTION BASED ON NORAD ORBIT ELEMENTS WAS SUBSEQUENTLY ASSUMED BY ESRO. THE SATELLITE FAILED IN FEBRUARY 1970 AND EXPLORER 27 (65-032A) WAS TURNED ON IN ORDER TO PARTIALLY REPLACE USE MADE OF THIS SATELLITE BEACON EXPERIMENT.

BRACE, DE-B

EXPERIMENT NAME- LANGMUIR PROBE

NSSDC ID- 64-064A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/00/68

PERSONNEL
PI - L.H. BRACE ..... NASA-GSFC
GREENBELT, MD
OI - H.W. SPENCER ..... NASA-GSFC
GREENBELT, MD

TWO CYLINDRICAL ELECTROSTATIC PROBES (TYPES OF LANGMUIR PROBES) WERE USED TO MEASURE ELECTRON DENSITY AND TEMPERATURE. EACH CONSISTED OF A COLLECTOR ELECTRODE WHICH EXTENDED FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING EXTENDED 12.7 CM FROM THE SPACECRAFT, AND THE PROBE EXTENDED 22.86 CM. A 2-HZ SAWTOOTH VOLTAGE OF -3 TO +5 VOLTS WAS SWEPT ALTERNATELY TO EACH OF THE PROBES, AND THE RESULTING CURRENT PROFILE TO THE PROBE WAS TELEMETERED. FROM THIS PROFILE, THE ELECTRON DENSITY AND TEMPERATURE AND MEAN ION MASS COULD BE DETERMINED. THE EXPERIMENT WAS OPERATED FOR 22 SEC EVERY 3 MIN WHILE WITHIN RANGE OF ANY OF 10 TELEMETRY STATIONS. THIS EXPERIMENT PERFORMED NOMINALLY FROM LAUNCH UNTIL AUGUST 1968, WHEN IT WAS TURNED OFF.

DATA SET NAME- TABULATIONS OF ELECTRON DENSITY DATA ON MICROFILM

NSSDC ID- 64-064A-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 10/10/64 TO 05/31/65
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS ANALYZED DATA SET, WHICH WAS RECEIVED FROM THE EXPERIMENTER, CONSISTS OF ELECTRON NUMBER DENSITIES RECORDED BY STADAN STATIONS FOR PERIODS IN WHICH THE SATELLITE ORBIT PATH WAS OVER ANY ONE OF 10 STATIONS OBSERVING THE IONOSPHERIC BEACON FROM THIS SATELLITE. KNOWLEDGE OF THE ELECTRON DENSITY AT THE SATELLITE IS VERY USEFUL FOR INTERPRETATION OF BEACON DATA. THE EXPERIMENT OPERATED FOR 22 SEC EVERY 3 MIN. THE TWO 22-SEC PERIODS OCCURRING NEAREST A GIVEN BEACON OBSERVING STATION WERE ANALYZED FOR ELECTRON DENSITY. THE RESULTS ARE PRESENTED IN TABULAR FORM ON 35-MM MICROFILM ALONG WITH UT, LATITUDE, LONGITUDE, AND ALTITUDE. THE DATA FROM EACH MONTH ARE ORDERED ACCORDING TO THE BEACON STATION OVER WHICH THE DATA WERE RECORDED.

SPACECRAFT COMMON NAME- DME-A

ALTERNATE NAMES- EXPLORER 31, ISIS-X
01806, S 30A

NSSDC ID- 65-098B

LAUNCH DATE- 11/29/65 WEIGHT- 100.0 KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 10/01/69

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 11/29/65
ORBIT PERIOD- 121. MIN INCLINATION- 79.724 DEG
PERIAPSIS- 529.000 KM ALT APOAPSIS- 2966.00 KM ALT

EXPLORER 31 WAS A SMALL IONOSPHERIC OBSERVATORY INSTRUMENTED TO MAKE DIRECT MEASUREMENTS OF SELECTED IONOSPHERIC PARAMETERS AT THE SPACECRAFT. IT CARRIED SEVEN EXPERIMENTS — A THERMAL ION EXPERIMENT, A THERMAL ELECTRON EXPERIMENT, AN ELECTROSTATIC PROBE, AN ELECTRON TEMPERATURE PROBE, A SPHERICAL MASS SPECTROMETER, AN ENERGETIC ELECTRON CURRENT MONITOR, AND AN ION-MASS SPECTROMETER. THE SPACECRAFT HAD NO TAPE RECORDER SO THAT DATA COULD BE OBSERVED AT THE SPACECRAFT ONLY WHEN THE SPACECRAFT WAS IN SIGHT OF THE TELEMETRY STATION AND WHEN COMMANDED ON. EXPERIMENTS WERE OPERATED EITHER SIMULTANEOUSLY OR SEQUENTIALLY, AS DESIRED. THE SATELLITE WAS SPIN-STABILIZED WITH THE SPIN AXIS PERPENDICULAR TO THE ORBIT PLANE. THE SPIN RATE AND SPIN AXIS WERE CONTROLLED BY AN ONBOARD MAGNETIC TORQUING SYSTEM. THE ATTITUDE AND SPIN RATE INFORMATION WAS OBSERVED BY A SUN SENSOR AND A THREE-AXIS MAGNETOMETER. SATELLITE PERFORMANCE WAS SATISFACTORY EXCEPT FOR A PARTIAL POWER FAILURE IN MAY 1966, WHICH REDUCED DATA ACQUISITION TIME TO ABOUT HALF THE NOMINAL AMOUNT. SOME DIFFICULTIES WERE ENCOUNTERED IN OBTAINING ATTITUDE INFORMATION THAT WAS NECESSARY TO REDUCTION OF THE EXPERIMENT OBSERVATIONS. ON JULY 1, 1969, THE SATELLITE DATA OBSERVATIONS WERE TERMINATED DUE TO FISCAL RESTRAINTS WITH FIVE OF THE SEVEN EXPERIMENTS OPERATING. RESPONSIBILITY FOR STANDBY MONITORING OF THE SATELLITE WAS GIVEN TO THE ESSA TELEMETRY STATION AT BOULDER, COLORADO, ON JULY 8, 1969. DURING THIS STANDBY OPERATION, EXPERIMENT DATA WERE COLLECTED ONLY ONCE ON OCTOBER 12, 1969, FOR 9 MIN FROM THE ELECTROSTATIC PROBE FOR USE IN STUDYING A RED ARC EVENT. ON JANUARY 15, 1971, NO RESPONSE WAS RECEIVED FROM A VARIETY OF SATELLITE COMMANDS, AND THE SATELLITE WAS ABANDONED.

HOFFMAN, DME-A

EXPERIMENT NAME- MAGNETIC ION MASS SPECTROMETER

NSSDC ID- 65-098B-05

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/03/68

PERSONNEL
PI - J.H. HOFFMAN ..... U OF TEXAS, DALLAS
DALLAS, TX

A MAGNETIC SECTOR FIELD MASS SPECTROMETER WAS USED TO MEASURE THE ABUNDANCES OF THE IONOSPHERIC POSITIVE ION SPECIES IN THE MASS RANGE 1 TO 20 AMU. THE MASS RANGE WAS SWEPT EVERY 3 SEC BY AN EXPONENTIALLY DECREASING ACCELERATING VOLTAGE, WHICH VARIED FROM -4000 TO -150 VOLTS. THE IONS WERE SEPARATED ACCORDING TO MASS-TO-CHARGE RATIO IN THE MAGNETIC ANALYZER SECTION OF THE SPECTROMETER. A PARTICULAR ION SPECIES, DEPENDING ON THE ACCELERATING VOLTAGE, WAS THEN PASSED THROUGH THE ANALYZER INTO AN ELECTRON MULTIPLIER. THE OUTPUT ION CURRENT FROM THE MULTIPLIER WAS MEASURED BY A LOGARITHMIC ELECTROMETER AMPLIFIER AND CONVERTED TO A VOLTAGE. THE EXPERIMENT OPERATED NORMALLY AND YIELDED USEFUL DATA FROM LAUNCH ON NOVEMBER 29, 1965, UNTIL ABOUT APRIL 1967. THEN LOW BATTERY VOLTAGE RESULTED IN A VOLTAGE REGULATOR PROBLEM. THE EFFECT WAS THAT THE EXPERIMENT PROVIDED USEFUL DATA ONLY INTERMITTENTLY AFTER THAT. THE EXPERIMENT FAILED IN MARCH 1968.

[redacted]

DATA SET NAME- ION DENSITY PLOTS ON MICROFILM

NSSDC ID- 65-098B-05A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/01/65 TO 03/03/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 38 REEL(S) OF MICROFILM

THIS ANALYZED DATA SET, SUPPLIED BY THE EXPERIMENTER, IS CONTAINED ON 38 REELS OF 35-MM MICROFILM PRODUCED BY A STROMBERG CARLSON SC-4020 PLOTTER. A NORMAL COMPLETE PASS OVER A TELEMETRY STATION PRODUCED FIVE GRAPHS. EACH GRAPH, A SEMILOG PLOT WITH A LINEAR TIME SCALE AS ABSCISSA, COVERED A 120-SEC INTERVAL. THE ORDINATE, A 6-DECADE LOG SCALE FOR ION CONCENTRATIONS IN UNITS OF NUMBER OF IONS PER CUBIC CENTIMETER, RANGED FROM 0.1 TO 100,000. THE CONCENTRATIONS OF 10 POSITIVE ION SPECIES CAN BE REPRESENTED ON THE PLOTS. THE RATIOS OF MASS TO CHARGE MEASURED VARIED FROM 1 FOR THE HYDROGEN ION TO 20 FOR THE NEON ION. THE SPIN-MODULATED SIGNALS PERMITTED THE MEASUREMENT OF PHASE SHIFTS BETWEEN TIMES OF MAXIMUM VALUES FOR DIFFERENT SPECIES. IN ADDITION TO THE TEMPORAL IDENTIFICATION OF THE MEASUREMENTS AS GIVEN BY THE PRINTED MONTH, DAY, YEAR, UT IN HOURS AND MINUTES, AND ORBIT NUMBER, THE FOLLOWING INFORMATION IS PRINTED ON EACH FRAME -- THE NAME OF THE TELEMETRY STATION RECEIVING THE DATA, LOCAL SUN AND LOCAL MAGNETIC TIMES, GEOGRAPHIC AND GEOMAGNETIC LATITUDE AND LONGITUDE, HEIGHT, MCILWAIN'S L PARAMETER, AND SPACECRAFT VELOCITY. THE MEASUREMENTS WERE TAKEN FROM DECEMBER 1965, TO MARCH 1968. NO DATA WERE OBTAINED DURING THE FOLLOWING TIME INTERVALS -- DURING 1966, ON JANUARY 1 TO 7 AND 14 TO 24, FEBRUARY 1 TO 4, MARCH 17 TO 22, 29, AND 31, APRIL 8 TO 13, MAY 6 TO JUNE 8, JUNE 10 TO JUNE 20, JULY 5 AND 22, OCTOBER 4 TO 14 AND 21 TO 23, NOVEMBER 10, AND DECEMBER 31 -- DURING 1967, ON JANUARY 1 TO 3 AND 12 TO 20, FEBRUARY 9 AND 10, AND 12 TO 14, MARCH 1 AND 2, MAY 8, 12 TO 15, 17, 29, JUNE 12, JULY 21 TO 24, SEPTEMBER 6 TO 14 AND 16 AND 17, NOVEMBER 5 TO 7 AND 17, AND DECEMBER 7 TO 26 -- DURING 1968 ON JANUARY 31 AND FEBRUARY 1 AND 2, AND 28. THERE WAS AT LEAST ONE AND AS MANY AS 14 DATA-PRODUCING TURNONS DURING EACH OF THE REMAINING DAYS.

[redacted]

DATA SET NAME- ION DENSITY MEASURMENTS ON MAGNETIC TAPE

NSSDC ID- 65-098B-05B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/01/65 TO 03/03/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 100 REEL(S) OF MAGNETIC TAPE

THIS REDUCED DATA SET, PRESENTLY 70 PERCENT COMPLETE, IS BEING COPIED FROM THE ORIGINAL TAPES BY THE EXPERIMENTER FOR NSSDC AND WILL CONTAIN ABOUT ONE HUNDRED 7-TRACK, 800-BPI, BCD, EVEN-PARITY, IBM 360/50 PRINT FORMAT TAPES. THERE ARE 34 FILES PER RUN AND A MAXIMUM OF 2 RUNS PER TAPE. THESE TIME-ORDERED TAPES WILL CONTAIN DATA OBTAINED FROM DECEMBER 1965, TO MARCH 1968, WITH SEVERAL TIME INTERVALS IN WHICH NO MEASUREMENTS WERE TAKEN. INCLUDED ON THE TAPE ARE THE FOLLOWING PARAMETERS -- THE DATE AND UT OF THE MEASUREMENTS, THE GROUND STATION THAT RECEIVED THE DATA AND THE PASS NUMBER, THE MASS NUMBERS OF THE ION SPECIES BEING MEASURED, THEIR CONCENTRATIONS EXPRESSED IN UNITS OF NUMBER PER CUBIC CENTIMETER, AND THE LOCATION OF THE MEASUREMENTS (THE LATITUDE AND LONGITUDE, BOTH GEOGRAPHIC AND MAGNETIC, THE ALTITUDE IN KILOMETERS, AND THE MCILWAIN "L" VALUE IN EARTH RADII). THE SPECIES CONCENTRATIONS ARE DISPLAYED GRAPHICALLY IN DATA SET 65-098B-05A.

[redacted]

SPACECRAFT COMMON NAME- DMSP(72-018A)

ALTERNATE NAMES- DSAP(72-018A), DAPP(72-018A)
USAF METSAT(72-018A)

NSSDC ID- 72-018A

LAUNCH DATE- 03/24/72 WEIGHT- 150. KG

STATUS OF OPERATION- PARTIAL

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 03/28/72
ORBIT PERIOD- 101.8 MIN INCLINATION- 98.8 DEG
PERIAPSIS- 823. KM ALT APOAPSIS- 885. KM ALT

ORIGINALLY PART OF A CLASSIFIED SYSTEM OF U.S. AIR FORCE WEATHER SATELLITES, THE SPACECRAFT'S MISSION WAS NOT REVEALED UNTIL MARCH 1973. THE CYLINDRICALLY SHAPED SPACECRAFT CARRIED BOTH VISUAL AND IR SENSORS FOR DAYLIGHT AND NIGHT CLOUDCOVER SURVEILLANCE. THE SATELLITE WAS MAINTAINED IN A NOON-MIDNIGHT, SUN-SYNCHRONOUS ORBIT. IN ADDITION, THE SPACECRAFT WAS ALSO CAPABLE OF TAKING INDIRECT ATMOSPHERIC TEMPERATURE PROFILES. THE SATELLITE COULD PRODUCE PHOTOGRAPHIC DATA WITH A HORIZONTAL RESOLUTION AT NADIR BETWEEN 0.6 AND 3.2 KM. DATA FROM THE SATELLITE WERE RECEIVED AT GROUND RECEIVING SITES AND RELAYED TO THE U.S. AIR FORCE GLOBAL WEATHER CENTRAL WHERE THE DATA WERE USED FOR OPERATIONAL FORECASTS AND ANALYSES. THE SATELLITE ALSO HAD A DIRECT READOUT CAPABILITY TO PROVIDE DATA TO VARIOUS UNDISCLOSED RECEIVING SITES LOCATED AROUND THE EARTH.

[redacted]

SNYDER, DMSP(72-018A)

EXPERIMENT NAME- EARTH IMAGERY.

NSSDC ID- 72-018A-01

STATUS OF OPERATION- UNKNOWN

PERSONNEL
PI - L. SNYDER ..... GLOBAL WEATHER CTR
OFFUT AIR FORCE BASE, NB

THIS IMAGERY SYSTEM WAS SENSITIVE IN THE WAVELENGTH RANGE FROM 4,000 TO 11,000 A, AND PEAKED AT ABOUT 8,000 A. THE FORWARD MOTION OF THE SATELLITE AND A ROTATING MIRROR PROVIDED THE SCANNING NEEDED TO GENERATE THE AURORAL IMAGES. THE INSTRUMENT RESOLUTION AT SUBTRACK WAS BETWEEN 0.6 AND 3.2 KM. THE IMAGERY WAS PRIMARILY USED FOR OPERATIONAL WEATHER FORECASTING. HOWEVER, POLAR NIGHT PASSES WERE SELECTED FOR THEIR CONTENT OF AURORAL EMISSION IMAGERY.

[redacted]

DATA SET NAME- AURORAL IMAGERY ON MICROFILM

NSSDC ID- 72-018A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/16/72 TO 03/31/75
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 41 REEL(S) OF MICROFILM

THIS DATA SET OF 35-MM FILM CONTAINS AURORAL IMAGES WHICH WERE TELEMETERED FROM THE SATELLITE SENSORS. THE DATA ARE CORRECTED FOR ROLL AND ALTITUDE VARIATIONS, BUT ARE NOT CORRECTED FOR SMALL PITCH AND YAW VARIATIONS. THE DATA FRAME WIDTH IS ABOUT 3000 KM. THE GEOGRAPHIC POSITIONS OF THE AURORAL FORMS CAN BE DETERMINED FROM THE EPHEMERIS INFORMATION AND COORDINATE GRIDS ACCOMPANYING THE DATA. A DATA USER INFORMATION SHEET AND NOTES ON THE USE OF THESE AURORAL IMAGES ARE ALSO PROVIDED WITH THE DATA. DATA ARE ARRANGED CHRONOLOGICALLY WITH IMAGES INTERMIXED FROM FOUR SATELLITES. SPECIFIC IDENTIFICATION OF TWO OF THESE SATELLITES IS STILL CLASSIFIED -- THE OTHER SATELLITE IS 72-069A.

DMSP (72-089A)/FR 1

SPACECRAFT COMMON NAME- DMSP(72-089A)

ALTERNATE NAMES- DSAP(72-089A), DAPP(72-089A)
USAF METSAT(72-089A)

NSSDC ID- 72-089A

LAUNCH DATE- 11/09/72 WEIGHT- 150. KG

STATUS OF OPERATION- NORMAL

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 11/09/72
ORBIT PERIOD- 101.68 MIN INCLINATION- 98.64 DEG
PERIAPSIS- 796. KM ALT APOAPSIS- 877. KM ALT

ORIGINALLY PART OF A CLASSIFIED SYSTEM OF U.S. AIR FORCE WEATHER SATELLITES, THE SPACECRAFT'S MISSION WAS NOT REVEALED UNTIL MARCH 1973. THE CYLINDRICALLY SHAPED SPACECRAFT CARRIED BOTH VISUAL AND IR SENSORS FOR DAYLIGHT AND NIGHT CLOUDCOVER SURVEILLANCE. THE SATELLITE WAS MAINTAINED IN A NOON-MIDNIGHT, SUN-SYNCHRONOUS ORBIT. IN ADDITION, THE SPACECRAFT WAS ALSO CAPABLE OF TAKING INDIRECT ATMOSPHERIC TEMPERATURE PROFILES. THE SATELLITE COULD PRODUCE PHOTOGRAPHIC DATA WITH A HORIZONTAL RESOLUTION AT NADIR BETWEEN 0.6 AND 3.2 KM. DATA FROM THE SATELLITE WERE RECEIVED AT GROUND RECEIVING SITES AND RELAYED TO THE U.S. AIR FORCE GLOBAL WEATHER CENTRAL WHERE THE DATA WERE USED FOR OPERATIONAL FORECASTS AND ANALYSIS. THE SATELLITE ALSO HAD A DIRECT READOUT CAPABILITY TO PROVIDE DATA TO VARIOUS UNDISCLOSED RECEIVING SITES LOCATED AROUND THE EARTH.

SNYDER, DMSP(72-089A)

EXPERIMENT NAME- VISUAL AND IR IMAGERY

NSSDC ID- 72-089A-01

STATUS OF OPERATION- NORMAL

PERSONNEL
PI - L. SNYDER ..... GLOBAL WEATHER CTR
OFFUT AIR FORCE BASE, NB

THIS IMAGERY SYSTEM WAS SENSITIVE IN THE WAVELENGTH RANGE FROM 4000 TO 11,000 A AND PEAKED AT ABOUT 8000 A. THE FORWARD MOTION OF THE SATELLITE AND A ROTATING MIRROR PROVIDED THE SCANNING NEEDED TO GENERATE THE IMAGES. THE INSTRUMENT RESOLUTION AT SUBTRACK WAS BETWEEN 0.6 AND 3.2 KM. THE IMAGERY WAS PRIMARILY USED FOR OPERATIONAL WEATHER FORECASTING. HOWEVER, POLAR NIGHT PASSES WERE SELECTED FOR THEIR CONTENT OF AURORAL EMISSION IMAGERY.

DATA SET NAME- AURORAL IMAGERY ON MICROFILM

NSSDC ID- 72-089A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/12/72 TO 03/31/75
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 41 REEL(S) OF MICROFILM

THIS DATA SET OF 35-MM FILM PREPARED BY A USAF OFFICE IN OMAHA CONTAINS AURORAL IMAGES WHICH WERE TELEMETERED FROM THE SATELLITE SENSORS. THE DATA ARE CORRECTED FOR ROLL AND ALTITUDE VARIATIONS, BUT ARE NOT CORRECTED FOR SMALL PITCH AND YAW VARIATIONS. THE DATA FRAME WIDTH IS ABOUT 3000 KM. THE GEOGRAPHIC POSITIONS OF THE AURORAL FORMS CAN BE DETERMINED FROM THE EPHEMERIS INFORMATION AND COORDINATE GRIDS ACCOMPANYING THE DATA. A DATA USER INFORMATION SHEET AND NOTES ON THE USE OF THESE AURORAL IMAGES ARE ALSO PROVIDED WITH THE DATA. DATA ARE ARRANGED CHRONOLOGICALLY WITH IMAGES INTERMIXED FROM FOUR SATELLITES. SPECIFIC IDENTIFICATION OF TWO OF THESE SATELLITES IS STILL CLASSIFIED. THE OTHER IDENTIFIED SATELLITE IS 72-010A. TIME SPAN OF DATA IS EARLIER THAN SATELLITE LAUNCH DATE DUE TO THE FACT THAT SOME DATA ARE FROM ANOTHER SATELLITE.

SPACECRAFT COMMON NAME- FR 1

ALTERNATE NAMES- 01814, FRANCE-1

NSSDC ID- 65-101A

LAUNCH DATE- 12/06/65 WEIGHT- 60. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/26/68

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 12/06/65
ORBIT PERIOD- 100. MIN INCLINATION- 78.9706 DEG
PERIAPSIS- 735.000 KM ALT APOAPSIS- 740.000 KM ALT

THE FR-1 SPACECRAFT WAS A SMALL SPACECRAFT CARRYING TWO EXPERIMENTS. ONE WAS DESIGNED TO OBSERVE VLF SIGNALS FROM EARTH-BASED TRANSMITTERS, AND THE OTHER WAS AN ELECTRON DENSITY PROBE MEASURING ELECTRON CONCENTRATION AT THE SATELLITE. THE SATELLITE STRUCTURE CONSISTED OF TWO TRUNCATED OCTAGONAL PYRAMIDS, JOINED AT THEIR BASES BY AN OCTAGONAL PRISM MEASURING 27 IN. ACROSS FROM CORNER TO CORNER. THIS BASIC STRUCTURE WAS COVERED WITH SOLAR CELLS AND MEASURED ABOUT 28 IN. HIGH, EXTENDING 19 IN. DOWNWARD FROM THE BASE OF THIS STRUCTURE WAS THE ELECTRON DENSITY PROBE. EXTENDING UPWARD FROM THE TOP WAS A STRUCTURE 28 IN. HIGH WHICH CONSISTED OF THE MAGNETIC FIELD ANTENNA AND ITS SUPPORTING TUBE. EXTENDING DIAGONALLY UPWARD FROM THE BASE OF THIS TUBE WERE FOUR TELEMETRY ANTENNAS. FOUR 78-IN.-LONG ELECTRIC FIELD ANTENNA BOOMS EXTENDED OUTWARD FROM THE BASE OF THE PRISMATIC PORTION OF THE BASIC STRUCTURE. THE SPACECRAFT WAS SPIN-STABILIZED, WITH ATTITUDE AND SPIN DETERMINATION MADE FROM OBSERVATIONS BY A SUN SENSOR AND A THREE-AXIS FLUXGATE MAGNETOMETER. THIS SATELLITE IS BEING USED TO STUDY VLF PROPAGATION IN THE MAGNETOSPHERE AND IRREGULARITIES IN THE TOPSIDE IONOSPHERE. THERE WAS NO TAPE RECORDER ONBOARD, SO REAL-TIME DATA WERE OBTAINED AS SCHEDULED, OVER DESIGNATED TELEMETRY STATIONS. THE SPACECRAFT OPERATED SUCCESSFULLY UNTIL AUGUST 1968.

STOREY, FR 1

EXPERIMENT NAME- VLF RECEIVER

NSSDC ID- 65-101A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/26/68

PERSONNEL
PI - L.R.O.STOREY ..... IONOSPHERIC RES GROUP
SAINT-MAUR, FRANCE
OI - C. RENARD ..... CNET
PARIS, FRANCE
OI - M.P. AUBREY ..... CNET
PARIS, FRANCE

THIS EXPERIMENT CONSISTED OF EQUIPMENT TO OBSERVE THE FIELD STRENGTH OF THE MAGNETIC AND ELECTRIC FIELDS AT THE SATELLITE WHICH RESULTED FROM TRANSMISSIONS OF TWO VLF GROUND TRANSMITTERS. THE ELECTRIC FIELD INTENSITY WAS OBSERVED WITH TWO DIPOLES AND THEIR CORRESPONDING RECEIVERS, AND THE MAGNETIC FIELD INTENSITY WAS OBSERVED WITH THREE LOOP ANTENNAS AND THEIR CORRESPONDING RECEIVERS. THE OBSERVATIONS CONSISTED OF FIELD STRENGTH RECORDING VS TIME (LOCATION) IN THE REGIONS OVER THE GROUND TRANSMITTER AND IN THE REGION CONJUGATE TO THE GROUND TRANSMITTER. THE EXPERIMENT FAILED ON AUGUST 26, 1968, AFTER 30 MONTHS OF OPERATION, THIS FAR EXCEEDED THE 3-MONTH PLANNED LIFETIME. THESE FIVE WIDE-DYNAMIC-RANGE (52DB), NARROWBAND (150 HZ), VLF RECEIVERS RECEIVED AT FREQUENCIES OF 16.8 KHZ (ST. ASSISE, FRANCE-FUB), OR AT 24.0 KHZ (BALBOA, PANAMA - NBA). A MORE EXTENSIVE EXPERIMENT DESCRIPTION WAS WRITTEN BY L.R.O. STOREY IN SPACE RESEARCH, NO. 7, PP 588-603.

DATA SET NAME- QUICK-LOOK VLF MAGNETIC FIELD DATA ON MICROFILM

NSSDC ID- 65-101A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/07/65 TO 08/01/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF QUICK-LOOK ANALOG DATA ON 35-MM MICROFILM. EACH FRAME SHOWS THE SATELLITE TRAJECTORY FOR ONE PASS, SUPERIMPOSED ON AN OUTLINE MAP OF THE REGION OVER WHICH THE SATELLITE FLEW, ALONG THE DIRECTION OF SATELLITE MOTION. THE VARIATION OF H (RMS VALUE OVER ONE PERIOD OF

OSCILLATION OF THREE COMPONENT VLF MAGNETIC FIELD STRENGTH) IS PLOTTED IN DB TO THE RIGHT OF THE TRAJECTORY. TO THE LEFT OF THE TRAJECTORY ON A LINEAR SCALE. THE AXIS RATIO OF THE POLARIZATION ELLIPSE IS PLOTTED. THE SATELLITE ALTITUDES ARE INDICATED AT THE END OF EACH OF THE 1-MIN MARKERS THAT ARE PLACED ALONG THE ORBIT. BREAKS IN THE FIELD STRENGTH RECORDS CORRESPONDING TO THE TRANSMITTER CODE APPEAR EVERY 10 SEC. TIME, ORBIT, SCALE, ETC., ARE INDICATED DIGITALLY TO THE LEFT OF EACH MAP. THE DATA ON HAND COVER 1024 PASSES.

SPACECRAFT COMMON NAME- GEMINI 3

ALTERNATE NAMES- 01301

NSSDC ID- 65-024A

LAUNCH DATE- 03/23/65 WEIGHT- 3220. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/23/65

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 03/23/65
ORBIT PERIOD- 88.37 MIN INCLINATION- 33.0 DEG
PERIAPSIS- 160.000 KM ALT APOAPSIS- 240.000 KM ALT

GEMINI 3 WAS THE FIRST MANNED EARTH-ORBITING SPACECRAFT OF THE GEMINI SERIES. ITS PRIMARY OBJECTIVE WAS TO DEMONSTRATE THE MANNED QUALIFICATIONS OF THE GEMINI SPACECRAFT. A SYNERGISTIC EFFECT OF ZERO-G AND RADIATION ON WHITE BLOOD CELLS EXPERIMENT, A SEA URCHIN EGG GROWTH UNDER ZERO-G EXPERIMENT, AND ONE TECHNOLOGICAL EXPERIMENT WERE CONDUCTED. SEVERAL OF THE PHOTOGRAPHS TAKEN BY THE ASTRONAUTS WERE LATER CONSIDERED SUITABLE FOR SYNOPTIC TERRAIN STUDIES. AFTER 5 HOURS, THE SPACECRAFT SUCCESSFULLY REENTERED THE ATMOSPHERE AND LANDED 60 N.M. (111 KM) FROM THE TARGET AREA.

LOWMAN, JR., GEMINI 3

EXPERIMENT NAME- 70-MM HASSELBLAD EARTH PHOTOGRAPHY

NSSDC ID- 65-024A-03

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/23/65

PERSONNEL
PI - P.D. LOWMAN, JR. ..... NASA-GSFC
GREENBELT, MD

THIS EXPERIMENT WAS DESIGNED TO TAKE PHOTOGRAPHS OF THE EARTH FROM THE SPACECRAFT. A HAND-HELD 70-MM HASSELBLAD 500-C CAMERA WITH AN 80-MM F/2.8 LENS WAS USED TO OBTAIN THE PHOTOGRAPHS. IT WAS LOADED WITH 70-MM EKTACHROME FILM. OF THE 25 PICTURES TAKEN, SEVEN WERE USABLE FOR TERRAIN STUDIES. THESE WERE OF NORTHWEST SONORA, THE RIO GRANDE VALLEY, AND BERMUDA.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS

NSSDC ID- 65-024A-03A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 03/23/65 TO 03/23/65
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 3 PHOTOGRAPHY. AN INVENTORY LIST OF AVAILABLE PHOTOGRAPHS, AND THE PHOTO REPRODUCTIONS THEMSELVES, ARE AVAILABLE FROM THE EROS DATA CENTER. SELECTED GEMINI COLOR PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 3, 4, AND 5" (NASA SP-129).

SPACECRAFT COMMON NAME- GEMINI 4

ALTERNATE NAMES- 01390

NSSDC ID- 65-043A

LAUNCH DATE- 06/03/65 WEIGHT- 3180. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/07/65

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 06/04/65
ORBIT PERIOD- 88.62 MIN INCLINATION- 32.53 DEG
PERIAPSIS- 162.000 KM ALT APOAPSIS- 281.000 KM ALT

GEMINI 4 WAS THE SECOND MANNED MISSION OF THE GEMINI SERIES AND CARRIED J. A. MCDIVITT AND E. H. WHITE ON A 4-DAY, 62-ORBIT, 98-HR FLIGHT FROM JUNE 3 TO JUNE 7, 1965. THE SPACECRAFT WAS CONICAL AND HAD A DIAMETER OF 3.05 M AT THE LARGE END, WHICH WAS THE REAR OF THE SPACECRAFT AND WHICH WAS COVERED BY A FIBERGLASS HEAT SHIELD TO PROTECT THE CRAFT DURING REENTRY. THE OBJECTIVE OF THE MISSION WAS TO TEST THE PERFORMANCE OF THE ASTRONAUTS AND CAPSULE FOR AN EXTENDED LENGTH OF TIME IN SPACE. THE SPACECRAFT WAS TRANSPORTED TO SPACE WITH A TITAN ROCKET. WHITE PERFORMED A 23-MIN EVA (WALK) IN SPACE ATTACHED TO THE SPACECRAFT BY AN 8-M TETHER. MEDICAL AND ENGINEERING EXPERIMENTS WERE PERFORMED. THE SCIENTIFIC EXPERIMENTS PERFORMED WERE VISUAL AND PHOTOGRAPHIC. THE EXPERIMENTS PERFORMED WERE ELECTROSTATIC CHARGE (MSC-1), PROTON-ELECTRON SPECTROMETER (MSC-2), TRIAXIAL MAGNETOMETER (MSC-3), TWO-COLOR EARTH LIMB PHOTOS (MSC-10), INFLIGHT EXERCISER (M-3), INFLIGHT PHONOCARDIOGRAM (M-4), BONE DEMINERALIZATION (M-6), SYNOPTIC TERRAIN PHOTOS (S-5), SYNOPTIC WEATHER PHOTOS (S-6), DIM AND TWILIGHT PHENOMENA (S-26), RADIATION (D-8), AND SIMPLE NAVIGATION (D-9). THE MISSION WAS SUCCESSFUL, AND THE SPACECRAFT LANDED IN THE PACIFIC ON JUNE 7, 1965.

LOWMAN, JR., GEMINI 4

EXPERIMENT NAME- 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS

NSSDC ID- 65-043A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/07/65

PERSONNEL
PI - P.D. LOWMAN, JR. ..... NASA-GSFC
GREENBELT, MD

THIS EXPERIMENT WAS DESIGNED TO TAKE HIGH-QUALITY COLOR PHOTOGRAPHS OF SELECTED LAND AND NEAR-SHORE AREAS OF THE EARTH FOR GEOLOGIC, GEOGRAPHIC, AND OCEANOGRAPHIC STUDIES. A HAND-HELD 70-MM HASSELBLAD 500-C CAMERA WITH A ZEISS PLANAR 80-MM F/2.8 LENS WAS USED TO OBTAIN THE PHOTOGRAPHS. A HAZE FILTER WAS ALSO USED TO REDUCE THE INTENSITY OF BLUE LIGHT SCATTERING FROM THE ATMOSPHERE. FIVE MAGAZINES OF 70-MM EKTACHROME MS SO-217 FILM WERE CARRIED ON BOARD FOR THIS AND OTHER PHOTOGRAPHIC EXPERIMENTS. OF THE 207 PHOTOGRAPHS OBTAINED DURING THE FLIGHT, 100 WERE OF EXCELLENT QUALITY AND WERE USEFUL FOR TERRAIN STUDIES. THESE WERE OF NORTHWEST MEXICO, THE SOUTHWEST UNITED STATES, NORTH AFRICA, THE BAHAMA ISLANDS, AND THE ARABIAN PENINSULA.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS

NSSDC ID- 65-043A-01A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 06/03/65 TO 06/07/65
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 4 PHOTOGRAPHY. AN INVENTORY LIST OF AVAILABLE PHOTOGRAPHS, AND THE PHOTO REPRODUCTIONS THEMSELVES, ARE AVAILABLE FROM THE EROS DATA CENTER. SELECTED GEMINI COLOR PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 3, 4, AND 5" (NASA SP-129).

GEMINI 5/GEMINI 6A/GEMINI 7

SPACECRAFT COMMON NAME- GEMINI 5

ALTERNATE NAMES- 01516

NSSDC ID- 65-068A

LAUNCH DATE- 08/21/65 WEIGHT- 3180. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/29/65

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 08/24/65
ORBIT PERIOD- 89.4 MIN INCLINATION- 32.6 DEG
PERIAPSIS- 197.000 KM ALT APOAPSIS- 303.000 KM ALT

GEMINI 5, MANNED WITH TWO ASTRONAUTS, WAS THE THIRD EARTH-ORBITING SPACECRAFT OF THE GEMINI SERIES. THE CONE-SHAPED SPACECRAFT WAS 3.05 M IN DIAMETER AT THE LARGEST END, WHICH WAS THE REAR OF THE CRAFT. THE MAJOR OBJECTIVES OF THIS MISSION WERE TO DEMONSTRATE (1) A LONG-DURATION MANNED FLIGHT USING A FUEL CELL POWER SYSTEM, (2) RENDEZVOUS CAPABILITIES, AND (3) RENDEZVOUS MANEUVERS. SCIENTIFIC STUDIES INCLUDED ZODIACAL LIGHT, SYNOPTIC TERRAIN, SYNOPTIC WEATHER PHOTOGRAPHY, AND A CLOUDTOP SPECTROMETER EXPERIMENT. IN ADDITION, FIVE MEDICAL AND SEVEN TECHNOLOGICAL EXPERIMENTS WERE PERFORMED DURING THE MISSION. THE 120-ORBIT FLIGHT LASTED 8 DAYS, RETURNING TO EARTH ON AUGUST 29, 1965. THE MISSION WAS CONSIDERED SUCCESSFUL.

LOWMAN, JR., GEMINI 5

EXPERIMENT NAME- 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS

NSSDC ID- 65-068A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/29/65

PERSONNEL
PI - P.D. LOWMAN, JR. ..... NASA-GSFC
GREENBELT, MD

THIS EXPERIMENT WAS DESIGNED TO TAKE HIGH-QUALITY COLOR PHOTOGRAPHS OF SELECTED LAND AND NEAR-SHORE AREAS OF THE EARTH FOR GEOLOGIC, GEOGRAPHIC, AND OCEANOGRAPHIC STUDIES. A HAND-HELD 70-MM HASSELBLAD 500-C CAMERA WITH A ZEISS PLANAR 80-MM F/2.8 LENS WAS USED TO OBTAIN THE PHOTOGRAPHS. A HAZE FILTER WAS ALSO USED TO REDUCE THE INTENSITY OF BLUE LIGHT SCATTERING FROM THE ATMOSPHERE. EKTACHROME MS SO-217 FILM AND SUPER ANSCOCHROME D-50 WERE USED FOR THIS AND OTHER PHOTOGRAPHIC EXPERIMENTS. OF THE 253 PICTURES TAKEN, 175 WERE USABLE FOR TERRAIN STUDIES. THESE INCLUDED HIGH-QUALITY PHOTOGRAPHS OF THE SOUTHWESTERN UNITED STATES, THE BAHAMA ISLANDS, SOUTHWESTERN AFRICA, TIBET, INDIA, CHINA, AND AUSTRALIA.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS

NSSDC ID- 65-068A-02A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 08/21/65 TO 08/29/65
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 5 PHOTOGRAPHY. OF THE 253 FIRST GENERATION COLOR TRANSPARENCIES ON 70-MM FILM, 175 WERE DESIGNATED AS SYNOPTIC TERRAIN PHOTOGRAPHY. AN INVENTORY LIST OF AVAILABLE PHOTOGRAPHS, AND THE PHOTO REPRODUCTIONS THEMSELVES, ARE AVAILABLE FROM THE EROS DATA CENTER. SELECTED GEMINI COLOR PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 3, 4, AND 5" (NASA SP-129).

SPACECRAFT COMMON NAME- GEMINI 6A

ALTERNATE NAMES- 01839

NSSDC ID- 65-104A

LAUNCH DATE- 12/15/65 WEIGHT- 3800. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/16/65

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 12/15/65
ORBIT PERIOD- 89.64 MIN INCLINATION- 28.89 DEG
PERIAPSIS- 258.000 KM ALT APOAPSIS- 271.000 KM ALT

GEMINI 6 WAS THE FIFTH MANNED EARTH-ORBITING SPACECRAFT OF THE GEMINI SERIES, HAVING BEEN LAUNCHED AFTER GEMINI 7. THE MISSION PRIORITIES WERE TO DEMONSTRATE ON-TIME LAUNCH PROCEDURES, CLOSED-LOOP RENDEZVOUS CAPABILITIES, AND STATIONKEEPING TECHNIQUES WITH GEMINI 7. THE CREW CONDUCTED THREE SCIENTIFIC EXPERIMENTS -- (1) SYNOPTIC TERRAIN PHOTOGRAPHY, (2) SYNOPTIC WEATHER PHOTOGRAPHY, AND (3) DIM LIGHT PHOTOGRAPHY. THE MISSION WAS SUCCESSFULLY COMPLETED AFTER 25 HOURS OF FLIGHT. THE SPACECRAFT LANDED WITHIN 11 KM OF THE TARGET POINT ON DECEMBER 16, 1965.

LOWMAN, JR., GEMINI 6A

EXPERIMENT NAME- 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS

NSSDC ID- 65-104A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/16/65

PERSONNEL
PI - P.D. LOWMAN, JR. ..... NASA-GSFC
GREENBELT, MD

THIS EXPERIMENT WAS DESIGNED TO TAKE HIGH-QUALITY COLOR PHOTOGRAPHS OF SELECTED LAND AND NEAR-SHORE AREAS OF THE EARTH FOR GEOLOGIC, GEOGRAPHIC, AND OCEANOGRAPHIC STUDIES. A HAND-HELD, 70-MM HASSELBLAD 500-C CAMERA WITH A ZEISS PLANAR 80-MM F/2.8 LENS WAS USED TO OBTAIN THE PHOTOGRAPHS. A HAZE FILTER WAS ALSO USED TO REDUCE THE INTENSITY OF BLUE LIGHT SCATTERING FROM THE ATMOSPHERE. EKTACHROME MS SO-217 FILM WAS USED FOR THIS AND THE OTHER PHOTOGRAPHIC EXPERIMENTS. OF THE 192 PICTURES TAKEN, 60 WERE USABLE FOR TERRAIN STUDIES. THEY INCLUDED VIEWS OF NORTHWEST, CENTRAL, AND EASTERN AFRICA, AUSTRALIA, AND THE CANARY ISLANDS.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS

NSSDC ID- 65-104A-01A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 12/15/65 TO 12/16/65
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 6 PHOTOGRAPHY. OF THE 192 FIRST GENERATION COLOR TRANSPARENCIES ON 70-MM FILM, 60 WERE DESIGNATED AS SYNOPTIC TERRAIN PHOTOGRAPHY. AN INVENTORY OF AVAILABLE PHOTOGRAPHS, AND THE PHOTO REPRODUCTIONS THEMSELVES, ARE AVAILABLE FROM THE EROS DATA CENTER. SELECTED GEMINI PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 6 THROUGH 12" (NASA SP-171).

SPACECRAFT COMMON NAME- GEMINI 7

ALTERNATE NAMES- 01812

NSSDC ID- 65-100A

LAUNCH DATE- 12/04/65 WEIGHT- 3200. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/18/65

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 12/05/65
ORBIT PERIOD- 89.75 MIN INCLINATION- 28.87 DEG
PERIAPSIS- 215.000 KM ALT APOAPSIS- 321.000 KM ALT

GEMINI 7 WAS THE FOURTH MANNED EARTH-ORBITING SPACECRAFT OF THE GEMINI SERIES. ITS MISSION PRIORITIES WERE (1) TO DEMONSTRATE A 2-WEEK FLIGHT, (2) TO PERFORM STATIONKEEPING WITH THE GEMINI LAUNCH VEHICLE STAGE 2, (3) TO EVALUATE THE "SHIRT SLEEVE" ENVIRONMENT, (4) TO ACT AS A RENDEZVOUS TARGET FOR GEMINI 6, AND (5) TO DEMONSTRATE CONTROLLED REENTRY TO WITHIN 11 KM OF THE LANDING POINT. THE CREW MEMBERS HAD FOUR

SCIENTIFIC EXPERIMENTS TO PERFORM. THESE WERE SYNOPTIC TERRAIN, SYNOPTIC WEATHER, DIM LIGHT PHOTOGRAPHY, AND VISUAL ACUITY IN THE SPACE ENVIRONMENT. FOUR TECHNOLOGICAL AND EIGHT MEDICAL EXPERIMENTS WERE ALSO CONDUCTED. ALL EXPERIMENTS AND MISSION OBJECTIVES WERE SUCCESSFULLY COMPLETED. THE SPACECRAFT REENTERED THE ATMOSPHERE AFTER 15 DAYS IN SPACE AND LANDED WITHIN 11 KM OF THE TARGET POINT.

LOWMAN, JR., GEMINI 7

EXPERIMENT NAME- 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS

NSSDC ID- 65-100A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/18/65

PERSONNEL
PI - P.D. LOWMAN, JR. ..... NASA-GSFC
GREENBELT, MD

THIS EXPERIMENT WAS DESIGNED TO TAKE HIGH-QUALITY COLOR PHOTOGRAPHS FROM THE SPACECRAFT OF SELECTED LAND AND NEAR-SHORE AREAS OF THE EARTH FOR GEOLOGIC, GEOGRAPHIC, AND OCEANOGRAPHIC STUDIES. A HAND-HELD, 70-MM HASSELBLAD 500-C CAMERA, WITH BOTH ZEISS PLANAR 80-MM F/2.8 AND ZEISS SONNAR 250-MM F/4.5 LENSES, WAS USED TO OBTAIN THE PHOTOGRAPHS. A HAZE FILTER WAS ALSO USED TO REDUCE THE INTENSITY OF BLUE LIGHT SCATTERING FROM THE ATMOSPHERE. EKTACHROME MS SO-217, EKTACHROME INFRARED TYPE-8443, AND PANATOMIC-X TYPE-2475 FILMS WERE USED FOR THIS AND THE OTHER PHOTOGRAPHIC EXPERIMENTS. ALTHOUGH A DEPOSIT ON THE SPACECRAFT WINDOWS DEGRADED A NUMBER OF PICTURES, 250 OF 522 PICTURES WERE USABLE FOR TERRAIN STUDIES. THESE WERE OF NORTHERN AFRICA, THE ARABIAN PENINSULA, INDIA, THE CARIBBEAN SEA, BRAZIL, AND MEXICO. PHOTOGRAPHS FROM THE INFRARED FILM INCLUDED THE GULF COAST, THE UNITED STATES, AND NORTHEASTERN BRAZIL.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS

NSSDC ID- 65-100A-01A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 12/04/65 TO 12/18/65
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 7 PHOTOGRAPHY. AN INVENTORY LIST OF AVAILABLE PHOTOGRAPHS, AND THE PHOTO REPRODUCTIONS THEMSELVES, ARE AVAILABLE FROM THE EROS DATA CENTER. SELECTED GEMINI PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 6 THROUGH 12" (NASA SP-171).

NAGLER, GEMINI 7

EXPERIMENT NAME- SYNOPTIC WEATHER PHOTOGRAPHY

NSSDC ID- 65-100A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/18/65

PERSONNEL
PI - K. NAGLER ..... NATL METEOROL CTR
SILVER SPRING, MD

THE SYNOPTIC WEATHER PHOTOGRAPHY EXPERIMENT WAS DESIGNED TO PROVIDE A SET OF HIGH-RESOLUTION PICTURES OF A BROAD RANGE OF METEOROLOGICAL PHENOMENA, ESPECIALLY VIEWS OF SPECIFIC CLOUD SYSTEMS. AS A RESULT OF THE 90-MIN ORBIT, THE EXPERIMENT COULD SHOW CHANGES IN THE SAME CLOUD PATTERN DURING THIS INTERVAL. A HASSELBLAD 500-C CAMERA WITH 70-MM EKTACHROME MS SO-217 FILM WAS USED FOR THIS AND OTHER PHOTOGRAPHIC EXPERIMENTS. ONE ROLL EACH OF PANATOMIC-X TYPE 3400 AND KODAK TYPE 2475 FILM WAS ALSO EXPOSED. INFRARED EKTACHROME TYPE 8443 FILM, DESIGNED PRIMARILY FOR OTHER PURPOSES, YIELDED SOME METEOROLOGICALLY INTERESTING PICTURES. A HAZE FILTER WAS ATTACHED TO THE STANDARD ZEISS PLANAR 80-MM F/2.8 LENS TO REDUCE THE INTENSITY OF THE BLUE LIGHT SCATTERING FROM THE ATMOSPHERE. A ZEISS SONNAR 250-MM F/4.5 LENS WAS ALSO USED. PHOTOGRAPHS TAKEN WHEN THE SPACECRAFT WAS IN A NEARLY VERTICAL POSITION COVER AN AREA APPROXIMATELY 161 KM SQ. FROM OBLIQUE ANGLES. LARGER AREAS WERE CLEARLY VISIBLE, BUT THERE WAS DISTORTION, RESOLUTION LOSS, AND COLOR FIDELITY LOSS IN THE IMAGE. A DEPOSIT ON THE SPACECRAFT WINDOWS SERIOUSLY DEGRADED A NUMBER OF PICTURES. HOWEVER, A LARGE NUMBER OF USABLE PICTURES THAT DISPLAY CLOUD FORMATIONS OR OTHER INFORMATION OF METEOROLOGICAL INTEREST WERE OBTAINED FROM THE EXPERIMENT.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC WEATHER PHOTOS

NSSDC ID- 65-100A-02A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 12/04/65 TO 12/18/65
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

OF THE FIRST GENERATION 70-MM COLOR TRANSPARENCIES IN THE COMPLETE SET OF GEMINI 7 PHOTOGRAPHY, A NUMBER WERE DESIGNATED AS SYNOPTIC WEATHER PHOTOGRAPHY. AN INVENTORY LIST OF AVAILABLE PHOTOGRAPHS, AND THE PHOTO REPRODUCTIONS THEMSELVES, ARE AVAILABLE FROM THE TECHNOLOGY APPLICATION CENTER (TAC), UNIVERSITY OF NEW MEXICO, ALBUQUERQUE, NEW MEXICO 87106. SELECTED GEMINI COLOR PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 6 THROUGH 12" (NASA SP-171), WHICH IS AVAILABLE FROM THE U.S. GOVERNMENT PRINTING OFFICE.

SPACECRAFT COMMON NAME- GEMINI 8

ALTERNATE NAMES- 02105

NSSDC ID- 66-020A

LAUNCH DATE- 03/16/66 WEIGHT- 3789. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/17/66

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 03/16/66
ORBIT PERIOD- 88.60 MIN INCLINATION- 2891. DEG
PERIAPSIS- 159.000 KM ALT APOAPSIS- 265.000 KM ALT

GEMINI 8 WAS THE SIXTH MANNED EARTH-ORBITING SPACECRAFT OF THE GEMINI SERIES. THE PRIMARY MISSION OBJECTIVES WERE TO PERFORM RENDEZVOUS AND FOUR DOCKING TESTS WITH THE AGENA TARGET VEHICLE AND TO EXECUTE AN EXTRAVEHICULAR ACTIVITY (EVA) EXPERIMENT. TEN TECHNOLOGICAL, MEDICAL, AND SCIENTIFIC EXPERIMENTS WERE CARRIED ON BOARD. OF THE SIX SCIENTIFIC EXPERIMENTS ONLY THE AGENA MICROMETEORITE COLLECTION WAS SUCCESSFUL. THE OTHERS — (1) ZODIACAL LIGHT PHOTOGRAPHY, (2) FROG EGG GROWTH, (3) SYNOPTIC TERRAIN PHOTOGRAPHY, (4) NUCLEAR EMULSIONS, AND (5) SPECTROPHOTOGRAPHY OF CLOUDS — WERE INCOMPLETE, OWING TO A LARGE LOSS OF FUEL AND EARLY TERMINATION OF THE MISSION. THE EVA DOCKING AND OTHER MANEUVERS WERE CANCELED. THE SPACECRAFT REENTERED THE EARTH'S ATMOSPHERE AFTER 6.5 ORBITS AND LANDED IN THE PACIFIC OCEAN ON MARCH 17, 1966.

LOWMAN, JR., GEMINI 8

EXPERIMENT NAME- SYNOPTIC TERRAIN PHOTOGRAPHY

NSSDC ID- 66-020A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/16/66

PERSONNEL
PI - P.D. LOWMAN, JR. ..... NASA-GSFC
GREENBELT, MD

THIS EXPERIMENT WAS DESIGNED TO OBTAIN HIGH-QUALITY, SMALL-SCALE PICTURES OF SELECTED AREAS OF THE EARTH'S SURFACE FOR GEOLOGIC, GEOGRAPHIC, AND OCEANOGRAPHIC STUDIES. A 70-MM HASSELBLAD 500-C CAMERA, WITH A ZEISS PLANAR 80-MM F/2.8 LENS AND A HAZE FILTER, WAS USED WITH EKTACHROME MS SO-217 FILM. OWING TO THE SHORT DURATION OF THE FLIGHT, ONLY 19 PHOTOGRAPHS WERE OBTAINED. THESE PHOTOGRAPHS WERE DESIGNATED AS WEATHER PHOTOGRAPHY AND WERE NOT SUITABLE TO SATISFY OBJECTIVES OF THE SYNOPTIC TERRAIN PHOTOGRAPHY EXPERIMENT.

GEMINI 8/GEMINI 9/GEMINI 10

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC WEATHER PHOTOS

NSSDC ID- 66-020A-01A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 03/16/66 TO 03/16/66
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 8 PHOTOGRAPHY. OF THE 19 FIRST GENERATION COLOR TRANSPARENCIES ON 70-MM FILM. NONE WERE DESIGNATED AS SYNOPTIC TERRAIN PHOTOGRAPHY. ALL WERE DESIGNATED AS WEATHER PHOTOGRAPHY. AN INVENTORY LIST OF AVAILABLE PHOTOGRAPHS. AND THE PHOTO REPRODUCTIONS THEMSELVES. ARE AVAILABLE FROM EROS. SELECTED GEMINI PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 6 THROUGH 12" (NASA SP-171).

SPACECRAFT COMMON NAME- GEMINI 9

ALTERNATE NAMES- GEMINI 9A. 02191

NSSDC ID- 66-047A

LAUNCH DATE- 06/03/66 WEIGHT- 3750. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/06/66

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 06/06/66
ORBIT PERIOD- 89.8 MIN INCLINATION- 28.9 DEG
PERIAPSIS- 270.000 KM ALT APOAPSIS- 272.000 KM ALT

GEMINI 9. MANNED WITH TWO ASTRONAUTS. WAS THE SEVENTH EARTH-ORBITING SPACECRAFT OF THE GEMINI SERIES. THE BLUNT. CONE-SHAPED SPACECRAFT WAS 3.048 CM IN DIAMETER AT THE REAR OF THE CRAFT. PRIMARY MISSION OBJECTIVES WERE TO DEMONSTRATE (1) THREE RENDEZVOUS TECHNIQUES. (2) AN EXTRAVEHICULAR ACTIVITY (EVA) TO TEST THE ASTRONAUT MANEUVERING UNIT (AMU). AND (3) PRECISION LANDING CAPABILITY. SCIENTIFIC OBJECTIVES INCLUDED OBTAINING ZODIACAL LIGHT AND AIRGLOW HORIZON PHOTOGRAPHS. TWO MICROMETEORITE STUDIES WERE TO BE CARRIED OUT. AND THERE WERE ALSO ONE MEDICAL AND TWO TECHNOLOGICAL EXPERIMENTS. THE AGENA TARGET VEHICLE FAILED TO ACHIEVE ORBIT. AND THE AGENA MICROMETEORITE EXPERIMENT HARDWARE WAS LOST. OTHER EXPERIMENTS FUNCTIONED NORMALLY. THE THREE RENDEZVOUS TECHNIQUES WERE DEMONSTRATED. ALTHOUGH DOCKING COULD NOT BE ACHIEVED DUE TO A FAILURE OF THE AUGMENTED TARGET-DOCKING SHROUD TO JETTISON. THE EVA WAS CURTAILED DUE TO FOGGING OF THE VISOR AND ENERGY EXPENDED BY THE ASTRONAUT. REENTRY WAS ROUTINELY ACCOMPLISHED AFTER 47 ORBITS ON JUNE 6. 1966. WITHIN 3.2 KM OF THE TARGET POINT.

LOWMAN. JR.. GEMINI 9

EXPERIMENT NAME- 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS

NSSDC ID- 66-047A-05

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/06/66

PERSONNEL
PI - P.D. LOWMAN. JR. ..... NASA-GSFC
GREENBELT. MD

AN EXPERIMENT FOR TERRAIN PHOTOGRAPHY WAS NOT SCHEDULED FOR THIS FLIGHT. FROM THE PICTURES OBTAINED. HOWEVER. 160 PHOTOGRAPHS WERE USABLE FOR GEOLOGIC. GEOGRAPHIC. AND OCEANOGRAPHIC STUDIES. THE CAMERAS USED WERE (1) A HASSELBLAD 500-C WITH A ZEISS PLANAR 80-MM F/2.8 LENS. (2) A HASSELBLAD SWC WITH A ZEISS BIOGON 38-MM F/4.5 LENS. AND (3) A MAURER 70-MM SPACE CAMERA WITH AN XENOTAR 80-MM F/2.8 LENS. EKTACHROME MS SO-217 FILM AND HAZE FILTERS WERE USED WITH THESE CAMERAS. THESE COVER THE AREAS OF SOUTH AMERICA. WITH GOOD PHOTOGRAPHS OF THE ANDES MOUNTAINS. NORTH AFRICA. AND THE SOUTHERN UNITED STATES.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS

NSSDC ID- 66-047A-05A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 06/03/66 TO 06/06/66
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 9 PHOTOGRAPHY. OF THE FIRST GENERATION COLOR TRANSPARENCIES ON 70-MM FILM. 160 WERE DESIGNATED AS SYNOPTIC TERRAIN PHOTOGRAPHY. AN INVENTORY OF AVAILABLE PHOTOGRAPHS. AND THE PHOTO REPRODUCTIONS THEMSELVES. ARE AVAILABLE FROM EROS. SELECTED GEMINI PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 6 THROUGH 12" (NASA SP-171).

SPACECRAFT COMMON NAME- GEMINI 10

ALTERNATE NAMES- 02349

NSSDC ID- 66-066A

LAUNCH DATE- 07/18/66 WEIGHT- 3750. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/21/66

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 07/18/66
ORBIT PERIOD- 88.64 MIN INCLINATION- 28.85 DEG
PERIAPSIS- 160.000 KM ALT APOAPSIS- 268.000 KM ALT

GEMINI 10 WAS THE EIGHTH MANNED EARTH-ORBITING SPACECRAFT OF THE GEMINI SERIES. THE CONICAL VEHICLE CONSISTED OF A REENTRY MODULE AND AN ADAPTER MODULE. ITS PRIMARY PURPOSE WAS TO CONDUCT RENDEZVOUS AND DOCKING TESTS WITH THE AGENA TARGET VEHICLE. THE MISSION PLAN INCLUDED A RENDEZVOUS WITH THE GEMINI 8 AGENA TARGET. TWO EVA EXCURSIONS. AND THE PERFORMANCE OF 15 SCIENTIFIC. TECHNOLOGICAL. AND MEDICAL EXPERIMENTS. THE SCIENTIFIC EXPERIMENTS WERE RELATED TO (1) ZODIACAL LIGHT. SYNOPTIC TERRAIN. AND SYNOPTIC WEATHER PHOTOGRAPHY. (2) MICROMETEORITE COLLECTIONS. (3) UV ASTRONOMICAL CAMERA. (4) ION WAKE MEASUREMENTS. AND (5) METEOROID EROSION. ALL EXPERIMENTS OBTAINED DATA EXCEPT FOR THE MICROMETEORITE COLLECTOR. THE FIRST RENDEZVOUS AND DOCKING MANEUVERS WERE SUCCESSFULLY ACCOMPLISHED. HOWEVER. FUEL CONSUMPTION WAS LARGER THAN EXPECTED DUE TO A LARGE OUT-OF-PLANE ERROR. THIS RESULTED IN MISSION REVISION. THE FIRST EVA EXCURSION WAS NORMAL FOR 30 MIN BUT WAS THEN TERMINATED BECAUSE BOTH CREW MEMBERS DEVELOPED EYE IRRITATION. A SECOND RENDEZVOUS AND EVA WERE SUCCESSFUL. THE SPACECRAFT REENTERED THE EARTH'S ATMOSPHERE AFTER 43 ORBITS AND LANDED WITHIN 5 KM OF THE TARGET AREA ON JULY 21. 1966.

LOWMAN. JR.. GEMINI 10

EXPERIMENT NAME- 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS

NSSDC ID- 66-066A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/21/66

PERSONNEL
PI - P.D. LOWMAN. JR. ..... NASA-GSFC
GREENBELT. MD

THIS EXPERIMENT WAS DESIGNED TO OBTAIN HIGH-QUALITY. SMALL-SCALE COLOR PHOTOGRAPHS OF SELECTED AREAS OF THE EARTH'S SURFACE FOR USE IN GEOLOGY. GEOPHYSICS. GEOGRAPHY. AND OCEANOGRAPHY AND FOR PLANNING PHOTOGRAPHY FROM MANNED SPACECRAFT. A MAURER 70-MM CAMERA WITH A XENOTAR 80-MM F/2.8 LENS. AND A HASSELBLAD SWC 70-MM CAMERA WITH A ZEISS BIOGON 38-MM F/4.5 LENS WERE USED FOR THIS AND OTHER PHOTOGRAPHIC EXPERIMENTS. THE FILM USED WAS EKTACHROME MS SO-217. OF THE 351 PICTURES TAKEN. 75 WERE USABLE FOR TERRAIN STUDIES. THESE COVER THE AREAS OF NORTH AFRICA. CHINA. TAIWAN. AND NORTHEASTERN SOUTH AMERICA.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS

NSSDC ID- 66-066A-02A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 07/18/66 TO 07/21/66
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 10 PHOTOGRAPHY. OF THE 351 FIRST-GENERATION COLOR TRANSPARENCIES ON 70-MM FILM, 75 WERE DESIGNATED AS SYNOPTIC TERRAIN PHOTOGRAPHY. AN INVENTORY OF AVAILABLE PHOTOGRAPHS, AND THE PHOTO REPRODUCTIONS THEMSELVES, ARE AVAILABLE FROM EROS. SELECTED GEMINI PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 6 THROUGH 12" (NASA SP-171).

SPACECRAFT COMMON NAME- GEMINI 11

ALTERNATE NAMES- 02415

NSSDC ID- 66-081A

LAUNCH DATE- 09/12/66 WEIGHT- 3630. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/15/66

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/12/66
ORBIT PERIOD- 88.78 MIN INCLINATION- 28.80 DEG
PERIAPSIS- 144.000 KM ALT APOAPSIS- 190.000 KM ALT

GEMINI 11 WAS THE NINTH MANNED EARTH-ORBITING SPACECRAFT OF THE GEMINI SERIES. THE 3-DAY MISSION WAS DESIGNED TO ACHIEVE A FIRST ORBIT RENDEZVOUS AND DOCKING WITH THE AGENA TARGET VEHICLE, TO ACCOMPLISH TWO EXTRAVEHICULAR ACTIVITY (EVA) TESTS, AND TO PERFORM SPACECRAFT MANEUVERS. THERE WERE ALSO EIGHT SCIENTIFIC AND FOUR TECHNOLOGICAL EXPERIMENTS ON BOARD. THE SCIENTIFIC EXPERIMENTS WERE (1) SYNERGISTIC EFFECT OF ZERO-G AND RADIATION ON WHITE BLOOD CELLS, (2) SYNOPTIC TERRAIN PHOTOGRAPHY, (3) SYNOPTIC WEATHER PHOTOGRAPHY, (4) NUCLEAR EMULSIONS, (5) AIRGLOW HORIZON PHOTOGRAPHY, (6) UV ASTRONOMICAL PHOTOGRAPHY, (7) GEMINI ION WAKE MEASUREMENT, AND (8) DIM SKY PHOTOGRAPHY. THE EXPERIMENTS AND THE OTHER MISSION OBJECTIVES WERE SUCCESSFULLY COMPLETED. REENTRY OCCURRED AFTER 44 ORBITS USING THE FIRST CLOSED-LOOP AUTOMATIC REENTRY MODE. THE SPACECRAFT LANDED WITHIN 4.8 KM OF THE PLANNED IMPACT POINT ON SEPTEMBER 15, 1966.

LOWMAN, JR., GEMINI 11

EXPERIMENT NAME- 70-MM SYNOPTIC TERRAIN PHOTOGRAPHS

NSSDC ID- 66-081A-06

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/15/66

PERSONNEL
PI - P.D. LOWMAN, JR. ..... NASA-GSFC
GREENBELT, MD

THIS EXPERIMENT WAS DESIGNED TO OBTAIN HIGH-QUALITY, SMALL-SCALE COLOR PHOTOGRAPHS OF SELECTED AREAS OF THE EARTH'S SURFACE FOR USE IN GEOLOGY, GEOPHYSICS, GEOGRAPHY, AND OCEANOGRAPHY AND FOR PLANNING PHOTOGRAPHY FROM MANNED SPACECRAFT. A MAURER 70-MM CAMERA WITH A XENOTAR 80-MM F/2.8 LENS AND A HASSELBLAD 5MC 70-MM CAMERA WITH A ZEISS BIOGON 38-MM F/4.5 LENS WERE USED FOR THIS AND OTHER PHOTOGRAPHIC EXPERIMENTS. THE FILM USED WAS EKTACHROME MS SO-368 OF THE 238 PICTURES TAKEN, 102 WERE USABLE FOR TERRAIN STUDIES. THESE COVER THE AREAS OF NORTH AFRICA, THE ARABIAN PENINSULA, SOUTH INDIA, SOUTHWEST SOUTH AMERICA, AND THE GULF COAST OF THE UNITED STATES.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS

NSSDC ID- 66-081A-06A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 09/12/66 TO 09/15/66
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 11 PHOTOGRAPHY. OF THE 238 FIRST GENERATION COLOR TRANSPARENCIES ON 70-MM FILM, 102 WERE DESIGNATED AS SYNOPTIC TERRAIN PHOTOGRAPHY. AN INVENTORY OF AVAILABLE PHOTOGRAPHS, AND THE PHOTO REPRODUCTIONS THEMSELVES, ARE AVAILABLE FROM EROS. SELECTED GEMINI PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 6 THROUGH 12" (NASA SP-171).

SPACECRAFT COMMON NAME- GEMINI 12

ALTERNATE NAMES- 02566

NSSDC ID- 66-104A

LAUNCH DATE- 11/11/66 WEIGHT- 3630. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 11/15/66

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 11/12/66
ORBIT PERIOD- 89.93 MIN INCLINATION- 28.78 DEG
PERIAPSIS- 243.000 KM ALT APOAPSIS- 310.000 KM ALT

GEMINI 12 WAS THE TENTH AND FINAL FLIGHT OF THE GEMINI SERIES, WHICH BRIDGED THE MERCURY AND APOLLO PROGRAMS. THIS MISSION WAS SCHEDULED TO PERFORM RENDEZVOUS AND DOCKING WITH THE AGENA TARGET VEHICLE, TO CONDUCT THREE EXTRAVEHICULAR ACTIVITY (EVA) OPERATIONS, AND TO CONDUCT A TETHERED STATIONKEEPING EXERCISE. THERE WERE ALSO 14 SCIENTIFIC, MEDICAL, AND TECHNOLOGICAL EXPERIMENTS ON BOARD. THE SUCCESSFULLY PERFORMED SCIENTIFIC EXPERIMENTS WERE (1) FROG EGG GROWTH UNDER ZERO-G, (2) SYNOPTIC TERRAIN PHOTOGRAPHY, (3) SYNOPTIC WEATHER PHOTOGRAPHY, (4) NUCLEAR EMULSIONS, (5) AIRGLOW HORIZON PHOTOGRAPHY, (6) UV ASTRONOMICAL PHOTOGRAPHY, AND (7) DIM SKY PHOTOGRAPHY. TWO MICROMETEORITE COLLECTION EXPERIMENTS, AS WELL AS THREE SPACE PHENOMENA PHOTOGRAPHY EXPERIMENTS, WERE NOT FULLY COMPLETED. THERE WERE FUEL CELL AND ATTITUDE CONTROL THRUSTER PROBLEMS DURING THE MISSION, WHICH WAS OTHERWISE HIGHLY SUCCESSFUL. REENTRY WAS ACCOMPLISHED AFTER 59 ORBITS, WITH THE SPACECRAFT UNDER AUTOMATIC CONTROL. IT LANDED WITHIN 4.8 KM OF THE INTENDED IMPACT POINT ON NOVEMBER 15, 1966.

LOWMAN, JR., GEMINI 12

EXPERIMENT NAME- 70-MM SYNOPTIC TERRAIN PHOTOGRAPHS

NSSDC ID- 66-104A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 11/15/66

PERSONNEL
PI - P.D. LOWMAN, JR. ..... NASA-GSFC
GREENBELT, MD

THE PURPOSE OF THIS EXPERIMENT WAS TO OBTAIN HIGH-QUALITY, SMALL-SCALE COLOR PHOTOGRAPHS OF SELECTED LAND AND OCEAN AREAS FOR GEOLOGIC, GEOGRAPHIC, AND OCEANOGRAPHIC RESEARCH. A MAURER 70-MM CAMERA WITH AN XENOTAR 80-MM F/2.8 LENS AND A HASSELBLAD 5MC CAMERA WITH A ZEISS BIOGON 38-MM F/4.5 LENS WERE USED FOR THIS AND OTHER PHOTOGRAPHIC EXPERIMENTS. EKTACHROME MS SO-368 FILM WAS USED. OF THE 401 PICTURES TAKEN, 160 WERE USABLE FOR TERRAIN STUDIES. THEY COVER THE AREA OF THE SOUTHERN UNITED STATES, NORTHERN MEXICO, NORTHERN AFRICA, SOUTHWEST ASIA, AND THE ARABIAN PENINSULA.

DATA SET NAME- COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS

NSSDC ID- 66-104A-02A

AVAILABILITY OF DATA SET- DATA AT ANOTHER CENTER

TIME PERIOD COVERED- 11/11/66 TO 11/15/66
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET IS THE COMPLETE SET OF GEMINI 12 PHOTOGRAPHY. OF THE 401 FIRST-GENERATION COLOR TRANSPARENCIES

ON 70-MM FILM. 160 WERE DESIGNATED AS SYNOPTIC TERRAIN PHOTOGRAPHY. AN INVENTORY LIST OF AVAILABLE PHOTOGRAPHS, AND THE PHOTO REPRODUCTIONS THEMSELVES, ARE AVAILABLE FROM THE TECHNOLOGY APPLICATION CENTER (TAC), UNIVERSITY OF NEW MEXICO, ALBUQUERQUE, NEW MEXICO 87106. SELECTED GEMINI COLOR PHOTOGRAPHS CAN BE FOUND IN "EARTH PHOTOGRAPHS FROM GEMINI 6 THROUGH 12" (NASA SP-171), OBTAINABLE FROM THE U.S. GOVERNMENT PRINTING OFFICE.

SPACECRAFT COMMON NAME- IE-A

ALTERNATE NAMES- EXPLORER 20, S 48
TOPSI, 00870
S 46

NSSDC ID- 64-051A

LAUNCH DATE- 08/25/64 WEIGHT- 44. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/29/65

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 08/25/64
ORBIT PERIOD- 104. MIN INCLINATION- 79.903 DEG
PERIAPSIS- 816.000 KM ALT APOAPSIS- 1010.00 KM ALT

EXPLORER 20 WAS DESIGNED TO MEASURE ELECTRON DISTRIBUTION, ION DENSITY AND TEMPERATURE, AND TO ESTIMATE COSMIC NOISE LEVELS BETWEEN 2 AND 7 MHZ. ALL OBSERVATIONS WERE AT THE SPACECRAFT, EXCEPT FOR THE SOUNDING TECHNIQUE THAT PERMITTED INFORMATION ABOUT ELECTRON DENSITY TO BE DERIVED FOR LOCATIONS BETWEEN THE SPACECRAFT AND THE F-2 MAXIMUM (350 KM). THE SATELLITE WAS A SMALL IONOSPHERIC OBSERVATORY INSTRUMENTED WITH A SIX-FREQUENCY IONOSPHERIC SOUNDER AND AN ION PROBE. A COSMIC NOISE EXPERIMENT USED THE NOISE SIGNAL FROM THE SOUNDER RECEIVERS. THE SATELLITE CONSISTED OF A SHORT CYLINDER TERMINATED ON EITHER END BY TRUNCATED CONES. THE ION PROBE, MOUNTED ON A SHORT BOOM, EXTENDED FROM THE UPPER CONE. THE SIX SOUNDING ANTENNAS (3 DIPOLES) EXTENDED FROM THE SATELLITE EQUATOR. ONE PAIR OF 18.28M ANTENNAS FORMED THE DIPOLE USED FOR THE LOW FREQUENCIES, AND THE OTHER TWO DIPOLES CONSISTED OF FOUR 9.14M ANTENNAS. THE SATELLITE WAS SPIN STABILIZED AT 1.53 RPM JUST AFTER ANTENNA EXTENSION, WITH THE SPIN AXIS INITIALLY VERY CLOSE TO THE ORBIT PLANE. AT THE END OF 1 YEAR, THE SPIN HAD SLOWED TO 0.45 RPM. THERE WAS NO TAPE RECORDER, SO DATA WERE RECEIVED ONLY IN THE VICINITY OF TELEMETRY STATIONS. TELEMETRY STATIONS WERE LOCATED TO PROVIDE PRIMARY DATA COVERAGE NEAR 80 DEG W PLUS AREAS NEAR HAWAII, SINGAPORE, ENGLAND, AUSTRALIA, AND AFRICA. DATA WERE RECORDED FOR PERIODS OF ONE-HALF HR TO OVER 4 HR PER DAY DEPENDING UPON AVAILABLE POWER. EVEN THOUGH THERE WERE PROBLEMS WITH TELEMETRY AND INTERFERENCE, THE EXPERIMENTS OPERATED SATISFACTORILY FOR ABOUT 16 MONTHS. A LARGE SPACECRAFT PLASMA SHEATH PREVENTED THE ION PROBE DATA FROM BEING USEFUL IN SPITE OF ATTEMPTS TO COMPENSATE. FOR THIS SPACECRAFT, THE 1-YR AUTOMATIC SATELLITE TURNOFF WAS DISCONNECTED JUST PRIOR TO LAUNCH. THE SATELLITE RESPONSES TO COMMAND SIGNALS WERE NOT DEPENDABLE AFTER DECEMBER 20, 1965, AND THE SATELLITE TRANSMITTER WAS OFTEN SPURIOUSLY TURNED ON WITH NO RESPONSE OCCURRING TO A TURNOFF COMMAND. TURNOFF COMMANDS WERE ATTEMPTED REPEATEDLY BETWEEN DECEMBER 30, 1965 AND OCTOBER 11, 1966, BUT THE SATELLITE DID NOT RESPOND. WEAK SIGNALS WERE OCCASIONNALLY RECEIVED IN LATE 1966.

DATA SET NAME- GSFC REFINED WORLD MAPS ON MICROFILM

NSSDC ID- 64-051A-00B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/25/64 TO 01/08/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 9 REEL(S) OF MICROFILM

THESE DATA, PREPARED AT GSFC, ARE LISTINGS OF SATELLITE POSITION FOR EACH MINUTE OF GMT. POSITION IS DESCRIBED BY GEOGRAPHIC LATITUDE, LONGITUDE, AND ALTITUDE ABOVE AN ELLIPSOID OF REVOLUTION CLOSELY APPROXIMATING THE MEAN EARTH SURFACE. POSITION DATA FOR SPECIAL TIMES (EQUATOR CROSSINGS, NORTHERNMOST AND SOUTHERNMOST POINTS, SUN ENTRANCE AND EXIT, ETC.) ARE ALSO LISTED. LISTINGS ARE COMPUTED AND LISTED BY BOOKS (ONE BOOK FOR EACH EPOCH) OF ABOUT 2 WEEKS OF POSITION/TIME DATA, HEADED BY THE ORBIT ELEMENTS AND CONSTANTS USED IN COMPUTATION OF THE POSITIONS. THE DATA ARE CONTAINED ON NINE 100-FT REELS OF 16-MM MICROFILM (AS OF APRIL 1971).

KNECHT, IE-A

EXPERIMENT NAME- FIXED-FREQUENCY IONOSONDE

NSSDC ID- 64-051A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/29/65

PERSONNEL
PI - R.W. KNECHT ..... NOAA-ERL
BOULDER, CO
OI - W. CALVERT ..... NOAA-ERL
BOULDER, CO
OI - T.E. VAN ZANDT ..... NOAA-ERL
BOULDER, CO
OI - R.B. NORTON ..... NOAA-ERL
BOULDER, CO
OI - J.W. WARNOCK ..... NOAA-ERL
BOULDER, CO

THE FIXED-FREQUENCY IONOSONDE IS A RADIO TRANSMITTER-RECEIVER THAT RECORDS THE TIME DELAY BETWEEN A TRANSMITTED AND A RETURNED RADIO PULSE. SIX SPECIFIC FREQUENCIES FROM 1.5 TO 7.22 MHZ WERE SAMPLED IN SEQUENCE ONCE EVERY 0.105 SEC. SEVERAL DELAY TIMES WERE OFTEN OBSERVED FOR EACH FREQUENCY DUE TO PLASMA RESONANCES, BIREFRINGENCE OF THE IONOSPHERE, NON-VERTICAL PROPAGATION, ETC. DELAY TIME WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL, ELECTRON DENSITY ALONG THE SIGNAL PATH, AND THE MODE OF PROPAGATION. A TOTAL OF 1450 HR OF DATA WAS ACQUIRED. MOST OF THESE DATA WERE OF ADEQUATE QUALITY TO PREPARE IONOGRAMS. SINCE ONLY TIME IS NOTED ON EACH IONOGRAM, SATELLITE POSITION AND OTHER RELATED INFORMATION MUST BE OBTAINED FROM WORLD MAPS. (SEE DATA SET 64-051A-00B.)

DATA SET NAME- TIME-ORDERED FIXED-FREQUENCY IONOGRAMS ON MICROFILM

NSSDC ID- 64-051A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/25/64 TO 12/29/65
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1017 REEL(S) OF MICROFILM

THIS DATA SET WAS PREPARED BY RECORDING ALL REFLECTIONS FOR EACH FREQUENCY IN A GIVEN PASS IN ONE SET OF IONOGRAMS. DATA FOR EACH PASS CONSIST OF SIX IONOGRAMS, ONE FOR EACH OF THE SIX FIXED FREQUENCIES (7.22, 5.47, 3.72, 2.85, 2.00, AND 1.50 MHZ). THESE IONOGRAMS SHOW TIME (SUBSATELLITE LOCATION) VS ECHO TIME DELAY (VIRTUAL RANGE) FOR EACH FREQUENCY. THE RESOLUTION ON ANY ONE IONOGRAM IS BETTER THAN 1 KM. THIS DATA SET IS A STANDARD FORM OF REDUCED DATA PREPARED FROM THE ORIGINAL TELEMETRY TAPES BY THE OFFICE OF THE PRINCIPAL INVESTIGATOR. THE DATA ARE AS COMPLETE AS PERMITTED BY LIMITATIONS OF POWER, LACK OF SATELLITE TAPE RECORDER, AND DATA SET PROCESSING FACILITIES. OBSERVATIONS MADE FROM AUGUST 1964 THROUGH DECEMBER 1965 ARE CONTAINED ON REELS OF 35-MM MICROFILM. MOST OF THE DATA COVERAGE IS NEAR THE 80 DEG W MERIDIAN, WITH SOME DATA ALSO OBSERVED IN AREAS NEAR HAWAII, ENGLAND, SINGAPORE, AUSTRALIA, CENTRAL AFRICA, AND SOUTH AFRICA. TIME TICKS AND DIGITAL TIME DATA APPEAR ON THE EDGE OF THE IONOGRAMS. INDEXING INFORMATION FOR THESE DATA IS AVAILABLE AT NSSDC IN DATA SET 64-051A-01D. APPROPRIATE WORLD MAPS PROVIDING POSITION INFORMATION APPEAR ON EACH ROLL OF MICROFILM.

DATA SET NAME- SINGAPORE AND WINKFIELD TIME-ORDERED, FIXED-FREQUENCY IONOGRAMS ON MICROFILM

NSSDC ID- 64-051A-01C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/27/64 TO 12/22/65
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 110 REEL(S) OF MICROFILM

THIS DATA SET WAS PREPARED BY RECORDING ALL REFLECTIONS FOR EACH FREQUENCY DURING A GIVEN PASS SEQUENTIALLY IN ONE IONOGRAM. DATA FOR EACH PASS, THEREFORE, CONSIST OF SIX "IONOGRAMS," ONE FOR EACH OF THE SIX FIXED FREQUENCIES. THE RESOLUTION ON ANY ONE IONOGRAM IS BETTER THAN 1 KM. THESE DATA ARE A STANDARD ORIGINAL FORM OF THE REDUCED DATA PREPARED BY COOPERATING INVESTIGATORS IN ENGLAND. THE DATA CONSIST OF 35-MM MICROFILMED "IONOGRAMS" OBSERVED BETWEEN AUGUST 27, 1964 AND DECEMBER 22, 1965. DATA WERE OBSERVED NEAR SINGAPORE (279 PASSES) AND WINKFIELD, ENGLAND (376 PASSES). ALL OF THESE DATA

ARE INCLUDED IN DATA SET 64-051A-01A. BUT THESE IONOGRAMS HAVE SOMEWHAT MORE CONTRAST TIME TICKS AND DIGITAL TIME DATA APPEAR ON THE EDGE OF THE IONOGRAMS. WORLD MAPS. DATA SET 64-051A-01B, ARE NEEDED TO OBTAIN POSITION INFORMATION INDEXING INFORMATION FOR THESE DATA IS AVAILABLE IN DATA SET 64-051A-01D.

DATA SET NAME- IONOGRAM INVENTORY ON TAPE

NSSDC ID- 64-051A-01D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/25/64 TO 12/22/65
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS FILE INDEXES THE EXPLORER 20 FIXED-FREQUENCY IONOSONDE DATA (DATA SETS 64-051A-01A AND 64-051A-01C) BY STATION PASS. INFORMATION IN THE DATA SET FOR WHICH FIXED-FREQUENCY IONOSONDE DATA CAN BE IDENTIFIED INCLUDES PASS START AND STOP TIME, ORBIT NUMBER, AND TELEMETRY STATION. THE INVENTORY, WHICH WAS PREPARED FROM PHYSICAL INSPECTION OF THE FILM AND SPACECRAFT EPHEMERIDES, IS MAINTAINED ON ONE 556-BPI, 7-TRACK, BCD MAGNETIC TAPE.

SPACECRAFT COMMON NAME- INJUN 5

ALTERNATE NAMES- EXPLORER 40, INJUN-C
INJUN IE-C, 03318

NSSDC ID- 68-066B

LAUNCH DATE- 08/08/68 WEIGHT- 71.4 KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/07/71

ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC	EPOCH DATE- 08/11/68
ORBIT PERIOD- 118.3 MIN	INCLINATION- 80.67 DEG
PERIAPSIS- 631.000 KM ALT	APOAPSIS- 2533.00 KM ALT

EXPLORER 40 (INJUN 5) WAS A 71-KG, MAGNETICALLY ORIENTED SPACECRAFT LAUNCHED TOGETHER WITH A 3.65-M INFLATABLE BALLOON (EXPLORER 39, 1968-66A, USED FOR AIR DENSITY MEASUREMENTS) USING A SINGLE SCOUT VEHICLE. EXPLORER 40 WAS DESIGNED TO ACCOMPLISH THE FOLLOWING OBJECTIVES -- (1) COMPREHENSIVE STUDY OF THE DOWNWARD FLUX OF CHARGED PARTICLES, (2) STUDY OF VLF RADIO EMISSION IN THE IONOSPHERE ASSOCIATED WITH THE DOWNWARD FLUX, (3) STUDY OF GEOMAGNETICALLY TRAPPED PROTONS, ALPHA PARTICLES, AND ELECTRONS, (4) OBSERVATION OF SOLAR COSMIC RAYS, (5) OBSERVATION OF THE CONTINUING DECAY OF THE STARFISH ARTIFICIAL RADIATION BELT, AND (6) STUDY OF THE TEMPERATURE AND DENSITY OF ELECTRONS AND POSITIVE IONS OF THERMAL AND NEAR THERMAL ENERGY. THE SPACECRAFT SYSTEMS PERFORMED NORMALLY EXCEPT FOR THE MALFUNCTION OF THE SOLAR CELL POWER DUMP DEVICE (SHORTLY AFTER LAUNCH) WHICH CAUSED THE SOLAR CELLS TO DELIVER A LOWER POWER LEVEL TO THE EXPERIMENTS AND REDUCED THE TIME DURING WHICH THE ONBOARD TAPE RECORDER COULD BE RUN. AFTER A PERIOD OF QUASI-RANDOM TUMBLING, THE PASSIVE MAGNETIC ALIGNMENT BECAME EFFECTIVE IN MID-DECEMBER 1968. THE SPACECRAFT WAS TURNED OFF FROM MAY 31, 1970, TO FEBRUARY 18, 1971 AFTER WHICH IT WAS TURNED ON AGAIN. THE SPACECRAFT WAS PUT IN AN OPERATIONAL-OFF MODE IN EARLY JUNE 1971, AND BECAME INOPERABLE SHORTLY THEREAFTER.

GURNETT, INJUN 5

EXPERIMENT NAME- VLF RECEIVER

NSSDC ID- 68-066B-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/07/71

PERSONNEL

PI -	D.A.	GURNETT	U OF IOWA IOWA CITY, IA
OI -	L.A.	FRANK	U OF IOWA IOWA CITY, IA

THIS VERY LOW FREQUENCY (VLF) RECEIVER WAS DESIGNED TO STUDY BOTH ELECTRIC AND MAGNETIC COMPONENTS (BOTH PHASE AND AMPLITUDE) OF VLF SIGNALS. THE DIRECTION OF SIGNAL PROPAGATION COULD BE DETERMINED AND USED TO ASSIST IN IDENTIFYING THE ORIGINS OF VARIOUS VLF SIGNALS. THE OBSERVATIONS OF ANTENNA IMPEDANCE FOR THE ELECTRIC ANTENNA (ECA) WERE NEEDED TO STUDY CHARACTERISTICS OF SUCH AN ANTENNA OPERATING IN A PLASMA. THERE WERE TWO ANTENNAS, ONE DRIVING A MAGNETIC-FIELD COMPONENT RECEIVER (MCR), AND THE OTHER DRIVING TWO ELECTRIC-FIELD COMPONENT RECEIVERS (ECR). THE MCR OPERATED FROM A 55.9-CM-DIAM LOOP ANTENNA (MCA), AND THE ECRS OPERATED FROM AN ANTENNA CONSISTING OF TWO 20.3-CM-DIAM ALUMINUM SPHERES MOUNTED 2.85 M APART ON OPPOSITE SIDES OF THE SPACECRAFT (SC). BOTH THE MCA AND ECA WERE MOUNTED ON BOOMS TO REDUCE INTERFERENCE FROM THE SC. WITHIN A FEW WEEKS AFTER LAUNCH, THE SC WAS DESPUN AND MAGNETICALLY STABILIZED SO THAT NOMINALLY, THE ANTENNA AXES AND THE MAGNETIC FIELD LINE THROUGH THE SC WERE ORTHOGONAL. IN THE NORTHERN HEMISPHERE, THE MCA SUPPORTING BOOM WAS INCLINED EARTHWARD. BOTH THE MCR AND ECR OPERATED FROM 10 TO 3083 HZ. ALSO OPERATING FROM THE ECA WAS A NARROW-BAND STEP FREQUENCY RECEIVER (ECR 2) WHICH WAS RECEIVING THROUGH FILTERS WITH CENTER FREQUENCIES AT 7.5, 10.5, 22, 52.5, 70, AND 105 (PLUS OR MINUS 7.5 PERCENT) KHZ. SUPPLEMENTARY TO THESE THREE RECEIVERS AND TWO ANTENNAS WERE (1) A SPECIAL CIRCUIT THAT COULD MEASURE PHASE AND AMPLITUDE OF THE IMPEDANCE ON THE ECA BETWEEN 20 AND 2.83 HZ AND (2) AN ELECTRON GUN USED TO BIAS THE ECA. THE MCR AND ECR1 OBSERVED AND TELEMETERED (ON A 0.8-W, 400-MHZ CHANNEL) ANALOG, BROADBAND DATA IN REAL TIME. WHEN THE SC WAS IN TELEMETRY RANGE OF A GROUND STATION. WHEN LATER ANALYZED, THE NORMAL DATA FORM FOR THESE BROADBAND DATA WERE PHOTOGRAPHICALLY PRODUCED FREQUENCY VS TIME PLOTS, (SPECTROGRAMS) PREPARED BY USE OF A SPECTRUM ANALYZER. SEPARATE PLOTS WERE REQUIRED TO SHOW THE DATA FROM EACH RECEIVER. THE IMPEDANCE OBSERVATIONS APPEAR ON THE ECR SPECTROGRAMS. WHEN OBSERVING WITH THE IMPEDANCE CIRCUIT ON, IMPEDANCE MEASUREMENTS REQUIRED 8 OF EACH 30 SEC OF WIDEBAND OBSERVING TIME. THE SIGNAL STRENGTH VALUES FROM THE ECR2, AND SEPARATELY FROM BOTH THE LOW (0.03 TO 0.65 KHZ) AND HIGH (0.3 TO 10 KHZ) RANGES OF THE ECR1 AND MCR, WERE RECORDED ON THE SC TAPE RECORDER AND COMPRISED THE DIGITAL DATA FOR THIS EXPERIMENT. THE RESOLUTION OF WIDEBAND DATA IS LARGELY DEPENDENT UPON THE SPECTRUM ANALYZER (AND ITS FILM TRANSPORT SPEED) USED FOR DATA PROCESSING. IN THIS EXPERIMENT, THE DIGITAL DATA WERE OBSERVED AND RECORDED OVER A 30-SEC CYCLE WITHIN WHICH THE SIGNAL AMPLITUDES FROM THE TWO LOW FREQUENCY STEPS OF THE ECR2 WERE OBSERVED EVERY 4 SEC (1-SEC DURATION) AND THE OTHER FREQUENCIES OBSERVED EVERY 8 SEC. WHEN THE IMPEDANCE CIRCUIT WAS ON, EIGHT SAMPLES OF THE STEP RECEIVER DATA WERE NOT OBSERVED DURING EACH 30-SEC CYCLE. EXPERIMENT PERFORMANCE WAS NOMINAL WITH THE EXCEPTION OF THE ELECTRON GUN OPERATION. THE CAUSE OF ITS INEFFECTIVE OPERATION WAS UNKNOWN, BUT THIS FAILURE WAS NOT A MAJOR LOSS TO THE EXPERIMENT RESULT. THIS FAILURE ONLY REDUCED THE CAPABILITY OF STUDYING ANTENNA CHARACTERISTICS UNDER DIFFERENT BIAS CONDITIONS. FAILURE OF THE SC POWER REGULATOR EARLY IN THE MISSION LIMITED OPERATION TO SOME EXTENT, BUT NOMINAL DATA WERE OBTAINED UNTIL MAY 29, 1970. DURING FEBRUARY TO JUNE 1971, WHEN THE SC WAS REACTIVATED, IT IS PRESUMED THAT ADDITIONAL VLF DATA WERE OBTAINED. PRINCIPAL TELEMETRY SITES FOR THE DATA THROUGH MAY 1970 WERE IN IOWA AND ALASKA. FURTHER EXPERIMENT DETAILS MAY BE FOUND IN GURNETT ET AL., U OF IOWA, REPORT 66-43, AND GURNETT ET AL., "JGR," VOL 74, PP 4631-4648.

DATA SET NAME- MASTER DATA TAPE INCLUDING VLF SIGNAL STRENGTH

NSSDC ID- 68-066B-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/09/68 TO 05/29/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 949 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, SUPPLIED BY THE EXPERIMENTER, CONSISTS OF A TIME-ORDERED MASTER FILE FOR EXPLORER 40 (INJUN 5) OF SATELLITE TELEMETRY DATA ON 949, 7-TRACK, UNIVAC 418, BINARY MAGNETIC TAPES WRITTEN AT 800 BPI WITH 696 CHARACTERS PER LOGICAL RECORD, 10 LOGICAL RECORDS PER PHYSICAL RECORD, A VARIABLE NUMBER OF PHYSICAL RECORDS PER FILE, AND ONE FILE PER TAPE. IN ADDITION TO EXPERIMENTAL DATA, THE FOLLOWING DATA ARE GIVEN -- TIME (UT-LOCAL), ORBIT NUMBER, GEOCENTRIC LOCATION (GEOGRAPHIC AND EQUATORIAL INERTIAL COORDINATES), SATELLITE VELOCITY VECTOR, MAGNETIC FIELD LOCATION (DIPOLE MODEL, MCILWAIN L, AND INVARIANT LATITUDE), SOLAR RIGHT ASCENSION AND DECLINATION IN CELESTIAL COORDINATES, SUN ECLIPSE TIME, AND ATTITUDE OF SATELLITE. THIS SET OF TAPES CONTAINS DATA SETS 68-066B-01A, -02A, -03A, AND -04A. THE VLF DATA OCCUR IN DATA WORDS 62 THROUGH 65 OF EACH 80-WORD DATA FRAME AND CONTAIN INFORMATION ON SIGNAL STRENGTH OF THE SIX FREQUENCIES RECEIVED BY THE VLF RECEIVER. FURTHER DESCRIPTIONS OF THE CONTENT OF THE VLF DATA IS NOT YET AVAILABLE FROM NSSDC.

ISIS 1

SPACECRAFT COMMON NAME- ISIS 1

ALTERNATE NAMES- ISIS-A. 03669

NSSDC ID- 69-009A

LAUNCH DATE- 01/30/69 WEIGHT- 332. KG

STATUS OF OPERATION- PARTIAL

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 01/30/69
ORBIT PERIOD- 128. MIN INCLINATION- 88.425 DEG
PERIAPSIS- 574.000 KM ALT APOAPSIS- 3522.00 KM ALT

ISIS 1 WAS AN IONOSPHERIC OBSERVATORY INSTRUMENTED WITH SWEEP FREQUENCY AND FIXED FREQUENCY IONOSONDES, A VLF RECEIVER, ENERGETIC AND SOFT PARTICLE DETECTORS, AN ION MASS SPECTROMETER, AN ELECTROSTATIC PROBE, AN ELECTROSTATIC ANALYZER, A BEACON TRANSMITTER, AND A COSMIC NOISE EXPERIMENT. THE SOUNDER USED TWO DIPOLE ANTENNAS (78.9 AND 20.2 M LONG, RESPECTIVELY). THE SATELLITE WAS SPIN-STABILIZED AT ABOUT 2.9 RPM AFTER ANTENNA DEPLOYMENT. SOME CONTROL COULD BE EXERCISED OVER THE SPIN RATE AND ATTITUDE BY USING MAGNETICALLY INDUCED TORQUES TO CHANGE THE SPIN RATE AND TO PRECESS THE SPIN AXIS. A TAPE RECORDER WITH 1-HR CAPACITY WAS INCLUDED ON THE SATELLITE. THE SATELLITE COULD BE PROGRAMMED TO TAKE RECORDED OBSERVATIONS FOR FOUR DIFFERENT TIME PERIODS FOR EACH FULL RECORDING PERIOD. THE RECORDER WAS DUMPED ONLY AT OTTAWA. FOR NON-TAPE-RECORDED OBSERVATIONS, DATA FOR THE SATELLITE AND SUBSATELLITE REGIONS COULD BE OBSERVED AND TELEMETERED WHEN THE SPACECRAFT WAS IN THE LINE OF SIGHT OF TELEMETRY STATIONS. THE SELECTED TELEMETRY STATIONS WERE IN AREAS THAT PROVIDED PRIMARY DATA COVERAGE NEAR THE 80 DEG W MERIDIAN, PLUS AREAS NEAR HAWAII, SINGAPORE, AUSTRALIA, ENGLAND, NORWAY, INDIA, JAPAN, ANTARCTICA, NEW ZEALAND, AND CENTRAL AFRICA. NO TAPE-RECORDED DATA WERE AVAILABLE AFTER JANUARY 30, 1970, BECAUSE OF FAILURE OF THE RECORDER. THE ION MASS SPECTROMETER FAILED ABOUT THREE DAYS AFTER LAUNCH. INITIALLY, 6 TO 9 HR OF OBSERVATIONS WERE MADE DAILY, BUT BY THE SPRING OF 1975, ABOUT 4 HR OF OBSERVATIONS PER DAY WERE BEING MADE. THE DECREASE IN OBSERVATION TIME WAS DUE TO A COMBINATION OF FUNDING, POWER LIMITATIONS, AND SCHEDULING.

DATA SET NAME- GSFC EXTENDED WORLD MAPS ON MICROFILM

NSSDC ID- 69-009A-00C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/01/69 TO 06/30/75
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 78 REEL(S) OF MICROFILM

THESE DATA, PREPARED AT GSFC, ARE LISTINGS OF SATELLITE POSITION AND SUPPORTING INFORMATION FOR EACH MINUTE (4 MIN AFTER 122972) OF GMT. THE INFORMATION IN THE LISTINGS INCLUDES LOCAL SOLAR TIME, GEODETIC LOCATION, SEVERAL VARIETIES OF MAGNETIC FIELD REFERENCED LOCATION, AND SUN POSITION. DATA ARE ALSO GIVEN FOR SPECIAL TIMES (EQUATOR CROSSINGS, NORTHERNMOST AND SOUTHERNMOST POINTS, SUNLIGHT ENTRANCE AND EXIT, ETC.).

BARRINGTON, ISIS 1

EXPERIMENT NAME- VLF RECEIVER

NSSDC ID- 69-009A-03

STATUS OF OPERATION- NORMAL

PERSONNEL
PI - R.E. BARRINGTON ..... COMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - F.H. PALMER ..... COMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

THE VLF EXPERIMENT WAS A LOW-FREQUENCY, BROADBAND RECEIVER THAT SENSED SIGNALS RECEIVED BY THE 79-M DIPOLE (SPLIT MONOPOLE) ANTENNA, BETWEEN 0.05 AND 30 KHZ. THIS SAME ANTENNA WAS USED FOR RECEIVING FREQUENCIES BELOW 5 KHZ ON THE IONOSONDE. THE RECEIVER HAD A WIDE DYNAMIC RANGE (80 DB) THAT WAS ACHIEVED BY USE OF AN AUTOMATIC GAIN CONTROL SYSTEM. THIS VLF EXPERIMENT INCLUDED AN OPTIONAL-USE ONBOARD EXCITER THAT OPERATED OVER A FREQUENCY CYCLE FROM 0 TO 0.5 TO 0 TO 11 TO 0 KHZ OVER A 3.5-SEC 'FRAME' PERIOD. THE TRANSMISSION AT 0.3 KHZ OCCURRED FOR ABOUT 2 SEC. THE NON-LINEAR SWEEP TO 11 KHZ REQUIRED 0.9 SEC. TRANSMISSION AT 11 KHZ FOR ABOUT 0.3 SEC, AND THE NON-LINEAR SWEEP BACK TO 0 TOOK ABOUT 0.3 SEC. THE FRAMES SEQUENCED THROUGH FOUR STEPS WHERE THE TRANSMISSIONS WERE ATTENUATED BY 0, 20, 20, THEN 40 DB, THUS REQUIRING 14 SEC FOR ONE COMPLETE CYCLE OF EXCITER OPERATION. THE EXCITER TRANSMITTED ON THE SHORT ANTENNAS AND THE RECEIVER SENSED THE SIGNALS COUPLED BETWEEN THE TWO ANTENNAS BY THE AMBIENT PLASMA, PLUS ANY NOISE SIGNALS WHICH WERE EXCITED IN THE PLASMA. EXCITER OPERATION PERMITTED THE CONTROLLED STUDY OF ION RESONANCES IN ADDITION TO STUDY OF NATURAL AND OTHER MAN-MADE VLF RADIO NOISE. THIS VLF EXPERIMENT ALSO PERMITTED ANTENNA IMPEDANCE MEASUREMENTS, WITH OR WITHOUT A DC BIAS ON THE ANTENNA. THE REAL-TIME DATA WERE TRANSMITTED ON 136.08-MHZ TELEMETRY. THE VLF DATA COULD BE RECORDED ON ONE OF THE FOUR TAPE RECORDER CHANNELS DURING THE TIME THE TAPE RECORDER OPERATED (TO JANUARY 1970). TAPE-RECORDED (AND BACK-UP REAL-TIME) DATA WERE TRANSMITTED ON 400-MHZ TELEMETRY. FURTHER DETAILS CAN BE FOUND IN THE "ISIS A TECHNICAL PLAN."

DATA SET NAME- VLF SPECTROGRAMS

NSSDC ID- 69-009A-03A

AVAILABILITY OF DATA SET- DATA AVAILABLE FROM EXPERIMENTER

TIME PERIOD COVERED- 01/30/69 TO 00/00/75
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 REEL(S) OF MICROFILM

THIS DATA SET IS IN A STANDARD GRAPHIC FORM (FREQUENCY VERSUS TIME) FOR RAW VLF DATA. THESE SONOGRAMS ON 35-MM FILM WERE PREPARED BY THE EXPERIMENTER FROM ANALOG DATA ON MAGNETIC TAPE, RECORDED AT TELEMETRY STATIONS IN REAL TIME. APPROXIMATELY 9000 PASSES WERE RECORDED, FROM WHICH SONOGRAMS HAVE BEEN PREPARED FOR ABOUT 300 PASSES. MOST OF THE SONOGRAMS ARE FROM PASSES OVER THE OTTAWA STATION, ALTHOUGH OVER HALF OF THE DATA OBSERVED WERE FROM OTHER LOCATIONS. BY SPECIAL ARRANGEMENT, ANY DATA AVAILABLE ON TAPE CAN BE PROVIDED IN LIMITED QUANTITIES IN SONOGRAM FORM. EACH PASS WHICH WAS PROCESSED INTO SONOGRAMS CONSISTS OF THREE PARTS, EACH USING DIFFERENT RANGES ON THE FREQUENCY SCALES, I.E., NOMINALLY 0 TO 20, 0 TO 10, AND 0 TO 2.5 KHZ. THE TIME SCALE FOR THE FIRST TWO PARTS IS 0.25 IN./SEC, AND 0.125 IN./SEC FOR THE 0 TO 2.5 KHZ SONOGRAM. IDENTIFICATION INFORMATION IS NOTED PRIOR TO EACH PASS OVER A STATION. TIME IS SHOWN (IN UT) AT 10-SECOND INTERVALS ALONG THE EDGE OF THE SONOGRAMS. AN ANALOG REPRESENTATION OF THE VLF-RECEIVER-AGC LEVEL IS ALSO SHOWN ALONG THE EDGE OF THE SONOGRAMS. THESE DATA CAN BE MADE AVAILABLE FOR VIEWING BY CONTACTING THE EXPERIMENTER, DR. R. E. BARRINGTON, COMMUNICATIONS RESEARCH CENTRE, DEPT OF COMMUNICATIONS, P. O. BOX 490, STATION A, OTTAWA, ONTARIO, CANADA, K1N 8T5.

BRACE, ISIS 1

EXPERIMENT NAME- CYLINDRICAL ELECTROSTATIC PROBE

NSSDC ID- 69-009A-07

STATUS OF OPERATION- NORMAL

PERSONNEL
PI - L.H. BRACE ..... NASA-GSFC
GREENBELT, MD
OI - J.A. FINDLAY ..... NASA-GSFC
GREENBELT, MD

THE PURPOSE OF THIS EXPERIMENT WAS TO STUDY THE GLOBAL VARIATIONS OF ELECTRON TEMPERATURE AND ELECTRON CONCENTRATION AT SPACECRAFT (SC) ALTITUDES DURING SOLAR MAXIMUM, AND TO STUDY CHARACTERISTICS OF THE SC ION SHEATH. THIS CYLINDRICAL PROBE WAS A TYPE OF LANGMUIR PROBE THAT OBSERVED CURRENT FLOW FOR A GIVEN VOLTAGE PROFILE PLACED ON THE COLLECTOR. FROM THIS CURRENT-VOLTAGE PROFILE, THE ELECTRON DENSITY AND ELECTRON TEMPERATURE COULD BE CALCULATED. THERE WAS A BOOM PROBE AND AN AXIAL PROBE EXTENDING FROM THE SC. THE AXIAL PROBE EXTENDED 48.3 CM FROM THE SC, ALONG THE SPIN AXIS, AND WAS CENTERED AMONG THE FOUR TELEMETRY ANTENNAS ON THE UNDERSIDE OF THE SC. THIS PROBE WAS CAPABLE OF MEASUREMENTS UNDISTURBED BY THE SATELLITE MOTION ONLY WHEN THE PROBE PRECEDED THE SC IN ITS MOTION THROUGH THE PLASMA. THE BOOM PROBE EXTENDED HORIZONTALLY AND OUTWARD (IN SC FRAME OF REFERENCE) FROM A BOOM 1 M LONG, WHICH IN TURN EXTENDED FROM AN UPPER SURFACE OF THE SATELLITE AT AN ANGLE OF ABOUT 45 DEG TO THE SPIN AXIS. THIS PROBE PROVIDED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE THAT WAS FREE OF SC WAKE EFFECTS. THE PROBES CONSISTED OF THREE CONCENTRIC, ELECTRICALLY ISOLATED, STAINLESS STEEL TUBES. THE OUTER (0.24-CM DIAM AND 23-CM LONG) TUBE FLOATED AT ITS OWN EQUILIBRIUM POTENTIAL AND SERVED TO PLACE THE COLLECTOR WELL AWAY FROM THE SC PLASMA SHEATH. THE CENTER TUBE (0.165-CM DIAM) EXTENDING 23 CM OUTWARD FROM THE OUTER TUBE ACTED AS AN ELECTRICAL GUARD FOR THE COLLECTOR. ITS ELECTRICAL POTENTIAL WAS CONTROLLED. THE COLLECTOR (0.058-CM DIAM) EXTENDED 23 CM OUTWARD FROM THE DRIVEN GUARD. DURING EACH 2-MIN SEQUENCE, A VOLT-AMPERE CURVE WAS OBTAINED FROM THE SAWTOOTH VOLTAGE (-2 TO +10V) APPLIED TO THE COLLECTOR. THIS CAN BE INTERPRETED IN ELECTRON DENSITIES OVER A RANGE FROM 100 TO 1,500,000 ELECTRONS PER CM SQ, AND TEMPERATURES FROM ABOUT

400 TO 50,000 DEG K.

DATA SET NAME- AVERAGED VALUES OF ELECTRON DENSITY AND TEMPERATURE ON MAGNETIC TAPE

NSSDC ID- 69-009A-07A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/30/69 TO 06/01/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE REDUCED DATA, PREPARED BY THE EXPERIMENTER, LIST ABOUT 17 MONTHS OF DENSITIES AND ELECTRON TEMPERATURES OBSERVED AT THE SATELLITE. THE DATA HAVE BEEN CALCULATED FROM THE TELEMETERED RETARDING POTENTIAL CURVES. INCLUDED IN THE LISTING FOR EACH DATA POINT ARE TELEMETRY STATION, ORBIT NUMBER, DATE AND TIME (UT AND LOCAL), GEOGRAPHIC AND MAGNETIC (MCILWAIN, DIP, INVARIANT, AND DIPOLE MODEL) LOCATIONS, HEIGHT ABOVE THE REFERENCE ELLIPSOID, SOLAR ZENITH ANGLE, SOLAR (F10.7) AND PLANETARY (AP) INDEXES, SATELLITE POTENTIAL, AND RECORD COUNT. TEMPERATURE DATA OCCUR ABOUT EVERY OTHER DATA POINT, ALTERNATING WITH ELECTRON DENSITY VALUES. GAPS IN TIME COVERAGE ARE USUALLY A FEW ORBITS OR LESS. THE DATA HAVE GAPS IN COVERAGE CAUSED PRIMARILY BY LIMITATIONS (OR FAILURE) OF THE TAPE RECORDER, AND LIMITATIONS OF EXPERIMENT SCHEDULING. THESE SAME DATA ARE AVAILABLE ON MICROFILM AS DATA SET 69-009A-07D. THIS DATA SET IS ON ONE FILE, OF 9-TRACK BCD, 800-BPI, MAGNETIC TAPE.

DATA SET NAME- AVERAGED VALUES OF ELECTRON DENSITY AND TEMPERATURE ON MICROFILM

NSSDC ID- 69-009A-07B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/30/69 TO 06/01/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MICROFILM

THESE REDUCED DATA, ON 35-MM MICROFILM, WERE PREPARED BY THE EXPERIMENTER AND LIST ABOUT 17 MONTHS OF DENSITIES AND ELECTRON TEMPERATURES OBSERVED AT THE SATELLITE. THE DATA HAVE BEEN CALCULATED FROM THE TELEMETERED RETARDING POTENTIAL CURVES. EACH DATA POINT REPRESENTS AVERAGED VALUES FROM ABOUT 16 RETARDING POTENTIAL CURVES. INCLUDED IN THE LISTINGS FOR EACH DATA POINT ARE TELEMETRY STATION, ORBIT NUMBER, DATE AND TIME (UT AND LOCAL), GEOGRAPHIC AND MAGNETIC (MCILWAIN, DIP, INVARIANT, AND DIPOLE MODEL) LOCATIONS, HEIGHT ABOVE THE REFERENCE ELLIPSOID, SOLAR ZENITH ANGLE, SOLAR (F10.7) AND PLANETARY (AP) INDEXES, SATELLITE POTENTIAL, AND RECORD COUNT. TEMPERATURE DATA OCCUR ABOUT EVERY OTHER DATA POINT, ALTERNATING WITH ELECTRON DENSITY VALUES. GAPS IN TIME COVERAGE ARE USUALLY A FEW ORBITS OR LESS. THE DATA GAPS IN COVERAGE ARE CAUSED PRIMARILY BY LIMITATIONS OF EXPERIMENT SCHEDULING. THESE SAME DATA ARE AVAILABLE ON TAPE AS DATA SET 69-009A-07A.

DATA SET NAME- ELECTRON DENSITY AND TEMPERATURE PLOTS IN BOOKS

NSSDC ID- 69-009A-07C

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 01/30/69 TO 06/05/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 BOOK(S) OR BOUND VOLUME(S)

THESE REDUCED DATA PREPARED BY THE EXPERIMENTER SHOW PLOTS OF ABOUT 17 MONTHS OF OBSERVATION OF ELECTRON DENSITIES AND ELECTRON TEMPERATURE RECORDED AT THE SATELLITE. THE DATA HAVE BEEN CALCULATED FROM THE TELEMETERED RETARDING POTENTIAL CURVES, PRIMARILY FROM THE BOOM PROBE. FOUR SEPARATE GRAPHS SHOWING DIP LATITUDE APPEAR ON EACH PAGE, AND EACH PAGE CONTAINS 1 WEEK OF DATA. THE PLOTS (ONE PER GRAPH) ARE OF ELECTRON NUMBER DENSITY, ELECTRON TEMPERATURE, SATELLITE ALTITUDE, AND SATELLITE LOCAL TIME. GAPS IN TIME COVERAGE ARE USUALLY NOT NOTICEABLE, GENERALLY BEING A FEW ORBITS OR LESS. SUCH GAPS WERE CAUSED BY FAILURE OF THE TAPE RECORDER, WHICH OCCURRED ABOUT 1 YEAR AFTER LAUNCH, AND BY LIMITATIONS OF EXPERIMENT/SATELLITE SCHEDULING. A CONSIDERABLE AMOUNT OF THESE DATA ARE INCLUDED ON ANOTHER FORM IN DATA SETS 69-009A-07A AND 69-009A-07D.

CALVERT, ISIS 1

EXPERIMENT NAME- FIXED-FREQUENCY SOUNDER

NSSDC ID- 69-009A-02

STATUS OF OPERATION- NORMAL

PERSONNEL

PI -	W.	CALVERT	NOAA-ERL BOULDER, CO
OI -	R.B.	NORTON	NOAA-ERL BOULDER, CO
OI -	J.H.	WARNOCK	NOAA-ERL BOULDER, CO
OI -	G.L.	HELMS	COMRUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	G.E.K.	LOCKWOOD	COMRUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	J.H.	WHITTEKER	COMRUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	C.E.	PETRIE	COMRUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	T.E.	VAN ZANDT	NOAA-ERL BOULDER, CO

THE FIXED FREQUENCY SOUNDER OPERATED FROM THE SAME ANTENNA, TRANSMITTER, AND RECEIVER USED FOR THE SWEEP FREQUENCY EXPERIMENT. IT NORMALLY OPERATED FOR 3 TO 5 SEC DURING THE FREQUENCY FLYBACK PERIOD OF THE SWEEP FREQUENCY OPERATION WHICH WAS EVERY 19 OR 29 SEC. ONE OF SIX FREQUENCIES (0.25, 0.48, 1.00, 1.95, 4.00, OR 9.303 MHZ) WAS CHOSEN FOR USE BY THE EXPERIMENTER AS DESIRED. OTHER MODES OF OPERATION WERE AVAILABLE, INCLUDING CONTINUOUS OBSERVATION AT A SELECTED FREQUENCY, AND A SPECIAL MIXED MODE WITH TRANSMISSION AT THE FIXED FREQUENCY OF 0.82 MHZ AND SWEEP RECEPTION. THIS EXPERIMENT WAS DESIGNED TO STUDY IONOSPHERIC FEATURES OF A SMALLER SCALE THAN COULD BE DETECTED BY THE SWEEP SOUNDER, AND TO STUDY PLASMA RESONANCES. PARAMETERS MEASURED WERE VIRTUAL RANGE (A FUNCTION OF PROPAGATION TIME OF THE REFLECTED PULSE) AND TIME (A FUNCTION OF GEOGRAPHICAL POSITION). THESE DATA WERE NORMALLY OBSERVED ONLY WHEN THE SPACECRAFT WAS IN RANGE OF THE TELEMETRY STATION. A LIMITED AMOUNT OF DATA WAS TAPE RECORDED DURING THE FIRST YEAR AFTER LAUNCH. THESE DATA HAVE BEEN TAKEN REGULARLY STARTING WITH ABOUT 7 HR PER DAY, FOR 3- TO 5-SEC PERIODS AT 19- OR 29-SEC INTERVALS. SINCE LAUNCH IN JANUARY 1969, OBSERVATIONS HAVE DECREASED GRADUALLY DUE TO BATTERY CONDITION, LOSS OF SCHEDULING PRIORITY, AND FUNDING CUTS. SPECIAL OBSERVATIONS MAY BE SCHEDULED ON REQUEST.

DATA SET NAME- FIXED-FREQUENCY IONOGRAMS ON MICROFILM

NSSDC ID- 69-009A-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/30/69 TO 10/12/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2027 REEL(S) OF MICROFILM

THE FIXED FREQUENCY IONOGRAMS ARE CONTAINED DIRECTLY IN FRONT OF EACH SWEEP-FREQUENCY IONOGRAM (69-009A-01A) ON REELS OF 35-MM MICROFILM. THESE ARE REDUCED DATA PREPARED FROM THE TELEMETRY TAPE AT CRC IN OTTAWA, CANADA, NOAA IN BOULDER, COLORADO, OR RSRS IN SLOUGH, BUCKS, ENGLAND. FREQUENCY LABELS, HEIGHT MARKERS, AND TIME ARE MARKED ON THE FILM. IN ORDER TO DETERMINE SATELLITE LOCATION AND ALTITUDE, SATELLITE EPHEMERIDES MUST BE CONSULTED.

SAGALYN, ISIS 1

EXPERIMENT NAME- SPHERICAL ELECTROSTATIC ANALYZER

NSSDC ID- 69-009A-08

STATUS OF OPERATION- NORMAL

PERSONNEL

PI -	R.C.	SAGALYN	USAF CAMBRIDGE RES LAB BEDFORD, MA
OI -	M.	SHIDDY	USAF CAMBRIDGE RES LAB BEDFORD, MA

THE OBJECTIVE OF THE SPHERICAL ELECTROSTATIC ANALYZER (SEA) EXPERIMENT WAS TO MEASURE THE TEMPORAL AND SPATIAL

ISIS 1

VARIATIONS IN THE CONCENTRATIONS AND ENERGY DISTRIBUTION OF THE CHARGED PARTICLES THROUGHOUT THE ORBIT. SPECIFICALLY, THE OBJECTIVES WERE TO MEASURE THE FOLLOWING PARAMETERS — (A) THE DENSITY OF POSITIVE IONS HAVING THERMAL ENERGY IN THE CONCENTRATION RANGE FROM 1.E1 TO 1.E6 IONS PER CUBIC CENTIMETER (LOGARITHMIC AMPLIFIERS WERE USED IN THE INPUT CIRCUIT). (B) THE KINETIC TEMPERATURE OF THE THERMAL IONS IN THE RANGE FROM 700 TO 4000 DEG K, (C) THE FLUX AND ENERGY SPECTRUM OF PROTONS IN THE RANGE FROM 0 TO 2 KEV, AND (D) THE SATELLITE POTENTIAL WITH RESPECT TO THE UNDISTURBED PLASMA. TWO UNITS MADE UP THE EXPERIMENT PACKAGE — A 76-CM BOOM THAT SUPPORTED THE SENSOR AND MADE POSSIBLE OMNIDIRECTIONAL MEASUREMENTS, AND AN ELECTRONICS PACKAGE (CONSIDERED TO INCLUDE THE SENSOR) TO PERFORM THE MEASUREMENTS AND TO PROCESS THE DATA INTO A SUITABLE FORM FOR TELEMETRY. THE SENSOR WAS MADE UP OF THREE CONCENTRIC SPHERICAL MESHED GRIDS HAVING RADII OF 3.18, 2.54, AND 1.90 CM. THE INNERMOST GRID WAS THE COLLECTOR. THESE GRIDS WERE MADE FROM TUNGSTEN MESH AND HAD A TRANSPARENCY OF 80 TO 90 PERCENT. TO MEASURE THE PARAMETERS LISTED ABOVE, SUITABLE SWEEP AND STEP VOLTAGES WERE APPLIED TO THE GRIDS. THIS INSTRUMENT WAS OPERATED IN SEVERAL MODES. THE ION DENSITIES WERE SAMPLED 60 TIMES A SECOND, CORRESPONDING TO A SPATIAL RESOLUTION OF 150 METERS. ONCE PER MINUTE THE RATIO OF MASS TO TEMPERATURE WAS SAMPLED, AND THE ENERGY DISTRIBUTION WAS SAMPLED ONCE EVERY 2 MINUTES.

[redacted]

DATA SET NAME- ION DENSITY ON 35-MM FILM

NSSDC ID- 69-009A-08A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/31/69 TO 05/17/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 4 REEL(S) OF MICROFILM

THIS DATA SET WAS PROVIDED BY THE EXPERIMENTER AND CONTAINS PLOTS OF ION DENSITY VS UNIVERSAL TIME ON 35-MM FILM. THE DENSITY SCALE (ORDINATE) IS LOGARITHMIC. EXTENDS OVER FOUR DECADES FROM 100 TO 1,000,000, AND IS EXPRESSED IN UNITS OF NUMBER OF IONS PER CUBIC CENTIMETER. THE LINEAR TIME SCALE (ABSCISSA) COVERS A 30-MIN TIME INTERVAL PER FILM FRAME, AND HAS TICK MARKS EVERY 2 MINUTES. THE TIME SPAN OF THE DATA PLOTTED VARIES FROM FRAME TO FRAME. OTHER PARAMETERS SHOWN ON EACH FRAME INCLUDE — DATE OF MEASUREMENT, ORBIT NUMBER, GROUND STATION THAT RECEIVED THE DATA, ALTITUDE, LOCAL TIME, GEODETIC LATITUDE AND LONGITUDE, INVARIANT LATITUDE MCILWAIN L PARAMETER, AND MAGNETIC LOCAL TIME.

[redacted]

DATA SET NAME- ION TEMPERATURE AND DENSITY ON MAGNETIC TAPE

NSSDC ID- 69-009A-08B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/31/69 TO 11/30/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 4 REEL(S) OF MAGNETIC TAPE

THIS DATA SET WAS PROVIDED BY THE EXPERIMENTER AND CONTAINS BINARY TAPES WRITTEN ON A CDC 6600 COMPUTER WITH THE SCOPE 3.3 OPERATING SYSTEM. EACH TAPE CONTAINS RESULTS OF THE ANALYSIS ON THE DATA OBSERVED IN 1 MONTH. EACH RECORD IN A FILE CONTAINS EPHEMERIS DATA AND THE RESULTS FROM ONE SWEEP. THE SWEEPS ARE OBTAINED ONCE EVERY MIN AND LAST FOR 2 SEC. HENCE THE OUTPUT PARAMETERS REPRESENT AVERAGED VALUES OVER 2-SEC PERIODS AT 1-MIN INTERVALS. THE OUTPUT PARAMETERS PRESENTED INCLUDE ION TEMPERATURE, ION DENSITY, AND VEHICLE POTENTIAL.

[redacted]

WHITTEKER, ISIS 1

EXPERIMENT NAME- SWEEP-FREQUENCY SOUNDER

NSSDC ID- 69-009A-01

STATUS OF OPERATION- NORMAL

PERSONNEL

PI -	J.H.	WHITTEKER	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	G.E.K.	LOCKWOOD	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	G.L.	NELMS	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	J.E.	JACKSON	NASA-GSFC GREENBELT, MD
OI -	J.M.	KING	APPLETON LAB SLOUGH, BERKS, ENGLAND
OI -	J.	TURNER	AUST DEPT OF INTERIOR SYDNEY, AUSTRALIA
OI -	H.	SYLVAIN	IONOSPHERIC RES GROUP ORLEANS, FRANCE
OI -	O.	HOLT	AURORAL OBS TROMSO, NORWAY
OI -	Y.	OGATA	RADIO RESEARCH LAB TOKYO, JAPAN
OI -	R.	RAGHAVARAO	PHYSICAL RESEARCH LAB AHMEDABAD, INDIA
OI -	W.	CALVERT	NOAA-ERL BOULDER, CO
OI -	T.E.	VAN ZANDT	NOAA-ERL BOULDER, CO
OI -	L.	COLIN	NASA-ARC MOFFETT FIELD, CA
OI -	R.B.	NORTON	NOAA-ERL BOULDER, CO
OI -	C.E.	PETRIE	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	K.L.	CHAN	NASA-ARC MOFFETT FIELD, CA
OI -	R.S.	UNWIN	DEPT OF SCI+INDUST RES CHRISTCHURCH, NEW ZEALAND

THE ISIS 1 IONOSONDE WAS A RADIO TRANSMITTER/RECEIVER THAT RECORDED THE TIME DELAY BETWEEN A TRANSMITTED AND A RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF FREQUENCIES BETWEEN 0.1 AND 20 MHZ WAS SAMPLED ONCE EVERY 19 OR 29 SEC, AND ONE OF SIX SELECTED FREQUENCIES WAS ALSO SOUNDED FOR A PERIOD OF 3 TO 5 SEC DURING THIS 19- OR 29-SEC PERIOD. IN ADDITION TO THE SWEEP- AND FIXED-FREQUENCY MODES OF OPERATION, A MIXED MODE WAS POSSIBLE WHERE THE TRANSMITTER FREQUENCY WAS FIXED AT 0.82 MHZ WHILE THE RECEIVER SWEPT. SEVERAL VIRTUAL HEIGHT (DELAY TIME) TRACES WERE NORMALLY OBSERVED DUE TO GROUND REFLECTIONS, PLASMA RESONANCES, BIREFRINGENCE OF THE IONOSPHERE, NON-VERTICAL PROPAGATION, ETC. VIRTUAL HEIGHT AT A GIVEN FREQUENCY WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL, ELECTRON DENSITY ALONG THE PROPAGATION PATH, AND MODE OF PROPAGATION. THE STANDARD DATA FORM WAS AN IONOGRAM SHOWING VIRTUAL HEIGHT AS A FUNCTION OF FREQUENCY. TWO OTHER FORMS OF DATA WERE COMMONLY PREPARED FROM THE IONOGRAMS. THEY WERE DIGITAL FREQUENCY AND/OR VIRTUAL HEIGHT VALUES OF CHARACTERISTIC IONOSPHERIC FEATURES AND COMPUTATIONS OF ELECTRON DENSITY PROFILES. THOSE DATA HAVE BEEN TAKEN REGULARLY STARTING WITH ABOUT 7 HR PER DAY AT LAUNCH AND GRADUALLY DECREASING IN TIME COVERAGE DUE TO BATTERY CONDITION AND ADMINISTRATIVE REASONS.

[redacted]

DATA SET NAME- SWEEP-FREQUENCY IONOGRAMS ON MICROFILM

NSSDC ID- 69-009A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/30/69 TO 03/26/75
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2063 REEL(S) OF MICROFILM

THESE IONOGRAMS ARE REDUCED DATA PLOTS OF VIRTUAL RANGE VS FREQUENCY. THE DATA SET IS ON 35-MM MICROFILM. VIRTUAL RANGE IS A FUNCTION OF TIME DELAY OF THE REFLECTED PULSE OF EACH FREQUENCY TRANSMITTED. THESE ARE FIRST GENERATION DATA PREPARED FROM THE TELEMETRY TAPES. PROCESSING HAS BEEN CARRIED OUT OR SCHEDULED AT SEVERAL PROCESSING LOCATIONS — CRC IN OTTAWA, CANADA; RSRS IN SLOUGH, BERKS, ENGLAND; NOAA IN BOULDER, COLORADO (BETWEEN LAUNCH AND MAY 1972); AND AFTER THE FALL OF 1972, INDIA, JAPAN, AUSTRALIA, AND NEW ZEALAND. TIME CODES ARE ENTERED IN THE MARGIN OF THE MICROFILM, AND HEIGHT AND FREQUENCY MARKERS HAVE BEEN PLACED ON EACH IONOGRAM. SATELLITE EPHEMERIDES MUST BE CONSULTED TO DETERMINE POSITION AND OBSERVATION TIME. THE DATA ARE AVAILABLE TO THE EXTENT PERMITTED BY TELEMETRY STATION SCHEDULING, LOCATION OF TELEMETRY STATIONS, AND TAPE RECORDER OPERATION AND SCHEDULING. SPACECRAFT POWER AVAILABILITY, WHICH WAS ALSO AN IMPORTANT FACTOR IN DATA OBSERVATION, LIMITED SOUNDER OPERATION TO ABOUT 7 HR PER DAY, OF WHICH ABOUT 1 HR PER ORBIT COULD BE FOR RECORDED DATA. THE TAPE RECORDER FAILED ON JAN. 30, 1970. PROCESSING LIMITATIONS RESULT IN A DELAY OF ABOUT 6 MONTHS FROM OBSERVATION TIME TO IONOGRAM PROCESSING. EARLY PROCESSING OF SMALL NUMBERS OF IONOGRAMS IS POSSIBLE ON REQUEST. SINCE ONLY TIME IS NOTED ON EACH IONOGRAM, SATELLITE POSITION AND RELATED INFORMATION MUST BE OBTAINED FROM ANOTHER SOURCE (NSSDC DATA SET 69-009A-00C). AN INDEX OF THESE IONOGRAMS IS ALSO AVAILABLE AS NSSDC DATA SET 69-009A-01B.

DATA SET NAME- IONOGRAM INVENTORY ON TAPE

NSSDC ID- 69-009A-01B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/30/69 TO 10/12/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS FILE INDEXES THE ISIS 1 IONOGRAMS. DATA SET 69-009A-01A, -02A, AND -10A INFORMATION IN THE FILE FOR WHICH IONOGRAMS CAN BE IDENTIFIED INCLUDES IONOGRAM QUALITY, TELEMETRY STATION, STOP AND START DATA FOR THE PASS (TIMES AND LOCATION), LOCATION AT WHICH THE ORIGINAL TELEMETRY TAPES ARE STORED AND IONOGRAMS PREPARED AND EXPERIMENT MODE OF OPERATION. SOME INFORMATION RELATING TO EXPERIMENTS 2, 3, AND 10 ARE ALSO INCLUDED SINCE THESE EXPERIMENTS ARE CLOSELY RELATED TO THE SOUNDER OPERATION, E.G., OPERATING FREQUENCY OF EXPERIMENT 2 (FIXED FREQUENCY) IS GIVEN, PRESENCE OF AGC TRACE (EXPERIMENT 10 DATA) IS NOTED, AND VLF OPERATION (EXPERIMENT 3) IS INDICATED. THIS INDEX IS UPDATED MONTHLY UNLESS FEW DATA ARE RECEIVED. THIS INDEX IS PREPARED FROM PHYSICAL INVENTORY OF FILM RECEIVED. THESE DATA ARE MAINTAINED ON SPECIAL NSSDC SYSTEMS TAPES. THE DATA CAN BE PROVIDED ON HARDCOPY OR ON MICROFILM, SORTED ACCORDING TO THE REQUIREMENTS OF THE REQUESTER.

DATA SET NAME- NASA-ARC ELECTRON DENSITIES INTERPOLATED TO 100-KM INTERVALS ON (PACKED) TAPE

NSSDC ID- 69-009A-01C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/03/69 TO 06/07/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE ANALYZED DATA ON MAGNETIC TAPE SUPPLIED BY THE EXPERIMENTER, WERE COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL RANGE THAT WERE SCALED FROM IONOGRAMS. DIGITAL ELECTRON DENSITY VALUES WERE LISTED FOR THE SATELLITE LOCATION AND FOR EACH 100 KM FROM SATELLITE ALTITUDE DOWN TO THE LOWEST HEIGHT OF SIGNAL REFLECTIONS (NORMALLY NEAR 300 KM). THESE DATA ARE PART OF A COLLECTION PREPARED FROM ALOUETTE 2, ISIS 1, AND ISIS 2 SATELLITES. FROM ALL THREE SATELLITES, THERE ARE ABOUT 33,000 PROFILES LISTED FOR TIMES BETWEEN NOVEMBER 11, 1965, AND JUNE 7, 1972, FROM THE VICINITY OF 18 DIFFERENT GROUND STATIONS. THESE DATA ARE FROM A SMALL BLOCK OF THE TOTAL IONOGRAM DATA FROM THE THREE SATELLITES (LESS THAN 1 PERCENT), BUT FORM ONE OF THE LARGEST BLOCKS OF REDUCED SATELLITE IONOGRAMS AVAILABLE. THESE REDUCTIONS ARE OF OPTIMUM QUALITY BECAUSE X- AND Y- AND Z-TRACE VALUES WERE CHECKED AGAINST ONE ANOTHER DURING COMPUTATION OF THE DENSITY VALUES. THESE DATA ARE PACKED ON ONE TAPE WRITTEN IN EXTENDED BCD INTERCHANGE (EBCDIC) CODE IN ODD PARITY. THE TAPES ARE 800 BPI, 7-TRACK, AND AN UNPACKING ROUTINE (CALLED *TAPE*) IS AVAILABLE FOR THIS DATA SET. THESE DATA WILL ALSO BE AVAILABLE ON MICROFILM.

DATA SET NAME- INDEX OF IONOGRAMS SHOWING DUCTED ECHOES

NSSDC ID- 69-009A-01E

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 02/01/69 TO 12/27/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, PROVIDED BY THE EXPERIMENTER'S OFFICE, IS AN INDEX TO IONOGRAMS CONTAINING DUCTED ECHOES. THE CRITERION FOR SELECTION WAS THAT AT LEAST ONE TRACE FROM THE CONJUGATE HEMISPHERE APPEARS ON THE IONOGRAMS. THIS TRACE HAS A POSITIVE SLOPE AS OPPOSED TO THE NORMAL NEGATIVE SLOPE OF THE X OR O TRACE. EACH RECORD CONTAINS THE SATELLITE IDENTIFICATION, GROUND STATION (QUITO=5, SANTIAGO=8, FT. MEYER=3, ORRORAL=21, SINGAPORE=48), PASS START TIME (UT), THE NUMBER OF IONOGRAMS IN THE PASS SHOWING DUCTED ECHOES, AND THE NUMBER NOT SHOWING DUCTED ECHOES. THE TIME COVERED IS FROM 1969 THROUGH 1971. FOR 3650 PASSES (ABOUT 100,000 IONOGRAMS), APPROXIMATELY 2000 IONOGRAMS WITH DUCTED ECHOES ARE IDENTIFIED. THE DATA ARE AVAILABLE ON 9-TRACK, 800-BPI, EBCDIC MAGNETIC TAPE. SIMILAR DATA FOR OTHER TIMES ARE STORED ON THE SAME TAPE AND ARE DESCRIBED UNDER DATA SETS 62-045A-01Q, 65-098A-01N, AND 71-024A-01E.

DATA SET NAME- CRC ELECTRON DENSITY PROFILES AT SCALED POINTS ON MAGNETIC TAPES

NSSDC ID- 69-009A-01F

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/01/69 TO 07/10/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF ELECTRON DENSITY PROFILES COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT, SCALED FROM IONOGRAMS. THESE DATA ARE ON 800-BPI, 9-TRACK MAGNETIC TAPE, WRITTEN IN EBCDIC AND PREPARED BY THE COMMUNICATIONS RESEARCH CENTRE, OTTAWA, CANADA. TELEMETRY STATIONS ARE NOT IDENTIFIED, BUT SATELLITE LOCATION, TIME OF OBSERVATION, SOLAR ZENITH ANGLE AT THE SATELLITE, DIP LATITUDE AT THE SATELLITE, TOTAL ELECTRON CONTENT DOWN TO THE ALTITUDE OF HIGHEST IONOSPHERICALLY REFLECTED FREQUENCY, AND OTHER RELEVANT INFORMATION ARE NOTED WITH EACH PROFILE. PROFILE DATA CONSIST OF ELECTRON DENSITY AND GEOMETRIC HEIGHT VALUES FOR EACH POINT SCALED FROM THE IONOGRAM. FOR INTERPOLATED VALUES OF ELECTRON DENSITY AT STANDARD INCREMENTS OF GEOMETRIC HEIGHT, A CRC INTERPOLATION PROGRAM (AVAILABLE AT NSSDC) CAN BE RUN WITH THIS DATA SET. THESE IONOGRAMS WERE SELECTED FOR THEIR SCIENTIFIC INTEREST AND COMPRISE ONLY A VERY SMALL PORTION OF REDUCTIONS POSSIBLE FROM THE AVAILABLE IONOGRAMS.

SPACECRAFT COMMON NAME- ISIS 2

ALTERNATE NAMES- ISIS-B, PL-701F
05104

NSSDC ID- 71-024A

LAUNCH DATE- 04/01/71 WEIGHT- 570. KG

STATUS OF OPERATION- PARTIAL

ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC	EPOCH DATE- 04/01/71
ORBIT PERIOD- 113.61 MIN	INCLINATION- 88.1564 DEG
PERIAPSIS- 1367. KM ALT	APOAPSIS- 1429. KM ALT

ISIS 2 WAS AN IONOSPHERIC OBSERVATORY INSTRUMENTED WITH A SWEEP FREQUENCY AND A FIXED FREQUENCY IONOSONDE, A VLF RECEIVER, ENERGETIC AND SOFT PARTICLE DETECTORS, AN ION MASS SPECTROMETER, AN ELECTROSTATIC PROBE, A RETARDING POTENTIAL ANALYZER, A BEACON TRANSMITTER, A COSMIC NOISE EXPERIMENT, AND TWO PHOTOMETERS. THE SOUNDER USED TWO LONG CROSSED-DIPOLE ANTENNAS (78.9 AND 20.2 M LONG) FOR THE SOUNDING, VLF, AND COSMIC NOISE EXPERIMENTS. THE SPACECRAFT WAS NOMINALLY SPIN-STABILIZED WITH SPIN AXIS IN THE ORBIT PLANE TO ABOUT 2 RPM AFTER ANTENNA DEPLOYMENT. A CARTWHEEL MODE WITH THE AXIS PERPENDICULAR TO THE ORBIT PLANE WAS MADE AVAILABLE OCCASIONALLY FOR PERIODS OF A FEW MONTHS. THIS WAS DONE TO PROVIDE RAM AND WAKE DATA FOR SOME EXPERIMENTS FOR EACH SPIN PERIOD, RATHER THAN EACH ORBIT PERIOD. ATTITUDE AND SPIN INFORMATION WAS OBTAINED FROM A THREE-AXIS MAGNETOMETER AND A SUN SENSOR. CONTROL OF ATTITUDE AND SPIN WAS POSSIBLE BY MEANS OF MAGNETIC TORQUING. THE EXPERIMENT PACKAGE ALSO INCLUDED A PROGRAMMABLE TAPE RECORDER WITH A 1-HR CAPACITY. FOR NONRECORDED OBSERVATIONS, DATA FROM SATELLITE AND SUBSATELLITE LOCATIONS WERE TELEMETERED WHEN THE SPACECRAFT WAS IN LINE OF SIGHT OF A TELEMETRY STATION. TELEMETRY STATIONS WERE LOCATED SO THAT PRIMARY DATA COVERAGE WAS NEAR THE 80 DEG W MERIDIAN AND NEAR HAWAII, SINGAPORE, AUSTRALIA, ENGLAND, FRANCE, NORWAY, INDIA, JAPAN, ANTARCTICA, NEW ZEALAND, AND CENTRAL AFRICA. INITIAL OPERATION OF ALL EXPERIMENTS WAS NOMINAL. THE TAPE RECORDERS FAILED ON FEBRUARY 4, 1972, BUT REAL-TIME OBSERVATIONS CONTINUED TO BE TELEMETERED TO GROUND STATIONS. AFTER APRIL 1973, DATA TAKEN WERE TO BE STORED ON TAPE FOR AT LEAST 18 MONTHS. THESE DATA TAPES MAY BE ERASED FOR REUSE IF NO REQUIREMENT (AND FUNDING) FOR DATA REDUCTION OCCURS WITHIN THAT PERIOD. SATELLITE OPERATION OCCURRED (SPRING 1975) FOR ABOUT 4 HR PER DAY.

DATA SET NAME- EXTENDED WORLD MAPS ON MICROFILM

NSSDC ID- 71-024A-00C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/17/71 TO 06/30/75
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 73 REEL(S) OF MICROFILM

ISIS 2

THESE DATA, PREPARED AT GSFC ON 35-MM MICROFILM, ARE LISTINGS OF SATELLITE POSITION AND SUPPORTING INFORMATION FOR EACH MINUTE OF GMT. THE LISTINGS INCLUDE LOCAL SOLAR TIME, GEODETIC LOCATION, SEVERAL VARIETIES OF MAGNETIC FIELD REFERENCED LOCATION, AND SUN POSITION. DATA ARE ALSO GIVEN FOR SPECIAL TIMES (EQUATOR CROSSINGS, NORTHERNMOST AND SOUTHERNMOST POINTS, SUNLIGHT ENTRANCE AND EXIT, ETC.). IF TIMES REQUIRED ARE NOT YET AVAILABLE IN THIS DATA SET, SEE DATA SET 71-024A-00B.

ANGER, ISIS 2

EXPERIMENT NAME- 3914- AND 5577-A PHOTOMETER

NSSDC ID- 71-024A-11

STATUS OF OPERATION- NORMAL

PERSONNEL
PI - C.D. ANGER ..... U OF CALGARY
EDMONTON, ALBERTA, CANADA

THIS DUAL-WAVELENGTH SCANNING AURORAL PHOTOMETER WAS DESIGNED TO MAP THE DISTRIBUTION OF AURORAL EMISSIONS AT 5577 AND 3914 A OVER THE PORTION OF THE DARK EARTH VISIBLE TO THE SPACECRAFT. A COMBINATION OF INTERNAL ELECTRONIC SCANNING PERFORMED BY AN IMAGE DISSECTOR AND OF THE NATURAL ORBITAL AND ROTATIONAL MOTIONS OF THE SPACECRAFT PERMITTED THE SENSOR TO SYSTEMATICALLY SCAN ACROSS THE EARTH. THE DETECTOR SYSTEM WAS CONSTRUCTED TO ALLOW INCIDENT RADIATION TO BE ACCEPTED FROM TWO DIRECTIONS 180 DEG APART, AND THEN TO FOCUS THIS LIGHT AT A COMMON POINT ON THE SINGLE IMAGE DISSECTOR PHOTOMETER TUBE. FOR EACH DIRECTION, THE LIGHT PASSED THROUGH ITS OWN LENS, INTERFERENCE FILTER, AND MIRROR. ONE FILTER OPERATED IN THE RANGE 5581 PLUS OR MINUS 9 A (AT THE HALF-MAXIMUM POINTS), AND THE OTHER FILTER OPERATED AT 3915 PLUS OR MINUS 13 A. ONLY ONE OF THE TWO OPTICAL SYSTEMS POINTED AT THE EARTH AT ANY ONE TIME, WHILE THE OTHER FACED INTO SPACE. WHEN THE SPACECRAFT SPIN AXIS WAS ORIENTED TO LIE IN THE ORBITAL PLANE, EACH ROTATION OF THE SPACECRAFT RESULTED IN AN EARTH SCAN 5 DEG WIDE. THIS WIDTH SIZE WAS CHOSEN TO INSURE OVERLAP WITH THE PREVIOUS SCAN. THE IMAGE DISSECTOR REPETITIVELY SCANNED AT A HIGH SPEED ACROSS THE NARROW DIMENSION OF EACH 5-DEG BAND AND DIVIDED IT INTO SEPARATELY RESOLVED REGIONS 0.4 DEG BY 0.4 DEG. SIMILAR STRIPS WERE SCANNED AT EACH OF THE TWO WAVELENGTHS, BUT AT TIMES THAT DIFFERED BY HALF THE ROTATION PERIOD OF ABOUT 10 SEC. A CALIBRATION LIGHT SOURCE FOR EACH WAVELENGTH WAS BUILT INTO THE OPTICAL ASSEMBLY, AND A CALIBRATE CYCLE WAS INITIATED AUTOMATICALLY WHENEVER A 'POWER ON' COMMAND WAS GIVEN. TO MINIMIZE THE PROBLEMS ARISING FROM SOLAR ILLUMINATION OF THE OPTICS AND THE DIRECT VIEWING OF THE SUNLIT EARTH, A SUNLIGHT PROTECTION SYSTEM WAS INCLUDED. THE ELECTRONIC PORTION OF THE INSTRUMENT CONSISTED OF MODULES THAT AMPLIFIED AND COUNTED OUTPUT PULSES FROM THE IMAGE DISSECTOR TUBE AND CONVERTED THESE INTO A HIGH-RATE PULSE CODE MODULATED OUTPUT AND A LOW-RATE ANALOG OUTPUT. THE DATA WILL BE USED TO STUDY THE LARGE-SCALE DISTRIBUTION AND MORPHOLOGY OF AURORAS, AND TO COMPARE WITH OTHER MEASUREMENTS FROM THIS AND OTHER SPACECRAFT AND GROUND-BASED INSTRUMENTS. COMPLETE DETAILS ABOUT THE EXPERIMENT CAN BE FOUND IN THE REPORT "THE ISIS-2 SCANNING AURORAL PHOTOMETER," C. D. ANGER, T. PANCOTT, J. MCNALLY, AND H. S. KERR, APPLIED OPTICS, VOL 12, NO. 8, PP 1753-1768, AUGUST 1973.

DATA SET NAME- 5577-A AND 3914-A INTENSITY MAPS ON TAPE

NSSDC ID- 71-024A-11A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/23/71 TO 12/31/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS 9-TRACK MAGNETIC TAPE DATA SET WAS WRITTEN ON THE IBM 370 AT 800 BPI. EACH FILE CONTAINS DATA FROM ONE PROCESSED PASS, AND CONSISTS OF SIX RECORDS. ONE RECORD CONTAINS A TABLE OF LIMB-CROSSING TIMES AND SPACECRAFT ORBITAL PARAMETERS. THE REMAINING RECORDS CONSIST OF SPIN MAPS OF GEOGRAPHIC LATITUDE AND LONGITUDE, AND OF INTENSITY MEASUREMENTS AT 6300, 5577, AND 3914 A. THE FIRST COLUMN OF THE TABLE GIVES THE SPIN NUMBER. OTHER COLUMN HEADINGS INCLUDE UT, GEOGRAPHIC AND MAGNETIC LATITUDE AND LONGITUDE OF THE SPACECRAFT, THE MCILWAIN 'L' VALUE, AND THE SOLAR-ZENITH ANGLE. THE SPIN MAP FOR THE 6300 A IS IN DATA SET 71-024A-12A. EACH SPIN MAP IS A MATRIX HAVING 40 COLUMNS AND A NUMBER OF ROWS EQUAL TO THE NUMBER OF SPACECRAFT ROTATIONS. A GIVEN ROW AND COLUMN ELEMENT HAS THE SAME LOOK POINT IN ALL SPIN MAPS.

BARRINGTON, ISIS 2

EXPERIMENT NAME- VLF RECEIVER

NSSDC ID- 71-024A-03

STATUS OF OPERATION- NORMAL

PERSONNEL
PI - R.E. BARRINGTON ..... COMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - F.W. PALMER ..... COMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

THE VERY-LOW-FREQUENCY (VLF) EXPERIMENT WAS A LOW-FREQUENCY (LF) BROADBAND RECEIVER THAT OBSERVED SIGNALS FROM THE 79-M LONG DIPOLE (SPLIT MONOPOLE) ANTENNA BETWEEN 0.05 AND 30 KHZ. THIS SAME ANTENNA WAS USED FOR RECEIVING SIGNALS BELOW 5 KHZ ON THE IONOSONDE. THE VLF RECEIVER HAD A WIDE DYNAMIC RANGE THAT WAS ACHIEVED BY USE OF AN AUTOMATIC GAIN CONTROL (AGC) SYSTEM. THIS VLF EXPERIMENT INCLUDED AN ONBOARD EXCITER THAT SWEPT AT A NONLINEAR RATE FROM 50 TO 0 HZ, THEN TO 9500 HZ, OVER A PERIOD OF 1.0 SEC. THIS PERMITTED THE CONTROLLED STUDY OF ION RESONANCES STIMULATED BY THE EXCITER. IN ADDITION TO STUDY OF NATURAL AND OTHER MAN-MADE VLF RADIO NOISE, THE EXPERIMENT ALSO PERMITTED ANTENNA IMPEDANCE MEASUREMENTS, WITH OR WITHOUT A DC BIAS ON THE ANTENNA. THE REAL-TIME DATA WERE TRANSMITTED ON 136.08-MHZ TELEMETRY. THE VLF DATA COULD BE RECORDED ON ONE OF THE FOUR TAPE RECORDER CHANNELS FOR THE FIRST YR WHEN THE SPACECRAFT TAPE RECORDER WAS OPERATING. TAPE RECORDED (AND BACKUP REAL-TIME CAPABILITY) DATA WERE TRANSMITTED ON 400-MHZ TELEMETRY.

DATA SET NAME- VLF SPECTROGRAMS

NSSDC ID- 71-024A-03A

AVAILABILITY OF DATA SET- DATA AVAILABLE FROM EXPERIMENTER

TIME PERIOD COVERED- 04/08/71 TO / /
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 REEL(S) OF MICROFILM

THIS DATA SET IS IN A STANDARD GRAPHIC FORM (FREQUENCY TIME) FOR RAW VLF DATA. THESE SONOGRAMS ON 35-MM FILM WERE PREPARED BY THE EXPERIMENTER FROM ANALOG DATA ON MAGNETIC TAPE. RECORDED AT TELEMETRY STATIONS IN REAL TIME, APPROXIMATELY 17,000 PASSES WERE RECORDED, FROM WHICH SONOGRAMS HAVE BEEN PREPARED FOR ABOUT 1000 PASSES. MOST OF THE SONOGRAMS ARE FROM PASSES OVER THE OTTAWA STATION. ALTHOUGH OVER HALF OF THE DATA OBSERVED WAS FROM OTHER LOCATIONS. BY SPECIAL ARRANGEMENT, ANY DATA STILL AVAILABLE ON TAPE CAN BE PROVIDED IN LIMITED QUANTITIES IN SONOGRAM FORM. EACH PASS WHICH WAS PROCESSED INTO SONOGRAMS CONSISTS OF THREE PARTS, EACH USING DIFFERENT RANGES ON THE FREQUENCY SCALES, I.E., NOMINALLY 0 TO 20, 0 TO 10, AND 0 TO 2.5 KHZ. THE TIME SCALE FOR THE FIRST TWO PARTS IS 0.25 IN./SEC AND 0.125 IN./SEC FOR THE 0- TO 2.5 SONOGRAM. IDENTIFICATION INFORMATION IS NOTED PRIOR TO EACH STATION PASS. TIME (UT) IS SHOWN AT 10-SECOND INTERVALS ALONG THE EDGE OF THE SONOGRAMS. AN ANALOG REPRESENTATION OF THE VLF-RECEIVER AGC LEVEL IS ALSO SHOWN ALONG THE EDGE OF THE SONOGRAMS. THESE DATA CAN BE MADE AVAILABLE FOR VIEWING BY CONTACTING THE EXPERIMENTER, DR. R. E. BARRINGTON, COMMUNICATIONS RESEARCH CENTRE, DEPT. OF COMMUNICATIONS, P. O. BOX 490, STATION A, OTTAWA, ONTARIO, CANADA, K1N 8T5.

BRACE, ISIS 2

EXPERIMENT NAME- CYLINDRICAL ELECTROSTATIC PROBE

NSSDC ID- 71-024A-07

STATUS OF OPERATION- NORMAL

PERSONNEL
PI - L.H. BRACE ..... NASA-GSFC
GREENBELT, MD
OI - J.A. FINDLAY ..... NASA-GSFC
GREENBELT, MD

THE PURPOSE OF THIS EXPERIMENT WAS TO STUDY THE GLOBAL VARIATIONS OF ELECTRON TEMPERATURE AND ELECTRON CONCENTRATION AT SPACECRAFT (SC) ALTITUDES DURING SOLAR MAXIMUM, AND THE CHARACTERISTICS OF THE SC ION SHEATH. THIS CYLINDRICAL PROBE WAS A TYPE OF LANGMUIR PROBE THAT OBSERVED CURRENT FLOW TO THE PROBE FOR A GIVEN VOLTAGE PROFILE PLACED ON THE COLLECTOR. FROM THIS CURRENT-VOLTAGE PROFILE, ELECTRON DENSITY AND ELECTRON TEMPERATURE COULD BE CALCULATED. THERE WAS A BOOM PROBE AND AN AXIAL PROBE EXTENDING FROM THE SC. THE AXIAL PROBE EXTENDED 46.3 CM FROM THE SC ALONG THE SPIN AXIS, AND WAS CENTERED BETWEEN THE FOUR TELEMETRY ANTENNAS ON THE

UNDERSIDE OF THE SC. THIS PROBE WAS CAPABLE OF MEASUREMENTS UNPERTURBED BY THE SATELLITE MOTION ONLY WHEN THE PROBE PRECEDED THE SC IN ITS MOTION THROUGH THE PLASMA. THE BOOM PROBE EXTENDED HORIZONTALLY AND OUTWARD (IN SC FRAME OF REFERENCE) FROM A BOOM 1 M LONG, WHICH IN TURN EXTENDED FROM AN UPPER SURFACE OF THE SATELLITE AT AN ANGLE OF ABOUT 45 DEG TO THE SPIN AXIS. THIS PROBE PROVIDED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE, WHICH WERE FREE OF SC WAKE EFFECTS. THE PROBES CONSISTED OF THREE CONCENTRIC, ELECTRICALLY-ISOLATED, STAINLESS STEEL TUBES. THE OUTER (0.24 CM IN DIAM AND 23 CM LONG) TUBE FLOATED AT ITS OWN EQUILIBRIUM POTENTIAL AND SERVED TO PLACE THE COLLECTOR WELL AWAY FROM THE SC PLASMA SHEATH. THE CENTER TUBE (0.165-CM DIAM) EXTENDING 2.3 CM OUTWARD FROM THE OUTER TUBE ACTED AS AN ELECTRICAL GUARD FOR THE COLLECTOR. ITS ELECTRICAL POTENTIAL WAS CONTROLLED. THE COLLECTOR (0.058-CM DIAM) EXTENDED 23 CM OUTWARD FROM THE DRIVEN GUARD. DURING EACH 2-MIN SEQUENCE, A VOLT-AMPERE CURVE WAS OBTAINED THAT CAN BE INTERPRETED IN ELECTRON DENSITIES OVER A RANGE FROM 100 TO 1,500,000 ELECTRONS PER CM SQ, AND IN TEMPERATURE VALUES FROM 400 TO 50,000 DEG K.

DATA SET NAME- AVERAGED VALUE OF ELECTRON DENSITY AND TEMPERATURE ON MAGNETIC TAPE

NSSDC ID- 71-024A-07A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/01/71 TO 03/31/73 (AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 8 REEL(S) OF MAGNETIC TAPE

THESE REDUCED DATA ON TAPE, WERE PREPARED BY THE EXPERIMENTER AND LIST ABOUT A TWO-YEAR SPAN OF DENSITIES AND ELECTRON TEMPERATURES OBSERVED AT THE SATELLITE. THE DATA HAVE BEEN CALCULATED FROM THE TELEMETERED RETARDING POTENTIAL CURVES. INCLUDED IN THE LISTING FOR EACH DATA POINT ARE TELEMETRY STATION, ORBIT NUMBER, DATE AND TIME (UT AND LOCAL), GEOGRAPHIC AND MAGNETIC (MCILWAIN, DIP, INVARIANT, AND DIPOLE MODEL) LOCATIONS, HEIGHT ABOVE THE REFERENCE ELLIPSOID, SOLAR-ZENITH ANGLE, SOLAR (F10.7) AND PLANETARY (AP) INDEXES, SATELLITE POTENTIAL, AND RECORD COUNT. TEMPERATURE DATA OCCUR ABOUT EVERY OTHER DATA POINT, ALTERNATING WITH ELECTRON DENSITY VALUES. GAPS IN TIME COVERAGE ARE USUALLY A FEW ORBITS OR LESS. THE DATA HAVE GAPS IN COVERAGE CAUSED PRIMARILY BY LIMITATIONS (OR FAILURE) OF THE TAPE RECORDER, AND LIMITATIONS OF EXPERIMENT SCHEDULING. THESE SAME DATA ARE AVAILABLE ON MICROFILM AS DATA SET 71-024A-07A. THIS DATA SET IS ON ONE FILE, OF 9-TRACK BCD, 800 BPI, MAGNETIC TAPE.

DATA SET NAME- AVERAGED VALUES OF ELECTRON DENSITY AND TEMPERATURE ON MICROFILM

NSSDC ID- 71-024A-07B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/01/71 TO 03/31/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 7 REEL(S) OF MICROFILM

THESE REDUCED DATA, ON 16-MM MICROFILM, WERE PREPARED BY THE EXPERIMENTER AND LIST ABOUT A TWO-YEAR SPAN OF DENSITIES AND ELECTRON TEMPERATURES OBSERVED AT THE SATELLITE. THE DATA HAVE BEEN CALCULATED FROM THE TELEMETERED RETARDING POTENTIAL CURVES. EACH DATA POINT REPRESENTS AVERAGED VALUES FROM ABOUT 15 RETARDING POTENTIAL CURVES. INCLUDED IN THE LISTINGS FOR EACH DATA POINT ARE TELEMETRY STATION, ORBIT NUMBER, DATE AND TIME (UT AND LOCAL), GEOGRAPHIC AND MAGNETIC (MCILWAIN, DIP, INVARIANT, AND DIPOLE MODEL) LOCATIONS, HEIGHT ABOVE THE REFERENCE ELLIPSOID, SOLAR-ZENITH ANGLE, SOLAR (F10.7) AND PLANETARY (AP) INDEXES, SATELLITE POTENTIAL, AND RECORD COUNT. TEMPERATURE DATA OCCUR ABOUT EVERY OTHER DATA POINT, ALTERNATING WITH ELECTRON DENSITY VALUES. GAPS IN TIME COVERAGE ARE USUALLY A FEW ORBITS OR LESS. THE DATA GAPS IN COVERAGE ARE CAUSED PRIMARILY BY LIMITATIONS OF EXPERIMENT SCHEDULING. THESE SAME DATA ARE AVAILABLE ON TAPE AS DATA SET 71-024A-07A.

CALVERT, ISIS 2

EXPERIMENT NAME- FIXED-FREQUENCY SOUNDER

NSSDC ID- 71-024A-02

STATUS OF OPERATION- NORMAL

PERSONNEL

PI -	W.	CALVERT	NOAA-ERL BOULDER, CO
OI -	R.B.	NORTON	NOAA-ERL BOULDER, CO
OI -	G.L.	HELMS	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	C.E.	PETRIE	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	G.E.K.LOCKWOOD		COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	J.H.	WHITTEKER	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
OI -	J.H.	WARNOCK	NOAA-ERL BOULDER, CO
OI -	T.E.	VAN ZANDT	NOAA-ERL BOULDER, CO

THE FIXED FREQUENCY SOUNDER OPERATED FROM THE SAME ANTENNA, TRANSMITTER, AND RECEIVER USED FOR THE SWEEP FREQUENCY EXPERIMENT. IT NORMALLY OPERATED FOR 3 TO 5 SEC DURING THE FREQUENCY FLYBACK PERIOD OF THE SWEEP FREQUENCY OPERATION WHICH WAS EVERY 14 OR 21 SEC. ONE OF SIX FREQUENCIES (0.12, 0.48, 1.00, 1.95, 4.00, OR 9.303 MHZ) WAS CHOSEN FOR USE BY THE EXPERIMENTER, AS DESIRED. OTHER MODES OF OPERATION WERE AVAILABLE INCLUDING CONTINUOUS OBSERVATION AT A SELECTED FREQUENCY AND A SPECIAL MIXED MODE WITH TRANSMISSION AT A SELECTED ONE OF THE SIX FIXED FREQUENCIES AND SWEEP RECEPTION. THIS EXPERIMENT WAS DESIGNED TO STUDY IONOSPHERIC FEATURES OF A SMALLER SCALE THAN COULD BE DETECTED BY THE SWEEP SOUNDER AND TO STUDY PLASMA RESONANCES. PARAMETERS MEASURED WERE VIRTUAL RANGE (A FUNCTION OF PROPAGATION TIME OF THE PULSE) AND TIME (A FUNCTION OF GEOGRAPHICAL POSITION). THESE DATA WERE NORMALLY OBSERVED ONLY WHEN THE SPACECRAFT WAS IN RANGE OF THE TELEMETRY STATION. A LIMITED AMOUNT OF DATA WAS TAPE RECORDED DURING THE FIRST 2 YEARS AFTER LAUNCH. SPECIAL OBSERVATIONS MAY BE SCHEDULED ON REQUEST.

DATA SET NAME- FIXED-FREQUENCY IONOGRAMS ON MICROFILM

NSSDC ID- 71-024A-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/08/71 TO 11/30/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1385 REEL(S) OF MICROFILM

THE FIXED FREQUENCY IONOGRAMS APPEAR IMMEDIATELY BEFORE EACH SWEEP FREQUENCY IONOGRAM (DATA SET 71-024A-01A) ON 35-MM MICROFILM. THESE ARE REDUCED DATA PREPARED FROM THE TELEMETRY TAPE AT CRC IN OTTAWA, CANADA, OR RSRS IN SLOUGH, BUCKINGHAMSHIRE, ENGLAND. A SMALL QUANTITY OF 1971 OBSERVATIONS WERE PROCESSED BY NOAA IN BOULDER, COLORADO. FREQUENCY AND VIRTUAL HEIGHT GRIDS APPEAR ON EACH FRAME. TIME IDENTIFICATION IS INCLUDED ALONG THE EDGE OF THE FILM. TO DETERMINE SATELLITE LOCATION AND ALTITUDE, EPHEMERIDES (DATA SET 71-024A-00C) ARE NEEDED.

HOFFMAN, ISIS 2

EXPERIMENT NAME- ION MASS SPECTROMETER

NSSDC ID- 71-024A-06

STATUS OF OPERATION- NORMAL

PERSONNEL

PI -	J.H.	HOFFMAN	U OF TEXAS, DALLAS DALLAS, TX

THIS MAGNETIC ION MASS SPECTROMETER EXPERIMENT WAS FLOWN TO MEASURE THE DISTRIBUTION OF THE CONCENTRATIONS OF THE ION SPECIES AS A FUNCTION OF TIME AND POSITION, WITH PARTICULAR INTEREST FOCUSED ON THE POLAR WIND PARTICLES. THE INSTRUMENT HAD TWO ION DETECTOR SYSTEMS, AND MASS SCANNING THROUGH THE RANGE FROM 1 TO 64 AMU WAS ACCOMPLISHED IN TWO SECTIONS -- 1 TO 8 AMU AND 8 TO 64 AMU. TWO ION BEAMS EMERGED FROM THE MAGNETIC SECTOR OF THE INSTRUMENT AND WERE SIMULTANEOUSLY DETECTED BY ELECTRON MULTIPLIERS AND LOG ELECTROMETER AMPLIFIERS. A CIRCUIT FOLLOWING EACH AMPLIFIER DETECTED THE PEAK AMPLITUDE OF THE ION CURRENT. THIS PEAK VALUE, RATHER THAN THE ENTIRE MASS SPECTRUM, WAS TRANSMITTED IN ORDER TO REDUCE THE REQUIRED TELEMETRY BANDWIDTH. IN THIS MODE OF OPERATION, THE COMPLETE MASS RANGE WAS SCANNED IN 1 SEC. A BACKUP MODE WAS PROVIDED WHICH PRODUCED AN ANALOG OUTPUT WITH A SWEEP PERIOD OF 8 SEC. THIS EXPERIMENT OPERATED NOMINALLY AFTER LAUNCH WITH MOST OF THE DATA OBTAINED IN THE PEAK MODE, FOR ABOUT 2 MIN PER PASS OVER OTTAWA, CANADA. THE EXPERIMENT OPERATED IN THE ANALOG MODE. INFLIGHT CALIBRATION WAS ACHIEVED BY COMPARING ION CONCENTRATION MEASUREMENTS AT APPROPRIATE

ISIS 2

ALTITUDES, I.E., WHERE A SINGLE ION SPECIES PREDOMINATED, WITH ELECTRON DATA FROM THE SOUNDER ON BOARD. OTHER COMPARISONS WERE MADE BETWEEN THE SPECTROMETER OUTPUT AND MEASUREMENTS OBTAINED FROM OTHER RELATED EXPERIMENTS ON BOARD.

DATA SET NAME- ION MASS SPECTROMETER DATA ON MICROFILM

NSSDC ID- 71-024A-06A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/71 TO 11/15/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 83 REEL(S) OF MICROFILM

THE 16-MM MICROFILM SHOWS TABLES AND SEMI-LOGARITHMIC DATA PLOTS. ION CONCENTRATIONS ARE ON A FIVE-DECADE LOGARITHMIC ORDINATE, AND TIME OR DIP ANGLE IS ON THE LINEAR ABSCISSA. ONE TABLE INCLUDES SYMBOLS TO IDENTIFY ION SPECIES WITH MASS-TO-CHARGE (M/E) RATIOS OF — 1, 2, 4, 7, 8, 14, 16, 18, 28, 30, AND 32. THE OTHER TABLE LISTS LOCATIONS AND NAMES OF THE GROUND STATIONS IDENTIFIED ON THE DATA PLOTS BY LETTER AND NUMBER CODE. THE TIME PLOTS COVER 120 SEC PER FRAME, AND THE DIP-ANGLE PLOTS EXTEND FROM POLE TO POLE. DATA FRAMES SHOW MEASUREMENT DATE AND TIME, ORBIT NUMBER, LOCAL APPARENT SUN TIME, ABSOLUTE VELOCITY, COSINE OF THE RELATIVE RAM, GEODETIC HEIGHT, GEODETIC AND MAGNETIC LATITUDE AND LONGITUDE, MAGNETIC LOCAL TIME, AND INVARIANT LATITUDE. THE MICROFILM WAS COPIED AT NSSDC FROM THE EXPERIMENTER'S FILM.

SHEPHERD, ISIS 2

EXPERIMENT NAME- 6300-A PHOTOMETER

NSSDC ID- 71-024A-12

STATUS OF OPERATION- NORMAL

PERSONNEL
PI - G.G. SHEPHERD ..... YORK U
DOWNSVIEW, ONTARIO, CANADA

A TWO-CHANNEL PHOTOMETER WAS USED TO MEASURE DIRECTLY AND TO MAP THE INTENSITY OF THE ATOMIC OXYGEN RED LINE AT 6300 A IN DAY, TWILIGHT, AND NIGHT AIRGLOW AND AURORA. EACH CHANNEL HAD ITS OWN OPTICAL INPUT, AND THE TWO INPUTS WERE MOUNTED AT THE SAME END OF THE SPACECRAFT, SEPARATED BY 180 DEG, WITH THEIR AXES AT 90 DEG TO THE SPACECRAFT'S SPIN AXIS. ONE OPTICAL INPUT WAS CHARACTERIZED BY A SPECTRAL BANDWIDTH OF 12 A CENTERED AROUND THE 6300-A LINE OF ATOMIC OXYGEN, AND THE OTHER INPUT WAS USED FOR WHITE LIGHT MEASUREMENTS. THE SPINNING SATELLITE CAUSED THE PHOTOMETER TO ALTERNATELY VIEW THE EARTH AND THEN THE SKY, I.E., WHEN ONE SENSOR VIEWED THE EARTH, THE OTHER SENSOR SAW THE SKY. BOTH SENSORS HAD A 2.5-DEG CIRCULAR FIELD OF VIEW. WITH THE USE OF A BEAM-COMBINER ARRANGEMENT, THE SAME PHOTOMULTIPLIER ACCEPTED THE TWO INPUTS. THE DYNAMIC RANGE OF INTENSITY MEASUREMENTS WAS FROM ABOUT 10 R TO MORE THAN ONE MEGARAYLEIGH. SUNLIGHT COULD ENTER THE OPTICAL SYSTEMS DIRECTLY IN ADDITION TO EARTH-REFLECTED LIGHT. THE INSTRUMENT BAFFLE WAS ILLUMINATED BY THE SUN ONLY FOR THE OFF-AXIS ANGLES LESS THAN 47 DEG. OUTSIDE THIS LIMIT, THE DATA WERE NOT DEGRADED BY SUNLIGHT, PERMITTING NORMAL OPERATION IN THE REGION OF THE ORBIT WHERE THE SPACECRAFT WAS IN SUNLIGHT, BUT THE PORTION OF THE EARTH BENEATH IT WAS DARK. AN EXTERNAL LIGHT SOURCE 'SAW' THE FILTER ONLY WHEN IT WAS 7.5 DEG OR LESS OFF AXIS. IN THE RANGE 7.5 TO 47 DEG, GOOD DATA WERE STILL OBTAINED WHEN THE SUNLIT EARTH WAS THE ORIGIN OF THE CONTAMINATION. TO GIVE ACCURATE LOW LIGHT LEVEL READINGS, AS WELL AS COVER THE FULL DYNAMIC RANGE AND TO PRESENT THE MEASUREMENTS IN A FORM COMPATIBLE WITH ENCODING AS AN 8-BIT BINARY WORD FOR TELEMETRY, A HYBRID LINEAR-LOG AMPLIFIER SYSTEM WAS USED. THE ELECTRONIC SYSTEM PULSE COUNTED AT LOW LIGHT LEVELS AND AMPLIFIED ON A LOG SCALE FOR HIGHER LIGHT LEVELS. IT WAS COMPOSED OF A PREAMP, TWO SIGNAL PROCESSING CHANNELS (LINEAR AND LOGARITHMIC), AND AN OUTPUT COMMUTATOR TO SELECT BETWEEN THEM AS WELL AS TO INTERFACE THEM TO THE SPACECRAFT SYSTEM. ALSO PROVIDED WERE CALIBRATION AND PROTECTION CIRCUITRY TO OPERATE THE CALIBRATE LAMPS AND TO PROTECT THE PHOTOTUBE FROM THE EFFECTS OF EXPOSURE TO HIGH LIGHT LEVELS. TO PERFORM THE DATA ANALYSIS, IT WAS NECESSARY, AMONG OTHER OPERATIONS, TO EVALUATE DIFFERENT GEOMETRICAL SITUATIONS, AND TO LOCATE THE ON-EARTH LIMB CROSSING OF THE 12-A BANDPASS PHOTOMETER SO THAT THE DATA COULD BE ORGANIZED INTO SPIN MAPS. FOR MORE DETAILS SEE "ISIS-2 ATOMIC OXYGEN RED LINE PHOTOMETER," G.G. SHEPHERD, ET AL., APPLIED OPTICS, VOL. 12, NO. 8, AUGUST 1973.

DATA SET NAME- 6300-A INTENSITY MAPS ON MAGNETIC TAPES

NSSDC ID- 71-024A-12A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/23/71 TO 12/31/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS 9-TRACK MAGNETIC TAPE DATA SET WAS SUPPLIED BY THE EXPERIMENTER. IT WAS WRITTEN ON THE IBM 370 AT 800 BPI. EACH FILE CONTAINS DATA FROM ONE PROCESSED PASS AND CONSISTS OF SIX RECORDS. ONE RECORD CONTAINS A TABLE OF LINE-CROSSING TIMES AND SPACECRAFT ORBITAL PARAMETERS. THE REMAINING RECORDS CONSIST OF SPIN MAPS OF GEOGRAPHIC LATITUDE AND LONGITUDE, AND OF INTENSITY MEASUREMENTS AT 6300, 5577, AND 3914 A. THE FIRST COLUMN OF THE TABLE GIVES THE SPIN NUMBER. OTHER COLUMN HEADINGS INCLUDE UT, GEOGRAPHIC AND MAGNETIC LATITUDE AND LONGITUDE OF THE SPACECRAFT, THE MCILWAIN "L" PARAMETER, AND THE SOLAR-ZENITH ANGLE. THE SPIN MAPS AT 5577 AND 3914 A ARE PART OF DATA SET 71-024A-11A. EACH SPIN MAP IS A MATRIX HAVING 40 COLUMNS AND A NUMBER OF ROWS EQUAL TO THE NUMBER OF SPACECRAFT ROTATIONS. A GIVEN ROW AND COLUMN ELEMENT HAS THE SAME LOOK POINT IN ALL SPIN MAPS.

WHITTEKER, ISIS 2

EXPERIMENT NAME- SWEEP-FREQUENCY SOUNDER

NSSDC ID- 71-024A-01

STATUS OF OPERATION- NORMAL

PERSONNEL

PI -	J.H.	WHITTEKER	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
CI -	G.E.K.	LOCKWOOD	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
CI -	G.L.	NELMS	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
CI -	J.	TURNER	AUST DEPT OF INTERIOR SYDNEY, AUSTRALIA
CI -	M.	SYLVAIN	IONOSPHERIC RES GROUP ORLEANS, FRANCE
CI -	O.	HOLT	AURORAL OBS TROMSO, NORWAY
CI -	Y.	OGATA	RADIO RESEARCH LAB TOKYO, JAPAN
CI -	R.	RAGHAVARAO	PHYSICAL RESEARCH LAB AHMEDABAD, INDIA
CI -	J.E.	JACKSON	NASA-GSFC GREENBELT, MD
CI -	C.E.	PETRIE	COMMUN RESEARCH CENTRE OTTAWA, ONTARIO, CANADA
CI -	T.E.	VAN ZANDT	NOAA-ERL BOULDER, CO
CI -	L.	COLIN	NASA-ARC MOFFETT FIELD, CA
CI -	W.	CALVERT	NOAA-ERL BOULDER, CO
CI -	R.B.	NORTON	NOAA-ERL BOULDER, CO
CI -	J.M.	KING	APPLETON LAB SLOUGH, BERKS, ENGLAND
CI -	K.L.	CHAN	NASA-ARC MOFFETT FIELD, CA
CI -	R.S.	UNWIN	DEPT OF SCI+INDUST RES CHRISTCHURCH, NEW ZEALAND

THE ISIS 2 IONOSONDE WAS A RADIO TRANSMITTER THAT RECORDED THE TIME DELAY BETWEEN A TRANSMITTED AND RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF FREQUENCIES BETWEEN 0.1 AND 20 MHZ WAS SAMPLED EVERY 14 OR 21 SEC, AND ONE OF SIX SELECTED FREQUENCIES WAS ALSO USED FOR SOUNDING FOR A FEW SECONDS DURING EACH 14- OR 21-SEC PERIOD. IN ADDITION TO THE SWEEP- AND FIXED-FREQUENCY MODES OF OPERATION, A MIXED MODE WAS AVAILABLE IN WHICH THE TRANSMITTER FREQUENCY WAS FIXED AT ONE OF SIX POSSIBLE FREQUENCIES WHILE THE RECEIVER SWEPT. SEVERAL VIRTUAL RANGE (DELAY TIME) TRACES RESULTING FROM GROUND REFLECTIONS, PLASMA RESONANCES, BIREFRINGENCE OF THE IONOSPHERE, NONVERTICAL PROPAGATION, ETC., WERE NORMALLY OBSERVED. VIRTUAL RANGE AT A GIVEN FREQUENCY WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL, ELECTRON DENSITY ALONG THE PROPAGATION PATH, AND MODE OF PROPAGATION. THE STANDARD DATA FORM WAS AN IONOGRAM (GRAPH) SHOWING VIRTUAL RANGE AS A FUNCTION OF RADIO FREQUENCY. TWO OTHER FORMS OF DATA WERE COMMONLY PREPARED FROM THE IONOGRAMS. THEY WERE DIGITAL FREQUENCY AND/OR VIRTUAL HEIGHT VALUES OF CHARACTERISTIC IONOSPHERIC FEATURES AND COMPUTATIONS OF ELECTRON DENSITY PROFILES. INITIAL OPERATION OF THIS EXPERIMENT WAS NORMAL, AND BOTH REAL-TIME AND TAPE-RECORDED DATA WERE TAKEN UNTIL FEBRUARY 4, 1972, WHEN THE RECORDERS FAILED. REAL-TIME DATA HAVE BEEN TAKEN SUBSEQUENTLY. INITIALLY, DATA WERE OBSERVED FOR ALMOST 9 HR PER DAY. OBSERVATIONS HAVE GRADUALLY DECREASED FOR ADMINISTRATIVE AND BATTERY POWER REASONS. SPECIAL OBSERVATIONS MAY BE SCHEDULED

ON REQUEST.

[redacted]

DATA SET NAME- SWEEP-FREQUENCY IONOGRAMS ON MICROFILM

NSSDC ID- 71-024A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/08/71 TO 12/19/74
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1424 REEL(S) OF MICROFILM

THESE IONOGRAMS ARE REDUCED DATA PLOTS OF VIRTUAL RANGE VS FREQUENCY. VIRTUAL RANGE IS A FUNCTION OF TIME DELAY OF THE REFLECTED PULSE OF EACH FREQUENCY TRANSMITTED. THESE ARE FIRST-GENERATION DATA PREPARED DIRECTLY FROM THE TELEMETRY TAPES. PROCESSING IS SCHEDULED AT EITHER CRC IN OTTAWA, CANADA, OR RSRS IN SLOUGH, BUCKINGHAMSHIRE, ENGLAND. PROCESSING ALSO OCCURRED AT BOULDER, COLORADO (NOAA), BETWEEN LAUNCH AND MAY 1972, AND IN INDIA, JAPAN, AUSTRALIA, AND NEW ZEALAND BEGINNING IN THE FALL OF 1972. TIME CODES ARE ENTERED IN THE MARGIN OF THE MICROFILM, AND VIRTUAL RANGE AND FREQUENCY MARKERS HAVE BEEN PLACED ON EACH IONOGRAM. THE DATA ARE AVAILABLE TO THE EXTENT PERMITTED BY TELEMETRY STATION SCHEDULING. LOCATION OF TELEMETRY STATIONS, AND TAPE RECORDER OPERATION AND SCHEDULING. SPACECRAFT POWER, WHICH WAS ALSO AN IMPORTANT FACTOR IN DATA OBSERVATION. LIMITED INITIAL SOUNDER OPERATION TO ABOUT 7 HR PER DAY, OF WHICH ABOUT 1 HR PER ORBIT COULD BE FOR RECORDED DATA (THE TAPE RECORDER FAILED ON FEBRUARY 4, 1972). PROCESSING LIMITATIONS RESULTED IN A DELAY OF ABOUT 6 MONTHS FROM OBSERVATION TIME TO IONOGRAM PREPARATION. THE DATA COVERAGE IS PRIMARILY NEAR THE 80 DEG W MERIDIAN FOR PERIODS UP TO 8 HR PER DAY. SINCE ONLY TIME IS NOTED ON EACH IONOGRAM, SATELLITE POSITION AND OTHER RELATED DATA MUST BE OBTAINED FROM ANOTHER SOURCE (NSSDC DATA SET 71-024A-00C).

[redacted]

DATA SET NAME- NSSDC INDEX OF IONOGRAMS ON TAPE

NSSDC ID- 71-024A-01B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/08/71 TO 11/30/73
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS FILE INDEXES THE ISIS 2 IONOGRAMS. DATA SETS 71-024A-01A, -02A, AND -10A. INFORMATION IN THE FILE FOR WHICH IONOGRAMS CAN BE IDENTIFIED INCLUDES IONOGRAM QUALITY, TELEMETRY STATION, STOP AND START DATA FOR THE PASS (TIMES AND LOCATION), LOCATION AT WHICH THE ORIGINAL TELEMETRY TAPES ARE STORED, AND IONOGRAMS PREPARED AND EXPERIMENT MODE OF OPERATION. SOME INFORMATION RELATING TO EXPERIMENTS 2, 3, AND 10 ARE ALSO INCLUDED SINCE THESE EXPERIMENTS ARE CLOSELY RELATED TO THE SOUNDER OPERATION, E.G., OPERATING FREQUENCY OF EXPERIMENT 2 (FIXED FREQUENCY) IS GIVEN, PRESENCE OF AGC TRACE (EXPERIMENT 10 DATA) IS NOTED, AND VLF OPERATION (EXPERIMENT 3) IS INDICATED. THIS INDEX IS UPDATED MONTHLY UNLESS FEW DATA ARE RECEIVED. THIS INDEX IS PREPARED FROM PHYSICAL INVENTORY OF FILM RECEIVED. THESE DATA ARE MAINTAINED ON SPECIAL NSSDC SYSTEMS TAPES. THE DATA CAN BE PROVIDED IN HARDCOPY LISTINGS, OR ON MICROFILM, SORTED ACCORDING TO THE REQUIREMENTS OF THE REQUESTER.

[redacted]

DATA SET NAME- NASA-ARC ELECTRON DENSITIES INTERPOLATED TO 100-KM INTERVALS ON (PACKED) TAPE

NSSDC ID- 71-024A-01C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/09/71 TO 10/22/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE ANALYZED DATA ON MAGNETIC TAPE SUPPLIED BY THE EXPERIMENTER, WERE COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL RANGE THAT WERE SCALED FROM IONOGRAMS. DIGITAL ELECTRON DENSITY VALUES WERE LISTED FOR THE SATELLITE LOCATION AND FOR EACH 100 KM FROM SATELLITE ALTITUDE DOWN TO THE LOWEST HEIGHT OF SIGNAL REFLECTIONS (NORMALLY NEAR 300 KM). THESE DATA ARE PART OF A COLLECTION PREPARED FROM ALOUETTE 2, ISIS 1, AND ISIS 2 SATELLITES. FROM ALL THREE SATELLITES, THERE ARE ABOUT 33,000 PROFILES LISTED FOR TIMES BETWEEN NOVEMBER 11, 1965, AND JUNE 7, 1972, FROM THE VICINITY OF 18 DIFFERENT GROUND STATIONS. THESE DATA ARE FROM A SMALL BLOCK OF THE TOTAL IONOGRAM DATA FROM THE THREE SATELLITES (LESS THAN 1 PERCENT), BUT FORM ONE OF THE LARGEST BLOCKS OF REDUCED SATELLITE IONOGRAMS AVAILABLE. THESE REDUCTIONS ARE OF OPTIMUM QUALITY BECAUSE X- AND Y- AND Z-TRACE VALUES WERE CHECKED AGAINST ONE ANOTHER DURING COMPUTATION OF THE DENSITY VALUES. THESE DATA ARE PACKED ON ONE TAPE WRITTEN IN EXTENDED BCD INTERCHANGE (EBCDIC) CODE IN ODD PARITY. THE TAPES ARE 800 BPI, 7-TRACK, AND AN UNPACKING ROUTINE (CALLED 'TAPE') IS AVAILABLE FOR THIS DATA SET. THESE DATA WILL ALSO BE AVAILABLE ON MICROFILM.

[redacted]

DATA SET NAME- INDEX OF IONOGRAMS SHOWING DUCTED ECHOES

NSSDC ID- 71-024A-01E

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/09/71 TO 06/22/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, PROVIDED BY THE EXPERIMENTER'S OFFICE, IS AN INDEX TO IONOGRAMS CONTAINING DUCTED ECHOES. THE CRITERION FOR SELECTION WAS THAT AT LEAST ONE TRACE FROM THE CONJUGATE HEMISPHERE APPEARS ON THE IONOGRAM. THIS TRACE HAS A POSITIVE SLOPE, AS OPPOSED TO THE NEGATIVE SLOPE OF THE NORMAL X OR O TRACE. EACH RECORD CONTAINS THE SATELLITE IDENTIFICATION, GROUND STATION (QUITO=5 AND SINGAPORE=48), PASS START TIME (UT), THE NUMBER OF IONOGRAMS IN THE PASS SHOWING DUCTED ECHOES, AND THE NUMBER NOT SHOWING DUCTED ECHOES. THE TIME COVERED IS FROM APRIL 1971 THROUGH JUNE 1972. FOR 209 PASSES (ABOUT 6000 IONOGRAMS), 2264 IONOGRAMS WITH DUCTED ECHOES ARE IDENTIFIED. THE DATA ARE AVAILABLE ON 9-TRACK, 800-BPI, EBCDIC MAGNETIC TAPE. SIMILAR DATA FOR OTHER TIMES ARE STORED ON THE SAME TAPE AND ARE DESCRIBED IN DATA SETS 65-098A-01N, 69-009A-01E, AND 62-049A-01G.

[redacted]

DATA SET NAME- CRC ELECTRON DENSITY PROFILES AT SCALED POINTS ON MAGNETIC TAPES

NSSDC ID- 71-024A-01F

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/08/71 TO 03/23/74
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF ANALYZED ELECTRON DENSITY PROFILES COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT, SCALED FROM IONOGRAMS. THESE ARE ANALYZED DATA ON 800-BPI, 9-TRACK MAGNETIC TAPE, WRITTEN IN EBCDIC AND PREPARED BY THE COMMUNICATIONS RESEARCH CENTRE, OTTAWA, CANADA. TELEMETRY STATIONS ARE NOT IDENTIFIED BUT SATELLITE LOCATION, TIME OF OBSERVATION, SOLAR ZENITH ANGLE AT THE SATELLITE, DIP LATITUDE AT THE SATELLITE, TOTAL ELECTRON CONTENT DOWN TO THE ALTITUDE OF HIGHEST IONOSPHERICALLY REFLECTED FREQUENCY, AND OTHER RELEVANT INFORMATION ARE NOTED WITH EACH PROFILE. PROFILE DATA CONSIST OF ELECTRON DENSITY AND GEOMETRIC HEIGHT VALUES FOR EACH POINT SCALED FROM THE IONOGRAM. FOR INTERPOLATED VALUES OF ELECTRON DENSITY AT STANDARD INCREMENTS OF GEOMETRIC HEIGHT, A CRC INTERPOLATION PROGRAM (AVAILABLE AT NSSDC) CAN BE RUN WITH THIS DATA SET. THESE IONOGRAMS WERE SELECTED FOR THEIR SCIENTIFIC INTEREST AND COMPRISE ONLY A VERY SMALL PORTION OF REDUCTIONS POSSIBLE FROM THE AVAILABLE IONOGRAMS.

[redacted]

DATA SET NAME- CRC ELECTRON DENSITY VALUES AT LAMINA BOUNDARIES (IN BOOKS)

NSSDC ID- 71-024A-01G

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/08/71 TO 10/13/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 BOOK(S) OR BOUND VOLUME(S)

THIS DATA SET CONSISTS OF ANALYZED ELECTRON DENSITY

ISIS 2/LOGACS 1

PROFILES. COMPUTED FROM DIGITAL VALUES OF FREQUENCY AND VIRTUAL HEIGHT SCALED FROM IONOGRAMS. THESE ARE ANALYZED DATA IN A BOUND VOLUME THAT WAS PREPARED BY THE COMMUNICATIONS RESEARCH CENTER IN OTTAWA, CANADA. WITHIN THE BOOK, THE DATA ARE ARRANGED CHRONOLOGICALLY, BUT TIME COVERAGE FOR DIFFERENT VOLUMES IS OVERLAPPING. TELEMETRY STATIONS ARE NOT IDENTIFIED, BUT SATELLITE LOCATION, TIME OF OBSERVATION, SOLAR ZENITH ANGLE AT THE SATELLITE, DIP LATITUDE AT THE SATELLITE, TOTAL ELECTRON CONTENT DOWN TO THE ALTITUDE OF HIGHEST IONOSPHERICALLY REFLECTED FREQUENCY, AND OTHER RELEVANT INFORMATION ARE LISTED FOR EACH PROFILE. PROFILE DATA CONSIST OF ELECTRON DENSITY AND GEOMETRIC HEIGHT VALUES FOR EACH POINT SCALED FROM THE IONOGRAM. FOR INTERPOLATED VALUES OF ELECTRON DENSITY AT STANDARD INCREMENTS OF GEOMETRIC HEIGHT, A CRC INTERPOLATION PROGRAM CAN BE RUN WITH THIS DATA SET ON TAPE (71-024A-01F). EACH OF THESE RAW PROFILES OCCUPIES ABOUT FOUR LINES OF PRINT, AND A CHRONOLOGICAL INDEX OF ALL DATA FROM ALL VOLUMES APPEARS IN THE FRONT OF THE BOOK. THESE IONOGRAMS WERE SELECTED FOR THEIR SCIENTIFIC INTEREST, AND COMPRISE ONLY A VERY SMALL PORTION OF REDUCTIONS POSSIBLE FROM THE AVAILABLE IONOGRAMS. THE BOOK IS TITLED "ISIS 2 IONOSPHERIC DATA N (N)."

SPACECRAFT COMMON NAME- LOGACS 1, AGENA

ALTERNATE NAMES- 02816

NSSDC ID- 67-050B

LAUNCH DATE- 05/22/67 WEIGHT- 870. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/25/67

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 05/27/67
ORBIT PERIOD- 88.42 MIN INCLINATION- 91.49 DEG
PERIAPSIS- 148.000 KM ALT APOAPSIS- 240.000 KM ALT

THIS SPACECRAFT CONSISTED OF THE AGENA SECOND STAGE, WHICH WAS USED TO LAUNCH A CLASSIFIED PRIMARY PAYLOAD. THE LOGACS EXPERIMENT WAS THE ONLY ONE CARRIED ON THE AGENA. IT WAS MOUNTED ON THE AFT OF THE VEHICLE, AND INCLUDED A TAPE RECORDER, A CLOCK, AND TELEMETRY EQUIPMENT. THE ORBIT WAS EXTENDED BY ADDITIONAL FIRING OF THE ROCKET ENGINES DURING ORBIT 18. BOTH REAL-TIME AND TAPERECORDED DATA WERE OBTAINED. THE SHORT SATELLITE LIFETIME OF 5 DAYS WAS DUE TO THE LOW PERIGEE, WHICH WAS INTENDED SINCE THE ALTITUDE OF EXPERIMENTAL INTEREST WAS IN THIS REGION. MORE DETAILS OF THE SPACECRAFT OPERATION ARE IN FOTOU, "AN ORBITAL ACCELEROMETER CALIBRATION EXPERIMENT."

BRUCE, LOGACS 1, AGENA

EXPERIMENT NAME- LOGACS 1, ATMOSPHERIC DENSITY SYSTEM

NSSDC ID- 67-050B-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/25/67

PERSONNEL
PI - R.W. BRUCE ..... AEROSPACE CORP
EL SEGUNDO, CA
OI - J.A. PEARSON ..... AEROSPACE CORP
EL SEGUNDO, CA
OI - E.G. FOTOU ..... AEROSPACE CORP
EL SEGUNDO, CA
OI - A.B. PRAG ..... AEROSPACE CORP
EL SEGUNDO, CA
OI - K.R. YOUNG ..... AEROSPACE CORP
EL SEGUNDO, CA

THIS EXPERIMENT WAS A MINIATURE ELECTROSTATIC ACCELEROMETER (MESA). THIS CONSISTED OF AN ELECTROSTATICALLY BALANCED PROOF MASS, WHICH COULD BE ELECTROSTATICALLY PULSE REBALANCED ALONG ITS SENSITIVE AXIS. COUNTS OF THE REBALANCING PULSES WERE OBSERVED AND CONVERTED INTO DENSITY VALUES. FOR FURTHER DETAILS, SEE FOTOU, "AN ORBITAL ACCELEROMETER CALIBRATION EXPERIMENT." THE EXPERIMENT OPERATED, AS INTENDED, FOR ONLY A FEW DAYS DUE TO THE LOW ORBIT PERIGEE (WHICH WAS THE LOCATION OF MOST USEFUL DATA).

DATA SET NAME- DENSITY PLOTS, 140-240KM, 23-26 MAY 1967
ON MICROFICHE

NSSDC ID- 67-050B-01A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 05/23/67 TO 05/26/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 9 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF REDUCED DENSITY DATA IN THE FORM OF DENSITY-ALTITUDE PROFILES ON SEMILOG PLOTS. THERE ARE 98 PLOTS WITH ALTITUDE RANGING FROM 140-260 KM. THE PLOTS ARE BY ORBIT (ORBITS 5 THROUGH 66 WITH GAPS IN DATA COVERAGE) AND SEPARATED WITHIN ORBIT ACCORDING TO WHETHER THEIR MOTION WAS TOWARD OR AWAY FROM PERIGEE. THESE DATA ARE IN VOL 2, APPENDIX B, OF PEARSON, "THE LOW-G ACCELEROMETER CALIBRATION SYSTEM ORBITAL ACCELEROMETER SYSTEM." DOCUMENTATION FOR REDUCTION OF THESE DATA ARE IN CHAPTER 2, VOL 1 OF THIS REFERENCE.

DATA SET NAME- ACCELEROMETER PLOTS, 140-240 KM,
23-26 MAY 1967, ON MICROFICHE

NSSDC ID- 67-050B-01B

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 05/23/67 TO 05/26/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 9 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF REDUCED DATA, IN THE FORM OF LINEAR GRAPHS AGAINST TIME REFERENCE G (TRG) TIME IN SECONDS, FROM THE ACCELEROMETER EXPERIMENT. THE PARAMETERS ON ONE SET OF GRAPHS ARE COUNTS (C) AND ON THE OTHER SET ARE (FT/SEC SQ). (NOTE (C) (10E-7) (G)=(A)). THE "COUNT" GRAPHS ARE IN VOL 1, APPENDIX G, AND THE OTHER GRAPHS CONVERTED TO UNITS OF ACCELERATION ARE IN VOL 2, APPENDIX A OF PEARSON, ET AL, "THE LOW-G ACCELEROMETER CALIBRATION SYSTEM ORBITAL ACCELEROMETER CALIBRATION SYSTEM." EXPERIMENTER CORRECTIONS AND CALIBRATION HAVE BEEN APPLIED TO THESE DATA. DOCUMENTATION FOR REDUCTION PROCEDURES USED FOR THESE DATA ARE IN CHAPTER 2, VOL 1 OF THIS REFERENCE.

CHIU, LOGACS 1, AGENA

EXPERIMENT NAME- WIND COMPONENT NORMAL TO ORBIT PLANE
BELOW 200 KM

NSSDC ID- 67-050B-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/23/67

PERSONNEL
PI - Y.T. CHIU ..... AEROSPACE CORP
LOS ANGELES, CA
OI - W.A. FEESS ..... AEROSPACE CORP
LOS ANGELES, CA

THIS EXPERIMENT WAS NOT PLANNED, BUT ITS POSSIBILITIES WERE REALIZED AFTER EXAMINATION OF THE ACCELEROMETER (EXPERIMENT -01) DATA. CONTROL-GAS FIRING DATA AND CALIBRATION MODE FOR THE ACCELEROMETER PROVIDED DATA TO MAKE POSSIBLE THE CALCULATION OF WIND FORCES PERPENDICULAR TO THE ORBIT PLANE. THIS "SENSOR" WAS THE AGENA SPACECRAFT CROSS-SECTION AND THE DATA FROM THE ACCELEROMETER AND CONTROL GAS RECORDS. MORE DETAILS ARE GIVEN IN FEESS, "LOGACS WIND ANALYSIS." SUFFICIENT DATA WAS AVAILABLE TO PROVIDE WIND COMPONENT DATA PERPENDICULAR TO THE TRAJECTORY, OVER A PERIOD OF SEVERAL DAYS.

DATA SET NAME- WIND COMPONENTS PERPENDICULAR TO ORBIT
PLANE BELOW 200 KM, 25-27 MAY 1967, FICHE

NSSDC ID- 67-050B-02A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 05/25/67 TO 05/27/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 9 CARD(S) OF B/W MICROFICHE

WIND VELOCITY COMPONENTS PERPENDICULAR TO THE ORBIT PLANE (INCLINATION 91.5 DEG) WERE CALCULATED USING THE SATELLITE YAW ANGLE OF ATTACK DATA. THESE ARE REDUCED DATA ON POLAR PLOTS PREPARED BY THE EXPERIMENTER'S OFFICE. ON EACH OF EIGHT POLAR DIAGRAMS (N POLE ONLY), SEVERAL ORBITS (NEAR

PERIGEE) ARE TRACED WITH COMPONENT WIND VECTORS PLOTTED AT REGULARLY SPACED INTERVALS. FOR AN ORBITAL TRACE COVERING 90 DEG LAT. ABOUT 12 COMPONENT WINDS ARE CALCULATED. TWO OF THE POLAR DIAGRAMS ARE 'DOUBLE SCALE' AND ALSO CONSTANT HEIGHT LINES FOR THE DATA. THESE DATA ARE ON PAGES 7-31 THROUGH 7-38 OF SECT. 7, VOL 2 OF PEARSON. 'THE LOW-G ACCELEROMETER CALIBRATION SYSTEM ORBITAL ACCELEROMETER CALIBRATION SYSTEM.' DOCUMENTATION FOR REDUCTION OF THESE DATA ARE ALSO CONTAINED IN THIS PAPER (SECTION 7). (RAW DATA SAMPLES ARE ILLUSTRATED IN THE PAPER, AND MORE COMPLETE RAW DATA MAKE UP APPENDIX C OF VOL 2).

SPACECRAFT COMMON NAME- MARINER 2

ALTERNATE NA - 1962 ALPHA RHO 1, P 38
MARINER R-2, 00374

NSSDC ID- 62-041A

LAUNCH DATE- 08/27/62 WEIGHT- 203. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 01/03/63

ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 08/27/62
ORBIT PERIOD- 292. DAYS INCLINATION- 0. DEG
PERIAPSIS- 0.72 AU RAD APOAPSIS- 1.0 AU RAD

THE MARINER 2 SPACECRAFT WAS THE SECOND OF A SERIES OF SPACECRAFT USED FOR PLANETARY EXPLORATION IN THE FLYBY, OR NONLANDING, MODE. MARINER 2 WAS A BACKUP FOR THE MARINER 1 MISSION WHICH FAILED SHORTLY AFTER LAUNCH TO VENUS. THE SPACECRAFT WAS ATTITUDE STABILIZED USING THE SUN AND EARTH AS REFERENCES. THE SPACECRAFT WAS SOLAR POWERED AND CAPABLE OF CONTINUOUS TELEMETRY OPERATION. THE SPACECRAFT OBTAINED DATA ON THE INTERPLANETARY MEDIUM DURING THE FLIGHT TO VENUS AND BEYOND AND OBTAINED PLANETARY DATA DURING THE ENCOUNTER OF VENUS. THE SPACECRAFT PASSED 41,000 KM FROM VENUS ON DECEMBER 14, 1962.

NEUGEBAUER, MARINER 2

EXPERIMENT NAME- INFRARED RADIOMETER

NSSDC ID- 62-041A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/14/62

PERSONNEL
PI - G. NEUGEBAUER ..... NASA-JPL
PASADENA, CA

THE INFRARED RADIOMETER ON MARINER 2 WAS DESIGNED TO MEASURE THE RADIATION TEMPERATURES OF SMALL AREAS OF VENUS IN THE 8.4- AND 10.4-MICRON BANDS. OPTICALLY, THE RADIOMETER CONSISTED OF TWO SIMILAR LENS SYSTEMS WHOSE AXES WERE SEPARATED BY 45 DEG. ONE SYSTEM, ESTABLISHING THE CHOPPING REFERENCE, VIEWED DARK SPACE, AND THE OTHER VIEWED THE PLANET. THE ENERGY THROUGH THE TWO SYSTEMS WAS COMBINED INTO A SINGLE CHOPPED BEAM THAT WAS IN TURN SPLIT BY A DICHROIC FILTER INTO TWO PERPENDICULAR BEAMS THAT WERE INCIDENT ON TWO THERMISTOR BOLOMETER DETECTORS. THREE SUCCESSFUL SCANS WERE ACCOMPLISHED DURING PLANETARY FLYBY ON DECEMBER 14, 1962. THE ACCURACY OF THE RADIATION TEMPERATURES OBTAINED VARIED FROM 2 DEG FOR SOURCE TEMPERATURES NEAR 200 DEG K TO 10 DEG FOR SOURCE TEMPERATURES NEAR 500 DEG K. A COMPLETE DESCRIPTION AND PERFORMANCE SUMMARY FOR THE MARINER 2 RADIOMETER IS GIVEN IN 'MARINER-VENUS 1962, FINAL PROJECT REPORT,' NASA SP-59, 1965.

DATA SET NAME- PUBLISHED INFRARED RADIATION TEMPERATURES

NSSDC ID- 62-041A-02A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 12/14/62 TO 12/14/62
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 7 CARD(S) OF B/W MICROFICHE

THESE DATA CONSIST OF RADIATION TEMPERATURES OF THE 8.4- AND 10.4-MICRON BANDS, WHICH ARE AVAILABLE FOR THREE SCANS THAT WERE ACCOMPLISHED DURING PLANETARY FLYBY ON DECEMBER 14, 1962. EACH APPROXIMATELY MERIDIANAL SCAN CONSISTS OF ABOUT FIVE TO EIGHT FRAMES, WITH THE FIRST SCAN CROSSING THE DARK SIDE NEAR 50 DEG LONGITUDE, THE SECOND NEAR THE TERMINATOR, AND THE THIRD IN THE SUNLIT SIDE NEAR 60 DEG LONGITUDE. THE ACCURACY OF THE TEMPERATURES OBTAINED VARIES FROM 2 DEG FOR SOURCE TEMPERATURES NEAR 200 DEG K TO 10 DEG FOR SOURCE TEMPERATURES NEAR 500 DEG K. THE SPATIAL RESOLUTION IS 1/250 FOR THE TOTAL PLANETARY AREA. THE DATA CAN BE FOUND IN 'JGR,' VOL 68, PP 6157-6169, 1963. A COMPLETE DESCRIPTION OF THE INSTRUMENTATION, OPERATION, AND CALIBRATION OF THE RADIOMETER IS ALSO PRESENTED.

SPACECRAFT COMMON NAME- MARINER 4

ALTERNATE NAMES- 00942

NSSDC ID- 64-077A

LAUNCH DATE- 11/28/64 WEIGHT- 262. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/20/67

ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 07/15/65
ORBIT PERIOD- 567. DAYS INCLINATION- 0. DEG
PERIAPSIS- 1.1 AU RAD APOAPSIS- 1.58 AU RAD

MARINER 4 WAS THE FOURTH IN A SERIES OF SPACECRAFT USED FOR PLANETARY EXPLORATION IN A FLYBY MODE. IT WAS DESIGNED TO CONDUCT CLOSEUP SCIENTIFIC OBSERVATIONS OF THE PLANET MARS AND TO TRANSMIT THESE OBSERVATIONS TO EARTH. OTHER MISSION OBJECTIVES WERE TO PERFORM FIELD AND PARTICLE MEASUREMENTS IN INTERPLANETARY SPACE IN THE VICINITY OF MARS AND TO PROVIDE EXPERIENCE IN AND KNOWLEDGE OF THE ENGINEERING CAPABILITIES FOR INTERPLANETARY FLIGHTS OF LONG DURATION. AFTER 7.5 MONTHS OF FLIGHT, THE SPACECRAFT FLEW BY MARS ON JULY 14, 1965, AND RETURNED 21 PICTURES PLUS 21 LINES OF PICTURE 22. THE CLOSEST APPROACH WAS 9846 KM FROM THE MARTIAN SURFACE. THE SPACECRAFT PERFORMED ALL PROGRAMMED ACTIVITIES SUCCESSFULLY AT THE PROPER TIMES AND RETURNED USEFUL DATA FROM LAUNCH UNTIL OCTOBER 1965, WHEN THE DISTANCE FROM EARTH AND ITS ANTENNA ORIENTATION TEMPORARILY HALTED THE SIGNAL ACQUISITION. DATA ACQUISITION RESUMED IN LATE 1967 AND CONTINUED UNTIL DECEMBER 20, 1967.

LEIGHTON, MARINER 4

EXPERIMENT NAME- MARS TV CAMERA

NSSDC ID- 64-077A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/14/65

PERSONNEL
PI - R.B. LEIGHTON ..... CALIF INST OF TECH
PASADENA, CA

THE MARS TELEVISION EXPERIMENT WAS DESIGNED TO OBTAIN PHOTOGRAPHS OF THE MARTIAN SURFACE AND TELEMETER THEM TO EARTH. THE TV SUBSYSTEM CONSISTED OF (1) A CASSEGRAIN NARROW-ANGLE REFLECTING TELESCOPE WITH A 30.5-CM EFFECTIVE FOCAL LENGTH AND A 1.05- BY 1.05-DEG FIELD OF VIEW, (2) A SHUTTER AND FILTER ASSEMBLY THAT HAD 0.08- AND 0.20-SEC EXPOSURE TIMES AND USED RED AND GREEN FILTERS, (3) A SLOW SCAN VIDICON TUBE, WITH A 0.22- BY 0.22-IN. SQ TARGET, WHICH TRANSLATED THE OPTICAL IMAGE INTO AN ELECTRICAL VIDEO SIGNAL, AND (4) RELATED ELECTRONICS INCLUDING A TV DATA ENCODER. ON JULY 14, 1965, AT 0015 UT, THE PICTURE RECORDING SEQUENCE COMMENCED. VIDICON OUTPUT UNDERWENT ANALOG-TO-DIGITAL CONVERSION AND DATA WERE STORED AT 240,000 BITS PER PICTURE ON A TWO-TRACK, 1/4-IN., 330-FT LONG, MAGNETIC TAPE LOOP ON THE SPACECRAFT. TWO OF EVERY THREE PICTURES TAKEN WERE RECORDED ON THE TAPE, RESULTING IN A CHAIN OF PAIRS OF OVERLAPPING, ALTERNATELY FILTERED PICTURES EXTENDING ACROSS THE DISC OF MARS. DATA WERE TRANSMITTED AFTER OCCULTATION OF THE SPACECRAFT BY MARS BY THE RADIO SUBSYSTEM FROM JULY 15 TO 24, 1965, AND WERE PROCESSED IN REAL TIME BY A 7044/7094 SYSTEM TO FORMAT MAGNETIC TAPES OF THE IMAGE DATA FOR PROCESSING BY THE RANGER TELEVISION PROCESSING PROGRAMS AND FOR CONVERSION TO A FILM RECORD. CONVERSION FROM ELECTRICAL SIGNALS TO AN OPTICAL IMAGE WAS PERFORMED BY THE VIDEO-TO-FILM RECORDER USING 64 SHADES. THE EXPERIMENT YIELDED 21 PICTURES PLUS 21 LINES OF PICTURE 22. THIS PERFORMANCE INDICATED A NORMAL RECORDING SEQUENCE. COMPUTER PROCESSING PROGRAMS YIELDED PHOTOGRAPHS WITH GREATER CONTRAST THAN THE RAW IMAGE DATA. A DETAILED DESCRIPTION OF THE TELEVISION EXPERIMENT, DATA PROCESSING, AND THE VARIOUS VERSIONS OF THE PHOTOGRAPHY CAN BE FOUND IN THE JPL 'MARINER MARS 1964 PROJECT REPORT, TELEVISION EXPERIMENT, PART I, INVESTIGATORS' REPORT, OF THE 'MARINER IV PICTURES OF MARS,' TR 32-884, 1967.

MARINER 4/MARINER 5

DATA SET NAME- ENHANCED VERSIONS OF TELEVISION PICTURES

NSSDC ID- 64-077A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/14/65 TO 07/14/65
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 112 FRAMES

THIS DATA SET CONTAINS SEVERAL TYPES OF ENHANCEMENTS OF THE 21 PICTURES PLUS 21 LINES OF PICTURE 22 RETURNED BY THE TELEVISION EXPERIMENT. THE PHOTOGRAPHS ARE ON 4- BY 5-IN. NEGATIVE FILM SHEETS. THE FOLLOWING TYPES OF ENHANCEMENTS ARE AVAILABLE -- TYPE A -- AERONAUTICAL CHART AND INFORMATION CENTER (ACIC) AIR BRUSH RENDITIONS (AN INTERPRETIVE RENDITION OF WHAT THE SURFACE OF MARS MAY LOOK LIKE), TYPE B -- A CALIBRATED AND GEOMETRICALLY CORRECTED VERSION ENHANCED IN CONTRAST. TYPE C -- THE SAME AS B, BUT ALSO SHARPENED. TYPE D -- A NEGATIVE VERSION OF THE CALIBRATED, ENHANCED PICTURE IN THE ORIGINAL PICTURE FORMAT. TYPE E -- A CALIBRATED, CONTRAST-ENHANCED VERSION IN THE ORIGINAL PICTURE FORMAT. TYPE F -- SAME AS E VERSION, BUT ALSO SHARPENED. TYPE G -- 'FLUCTUATION PLOT' IN WHICH SMOOTH AREAS ARE RENDERED AS DARK AND LOCALLY ROUGH AREAS ARE RENDERED AS LIGHT. CALIBRATION REMOVES THE SENSOR PROPERTIES FROM THE IMAGE, I.E., VIDICON PLATE SHADING. SHARPENING HELPS TO DELINEATE THE CRATER EDGES. VARIANCE PLOTS ARE BASICALLY FOR PHOTOMETRY PURPOSES. THE PICTURES ARE NUMBERED 1B, 1C, ETC., DENOTING PICTURE ORDER NUMBER AND ENHANCEMENT TYPE AS DESIGNATED ABOVE. EACH OF THE FIRST 16 PICTURES TAKEN BY THE VIDICON HAS BEEN ENHANCED BY THE METHODS DESCRIBED. THE ACIC AIRBRUSH RENDITIONS COMBINE TWO OVERLAPPING PICTURES ON ONE 4- BY 5-IN. FILM SHEET. THERE ARE THEREFORE EIGHT OF THESE NUMBERED 1.2A 3.4A, ETC. PICTURE NO. 1 WAS ENHANCED TO DISCERN HAZE. SINCE THE PICTURE ELEMENT (PIXEL) RANGE WAS SMALL IN PICTURES 17 TO 22, THE PIXELS HAVE BEEN LINEARLY STRETCHED TO PRESENT SOME CONTRAST IN THE IMAGE. THE LOW CONTRAST DISCERNIBILITY IN THE NEGATIVES, HOWEVER, RESULTS IN PICTURES OF NEGLIGIBLE VALUE. IN A SEPARATE ENHANCEMENT OF PICTURE NO. 1 (DESIGNATED AS 1H), PIXELS WERE STRETCHED AND LIGHTENED ONLY IN THE HAZE PORTIONS IN ORDER TO INDICATE CONTRAST IN THIS PHENOMENON. REPRODUCTIONS AND FURTHER DISCUSSION AND INTERPRETATION OF THESE TELEVISION PICTURES ARE PRESENTED IN 'MARINER MARS 1964 PROJECT REPORT, TELEVISION EXPERIMENT, PART I, INVESTIGATORS' REPORT, OF JPL TECHNICAL REPORT 32-884, 'MARINER IV PICTURES OF MARS,' BY ROBERT B. LEIGHTON, ET AL., 1967.

DATA SET NAME- PICTURE ELEMENT MATRICES

NSSDC ID- 64-077A-01B

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 07/14/65 TO 07/14/65
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 4 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF MICROFICHE PAGES OF THE JET PROPULSION LAB (JPL) REPORT, TR32-884, PART I. THE REPORT CONCERNS THE TV EXPERIMENT AND THE RESULTING PHOTOGRAPHY OF MARS FROM MARINER 4, ALONG WITH THE INVESTIGATORS' REPORTS. REDUCED DATA ARE PRESENTED IN NUMERICAL AND PICTORIAL FORM, AND PROCEDURES FOR CORRECTING THE ORIGINAL DIGITAL DATA ARE DESCRIBED. CALIBRATED AND CONTRAST-ENHANCED PICTURES SHOW MUCH MORE DETAIL THAN THE UNCORRECTED PICTURES, (IN WHICH 300 DISTINCT AND POSSIBLY 300 MORE CAN BE DISCERNED) IN CONTRAST TO THE 100 DETECTED ON THE PRELIMINARY PHOTOS. BACKGROUND INFORMATION ON THE PHOTOS IS GIVEN IN APPENDIXES. VARIOUS RENDITIONS OF THE 19 USABLE PHOTOGRAPHS ARE PRESENTED. THESE PHOTOS RANGE FROM THE MARTIAN LIMB TO THE TERMINATOR. OF THESE PHOTOS, 16 HAVE BEEN CALIBRATED, ENHANCED IN CONTRAST, SHARPENED IN RESOLUTION, AND GEOMETRICALLY CORRECTED. THESE 16 PHOTOS ARE PRESENTED IN THE STATED VERSIONS, PLUS AN AIRBRUSH DRAWING AS INTERPRETED BY AERONAUTICAL CHART AND INFORMATION CENTER (ACIC) PERSONNEL. FRAMES 17-22 ARE PRESENTED IN ONE VERSION ONLY. EACH PICTURE APPEARS IN THE FOLLOWING FORMS -- (A) THE ACIC AIRBRUSH; (B) A CALIBRATED AND GEOMETRICALLY CORRECTED VERSION ENHANCED IN CONTRAST; (C) AS (B) BUT SHARPENED; (D) A NEGATIVE VERSION OF THE CALIBRATED, ENHANCED PICTURE IN THE ORIGINAL FORMAT; (E) A CALIBRATED, CONTRAST-ENHANCED VERSION OF THE ORIGINAL FORMAT; (F) AS (E) BUT SHARPENED; AND, (G) THE PICTURES ARE PRESENTED IN PAIRS, WITH A 'FLUCTUATION' PLOT IN WHICH SMOOTH AREAS ARE RENDERED AS DARK AND LOCALLY ROUGH AREAS ARE RENDERED AS LIGHT. THE ACIC RENDITIONS INCORPORATE TWO OVERLAPPING PICTURES OF A PAIR IN A SINGLE VIEW, BUT THE PHOTOGRAPHS ARE PRESENTED SEPARATELY. TECHNICAL INFORMATION IS ALSO PROVIDED AND INCLUDES -- (1) FILTER USED, (2) PHOTO CENTER LOCATION, (3) DIMENSIONS OF THE PHOTO FIELD IN KM, (4) LOCAL SOLAR TIME AND ZENITH ANGLE, (5) BRIGHTNESS RANGE AND, (6) COMMENTS. CAPTIONS DESCRIBE EACH VERSION. THIS DATA SET IS FOUND IN TRF B02970. PHOTO QUALITY IS VERY GOOD AND MAY BE USED IN SOME SCIENTIFIC STUDIES.

DATA SET NAME- MARINER 4 TV PHOTOGRAPHS OF MARS ON 35-MM MICROFILM

NSSDC ID- 64-077A-01G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/14/65 TO 07/14/65
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF THE COMPLETE PHOTOGRAPHY OF THE MARTIAN SURFACE FROM THE MARINER 4 MISSION RECEIVED FROM JPL REPRODUCED ONTO 35-MM MICROFILM. THIS DATA SET MAY BE USED AS A CATALOG FOR THE MARINER 4 PHOTOGRAPHY. OF THE 22 FRAMES OBTAINED, ONLY 10 CONTAIN USABLE DATA. THESE FRAMES ARE OF THE ORIGINAL, RAW, UNCORRECTED PHOTOS ONLY.

SPACECRAFT COMMON NAME- MARINER 5

ALTERNATE NAMES- MARINER VENUS 67, 02845

NSSDC ID- 67-060A

LAUNCH DATE- 06/14/67 WEIGHT- 245. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 11/21/67

ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 06/14/67
ORBIT PERIOD- 292. DAYS INCLINATION- 0. DEG
PERIAPSIS- .72 AU RAD APOAPSIS- 1.0 AU RAD

THE MARINER 5 SPACECRAFT WAS THE FIFTH IN A SERIES OF SPACECRAFT USED FOR PLANETARY EXPLORATION IN THE FLYBY MODE. MARINER 5 WAS A REFURBISHED BACKUP SPACECRAFT FOR THE MARINER 4 MISSION AND WAS CONVERTED FROM A MARS MISSION TO A VENUS MISSION. THE SPACECRAFT WAS FULLY ATTITUDE STABILIZED, USING THE SUN AND THE STAR CANOPUS AS REFERENCES. A CENTRAL COMPUTER AND SEQUENCER SUBSYSTEM SUPPLIED TIMING SEQUENCES AND COMPUTING SERVICES FOR OTHER SPACECRAFT SUBSYSTEMS. THE SPACECRAFT PASSED 4000 KM FROM VENUS ON OCTOBER 19, 1967. THE SPACECRAFT INSTRUMENTS MEASURED BOTH INTERPLANETARY AND VENUSIAN MAGNETIC FIELDS, CHARGED PARTICLES, AND PLASMAS, AS WELL AS THE RADIO REFRACTIVITY AND UV EMISSIONS OF THE VENUSIAN ATMOSPHERE. THE MISSION WAS TERMED A SUCCESS.

ESHLEMAN, MARINER 5

EXPERIMENT NAME- TWO-FREQUENCY BEACON RECEIVER

NSSDC ID- 67-060A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 11/21/67

PERSONNEL
PI - V.R. ESHLEMAN ..... STANFORD U
STANFORD, CA
OI - T.A. CROFT ..... STANFORD U
STANFORD, CA

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 4.6-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY DELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES, THE IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) CAN BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. THE EXPERIMENT HAD OPERATED NOMINALLY FROM LAUNCH TO NOVEMBER 1967. FOR SIMILAR EXPERIMENTS COVERING OTHER TIME PERIODS, SEE 66-100A-03, 67-123A-03, 66-075A-04, AND 65-105A-04. MORE DETAILED DESCRIPTIONS OF THE EXPERIMENT CAN BE FOUND IN THE 'JGR,' VOL 17, PP 3325-3327, AND IN 'RADIO SCIENCE,' VOL 6, PP 55-63.

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON PUNCHED CARDS

NSSDC ID- 67-060A-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/14/67 TO 11/21/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF DIGITIZED HOURLY VALUES OF TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON ONE 556-BPI, 7-TRACK, BCD MAGNETIC TAPE GENERATED AT NSSDC FROM PUNCHED CARDS SUPPLIED BY THE EXPERIMENTER. THE TAPE ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04A), 7 (66-075A-04A), 8 (67-123A-03A), AND 9 (68-100A-03A).

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON MICROFILM

NSSDC ID- 67-060A-02B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/14/67 TO 11/21/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF DIGITIZED AND PLOTTED HOURLY VALUES OF TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON 35-MM MICROFILM GENERATED AT NSSDC FROM DATA SUPPLIED BY THE EXPERIMENTER. THIS MICROFILM ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04B), 7 (66-075A-04B), 8 (67-123A-03B), AND 9 (68-100A-03B), AND SOLAR WIND ELECTRON DENSITY PLOTS FROM PIONEERS 6 (65-104A-04E), 7 (66-075A-04E), 8 (67-123A-03D), AND 9 (68-100A-03D).

DATA SET NAME- DIGITAL VALUES OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1AU

NSSDC ID- 67-060A-02C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/01/67 TO 10/26/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE DATA WERE PREPARED FROM THE ORIGINAL ANALOG RECORDS BY THE EXPERIMENTER'S STAFF. THE PRIMARY DATA CONSIST OF HOURLY VALUES OF NORMALIZED ELECTRON NUMBER DENSITY IN THE SOLAR WIND. TO OBTAIN THESE DATA, THE IONOSPHERIC TOTAL CONTENT WAS REMOVED FROM THE OBSERVED TOTAL CONTENT VALUES, AND THE TOTAL CONTENT PATH LENGTH WAS USED TO CONVERT TOTAL CONTENT TO DENSITY. THE RESULTING VALUES WERE THEN NORMALIZED TO 1 AU ASSUMING DENSITY TO BE PROPORTIONAL TO THE INVERSE SQUARE OF THE SATELLITE-SOLAR DISTANCE. VALUES RESULTING FROM INTERPOLATION ARE FLAGGED. NO INTERPOLATED VALUES WERE RECORDED WHEN DATA GAPS EXCEEDED 4 DAYS. THIS DATA SET IS ON ONE 800-BPI, 7-TRACK, ODD-PARITY, BINARY MAGNETIC TAPE WRITTEN ON AN IBM 7094 COMPUTER. AUXILIARY DATA ON THE TAPE INCLUDE UT AND CARRINGTON ROTATION NUMBER. DATA ARE AVAILABLE FOR ABOUT 12 HR PER DAY WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04D), 7 (66-075A-04D), 8 (67-123A-03C), AND 9 (68-100A-03C) ALSO APPEAR ON THIS TAPE.

SPACECRAFT COMMON NAME- MARINER 6

ALTERNATE NAMES- PL-691E, MARINER MARS 69A
03759

NSSDC ID- 69-014A

LAUNCH DATE- 02/24/69 WEIGHT- 380. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/30/69

ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 02/24/69
ORBIT PERIOD- 517. DAYS INCLINATION- 0. DEG
PERIAPSIS- 1.0 AU RAD APOAPSIS- 1.52 AU RAD

MARINER 6 WAS THE SIXTH IN A SERIES OF SPACECRAFT USED FOR PLANETARY EXPLORATION IN THE FLYBY MODE. MARINER 6 WAS ATTITUDE STABILIZED IN THREE AXES (REFERENCED TO THE SUN AND THE STAR, CANOPUS). THE SPACECRAFT WAS SOLAR POWERED AND CAPABLE OF CONTINUOUS TELEMETRY TRANSMISSION. IT WAS FULLY AUTOMATIC IN OPERATION ALTHOUGH IT COULD BE REPROGRAMMED FROM EARTH DURING THE MISSION. THE SPACECRAFT WAS ORIENTED ENTIRELY TO PLANETARY DATA ACQUISITION, AND NO DATA WERE OBTAINED DURING THE TRIP TO MARS OR BEYOND MARS. MARINER 6 PASSED 3431 KM FROM MARS ON JULY 31, 1969. THE SPACECRAFT INSTRUMENTS TOOK TV IMAGES OF MARS AND MEASURED THE RADIO REFRACTIVITY AND UV AND IR EMISSIONS OF THE MARTIAN ATMOSPHERE. THE MISSION WAS A SUCCESS, AND DATA FROM IT WERE USED TO PROGRAM MARINER 7.

EARTH, MARINER 6

EXPERIMENT NAME- UV SPECTROMETER

NSSDC ID- 69-014A-04

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/31/69

PERSONNEL
PI - C.A. BARTH ..... U OF COLORADO
BOULDER, CO
OI - C.W. HORD ..... U OF COLORADO
BOULDER, CO
OI - J.B. PEARCE ..... U OF COLORADO
BOULDER, CO

SPECTRAL MEASUREMENTS WERE MADE OF THE UV RADIATION EMITTED FROM THE MARTIAN ATMOSPHERE DUE TO -- RESONANCE SCATTERING OF SOLAR RADIATION FROM THE UPPER ATMOSPHERE, RESONANCE RERADIATION, FLUORESCENCE, AND PHOTOELECTRON EXCITATION OF NEUTRAL AND IONIC CONSTITUENTS FOUND IN THE LOWER PART OF THE ATMOSPHERE. THE FOLLOWING PARAMETERS WERE DETERMINED -- THE PRESENCE OF CERTAIN ATOMS, IONS AND MOLECULES IN THE UPPER AND LOWER ATMOSPHERE, THEIR RESPECTIVE SCALE HEIGHTS, THE DEGREE OF ATMOSPHERIC RAYLEIGH SCATTERING DUE TO CARBON DIOXIDE, AND SURFACE REFLECTIVITY IN THE UV. THE INSTRUMENT WAS AN EBERT-FASTIE SCANNING MONOCHROMATOR WITH DUAL PHOTOMULTIPLIER DETECTORS, USED IN THE FOCAL PLANE OF A REFLECTING PLANETARY CORONOGRAPH. INCOMING LIGHT PASSED THROUGH A BAFFLED LIGHT SHADE AND STRUCK THE PRIMARY TELESCOPE MIRROR, WHICH FOCUSED THE LIGHT THROUGH A PRESLIT ONTO A SECONDARY MIRROR. FROM THERE, THE LIGHT WAS FOCUSED ONTO THE ENTRANCE SLIT OF THE SPECTROMETER. ENTERING THE SPECTROMETER, THE RADIATION WAS COLLIMATED BY THE FIRST HALF OF THE EBERT MIRROR ONTO A DIFFRACTION GRATING. DIFFRACTED LIGHT WAS THEN FOCUSED ONTO EXIT SLITS BY THE SECOND HALF OF THE EBERT MIRROR. A SEPARATE EXIT SLIT WAS PROVIDED FOR EACH OF THE TWO DETECTORS. THE POSITION OF THE SPECTRAL IMAGES WITH RESPECT TO THE EXIT SLITS WAS CONTROLLED BY CYCLICALLY SCANNING THE GRATING, WITH A SCAN FROM LOW- TO HIGH-WAVELENGTH TAKING 2.82 SEC, AND THE GRATING RETURN TAKING 0.18 SEC. THE WAVELENGTH REGION FROM 1900 A TO 4300 A WAS COVERED IN FIRST ORDER AS SEEN BY ONE OF THE TWO SLITS, AND THE RANGE FROM 1100 A TO 2100 A MEASURED IN SECOND ORDER BY THE OTHER. THE PHOTOMULTIPLIER DETECTOR USED FOR THE LONG-WAVELENGTH RANGE OPERATED IN TWO GAIN MODES, SO THAT VALID MEASUREMENTS COULD BE MADE OVER THE ENTIRE DYNAMIC RANGE FROM 100 TO 10,000 RAYLEIGHS. THE SPECTRAL RESOLUTION OF THE INSTRUMENT WAS 20 A AT 2950 A IN FIRST ORDER. A SPECTRUM WAS PRODUCED EVERY 3 SEC, AND CONTAINED 600 VALUES FROM EACH OF THE TWO DETECTORS. THIRTY-SIX VALUES WERE USED AS FIDUCIAL PERIOD MEASUREMENTS AND 564 FOR SPECTRAL MEASUREMENTS. MEASUREMENTS OF LYMAN-ALPHA RADIATION AT 1216 A WERE ALSO TAKEN AFTER ENCOUNTER. LESS THAN 30 MINUTES OF DATA WERE OBTAINED FROM BOTH CHANNELS DURING THE MARINER 6 NEAR-ENCOUNTER EQUATORIAL SCAN ON JULY 31, 1969. THE QUALITY OF THE DATA WAS COMPARABLE TO THE BEST OBTAINED BY ROCKETS IN THE 130-KM-AND-ABOVE REGION OF THE EARTH'S ATMOSPHERE. MORE EXPERIMENT DETAILS CAN BE FOUND IN: "MARINER 6 AND 7 ULTRAVIOLET SPECTROMETERS," J. B. PEARCE, ET AL, "APPLIED OPTICS," VOL 10, NO. 4, APRIL 1971.

MARINER 6

[redacted]

DATA SET NAME- UPPER ATMOSPHERE FAR-UV, MIDDLE-UV, AND LYMAN-ALPHA SPECTRA

NSSDC ID- 69-014A-04A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/69 TO 07/31/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, SUPPLIED BY THE EXPERIMENTER, CONSISTS OF TWO REFORMATTED 7-TRACK, 800-BPI, BINARY MAGNETIC TAPES WITH ODD PARITY GENERATED ON A CDC 6400 COMPUTER. THESE TAPES WERE DERIVED FROM THE ORIGINAL EXPERIMENTER'S DATA TAPE, WHICH CONTAINED BOTH THE MARINER 6 AND 7 ULTRAVIOLET SPECTROMETER (UVS) DATA. THE DATA SET CONTAINS LESS THAN 30 MIN OF UV DATA. FILE 1 CONTAINS UNPROCESSED (AS TRANSMITTED BY THE SPACECRAFT) DATA BETWEEN 1900 AND 4000 A, WHILE FILE 2 CONTAINS THE SAME DATA CALIBRATED IN UNITS OF RAYLEIGHS/A. THESE SPECTRA REPRESENT ATMOSPHERIC EMISSIONS FROM THE 90- TO 240-KM ALTITUDE REGION. THE FORMATS FOR THE TWO FILES ARE IDENTICAL. THE FIRST RECORD OF EACH FILE PROVIDES A SIX-WORD DESCRIPTION OF THE FILE CONTENTS INCLUDING INFORMATION ON WHETHER THE DATA ARE PROCESSED OR UNPROCESSED, WHETHER THE SPECTRA ARE MIDDLE UV (1900 TO 4000 A) OR FAR UV (1100 TO 1800 A), WHAT UNITS THE DATA ARE IN, AND THE RECORD SIZE. THE SUBSEQUENT RECORDS CONSIST OF A 10-WORD DESCRIPTION OF ONE SPECTRUM (THE SPECTRAL NUMBER, SPACECRAFT ID, ALTITUDE AT FIRST WAVELENGTH, ALTITUDE AT LAST WAVELENGTH, SLIT HEIGHT, SOLAR INCIDENT ANGLE, SOLAR EMISSION ANGLE, AND PHASE ANGLE) AND THE DATA FROM THAT SPECTRUM. EACH SPECTRUM IS PRESENTED AS ALTERNATING WORDS OF WAVELENGTH AND RELATIVE AMPLITUDE. THESE TWO FILES OF DATA ARE UNIQUE IN THAT NO TIMES OF OBSERVATION ARE GIVEN. THE SECOND TAPE CONTAINS ONE FILE OF LYMAN-ALPHA (1216 A) DATA DERIVED FROM EMISSIONS OBSERVED NEAR THE PLANETARY SURFACE TO 30,000-KM ALTITUDE. THE FILE CONSISTS OF A SERIES OF THREE-WORD SEQUENCES THAT GIVE (1) THE INTEGRATED VALUE OF THE LYMAN-ALPHA SIGNAL IN RAYLEIGHS, (2) THE PLANETOCENTRIC DISTANCE OF THAT SIGNAL IN KM, AND (3) THE ACTUAL TIME THE SIGNAL WAS TAKEN EXPRESSED IN UNITS OF GHT (IN DECIMAL FORM) TIMED TO THE 4s. THE QUALITY OF THE DATA IS EXCELLENT.

[redacted]

KLIORE, MARINER 6

EXPERIMENT NAME- S-BAND OCCULTATION

NSSDC ID- 69-014A-05

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/30/69

PERSONNEL
PI - A.J. KLIORE [redacted] NASA-JPL
PASADENA, CA

IN THIS EXPERIMENT THE CHANGES IN THE FREQUENCY, PHASE, AND AMPLITUDE OF THE S-BAND (2300 MHZ) TRACKING AND TELEMETRY SIGNAL, IMMEDIATELY PRIOR TO AND FOLLOWING THE OCCULTATION OF THE SPACECRAFT BY THE PLANET, WERE USED TO DERIVE THE TEMPERATURE, PRESSURE, AND DENSITY OF THE LOWER GASEOUS ATMOSPHERE OF MARS, AND THE DENSITY OF CHARGED PARTICLES IN THE MARTIAN IONOSPHERE.

[redacted]

DATA SET NAME- S-BAND DOPPLER RESIDUALS/REFRACTIVITY DATA ON MAGNETIC TAPE

NSSDC ID- 69-014A-06A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/00/69 TO 00/00/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF DOPPLER RESIDUALS AND REFRACTIVITY DATA ON TWO 7-TRACK, 800-BPI, UNIVAC 1108, BINARY MAGNETIC TAPES. DATA ON BOTH ENTRANCE AND EXIT OCCULTATIONS FROM MARINER 6 (69-014A) AND MARINER 7 (69-030A) ARE INCLUDED ON THE TAPES. THE DATA ARE REDUCED DATA SUPPLIED TO NSSDC BY THE EXPERIMENTER.

[redacted]

LEIGHTON, MARINER 6

EXPERIMENT NAME- MARS TV CAMERA

NSSDC ID- 69-014A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/31/69

PERSONNEL
PI - R.B. LEIGHTON [redacted] CALIF INST OF TECH
PASADENA, CA

TWO TELEVISION CAMERAS, ONE OF MEDIUM RESOLUTION (WIDE ANGLE) AND THE OTHER OF HIGH RESOLUTION (NARROW ANGLE), WERE PART OF THE MARINER 6 SCIENTIFIC INSTRUMENTATION. THE WIDE-ANGLE CAMERA, WHICH HAD A FIELD OF VIEW OF 11 DEG BY 14 DEG AND A FOCAL LENGTH OF 50 MM, ENCOMPASSED 100 TIMES MORE SURFACE AREA THAN THE NARROW-ANGLE CAMERA AND WAS USED ONLY FOR NEAR-ENCOUNTER PICTURES. THE NARROW-ANGLE CAMERA, WHICH WAS USED FOR BOTH NEAR- AND FAR-ENCOUNTER PICTURES, HAD A FOCAL LENGTH OF 508 MM AND PROVIDED 10 TIMES THE LINEAR RESOLUTION OF THE WIDE-ANGLE CAMERA. CAMERA SHUTTERS WERE ALTERNATED AND TIMED TO PROVIDE OVERLAPPING OF THE WIDE-ANGLE AND NARROW-ANGLE PICTURES, PROVIDING 75 PICTURES FROM THE TWO SYSTEMS — 25 NEAR-ENCOUNTER AND 50 FAR-ENCOUNTER. THE NEAR-ENCOUNTER PICTURES WERE TAKEN BETWEEN 13 MIN 59 SEC BEFORE ENCOUNTER AND 2 MIN 55 SEC AFTER ENCOUNTER ALONG A TRACK THAT CROSSED THE EQUATORIAL ZONES OF THE PLANET AND INCLUDED MANY KNOWN LIGHT AND DARK FEATURES OF THE MARTIAN SURFACE. THE FAR-ENCOUNTER PICTURES WERE OBTAINED IN TWO SERIES OF OPERATIONS. IN THE FIRST SERIES, 33 PICTURES WERE OBTAINED BETWEEN 48 HR AND 28 HR BEFORE ENCOUNTER. IN THE SECOND SERIES, 17 PICTURES WERE OBTAINED BETWEEN 22 HR AND 7 HR FROM CLOSEST APPROACH. THE PICTURE DATA WERE ENCODED AND RECORDED WITHIN THE ONBOARD TELEVISION AND DATA STORAGE SUBSYSTEMS. FOR EACH PICTURE PRODUCED BY THE CAMERAS, THREE SEPARATE ENCODED VERSIONS WERE TRANSMITTED TO EARTH — A COMPOSITE ANALOG VIDEO (CAV) PICTURE, A DIGITAL VIDEO (DV) PICTURE, AND AN EVERY TWENTY-EIGHTH (ETE) DIGITAL PICTURE. VIDEO RECONSTRUCTION CONSISTED OF COMBINING THE THREE DATA STREAMS (CAV, DV, AND ETE). THIS GENERATED VIDEO DATA AS THEY EXISTED COMING OUT OF THE CAMERA HEADS. THE TELEMETERED VIDEO MAGNETIC TAPES WERE DISPLAYED ON A CRT AND PHOTOGRAPHED ON 70-MM FILM TO PRODUCE THE RAW IMAGES. THEY WERE ALSO DIGITALLY PROCESSED BY AN IBM 360/44 COMPUTER FOR ENHANCEMENT AND BY AN IBM 360/75 FOR NOISE REMOVAL TO OBTAIN THE VERSIONS CONTAINED IN DATA SETS -01C THROUGH -01H. DETAILED INFORMATION ON THE DIGITAL PROCESSING PROCEDURES CAN BE FOUND IN "DIGITAL PROCESSING OF THE MARINER 6 AND 7 PICTURES," T. C. RINDFLEISH ET AL., J. GEOPHYS. RES., VOL 76, PP 394-417, JANUARY 1971. ACCURATE TRAJECTORY AND RELATED GEOMETRICAL DATA CAN BE FOUND IN "MARINER MARS 1969 SIMULATED TV PICTURES (FINAL)," J. K. CAMPBELL, 1970, WHICH WAS ISSUED BY JPL.

[redacted]

DATA SET NAME- RAW-ANALOG NEAR-ENCOUNTER PHOTOS

NSSDC ID- 69-014A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 07/31/69 TO 07/31/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 25 FRAMES

THIS DATA SET CONSISTS OF 25 UNENHANCED PHOTOGRAPHS ON 70-MM POSITIVE FILM. THESE ARE SECOND-GENERATION COPIES OF THE PHOTOGRAPHS TAKEN BY BOTH THE NARROW-ANGLE AND THE WIDE-ANGLE CAMERAS. EACH PHOTOGRAPH CONTAINS A LIMITED VIEW OF THE MARTIAN SURFACE.

[redacted]

DATA SET NAME- NEAR-ENCOUNTER MAXIMUM DISCRIMINABILITY OPTIMAL PRESENTATION PHOTOS

NSSDC ID- 69-014A-01C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/69 TO 07/31/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 25 FRAMES

THIS DATA SET IS AN ENHANCED VERSION OF THE 25 NEAR-ENCOUNTER MARS PHOTOGRAPHS IN THE ORIGINAL COMPUTER ENHANCED 70-MM NEGATIVE VERSION. IN THESE PHOTOGRAPHS, WHICH WERE PRODUCED FOR OPTIMAL PRESENTATION, THE SMALL-SCALE DETAIL WITHIN EACH FRAME WAS ENPHASIZED, CONTRAST WAS ENHANCED, SYSTEM NOISES WERE SUPPRESSED, AND GEOMETRIC DISTORTIONS WERE CORRECTED BY DIGITAL PROCESSING OF THE IMAGES ON THE SPACECRAFT AND ON THE GROUND DURING VIDEO RECONSTRUCTION AND

RECTIFICATION. IMPROVEMENT OF IMAGE RESOLUTION AND SHARPENING OF FEATURES WAS A RESULT OF HIGH PASS FILTERING. THIS PROCESSING OF THE TELEVISION DATA ACHIEVES MAXIMUM QUALITY IMAGE DISPLAY FOR PHOTO INTERPRETATION.

DATA SET NAME- NEAR-ENCOUNTER PHOTOMETRICALLY DECALIBRATED PHOTOS

NSSDC ID- 69-014A-01E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/69 TO 07/31/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 50 FRAMES

THIS DATA SET CONSISTS OF TWO DECALIBRATED VERSIONS OF THE 25 NEAR-ENCOUNTER PHOTOGRAPHS OF MARS FROM THE MARS TELEVISION EXPERIMENT. THESE VERSIONS ARE ON 70-MM NEGATIVE FILM AND WERE DIGITALLY PROCESSED TO REMOVE THE EFFECTS OF THE TV SYSTEM AND TO DEPICT THE ACTUAL SCENE LUMINANCE AND LARGE-SCALE ALBEDO VARIATIONS, NOT SMALL-SCALE DETAIL. THE REPRESENTATION IS RATHER FLAT IN CONTRAST FOR ALL THE MARTIAN TERRAIN TONAL CHARACTERISTICS. THE SPACECRAFT VIDICONS WERE CALIBRATED TO DETERMINE THE RELATIONSHIP BETWEEN THE INPUT LUMINANCE AND THE CAMERA OUTPUT SIGNAL AS A FUNCTION OF POSITION IN EACH FRAME. EACH PICTURE ELEMENT WAS THEN TREATED AS A TINY PHOTOMETER WITH UNIQUE TRANSFER PROPERTIES. THE RECORDED OUTPUT SIGNAL WAS CONVERTED TO THE ACTUAL SCENE LUMINANCE, AND THE RESULT WAS STORED IN THE CORRECTED OUTPUT IMAGE FOR THESE PHOTOMETRICALLY DECALIBRATED PHOTOGRAPHS.

DATA SET NAME- NEAR-ENCOUNTER MAXIMUM DISCRIMINABILITY ALTERNATIVE CONTRAST ENHANCED PHOTOS

NSSDC ID- 69-014A-01G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/69 TO 07/31/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 72 FRAMES

THIS DATA SET CONSISTS OF UP TO SIX ALTERNATIVE VERSIONS OF 24 CONTRAST ENHANCED NEAR-ENCOUNTER PHOTOGRAPHS OF MARS. (FRAME 6N25 WAS NOT PROCESSED.) THESE VERSIONS WERE PRODUCED ON 70-MM NEGATIVE FILM BY DIGITALLY PROCESSING THE ORIGINAL RAW ANALOG DATA. THE PROCEDURE DIVIDED THE 256-LEVEL GRAY SCALE INTO THREE GROUPS, THE LOWER, MIDDLE, AND UPPER DATA NUMBER RANGES, AND STRETCHED ONE RANGE. EACH SPECIALIZED VERSION WAS PRODUCED FROM ONE OF THESE GRAY-SCALE STRETCHES. VIDEO RECONSTRUCTION AND RECTIFICATION PROCESSES, AS IN DATA SETS -01C AND -01D, WERE APPLIED TO OBTAIN THE FINAL VERSIONS.

DATA SET NAME- NEAR-ENCOUNTER PHOTOGRAPHIC MOSAICS

NSSDC ID- 69-014A-01I

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/69 TO 07/31/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 2 FRAMES

THIS DATA SET CONSISTS OF TWO 4- BY 5-IN. MOSAICS ASSEMBLED FROM THE NEAR-ENCOUNTER PHOTOGRAPHS OF MARINER 6. THE FIRST MOSAIC WAS ASSEMBLED FROM FRAMES 1 TO 8 AND SHOWS THE AURORAE SINUS AREA. THE SECOND MOSAIC WAS ASSEMBLED FROM FRAMES 9 TO 24 AND SHOWS THE MERIDIANI SINUS AREA. COLLECTIVELY, THESE MOSAICS CONTAIN ALL THE MARINER 6 NEAR-ENCOUNTER PICTURES EXCEPT THAT TAKEN RIGHT AT THE TERMINATOR.

DATA SET NAME- NEAR-ENCOUNTER ENHANCED PHOTOGRAPHS ON TAPE

NSSDC ID- -9-014A-01J

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/69 TO 07/31/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONTAINS THE COMPLETE SET OF MARINER 6 NEAR-ENCOUNTER ENHANCED PHOTOGRAPHS ON TWO IBM 360, 7-TRACK, BINARY MAGNETIC TAPES, WITH ODD PARITY AT 800 BPI. EACH FILE CONTAINS A SINGLE PICTURE, AND EACH RECORD IN A FILE CORRESPONDS TO A LINE OF TV PICTURES. A PICTURE ELEMENT IS WRITTEN IN BINARY AS AN EIGHT-BIT BYTE. PRECEDING THE BINARY PICTURE DATA OF EACH FILE ARE SEVERAL LABEL RECORDS WRITTEN IN EBCDIC. THESE RECORDS, WHICH CONTAIN FIVE 72-BYTE LOGICAL RECORDS EACH, PROVIDE INFORMATION SUCH AS THE NUMBER OF LINES AND SAMPLES IN THE FOLLOWING FILE, THE PICTURE IDENTIFICATION, AND A HISTORY OF THE COMPUTER PROCESSING TO WHICH THE PICTURE HAS BEEN SUBJECTED.

DATA SET NAME- NEAR-ENCOUNTER PHOTOMETRIC PHOTOGRAPHS ON TAPE

NSSDC ID- 69-014A-01K

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/69 TO 07/31/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONTAINS THE COMPLETE SET OF MARINER 6 NEAR-ENCOUNTER PHOTOMETRIC PHOTOGRAPHS ON TWO IBM 360, 7-TRACK, BINARY MAGNETIC TAPES, WITH ODD PARITY AT 800 BPI. EACH FILE CONTAINS A SINGLE PICTURE, AND EACH RECORD IN A FILE CORRESPONDS TO A LINE OF TV PICTURES. A PICTURE ELEMENT IS WRITTEN IN BINARY AS AN EIGHT-BIT BYTE. PRECEDING THE BINARY PICTURE DATA OF EACH FILE ARE SEVERAL LABEL RECORDS WRITTEN IN EBCDIC. THESE RECORDS, WHICH CONTAIN FIVE 72-BYTE LOGICAL RECORDS EACH, PROVIDE INFORMATION SUCH AS THE NUMBER OF LINES AND SAMPLES IN THE FOLLOWING FILE, PICTURE IDENTIFICATION, AND A HISTORY OF THE COMPUTER PROCESSING TO WHICH THE PICTURE HAS BEEN SUBJECTED. DOCUMENTATION THAT DESCRIBES THE GENESIS AND SCALING OF THE NUMERICAL PHOTOMETRIC DATA IS AVAILABLE IN HARDCOPY AND IS SENT TO REQUESTERS ALONG WITH THE TAPES.

PIMENTEL, MARINER 6

EXPERIMENT NAME- IR SPECTROMETER

NSSDC ID- 69-014A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/31/69

PERSONNEL

PI -	G.C.	PIMENTEL ----------	U OF CALIF, BERKELEY BERKELEY, CA
OI -	K.C.	HERR ----------	U OF CALIF, BERKELEY BERKELEY, CA

SPECTRAL MEASUREMENTS OF THE THERMAL (IR) EMISSION BY THE MARTIAN SURFACE AND ATMOSPHERE WERE OBTAINED TO DETERMINE (1) THE ATMOSPHERIC COMPOSITION, INCLUDING POLYATOMIC LIFE-RELATED MOLECULES, (2) THE SURFACE TEMPERATURE ALONG THE TRACK OF VIEW, (3) THE SURFACE COMPOSITION, (4) THE SURFACE TOPOGRAPHY, (5) THE COMPOSITION OF THE POLAR CAP, AND (6) THE BRIGHT LINE IR EMISSION CHARACTERISTICS. THE EXPERIMENT, MOUNTED ON THE BOTTOM OF THE OCTAGONAL SCAN PLATFORM OF THE SPACECRAFT, USED AN IR SPECTROMETER THAT CONSISTED OF A TELESCOPE, OPTICAL FOCUSING LENSES AND MIRRORS, A VARIABLE-WEDGE INTERFERENCE FILTER THAT SELECTED THE WAVELENGTHS REACHING THE DETECTORS, AND COOLED IR DETECTORS. THE SPECTRA OBSERVED COVERED THE WAVELENGTH REGION OF 1.9 TO 14.3 MICRONS AND WERE PROVIDED BY CHANNEL 1 (4.0 TO 14.3 MICRONS), WHICH OPERATED ON EMITTED LIGHT FROM THE PLANET AND CONTINUED TO OBTAIN MEASUREMENTS ON THE DARK SIDE OF THE PLANET, AND CHANNEL 2 (1.9 TO 6.0 MICRONS), WHICH OPERATED ON REFLECTED SOLAR RADIATION. THE INSTRUMENT TELESCOPE HAD A FIELD OF VIEW OF 2 DEG AND, THUS, AT CLOSEST APPROACH (ABOUT 3100 KM) THE GEOGRAPHICAL RESOLUTION WAS ABOUT 120 KM BY 3 KM AND, DURING A SINGLE SCAN, ABOUT 120 KM BY 120 KM. THE SPECTRAL RESOLTION OBTAINED WAS 0.5 TO 1 PERCENT. ABOUT 29 MIN OF DATA WERE OBTAINED DURING THE MARINER 6 NEAR-ENCOUNTER EQUATORIAL SCAN ON JULY 31, 1969. HOWEVER, DUE TO THE FAILURE OF THE CHANNEL 1 CRYOSTAT, ONLY CHANNEL 2 MEASUREMENTS WERE

OBTAINED. THE QUALITY OF THE DATA IS EXCELLENT.

DATA SET NAME- IR SPECTROMETER DATA

NSSDC ID- 69-014A-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/69 TO 07/31/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 6 CARD(S) OF 8/W MICROFICHE

THE IR SPECTRAL DATA FROM THE MARINER 6 SPECTROMETER EXPERIMENT ARE CONTAINED ON SIX 4-1/8" BY 5-7/8-IN. MICROFICHE CARDS THAT WERE GENERATED FROM THE JET PROPULSION LABORATORY'S MASTER DATA RECORD TAPES. THE CARDS, WHICH ARE ATTACHED TO THE UNIVERSITY OF CALIFORNIA AT BERKELEY DATA FORMAT REPORT, EACH SHOW SEPARATE PLOTS OF THE ABSORPTION INTENSITY FOR CHANNEL 2 VS WAVELENGTH FOR 10-SEC INTERVALS. ALSO INCLUDED ON THE PLOTS ARE THE SPECTRUM NUMBER, TIME OF EACH SPECTRUM, SPACECRAFT NUMBER, AND AN INDICATOR DESIGNATING WHETHER THE SPECTRA WERE HIGH OR LOW GAIN. THE DATA COVER THE TIME PERIOD FROM 05 HR 02 MIN 55 SEC TO 05 HR 32 MIN 10 SEC SPACECRAFT UT ON JULY 31, 1969. THE QUALITY OF THE DATA IS GOOD. A SUPPLEMENT TO THE DATA FORMAT REPORT CONTAINS THE SPECTROMETER CALIBRATION DATA ON FOUR MICROFICHE CARDS.

SPACECRAFT COMMON NAME- MARINER 7

ALTERNATE NAMES- PL-691F, MARINER MARS 69B
03837

NSSDC ID- 69-030A

LAUNCH DATE- 03/27/69 WEIGHT- 380. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/00/69

ORBIT PARAMETERS

ORBIT TYPE-	HELIOCENTRIC	EPOCH DATE-	03/27/69
ORBIT PERIOD-	517. DAYS	INCLINATION-	0. DEG
PERIAPSIS-	1.0 AU RAD	APOAPSIS-	1.62 AU RAD

MARINER 7 WAS THE SEVENTH IN A SERIES OF SPACECRAFT USED FOR PLANETARY EXPLORATION IN THE FLYBY MODE. IT WAS IDENTICAL TO THE MARINER 6 SPACECRAFT. MARINER 7 WAS ATTITUDE STABILIZED IN THREE AXES (REFERENCED TO THE SUN AND THE STAR, CANOPUS). THE SPACECRAFT WAS SOLAR POWERED AND CAPABLE OF CONTINUOUS TELEMETRY TRANSMISSION, AND IT WAS FULLY AUTOMATIC IN OPERATION ALTHOUGH IT COULD BE REPROGRAMMED FROM EARTH DURING THE MISSION. THE SPACECRAFT WAS ORIENTED ENTIRELY TO PLANETARY DATA ACQUISITION, AND NO DATA WERE OBTAINED DURING THE TRIP TO MARS OR BEYOND MARS. MARINER 7 PASSED 3430 KM FROM MARS ON AUGUST 5, 1969. THE SPACECRAFT INSTRUMENTS TOOK TV IMAGES OF MARS AND MEASURED THE RADIO REFRACTIVITY AND UV AND IR EMISSIONS OF THE MARTIAN ATMOSPHERE. THE MISSION WAS A SUCCESS.

EARTH, MARINER 7

EXPERIMENT NAME- UV SPECTROMETER

NSSDC ID- 69-030A-04

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/05/69

PERSONNEL

PI -	C.A.	BARTH	U OF COLORADO BOULDER, CO
OI -	C.W.	HORD	U. OF COLORADO BOULDER, CO
OI -	J.B.	PEARCE	U OF COLORADO BOULDER, CO

SPECTRAL MEASUREMENTS WERE MADE OF THE UV RADIATION EMITTED FROM THE MARTIAN ATMOSPHERE DUE TO -- RESONANCE SCATTERING OF SOLAR RADIATION FROM THE UPPER ATMOSPHERE, RESONANCE RERADIATION, FLUORESCENCE, AND PHOTOELECTRON EXCITATION OF NEUTRAL AND IONIC CONSTITUENTS FOUND IN THE LOWER PART OF THE ATMOSPHERE. THE FOLLOWING PARAMETERS WERE DETERMINED -- THE PRESENCE OF CERTAIN ATOMS, IONS AND MOLECULES IN THE UPPER AND LOWER ATMOSPHERE, THEIR RESPECTIVE SCALE HEIGHTS, THE DEGREE OF ATMOSPHERIC RAYLEIGH SCATTERING DUE TO CARBON DIOXIDE, AND SURFACE REFLECTIVITY IN THE UV. THE INSTRUMENT WAS AN EBERT-FASTIE SCANNING MONOCHROMATOR WITH DUAL PHOTOMULTIPLIER DETECTORS USED IN THE FOCAL PLANE OF A REFLECTING PLANETARY CORONOGRAPH. INCOMING LIGHT PASSED THROUGH A BAFFLED LIGHT SHADE AND STRUCK A PRIMARY TELESCOPE MIRROR THAT FOCUSED THE LIGHT THROUGH A PRE-SLIT ONTO A SECONDARY MIRROR. FROM THERE, THE LIGHT WAS FOCUSED ONTO THE ENTRANCE SLIT OF THE SPECTROMETER. ENTERING THE SPECTROMETER, THE RADIATION WAS COLLIMATED BY THE FIRST HALF OF THE EBERT MIRROR ONTO A DIFFRACTION GRATING. DIFFRACTED LIGHT WAS THEN FOCUSED ONTO EXIT SLITS BY THE SECOND HALF OF THE EBERT MIRROR. A SEPARATE EXIT SLIT WAS PROVIDED FOR EACH OF THE TWO DETECTORS. THE POSITION OF THE SPECTRAL IMAGES WITH RESPECT TO THE EXIT SLITS WAS CONTROLLED BY CYCLICALLY SCANNING THE GRATING, WITH A SCAN FROM LOW- TO HIGH-WAVELENGTH TAKING 2.82 SEC. AND THE GRATING RETURN TAKING 0.18 SEC. THE WAVELENGTH REGION FROM 1900 A TO 4300 A WAS COVERED IN FIRST ORDER AS SEEN BY ONE OF THE TWO SLITS, AND THE RANGE FROM 1100 A TO 2100 A MEASURED IN SECOND ORDER BY THE OTHER. THE PHOTOMULTIPLIER DETECTOR USED FOR THE LONG-WAVELENGTH RANGE OPERATED IN TWO GAIN MODES SO THAT VALID MEASUREMENTS COULD BE MADE OVER THE ENTIRE DYNAMIC RANGE FROM 100 TO 10,000 RAYLEIGHS. THE SPECTRAL RESOLUTION OF THE INSTRUMENT WAS 20 A AT 2950 A IN FIRST ORDER. A SPECTRUM WAS PRODUCED EVERY 3 SEC. AND CONTAINED 600 VALUES FROM EACH OF THE TWO DETECTORS. THIRTY-SIX VALUES WERE USED AS FIDUCIAL PERIOD MEASUREMENTS AND 564 FOR SPECTRAL MEASUREMENTS. MEASUREMENTS OF LYMAN-ALPHA RADIATION AT 1216 A WERE ALSO TAKEN AWAY FROM ENCOUNTER. LESS THAN 30 MINUTES OF DATA WERE OBTAINED FROM BOTH CHANNELS DURING THE MARINER 7 NEAR-ENCOUNTER SCAN OF HIGH LATITUDE AND POLAR REGIONS IN THE MARTIAN SOUTHERN HEMISPHERE ON AUGUST 5, 1969. THE QUALITY OF THE DATA WAS COMPARABLE TO THE BEST OBTAINED BY SOUNDING ROCKETS IN THE 130-KM AND ABOVE REGION OF THE EARTH'S ATMOSPHERE. ADDITIONAL EXPERIMENT DETAILS CAN BE FOUND IN "MARINER 6 AND 7 ULTRAVIOLET SPECTROMETERS," J. B. PEARCE, ET AL. APPLIED OPTICS, VOL. 10, NO. 4, APRIL 1971.

DATA SET NAME- UPPER ATMOSPHERE FAR-UV, MIDDLE-UV, AND LYMAN-ALPHA SPECTRA

NSSDC ID- 69-030A-04A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/05/69 TO 08/05/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, SUPPLIED BY THE EXPERIMENTER, CONSISTS OF TWO REFORMATTED 7-TRACK, 800-BPI, BINARY (ODD PARITY) MAGNETIC TAPES GENERATED ON A CDC 6400 COMPUTER. THESE TAPES WERE DERIVED FROM THE EXPERIMENTER'S ORIGINAL DATA TAPE, WHICH CONTAINED BOTH THE MARINER 6 AND 7 ULTRAVIOLET SPECTROMETER (UVS) DATA. THE DATA SET CONTAINS LESS THAN 30 MIN OF UV SPECTRA OBTAINED BY THE MARINER 7 UV SPECTROMETER EXPERIMENT ON AUGUST 5, 1969. THE FIRST TAPE CONTAINS FOUR FILES OF UV SPECTRA. FILE 1 CONTAINS UNPROCESSED DATA BETWEEN 1900 AND 4000 A. FILE 2 CONTAINS THE SAME DATA AS FILE 1 CALIBRATED IN RAYLEIGHS/A. FILE 3 CONTAINS UNPROCESSED DATA BETWEEN 1100 AND 1800 A. FILE 4 CONTAINS THE SAME DATA AS FILE 3 CALIBRATED IN RAYLEIGHS/A. THESE SPECTRA REPRESENT ATMOSPHERIC EMISSIONS FROM THE 90- TO 130-KM ALTITUDE REGION. THE FORMATS FOR THE FOUR FILES ARE IDENTICAL. THE FIRST RECORD OF EACH FILE PROVIDES A SIX-WORD DESCRIPTION OF THE FILE CONTENTS INCLUDING INFORMATION ON WHETHER THE DATA ARE PROCESSED OR UNPROCESSED, WHETHER THE SPECTRA ARE MIDDLE UV (1900 TO 4000 A) OR FAR UV (1100 TO 1800 A), WHAT UNITS THE DATA ARE IN, AND THE RECORD SIZE. THE SUBSEQUENT RECORDS CONSIST OF A 10-WORD DESCRIPTION OF ONE SPECTRUM (THE SPECTRAL NUMBER, SPACECRAFT ID, ALTITUDE AT FIRST WAVELENGTH, ALTITUDE AT LAST WAVELENGTH, SLIT HEIGHT, SOLAR INCIDENT ANGLE, SOLAR EMISSION ANGLE, AND PHASE ANGLE) AND THE DATA FROM THAT SPECTRUM. EACH SPECTRUM IS PRESENTED AS ALTERNATING WORDS OF WAVELENGTH AND RELATIVE AMPLITUDE. THESE FOUR FILES OF DATA ARE UNIQUE IN THAT NO TIMES OF OBSERVATION ARE GIVEN. THE SECOND TAPE IN THIS DATA SET CONTAINS ONE FILE OF LYMAN-ALPHA (1216 A) DATA DERIVED FROM EMISSIONS OBSERVED NEAR THE PLANETARY SURFACE TO 30,000 KM ALTITUDE. THE FILE CONSISTS OF A SERIES OF THREE-WORD SEQUENCES THAT GIVE (1) THE INTEGRATED VALUE OF THE LYMAN-ALPHA SIGNAL IN RAYLEIGHS, (2) THE DISTANCE OF THAT SIGNAL IN KM, AND (3) THE ACTUAL TIME THE SIGNAL WAS TAKEN EXPRESSED IN UNITS OF GMT (IN DECIMAL FORM) TIMES 10 TO THE 4 POWER. THE QUALITY OF THE DATA IS EXCELLENT.

KLIORE, MARINER 7

EXPERIMENT NAME- S-BAND OCCULTATION

NSSDC ID- 69-030A-06

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 09/00/69

PERSONNEL
PI - A.J. KLIORE ..... NASA-JPL
PASADENA, CA

IN THIS EXPERIMENT, THE CHANGES IN THE FREQUENCY, PHASE, AND AMPLITUDE OF THE S-BAND (2300 MHZ) TRACKING AND TELEMETRY SIGNAL (IMMEDIATELY PRIOR TO AND FOLLOWING THE OCCULTATION OF THE SPACECRAFT BY THE PLANE) WERE USED TO DERIVE THE TEMPERATURE, PRESSURE, AND DENSITY OF THE LOWER GASEOUS ATMOSPHERE OF MARS, AND THE DENSITY OF CHARGED PARTICLES IN THE MARTIAN IONOSPHERE.

DATA SET NAME- S-BAND DOPPLER RESIDUALS/REFRACTIVITY
DATA ON MAGNETIC TAPE

NSSDC ID- 69-030A-06A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/00/69 TO 08/00/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 2 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF DOPPLER RESIDUALS AND REFRACTIVITY DATA ON TWO 7-TRACK, 800-BPI, UNIVAC 1108, BINARY MAGNETIC TAPES. DATA ON BOTH ENTRANCE AND EXIT OCCULTATIONS FROM MARINER 6 (69-014A) AND MARINER 7 (69-030A) ARE INCLUDED ON THE TAPES. THE DATA ARE REDUCED DATA SUPPLIED TO NSSDC BY THE EXPERIMENTER.

LEIGHTON, MARINER 7

EXPERIMENT NAME- MARS TV CAMERA

NSSDC ID- 69-030A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/05/69

PERSONNEL
PI - R.B. LEIGHTON ..... CALIF INST OF TECH
PASADENA, CA

TWO TELEVISION VIDICON CAMERAS, ONE OF MEDIUM RESOLUTION (WIDE ANGLE) AND THE OTHER OF HIGH RESOLUTION (NARROW ANGLE), WERE PART OF THE MARINER 7 SCIENTIFIC INSTRUMENTATION. THE WIDE-ANGLE CAMERA, WHICH HAD A FOV OF 11 DEG BY 14 DEG AND A FOCAL LENGTH OF 50 MM, ENCOMPASSED 100 TIMES MORE SURFACE AREA THAN THE NARROW-ANGLE CAMERA AND WAS USED ONLY FOR FAR-ENCOUNTER PICTURES. THE NARROW-ANGLE CAMERA, WHICH WAS USED FOR BOTH NEAR- AND FAR-ENCOUNTER PICTURES, HAD A FOCAL LENGTH OF 505 MM AND PROVIDED 10 TIMES THE LINEAR RESOLUTION OF THE WIDE-ANGLE CAMERA. CAMERA SHUTTERS WERE ALTERNATED AND TIMED TO PROVIDE OVERLAPPING OF THE WIDE-ANGLE AND NARROW-ANGLE PICTURES, PROVIDING 126 PICTURES FROM THE TWO SYSTEMS -- 33 NEAR-ENCOUNTER AND 93 FAR-ENCOUNTER. THE NEAR-ENCOUNTER PICTURES WERE TAKEN BETWEEN 20 MIN 26 SEC BEFORE CLOSEST APPROACH AND 2 MIN 6 SEC AFTER CLOSEST APPROACH ALONG A ROUGHLY NORTH-SOUTH COURSE THAT INTERSECTED THE MARINER 6 TRACK AND INCLUDED THE MARTIAN SOUTH POLAR CAP. THE FAR-ENCOUNTER PICTURES WERE OBTAINED IN THREE SERIES OF OPERATIONS BETWEEN 66 HR AND 5 HR BEFORE CLOSEST APPROACH. TWO FRACTIONAL PICTURES WERE OBTAINED AT THE END OF THE FIRST TWO SERIES. THE PICTURE DATA WERE ENCODED AND RECORDED WITHIN THE ONBOARD TELEVISION AND DATA STORAGE SUBSYSTEMS. FOR EACH PICTURE PRODUCED BY THE CAMERAS THREE SEPARATE ENCODED VERSIONS WERE TRANSMITTED TO EARTH -- A COMPOSITE ANALOG VIDEO (CAV) PICTURE, A DIGITAL VIDEO (DV) PICTURE, AND AN EVERY TWENTY-EIGHTH (ETE) DIGITAL PICTURE. VIDEO RECONSTRUCTION CONSISTED OF COMBINING THE THREE DATA STREAMS (CAV, DV, AND ETE). THIS GENERATED VIDEO DATA AS THEY EXISTED COMING OUT OF THE CAMERA HEADS. THE TELEMETERED VIDEO MAGNETIC TAPES WERE DISPLAYED ON A CRT AND PHOTOGRAPHED ON 70-MM FILM TO PRODUCE THE RAW IMAGES. THEY WERE ALSO DIGITALLY PROCESSED BY AN IBM 360/44 COMPUTER FOR ENHANCEMENT AND BY AN IBM 360/75 FOR NOISE REMOVAL TO OBTAIN THE VERSIONS CONTAINED IN DATA SETS -01C THROUGH -01H. DETAILED INFORMATION ON THE DIGITAL PROCESSING PROCEDURES CAN BE FOUND IN "DIGITAL PROCESSING OF THE MARINER 6 AND 7 PICTURES," T. C. RINDFLEISH ET AL., "J. GEOPHYS. RES.," VOL 76, PP 394-417, JANUARY 1971. ACCURATE TRAJECTORY AND RELATED GEOMETRICAL DATA CAN BE FOUND IN "MARINER MARS 1969 SIMULATED TV PICTURES (FINAL)," J. K. CAMPBELL 1970, WHICH WAS ISSUED BY JPL.

DATA SET NAME- RAW-ANALOG NEAR-ENCOUNTER PHOTOS

NSSDC ID- 69-030A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 08/05/69 TO 08/05/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 33 FRAMES

THIS DATA SET CONSISTS OF 33 UNENHANCED PHOTOGRAPHS ON 70-MM POSITIVE FILM. THESE ARE SECOND GENERATION COPIES OF THE PHOTOGRAPHS TAKEN BY BOTH THE NARROW-ANGLE AND THE WIDE-ANGLE CAMERAS. THE FILM WAS SUPPLIED BY THE EXPERIMENTER TEAM AT JPL. EACH PHOTOGRAPH CONTAINS A LIMITED VIEW OF THE MARTIAN SURFACE.

DATA SET NAME- NEAR-ENCOUNTER MAXIMUM DISCRIMINABILITY
OPTIMAL PRESENTATION PHOTOS

NSSDC ID- 69-030A-01C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/05/69 TO 08/05/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 32 FRAMES

THIS DATA SET IS AN ENHANCED VERSION OF 32 OF THE NEAR-ENCOUNTER PHOTOGRAPHS OF MARS RETURNED BY THE TELEVISION EXPERIMENT. THIS VERSION IS THE SECOND GENERATION COMPUTER-ENHANCED 70-MM NEGATIVE, PRODUCED FOR OPTIMAL PRESENTATION. SMALL-SCALE DETAIL WITHIN EACH FRAME WAS EMPHASIZED, CONTRAST WAS ENHANCED, SYSTEM NOISES WERE SUPPRESSED, AND GEOMETRIC DISTORTIONS WERE CORRECTED BY DIGITAL PROCESSING OF THE IMAGES ON THE SPACECRAFT AND ON THE GROUND DURING VIDEO RECONSTRUCTION AND RECTIFICATION. IMPROVEMENT OF IMAGE RESOLUTION AND SHARPENING OF FEATURES WAS A RESULT OF HIGH PASS FILTERING. THIS PROCESSING OF THE TELEVISION DATA ACHIEVES MAXIMUM QUALITY IMAGE DISPLAY FOR PHOTO INTERPRETATION.

DATA SET NAME- NEAR-ENCOUNTER PHOTOMETRICALLY
DECALIBRATED PHOTOS

NSSDC ID- 69-030A-01E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/05/69 TO 08/05/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 62 FRAMES

THIS DATA SET CONSISTS OF A DECALIBRATED VERSION OF 31 OF THE NEAR-ENCOUNTER PHOTOGRAPHS OF MARS FROM THE TELEVISION (TV) EXPERIMENT. THIS VERSION IS ON 70-MM NEGATIVE FILM AND WAS DIGITALLY PROCESSED TO REMOVE THE EFFECTS OF THE TV SYSTEM AND TO DEPICT THE ACTUAL SCENE LUMINANCE AND LARGE-SCALE ALBEDO VARIATIONS, NOT SMALL-SCALE DETAIL. THIS REPRESENTATION IS RATHER FLAT IN CONTRAST FOR ALL THE MARTIAN TERRAIN TONAL CHARACTERISTICS. THE SPACECRAFT VIDICONS WERE CALIBRATED TO DETERMINE THE RELATIONSHIP BETWEEN THE INPUT LUMINANCE AND THE CAMERA OUTPUT SIGNAL AS A FUNCTION OF POSITION IN EACH FRAME. EACH PICTURE ELEMENT WAS THEN TREATED AS A TINY PHOTOMETER WITH UNIQUE TRANSFER PROPERTIES. THE RECORDED OUTPUT SIGNAL WAS CONVERTED TO THE ACTUAL SCENE LUMINANCE, AND THE RESULT WAS STORED IN THE CORRECTED OUTPUT IMAGE FOR THESE PHOTOMETRICALLY DECALIBRATED PHOTOGRAPHS.

DATA SET NAME- NEAR-ENCOUNTER MAXIMUM DISCRIMINABILITY
ALTERNATIVE CONTRAST ENHANCED PHOTOS

NSSDC ID- 69-030A-01G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/05/69 TO 08/05/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 93 FRAMES

MARINER 7/MARINER 9

THIS DATA SET CONSISTS OF UP TO SIX ALTERNATIVE VERSIONS OF THE 33 CONTRAST ENHANCED NEAR-ENCOUNTER PHOTOGRAPHS OF MARS. THESE VERSIONS WERE PRODUCED ON 70-MM NEGATIVE FILM BY DIGITALLY PROCESSING THE ORIGINAL RAW ANALOG DATA. THE PROCEDURE DIVIDED THE 256-LEVEL GRAY SCALE INTO THREE GROUPS, THE LOWER, MIDDLE, AND UPPER DATA NUMBER RANGES, AND STRETCHED ONE RANGE. EACH SPECIALIZED VERSION WAS PRODUCED FROM ONE OF THESE GRAY-SCALE STRETCHES. VIDEO RECONSTRUCTION AND RECTIFICATION PROCESSES, AS IN DATA SETS -01C AND -1D, WERE APPLIED TO OBTAIN THE FINAL VERSIONS.

[redacted]

DATA SET NAME- NEAR-ENCOUNTER PHOTOGRAPHIC MOSAICS

NSSDC ID- 69-030A-01I

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 08/05/69 TO 08/05/69
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 5 FRAMES

THIS DATA SET CONSISTS OF FIVE MOSAICS ASSEMBLED FROM THE NEAR-ENCOUNTER PHOTOGRAPHS OF MARINER 7. THE FIRST MOSAIC COMPROMISES FRAMES 1 TO 3 AND SHOWS THE LIMB. THE SECOND MOSAIC INCLUDES FRAMES 4 TO 9 AND SHOWS THE MERIDIANI SINUS AREA. THE THIRD MOSAIC, FRAMES 11 TO 19, SHOWS THE POLAR CAP (PHOTOMETRIC VERSION). THE FOURTH MOSAIC, FRAMES 10 TO 20, COVERS THE POLAR CAP (MAXIMUM DISCRIMINABILITY VERSION), AND THE LAST MOSAIC, FRAMES 21 TO 31, COVERS NOACHIS-HELLAS. COLLECTIVELY, THESE MOSAICS CONTAIN ALL THE MARINER 7 NEAR-ENCOUNTER PICTURES EXCEPT THOSE TAKEN RIGHT AT THE TERMINATOR.

[redacted]

DATA SET NAME- NEAR-ENCOUNTER ENHANCED PHOTOGRAPHS ON TAPE

NSSDC ID- 69-030A-01J

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/05/69 TO 08/05/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONTAINS THE COMPLETE SET OF MARINER 7 NEAR-ENCOUNTER ENHANCED PHOTOGRAPHS ON THREE IBM 360, 7-TRACK, BINARY MAGNETIC TAPES, WITH ODD PARITY AT 800 BPI. EACH FILE CONTAINS A SINGLE PICTURE, AND EACH RECORD IN A FILE CORRESPONDS TO A LINE OF TV PICTURES. A PICTURE ELEMENT IS WRITTEN IN BINARY AS AN EIGHT-BIT BYTE. PRECEDING THE BINARY PICTURE DATA OF EACH FILE ARE SEVERAL LABEL RECORDS WRITTEN IN EBCDIC. THESE RECORDS, WHICH CONTAIN FIVE 72-BYTE LOGICAL RECORDS EACH, PROVIDE INFORMATION SUCH AS THE NUMBER OF LINES AND SAMPLES IN THE FOLLOWING FILE, PICTURE IDENTIFICATION, AND A HISTORY OF THE COMPUTER PROCESSING TO WHICH THE PICTURE HAS BEEN SUBJECTED.

[redacted]

DATA SET NAME- NEAR-ENCOUNTER PHOTOMETRIC PHOTOGRAPHS ON TAPE

NSSDC ID- 69-030A-01K

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/05/69 TO 08/05/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 3 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONTAINS THE COMPLETE SET OF MARINER 7 NEAR-ENCOUNTER PHOTOMETRIC PHOTOGRAPHS ON THREE IBM 360, 7-TRACK, BINARY MAGNETIC TAPES, WITH ODD PARITY AT 800 BPI. EACH FILE CONTAINS A SINGLE PICTURE, AND EACH RECORD IN A FILE CORRESPONDS TO A LINE OF TV PICTURES. A PICTURE ELEMENT IS WRITTEN IN BINARY AS AN EIGHT-BIT BYTE. PRECEDING THE BINARY PICTURE DATA OF EACH FILE ARE SEVERAL LABEL RECORDS WRITTEN IN EBCDIC. THESE RECORDS, WHICH CONTAIN FIVE 72-BYTE LOGICAL RECORDS EACH, PROVIDE INFORMATION SUCH AS THE NUMBER OF LINES AND SAMPLES IN THE FOLLOWING FILE. PICTURE IDENTIFICATION, AND A HISTORY OF THE COMPUTER PROCESSING TO WHICH THE PICTURE HAS BEEN SUBJECTED. DOCUMENTATION THAT DESCRIBES THE GENESIS AND SCALING OF THE NUMERICAL PHOTOMETRIC DATA IS AVAILABLE IN HARDCOPY AND IS PROVIDED TO REQUESTERS ALONG WITH THE TAPES.

[redacted]

PINENTEL, MARINER 7

EXPERIMENT NAME- IR SPECTROMETER

NSSDC ID- 69-030A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/05/69

PERSONNEL
PI - G.C. PINENTEL ..... U OF CALIF, BERKELEY
BERKELEY, CA
OI - K.C. HERR ..... U OF CALIF, BERKELEY
BERKELEY, CA

SPECTRAL MEASUREMENTS OF THE THERMAL IR EMISSION FROM THE MARTIAN SURFACE AND ATMOSPHERE WERE OBTAINED TO DETERMINE (1) THE ATMOSPHERIC COMPOSITION, INCLUDING POLYATOMIC LIFE-RELATED MOLECULES, (2) THE SURFACE TEMPERATURE ALONG THE TRACK OF VIEW, (3) THE SURFACE COMPOSITION, (4) THE SURFACE TOPOGRAPHY, (5) THE COMPOSITION OF THE POLAR CAP, AND (6) THE BRIGHT LIMB IR EMISSION CHARACTERISTICS. THE EXPERIMENT, MOUNTED ON THE BOTTOM OF THE OCTAGONAL SCAN PLATFORM OF THE SPACECRAFT, USED AN IR SPECTROMETER CONSISTING OF A TELESCOPE, OPTICAL FOCUSING LENSES AND MIRRORS, A VARIABLE-WEDGE INTERFERENCE FILTER THAT SELECTED THE WAVELENGTHS REACHING THE DETECTORS, AND COOLED IR DETECTORS. THE SPECTRA OBSERVED COVERED A WAVELENGTH REGION OF 1.9 TO 14.3 MICRONS AND WERE PROVIDED BY CHANNEL 1 (4.0 TO 14.3 MICRONS), WHICH OPERATED ON EMITTED LIGHT FROM THE PLANET AND CONTINUED TO OBTAIN MEASUREMENTS ON THE DARK SIDE OF THE PLANET, AND CHANNEL 2 (1.9 TO 6.0 MICRONS), WHICH OPERATED ON REFLECTED SOLAR RADIATION. THE INSTRUMENT TELESCOPE HAD A FOV OF 2 DEG AND, THUS, AT CLOSEST APPROACH (ABOUT 3600 KM), THE GEOGRAPHICAL RESOLUTION WAS ABOUT 120 KM BY 3 KM AND, DURING A SINGLE SCAN, 120 KM BY 120 KM. THE SPECTRAL RESOLUTION OBTAINED WAS 0.5 TO 1 PERCENT. ABOUT 34 MIN OF DATA WERE OBTAINED FROM BOTH CHANNELS DURING THE MARINER 7 NEAR-ENCOUNTER SCAN OF HIGH-LATITUDE AND POLAR REGIONS OF THE MARTIAN SOUTHERN HEMISPHERE ON AUGUST 5, 1969. THE QUALITY OF THE DATA IS EXCELLENT.

[redacted]

DATA SET NAME- IR SPECTROMETER DATA ON MICROFICHE

NSSDC ID- 69-030A-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/05/69 TO 08/05/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 14 CARD(S) OF 8/M MICROFICHE

THE IR SPECTRAL DATA FROM THE MARINER 7 SPECTROMETER EXPERIMENT ARE ON 4-1/8- BY 5-7/8-IN. MICROFICHE CARDS GENERATED FROM THE JET PROPULSION LABORATORY'S MASTER DATA RECORD TAPES. THE CARDS, WHICH ARE ATTACHED TO THE UNIVERSITY OF CALIFORNIA AT BERKELEY DATA FORMAT REPORT, EACH SHOW SEPARATE PLOTS OF THE ABSORPTION INTENSITY FOR CHANNELS 1 AND 2 VS WAVELENGTH FOR 10-SEC INTERVALS. ALSO INCLUDED ON THE PLOTS ARE THE SPECTRUM NUMBER, TIME OF EACH SPECTRUM, SPACECRAFT NUMBER, AND AN INDICATOR DESIGNATING WHETHER THE SPECTRA WERE HIGH OR LOW GAIN. THE DATA COVER THE TIME PERIOD FROM 04 HR 39 MIN 49 SEC TO 05 HR 13 MIN 23 SEC SPACECRAFT UT ON AUGUST 5, 1969, AND ARE OF GOOD QUALITY. A SUPPLEMENT TO THE DATA FORMAT REPORT CONTAINS THE SPECTROMETER CALIBRATION DATA ON FOUR MICROFICHE CARDS.

[redacted]

SPACECRAFT COMMON NAME- MARINER 9

ALTERNATE NAMES- MARINER-I, MARINER MARS 71
MARIN-I, PL-7120
05261

NSSDC ID- 71-051A

LAUNCH DATE- 05/30/71 WEIGHT- 997. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 10/27/72

ORBIT PARAMETERS
ORBIT TYPE- MARSCENTRIC EPOCH DATE- 11/16/71
ORBIT PERIOD- 719. MIN INCLINATION- 64.37 DEG
PERIAPSIS- 1250. KM ALT APOAPSIS- 17168. KM ALT

THE MARINER MARS 71 MISSION WAS PLANNED TO CONSIST OF TWO SPACECRAFT ON COMPLEMENTARY MISSIONS, BUT DUE TO THE FAILURE OF MARINER 8 TO LAUNCH PROPERLY, ONLY ONE SPACECRAFT WAS AVAILABLE. MARINER 9 COMBINED MISSION OBJECTIVES OF BOTH MARINER 8 (MAPPING 70 PERCENT OF THE MARTIAN SURFACE) AND MARINER 9 (A STUDY OF TEMPORAL CHANGES IN THE MARTIAN

ATMOSPHERE AND ON THE MARTIAN SURFACE). FOR THE SURVEY PORTION OF THE MISSION, THE PLANETARY SURFACE WAS TO BE MAPPED WITH THE SAME RESOLUTION AS PLANNED FOR THE ORIGINAL MISSION, ALTHOUGH THE RESOLUTION OF PICTURES OF THE POLAR REGIONS WOULD BE DECREASED DUE TO THE INCREASED SLANT RANGE. THE VARIABLE FEATURES EXPERIMENTS WERE CHANGED FROM STUDIES OF SIX GIVEN AREAS EVERY 6 DAYS TO STUDIES OF SMALLER REGIONS EVERY 17 DAYS. MARINER 9 ARRIVED AT MARS ON NOVEMBER 14, 1971. THE SPACECRAFT GATHERED DATA ON THE ATMOSPHERIC COMPOSITION, DENSITY, PRESSURE, AND TEMPERATURE AND ON-THE-SURFACE COMPOSITION, TEMPERATURE, AND TOPOGRAPHY OF MARS. AFTER DEPLETING ITS SUPPLY OF ATTITUDE CONTROL GAS, THE SPACECRAFT WAS TURNED OFF OCTOBER 27, 1972.

EARTH, MARINER 9

EXPERIMENT NAME- ULTRAVIOLET SPECTROMETER (UVS)

NSSDC ID- 71-051A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 10/27/72

PERSONNEL

PI -	C.A.	BARTH	U OF COLORADO BOULDER, CO
DI -	J.B.	PEARCE	U OF COLORADO BOULDER, CO
DI -	C.W.	HORD	U OF COLORADO BOULDER, CO

THE MARINER 9 ULTRAVIOLET SPECTROMETER (UVS) EXPERIMENT WAS DESIGNED TO RECEIVE UV RADIATION (1100 TO 3520 A) FROM THE SURFACE AND ATMOSPHERE OF MARS, SCAN SELECTED BANDS OF THIS RADIATION, AND PROVIDE AN INTENSITY VALUE AS A FUNCTION OF WAVELENGTH ON THE BASIS OF SCAN-CYCLE TIME. THE SCIENTIFIC OBJECTIVES OF THIS EXPERIMENT FELL INTO TWO BROAD CATEGORIES -- UV CARTOGRAPHY AND UV AERONOMY. THE UV CARTOGRAPHY INVOLVED MEASUREMENTS IN THE UV OF THE (1) LOCAL ATMOSPHERIC PRESSURE OVER THE MAJOR PORTION OF THE PLANET, (2) LOCAL OZONE CONCENTRATION, (3) [illegible]E OF DARKENING, (4) VARIABILITY OF SURFACE FEATURES, (5) YELLOW CLOUDS, BLUE HAZE, AND BLUE CLEARING, AND (6) LOCAL VARIATIONS IN THE OXYGEN-OZONE ABUNDANCES FOR DETECTING SIGNS OF BIOLOGICAL ACTIVITY. THE UV AERONOMY INVOLVED MEASUREMENTS IN THE UV OF THE (1) COMPOSITION AND STRUCTURE OF THE UPPER ATMOSPHERE AS A FUNCTION OF LATITUDE, LONGITUDE, AND TIME, (2) VARIABILITY OF THE RATE OF ESCAPE OF ATOMIC HYDROGEN FROM THE EXOSPHERE, AND (3) DISTRIBUTION AND VARIABILITY OF THE UV AURORA AND DETERMINATION OF THE INDUCED PLANETARY MAGNETIC FIELD. IN ADDITION, WHEN MARS WAS OCCULTED FROM THE INSTRUMENT FOV, OBSERVATIONS OF STRONG STELLAR SOURCES OF UV WERE MADE. THE OPTICS AND SENSING PORTION OF THE UVS CONSISTED OF AN EBERT GRATING SPECTROMETER WITH TWO EXIT SLITS, A LIGHT BAFFLE, AN OCCULTING SLIT TELESCOPE, AND TWO PHOTOMULTIPLIER TUBE (PMT) LIGHT SENSORS. THE INCIDENT UV RADIATION PASSED THROUGH THE BAFFLING SYSTEM, WHICH ELIMINATED ANY STRAY LIGHT, AND ENTERED INTO THE TELESCOPE. THE TELESCOPE PRIMARY MIRROR REFLECTED THE RADIATION TO A SECONDARY MIRROR THROUGH A PRESLIT WHERE IT WAS FOCUSSED ONTO THE ENTRANCE SLIT OF THE EBERT SPECTROMETER, WHICH ISOLATED MONOCHROMATIC RADIATION FROM THE INCOMING RADIATION. THE RADIATION FROM THE ENTRANCE SLIT FILLED HALF THE EBERT MIRROR WHERE IT WAS COLLIMATED AND REFLECTED ONTO THE GRATING (2160 LINES/MM) SO THAT THE RADIATION FILLED THE GRATING. THE GRATING ROTATED OVER A SMALL ANGLE BY MEANS OF A CAM-FOLLOWER DRIVE AND DIFFRACTED THE RADIATION. DIFFRACTED RADIATION OF DIFFERENT WAVELENGTHS, DEPENDING ON THE GRATING ANGLE, FELL ON THE OTHER HALF OF THE EBERT MIRROR, WHICH FOCUSSED IT ONTO THE TWO EXIT SLITS, THUS PROVIDING THE WAVELENGTH SCAN. THE TWO PHOTOMULTIPLIER TUBES SENSED RADIATION FROM THEIR RESPECTIVE EXIT SLIT AND WERE SENSITIVE ONLY TO SELECTED BANDS IN THE UV SPECTRUM -- 1100 TO 2000 A (CHANNEL 1) AND 1450 TO 3520 A (CHANNEL 2). CHANNEL 1 WAS DETECTED BY THE PMT WITH A CESIUM IODIDE PHOTOCATHODE AND LITHIUM FLUORIDE WINDOW AND INCLUDED THE DATA USED IN THE UV AERONOMY STUDY. CHANNEL 2 WAS DETECTED BY THE PMT WITH A CESIUM TELLURIDE PHOTOCATHODE AND SAPPHIRE WINDOW AND INCLUDED THE DATA USED IN THE UV CARTOGRAPHY STUDY. THE UVS SCANNED THE WAVELENGTH RANGE WITH A 3-SEC PERIOD AND A SPECTRAL RESOLUTION FOR FIRST-ORDER SPECTRA OF 15 A. THE WAVELENGTH OF ANY GIVEN PHOTOMETRIC SAMPLE IN THE UV SPECTRUM WAS KNOWN TO PLUS OR MINUS 5 A OR BETTER. THE MARINER 9 DATA AUTOMATION SUBSYSTEM (DAS) CAUSED EACH CHANNEL TO BE SAMPLED EVERY 5 MSEC. CHANNEL 2 WAS SAMPLED 2.5 MSEC AFTER CHANNEL 1. THERE WERE 200 SAMPLES/SEC/CHANNEL, A TOTAL OF 400 UVS SAMPLES/SEC. EACH SAMPLE WAS DIGITIZED TO EIGHT BITS AND ONE SIGN BIT IN THE DAS. THE INSTRUMENT HAD A DYNAMIC RANGE OF 200 RAYLEIGHS PER 20-A INTERVAL TO 50 KILORAYLEIGHS PER 20-A INTERVAL FOR CHANNEL 1 AND 200 RAYLEIGHS PER 20-A INTERVAL TO 50 MEGARAYLEIGHS PER 20-A INTERVAL FOR CHANNEL 2. CHANNEL 1 HAD A FIELD OF VIEW SUFFICIENT TO PERMIT IMAGING A PORTION OF THE MARTIAN SURFACE SUBTENDING 0.19 BY 1.9 DEG OF ARC, WHILE CHANNEL 2 WAS LIMITED TO A 0.19- BY 0.65-DEG FIELD OF VIEW. CHANNEL 1, AT A SLANT RANGE OF 5700 KM, VIEWED A COLUMN OF SPACE 100 KM ABOVE THE MARTIAN SURFACE THAT WAS 24 BY 240 KM. CHANNEL 2, ON THE OTHER HAND, AT A VERTICAL DISTANCE OF 1250 KM, VIEWED A 2.25- BY 6.5-KM AREA AT THE SUBSPACECRAFT POINT ON THE PLANET'S SURFACE. WHILE AT A VERTICAL DISTANCE OF 850 KM THE AREA VIEWED WAS 1.5 BY 4.5 KM. THE UVS HAD FOUR FUNDAMENTAL MEASURING GEOMETRIES DURING AN ORBIT -- (1) BRIGHT LIMB, (2) ILLUMINATED DISC, (3) TERMINATOR, AND (4) DARK LIMB. IN ADDITION TO TAKING COMPLETE UV SPECTRA, THE INSTRUMENT DESIGN ALSO ALLOWED FOR SAMPLING AT 1216 A (LYMAN-ALPHA) TO UTILIZE A LOWER DATA RATE MODE. THIS ALLOWED LYMAN-ALPHA DATA TO BE TAKEN FOR A LARGE PERCENTAGE OF EACH ORBIT. THE EXPERIMENT BEGAN COLLECTING EXCELLENT DATA SOON AFTER ORBITAL INSERTION ON NOVEMBER 13, 1971, AND CONTINUED UNTIL APRIL 2, 1972, WHEN THE EXPERIMENT WAS SHUT OFF TO CONSERVE SPACECRAFT POWER DURING SOLAR OCCULTATION. THE EXPERIMENT WAS REACTIVATED ON JUNE 8, 1972, AFTER THE SPACECRAFT EMERGED FROM SOLAR OCCULTATION. IT CONTINUED TO OPERATE NORMALLY UNTIL 2200 GMT ON OCTOBER 27, 1972, WHEN THE EXPERIMENT WAS SHUT OFF ALONG WITH THE REST OF THE MARINER 9 SPACECRAFT.

DATA SET NAME- PUBLISHED DATA ON MARS' LOWER ATMOSPHERE ON MICROFICHE

NSSDC ID- 71-051A-02A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 11/27/71 TO 01/21/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 7 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF THREE PUBLISHED REPORTS SUPPLIED BY THE EXPERIMENTER -- "MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER (UVS) EXPERIMENT DATA REPORT 2, DECEMBER 22, 1971," "MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 4, FEBRUARY 2, 1972," AND "MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 12, MARCH 22, 1972." THESE REPORTS WERE PUBLISHED IN HARDCOPY BY THE LABORATORY FOR ATMOSPHERIC AND SPACE PHYSICS, UNIVERSITY OF COLORADO, BOULDER, COLO. REPORT 2 COVERS NOVEMBER 27 TO DECEMBER 15, 1971, WHICH COINCIDES WITH THE PLANETWIDE DUST STORM CONDITIONS IN THE LOWER ATMOSPHERE. IT PRESENTS THE UVS DATA AND SEVERAL APPROPRIATE OBSERVATIONAL PARAMETERS GROUPED ACCORDING TO ORBITAL PASS AND PLOTTED AS A FUNCTION OF TIME. THE FIRST FIGURE OF EACH GROUP SHOWS THE PATH OF OBSERVATION ON A 1 TO 50,000,000-SCALE MERCATOR PROJECTION. THE SUBSEQUENT FIGURES OF EACH GROUP COME IN PAIRS AND INCLUDE (1) A FIGURE SHOWING THE COSINE OF THE ILLUMINATION ANGLE, THE COSINE OF THE INSTRUMENT VIEWING ANGLE, AND THE SCATTERING ANGLE, (2) THE UV DATA SHOWING THE REFLECTANCE OF THE 3050-A BAND, THE BLUE COLOR REFLECTANCE RATIO (2500 A/3050 A), AND THE RED COLOR REFLECTANCE RATIO (3380 A/3050 A). USUALLY THERE WILL BE TWO SETS OF FIGURES FOR THE MORNING MAPPING SEQUENCE AND ONE FOR THE AFTERNOON SEQUENCE. REPORT 4 COVERS DECEMBER 16, 1971, TO JANUARY 1, 1972. THIS WAS A PERIOD WHEN THE LOWER ATMOSPHERE OF MARS BEGAN TO CLEAR. AS IN REPORT 2, THE DATA HAVE BEEN GROUPED ACCORDING TO ORBITAL PASS AND PLOTTED AS A FUNCTION OF TIME, WITH THE FIRST FIGURE IN EACH GROUP BEING THE MERCATOR CHART SHOWING THE GENERAL LATITUDE AND LONGITUDE REGIONS COVERED DURING THE PASS. HOWEVER, FOLLOWING THIS FIGURE THE DATA ARRANGEMENT IS SOMEWHAT DIFFERENT. ALL THE 3050-A AND 2630-A DATA OBTAINED ON THAT PASS ARE PLOTTED IN TIME SEQUENCE. EACH SECTION OF DATA IS SUBDIVIDED INTO TWO PARTS AND ARRANGED ON OPPOSITE PAGES COVERING THE SAME TIME INTERVAL. FOUR CURVES BASED ON THE VIEWING AND ILLUMINATION GEOMETRIES HAVE BEEN INCLUDED TO FACILITATE AN UNDERSTANDING OF THE GEOMETRY OF THE MEASUREMENTS -- (1) THE SCATTERING ANGLE IS PLOTTED ALONG WITH THE 2630-A TO 3050-A REFLECTANCE RATIO AND (2) THE COSINES OF THE SOLAR INCIDENCE AND VIEWING EMISSION ANGLES AND A REPRESENTATIVE PHOTOMETRIC FUNCTION ARE PLOTTED ALONG WITH THE 3050-A REFLECTANCE. REPORT 12 COVERS JANUARY 3 TO JANUARY 21, 1972. AS BEFORE, THE DATA ARE PRESENTED IN ORBITAL SEQUENCE, AND THE COVERAGE IS INDICATED ON THE MERCATOR PROJECTION. ALSO INDICATED ON THIS MAP IS THE SCATTERING ANGLE FOR EACH OF THREE TIME INTERVALS OF OBSERVATION. THE SECOND FIGURE SHOWS THE 3050-A REFLECTANCE AND THE RED COLOR RATIO PLOTTED AS A FUNCTION OF TIME. THESE REPORTS ARE AVAILABLE THROUGH THE EXPERIMENTER.

DATA SET NAME- PUBLISHED DATA ON MARS' UPPER ATMOSPHERE AIRGLOW ON MICROFICHE

NSSDC ID- 71-051A-02B

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 11/14/71 TO 02/08/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 8 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF SIX PUBLISHED REPORTS SUPPLIED BY THE EXPERIMENTER -- "MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 1, DECEMBER 8, 1971," "MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 3, DECEMBER 15, 1971," "MARINER 9 MARS ORBITER

MARINER 9

ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 5, DECEMBER 29, 1971,' 'MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 7, JANUARY 5, 1972,' 'MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 9, JANUARY 26, 1972,' AND 'MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 11, FEBRUARY 16, 1972.' THESE REPORTS WERE PUBLISHED IN HARDCOPY BY THE LABORATORY FOR ATMOSPHERIC AND SPACE PHYSICS, UNIVERSITY OF COLORADO, BOULDER, COLO. REPORT 1 PROVIDES MARS UPPER ATMOSPHERE AIRGLOW DATA THAT WERE OBTAINED ON NOVEMBER 14, 1971, DURING THE FIRST ORBIT IN WHICH HIGH DATA RATE COMMUNICATION WAS POSSIBLE WITH MARINER 9 FOLLOWING ORBIT INSERTION. THE REPORT ALSO INCLUDES DATA OBTAINED DURING A SYSTEMATIC UPPER ATMOSPHERE STUDY FROM NOVEMBER 27 TO DECEMBER 3, 1971. THE AIRGLOW EMISSIONS ARE GROUPED AS -- (1) THE CO FOURTH POSITIVE BANDS AND THE CI 1561- AND 1657-A LINES IN THE 1418- TO 1758-A SPECTRAL REGION, (2) THE CO CAMERON BANDS IN THE 1910 TO 2458 A SPECTRAL REGION, (3) THE OI 1304-A LINE, AND (4) THE HI 1216-A LINES. THE DATA ARE PRESENTED IN SUCCESSIVE GROUPS OF EIGHT FIGURES CONTAINING THE LOG EMISSION RATE VS ALTITUDE FOR EACH OF THE ABOVE FOUR SPECTRAL RANGES FOR THE EIGHT ORBITS REPORTED. THE ORBITAL PASS NUMBER IS INDICATED ON EACH FIGURE. A TABLE IS ALSO INCLUDED GIVING THE ORBITAL PARAMETERS ASSOCIATED WITH EACH BRIGHT LIMB CROSSING. REPORT 3 COVERS THE PERIOD NOVEMBER 20 THROUGH DECEMBER 13, 1971. REPORT 5 COVERS THE PERIOD DECEMBER 15 TO DECEMBER 21, 1971. REPORT 7 COVERS THE PERIOD DECEMBER 23, 1971, TO JANUARY 2, 1972. REPORT 9 COVERS THE PERIOD JANUARY 3 TO JANUARY 21, 1972, AND REPORT 11 COVERS THE PERIOD JANUARY 23 TO FEBRUARY 8, 1972. ALL THESE REPORTS PRESENT THE SAME DATA IN THE SAME FORMAT WITH ONE EXCEPTION. AN ANOMALY APPEARED IN THE LONG WAVELENGTH CHANNEL ON ORBIT 114 AND AFFECTED THE ACQUISITION OF AIRGLOW DATA IN THAT REGION. CONSEQUENTLY, NO DATA FOR THE CO CAMERON BANDS ARE PRESENTED AFTER THIS DATE. THE OTHER DATA, HOWEVER, ARE UNAFFECTED. THESE REPORTS ARE AVAILABLE THROUGH THE EXPERIMENTER.

DATA SET NAME- PUBLISHED DATA ON 1216- AND 1304-A LIMB AND DISC AREAS OF MARS ON MICROFICHE

NSSDC ID- 71-051A-02C

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 11/12/71 TO 12/06/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF TWO PUBLISHED REPORTS SUPPLIED BY THE EXPERIMENTER -- 'MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 8, MARCH 8, 1972,' AND 'MARINER 9 MARS ORBITER ULTRAVIOLET SPECTROMETER EXPERIMENT DATA REPORT 10, MARCH 15, 1972.' THESE REPORTS WERE PUBLISHED IN HARDCOPY BY THE LABORATORY FOR ATMOSPHERIC AND SPACE PHYSICS, UNIVERSITY OF COLORADO, BOULDER, COLO. REPORT 8 PROVIDES OI 1304-A DATA FROM BOTH THE BRIGHT LIMB AND DISC OF MARS. THE 1304-A DATA HAVE BEEN PREVIOUSLY REPORTED IN DATA REPORTS 1 AND 3 (71-051A-02B). PRESENTED IN REPORT 8 ARE DATA FOR NOVEMBER 12, 1971, AND FOR NOVEMBER 27 TO DECEMBER 4 AND 6, 1971. EACH PASS SHOWN REPRESENTS APPROXIMATELY 30 MIN OF VIEWING TIME AS THE FOV CROSSED THE BRIGHT LIMB, MOVED ONTO THE DISC, AND CONTINUED PAST THE EVENING TERMINATOR. THE DATA ARE DIVIDED INTO TWO PARTS -- PREORBITAL AND ORBITAL. FIGURES 1 AND 2 D[illegible] WITH THE PREORBITAL DATA. FIGURE 1 SHOWS FIRST-ORDER SPECTRUM BETWEEN 1270 AND 1370 A OBTAINED BY AVERAGING SIX SUCCESSIVE SPECTRA OF THE DISC OF MARS VIEWED FROM APPROXIMATELY 300,000 KM. THE RELATIVE INTENSITY OF OI 1304 AND OI 1356 ARE DEPICTED ON AN INTENSITY VS WAVELENGTH PLOT WITH A DISC IN THE UPPER RIGHT HAND CORNER SHOWING THE ILLUMINATION OF THE DISC AND THE FOV. FIGURE 2 SHOWS THEORETICAL INTENSITY CONTOURS OF THESE FEATURES FOR THE SAME VIEWING CONDITIONS. FIGURES 3 TO 11 DEAL WITH THE ORBITAL DATA. EACH FIGURE IS COMPOSED OF TWO PARTS. THE UPPER HALF SHOWS THE ORBITAL PARAMETERS (COSINE OF ANGLE AT INTERSECTION POINT BETWEEN LOOK DIRECTION AND LOCAL ZENITH, COSINE OF SOLAR ZENITH ANGLE, AND SCATTERING ANGLE) NEEDED TO SPECIFY THE LINE OF SIGHT AND SOLAR ZENITH ANGLE ALONG THAT LINE. THE LOWER HALF OF EACH FIGURE SHOWS THE 1304-A INTENSITY, A THEORETICAL 1304-A INTENSITY, AND THE CO (A-X) INTENSITY ON A RELATIVE SCALE. ALSO INDICATED IS THE APPROXIMATE TIME THE FOV MOVED FROM THE LIMB ONTO THE DISC. REPORT 10 PROVIDES HI 1216-A LYMAN-ALPHA DATA FROM BOTH THE BRIGHT LIMB AND DISC OF MARS. THE DATA FORMAT IS IDENTICAL TO THAT OF REPORT 8, EXCEPT THAT THERE ARE NO PREORBITAL DATA, THEORETICAL 1216-A INTENSITY, AND CO (A-X) PLOTS INCLUDED. THIS REPORT COVERS THE SAME PERIOD AS THE REPORT 8. THESE REPORTS ARE AVAILABLE THROUGH THE EXPERIMENTER.

MANEL, MARINER 9

EXPERIMENT NAME- INFRARED INTERFEROMETER SPECTROMETER (IRIS)

NSSDC ID- 71-051A-03

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 10/27/72

PERSONNEL

PI -	R.A.	HANEL	NASA-GSFC GREENBELT, MD
OI -	B.J.	CONRATH	NASA-GSFC GREENBELT, MD
OI -	C.	PRABHAKARA	NASA-GSFC GREENBELT, MD
OI -	G.V.	LEVIN	BIOSPHERICS, INC ROCKVILLE, MD
OI -	B.	SCHLACHMAN	NASA-GSFC GREENBELT, MD
OI -	W.A.	HOVIS	NASA-GSFC GREENBELT, MD
OI -	V.G.	KUNDE	NASA-GSFC GREENBELT, MD
OI -	P.D.	LOWMAN, JR.	NASA-GSFC GREENBELT, MD
OI -	J.	PIRRAGLIA	NASA-GSFC GREENBELT, MD
OI -	T.E.	BURKE	NASA-JPL PASADENA, CA
OI -	J.C.	PEARL	NASA-GSFC GREENBELT, MD

THE MARINER 9 INFRARED INTERFEROMETER SPECTROMETER (IRIS) EXPERIMENT WAS DESIGNED TO PROVIDE INFORMATION ON THE VERTICAL STRUCTURE, COMPOSITION, AND DYNAMICS OF THE ATMOSPHERE AND ON THE EMISSIVE PROPERTIES OF THE SURFACE OF MARS. MEASUREMENTS WERE MADE IN THE REGION OF THERMAL EMISSION SPECTRA FROM 6 TO 50 MICRONS, USING A MODIFIED MICHELSON INTERFEROMETER WITH A SPECTRAL RESOLUTION OF 0.042 CM (APODIZED) AND 0.083 CM (UNAPODIZED). TO DETERMINE THE VERTICAL TEMPERATURE PROFILE, GENERAL ATMOSPHERIC CIRCULATION, MINOR ATMOSPHERIC CONSTITUENTS, AND SURFACE TEMPERATURE, COMPOSITION, AND THERMAL PROPERTIES AS A FUNCTION OF LATITUDE AND LOCAL TIME FOR DARK AND BRIGHT AREAS AND THE POLAR CAP REGION. THE INSTRUMENTATION, MOUNTED ON THE BOTTOM OF THE SPACECRAFT ON A MULTIPLE-POINTING, MOTOR-DRIVEN SCAN PLATFORM, CONSISTED PRIMARILY OF -- (1) A SCAN MIRROR, (2) A COATED CESIUM IODIDE ENTRANCE WINDOW, (3) A CESIUM IODIDE BEAM SPLITTER, (4) A FIXED MIRROR, (5) A MOVABLE MIRROR WITH ELECTROMAGNETIC DRIVE, (6) A CONDENSING MIRROR, (7) A THERMISTOR BOLOMETER DETECTOR, (8) A REFERENCE INTERFEROMETER, (9) AN INTERNAL WARM BLACKBODY CALIBRATOR, AND (10) A PROGRAMMER. THE SCAN MIRROR SELECTED IR RADIATION FROM ONE OF THREE DIRECTIONS -- MARS, DEEP SPACE, OR THE INTERNAL WARM BLACKBODY. FROM THIS MIRROR, THE RADIATION WAS REFLECTED TO THE INTERFEROMETER THROUGH THE ENTRANCE WINDOW, WHICH ACTED AS AN IR FILTER AND HAD AN EFFECTIVE APERTURE AREA OF 10 CM SQ. THE BEAM SPLITTER THEN DIVIDED THE INCOMING RADIATION INTO TWO APPROXIMATELY EQUAL COMPONENTS. AFTER REFLECTIONS FROM THE FIXED AND MOVING MIRRORS, RESPECTIVELY, THE TWO BEAMS INTERFERED WITH EACH OTHER AND WERE FOCUSED BY THE CONDENSING MIRROR ONTO THE BOLOMETRIC DETECTOR, WHICH PROVIDED AN ELECTRICAL OUTPUT PROPORTIONAL TO THE INTENSITY AS A FUNCTION OF THE PATH LENGTH DIFFERENCE OR PHASE DIFFERENCE BETWEEN THE IR RADIATION REFLECTED OR TRANSMITTED BY THE BEAM SPLITTER. THE ELECTRICAL OUTPUT, CONVERTED FROM ANALOG TO DIGITAL FORM, WAS CALLED AN INTERFEROGRAM AND REPRESENTED A CIRCULAR FRINGE PATTERN THAT APPEARED AT THE FOCAL PLANE OF THE CONDENSING MIRROR. EACH INTERFEROGRAM HAD A DURATION OF 18.2 SEC AND CONTAINED 4096 SAMPLES. AFTER SEVEN INTERFEROGRAMS WERE TAKEN IN THE OPERATING MODE, ONE WAS TAKEN OF THE INTERNAL WARM (298 PLUS OR MINUS 3 DEG K) BLACKBODY, FOLLOWED BY ANOTHER SET OF SEVEN MARS INTERFEROGRAMS, AND FINALLY BY AN INTERFEROGRAM FROM THE DEEP SPACE BACKGROUND (4 DEG). THE IRIS, WHICH HAD A FIELD OF VIEW OF 4.5 DEG, VIEWED AN AREA 116 CM IN DIAMETER FROM AN ORBITAL ALTITUDE OF 1600 KM. THE INSTRUMENT WAS IDENTICAL IN ALL CRITICAL AREAS TO THE INTERFEROMETERS DESIGNED FOR THE NIMBUS-B AND -D METEOROLOGICAL SATELLITES, EXCEPT THAT THE MARINER 9 IRIS HAD BETTER SPECTRAL RESOLUTION. THE EXPERIMENT BEGAN COLLECTING EXCELLENT DATA SOON AFTER ORBITAL INSERTION ON NOVEMBER 13, 1971, AND CONTINUED UNTIL APRIL 2, 1972, WHEN THE EXPERIMENT WAS SHUT OFF TO CONSERVE SPACECRAFT POWER DURING 2 MONTHS OF SOLAR OCCULTATION. THE EXPERIMENT WAS TURNED BACK ON JUNE 8, 1972, AFTER THE SPACECRAFT MOVED OUT OF SOLAR OCCULTATION. IT CONTINUED TO OPERATE NORMALLY UNTIL 2341 GMT ON OCTOBER 27, 1972, WHEN THE EXPERIMENT WAS TURNED OFF ALONG WITH THE REST OF THE MARINER 9 SPACECRAFT.

DATA SET NAME- INFRARED INTERFEROMETER SPECTROMETER DATA TAPES

NSSDC ID- 71-051A-03A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/16/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 5 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF 1600-BPI BINARY DATA TAPES, PRODUCED ON AN IBM 360. THE TAPES ARE 9 TRACK. EACH CONTAINS ONE FILE OF DATA. THE RECORDS HAVE A PHYSICAL RECORD SIZE OF 6408 BYTES AND A LOGICAL RECORD SIZE OF 6404 BYTES. EACH TAPE CONTAINS THE FOLLOWING SEVEN TYPES OF RECORDS -- (1) TAPE SUMMARY, (2) COLD REFERENCE CALIBRATION, (3) WARM REFERENCE CALIBRATION, (4) AVERAGE NORMALIZED RESPONSIVITY, (5) NOISE EQUIVALENT RADIANCE, (6) AVERAGE INSTRUMENT TEMPERATURE, AND (7) CALIBRATED MARTIAN SPECTRA. APPROXIMATELY 21,000 CALIBRATED SPECTRA ARE INCLUDED IN THIS DATA SET. FOR A MORE COMPLETE DESCRIPTION OF THIS DATA SET, INCLUDING CALIBRATION PROCEDURES, SEE HANEL, 'MARINER 9 INFRARED INTERFEROMETER SPECTROMETER (IRIS) REDUCED DATA RECORDS DOCUMENTATION,' OCTOBER 1973, GSFC X-622-73-305.

KLIORE, MARINER 9

EXPERIMENT NAME- S-BAND OCCULTATION

NSSDC ID- 71-051A-08

STATUS OF OPERATION- INOPERABLE
DATE LAST DATA RECORDED- 10/26/72

PERSONNEL

PI -	A.J.	KLIORE	NASA-JPL PASADENA, CA
OI -	D.L.	CAIN	NASA-JPL PASADENA, CA
OI -	G.	FJELDBO	NASA-JPL PASADENA, CA
OI -	D.L.	SEIDEL	NASA-JPL PASADENA, CA

THE DOPPLER SHIFT OF THE S-BAND TELEMETRY SIGNAL DURING OCCULTATION OF THE SPACECRAFT BY MARS PROVIDES THE VERTICAL DISTRIBUTION OF THE INDEX OF REFRACTION OF THE MARTIAN ATMOSPHERE. THESE DATA YIELD THE VERTICAL DISTRIBUTION OF NEUTRAL AND IONIZED SPECIES.

DATA SET NAME- REDUCED AND ANALYZED MARTIAN OCCULTATION DATA (TABLES AND PLOTS) ON MICROFILM

NSSDC ID- 71-051A-08A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/26/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 11 REEL(S) OF MICROFILM

THIS DATA SET CONTAINS BOTH REDUCED AND ANALYZED DATA ON 16-MM MICROFILM. THE REDUCED DATA ARE TABLES AND PLOTS OF OBSERVED FREQUENCY AND RESIDUALS (BOTH RAW AND SMOOTHED) VERSUS TIME. THE ANALYZED DATA INCLUDE TABLES AND PLOTS OF DERIVED ELECTRON DENSITY, PLASMA SCALE HEIGHT, PLASMA TEMPERATURE, MASS DENSITY, NUMBER DENSITY, TEMPERATURE LAPSE RATE, PRESSURE SCALE HEIGHT, PRESSURE, AND TEMPERATURE VERSUS RADIUS FROM THE CENTER OF MASS OF THE PLANET MARS. MOST OF THESE ITEMS ARE ALSO LISTED AND PLOTTED VERSUS ALTITUDE FROM THE SURFACE. THE SPACECRAFT ORBIT NUMBER, DAY OF YEAR, AND START-STOP TIMES ARE ALSO GIVEN FOR EACH OCCULTATION. GEODETIC COORDINATES (LATITUDE, LONGITUDE, SURFACE RADIUS, PARAMETERS REFERENCED TO A REFERENCE ELLIPSOID) ARE ALSO GIVEN FOR EACH OCCULTATION. DATA ARE INCLUDED FROM THE STANDARD MISSION (ORBITS 0 TO 79), THE FIRST EXTENDED MISSION (ORBITS 352 TO 460), AND THE SECOND EXTENDED MISSION (ORBITS 638 TO 696).

NASURSKY, MARINER 9

EXPERIMENT NAME- TELEVISION PHOTOGRAPHY

NSSDC ID- 71-051A-04

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 10/27/72

PERSONNEL

PI -	H.	NASURSKY	US GEOLOGICAL SURVEY FLAGSTAFF, AZ
OI -	G.	DE VAUCOULEURS	U OF TEXAS, AUSTIN AUSTIN, TX
OI -	J.	LEDERBERG	STANFORD U STANFORD, CA
OI -	W.	THOMPSON	BELLCOMM, INC WASHINGTON, DC

THIS EXPERIMENT CONSISTED OF A 2-IN. VIDICON TELEVISION CAMERA WHICH TRANSMITTED PHOTOGRAPHY FROM MARS. IT WAS A PHOTOMETRICALLY CALIBRATED INSTRUMENT PROVIDING OVERLAPPING, SELECTIVELY FILTERED, LOW-RESOLUTION PICTURES AND BROADBAND (UNFILTERED) HIGH-RESOLUTION PICTURES, EACH NESTED IN A LOW-RESOLUTION OVERLAP. BOTH TYPES OF PICTURES HAD APPROXIMATELY A 700- BY 380-ELEMENT FORMAT, AND AN ORDER-OF-MAGNITUDE DIFFERENCE IN RESOLUTION BETWEEN THEM. RESOLUTION OF 500 M/TV LINE AND 50 M/TV LINE RESULTED FROM LOW (11 DEG BY 14 DEG) AND HIGH (1.1 DEG BY 1.4 DEG) RESOLUTION PICTURES TAKEN AT A PERIAPSIS ALTITUDE OF 2000 KM. THE OFFICIAL ORDERING SYSTEM OF IDENTIFICATION OF PICTURES WAS BY A 9-DIGIT NUMBER CALLED DATA AUTOMATION SET (DAS) WHICH IS CHRONOLOGICAL AND A KIND OF TIME. MORE THAN 7300 PICTURES OF THE MARTIAN SURFACE, THE MARTIAN SATELLITES, SATURN, AND STAR FIELDS WERE ACQUIRED DURING THE MISSION. A VARIETY OF PICTURE ENHANCEMENT TECHNIQUES HAVE BEEN APPLIED TO THE ORIGINAL DATA RESULTING IN MORE THAN 30,000 PHOTOGRAPHS BEING AVAILABLE THROUGH NSSDC. THESE DIFFERENT VERSIONS OF THE ORIGINAL IMAGERY WERE PROCESSED USING THE MISSION TEST VIDEO SYSTEM (MTVS) AND THE IMAGE PROCESSING LABORATORY (IPL) AT JPL.

DATA SET NAME- MTVS RAW PHOTOS ON B/W POSITIVE 70-MM FILM

NSSDC ID- 71-051A-04A

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 8461 FRAMES

THIS DATA SET WHICH CONSISTS OF 70-MM B/W FILM, IS ONE OF THREE VERSIONS REPRODUCED FROM THE DIGITIZED IMAGES TRANSMITTED FROM CAMERAS ON MARINER 9. THESE PHOTOGRAPHS, REPRODUCED BY THE MTVS LABORATORY HAVE HAD NO ENHANCEMENT, STRETCHING, OR FILTERING, AND HENCE ARE RAW DATA. THE OTHER TWO VERSIONS APPEAR NEXT TO THE RAW VERSION, FOLLOWED BY A DATA BLOCK CONTAINING THE FOLLOWING INFORMATION -- MISSION DESIGNATION, PLAYBACK NUMBER, ORBIT (OFTEN NOT GIVEN), SET (OFTEN NOT GIVEN), TIME FROM PERIAPSIS, SLANT RANGE, VIEWING ANGLE, PHASE ANGLE, LIGHTING ANGLE, LATITUDE AND LONGITUDE OF CORNERS AND CENTER OF FRAME, PICTURE NUMBER, CAMERA, FILTER, EXPOSURE TIME, DAS NUMBER, RATE, PN ERRORS, PIX SPIKES, FRAME NUMBER, STRETCH CONTROL, TRANSLATION, AND PICTURE VERSION. BELOW THE PICTURE ARE TWO GRAPH CHARTS, ONE SHOWING DATA OUTPUT AND THE OTHER SHOWING FILM OUTPUT.

DATA SET NAME- MTVS ALBEDO PHOTOS ON B/W POSITIVE 70-MM FILM

NSSDC ID- 71-051A-04B

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 8461 FRAMES

THIS DATA SET IS THE ALBEDO VERSION OF DATA SET -01A. IN THESE FRAMES, THE ORIGINAL DATA HAVE BEEN COMPUTER-ENHANCED (SHADING CORRECTED) AND STRETCHED TO BRING OUT THE RANGE OF BRIGHTNESS OF DETAILS THAT ARE CONTAINED IN THE ORIGINALS. THIS VERSION MAY BE USED FOR MORE MAGNIFIED DATA ON RANGE OF ALBEDOS OR THE LIGHT REFLECTANCE RANGE OF THE MARTIAN SURFACE. THE ACCOMPANYING DATA BLOCK CONTAINS THE FOLLOWING INFORMATION -- MISSION DESIGNATION, PLAYBACK NUMBER, ORBIT (OFTEN NOT GIVEN), SET (OFTEN NOT GIVEN), TIME FROM PERIAPSIS, SLANT RANGE, VIEWING ANGLE, PHASE ANGLE, LIGHTING ANGLE, LATITUDE AND LONGITUDE OF CORNERS AND CENTER OF PHOTO, PICTURE NUMBER, CAMERA FILTER, EXPOSURE TIME, DAS NUMBER, RATE, PN ERRORS, PIX SPIKES, FRAME NUMBER, STRETCH CONTROL, TRANSLATION, AND PICTURE VERSION. BELOW THE PICTURE ARE TWO GRAPHS, ONE SHOWING THE DATA OUTPUT AND THE OTHER SHOWING FILM OUTPUT. THE QUALITY IS GENERALLY GOOD AFTER THE FIRST 40 REVOLUTIONS. IN THE FIRST FEW WEEKS OF PHOTOGRAPHY, A PLANET-WIDE DUST STORM OBSCURED NEARLY ALL SURFACE DETAIL. AFTER THE DUST SETTLED, EXCELLENT DETAIL WAS RECORDED.

MARINER 9

DATA SET NAME- HTVS MAXIMUM DISCRIMINATION PHOTOS ON B/W POSITIVE 70-MM FILM

NSSDC ID- 71-051A-04C

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 6461 FRAMES

THIS DATA SET IS THE ENHANCED VERSION OF DATA SET -01A AND IS THE THIRD VERSION OF THE ORIGINAL DATA AS PROCESSED BY THE HTVS LABORATORY. THIS VERSION CONTAINS THE PHOTOS THAT RESULTED AFTER THE DIGITAL DATA HAD BEEN PASSED THROUGH A FILTERING PROCESS THAT GIVES MAXIMUM DISCRIMINATION OF DETAILS BUT IN WHICH THE ALBEDO IS NOT AS APPARENT AS IN THE ALBEDO VERSION. EACH FRAME IS ACCOMPANIED BY A DATA BLOCK THAT GIVES THE FOLLOWING INFORMATION -- MISSION DESIGNATION, PLAYBACK NUMBER, ORBIT (OFTEN NOT GIVEN), SET (OFTEN NOT GIVEN), TIME FROM PERIAPSIS, SLANT RANGE, VIEWING ANGLE, PHASE ANGLE, LIGHTING ANGLE, LATITUDE AND LONGITUDE OF CORNERS AND CENTER OF PHOTO, PICTURE NUMBER, CAMERA FILTER, EXPOSURE TIME, DAS NUMBER, RATE, PN ERRORS, PIX SPIKES, FRAME NUMBER, STRETCH CONTROL, TRANSLATION, AND PICTURE VERSION. BELOW THE PICTURE ARE TWO GRAPHS, ONE SHOWING DATA OUTPUT AND THE OTHER SHOWING FILM OUTPUT. THE QUALITY IS GENERALLY GOOD AFTER ABOUT REVOLUTION 40. BEFORE THAT TIME THE CAMERA WAS OPERATING DURING A PLANET-WIDE DUST STORM WHICH OBSCURED NEARLY ALL DETAIL. AFTER ABOUT THE FIRST 3 WEEKS OF THE MISSION, THE DUST SETTLED AND EXCELLENT DETAIL WAS RECORDED.

DATA SET NAME- IPL ALBEDO PHOTOS ON BLACK/WHITE POSITIVE 70-MM FILM

NSSDC ID- 71-051A-04D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 8410 FRAMES

THESE PHOTOGRAPHS ARE ALBEDO VERSIONS OF THE ORIGINAL 70-MM FRAMES PROCESSED BY THE IPL LABORATORY. THE ALBEDO VERSIONS HAVE BEEN ENHANCED BY STRETCHING OUT ALBEDOS FOR CONTRAST, THUS ENCOMPASSING THE ENTIRE BRIGHTNESS RANGE OF THE EXPOSED REGIONS. A DATA BLOCK INCLUDED ON THE FRAME GIVES THE FOLLOWING DATA -- MISSION DESIGNATION, DATE, TIME, DAS NUMBER, PICTURE NUMBER, EXPOSURE TIME (MILLISECONDS), FILTER USED, ALTITUDE OF SPACECRAFT, VIEW ZENITH ANGLE, LONGITUDE AND LATITUDE OF CENTER OF PHOTO, APPROXIMATE HORIZONTAL DISTANCE (WIDTH) ON SURFACE, VERTICAL DISTANCE (HEIGHT) ON SURFACE, SOLAR ZENITH ANGLE, FRAME CORNER COORDINATES, CORRECTION FOR RESIDUAL IMAGE, CONVERSION FACTOR FOR LUMINOSITY (TO FT-L), AND STRETCH FACTOR. THIS VERSION HAS HAD FIRST-ORDER CORRECTION FOR ERROR AND ORTHOGRAPHIC CORRECTION. THE QUALITY OF THE FRAMES IN GENERALLY GOOD. VERY LITTLE DETAIL IS FOUND ON THE FRAMES TAKEN EARLY IN THE MISSION (NOVEMBER-DECEMBER 1971) OWING TO THE PLANET-WIDE DUST STORM IN PROGRESS AT THAT TIME.

DATA SET NAME- IPL MAXIMUM DISCRIMINATION PHOTOS ON BLACK/WHITE POSITIVE 70-MM FILM

NSSDC ID- 71-051A-04E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 8410 FRAMES

THESE PHOTOS ARE ENHANCED VERSIONS OF THE ORIGINAL 70-MM FRAMES PROCESSED BY THE IPL LABORATORY. IN THIS VERSION THE ORIGINAL HAS BEEN FILTERED TO PRODUCE MAXIMUM DISCRIMINATION FOR SURFACE DETAIL AND HAS HAD SOME FIRST-ORDER ERROR CORRECTION AND ORTHOGRAPHIC CORRECTION. INCLUDED ON EACH FRAME IS A DATA BLOCK CONTAINING THE FOLLOWING INFORMATION -- MISSION DESIGNATION, DATE, TIME, DAS NO., PICTURE, EXPOSURE TIME (IN MILLISECONDS), FILTER USED, ALTITUDE OF SPACECRAFT, VIEW ZENITH ANGLE, LONGITUDE AND LATITUDE OF PHOTO CENTER, APPROXIMATE HORIZONTAL DISTANCE COVERED ON THE MARTIAN SURFACE IN THE FRAME (WIDTH), VERTICAL DISTANCE ON SURFACE COVERED BY THE FRAME (HEIGHT), SOLAR ZENITH ANGLE, CORNER COORDINATES OF THE FRAME, CORRECTION FOR RESIDUAL IMAGE, CONVERSION FACTOR FOR LUMINOSITY (TO FT-L), AND STRETCH FACTOR. THE QUALITY IS GENERALLY GOOD. VERY LITTLE DETAIL IS SEEN ON THOSE FRAMES TAKEN EARLY IN THE MISSION (NOVEMBER-DECEMBER 1971) OWING TO THE PLANET-WIDE DUST STORM IN PROGRESS AT THAT TIME.

DATA SET NAME- COMPLETE 70-MM PHOTOGRAPHY ON 4- BY 6-IN. B/W MICROFICHE

NSSDC ID- 71-051A-04F

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 771 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF 4- X 6- IN. B/W MICROFICHE CONTAINING ALL VERSIONS OF THE MARINER 9 TV IMAGERY REPRODUCED BY THE HTVS LABORATORY. THE VERSIONS ARE (1) RAW, (2) ALBEDO, (3) MAXIMUM DISCRIMINATION (HORIZONTALLY FILTERED) AND, IN SOME CASES, (4) MAXIMUM DISCRIMINATION VERTICALLY FILTERED. THESE VERSIONS APPEAR SIDE BY SIDE, FOLLOWED BY THE DATA BLOCK WITH THE DATA COMMON TO ALL VERSIONS. UP TO 60 FRAMES APPEAR ON EACH CARD. UP TO FOUR SUCCESSIVE CARDS CONSTITUTE THE IMAGERY FROM ONE ORBIT. THE LAST CARD CONTAINS ADDITIONAL SUPPORT DATA. THE CARDS ARE ORDERED BY ROLL AND FILE NUMBERS AND ARE ALSO DAS SEQUENTIAL. (THE DAS NUMBER IS THE COMMON DATUM TO ALL VERSIONS OF THE SAME PICTURE.) EACH CARD IS HEADED BY THE IDENTIFICATION OF THE MISSION PHOTO LABORATORY AND ROLL NUMBER. THE LAST CARD FOR EACH ORBIT CONTAINS UPDATING OF SOME OF THE PARAMETERS CONTAINED IN THE DATA BLOCKS THAT CONTAIN PREDICTED VALUES THAT MAY BE IN ERROR. THESE MICROFICHE CONSTITUTE THE NSSDC CATALOG OF MARINER 9 HTVS PHOTOGRAPHY. INCLUDED ARE 15 CARDS CONTAINING THE ADDITIONAL AND COMPLETE SUPPORTING DATA FOR EACH OF THE FRAMES OF THE PHOTOGRAPHY.

DATA SET NAME- PANORAMIC MOSAIC PHOTOGRAPHS ON 4- BY 5-IN. B/W FILM SHEETS

NSSDC ID- 71-051A-04G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 96 FRAMES

THIS DATA SET CONSISTS OF 4- X 5- IN. NEGATIVES FILMED FROM JPL-PREPARED MOSAIC BOARDS CONTAINING THE MARINER 9 B CAMERA (NARROW-ANGLE, HIGH-RESOLUTION) PHOTOGRAPHY IN WHICH FRAMES IN A GIVEN QUADRANGLE OF THE MARTIAN SURFACE ARE SHOWN TOGETHER. THIS DATA SET WAS FILMED BY JPL FROM JPL-PREPARED MOSAIC BOARDS. FRAMES OF ADJACENT AREAS ARE ARRANGED TOGETHER, PRODUCING A KIND OF MOSAIC. THE LAST FOUR DIGITS OF THE DAS TIME ARE GIVEN BESIDE EACH FRAME. THE JPL-ASSIGNED BOARD NUMBER AT THE LOWER RIGHT CORNER, AND THE CAMERA AND TYPE OF PROCESSING (SHADING CORRECTED (SC) OR MAXIMUM DISCRIMINATION - EITHER VERTICALLY (VAGC) OR HORIZONTALLY (HAGC)) IN THE UPPER RIGHT CORNER. THE REVOLUTION NUMBER AND FULL DAS TIME ARE GIVEN IN EACH MOW. THE QUALITY IS EXCELLENT, AND THESE PHOTOS CAN BE USED FOR SOME SCIENTIFIC PURPOSES, BUT THEIR MAIN PURPOSE IS FOR USE AS A CATALOG, AN INDEX, TOGETHER WITH REDUCED-SIZE COPY OF EACH OF THE MOSAICS, IS AVAILABLE IN MICROFORM (SEE 71-051A-04H).

DATA SET NAME- TELEVISION PHOTOGRAPHY SUPPORTING DATA ON 16-MM MICROFILM

NSSDC ID- 71-051A-04H

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF 16-MM MICROFILM CONTAINING THE SUPPORTING DATA FOR THE COMPLETE 70-MM PHOTOGRAPHY OF THE MARINER 9 MISSION. EXPLANATORY TABLES AND DIAGRAMS ARE AT THE BEGINNING OF THE ROLL AND PERTAIN TO THE FOLLOWING SUPPORTING DATA -- REVOLUTION NUMBER, DAS TIME, CAMERA, SHUTTER TIME IN GMT, DAY OF YEAR, FILTER AND EXPOSURE TIME, LOCAL TIME FROM TIME OF PERIAPSIS, DISTANCE FROM SPACECRAFT TO CENTER OF

PLANET (RHAG), TRUE ANOMALY OF THE SPACECRAFT (SC/TA), SUN'S LATITUDE AND LONGITUDE, SPACECRAFT'S LATITUDES AND LONGITUDES, PRINCIPAL POINT'S LATITUDE AND LONGITUDE (0 LAT AND 0 LONG), PICTURE HEIGHT AND WIDTH, NORTH DIRECTION ON THE PLANETARY SURFACE MEASURED IN THE IMAGE PLANE AND PIXEL SIZE, AND SUN ANGLE (WHICH IS THE SUN'S DIRECTION ON THE PLANET MEASURED IN THE IMAGE PLANE). THESE SUPPORT DATA ARE EARLY DATA THAT CONTAIN SOME ERRORS. THE SEDR SUPPORT DATA (DATA SET 71-051A-04K) ON MAGNETIC TAPE CONTAIN THE FINAL BEST DATA.

DATA SET NAME- TELEVISION PHOTOGRAPHY INDEX DATA ON 16-MM MICROFILM

NSSDC ID- 71-051A-04I

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 2 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF THE COMPLETE INDEXES OF NTVS AND IPL VERSIONS OF THE MARINER 9 70-MM PHOTOGRAPHY, REPRODUCED AT NSSDC ON 16-MM MICROFILM FOR CATALOG PURPOSES. THE INDEXES ARE ARRANGED IN SIX DIFFERENT SORTS -- (1) PRINCIPAL POINT LATITUDE, (2) PRINCIPAL POINT LONGITUDE, (3) DAS TIME, (4) NTVS ROLL AND FILE NUMBER, (5) IPL ROLL AND PROCESS TIME, AND (6) COMMENTS. EACH SORT CONTAINS THE PARAMETERS LISTED ABOVE AND, IN ADDITION, GIVES THE REVOLUTION NUMBER.

DATA SET NAME- IPL MICROFICHE CATALOG OF SELECTED PHOTOGRAPHY

NSSDC ID- 71-051A-04J

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 08/06/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 279 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF THE BEST MARINER 9 PHOTOGRAPHY ON MICROFICHE FROM THE IPL/ADR. THE FIRST CARD CONTAINS EXPLANATIONS OF DATA FOR THIS MICROFICHE CATALOG. THE QUALITY OF REPRODUCTION IS SUFFICIENT FOR SOME SCIENTIFIC STUDIES TO BE MADE DIRECTLY FROM THEM.

DATA SET NAME- SEDR FINAL SUPPORT DATA ON MAGNETIC TAPE

NSSDC ID- 71-051A-04K

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/12/71 TO 10/18/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF THE FINAL AND MOST CORRECT SUPPORT DATA TAPE FOR THE MARINER 9 PHOTOGRAPHY. THE TAPE WAS WRITTEN IN 7-TRACK, BINARY CODE AT 556 BPI ON AN IBM 360. THE CONTENTS OF THE TAPE SUPERSEDE ANY OTHER SUPPORT DATA, SUCH AS THE RECORDS ON THE DATA BLOCKS ON THE IMAGERY, OR THOSE ON THE REDUCED DATA RECORDS (RDR). THE INFORMATION GIVEN IS SIMILAR TO THAT CONTAINED IN DATA SET 71-051A-04H.

DATA SET NAME- CATALOG OF MARINER 9 NTVS PHOTOGRAPHY ON 16-MM MICROFILM

NSSDC ID- 71-051A-04L

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/09/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 20 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF THE COMPLETE MARINER 9 NTVS PHOTOGRAPHY ON 16-MM FILM FOR CATALOG PURPOSES. GENERALLY, THREE RENDITIONS OF EACH FRAME ARE GIVEN -- (A) RAW, (B) ALBEDO RECTIFIED, AND (C) HIGH PASS FILTERED (FOR MAXIMUM DISCRIMINATION). THE QUALITY IS VERY GOOD, AND THE PHOTOS CAN BE DIRECTLY USED FOR SOME SCIENTIFIC PURPOSES.

DATA SET NAME- MOSAIC PHOTOGRAPHS AND INDEX CATALOG ON 16-MM MICROFILM

NSSDC ID- 71-051A-04N

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF JPL-PREPARED MOSAIC BOARDS OF SELECTED AREAS OF THE MARTIAN TERRAIN TOGETHER WITH AN INDEX ON 16-MM MICROFILM. THE PHOTOGRAPHIC MOSAICS ARE GROUPED ACCORDING TO SPECIFIC GEOGRAPHICAL AREAS AND WERE FILMED FROM 4- X 5-IN. NEGATIVES (DATA SET 71-051A-04G). THE INDEX CONSISTS OF TWO LISTINGS WHICH ARE IDENTICAL IN CONTENT. THE FIRST IS ORDERED BY MOSAIC NUMBER AND THE SECOND BY DAS TIME. THIS MOSAIC CATALOG ENABLES USERS TO IDENTIFY THOSE MOSAICS FOR WHICH THEY REQUIRE HIGHER QUALITY REPRODUCTIONS.

DATA SET NAME- LIMB PHOTOGRAPHY INDEX ON B/W MICROFICHE

NSSDC ID- 71-051A-04O

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 16 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF B/W POSITIVE MICROFICHE CARDS INDEXING THE COMPLETE SET OF LIMB PHOTOGRAPHY FROM THE MARINER 9 IPL REDUCED DATA FOUND IN DATA SET 71-051A-04P. EACH FRAME CONTAINS THE SUPPORT DATA THAT ALL MARINER 9 PHOTOGRAPHY POSSESSES. THE LISTINGS ARE ORDERED BY IPL ROLL NUMBER AND SEDR/DAS TIME.

DATA SET NAME- LIMB PHOTOGRAPHY CATALOG ON B/W MICROFICHE

NSSDC ID- 71-051A-04P

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 166 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF MICROFICHE OF THE MARTIAN LIMB PHOTOGRAPHY. IN ADDITION TO THE PHOTOGRAPHIC IMAGERY, THERE ARE PLOTS OF LIMB PROFILES, SUPPORTING DATA BLOCKS FOR THE PHOTOGRAPHS, AND SUPPORTING DATA FOR THE PLOTS. THE DATA BLOCKS FOR THE PHOTOGRAPHY CONTAIN THE FOLLOWING INFORMATION -- PICTURE NUMBER, DAS TIME, ALTITUDE, VIEW ZENITH ANGLE, CENTER AND CORNER COORDINATES, YEAR, DAY, MONTH, GMT TIME, FILTER, PICTURE HEIGHT AND WIDTH IN KM ON THE SURFACE, PHASE ANGLE, PROCESS DATA, AND IPL NUMBER. THE DATA BLOCKS ON THE LIMB PROFILE PLOTS CONTAIN THE FOLLOWING INFORMATION -- DAS TIME, FILTER, LIMB ASSCISSA, PLOT LINE NUMBER, LOCAL TIME, LONGITUDE AND LATITUDE, LINE SAMPLE, ILLUMINATION ANGLE, PHASE ANGLE, SUN AZIMUTH, SCALE, START LINE, START SAMPLE, END LINE, AND END SAMPLE. THE IMAGERY IS GENERALLY VERY GOOD, INCLUDING THE PLOTS AND THE DATA BLOCKS. OCCASIONALLY SOME OF THE LETTERS BLEED A LITTLE IN THE DATA BLOCKS, BUT EVEN THESE SHOULD BE LEGIBLE.

MARINER 9/MARINER 10

DATA SET NAME- SELECTED MTVS AND IPL PHOTOGRAPHY ON MICROFICHE FROM CAL TECH

NSSDC ID- 71-051A-04Q

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/13/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 465 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF MICROFICHE, SELECTED BY CAL TECH PERSONNEL REPRESENTING THE BEST FRAMES FROM THE MTVS AND IPL REPRODUCTIONS. MOST OF THE PHOTOGRAPHS ARE THE ALBEDO-STRETCHED AND MAXIMUM-DISCRIMINATION VERSIONS OF THE ORIGINAL IMAGERY. INCLUDED WITH THE PHOTOGRAPHS ARE GRAY SCALES, QUADRANT MAPS, AND SUPPORTING DATA FOR THE IMAGES THAT APPEAR ON EACH CARD. THE SUPPORTING DATA CONTAIN THE FOLLOWING INFORMATION -- PICTURE IDENTIFICATION, DAS TIME, ORBIT NUMBER, CAMERA, FILTER, ROLL AND FILE NUMBER (MTVS), DATA PICTURES FOOTPRINTS (MAPS), CORNER COORDINATES, SLANT RANGE, VIEWING ANGLE, RESOLUTION, SOLAR LIGHTING ANGLE, PHASE ANGLE, LOCAL TIME OF THE CENTER FROM MIDNIGHT, SUN DIRECTION IN THE IMAGE, DIRECTION OF NORTH IN THE IMAGE, AND EXPOSURE INTERVAL. THE TIME PERIOD COVERED IS FROM NOVEMBER 12, 1971 (FAR-ENCOUNTER PHOTOS), TO OCTOBER 27, 1972. THE SUPPORTING DATA IN THESE CARDS ARE EQUIVALENT TO THE SEQR DATA, WHICH IS THEREFORE THE MOST CORRECT. THE PHOTOGRAPHIC IMAGERY IS GENERALLY VERY GOOD. THE FOOTPRINT AND SUPPORTING DATA IMAGERY VARY FROM FAIR TO POOR. THESE MICROFICHE ARE FOR CATALOG PURPOSES, BUT THE IMAGERY MAY BE USEFUL IN SOME AREAS OF RESEARCH.

DATA SET NAME- RDR PRODUCTS STATUS INDEX OF MARINER 9 PHOTOGRAPHY ON 16-MM MICROFILM

NSSDC ID- 71-051A-04V

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/09/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET IS AN INDEX OF THE PRESENT STATUS OF THE REDUCED DATA RECORD (RDR) FOR MARINER PHOTOGRAPHY COPIED ON 16-MM MICROFILM FROM COMPUTER LISTING HARDCOPY SUPPLIED BY JPL. THE INDEX IS ORDERED IN TWO WAYS, BY IPL ROLL NO. AND BY DAS TIME, AND CONTAINS THE FOLLOWING INFORMATION (ORDERED BY ROLL NO.) IN COLUMNS -- (1) ROLL NO., (2) PROCESSING TIME, (3) DAS TIME, (4) REVOLUTION NO., (5) CAMERA, (6) NO. OF FRAME IN REVOLUTION, (7) TOTAL PICTURES IN REVOLUTION, (8) DSPL, (9) CUMULATIVE PICTURE NO., (10) ENHANCEMENT 1, (11) ENHANCEMENT 2, AND (12) RDR STATUS. THE LISTING BY DAS TIME IS PRECEDED BY AN EXPLANATION OF TERMS IN THE STATUS COLUMN.

DATA SET NAME- IPL MARINER 9 PHOTOGRAPHY ENHANCEMENT INDEX ON 16-MM MICROFILM

NSSDC ID- 71-051A-04W

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/09/71 TO 10/27/72
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET IS AN INDEX CATALOG OF THE IPL ENHANCEMENT PROCESSING OF MARINER 9 PHOTOGRAPHY SUPPLIED BY JPL IN THE FORM OF A COMPUTER PRINTOUT REPRODUCED ONTO 16-MM MICROFILM. THE INDEX LISTING, ORDERED BY PROCESSING TIME CONTAINS THE FOLLOWING INFORMATION -- (1) PROCESSING TIME, (2) DAS TIME, (3) PROCESSING DATE, (4) ROLL NO., (5) ENHANCEMENT 1, (6) ENHANCEMENT 2, (7) ENHANCEMENT 3, (8) ENHANCEMENT 4, (9) ENHANCEMENT 5, (10) ENHANCEMENT 6, (11) ENHANCEMENT 7, (12) OUTPUT TAPE, (13) TAPE FILE, AND (14) REMARKS. NO EXPLANATORY NOTES ARE INCLUDED. THE MATERIAL IS GENERALLY LEGIBLE.

SPACECRAFT COMMON NAME- MARINER 10

ALTERNATE NAMES- MARINER 73, PL-732A
MARINER-J VENUS/MERCURY, MARINER VENUS/MERCURY 6919

NSSDC ID- 73-085A

LAUNCH DATE- 11/03/73 WEIGHT- 504. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/24/75

THIS SPACECRAFT WAS THE FIRST ONE TO USE THE GRAVITATIONAL PULL OF ONE PLANET (VENUS) TO REACH ANOTHER (MERCURY). THE SPACECRAFT STRUCTURE WAS AN 18.15-KG, EIGHT-SIDED FRAMEWORK WITH EIGHT ELECTRONICS COMPARTMENTS. IT MEASURED 1.39 M DIAGONALLY AND 0.457 M IN DEPTH. TWO SOLAR PANELS, EACH 2.7 M LONG AND 0.97 M WIDE, WERE ATTACHED AT THE TOP, SUPPORTING 5.1 SQ M OF SOLAR CELL AREA. THE ROCKET ENGINE WAS LIQUID-FUELED, WITH TWO SETS OF REACTION JETS USED TO STABILIZE THE SPACECRAFT ON THREE AXES. IT CARRIED A LOW-GAIN OMNIDIRECTIONAL ANTENNA, COMPOSED OF A HONEYCOMB-DISC PARABOLIC REFLECTOR, 1.37 M IN DIAMETER, WITH FOCAL LENGTH 55 CM. FEEDS ENABLED THE SPACECRAFT TO TRANSMIT AT S-BAND AND X-BAND FREQUENCIES. THE SPACECRAFT CARRIED A CANOPUS STAR TRACKER, LOCATED ON THE UPPER RING STRUCTURE OF THE OCTAGONAL SATELLITE, AND ACQUISITION SUN SENSORS ON THE TIPS OF THE SOLAR PANELS. THE INTERIOR OF THE SPACECRAFT WAS INSULATED WITH MULTILAYER THERMAL BLANKETS AT TOP AND BOTTOM. A SUNSHADE WAS DEPLOYED AFTER LAUNCH TO PROTECT THE SPACECRAFT ON THE SOLAR-ORIENTED SIDE. INSTRUMENTS ABOARD THE SPACECRAFT MEASURED THE ATMOSPHERIC, SURFACE, AND PHYSICAL CHARACTERISTICS OF MERCURY AND VENUS. EXPERIMENTS INCLUDED TELEVISION PHOTOGRAPHY, AND MAGNETIC FIELD, PLASMA, INFRARED RADIOMETRY, ULTRAVIOLET SPECTROSCOPY, AND RADIO SCIENCE DETECTORS. AN EXPERIMENTAL X-BAND HIGH-FREQUENCY TRANSMITTER WAS FLOWN FOR THE FIRST TIME ON THIS SPACECRAFT. MARINER 10 WAS PLACED IN A PARKING ORBIT AFTER LAUNCH FOR APPROXIMATELY 25 MINUTES, THEN PLACED IN ORBIT AROUND THE SUN EN ROUTE TO VENUS. THE ORBIT DIRECTION WAS OPPOSITE TO THE MOTION OF THE EARTH AROUND THE SUN. MID-COURSE CORRECTIONS WERE MADE. THE SPACECRAFT PASSED VENUS ON FEBRUARY 5, 1974, AT A DISTANCE OF 4200 KM. IT CROSSED THE ORBIT OF MERCURY ON MARCH 29, 1974, AT 2046UT, AT A DISTANCE OF ABOUT 704 KM FROM THE SURFACE. THE TV AND ULTRAVIOLET EXPERIMENTS WERE TURNED ON THE COMET KOHOUTEK WHILE THE SPACECRAFT WAS ON THE WAY TO VENUS. A SECOND ENCOUNTER WITH MERCURY, WHEN MORE PHOTOGRAPHS WERE TAKEN, OCCURRED ON SEPTEMBER 21, 1974, AT AN ALTITUDE OF ABOUT 47,000 KM. A THIRD AND LAST MERCURY ENCOUNTER AT AN ALTITUDE OF 327 KM, WITH ADDITIONAL PHOTOGRAPHY OF ABOUT 300 PHOTOS AND MAGNETIC FIELD MEASUREMENTS OCCURRED ON MARCH 16, 1975. ENGINEERING TESTS WERE CONTINUED UNTIL MARCH 24, 1975, WHEN THE SUPPLY OF ATTITUDE CONTROL GAS WAS DEPLETED AND THE MISSION WAS TERMINATED.

HURRAY, MARINER 10

EXPERIMENT NAME- TELEVISION PHOTOGRAPHY

NSSDC ID- 73-085A-01

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST USABLE DATA RECORDED- 03/17/75

PERSONNEL

PI -	B.C. HURRAY	CALIF INST OF TECH	PASADENA, CA
OI -	H.J.S.BELTON	KITT PEAK NATL OBS	TUCSON, AZ
OI -	G.P. KUIPER	U OF ARIZONA	TUCSON, AZ
OI -	V.E. SUOMI	U OF WISCONSIN	MADISON, WI
OI -	N.J. TRASK, JR.	US GEOLOGICAL SURVEY	MENLO PARK, CA
OI -	D.E. GAULT	NASA-ARC	MOFFETT FIELD, CA
OI -	B.M. HAPKE	U OF PITTSBURGH	PITTSBURGH, PA
OI -	M.E. DAVIES	RAND CORP	SANTA MONICA, CA
OI -	D.T. O'LEARY	CORNELL U	ITHACA, NY

THIS EXPERIMENT TOOK TELEVISION-VIDEO PHOTOGRAPHY OF BOTH VENUS AND MERCURY. THE OBJECTIVES OF THE EXPERIMENT WERE -- (1) TO MAP AND IDENTIFY THE MAJOR PHYSIOGRAPHIC PROVINCES OF MERCURY, (2) TO DETERMINE THE ORIENTATION OF THE SPIN AXIS OF MERCURY, (3) TO COMBINE ALL OF THE MERCURY DATA TO ESTABLISH A CARTOGRAPHIC COORDINATE SYSTEM, (4) TO INVESTIGATE THE TIME-DEPENDENT PROPERTIES OF THE VENUS ULTRAVIOLET "CLOUDS," AND (5) TO OBTAIN HIGH-RESOLUTION IMAGERY OF THE MAIN CLOUDS OF VENUS. THE INSTRUMENT WAS A GEC 1 "VIDICON TUBE." IT HAD A 42-SEC FRAMING RATE AND A 0.48- BY 0.37-DEG FIELD OF VIEW AND USED TWO SPHERICAL TELESCOPE 150-MM OPTICS. APPROXIMATELY 6700 PICTURES, WITH A RESOLUTION OF 100 M, WERE OBTAINED.

DATA SET NAME- MARINER 10 PHOTOGRAPHY OF VENUS
ON MICROFICHE

NSSDC ID- 73-085A-01G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/05/74 TO 02/05/74
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 120 CARD(S) OF B/W MICROFICHE

THESE NUMBERED MICROFICHE CARDS CONTAIN THREE VERSIONS OF THE MARINER 10 FIRST-ENCOUNTER VENUS PHOTOGRAPHY. EACH FRAME HAS A VERTICAL AND HORIZONTAL (0 TO 700 ON THE ORDINATE AND 0 TO 800 ON THE ABSCISSA) AND CONTAINS ONE VERSION OF IMAGERY IN ORDER -- (1) RAW PHOTOGRAPH (R), (2) HIGH-PASS FILTER (H), THEN (3) VERTICAL AGC (V), WHICH IS GENERALLY THE MOST DETAILED VERSION. THE THREE VERSIONS HAVE THE SAME 7-DIGIT FRAME NUMBER, WHICH IS PRECEDED BY A CAMERA ID LETTER (A -- WIDE ANGLE, B -- NARROW ANGLE) AND FOLLOWED BY A LETTER IDENTIFYING IMAGERY VERSION. BELOW EACH FRAME ARE TWO GRAPHS -- ONE (LEFT) INDICATING DATA INPUT GRAY SCALE, AND THE OTHER (RIGHT) INDICATING FILM OUTPUT GRAY SCALE.

SPACECRAFT COMMON NAME- NIMBUS 4

ALTERNATE NAMES- NIMBUS-D, PL-701E
04362

NSSDC ID- 70-025A

LAUNCH DATE- 04/08/70 WEIGHT- 620. KG

STATUS OF OPERATION- PARTIAL

ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC	EPOCH DATE- 05/05/,3
ORBIT PERIOD- 107.12 MIN	INCLINATION- 99.69 DEG
PERIAPSIS- 1091. KM ALT	APOAPSIS- 1096. KM ALT

NIMBUS 4, THE FOURTH IN A SERIES OF SECOND-GENERATION METEOROLOGICAL R AND D SATELLITES, WAS DESIGNED TO SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOROLOGICAL DATA. THE POLAR-ORBITING SPACECRAFT CONSISTED OF THREE MAJOR STRUCTURES -- (1) A RING-SHAPED SENSOR MOUNT, (2) SOLAR PADDLES, AND (3) THE CONTROL HOUSING UNIT, WHICH WAS CONNECTED TO THE SENSOR MOUNT BY A TRUSS STRUCTURE. SHAPED SOMEWHAT LIKE AN OCEAN BUOY, NIMBUS 4 WAS NEARLY 3.7-M TALL, 1.45 M IN DIAMETER AT THE BASE, AND ABOUT 3 M ACROSS WITH SOLAR PADDLES EXTENDED. THE TORUS-SHAPED SENSOR MOUNT, WHICH FORMED THE SATELLITE BASE, HOUSED THE ELECTRONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS RING PROVIDED A MOUNTING SPACE FOR SENSORS AND TELEMETRY ANTENNAS. AN H-FRAME STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS PROVIDED SUPPORT FOR THE LARGER EXPERIMENTS AND TAPE RECORDERS. MOUNTED ON THE CONTROL HOUSING UNIT, WHICH WAS ON TOP OF THE SPACECRAFT, WERE SUN SENSORS, HORIZON SCANNERS, GAS NOZZLES FOR ATTITUDE CONTROL, AND A COMMAND ANTENNA. USE OF AN ADVANCED ATTITUDE CONTROL SUBSYSTEM PERMITTED THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 1 DEG FOR ALL THREE AXES (PITCH, ROLL, AND YAW). PRIMARY EXPERIMENTS CONSISTED OF (1) AN IMAGE DISSECTOR CAMERA SYSTEM (IDCS) FOR PROVIDING DAYTIME CLOUDCOVER PICTURES BOTH IN REAL-TIME AND RECORDED MODES, (2) A TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) FOR MEASURING DAYTIME AND NIGHTTIME SURFACE AND CLOUDTOP TEMPERATURES AS WELL AS THE WATER VAPOR CONTENT OF THE UPPER ATMOSPHERE, (3) AN INFRARED INTERFEROMETER SPECTROMETER (IRIS) FOR MEASURING THE EMISSION SPECTRA OF THE EARTH/ATMOSPHERE SYSTEM, (4) A SATELLITE INFRARED SPECTROMETER (SIRS) FOR DETERMINING THE VERTICAL PROFILES OF TEMPERATURE AND WATER VAPOR IN THE ATMOSPHERE, (5) A MONITOR OF ULTRAVIOLET SOLAR ENERGY (MUSE) FOR DETECTING SOLAR UV RADIATION, (6) A BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER FOR MONITORING THE VERTICAL DISTRIBUTION AND TOTAL AMOUNT OF ATMOSPHERIC OZONE ON A GLOBAL SCALE, (7) A FILTER WEDGE SPECTROMETER (FWS) FOR ACCURATE MEASUREMENT OF IR RADIANCE AS A FUNCTION OF WAVELENGTH FROM THE EARTH/ATMOSPHERE SYSTEM, (8) A SELECTIVE CHOPPER RADIOMETER (SCR) FOR DETERMINING THE TEMPERATURES OF SIX SUCCESSIVE 10-KM LAYERS IN THE ATMOSPHERE FROM ABSORPTION MEASUREMENTS IN THE 15-MICRON CARBON DIOXIDE BAND, AND (9) AN INTERROGATION, RECORDING, AND LOCATION SYSTEM (IRLS) FOR LOCATING, INTERROGATING, RECORDING, AND RETRANSMITTING METEOROLOGICAL AND GEOPHYSICAL DATA FROM REMOTE COLLECTION STATIONS. THE SPACECRAFT OPERATION WAS A SUCCESS, AND IT PERFORMED NORMALLY UNTIL APRIL 8, 1971, WHEN THE YAW GYRO FAILED, CAUSING THE SPACECRAFT TO FACE BACKWARDS IN ORBIT. IT WAS SUCCESSFULLY TURNED AROUND ON MAY 12, 1971. YAW PROBLEMS CONTINUED TO AFFECT THE SPACECRAFT THEREAFTER.

HEATH, NIMBUS 4

EXPERIMENT NAME- BACKSCATTER ULTRAVIOLET (BUV)
SPECTROMETER

NSSDC ID- 70-025A-05

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST DATA RECORDED- 06/02/75

PERSONNEL

PI -	D.F.	HEATH	NASA-GSFC GREENBELT, MD
OI -	J.V.	DAVE	NATL CTR FOR ATMOS RES BOULDER, CO
OI -	A.J.	KRUEGER	NASA-GSFC GREENBELT, MD
OI -	C.L.	MATEER	NATL CTR FOR ATMOS RES BOULDER, CO

THE NIMBUS 4 BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER EXPERIMENT WAS DESIGNED TO MONITOR THE VERTICAL DISTRIBUTION AND TOTAL AMOUNT OF ATMOSPHERIC OZONE ON A GLOBAL SCALE BY MEASURING THE INTENSITY OF UV RADIATION BACKSCATTERED BY THE EARTH/ATMOSPHERE SYSTEM DURING DAY AND NIGHT IN THE 2500- TO 3400-A SPECTRAL BAND. THE PRIMARY INSTRUMENTATION CONSISTED OF A DOUBLE MONOCHROMATOR CONTAINING ALL REFLECTIVE OPTICS AND A PHOTOMULTIPLIER DETECTOR. THE DOUBLE MONOCHROMATOR WAS COMPOSED OF TWO FASTIE-EBERT TYPE MONOCHROMATORS IN TANDEM. EACH MONOCHROMATOR HAD A 32- BY 64-MM GRATING WITH 2400 LINES PER MM. LIGHT FROM A 0.02-STER SOLID ANGLE (SUBTENDING APPROXIMATELY A 222-KM-SQUARE AREA ON THE EARTH'S SURFACE FROM A SATELLITE HEIGHT OF APPROXIMATELY 1100 KM) ENTERED THE NADIR-POINTING INSTRUMENT THROUGH A DEPOLARIZING FILTER. A MOTOR-DRIVEN CAM STEP ROTATED THE GRATINGS TO MONITOR THE INTENSITY OF 12 OZONE ABSORPTION WAVELENGTHS. THE DETECTOR WAS A PHOTOMULTIPLIER TUBE. FOR BACKGROUND READINGS, A FILTER PHOTOMETER MEASURED THE REFLECTED UV RADIATION IN AN OZONE FREE ABSORPTION AREA NEAR 3600 A. SIGNALS FROM BOTH UNITS WERE READ BY SEPARATE RANGE-SWITCHING ELECTROMETERS WITH SEVEN RANGES. THE BUV EXPERIMENT CYCLE REQUIRED 6144 SEC. EACH CYCLE, IN TURN, WAS DIVIDED INTO 192 BUV FRAMES OF 32-SEC DURATION. CALIBRATION BY ONBOARD LIGHT SOURCES WAS PERFORMED IN 26 OF THE 192 FRAMES. THE OTHER FRAMES WERE USED FOR EXPERIMENTAL DATA. DURING EACH OF THESE DATA FRAMES, THE MONOCHROMATOR MEASURED THE INTENSITY OF THE UV RADIATION IN EACH OF THE 12 WAVELENGTH BANDS WHILE THE PHOTOMETER MEASURED THE UV INTENSITY IN A SINGLE WAVELENGTH BAND. THE DWELL TIME AT EACH WAVELENGTH WAS 1.8 SEC. AND, DURING THIS INTERVAL, FOUR ANALOG UV INTENSITY MEASUREMENTS WERE TAKEN AT 400-MSEC INTERVALS. IN ADDITION TO AN INTEGRATED PULSE COUNT MEASUREMENT OF THE UV INTENSITY AND ENERGETIC PARTICLE FLUX. ONCE EACH ORBIT, THE FIELD OF VIEW WAS CHANGED TO MONITOR THE SUN OR MOON DIRECTLY. THE MEASUREMENT RANGE OF THE SIGNAL CURRENT WAS FROM 0.2 TO 3000 MICROAMPS. THE VERTICAL DISTRIBUTION OF OZONE WAS OBTAINED BY MATHEMATICAL INVERSION TECHNIQUES. FOR A COMPLETE DESCRIPTION OF THE BUV EXPERIMENT, SEE SECTION 7 IN "THE NIMBUS IV USER'S GUIDE."

DATA SET NAME- BACKSCATTER ULTRAVIOLET ATMOSPHERIC OZONE
DATA ON TAPE

NSSDC ID- 70-025A-05A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/11/70 TO 12/31/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 94 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF 7-TRACK, BINARY, 800-BPI MAGNETIC TAPES OF RAW DATA FROM BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER INSTRUMENT WAVELENGTH SCANS. THESE DATA MAY REFER TO BUV OR DIFFUSER PLATE MEASUREMENTS OR ONE OF THE CALIBRATION SCANS. THE SCANS ARE NUMBERED CONSECUTIVELY WITHIN EACH ORBIT REGARDLESS OF TYPE. TAPES CONTAIN SCAN-TIME AND LOCATION, SUMMARIZED CALIBRATIONS, HOUSEKEEPING INFORMATION, AND PHOTOCATHODE CURRENTS (AMP) WHICH HAVE BEEN CONVERTED FROM MONOCHROMATOR AND PHOTOMETER SIGNALS. EACH PHYSICAL RECORD CONSISTS OF THREE 200-WORD LOGICAL RECORDS. AN END-OF-FILE MARK IS WRITTEN AFTER THE LAST RECORD PERTAINING TO A GIVEN SATELLITE ORBIT. THE TAPES, GENERATED ON AN IBM 7094 COMPUTER, EACH CONTAINS SEVERAL ORBITS. FOR A MORE COMPLETE DESCRIPTION OF THE TAPE FORMAT, SEE SECTION 1.7.4, VOL 1, "THE NIMBUS 4 DATA CATALOG," AVAILABLE THROUGH NSSDC.

OGO 1

SPACECRAFT COMMON NAME- OGO 1

ALTERNATE NAMES- EGSO 1, OGO-A
00879, S 49

NSSDC ID- 64-054A

LAUNCH DATE- 09/05/64 WEIGHT- 487. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 11/28/69

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/07/64
ORBIT PERIOD- 3839. MIN INCLINATION- 31.2 DEG
PERIAPSIS- 281.000 KM ALT APOAPSIS- 149385. KM ALT

THE PURPOSE OF THE OGO 1 SPACECRAFT, THE FIRST OF A SERIES OF SIX ORBITING GEOPHYSICAL OBSERVATORIES, WAS TO CONDUCT DIVERSIFIED GEOPHYSICAL EXPERIMENTS TO OBTAIN A BETTER UNDERSTANDING OF THE EARTH AS A PLANET AND TO DEVELOP AND OPERATE A STANDARDIZED OBSERVATORY-TYPE SATELLITE. OGO 1 CONSISTED OF A MAIN BODY THAT WAS PARALLELEPIPED IN FORM, TWO SOLAR PANELS, EACH WITH A SOLAR-ORIENTED EXPERIMENT PACKAGE (SOEP), TWO ORBITAL PLANE EXPERIMENT PACKAGES (OPEP) AND SIX APPENDAGES EP-1 THROUGH EP-6 SUPPORTING THE BOOM EXPERIMENT PACKAGES. ONE FACE OF THE MAIN BODY WAS DESIGNED TO POINT TOWARD THE EARTH (+Z AXIS), AND THE LINE CONNECTING THE TWO SOLAR PANELS (X AXIS) WAS INTENDED TO BE PERPENDICULAR TO THE EARTH-SUN-SPACECRAFT PLANE. THE SOLAR PANELS WERE ABLE TO ROTATE ABOUT THE X AXIS. THE OPEP'S WERE MOUNTED ON AND COULD ROTATE ABOUT AN AXIS WHICH WAS PARALLEL TO THE Z AXIS AND ATTACHED TO THE MAIN BODY. DUE TO A BOOM DEPLOYMENT FAILURE SHORTLY AFTER ORBITAL INJECTION, THE SPACECRAFT WAS PUT INTO A PERMANENT SPIN MODE OF 5 RPM ABOUT THE Z AXIS. THIS SPIN AXIS REMAINED FIXED WITH A DECLINATION OF ABOUT -10 DEG AND RIGHT ASCENSION OF ABOUT 40 DEG AT LAUNCH. THE INITIAL LOCAL TIME OF APOGEE WAS 2100 HR. OGO 1 CARRIED 20 EXPERIMENTS. TWELVE OF THESE WERE PARTICLE STUDIES AND TWO WERE MAGNETIC FIELD STUDIES. IN ADDITION, THERE WAS ONE EXPERIMENT FOR EACH OF THE FOLLOWING TYPES OF STUDIES -- INTERPLANETARY DUST, VLF, LYMAN-ALPHA, GEGENSCHEIN, ATMOSPHERIC MASS, AND RADIO ASTRONOMY. REAL-TIME DATA WERE TRANSMITTED AT 1, 8, OR 64 KBS DEPENDING ON THE DISTANCE OF THE SPACECRAFT FROM THE EARTH. PLAYBACK DATA WERE TAPE RECORDED AT 1 KBS AND TRANSMITTED AT 64 KBS. TWO WIDEBAND TRANSMITTERS, ONE FEEDING INTO AN OMNIDIRECTIONAL ANTENNA AND THE OTHER FEEDING INTO A DIRECTIONAL ANTENNA, WERE USED TO TRANSMIT DATA. A SPECIAL-PURPOSE TELEMETRY SYSTEM, FEEDING INTO EITHER ANTENNA, WAS ALSO USED TO TRANSMIT WIDEBAND DATA IN REAL TIME ONLY. TRACKING WAS ACCOMPLISHED BY USING RADIO BEACONS AND A RANGE AND RANGE-RATE S-BAND TRANSPONDER. BECAUSE OF THE BOOM DEPLOYMENT FAILURE, THE BEST OPERATING MODE FOR THE DATA HANDLING SYSTEM WAS THE USE OF ONE OF THE WIDEBAND TRANSMITTERS AND THE DIRECTIONAL ANTENNA. ALL DATA RECEIVED FROM THE OMNIDIRECTIONAL ANTENNA WERE NOISY. DURING SEPTEMBER 1964, ACCEPTABLE DATA WERE RECEIVED OVER 70 PERCENT OF THE ORBITAL PATH. BY JUNE 1969, DATA ACQUISITION WAS LIMITED TO 10 PERCENT OF THE ORBITAL PATH. THE SPACECRAFT WAS PLACED IN A STAND-BY STATUS NOVEMBER 25, 1969, AND ALL SUPPORT WAS TERMINATED NOVEMBER 1, 1971. BY APRIL 1970 THE SPACECRAFT PERIGEE HAD INCREASED TO 46,000 KM AND THE INCLINATION HAD INCREASED TO 50.8 DEG.

DATA SET NAME- GSFC EXTENDED MASTER ORBIT WORLD MAPS ON MICROFILM

NSSDC ID- 64-054A-00C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/05/64 TO 10/30/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 26 REEL(S) OF MICROFILM

THESE DATA, PREPARED AT GSFC, ARE LISTINGS OF SATELLITE POSITION AND SUPPORTING INFORMATION FOR EACH MINUTE OF GMT. THE INFORMATION PROVIDED IN THESE LISTINGS INCLUDES GEOCENTRIC POSITION, INERTIAL POSITION, DEFINITION OF THE SATELLITE VELOCITY VECTOR, AND SATELLITE POSITION IN THE MAGNETIC DIPOLE FIELD AND IN THE "REAL" MAGNETIC (GSFC/MAIN) FIELD.

HARGREAVES, OGO 1

EXPERIMENT NAME- RADIO PROPAGATION

NSSDC ID- 64-054A-05

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/20/67

PERSONNEL
PI - J.K. HARGREAVES ..... U OF LANCASTER
LANCASTER, ENGLAND
OI - R.S. LAWRENCE ..... NOAA-ERL
BOULDER, CO
OI - R.B. FRITZ ..... NOAA-ERL
BOULDER, CO
OI - G.K. GARRIOTT ..... STANFORD U
STANFORD, CA

THIS EXPERIMENT WAS USED TO EXPLORE THE EXOSPHERE BY STUDYING THE BEHAVIOR OF THE COLUMNAR ELECTRON CONTENT BETWEEN GROUND AND SATELLITE AS THE SPACECRAFT ROSE FROM PERIGEE IN ITS VERY ECCENTRIC ORBIT. SIMULTANEOUS MEASUREMENTS WERE MADE OF THE DIFFERENTIAL DOPPLER FREQUENCY AND THE FARADAY ROTATION ANGLE. THE INSTRUMENTATION CONSISTED OF A PAIR OF RADIO BEACONS OPERATING AT HARMONICALLY RELATED FREQUENCIES (40.01 AND 360.09 MHZ), WHICH WERE MODULATED BY 20- AND 200-KHZ SIGNALS. THE 40-KHZ TRANSMITTING ANTENNA WAS A SIMPLE DIPOLE WITH A GAIN OF 2 DB, WHILE THE 360-MHZ ANTENNA WAS A YAGI WITH A GAIN OF 8 DB. SIGNALS WERE RECEIVED BY TWO SETS OF TRACKING ANTENNAS AT BOULDER FROM A MAXIMUM DISTANCE OF 60,000 KM. EACH SET OF TRACKING ANTENNAS CONSISTED OF A 28-FT PARABOLOID TO RECEIVE THE 360-MHZ SIGNAL AND A 6-ELEMENT YAGI TO RECEIVE THE 40-MHZ SIGNAL. IN USING FARADAY ROTATION TECHNIQUES ON THE 40-MHZ SIGNAL, THE ELECTRONS AFFECTING THE SIGNAL ARE ASSUMED TO OCCUR NEAR THE FOF2 MAXIMUM. IN THE DOPPLER (ALSO CALLED GROUP-DELAY OR MODULATION-PHASE) TECHNIQUE, THE TOTAL ELECTRON CONTENT (TEC) IS INDEPENDENT OF THE ELECTRON DENSITY DISTRIBUTION. THE TWO KINDS OF TEC MEASUREMENTS SHOULD THUS BE COMPARABLE AT LOWER ALTITUDES. AT HIGHER ALTITUDES, THE MEASUREMENTS SHOULD DIFFER DUE TO ELECTRONS WHICH ARE FAR REMOVED FROM THE FOF2 MAXIMUM. OGO 1 WAS PLANNED AS AN EARTH-STABILIZED SATELLITE, BUT DIFFICULTIES THAT APPEARED IMMEDIATELY AFTER LAUNCH CAUSED THE SATELLITE TO SPIN AT A RATE OF ABOUT 5 RPM. THIS INTRODUCED A NUMBER OF UNEXPECTED COMPLICATIONS IN THE INTERPRETATION AND ANALYSIS OF THE DATA. THE SPIN AXIS ORIENTATION WAS NOT PRECISELY KNOWN. VALUES OF 42.5 DEG IN RIGHT ASCENSION AND -9 DEG IN INCLINATION, SUGGESTED BY INDEPENDENT EXPERIMENTS, WERE USED IN INTERPRETING THE BEACON DATA. ALTHOUGH THE RESULTS DID NOT REQUIRE AN ACCURATE KNOWLEDGE OF THIS ORIENTATION, DURING WINTER (JANUARY AND FEBRUARY) AND SUMMER (JUNE THROUGH AUGUST) MONTHS, THERE WAS INSUFFICIENT SPACECRAFT POWER DUE TO THE UNFAVORABLE SUN ANGLE. DURING THE REMAINING MONTHS, OBSERVATIONS OF SEVERAL HOURS WERE POSSIBLE ONCE OR TWICE DURING EACH 8-DAY PERIOD. ON MAY 27, 1967, THIS EXPERIMENT PRODUCED INTERFERENCE WITH THE COMMAND RECEIVER. THE EXPERIMENT WAS TURNED OFF JUNE 6, 1967, WHEN THE INTERFERENCE PROBLEM WAS CONFIRMED AS BEING CAUSED BY THIS EXPERIMENT.

DATA SET NAME- IONOSPHERIC AND EXOSPHERIC ELECTRON CONTENT ON MICROFICHE

NSSDC ID- 64-054A-05A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 12/12/64 TO 05/20/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 CARD(S) OF B/W MICROFICHE

THIS DATA SET CONSISTS OF ALL OBSERVATIONS FOR WHICH COMPLETE DATA REDUCTION WAS POSSIBLE. THIS COMPRISES 28 OF THE 62 ORBITS FROM WHICH OBSERVATIONS WERE TAKEN. THE DATA CONSISTS OF TWO PAGES PER ORBIT. ONE PAGE CONTAINS SPACECRAFT TIME AND POSITION INFORMATION ALONG WITH K(P) AND ELECTRON DENSITY AT THE F2 MAXIMUM (FROM THE BOULDER IONOSONDE). THE OTHER PAGE CONSISTS OF THE FOLLOWING FOUR DATA PLOTS. I(F) IS TOTAL ELECTRON CONTENT (TEC) FROM FARADAY ROTATION TECHNIQUES. I(F) (V) IS I(F) NORMALIZED TO A VERTICAL PATH THROUGH THE FI MAX. I(P) IS THE VALUE OF THE PHASE MEASUREMENTS (RELATIVE TO I(F) SINCE ABSOLUTE VALUES WERE NOT OBTAINED). AND I(X) IS I(P) MINUS I(F). DISCUSSION AND BACKGROUND INFORMATION ARE ALSO CONTAINED IN "MEASUREMENTS OF IONOSPHERIC AND EXOSPHERIC ELECTRON CONTENT USING RADIO BEACONS ON ORBITING GEOPHYSICAL OBSERVATORIES," BY R. B. FRITZ.

HELLIWELL, OGO 1

EXPERIMENT NAME- WIDEBAND AND NARROW-BAND STEP FREQUENCY VLF RECEIVERS

NSSDC ID- 64-054A-08

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 04/00/70

PERSONNEL
PI - R.A. HELLIWELL ..... STANFORD U
STANFORD, CA
OI - J.J. ANGERAMI ..... STANFORD U
STANFORD, CA

01 - L.H. RORDEN ..... STANFORD U
STANFORD, CA

THIS EXPERIMENT CONSISTED OF FOUR VLF RADIO RECEIVERS TO BE USED FOR STUDY OF NATURAL VLF NOISE OCCURRENCES AT ORBITAL ALTITUDES. THE RECEIVER SYSTEMS CONSISTED OF AN INFLATABLE 2.9-M LOOP ANTENNA, A PREAMPLIFIER STAGE AT THE END OF A LONG BOOM, AND THE RECEIVER ELECTRONICS PACKAGES IN THE MAIN BODY OF THE SATELLITE. THREE STEP-FREQUENCY RECEIVERS, COVERING FREQUENCY RANGES OF 0.2 TO 1.6 KHZ, 1.6 TO 12.5 KHZ, AND 12.5 TO 100 KHZ, EACH OBSERVED A COMPLETE SPECTRUM OF 256 SIGNAL STRENGTH VALUES ONCE EVERY 2.3, 18.4, OR 147.2 SEC DEPENDING UPON THE SELECTED MODE OF OPERATION. OBSERVATIONS FROM THESE THREE RECEIVERS WERE TAPE RECORDED AT 1 KBS OR OBSERVED IN REAL TIME AT 1, 8, OR 64 KB PER SEC. THE TAPE IS READ OUT UPON COMMAND AT THE 64 KB RATE. THE OTHER RECEIVER IS A BROADBAND RECEIVER OBSERVING SIGNALS FROM 0.3 TO 12.5 KHZ. THESE DATA WERE NOT TAPE RECORDED, BUT OBSERVED ONLY IN REAL TIME ON THE SPECIAL PURPOSE TELEMETRY CHANNEL. DATA FROM THE THREE RECEIVERS (CALLED PCH DATA) WERE RECORDED FOR OVER HALF THE TIME IN ORBIT WITH HIGH BIT RATE (HBR) USUALLY USED WHEN THE SATELLITE WAS NEAR PERIGEE AND LOW BIT RATE (LBR) NEAR APOGEE. BROADBAND RESOLUTION DEPENDED UPON THE SPECTRUM ANALYZER USED TO PROCESS THE TAPE. THIS RAYSPAN EQUIPMENT CAN PROVIDE UP TO 10 MSEC TIME RESOLUTION AND UP TO 30 HZ FREQUENCY RESOLUTION. THE BROADBAND DATA WERE AVAILABLE ONLY FOR RELATIVELY SHORT PORTIONS OF THE SATELLITE OPERATING LIFETIME SINCE THEY WERE RECEIVED ONLY WHEN THE SATELLITE WAS SCHEDULED TO TRANSMIT IN RANGE OF A TELEMETRY STATION. THIS EXPERIMENT OPERATED NOMINALLY DURING THE ACTIVE SATELLITE LIFETIME. SATELLITE OPERATION WAS RESTRICTED TO SPRING (APPROXIMATELY MARCH, APRIL, AND MAY) AND FALL (APPROXIMATELY SEPTEMBER, OCTOBER, AND NOVEMBER) DUE TO SPACECRAFT POWER SUPPLY LIMITATIONS. THERE WERE 11 OF THESE 3-MONTH PERIODS PRIOR TO SPACECRAFT TURN-OFF ON NOVEMBER 28, 1969, AFTER 22,631 HOURS OF EXPERIMENT OPERATION. A MAY 1966, SRI INSTRUMENT REPORT BY L. H. RORDEN, ET AL., GIVES A COMPLETE DESCRIPTION OF THIS EXPERIMENT.

DATA SET NAME- VLF SPECTROGRAMS, LOW-RESOLUTION ON 35-MM PAPER

NSSDC ID- 64-054A-08A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/10/64 TO 12/15/65
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 39 ROLL(S) OF STRIP OR BRUSH CHART(S)

THESE SPECTROGRAMS ARE REDUCED DATA PLOTS PRODUCED BY RAYSPAN EQUIPMENT ON 35-MM PAPER SHOWING TIME OF SIGNAL OCCURRENCE VS FREQUENCY OF RECEIVED VLF SIGNALS. RELATIVE SIGNAL INTENSITY CAN BE QUALITATIVELY JUDGED ONLY BY CONTRAST BETWEEN THE BACKGROUND AND THE SIGNAL TRACES. THESE DATA ARE IN AN ORIGINAL FORM THAT WAS PREPARED DIRECTLY FROM THE FIRST TWO CHANNELS OF THE SPECIAL PURPOSE TELEMETRY TAPES. THEY ARE RECORDS OF SIGNALS RECEIVED BY THE 0.3- TO 12.5-KHZ BROADBAND RECEIVER AND TRANSMITTED IN REAL TIME WHEN THE SATELLITE WAS IN RANGE OF A TELEMETRY STATION. DATA SET REQUIREMENTS, BASED UPON DATA ANTICIPATED TO BE MOST USEFUL, WERE MESHED WITH SPACECRAFT POWER AND ORBIT CHARACTERISTICS IN ORDER TO SCHEDULE OBSERVATION TIMES. THESE DATA REPRESENT ALL VLF BROADBAND OBSERVATIONS MADE PRIOR TO DECEMBER 15, 1965. SUBSEQUENT OBSERVATIONS HAVE NOT BEEN PROCESSED AND/OR RELEASED BY THE EXPERIMENTER. THE DATA CONSIST OF 35-MM POSITIVE PHOTOGRAPHIC PAPER ON 100-FT REELS. THEY ARE LOW-RESOLUTION DATA, HAVING BEEN PHOTOGRAPHED WITH LOW PAPER TRANSPORT SPEEDS. A PRIMARY USE FOR THIS DATA FORM IS IN IDENTIFICATION OF DATA THAT MAY PROVIDE INTERESTING CASES TO STUDY WITH HIGH-RESOLUTION PROCESSING OF THE SAME DATA. THE ORIGINAL TAPES AND PROCESSING AT VARIOUS TRANSPORT SPEEDS ARE AVAILABLE THROUGH THE DATA SET CONTACT, DR. J. KATSUFRAKIS, AT STANFORD UNIVERSITY. SINCE ONLY TIME IS NOTED ON THE SONOGRAMS, SATELLITE POSITION AND OTHER RELATED INFORMATION MUST BE OBTAINED FROM WORLD MAPS. (SEE DATA SET 64-054A-00C.)

DATA SET NAME- HIGH-RESOLUTION VLF SPECTROGRAMS

NSSDC ID- 64-054A-08B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 03/21/65 TO 11/24/65
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 16 REEL(S) OF MICROFILM

THESE SPECTROGRAMS ARE REDUCED DATA PLOTS PRODUCED BY RAYSPAN EQUIPMENT ON 35-MM FILM SHOWING TIME OF SIGNAL OCCURRENCE VS FREQUENCY OF RECEIVED VLF SIGNALS. RELATIVE SIGNAL INTENSITY CAN BE ONLY QUALITATIVELY JUDGED BY CONTRAST BETWEEN THE BACKGROUND AND THE SIGNAL TRACES. THESE DATA ARE IN AN ORIGINAL FORM THAT IS PREPARED DIRECTLY FROM THE FIRST TWO CHANNELS OF THE SPECIAL PURPOSE TELEMETRY TAPES. THEY ARE RECORDS OF SIGNALS RECEIVED BY THE 0.3- TO 12.5-KHZ BROADBAND RECEIVER AND TRANSMITTED IN REAL TIME WHEN IN RANGE OF A TELEMETRY STATION. THESE DATA ARE THOSE OF PARTICULAR INTEREST TO THE INVESTIGATOR AND WERE SELECTED FROM THE LOW-RESOLUTION DATA (64-054A-08A). THESE DATA ARE ON 100-FT ROLLS OF 35-MM FILM AND ARE PRODUCED FROM THE ORIGINAL TELEMETRY TAPES AT HIGHER FILM TRANSPORT SPEEDS THAN THE LOW-RESOLUTION DATA. THE HORIZONTAL (TIME) AXIS IS THUS STRETCHED BY AT LEAST A FACTOR OF 2 OVER THE LOW-RESOLUTION DATA. THESE INCLUDE LESS THAN 0.2 OF THE LOW-RESOLUTION DATA. SINCE ONLY TIME IS NOTED ON THE SONOGRAMS, SATELLITE POSITION AND OTHER RELATED INFORMATION MUST BE OBTAINED FROM WORLD MAPS. (SEE DATA SET 64-054A-00C.)

DATA SET NAME- VLF SIGNAL STRENGTH VS FREQUENCY ON 16-MM CINE FILM

NSSDC ID- 64-054A-08C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/07/64 TO 12/29/65
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 16 FRAMES

THIS DATA SET CONSISTS OF GRAPHICAL REPRESENTATIONS OF VLF SIGNAL STRENGTH VS FREQUENCY. THEY ARE ARRANGED CHRONOLOGICALLY ON REELS OF 16-MM CINE FILM. THESE DATA HAVE BEEN THROUGH CONSIDERABLE PROCESSING IN ORDER TO PROVIDE CONVENIENT REFERENCE TO ORBIT AND OTHER SELECTED GEOPHYSICAL INFORMATION THAT MAY BE USEFUL. EACH DATA FRAME CONSISTS OF TWO PARTS. ON THE LEFT SIDE ARE THREE GRAPHS, EACH PERTAINING TO A PARTICULAR RECEIVER AND COVERING ONE OF THE RANGES BETWEEN 0.2-, 1.6, 12.5, AND 100 KHZ. THE GRAPHS SHOW FREQUENCY VS MAGNETIC FIELD INTENSITY IN DECIBELS (REFERENCED TO 1 GAMMA RMS). FOR FIXED-FREQUENCY OPERATION, FREQUENCY IS REPLACED BY A TIME SCALE. THE RIGHT HALF OF EACH FRAME SHOWS PICTORIALLY THE SATELLITE POSITION IN ORBIT LOOKING BOTH PERPENDICULAR TO AND PARALLEL TO THE EQUATORIAL PLANE. TIME, ILLUMINATION, L, K, AND OTHER DIGITAL DATA FOR THE TIME AND/OR POSITION OF OBSERVATION ARE INCLUDED ON THE FRAME IN DIGITAL FORM. DATA PRESENTLY AVAILABLE INCLUDE ALL OBSERVATIONS TAKEN PRIOR TO DECEMBER 1965. SUBSEQUENT OBSERVATIONS HAVE NOT BEEN PROCESSED AND/OR RELEASED BY THE EXPERIMENTER. THESE DATA INCLUDE BOTH REAL TIME AS WELL AS OBSERVATIONS TAPE RECORDED ON THE SPACECRAFT. ADDITIONAL INFORMATION AND ILLUSTRATIONS OF THESE DATA ARE IN A JULY 1967 SRI REPORT BY BLAIR AND FICKLIN.

SPACECRAFT COMMON NAME- OGO 2

ALTERNATE NAMES- OGO-C, POGO 1
S 50, 01620

NSSDC ID- 65-061A

LAUNCH DATE- 10/14/65 WEIGHT- 520. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 02/00/68

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 10/15/65
ORBIT PERIOD- 104. MIN INCLINATION- 87.356 DEG
PERIAPSIS- 414.000 KM ALT APOAPSIS- 1510.00 KM ALT

OGO 2 WAS A LARGE OBSERVATORY INSTRUMENTED WITH 20 EXPERIMENTS DESIGNED TO MAKE SIMULTANEOUS, CORRELATIVE OBSERVATIONS OF AURORA AND AIRGLOW EMISSIONS, ENERGETIC PARTICLES, MAGNETIC FIELD VARIATIONS, IONOSPHERIC PROPERTIES, ETC., ESPECIALLY OVER THE POLAR AREAS. OGO 2 CONSISTED OF A MAIN BODY, GENERALLY PARALLELEPIPED IN FORM, TWO RECTANGULAR SOLAR PANELS, EACH WITH A SOLAR-ORIENTED EXPERIMENT PACKAGE (SOEP), AND TWO ORBITAL PLANE EXPERIMENT PACKAGES (OPEP). IT ALSO INCLUDED SIX EXPERIMENT PACKAGES (EP) MOUNTED ON BOOMS EXTENDING GENERALLY FORE AND AFT OF THE SPACECRAFT ALONG THE Y-AXIS. ANTENNA AND ATTITUDE CONTROL FIXTURES ALSO EXTENDED FROM SEPARATE AND/OR EP BOOMS. THE MAIN BODY WAS ATTITUDE-CONTROLLED BY USE OF HORIZON SCANNERS AND GAS JETS AND WAS DESIGNED TO POINT TOWARD THE EARTH (Z-AXIS). THE AXIS CONNECTING THE TWO SOLAR PANELS (X-AXIS) WAS DESIGNED TO OSCILLATE IN ORDER TO REMAIN PERPENDICULAR TO THE EARTH-SUN-SPACECRAFT PLANE. THE SOLAR PANELS ACTIVATED BY SUN SENSORS COULD ROTATE ABOUT THIS X-AXIS IN ORDER TO OBTAIN MAXIMUM RADIATION FOR THE SOLAR CELLS AND CONCURRENTLY ORIENT THE SOEP PROPERLY. THE OPEP'S WERE REORIENTED ON EITHER END OF AN AXIS THAT WAS PARALLEL TO THE Z-AXIS AND ATTACHED TO THE FORWARD END OF THE MAIN BODY. THESE OPEP SENSORS NORMALLY WERE MAINTAINED LOOKING FORWARD IN THE ORBITAL PLANE OF THE

SATELLITE. TO MAINTAIN THIS ORIENTATION, THE OPEP AXIS COULD ROTATE OVER 90 DEG. IN ADDITION, AN ANGULAR DIFFERENCE OF OVER 90 DEG WAS POSSIBLE BETWEEN THE ORIENTATION OF THE UPPER AND LOWER OPEP PACKAGES. THE SOEP CONTAINED FOUR EXPERIMENTS, AND THE OPEP CONTAINED FIVE EXPERIMENTS. NEWTON'S PARTICLE EXPERIMENT FAILED ON LAUNCH, AND KREPLIN'S SOLAR X-RAY EXPERIMENT FAILED SHORTLY THEREAFTER. SOON AFTER ACHIEVING ORBIT, DIFFICULTIES IN MAINTAINING EARTH LOCK WITH HORIZON SCANNERS CAUSED EXHAUSTION OF ATTITUDE CONTROL GAS BY OCTOBER 23, 1965, 10 DAYS AFTER LAUNCH. AT THIS TIME, THE SPACECRAFT ENTERED A SPIN MODE (ABOUT 0.11 RPM) WITH A LARGE CONING ANGLE ABOUT THE PREVIOUSLY VERTICAL AXIS. FIVE EXPERIMENTS BECAME USELESS WHEN THE SATELLITE WENT INTO THIS SPIN MODE. SIX ADDITIONAL EXPERIMENTS WERE DEGRADED BY THIS LOSS OF ATTITUDE CONTROL. BY APRIL 1966, BOTH BATTERIES HAD FAILED, SO SUBSEQUENT OBSERVATIONS WERE LIMITED TO SUNLIT PORTIONS OF THE ORBIT. BY DECEMBER 1966, ONLY EIGHT EXPERIMENTS WERE OPERATIONAL, FIVE OF WHICH WERE NOT DEGRADED BY THE SPIN MODE OPERATION. BY APRIL 1967, THE TAPE RECORDERS HAD MALFUNCTIONED AND ONLY ONE THIRD OF THE RECORDED DATA COULD BE PROCESSED. SPACECRAFT POWER AND PERIODS OF OPERATIONAL SCHEDULING CONFLICTS CREATED SIX LARGE DATA GAPS SO THAT DATA WERE OBSERVED ON A TOTAL OF ABOUT 306 DAYS OF THE TWO-YR 18-DAY TOTAL SPAN OF OBSERVED SATELLITE DATA TO NOVEMBER 1, 1967. THE DATA GAPS WERE — (A) OCTOBER 24, 1965 TO NOVEMBER 5, 1965, (B) DECEMBER 6, 1965 TO JANUARY 7, 1966, (C) APRIL 9, 1966 TO JUNE 21, 1966, (D) SEPTEMBER 2, 1966 TO NOVEMBER 18, 1966, (E) DECEMBER 27, 1966 TO APRIL 11, 1967, AND (F) MAY 9, 1967 TO SEPTEMBER 19, 1967. THE SPACECRAFT WAS SHUT DOWN ON NOVEMBER 1, 1967 WITH EIGHT EXPERIMENTS STILL OPERATIONAL. IT WAS REACTIVATED FOR 2 WEEKS IN FEBRUARY 1968 TO OPERATE EXPERIMENT 5 (J. CAIN).

DATA SET NAME- GSFC EXTENDED MASTER ORBIT WORLD MAPS ON MICROFILM

NSSDC ID- 65-081A-00C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 10/14/65 TO 10/03/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 16 REEL(S) OF MICROFILM

THESE DATA, PREPARED AT GSFC, ARE LISTINGS OF SATELLITE POSITION AND SUPPORTING INFORMATION FOR EACH MINUTE OF GMT. THE INFORMATION IN THESE LISTINGS INCLUDES GEOCENTRIC POSITION, INERTIAL POSITION, DEFINITION OF SATELLITE VELOCITY VECTOR, AND SATELLITE POSITION IN THE MAGNETIC DIPOLE FIELD AND IN THE MAGNETIC (HOILMAIN) MODEL FIELD.

HELLIWELL, OGO 2

EXPERIMENT NAME- VLF RECEIVERS, WIDEBAND, NARROW-BAND, STEP FREQUENCY, AND TUNABLE

NSSDC ID- 65-081A-02

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 10/01/67

PERSONNEL
PI - R.A. HELLIWELL ..... STANFORD U
STANFORD, CA
OI - L.M. RORDEN ..... STANFORD U
STANFORD, CA
OI - J.J. ANGERAMI ..... STANFORD U
STANFORD, CA

THIS EXPERIMENT CONSISTED OF FIVE VLF RADIO RECEIVERS THAT STUDIED NATURAL AND MAN-MADE VLF NOISE OCCURRENCES AT ORBITAL ALTITUDES. THE RECEIVER SYSTEMS CONSISTED OF AN INFLATABLE 2.9-M DIAMETER LOOP ANTENNA, A PREAMPLIFIER STAGE AT THE END OF A LONG BOOM, AND A RECEIVER ELECTRONICS PACKAGE IN THE MAIN BODY OF THE SATELLITE. THREE, STEP FREQUENCY RECEIVERS, COVERING FREQUENCY RANGES OF 0.2 TO 1.6, 1.6 TO 12.5, AND 12.5 TO 100 KHZ EACH OBSERVED A COMPLETE SPECTRUM OF 256 SIGNAL STRENGTH VALUES ONCE EVERY 4.6, 18.4, OR 73.7 SEC, DEPENDING UPON THE SELECTED MODE OF OPERATION. OBSERVATIONS FROM THESE THREE RECEIVERS WERE TAPE RECORDED AT 1 KBS OR OBSERVED IN REAL TIME AT 4, 16, OR 64 KBS. THE TAPE WAS READ OUT AT 64 KBS UPON COMMAND. THE FOURTH RECEIVER OPERATED BETWEEN 14.4 AND 26.3 KHZ AND WAS TUNED BY COMMAND TO RECEIVE SIGNALS FROM ANY VLF STATION TRANSMITTING IN THIS RANGE. SIGNAL PHASE AND AMPLITUDE WERE OBSERVED TWICE IN EACH MAIN COMMUTATOR FRAME, MAKING AVAILABLE 512 OBSERVATIONS OF PHASE AND AMPLITUDE EVERY 4.6, 18.4, OR 73.7 SEC DEPENDING ON THE MODE OF OPERATION. THESE DATA WERE RECORDED AND TRANSMITTED IN THE SAME WAY AS THE DATA FROM THE THREE, STEP-FREQUENCY RECEIVERS. THE FIFTH RECEIVER WAS A BROADBAND RECEIVER OPERATING BETWEEN 0.3 AND 12.5 KHZ. THESE DATA WERE NOT TAPE RECORDED, BUT WERE OBSERVED ONLY IN REAL TIME ON THE SPECIAL PURPOSE TELEMETRY CHANNEL. DATA FROM THE FOUR, STEP-FREQUENCY RECEIVERS WERE OBTAINED INTERMITTENTLY FOR ABOUT ONE-THIRD OF THE TIME OVER APPROXIMATELY 2 YEARS OF SPACECRAFT OPERATION. THE WIDEBAND DATA OBSERVATIONS COVERED ONLY A VERY SMALL PORTION OF THE SATELLITE LIFETIME DUE TO THE LIMITATION OF REAL TIME OPERATION ONLY AND DIFFICULTIES EXPERIENCED WITH THE SPACECRAFT POWER. THIS EXPERIMENT OPERATED FOR SEVEN 1- TO 2-MONTH PERIODS, BEGINNING RESPECTIVELY ON OCTOBER 17, 1965, JANUARY 17, 1966, MARCH 15, 1966, JUNE 21, 1966, NOVEMBER 18, 1966, APRIL 11, 1967, AND SEPTEMBER 2, 1967. THIS EXPERIMENT OPERATED FOR A TOTAL OF 6,748 HOURS.

DATA SET NAME- VLF SPECTROGRAMS, LOW RESOLUTION ON 35-MM PAPER

NSSDC ID- 65-081A-02B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 10/17/65 TO 09/02/66
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 226 ROLL(S) OF STRIP OR BRUSH CHART(S)

THESE SPECTROGRAMS ARE REDUCED DATA PLOTS PRODUCED BY RAYSPAN EQUIPMENT ON 226 35-MM ROLLS OF PAPER. THEY SHOW, FOR EACH STATION PASS RECORDED, THE TIME OF SIGNAL OCCURRENCE VERSUS FREQUENCY OF THE RECEIVED VLF SIGNAL. RELATIVE SIGNAL STRENGTH CAN BE QUALITATIVELY ESTIMATED BY CONTRAST BETWEEN THE BACKGROUND AND THE SIGNAL TRACES. THESE DATA ARE IN AN ORIGINAL FORM THAT IS PREPARED DIRECTLY FROM THE FIRST TWO CHANNELS OF THE SPECIAL PURPOSE TELEMETRY TAPES. THEY ARE RECORDS OF SIGNALS RECEIVED BY THE 0.3- TO 12.5-KHZ BROADBAND RECEIVER AND TRANSMITTED IN REAL TIME WHEN IN RANGE OF A TELEMETRY STATION. DATA SET REQUIREMENTS, BASED UPON DATA ANTICIPATED TO BE MOST USEFUL, WERE MESHED WITH SPACECRAFT POWER AND ORBIT CHARACTERISTICS IN ORDER TO SCHEDULE OBSERVATION TIMES. THESE ARE LOW-RESOLUTION DATA THAT HAVE BEEN PHOTOGRAPHED ON THE RAYSPAN EQUIPMENT WITH LOW PAPER TRANSPORT SPEEDS. THE PRIMARY USE FOR THIS DATA FORM IS IN IDENTIFICATION OF DATA THAT MAY PROVIDE INTERESTING CASES FOR STUDY WITH HIGHER RESOLUTION PROCESSING OF THE SAME DATA. THE ORIGINAL TAPES AND PROCESSING AT VARIOUS TRANSPORT SPEEDS ARE AVAILABLE THROUGH THE DATA SET CONTACT AT STANFORD UNIVERSITY. SINCE ONLY TIME IS NOTED ON THE SONOGRAMS, SATELLITE POSITION AND OTHER RELATED INFORMATION MUST BE OBTAINED FROM THE WORLD MAPS. (SEE DATA SET 65-081A-00C.)

SPACECRAFT COMMON NAME- OGO 4

ALTERNATE NAMES- OGO-D, POGO 2
02895, S 50A

NSSDC ID- 67-073A

LAUNCH DATE- 07/28/67 WEIGHT- 562.0 KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 02/00/70

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 07/28/67
ORBIT PERIOD- 98. MIN INCLINATION- 86.011 DEG
PERIAPSIS- 412.000 KM ALT APOAPSIS- 908.000 KM ALT

OGO 4 WAS A LARGE OBSERVATORY INSTRUMENTED WITH EXPERIMENTS DESIGNED TO STUDY THE INTERRELATIONSHIPS BETWEEN THE AURORA AND AIRGLOW EMISSIONS, ENERGETIC PARTICLE ACTIVITY, GEOMAGNETIC FIELD VARIATION, IONOSPHERIC IONIZATION AND RECOMBINATION, AND ATMOSPHERIC HEATING WHICH TAKE PLACE DURING A PERIOD OF INCREASED SOLAR ACTIVITY. OGO 4 CONSISTED OF A MAIN BODY, GENERALLY PARALLELEPIPED IN FORM, TWO RECTANGULAR SOLAR PANELS EACH INCLUDING A SOLAR-ORIENTED EXPERIMENT PACKAGE (SOEP), AND TWO ORBITAL PLANE EXPERIMENT PACKAGES (OPEP). THE MAIN BODY WAS ATTITUDE CONTROLLED BY USE OF HORIZON SCANNERS AND GAS JETS AND WAS DESIGNED TO BE POINTED TOWARD THE EARTH (Z-AXIS). THE AXIS CONNECTING THE TWO SOLAR PANELS (X-AXIS) WAS DESIGNED TO OSCILLATE SO AS TO REMAIN PERPENDICULAR TO THE EARTH-SUN-SPACECRAFT PLANE. THE SOLAR PANELS, ACTIVATED BY SUN SENSORS, COULD ROTATE ABOUT THIS X-AXIS TO OBTAIN MAXIMUM RADIATION FOR THE SOLAR CELLS AND, CONCURRENTLY, ORIENT THE SOEP PROPERLY. THE OPEP'S WERE MOUNTED ON EITHER END OF AN AXIS WHICH WAS PARALLEL TO THE Z-AXIS AND ATTACHED TO THE FORWARD END OF THE MAIN BODY. THE OPEP SENSORS NORMALLY WERE MAINTAINED LOOKING FORWARD IN THE ORBITAL PLANE OF THE SATELLITE. TO MAINTAIN THIS ORIENTATION, THE OPEP AXIS COULD ROTATE OVER 90 DEG, AND, IN ADDITION, AN ANGULAR DIFFERENCE OF OVER 90 DEG WAS POSSIBLE BETWEEN THE ORIENTATION OF THE UPPER AND LOWER OPEP PACKAGES. THE SOEP CONTAINED FOUR EXPERIMENTS, AND THE OPEP CONTAINED FIVE EXPERIMENTS. AFTER THE SPACECRAFT ACHIEVED ORBIT AND THE EXPERIMENTS WERE DEPLOYED INTO AN OPERATING MODE, AN ATTITUDE CONTROL PROBLEM OCCURRED. THIS CONDITION WAS CORRECTED BY

GROUND CONTROL PROCEDURES UNTIL COMPLETE FAILURE OF THE TAPE RECORDING SYSTEMS IN MID-JANUARY 1969. AT THAT TIME, DUE TO THE DIFFICULTY OF MAINTAINING ATTITUDE CONTROL WITHOUT THE TAPE RECORDERS, THE ATTITUDE CONTROL SYSTEM WAS COMMANDED OFF, AND THE SPACECRAFT WAS PLACED INTO A SPIN-STABILIZED MODE ABOUT THE AXIS WHICH WAS PREVIOUSLY MAINTAINED VERTICALLY. INITIAL SPIN PERIOD WAS 202 SEC WITH THE MEAN SPIN AXIS APPROXIMATELY PERPENDICULAR TO THE ORBIT PLANE (SPIN PERIOD AS OF MARCH 12, 1969, WAS 217 SEC). THE PRECESSION PERIOD OF THE MEAN SPIN AXIS WAS ABOUT 5 DAYS. IN THIS MODE, SEVEN OF THE REMAINING EXPERIMENTS WERE TURNED OFF SINCE NO MEANINGFUL DATA COULD BE OBSERVED BY THEM. ON OCTOBER 23, 1969, THE SATELLITE WAS TURNED OFF. IT WAS REACTIVATED AGAIN IN JANUARY 1970 FOR 2 MONTHS TO OBTAIN VLF OBSERVATIONS.

BARTH, OGO 4

EXPERIMENT NAME- UV SPECTROMETER 1100-1750A, 1750-3400A

NSSDC ID- 67-073A-14

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST DATA RECORDED- 03/00/69

PERSONNEL

PI -	C.A.	BARTH	U OF COLORADO BOULDER, CO
OI -	L.J.	WALLACE	KITT PEAK NATL OBS TUCSON, AZ
OI -	E.F.	HACKEY	PACKARD-BELL CORP NEWBERRY PARK, CA

AN EBERT-FASTIE SCANNING SPECTROMETER WAS USED TO MEASURE THE ULTRAVIOLET (UV) SPECTRUM OF THE EARTH IN THE WAVELENGTH RANGE FROM 1100 TO 3400 A, WITH A 20-A RESOLUTION. THE OBJECTIVES OF THIS EXPERIMENT INCLUDED THE MEASUREMENT OF THE INTENSITY OF THE FOLLOWING EMISSIONS -- (A) THE HYDROGEN LYMAN-ALPHA ON BOTH THE DAY AND NIGHT SIDES, (B) THE ATOMIC OXYGEN 1304-A DAY AND TWILIGHT GLOW, AND (C) THE ATOMIC OXYGEN 1356-A LINE. THE ATOMIC NITROGEN 1493-A LINE, AND THE MOLECULAR NITROGEN LYMAN-BIRGE-HOPFIELD BANDS OF THE PHOTOELECTRON-EXCITED DAYGLOW. ANOTHER OBJECTIVE WAS THE DETERMINATION OF THE VERTICAL DISTRIBUTION OF OZONE FROM THE MEASUREMENT OF THE BACK-SCATTERED UV DAYLIGHT IN THE 2000- TO 3400-A RANGE. THE FOCAL LENGTH OF THE EBERT MIRROR WAS 250 MM, AND THE GRATING USED HAD 2160 LINES PER MILLIMETER. THE SPECTRAL SCAN PERIOD WAS ESSENTIALLY 74.5 SEC, HOWEVER, DURING ABOUT 7 PERCENT OF THE TIME, THIS SCAN PERIOD WAS REDUCED TO 18.6 SEC. THE INSTRUMENT WAS MOUNTED LOOKING TO NADIR. THE F CHANNEL WAS THE OUTPUT OF A PHOTOMULTIPLIER TUBE (PMT) WITH A SAPPHIRE WINDOW AND A CESIUM TELLURIDE CATHODE. THE WAVELENGTH INTERVAL MEASURED HERE EXTENDED FROM 1750 TO 3400 A, WITH A DYNAMIC RANGE OF INTENSITIES OF 1.66 POWER. THE G DATA CHANNEL WAS THE OUTPUT OF A PMT WITH A LITHIUM FLUORIDE WINDOW AND A CESIUM IODIDE CATHODE. ON THIS CHANNEL THE WAVELENGTH RANGES SCANNED EXTENDED FROM 1100 TO 1750 A, AND THE MEASURED INTENSITY COULD VARY OVER A RANGE FROM 1 TO 1000. THE EXPONENTIAL VOLTAGE GAIN CHARACTERISTICS OF THE PMT RESULTED IN A NEAR-LOGARITHMIC SCALING BETWEEN FLUX AND HIGH-VOLTAGE LEVEL. APPROPRIATE CIRCUITRY TRANSLATED THE OUTPUT TO 1-TO-5-V ANALOG. AN OUTPUT SIGNAL CONSISTENT WITH THE SPACECRAFT DATA SYSTEM. PREFOCUSED LIGHT SOURCES, SOME OPERATED BY COMMAND, PROVIDED IN-ORBIT CALIBRATIONS. A COMPLETE DESCRIPTION OF THIS EXPERIMENT CAN BE FOUND IN "OGO-IV ULTRAVIOLET AIRGLOW SPECTROMETER," BY C. A. BARTH AND E. F. HACKEY, IEEE TRANSACTIONS ON GEOSCIENCE ELECTRONICS, VOL GE-7, NO. 2, APRIL 1969, PP 114-119.

DATA SET NAME- OZONE DATA ON MAGNETIC TAPE

NSSDC ID- 67-073A-14A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/30/67 TO 02/29/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND CONTAINS CALCULATED OZONE PROFILES TAKEN OVER THE 5-MONTH INTERVAL FROM SEPTEMBER 1967 TO JANUARY 1968. SPECIFICALLY, THERE ARE -- 995 PROFILES FOR SEPTEMBER 1967, 1508 PROFILES FOR OCTOBER 1967, 647 PROFILES FOR NOVEMBER 1967, 514 PROFILES FOR DECEMBER 1967, AND 381 PROFILES FOR JANUARY 1968. THIS 7-TRACK TAPE WAS WRITTEN AT 556 BPI, AND IN EVEN-PARITY, CARD-IMAGE FORMAT. EVERY PROFILE CONSISTS OF VALUES AT 16 DIFFERENT PRESSURE LEVELS, AND REQUIRES FIVE RECORDS OR CARD IMAGES. THE FIRST RECORD IN EACH SET GIVES THE TAPE AND RECORD NUMBER, THE DATE AND TIME OF THE MEASUREMENT, THE LOCATION OF THE SATELLITE, AND THE SUN'S AZIMUTH AND ZENITH ANGLES. THE REMAINING FOUR RECORDS EACH CONTAIN FOUR PAIRS OF VALUES. EACH PAIR CONSISTS OF THE PRESSURE (MILLIBARS) AND THE CORRESPONDING MIXING RATIO (GM PER GM).

HANGE, OGO 4

EXPERIMENT NAME- LYMAN-ALPHA AND UV AIRGLOW STUDY

NSSDC ID- 67-073A-13

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST USABLE DATA RECORDED- 01/00/69

PERSONNEL

PI -	P.W.	HANGE	US NAVAL RESEARCH LAB WASHINGTON, DC
OI -	R.R.	MEIER	US NAVAL RESEARCH LAB WASHINGTON, DC

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE LYMAN-ALPHA NIGHT SKYGLOW RADIATION FROM EARTH (1050 TO 1350 A), THE LYMAN-ALPHA BACKGROUND RADIATION FROM SPACE (1050 TO 1350 A), AND THE FAR UV AIRGLOW RADIATION FROM EARTH (1230 TO 1350 A AND 1350 TO 1550 A) USING EIGHT DETECTORS. SEVEN OF THE DETECTORS WERE POINTED TOWARD THE EARTH TO MEASURE THE FAR UV AIRGLOW AND LYMAN-ALPHA NIGHT SKYGLOW, AND ONE WAS DIRECTED TOWARD SPACE TO MEASURE THE LYMAN-ALPHA BACKGROUND RADIATION. THE 1050- TO 1350-A DETECTORS HAD LITHIUM FLUORIDE WINDOWS AND NITRIC OXIDE GAS FILLER. THE 1230- TO 1350-A DETECTORS HAD CALCIUM FLUORIDE WINDOWS AND NITRIC OXIDE GAS FILLER, AND THE 1350- TO 1550-A DETECTORS HAD BARIUM FLUORIDE WINDOWS AND UNSYMMETRICAL DIMETHYL HYDRAZINE GAS FILLER. THESE DETECTORS OBSERVED ZENITH AND NADIR INTENSITIES IN THE NIGHT SKY AT ALTITUDES OF 400 TO 900 KM. THE OUTPUT CONSISTED OF INTENSITIES TAKEN AT 2-MIN INTERVALS COVERING THE PERIOD JULY 29, 1967, TO JANUARY 20, 1969. THE SATELLITE TAPE RECORDER FAILED ON JANUARY 20, 1969, LIMITING THE DATA TO REAL TIME ONLY. PRIOR TO THIS EQUIPMENT FAILURE, THE RADIATION DETECTORS OPERATED WITH NEGLIGIBLE LOSS OF SENSITIVITY WITH THE EXCEPTION OF THE 1230- TO 1350-A DETECTORS WHICH, FOR NO KNOWN REASON, STEADILY DECREASED IN SENSITIVITY AND BECAME USELESS AFTER 6 WEEKS OF OPERATION. IN GENERAL, THE OPERATION OF THE INSTRUMENTATION WAS NOMINAL.

DATA SET NAME- AIRGLOW RADIATION INTENSITY PLOTS ON MICROFILM

NSSDC ID- 67-073A-13A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/29/67 TO 02/12/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 2 REEL(S) OF MICROFILM

THE DATA SET CONSISTS OF MEASUREMENTS OF BACKGROUND LYMAN-ALPHA RADIATION FROM SPACE (1050 TO 1350 A), LYMAN-ALPHA NIGHT SKYGLOW RADIATION FROM EARTH (1050 TO 1350 A), AND FAR UV AIRGLOW RADIATION FROM EARTH (1230 TO 1350 A AND 1350 TO 1550 A), WHICH HAVE BEEN CONVERTED TO RADIATION INTENSITIES BY THE USE OF CALIBRATION OR CONVERSION FACTORS. THE 1230- TO 1350-A RADIATION READINGS ARE QUESTIONABLE SINCE THE FAR UV DETECTORS LOST SENSITIVITY OVER A 6-WEEK PERIOD AND EVENTUALLY BECAME USELESS. THE DATA, WHICH ARE AVAILABLE ON REELS OF 16-MM MICROFILM, CONSIST OF STRIP CHARTS IN ANALOG FORM OF TIME (UT) VS THE THREE RADIATION INTENSITIES (FAR UV, EARTH LYMAN-ALPHA, AND BACKGROUND SPACE LYMAN-ALPHA) IN UNITS OF KILORAYLEIGHS. THE TIME PERIOD COVERED PER PLOT OR CHART RANGES FROM 15 MIN TO NEARLY 2 HR, WITH THE MOST FREQUENT INTERVAL BEING ABOUT 90 MIN. CALIBRATION FACTORS ARE ALSO GIVEN (KILORAYLEIGHS/V), WHILE THE INTENSITIES PLOTTED ARE ACCURATE TO PLUS OR MINUS 0.2 KILORAYLEIGH. THE INTENSITY READINGS WERE TAKEN AT 2-MIN INTERVALS DURING THE PERIOD JULY 29, 1967, TO FEBRUARY 12, 1968. NO ORBITAL DATA ARE INCLUDED IN THIS DATA SET.

REED, OGO 4

EXPERIMENT NAME- AIRGLOW PHOTOMETER

NSSDC ID- 67-073A-12

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 01/00/69

PERSONNEL

PI -	E.I.	REED	NASA-GSFC GREENBELT, MD
OI -	J.E.	BLAMONT	CNRS-LPSP VERRIERES-LE-BUISSON, FRANCE

THE OBJECTIVE OF THE MAIN BODY EXPERIMENT WAS TO STUDY THE CHARACTERISTICS AND DISTRIBUTION OF AIRGLOW AND AURORAL ACTIVITY BY OBTAINING PHOTOMETRIC MEASUREMENTS OF SEVERAL PROMINENT EMISSION LINES. AN EMR 541E PHOTOMULTIPLIER (TRIALKALI CATHODE AND SAPPHIRE WINDOW) WAS USED WITH SEVEN INTERFERENCE FILTERS. WITH THE TWO EXCEPTIONS NOTED BELOW, ALL

THE EMISSIONS IN THE VISIBLE AND UV WAVELENGTHS WERE VIEWED IN THE NADIR DIRECTION, I.E., DIRECTLY BELOW THE SPACECRAFT. EIGHT CHANNELS OR MODES OF OPERATION WERE USED AND WERE ESSENTIALLY GENERATED BY ROTATING MIRRORS. FOR EACH POSITION OF THE MIRRORS, THE LIGHT INTENSITY FOR A PARTICULAR LIGHT PATH THROUGH A DIFFERENT FILTER WAS RECORDED. THE MIRRORS SWITCHED AT 1-SEC INTERVALS. IN THE 8-SEC INTERVAL NEEDED TO COMPLETE A MEASUREMENT CYCLE, THE SATELLITE MOVED 0.5 DEG LATITUDE. IN THE FIRST MIRROR POSITION, THE FIELD OF VIEW WAS BLANKED, AND THE NOISE LEVEL OF THE SENSOR WAS MEASURED. THE NEXT MIRROR POSITION PRESENTED THE NADIR EMISSION INTENSITY THROUGH AN INTERFERENCE FILTER CENTERED AT 2630 A. THE THIRD POSITION MEASURED ZENITH EMISSION INTENSITY THROUGH THE 6300-A FILTER. THIS WAS THE ONLY UPWARD-LOOKING MEASUREMENT TAKEN. THE NEXT MIRROR POSITION ALSO PASSED THE RADIATION THROUGH A 6300-A FILTER, EXCEPT HERE THE INCOMING LIGHT WAS FROM BELOW. THE FIFTH MIRROR POSITION ENABLED RADIATION FROM THE NADIR AT 6225 A TO BE MEASURED. SUBSEQUENT MIRROR POSITIONS PERMITTED MEASUREMENT OF NADIR INTENSITIES AT THE FOLLOWING WAVELENGTHS — 5892, 5577, AND 3914 A. THE FOV WAS 10 DEG ACROSS IN THE DOWNWARD DIRECTION AND 7 DEG ACROSS LOOKING UPWARD. AN ASSESSMENT OF THE STABILITY OF THE EXPERIMENT'S RESPONSE WAS OBTAINED BY COMPARING MEASURED MOONLIT EARTH RADIANCE OVER OCEANS ON REPEATED PASSES. ABSOLUTE 'RESPONSIVITY' WAS DETERMINED FROM THE OVERHEAD TRANSIT OF SATURN AND JUPITER. IN JANUARY 1969, THIS EXPERIMENT WAS STILL OPERATIONAL. IN ADDITION TO THE MAIN BODY PHOTOMETER, THERE WAS A PHOTOMETER MOUNTED IN THE OPEP THAT VIEWED TOWARD THE EARTH. IT PROJECTED THE LIGHT THROUGH A 6300-A FILTER.

DATA SET NAME- AIRGLOW DATA MAPS AS COLOR TRANSPARENCIES

NSSDC ID- 67-073A-12A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/30/67 TO 01/10/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 19 FRAMES

THIS DATA SET, SUPPLIED BY THE EXPERIMENTER, CONSISTS OF NINETEEN 8-IN. BY 10-IN. COLOR TRANSPARENCIES THAT CONTAIN A SELECTION OF THE OGO 4 PHOTOMETER DATA. EACH TRANSPARENCY IS A MAP GIVING VALUES FOR THE NIGHT AIRGLOW EMISSION RATE OF THE ATOMIC OXYGEN LINE AT 6300 A AS A FUNCTION OF LATITUDE BETWEEN 40 DEG S AND 40 DEG N AND AS A FUNCTION OF LONGITUDE. THE MONTH, DAY, YEAR, AND LOCAL TIME OF THESE MEASUREMENTS, TO WITHIN 20 MIN, ARE PRINTED ON EACH MAP. MOST OF THE FIGURES ARE CENTERED ON 2-DAY PERIODS FOR WHICH THERE WERE DATA FROM AT LEAST 10 ORBITS PER DAY, WITH SOME ADDITIONAL MEASUREMENTS FROM THE DAY PRECEDING AND FOLLOWING THIS PERIOD ALSO INCLUDED. THIS SET CONTAINS DATA TAKEN FROM AUGUST 30, 1967, TO JANUARY 10, 1968, AND WITHIN A LOCAL TIME INTERVAL OF 18 HR 33 MIN TO 3 HR 36 MIN. ON THESE MAPS THE CONTOURS OF THE AIRGLOW ARE INDICATED AS THE BOUNDARIES OF THE DIFFERENT COLORS. THERE ARE SEVEN EMISSION RATE RANGES IDENTIFIED AND ONE 'NO DATA' CATEGORY, EXPRESSED IN RAYLEIGHS AND DISPLAYED IN DIFFERENT COLORS. THE RANGES ARE DIVIDED AS FOLLOWS — GREATER THAN 800, 800 TO 400, 400 TO 200, 200 TO 100, 100 TO 50, 50 TO 25, AND LESS THAN 25. THE MINIMUM MAGNETIC FIELD STRENGTH (B) EQUATOR AT 300 KM IS PLOTTED AS A HEAVY BLUE LINE. THE LONGITUDES OF THE ORBITS FROM WHICH DATA WERE USED ARE INDICATED BY THE LOCATION OF THE ORBIT NUMBERS ON THE TOP ABSCISSA SCALE.

DATA SET NAME- AIRGLOW DATA MAPS AS COLOR NEGATIVES

NSSDC ID- 67-073A-12B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/30/67 TO 01/10/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 19 FRAMES

THIS DATA SET, SUPPLIED BY THE EXPERIMENTER, CONSISTS OF NINETEEN 4-IN. BY 5-IN. COLOR NEGATIVES THAT CONTAIN A SELECTION OF THE OGO 4 PHOTOMETER DATA. EACH NEGATIVE IS A MAP GIVING VALUES FOR THE NIGHT AIRGLOW EMISSION RATE OF THE ATOMIC OXYGEN LINE AT 6300 A AS A FUNCTION OF LATITUDE BETWEEN 40 DEG S AND 40 DEG N AND AS A FUNCTION OF LONGITUDE. THE MONTH, DAY, YEAR, AND LOCAL TIME OF THESE MEASUREMENTS, TO WITHIN 20 MIN, ARE PRINTED ON EACH MAP. MOST OF THE FIGURES ARE CENTERED ON 2-DAY PERIODS FOR WHICH THERE WERE DATA FROM AT LEAST 10 ORBITS PER DAY, WITH SOME ADDITIONAL MEASUREMENTS FROM THE DAY PRECEDING AND FOLLOWING THIS INTERVAL ALSO INCLUDED. THIS SET CONTAINS DATA TAKEN FROM AUGUST 30, 1967, TO JANUARY 10, 1968, AND WITHIN A LOCAL TIME INTERVAL OF 18 HR 38 MIN TO 3 HR 36 MIN. ON THESE MAPS THE CONTOURS OF THE AIRGLOW ARE INDICATED AS THE BOUNDARIES OF THE DIFFERENT COLORS. THERE ARE SEVEN EMISSION RATE RANGES IDENTIFIED AND ONE 'NO DATA' CATEGORY, EXPRESSED IN RAYLEIGHS AND DISPLAYED IN DIFFERENT COLORS. THE RANGES ARE DIVIDED AS FOLLOWS — GREATER THAN 800, 800 TO 400, 400 TO 200, 200 TO 100, 100 TO 50, 50 TO 25, AND LESS THAN 25. THE MINIMUM MAGNETIC FIELD STRENGTH (B) EQUATOR AT 300 KM IS PLOTTED AS A HEAVY BLUE LINE. THE LONGITUDES OF THE ORBITS FROM WHICH THE MEASUREMENTS WERE USED ARE INDICATED BY THE LOCATION OF THE ORBIT NUMBERS ON THE TOP ABSCISSA SCALE.

DATA SET NAME- AIRGLOW INTENSITIES ON MAGNETIC TAPES

NSSDC ID- 67-073A-12C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/19/67 TO 01/19/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 9 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, WHICH WAS COPIED AT THE NATIONAL SPACE SCIENCE DATA CENTER FROM THE EXPERIMENTER'S TAPES, CONSISTS OF 800-BPI, 9-TRACK MAGNETIC TAPES. THE NUMBER OF FILES PER TAPE DOES NOT EXCEED 250, AND CONSECUTIVE FILES MAY NOT BE CHRONOLOGICALLY ORDERED. ALL EIGHT PHOTOMETER OUTPUTS ARE GIVEN IN VOLTS, WHICH CAN BE MULTIPLIED BY THE AVAILABLE CONVERSION FACTORS TO OBTAIN THE MEASUREMENTS IN RAYLEIGHS. INCLUDED WITH THE SENSOR DATA ARE TEMPORAL AND SPATIAL PARAMETERS SUCH AS DAY AND SECONDS OF DAY OF BOTH START AND END OF MEASUREMENTS, LOCAL AND UNIVERSAL TIMES, AND LATITUDE AND LONGITUDE OF THE MEASUREMENTS.

DATA SET NAME- AIRGLOW DATA MAPS BY ORBIT ON MICROFILM

NSSDC ID- 67-073A-12D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/19/67 TO 01/29/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 11 REEL(S) OF MICROFILM

THIS SET OF REDUCED DATA WAS SUPPLIED BY THE EXPERIMENTER AND CONSISTS OF 11 REELS OF 16-MM MICROFILM. EACH REEL CONTAINS THE PHOTOMETER DATA FOR A SPECIFIC TIME PERIOD WITHIN THE TIME RANGE FROM AUGUST 19, 1967, TO JANUARY 29, 1968, WITH NO DATA SHOWN FOR SOME INTERVALS AS LONG AS 1 WEEK. THE SEQUENCING OF THE MEASUREMENTS ON EACH REEL IS THE SAME, WITH ALL CHANNEL 1 DATA GIVEN FIRST, FOLLOWED BY CHANNEL 2 OUTPUTS, THEN BY CHANNEL 3, ETC. EACH FRAME IS A MAP WITH THE LONGITUDE SCALE RANGING FROM -180 TO +180 DEG, AND THE LATITUDE SCALE COVERING A 30-DEG INCREMENT OF THE PLUS OR MINUS 90-DEGREE RANGE OBSERVED. MEASUREMENTS TAKEN OVER A 24-HR PERIOD ARE ON ONE FRAME. THE DATA ARE DISPLAYED AS A SEQUENCE OF DECIMAL NUMBERS WHICH ARE THE VALUES OF THE PHOTOMETER OUTPUTS EXPRESSED IN VOLTS, AND REPRESENT 1-SEC MEASUREMENTS. THE PRINTED VALUES ARE POSITIONED AT THE LOCATIONS OF THEIR RESPECTIVE SUBSATELLITE POINTS ON THE MAP. HENCE, EACH SEQUENCE OF NUMBERS CORRESPONDS TO A PARTICULAR ORBIT PASS, WHICH IS IDENTIFIED BY THE ORBIT NUMBERS PRINTED ALONG THE TOP OF THE MAP. SEVERAL PARAMETERS ARE PRINTED ON EACH FRAME INCLUDING CHANNEL NUMBERS BEING DISPLAYED, DATES AT START AND END OF MEASUREMENTS, ECLIPSE LATITUDES, AND LOCAL TIME.

SPACECRAFT COMMON NAME- OGO 5

ALTERNATE NAMES- OGO-E, EGO 5
EOGO 5, 03138
S 59

NSSDC ID- 68-014A

LAUNCH DATE- 03/04/68 WEIGHT- 611. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/13/72

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 03/04/68
ORBIT PERIOD- 3796. MIN INCLINATION- 31.1 DEG
PERIAPSIS- 232.000 KM ALT APOAPSIS- 148228. KM ALT

THE PURPOSE OF THE OGO 5 SPACECRAFT, THE FIFTH OF A

SERIES OF SIX ORBITING GEOPHYSICAL OBSERVATORIES, WAS TO CONDUCT MANY DIVERSIFIED GEOPHYSICAL EXPERIMENTS TO OBTAIN A BETTER UNDERSTANDING OF THE EARTH AS A PLANET, AND TO DEVELOP AND OPERATE A STANDARDIZED OBSERVATORY-TYPE SPACECRAFT. OGO 5 CONSISTED OF A MAIN BODY THAT WAS PARALLELEPIPED IN FORM, TWO SOLAR PANELS, EACH WITH A SOLAR-ORIENTED EXPERIMENT PACKAGE (SOEP), AND TWO ORBITAL PLANE EXPERIMENT PACKAGES (OPEP). ONE FACE OF THE MAIN BODY WAS EARTH POINTING (Z-AXIS), AND THE LINE CONNECTING THE TWO SOLAR PANELS (X-AXIS) WAS PERPENDICULAR TO THE EARTH-SUN-SPACECRAFT PLANE. THE SOLAR PANELS WERE ABLE TO ROTATE ABOUT THE X-AXIS. THE OPEP'S WERE MOUNTED ON AND COULD ROTATE ABOUT AN AXIS THAT WAS PARALLEL TO THE Z-AXIS AND THAT WAS ATTACHED TO THE MAIN BODY. AT LAUNCH, THE INITIAL LOCAL TIME OF APOGEE WAS 0944 HR. OGO 5 CARRIED 25 EXPERIMENTS, 17 OF WHICH WERE PARTICLE STUDIES, TWO, MAGNETIC FIELD STUDIES. IN ADDITION, THERE WAS ONE EACH OF THE FOLLOWING TYPES OF EXPERIMENTS -- RADIO ASTRONOMY, UV SPECTRUM, LYMAN-ALPHA, SOLAR X RAY, PLASMA WAVES, AND ELECTRIC FIELD. REAL-TIME DATA WERE TRANSMITTED AT 1, 8, AND 64 KBS DEPENDING ON THE DISTANCE FROM THE SPACECRAFT TO THE EARTH. PLAYBACK DATA WERE TAPE RECORDED AT 1 KBS AND TRANSMITTED AT 64 KBS. TWO WIDE-BAND TRANSMITTERS, ONE FEEDING INTO AN OMNIDIRECTIONAL ANTENNA AND THE OTHER FEEDING INTO A DIRECTIONAL ANTENNA, WERE USED TO TRANSMIT DATA. A SPECIAL PURPOSE TELEMETRY SYSTEM, FEEDING INTO EITHER ANTENNA, WAS ALSO USED TO TRANSMIT WIDE-BAND DATA IN REAL TIME ONLY. TRACKING WAS ACCOMPLISHED BY USING RADIO BEACONS AND A RANGE AND RANGE-RATE, S-BAND TRANSPONDER. THE SPACECRAFT ATTITUDE CONTROL FAILED ON AUGUST 6, 1971, AFTER 41 MONTHS OF NORMAL OPERATION. THE SPACECRAFT WAS PLACED IN A STANDBY STATUS ON OCTOBER 8, 1971. FOUR EXPERIMENTS (MEYER, BLAMONT, THOMAS, AND SIMPSON) WERE REACTIVATED FOR THE PERIOD FROM JUNE 1 TO JULY 13, 1972, AFTER WHICH ALL OPERATIONAL SUPPORT TERMINATED. SPACECRAFT ORBIT PARAMETERS CHANGED SIGNIFICANTLY OVER THE SPACECRAFT LIFE. BY APRIL 1971, SPACECRAFT PERIGEE HAD INCREASED TO 26,400 KM AND INCLINATION HAD INCREASED TO 54 DEG.

EARTH, OGO 5

EXPERIMENT NAME- ULTRAVIOLET AIRGLOW

NSSDC ID- 68-014A-21

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 08/00/71

PERSONNEL

PI -	C.A.	BARTH	U OF COLORADO BOULDER, CO
OI -	G.E.	THOMAS	U OF COLORADO BOULDER, CO
OI -	J.B.	PEARCE	U OF COLORADO BOULDER, CO
OI -	E.F.	HACKEY	PACKARD-BELL CORP NEWBERRY PARK, CA

THE UV PHOTOMETER EXPERIMENT ON OGO 5 WAS FLOWN TO MEASURE THE DISTRIBUTION OF TERRESTRIAL AIRGLOW IN THE HYDROGEN LINE AT 1216 A AND THE ATOMIC OXYGEN LINE AT 1304 A. THREE-AXIS EARTH STABILIZATION OF THE MAIN SPACECRAFT BODY DURING NORMAL OPERATION PERMITTED THE PHOTOMETER TO VIEW THE AIRGLOW IN THE LOCAL ZENITH. THE FIELD OF VIEW WAS 3 DEG AT HALF MAXIMUM. RADIATION MEASUREMENTS BETWEEN 1050 AND 1800 A WERE OBTAINED WITH THIS TWO-CHANNEL PHOTOMETER EXPERIMENT. 'B' CHANNEL DATA (FROM 1250 TO 1800 A) WERE USED TO REMOVE THE CONTRIBUTION OF NON-LYMAN-ALPHA RADIATION FROM THE 'A' CHANNEL (1050 TO 1800 A) DATA. EACH PHOTOMETER HAD ITS OWN AMPLIFIER AND HIGH-VOLTAGE SERVO CONTROL SYSTEM. THE HIGH VOLTAGE ACROSS THE PHOTOMULTIPLIER TUBE WAS LOGARITHMICALLY PROPORTIONAL TO THE UV SOURCE INTENSITY. INFLIGHT CALIBRATION CHECKS AND AUTOMATIC DRIFT CORRECTIONS WERE INCORPORATED IN THE FLIGHT EXPERIMENT. A LENS COVER, MOUNTED AT THE EDGE OF THE PHOTOMETER APERTURE AND OPERATED ON GROUND COMMAND, NOT ONLY FULFILLED THE ORIGINAL DESIGN OBJECTIVE OF PROVIDING INCREASED PROTECTION OF THE PHOTOMULTIPLIER SURFACES FROM INCIDENT SUNLIGHT, BUT ON SEVERAL OCCASIONS IT ENABLED THE EXPERIMENTER TO IDENTIFY SPURIOUS SIGNALS SUCH AS THOSE RECEIVED WHEN THE SPACECRAFT PASSED THROUGH THE RADIATION BELT. BOTH CHANNELS HAD A NOMINAL SENSITIVITY OF 10 RAYLEIGHS. IN THIS EXPERIMENT, THE EARTH'S 1216-A AIRGLOW WAS MEASURED AGAINST THE EXTRATERRESTRIAL BACKGROUND RADIATION. THEREFORE, THE SPATIAL VARIATION OF THIS LYMAN-ALPHA BACKGROUND NEEDED TO BE DETERMINED TO OBTAIN A DESCRIPTION OF THE ALTITUDE DISTRIBUTION OF THE 1216-A EMISSION. TO ACHIEVE THIS SURVEY OF THE BACKGROUND RADIATION, THE OGO 5 SPACECRAFT WAS PUT INTO A SPINNING MODE WHEN IT WAS AT DISTANCES BEYOND THE GEOCORONAL SCATTERING REGION, I.E., AT ALTITUDES GREATER THAN 80,000 KM. TIME INTERVALS IN WHICH THE SPACECRAFT WAS SPINNING TO OBTAIN BACKGROUND MEASUREMENTS INCLUDED SEPTEMBER 12 TO 14 AND DECEMBER 15 TO 17, 1969; APRIL 1 TO 3 AND SEPTEMBER 1 TO 6, 1970, AND MARCH 18 TO 22, 1971.

DATA SET NAME- AIRGLOW INTENSITIES AT 1304 A AND 1216 A ON MAGNETIC TAPES

NSSDC ID- 68-014A-21A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 03/04/68 TO 06/28/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 456 REEL(S) OF MAGNETIC TAPE

THIS REDUCED DATA SET, WHICH WAS GENERATED AT NSSDC FROM TAPES SUPPLIED BY THE EXPERIMENTER, CONSISTS OF REFORMATTED 7-TRACK, ODD-PARITY, MAGNETIC TAPES RECORDED AT 556-BPI AND GENERATED IN IBM 7094 FORMAT. EACH TAPE CONTAINS ONE ORBIT OF EXPERIMENT DATA AND CONSISTS OF ONE FILE OF INFORMATION COMPOSED OF ONE 22-WORD ORBIT INFORMATION RECORD, ONE 78-WORD ATTITUDE/ORBIT DATA RECORD AND APPROXIMATELY THIRTY-SEVEN HUNDRED AND FIFTY 438-WORD RECORDS EACH CONTAINING 78 WORDS OF ATTITUDE/ORBIT DATA AT 1-MIN INTERVALS, AND 360 WORDS OF EXPERIMENT DATA AT 1-SEC INTERVALS. ALL WORDS ARE 36-BITS LONG. THE CHANNEL A AND B OUTPUTS ARE PRESENTED AS DATA NUMBERS THAT RANGE IN MAGNITUDE FROM 0 TO 255. CONVERSION VALUES ARE AVAILABLE TO TRANSFORM THESE DATA NUMBERS INTO KILORAYLEIGHS. PARAMETERS PROVIDED INCLUDE (1) TIME AND (2) POSITION RELATIVE TO THE EARTH, THE SUN, AND THE EARTH'S MAGNETIC FIELD.

DATA SET NAME- CALCOMP PLOTS OF AIRGLOW AT 1216 A AND 1304 A

NSSDC ID- 68-014A-21B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 03/27/68 TO 05/20/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

SOME OF THE OGO 5 TWO-CHANNEL PHOTOMETER EXPERIMENT DATA ARE PRESENTED ON CALCOMP PLOTS SUPPLIED BY THE EXPERIMENTER. THESE PLOTS WERE COPIED ONTO 35-MM FILM AT NSSDC. ALTHOUGH BASICALLY THE SAME DATA PARAMETERS ARE PRESENTED THROUGHOUT THE FILM, VALUES FROM THE EARLY ORBITS ARE SHOWN IN ONE FORMAT, AND THOSE OF LATER ORBITS ARE DISPLAYED IN A DIFFERENT FORMAT. IN THE EARLY FORMAT, THE DATA FROM EACH ORBIT ARE DISPLAYED ON THREE GRAPHS, EACH CONTAINING TWO CURVES, AND ALL PLOTS SHARING A COMMON LINEAR ABSCISSA SCALE, TRUE ANOMALY (DESIGNATED AS 'ETA'). SOLAR ZENITH ANGLE AND MAGNETIC LATITUDE VALUES ARE PLOTTED ON THE TOP GRAPH, SPACECRAFT POSITION (RIGHT ASCENSION AND DECLINATION) VALUES ARE SHOWN ON THE MIDDLE GRAPH, AND THE EXPERIMENT OUTPUTS IN KILORAYLEIGHS AT WAVELENGTHS OF 1216 A AND 1304 A COMPRISE THE BOTTOM GRAPH. BENEATH THE ABSCISSA SCALE ARE PRINTED VALUES FOR GEOCENTRIC RADIAL DISTANCE, CALENDAR DATE, AND GREENWICH MEAN TIME. THE ORBIT NUMBER IS PRINTED BENEATH THESE VALUES. FOR THE LATER ORBITS, THE PARAMETER VALUES ARE DISPLAYED ON TWO GRAPHS EACH CONTAINING FOUR CURVES, AND AGAIN PRESENTED SO THAT ALL PLOTS SHARE A COMMON LINEAR ABSCISSA -TRUE ANOMALY. THE DETECTOR OUTPUTS EXPRESSED IN KILORAYLEIGHS AT WAVELENGTHS OF 1216 A AND 1304 A ARE SHOWN ON THE TOP GRAPH ALONG WITH VALUES FOR THE SOLAR ZENITH ANGLE AND SPACECRAFT RADIAL DISTANCE. VALUES FOR THE FOLLOWING FOUR PARAMETERS ARE PLOTTED ON THE BOTTOM GRAPH -- SPACECRAFT RIGHT ASCENSION AND DECLINATION, LONGITUDE, AND MAGNETIC LATITUDE. THE ORBIT NUMBER IS PRINTED BENEATH THE ABSCISSA SCALE.

BLAMONT, OGO 5

EXPERIMENT NAME- GEOCORONAL LYMAN-ALPHA MEASUREMENT

NSSDC ID- 68-014A-22

STATUS OF OPERATION- OPERATIONAL OFF
DATE LAST DATA RECORDED- 09/00/71

PERSONNEL

PI -	J.E.	BLAMONT	CNRS-LPSP VERRIERES-LE-BUISSON, FRANCE

THE OBJECTIVE OF THIS EXPERIMENT WAS TO DETERMINE THE HYDROGEN (H) DISTRIBUTION IN THE GEOCORONA AND THE GEOCORONA'S TEMPERATURE FROM THE MEASUREMENTS OF THE INTENSITY AND LINE SHAPE OF THE EMERGING LYMAN-ALPHA RADIATION. IN ADDITION, THE EXPERIMENT PROVIDED DATA ON EXTRA TERRESTRIAL SOURCES OF LYMAN-ALPHA, SUCH AS INTERSTELLAR WIND, COMETS, PLANETS, AND NUMEROUS STARS. THE SENSOR WAS A PHOTOMETER WITH A FOV OF 40 MIN OF ARC AND A BANDWIDTH OF 80 A CENTERED AT LYMAN-ALPHA (1216 A). SPECIFICALLY, A PLANE MIRROR WHICH COULD ROTATE ABOUT A HORIZONTAL AXIS WAS USED TO MOVE THE FOV IN 1/2 DEG

STEPS. LEAVING THIS MIRROR, THE RADIATION STRUCK A SPHERICAL MIRROR THAT FOCUSED IT ONTO A DIAPHRAGM. SUBSEQUENTLY THE IMAGE OF THE DIAPHRAGM WAS FOCUSED ON THE ENTRANCE WINDOW OF A PHOTOMULTIPLIER VIA A SYSTEM CONSISTING OF AN ASPHERICAL MIRROR AND A PLANE GRATING. A HYDROGEN CELL, FILLED WITH H GAS AT A PRESSURE OF 0.5 MM OF MERCURY AND CONTAINING TWO MAGNESIUM FLUORIDE WINDOWS, WAS PLACED IN FRONT OF THE PHOTOMULTIPLIER AND PROVIDED THE MEASUREMENT OF LINE WIDTH. PULSES PRODUCED BY THE PHOTOMULTIPLIER WERE COUNTED FOR 0.432 SEC, A TIME SPAN DURING WHICH THE PLANE MIRROR POSITION DID NOT CHANGE. THE NUMBER OF PULSES IN THIS TIME INTERVAL WAS A MEASUREMENT OF INTENSITY. A SHUTTER WAS CLOSED EVERY THIRD MINUTE TO MEASURE THE DARK CURRENT LEVEL OF THE PHOTOMETER. THE EXPERIMENT WAS MOUNTED IN THE OPEP. INSTRUMENT SCANNING CAUSED THE FOV AXIS TO MOVE INSIDE A CONE OF ±6-DEG HALF-ANGLE, WITH THE LOCAL VERTICAL AS AXIS. TWO MODES OF OPERATION WERE POSSIBLE AND THE CHOICE WAS MADE BY GROUND COMMAND. IN THE SCANNING MODE THE PLANE MIRROR WOULD SCAN CONTINUOUSLY, IN THE STEPPING MODE THIS MIRROR WOULD BE PLACED IN A SPECIFIED POSITION. THE EXPERIMENT WAS TURNED OFF WHEN THE SPACECRAFT WAS DEACTIVATED ON OCTOBER 8, 1971, AFTER OPERATING FOR 23,170 HRS. THE EXPERIMENT WAS TURNED ON AGAIN WHEN THE SPACECRAFT WAS REACTIVATED FOR THE PERIOD JUNE 1 TO JULY 13, 1972. MORE EXPERIMENT DETAILS AND SOME DATA APPEAR IN "INTERPRETATION OF OGO 5 LYMAN-ALPHA MEASUREMENTS IN THE UPPER GEOCORONA." J. L. BERTAUX, ET AL, "JGR," VOL 78, NO. 1, P 80 (1973).

DATA SET NAME- LYMAN ALPHA GEOCORONAL DATA ON MAGNETIC TAPES

NSSDC ID- 68-014A-22A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 03/05/68 TO 12/31/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 32 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF 9-TRACK MAGNETIC TAPES WRITTEN AT 1600 BPI ON A 360/65 IBM COMPUTER IN A FLOATING POINT FORMAT. THE NUMBER OF FILES PER TAPE VARIES FROM 4 TO 25. EACH FILE CONTAINS THE DATA FOR AN ENTIRE ORBIT AND IS ARRANGED WITH A FILE LABEL, FOLLOWED BY A VARIABLE NUMBER OF RECORDS. THE RECORDS ARE OF VARIABLE LENGTH AND CONTAIN ABOUT 3 MIN OF DATA. IN ADDITION TO THE MEASURED LYMAN-ALPHA INTENSITY, SEVERAL OTHER PARAMETERS ARE PRESENTED INCLUDING ALTITUDE, LOCATION, AND TIME.

SHARP, OGO 5

EXPERIMENT NAME- LIGHT ION MASS MAGNETIC SPECTROMETER

NSSDC ID- 68-014A-18

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/00/69

PERSONNEL

PI -	G.M. SHARP	NASA HEADQUARTERS WASHINGTON, DC
OI -	T.J. CROWTHER	LOCKHEED PALO ALTO PALO ALTO, CA
OI -	K.K. HARRIS	LOCKHEED PALO ALTO PALO ALTO, CA

THIS EXPERIMENT WAS DESIGNED TO DETERMINE THE CONCENTRATION OF LIGHT ION SPECIES IN THE TOPSIDE IONOSPHERE AND EXOSPHERE AND TO MEASURE THESE CONCENTRATIONS THROUGHOUT THE PLASMASPHERE. THE EXPERIMENT WAS ALSO DESIGNED TO MONITOR THE LOCATIONS OF THE PLASMAPAUSE, MAGNETOPAUSE, AND BOW SHOCK. THE INSTRUMENT CONSISTED OF AN AUTOMATIC MULTIRANGED MAGNETIC FOCUS ION MASS SPECTROMETER. THE INSTRUMENT WAS CAPABLE OF MEASURING SINGLY IONIZED ATOMIC OXYGEN, HYDROGEN, AND HELIUM CONCENTRATIONS. A COMPLETE MEASUREMENT OF THESE CONCENTRATIONS PLUS A CALIBRATION WAS COMPLETED IN 4.6 SEC. THE ACCURACY OF THE MEASURED DATA WAS ESTIMATED TO BE 10 PERCENT. THE INSTRUMENT WAS MOUNTED ON THE SPACECRAFT SO THAT THE VELOCITY VECTOR WAS ESSENTIALLY NORMAL TO THE INSTRUMENT APERTURE. THE INSTRUMENT ACQUIRED USEFUL DATA FROM LAUNCH UNTIL MAY 31, 1969. IN EARLY JULY 1969 THE INSTRUMENT WAS TURNED OFF DUE TO DEGRADATION OF THE EXPERIMENT SENSING ELEMENT. AT THAT TIME THE EXPERIMENT HAD OPERATED FOR MORE THAN 14,000 HR.

DATA SET NAME- O+, HE+, AND H-ION CONCENTRATIONS ON MAGNETIC TAPE

NSSDC ID- 68-014A-18A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 03/07/68 TO 05/31/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 14 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, SUPPLIED BY THE EXPERIMENTER, CONSISTS OF BINARY, 7-TRACK, 800-BPI UNIVAC 1108 MAGNETIC TAPES. THERE ARE 7 TO 12 FILES PER TAPE. THE TAPES CONTAIN HEADER RECORDS IN BCD FORMAT. THE FOLLOWING INFORMATION IS CONTAINED ON EACH TAPE - TIME, ION CONCENTRATION, GEODETIC LONGITUDE, LATITUDE AND ALTITUDE, MCILWAIN L, GEOCENTRIC DISTANCE, LOCAL TIME, MAGNETIC LATITUDE, EGRESS LATITUDE, AND INGRESS LATITUDE. WITH THE EXCEPTION OF THE TIME SPAN FROM APRIL 24 TO JUNE 12, 1968, THERE IS COMPLETE COVERAGE OVER THE TIME PERIOD INDICATED ABOVE.

SPACECRAFT COMMON NAME- OGO 6

ALTERNATE NAMES- PL-691D, OGO-F
S 60, POGO 3
03986

NSSDC ID- 69-051A

LAUNCH DATE- 06/05/69 WEIGHT- 632.0 KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/00/72

ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC		EPOCH DATE- 06/06/69	
ORBIT PERIOD- 099.66 MIN		INCLINATION- 81.9810 DEG	
PERIAPSIS- 413. KM ALT		APOAPSIS- 1077. KM ALT	

OGO 5 WAS A LARGE OBSERVATORY INSTRUMENTED WITH 26 EXPERIMENTS DESIGNED TO STUDY THE VARIOUS INTERRELATIONSHIPS BETWEEN, AND LATITUDINAL DISTRIBUTIONS OF, HIGH-ALTITUDE ATMOSPHERIC PARAMETERS DURING A PERIOD OF INCREASED SOLAR ACTIVITY. THE MAIN BODY OF THE SPACECRAFT WAS ATTITUDE CONTROLLED BY MEANS OF HORIZON SCANNERS AND GAS JETS SO THAT ITS ORIENTATION WAS MAINTAINED CONSTANT WITH RESPECT TO THE EARTH AND THE SUN. THE SOLAR PANELS ROTATED ON A HORIZONTAL AXIS EXTENDING TRANSVERSELY THROUGH THE MAIN BODY OF THE SPACECRAFT. THE ROTATION OF THE PANELS WAS ACTIVATED BY SUN SENSORS SO THAT THE PANELS RECEIVED MAXIMUM SUNLIGHT. SEVEN EXPERIMENTS WERE MOUNTED ON THE SOLAR PANELS (THE SOPEP PACKAGE). AN ADDITIONAL AXIS, ORIENTED VERTICALLY ACROSS THE FRONT OF THE MAIN BODY, CARRIED SEVEN EXPERIMENTS (THE OPEP PACKAGE). NOMINALLY, THESE SENSORS OBSERVED IN A FORWARD DIRECTION IN THE ORBITAL PLANE OF THE SATELLITE. THE SENSORS COULD BE ROTATED MORE THAN 90 DEG RELATIVE TO THE NORMAL OBSERVING POSITION AND MORE THAN 90 DEG BETWEEN THE UPPER AND LOWER OPEP GROUPS MOUNTED ON EITHER END OF THIS AXIS. ON JUNE 22, 1969, THE SPACECRAFT POTENTIAL DROPPED SIGNIFICANTLY DURING SUNLIGHT OPERATION AND REMAINED SO DURING SUBSEQUENT SUNLIGHT OPERATION. THIS UNEXPLAINED SHIFT AFFECTED SEVEN EXPERIMENTS WHICH MADE MEASUREMENTS DEPENDENT UPON KNOWLEDGE OF THE SPACECRAFT PLASMA SHEATH. DURING OCTOBER 1969, A STRING OF SOLAR CELLS FAILED, BUT THE ONLY EFFECT OF THE DECREASED POWER WAS TO CAUSE TWO EXPERIMENTS TO CHANGE THEIR MODE OF OPERATION. ALSO DURING OCTOBER 1969, A COMBINATION OF MANUAL AND AUTOMATIC ATTITUDE CONTROL WAS INITIATED, WHICH EXTENDED THE CONTROL GAS LIFETIME OF THE ATTITUDE CONTROL SYSTEM. IN AUGUST 1970, TAPE RECORDER (TR) NO. 1 OPERATION DEGRADED SO THAT ALL RECORDED DATA WERE SUBSEQUENTLY TAKEN WITH TR NO. 2 BY SEPTEMBER 1970, POWER AND EQUIPMENT DEGRADATION LEFT 14 EXPERIMENTS OPERATING NORMALLY, 3 PARTIALLY, AND 9 OFF. FROM OCTOBER 14, 1970, TR NO. 2 WAS USED ONLY ON WEDNESDAYS (WORLD DAYS) TO CONSERVE POWER AND EXTEND TR OPERATION. IN JUNE 1971, THE NUMBER OF "ON" EXPERIMENTS DECREASED FROM 13 TO 7, AND ON JUNE 28, 1971, THE SPACECRAFT WAS PLACED IN A SPIN-STABILIZED MODE ABOUT THE YAW (Z) AXIS AND TURNED OFF DUE TO DIFFICULTIES WITH SPACECRAFT POWER. OGO 6 WAS TURNED ON AGAIN FROM OCTOBER 10, 1971, THROUGH MARCH 1972, FOR OPERATION OF EXPERIMENT 25 BY RADIO RESEARCH LABORATORY, JAPAN.

DATA SET NAME- EXTENDED WORLD MAPS (EPHEMERIDES) ON MICROFILM

NSSDC ID- 69-051A-00C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/05/69 TO 10/05/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 13 REEL(S) OF MICROFILM

THESE DATA, PREPARED AT GSFC, ARE LISTINGS OF SATELLITE POSITION AND SUPPORTING INFORMATION FOR EACH MINUTE OF GMT. THE INFORMATION IN THESE LISTINGS INCLUDES GEOCENTRIC POSITION, INTERTIAL POSITION, DEFINITION OF THE SATELLITE VELOCITY VECTOR, AND SATELLITE POSITION IN THE MAGNETIC DIPOLE FIELD AND IN THE 'REAL' MAGNETIC (MCILWAIN) FIELD.

[redacted]

EARTH, OGO 6

EXPERIMENT NAME- UV PHOTOMETER

NSSDC ID- 69-051A-13

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 02/05/71

PERSONNEL
PI - C.A. BARTH ..... U OF COLORADO
BOULDER, CO
OI - J.B. PEARCE ..... U OF COLORADO
BOULDER, CO
OI - E.F. MACKEY ..... PACKARD-BELL CORP
NEWBERRY PARK, CA

THE SCIENTIFIC OBJECTIVES OF THIS EXPERIMENT WERE TO MEASURE (1) THE INTENSITY OF THE HYDROGEN LYMAN-ALPHA EMISSION AT 1216 A AND OF THE ATOMIC OXYGEN EMISSION AT 1304 A IN THE AIRGLOW, (2) THE COLUMNAR DENSITIES OF THE NEUTRAL ATOMIC HYDROGEN AND OXYGEN SPECIES ABOVE THE ORBIT, AND (3) THE SPATIAL DISTRIBUTION (IN LOCAL TIME AND LATITUDE) AND THE TEMPORAL CHANGES (WITH SOLAR AND GEOPHYSICAL ACTIVITY) OF THE ABOVE DENSITIES AND EMISSION INTENSITIES. THREE-AXIS EARTH STABILIZATION OF THE MAIN SPACECRAFT BODY DURING NORMAL OPERATION PERMITTED THE PHOTOMETERS TO VIEW THE AIRGLOW IN THE LOCAL ZENITH. THE FIELD OF VIEW WAS 3 DEG AT HALF-MAXIMUM. RADIATION MEASUREMENTS MADE WITH THIS TWO-CHANNEL PHOTOMETER EXPERIMENT COVERED THE WAVELENGTH INTERVAL FROM 1050 TO 1800 A. CHANNEL 'B' DATA, IN THE WAVELENGTH INTERVAL FROM 1250 TO 1800 A, WERE USED TO REMOVE THE CONTRIBUTION OF THE NON-LYMAN-ALPHA RADIATION FROM THE CHANNEL 'A' DATA, WHICH RANGED FROM 1050 TO 1800 A. THUS, THE INTENSITY OF THE AIRGLOW EMISSIONS AT 1216 AND 1304 A COULD BE INFERRED DIRECTLY FROM THE QUANTITIES CHANNEL A OUTPUT MINUS CHANNEL B, AND CHANNEL B OUTPUT, RESPECTIVELY. THE PHOTOMULTIPLIER TUBE ANODE CURRENT WAS DETECTED WITH A DC-COUPLED STABILIZED ELECTROMETER. BOTH CHANNELS HAD A DYNAMIC RANGE FROM 10 RAYLEIGHS TO 100 KILORAYLEIGHS. A COMMANDABLE SHUTTER WAS INCLUDED TO ALLOW MEASUREMENTS OF BACKGROUND. SINCE SCATTERED SUNLIGHT AFFECTED THE MEASUREMENTS WHEN THE SUN WAS WITHIN 34 DEG OF THE Z-A IS, SUITABLE SHIELDING WAS PROVIDED. THE RADIATION BELT ABOVE 600 KM (OR IN THE ANOMALY ABOVE 600 KM) CAUSED SPURIOUS SIGNALS THAT WERE PRESENT IN BOTH CHANNELS. THE TELEMETERED DATA WERE APPROXIMATELY PROPORTIONAL TO THE LOGARITHM OF THE UV SOURCE INTENSITY. INFLIGHT CALIBRATION CHECKS AND AUTOMATIC DRIFT CORRECTIONS WERE INCORPORATED IN THE EXPERIMENT. REDUCED DATA INCLUDED EXPERIMENT OUTPUTS OF BOTH PHOTOMULTIPLIER CHANNELS AT 1-SEC INTERVALS. SPACECRAFT OPERATIONS WERE TERMINATED ON JUNE 28, 1971. AT THAT TIME, THIS EXPERIMENT WAS STILL OPERATIONAL, HAVING FUNCTIONED FOR MORE THAN 14,000 HR.

[redacted]

DATA SET NAME- AIRGLOW INTENSITIES AT 1304 A AND 1216 A

NSSDC ID- 69-051A-13A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/09/69 TO 07/24/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 110 REEL(S) OF MAGNETIC TAPE

THIS REFORMATTED DATA SET SUPPLIED BY THE EXPERIMENTER, CONTAINS 7-TRACK, ODD PARITY MAGNETIC TAPES IN IBM 7094 FORMAT, WRITTEN AT 556 BPI. ALL TAPES CONTAIN 50 FILES OF INFORMATION. I.E., 50 ORBITS OF EXPERIMENT DATA AND SELECTED ATTITUDE-ORBIT PARAMETERS. EACH FILE IS COMPOSED OF ONE 22-WORD ORBIT INFORMATION RECORD, ONE 78-WORD ATTITUDE-ORBIT DATA RECORD, AND APPROXIMATELY ONE HUNDRED 436-WORD RECORDS, EACH CONTAINING 78 WORDS OF ATTITUDE ORBIT DATA AT 1-MIN INTERVALS AND 360 WORDS OF EXPERIMENT DATA AT 1-SEC INTERVALS. ALL WORDS ARE 36 BITS LONG. THE DATA CHANNELS A AND B OUTPUTS ARE IN DATA NUMBERS, WHICH RANGE IN MAGNITUDE FROM 0 TO 255. CONSTANTS ARE AVAILABLE TO CONVERT THESE DATA NUMBERS INTO KILORAYLEIGHS. THE PARAMETERS PROVIDED INCLUDE DATE AND TIME OF THE MEASUREMENTS AND THE SPACECRAFT POSITION RELATIVE TO THE EARTH, SUN, AND EARTH'S MAGNETIC FIELD.

[redacted]

DATA SET NAME- CALCOMP PLOTS OF UV AIRGLOW DATA ON MICROFILM

NSSDC ID- 69-051A-13B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/09/69 TO 11/05/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET OF 35-MM FILM, SUPPLIED BY THE EXPERIMENTER, CONTAINS CALCOMP PLOTS OF SOME OF THE OGO 6 PHOTOMETER DATA CONTAINED ON TAPE (DATA SET 69-051A-13A). EACH FILM FRAME SHOWS ONE ORBIT OF DATA AND IS MADE UP OF TWO GRAPHS PLACED ONE ABOVE THE OTHER. VALUES FOR FOUR PARAMETERS ARE SHOWN ON EACH GRAPH, AND ALL EIGHT CURVES ARE PLOTTED VS TRUE ANOMALY (DEG). THE UPPER GRAPH CONTAINS VALUES FOR THE INTENSITIES OF THE 1216-A AND 1304-A EMISSIONS, THE SPACECRAFT HEIGHT (KM), AND THE SOLAR ZENITH ANGLE (DEG). THE LOWER GRAPH CONTAINS VALUES FOR THE RIGHT ASCENSION AND DECLINATION, GEODETIC LONGITUDE, AND MAGNETIC LATITUDE. THE ORBIT NUMBER IS PRINTED AT THE BOTTOM OF EACH FRAME.

[redacted]

CLARK, OGO 6

EXPERIMENT NAME- LYMAN-ALPHA PHOTOMETER

NSSDC ID- 69-051A-12

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/28/71

PERSONNEL
PI - W.A. CLARK ..... AEROSPACE CORP
EL SEGUNDO, CA
OI - D.D. ELLIOTT ..... AEROSPACE CORP
EL SEGUNDO, CA
OI - P.M. KETZGER ..... AEROSPACE CORP
EL SEGUNDO, CA

THIS EXPERIMENT WAS DESIGNED TO OBSERVE FROM WITHIN THE GEOCORONA WEAK EXTERNAL ENHANCEMENTS OF CELESTIAL LYMAN-ALPHA SKY. THE INSTRUMENTATION CONSISTED OF A SKY-SCANNING HYDROGEN LYMAN-ALPHA PHOTOMETER WITH A 3-A BANDWIDTH. THE INSTRUMENT WAS EQUIPPED WITH (1) AN INSERTABLE SRF2 SCATTERED LIGHT TESTING FILTER, (2) A HYDROGEN-FILLED TYPE 304 STAINLESS STEEL CELL RESONANCE FILTER (WHICH SUPPRESSED THE STRONG LYMAN-ALPHA AIRGLOW), (3) AN OXYLEN BANDWIDTH DETERMINING FILTER, (4) AN ERR TYPE 543-T PHOTOMULTIPLIER WITH AN NACL CATHODE, (5) A ROTATING PLANE MIRROR OPTIMIZED FOR REFLECTION AT 1216 A, AND (6) A PLATINUM-FOIL SECONDARY STANDARD INFLIGHT CALIBRATOR. THE PHOTOMETER WAS MOUNTED EXTERNAL TO THE SPACECRAFT ABOVE THE Z-AXIS DOOR, ALLOWING A CLEAR VIEW OF BOTH HORIZONS. THE SCANNER PLANE WAS CANTED 20 DEG FROM THE SPACECRAFT AXIS TO AVOID DIRECT OBSERVATION OF THE SUN, AND THEREFORE THE INSTRUMENT SCANNED MOST OF THE CELESTIAL SPHERE EXCLUSIVE OF A CONE OF 20 DEG HALF-ANGLE AROUND THE SOLAR AND ANTISOLAR POINTS. ZENITH OBSERVATIONS WERE MADE ONCE PER SCAN AND WERE TAKEN ALTERNATELY WITH THE RESONANCE CELL ON AND OFF. THE AUTOMATIC FUNCTIONS OF THE PHOTOMETER, WHICH HAD A FIELD OF VIEW OF 5 DEG (FWHM), WERE PROGRAMMED TO OPERATE FROM A CLOCK PULSE GENERATED BY THE ROTATING SCANNER MIRROR. THE CALIBRATION SIGNAL WAS GENERATED FOR FOUR OF EVERY 32 TURNS OF THE SCANNER, WHICH TURNED ONCE EVERY 40 SEC, AND THE SRF2 FILTER WAS INSERTED FOR TWO OF EVERY 16 TURNS. THE PHOTOMETER SENSITIVITY WAS ABOUT 1 RAYLEIGH (R) DURING EARLY OPERATIONS BUT DECAYED TO APPROXIMATELY 10 R AFTER A FEW DAYS. COUNT RATE DATA WERE OBTAINED DURING THE PERIOD JUNE 6 TO 18, 1969, AND WERE OF EXCELLENT QUALITY.

[redacted]

DATA SET NAME- REDUCED PHOTOMETER CURRENTS, ATTITUDE AND EPHEMERIS DATA ON MAGNETIC TAPE

NSSDC ID- 69-051A-12A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/08/69 TO 06/08/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, OBTAINED FROM THE EXPERIMENTER, IS ON 800-BPI, BCD, 7-TRACK MAGNETIC TAPE. IT CONSISTS OF AN ID RECORD (CONTAINING THE SPACECRAFT AND EXPERIMENT NAME, THE ORBIT NUMBER IN WHICH DATA STARTS, THE DAY NUMBER, AND THE DATE OF THE BACKGROUND CORRECTION DATA USED) FOLLOWED BY ONE OR MORE DATA RECORDS. EACH DATA RECORD CONTAINS 40 DATA FRAMES. EACH DATA FRAME INCLUDES THE TIME (MSEC), THE SCANNER ANGLE (DEG), BOTH UNCORRECTED AND BACKGROUND CORRECTED COUNT

OGO 6

RATES (COUNTS PER SEC). DATA ELECTROMETER CURRENT (AMP). AN EXPERIMENT STATUS FLAG. THE RIGHT ASCENSION/DECLINATION OF THE LOOK DIRECTION (DEG). THE ECLIPTIC LONGITUDE/LATITUDE OF THE LOOK DIRECTION (DEG). THE ALTITUDE OF THE SPACECRAFT (KM). THE GEODETIC LATITUDE/LONGITUDE OF THE SPACECRAFT (DEG). AND THE SUN-EARTH-SATELLITE ANGLE (DEG). THE DATA ARE NOT CONTINUOUS BECAUSE EITHER (1) AT THE START OF EACH INPUT FILE SEVERAL SEC OF DATA ARE NEEDED TO INITIALIZE THE ROUTINE THAT ESTABLISHES THE SCANNER ANGLE. (2) THE COUNT RATE DATA FOR SCANNER ANGLES BETWEEN 300 AND 60 DEG ARE USELESS AND HAVE BEEN EDITED OUT. OR (3) DROPOUTS IN THE DATA STILL APPEAR IN THE FINAL TAPE.

HANSON, OGO 6

EXPERIMENT NAME- PLANAR ION ELECTRON TRAP

NSSDC ID- 69-051A-03

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 06/28/71

PERSONNEL
PI - W.B. HANSON ..... U OF TEXAS, DALLAS
DALLAS, TX
OI - T.W. FLOWERDAY ..... U OF TEXAS, DALLAS
DALLAS, TX

THIS EXPERIMENT WAS USED TO DETERMINE THE FOLLOWING CHARACTERISTICS OF THE IONOSPHERE -- THE ION CONCENTRATION, THE ION COMPOSITION, THE ION TEMPERATURE, THE FAST ELECTRON FLUX WITH A NORMAL ENERGY COMPONENT >GT. 9.1 EV, AND THE HORIZONTAL IRREGULARITIES IN THE ION CONCENTRATION. THE RETARDING POTENTIAL ANALYZER CONSISTED OF A SENSOR HEAD AND AN ELECTRONICS BOX. THE SENSOR HEAD CONTAINED AN 8-CM- CYLINDER WITH A CONCENTRIC 2-CM APERTURE. CHARGED PARTICLES PASSED THROUGH THIS APERTURE BEFORE STRIKING A SOLID COLLECTOR. THE PATH BETWEEN THE APERTURE AND COLLECTOR WAS SEGMENTED BY FOUR GRIDS, WHOSE POTENTIALS WERE CONTROLLED BY THE ELECTRONICS BOX. THE SENSOR HEAD WAS FLUSH-MOUNTED WITH THE FRONT FACE OF THE ORBITAL PLANE EXPERIMENTAL PACKAGE (OPEP). A GROUNDED, GOLD-PLATED SCREEN ENCIRCLED THE SENSOR HEAD. ITS PURPOSE WAS TO MINIMIZE ELECTRIC FIELDS PARALLEL TO THE SENSOR FACE. DURING NORMAL OPERATION, THE SENSOR FACE WAS PERPENDICULAR TO THE VEHICLE VELOCITY VECTOR. THE ELECTRONICS BOX CONTAINED THE FOLLOWING -- A POWER SUPPLY WITH SEVERAL FIXED OUTPUT VOLTAGES, AN AUTOMATIC RANGE-CHANGING LINEAR ELECTROMETER, A DIFFERENTIAL AMPLIFIER, A LINEAR VOLTAGE SWEEP CIRCUIT, AND SEVERAL LOGIC AND TIMING NETWORKS. THERE WERE TWO BASIC MODES OF OPERATION -- AN ION-ANALYSIS MODE AND A DUCT MODE. THESE MODES WERE ALTERNATELY EMPLOYED. DURING BOTH MODES, THE FIRST TWO GRIDS WERE ALWAYS GROUNDED. THE THIRD GRID (THE RETARDING GRID) WAS LINEARLY SWEPT FROM +19.5 TO -1.8 V DURING THE ION-ANALYSIS MODE. THIS YIELDED A PROFILE OF ION CURRENT AS A FUNCTION OF VOLTAGE, WHICH WAS USED IN DETERMINING ION TEMPERATURE AND COMPOSITION. DURING THE DUCT MODE, WHEN SMALL HORIZONTAL GRADIENTS IN ION CONCENTRATION WERE EXAMINED, THE RETARDING GRID WAS MAINTAINED AT -1.8 V. THE FOURTH GRID (THE SUPRESSOR GRID) WAS ALWAYS MAINTAINED AT -7.1 V. THIS GRID WAS USED TO SUPRESS PHOTOEMISSION FROM THE COLLECTOR. (ALL VOLTAGES GIVEN ARE WITH RESPECT TO VEHICLE GROUND). A COMPLETE CYCLE TIME OF EITHER 40 OR 10 SEC COULD BE SELECTED FOR BOTH MODES BY GROUND COMMAND. IN A 10-SEC CYCLE TIME, FOR EXAMPLE, THE FIRST 5 SEC WERE USED FOR THE ION-ANALYSIS MODE, AND THE SECOND 5 SEC WERE USED FOR THE DUCT MODE. DURING REAL-TIME READOUT, THE 10-SEC CYCLE PERIOD WAS AUTOMATICALLY INVOKED. SINCE HIGHER DATA RATES WERE EMPLOYED. THE SPATIAL RESOLUTION WAS FROM 40 TO 160 M, DEPENDING ON THE CYCLE TIME SELECTED. THE EXPERIMENT WAS FIRST TURNED ON DURING ORBIT 20, THREE WEEKS AFTER LAUNCH (JUNE 22, 1969). A FAILURE OCCURRED IN THE SOLAR PADDLE ARRAY. THIS GAVE THE VEHICLE A NEGATIVE POTENTIAL OF MORE THAN 20 V WHEN THE PADDLES WERE EXPOSED TO SUNLIGHT. UNDER THIS CONDITION, RELIABLE ION TEMPERATURE, ION COMPOSITION, AND PHOTOELECTRON FLUX DATA COULD NOT BE OBTAINED EXCEPT UPON SPACECRAFT ENTRY INTO ECLIPSE. WHEN THE VEHICLE POTENTIAL RECOVERED QUITE RAPIDLY. HOWEVER, ION CONCENTRATION AND DUCT MODE WERE STILL VALID DURING SUNLIGHT. IN OCTOBER 1969, A CHANGE OCCURRED IN THE SOLAR PADDLE ARRAY. THIS CAUSED THE VEHICLE POTENTIAL TO DIMINISH TO THE EXTENT THAT ION TEMPERATURE AND DOMINANT COMPONENT IONS COULD BE DETERMINED EVEN IN SUNLIGHT. DURING EACH ECLIPSE, THE VEHICLE POTENTIAL RETURNED TO NORMAL, AND COMPLETE DATA WERE OBTAINED DURING APPROXIMATELY 30 PERCENT OF EACH ORBIT. THE PERFORMANCE OF THE INSTRUMENT WAS EXCELLENT FROM TURN-ON, AND THE EXPERIMENT YIELDED EXCELLENT DATA. IT WAS NORMALLY OPERATED 100 PERCENT OF THE TIME. AFTER OPERATING FOR 17,180 HRS, THE EXPERIMENT WAS TURNED OFF DURING JUNE 1971. A GOOD DESCRIPTION OF THE EXPERIMENT IS GIVEN IN HANSON, ET AL, J. GEOPHYS. RES., VOL. 75, PP. 5483-5501 (1970).

DATA SET NAME- ION DENSITY, FLUX AND TEMPERATURE SUMMARIES ON TAPE

NSSDC ID- 69-051A-03C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/07/69 TO 04/23/71
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 31 REEL(S) OF MAGNETIC TAPE

THESE DATA ARE ION TEMPERATURE (DEG K) AND ION CONCENTRATION VALUES (IONS PER CCM) FOR AKU VALUES OF 1, 4, 16, 30, 56, AND TOTALS FOR ALL MASSES. THE DATA WERE PREPARED BY THE EXPERIMENTER'S OFFICE ON UNLABELED 9-TRACK, 800 BPI, ODD-PARITY TAPE. GENERATED ON AN IBM 360 COMPUTER. ONE TAPE IS A PRINT TAPE WHICH INDEXES ALL OTHER TAPE DATA BY ORBIT, TAPE RECORD, START AND STOP DATE/TIME FOR EACH ORBIT, AND BRIEF EXPERIMENT OPERATION INFORMATION. THE DATA TAPES CONTAIN 66 WORDS IN EACH LOGICAL RECORD. THESE WORDS PROVIDE THE REDUCED DATA, A VARIETY OF TIME AND LOCATION PARAMETERS, RELATED EXPERIMENT OPERATING INFORMATION, AND TAPE RECORD IDENTIFICATION INFORMATION. MOST OF THE OBSERVATIONS ARE IN THE FAST-SWEEP (10 SEC) MODE, WITH VERY FEW SLOW-SWEEP (40 SEC) DATA AFTER AUGUST 7, 1969. OBSERVATIONS OF UP TO 616 SWEEPS DURING ONE ORBIT WERE MADE. EACH TAPE CONTAINS OVER 67,000 LOGICAL RECORDS (SWEEPS). MICROFILM DATA SETS 69-051A-03A AND 69-051A-03B HAVE BEEN PREPARED FROM THESE TAPES.

LAASPERE, OGO 6

EXPERIMENT NAME- WHISTLER AND AUDIOFREQUENCY ELECTROMAGNETIC WAVES

NSSDC ID- 69-051A-25

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 03/00/72

PERSONNEL
PI - T. LAASPERE ..... DARTMOUTH COLLEGE
HANOVER, NH
OI - N.G. MORGAN ..... DARTMOUTH COLLEGE
HANOVER, NH

TWO 60-FT ELECTRIC DIPOLE ANTENNAS WERE USED TO STUDY THE PROPAGATION AND CHARACTERISTICS OF WHISTLER-MODE WAVES IN THE IONOSPHERE OVER AN EXTENDED RANGE OF FREQUENCIES. FOUR 15-KHZ BROAD BANDS (0.02 TO 15 KHZ, 15 TO 30 KHZ, 92.5 TO 107.5 KHZ, AND 280 TO 295 KHZ) COULD BE RECEIVED IN REAL TIME. TWO 0.2-KHZ NARROW BANDS (AT 200 AND 540 KHZ) COULD BE TAPE RECORDED, AND A 0.02- TO 1000-KHZ BROADBAND SIGNAL COULD BE RECORDED. THE TAPE-RECORDED DATA CONSISTED OF DIGITAL VALUES OF SIGNAL INTENSITIES. THE REAL-TIME DATA WERE NORMALLY CYCLED THROUGH EACH OF THE FOUR BANDS AT A GIVEN GAIN, RECYCLED AT A SECOND OVERLAPPING GAIN, AND FINALLY CYCLED AT A THIRD OVERLAPPING GAIN. THIS WHOLE 12-CYCLE STEP WAS THEN REPEATED. EACH OF THE STEPS IN THE CYCLE REQUIRED 18.4 SEC, WHICH MEANS ALL BANDS WERE OBSERVED IN 1.26 MIN, AND ALL BANDS AT ALL GAINS WERE OBSERVED IN 3.7 MIN. THE AUTOMATIC CYCLING COULD BE INTERRUPTED FOR MANUAL CONTROL. THESE REAL-TIME DATA WERE TRANSMITTED ON SPECIAL PURPOSE TELEMETRY TO, AND OBSERVED NEAR, EIGHT LOCATIONS -- QUITO, ROSMAN OR GSO CONTROL CENTER, FAIRBANKS, MADAGASCAR, WINKFIELD, JOHANNESBURG, ORRORAL OR ACTON, AND SANTIAGO. EVERY 0.144 SEC, THE NARROW-BAND (NB) RECEIVERS RECORDED SIGNAL INTENSITIES OF 200-KHZ SIGNALS FROM BBC ENGLAND, AND OF 540-KHZ SIGNALS FROM NEW MEXICO, OR FROM OTHER EMITTERS AT THOSE FREQUENCIES. THE TAPE-RECORDED BROADBAND DETECTOR RECORDED SIGNAL INTENSITY EVERY 18.9 SEC, I.E., ONCE FOR EACH 128 NARROWBAND OBSERVATIONS AT A GIVEN FREQUENCY. DIGITAL TAPE RECORDED DATA WERE OBSERVED ALMOST CONTINUOUSLY FROM LAUNCH UNTIL SPACECRAFT TURNOFF ON JUNE 28, 1971. REAL-TIME DATA WERE OBTAINED FROM TELEMETRY STATIONS ON ALL SCHEDULED DAYS (2 DAYS OUT OF 6 SINCE THIS WAS ONE OF THREE DIFFERENT EXPERIMENTS SHARING THE SAME SPECIAL PURPOSE TELEMETRY SYSTEM) OVER THE SAME TIME PERIOD. A SPECIAL OPERATION OF THE REAL-TIME BROADBAND RECEIVERS WAS MADE BY RADIO RESEARCH LABORATORIES, JAPAN, WITH OBSERVATIONS NEAR SIPLE STATION, ANTARCTICA, AND KASHIMA, JAPAN, FROM OCTOBER 1, 1971 TO MARCH 1972.

DATA SET NAME- VLF SPECTROGRAMS

NSSDC ID- 69-051A-25A

AVAILABILITY OF DATA SET- DATA AVAILABLE FROM EXPERIMENTER

TIME PERIOD COVERED- 06/10/69 TO 03/04/70
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 FRAMES

THIS DATA SET CONSISTS OF STANDARD SPECTROGRAMS RUN AT 15 IN. OF FILM PER MIN ON 2032 ROLLS OF 35-MM PAPER. EACH ROLL CONTAINS ONE STATION PASS AND IS APPROXIMATELY 10-FT LONG. A SPECTROGRAM IS A GRAPH OF FREQUENCY (ORDINATE) VS TIME, WITH INTENSITY OF THE GRAPH TRACINGS RELATED TO SIGNAL INTENSITY.

HOST PASSES CONSIST OF SPECTROGRAMS COVERING THE FOUR FREQUENCY BANDS OF 0.02 TO 15, 15 TO 30, 92.5 TO 107.5, AND 280 TO 295 KHZ IN TIME SEQUENCE. THE SAMPLING TIME IS 18.4 SEC FOR EACH BAND. THESE RECORDS WERE PREPARED BY THE EXPERIMENTER FROM ANALOG DATA ON MAGNETIC TAPE THAT WERE RECORDED AT TELEMETRY STATIONS IN REAL TIME. IDENTIFICATION INFORMATION IS NOTED ON THE HEADER OF EACH ROLL, AND STANDARD 'OGO' TIME CODES APPEAR ON THE EDGE OF THE SPECTROGRAMS. THE DATA WERE OBSERVED FROM REGIONS NEAR EIGHT TELEMETRY STATIONS BETWEEN JUNE 10, 1969 AND MARCH 4, 1970. SPECIFIC TIME PERIODS FOR WHICH DATA ARE AVAILABLE CAN BE IDENTIFIED FROM RECORDS AT NSSDC OR AT THE EXPERIMENTER'S OFFICE. ALL ANALOG DATA (SEE DATA SET 69-051A-25C) HAVE BEEN MADE INTO SPECTROGRAMS. THESE SPECTROGRAMS ARE AVAILABLE ON 30-DAY LOAN IN SMALL QUANTITIES (UP TO FIVE ROLLS) AT NO COST, AND ARRANGEMENTS CAN BE MADE TO PROVIDE LARGER QUANTITITES OR TO PROVIDE SPECTROGRAMS PREPARED AT FILM TRANSPORT SPEEDS OTHER THAN 15 IN. PER MIN. 'ON LOAN' DATA IF NOT IN USE, CAN BE PROVIDED PROMPTLY. SPECIALLY PREPARED SPECTROGRAMS CANNOT NORMALLY BE PROVIDED IN LESS THAN 2 WEEKS, AND THEIR AVAILABILITY DEPENDS ON THE QUANTITY REQUIRED AND ON THE EXPERIMENTER'S TIME. THESE DATA ARE AVAILABLE FROM THE EXPERIMENTER, DR. T. LAASPERE, RADIO PHYSICS LABORATORY, THAYER SCHOOL OF ENGINEERING, DARTMOUTH COLLEGE, HANOVER, NEW HAMPSHIRE, 03755, (PHONE 603-646-2232).

DATA SET NAME- SUMMARY PRINTOUTS OF 0.2-1000 KHZ WB AND NB (200 + 500 KHZ) VLF NOISE INTENSITY

NSSDC ID- 69-051A-25B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/30/69 TO 12/31/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 8 REEL(S) OF MICROFILM

THIS DATA SET, SUPPLIED BY THE EXPERIMENTER, CONSISTS OF TIME-ORDERED, CALIBRATED LISTINGS OF ALL TAPE-RECORDED NOISE INTENSITY DATA FROM THIS EXPERIMENT. DATA INTERVALS ARE AT 0.31 MIN (18.4 SEC). NARROW-BAND (NB) INTENSITIES AT 200 AND 540 KHZ ARE GIVEN IN VOLTS TIMES 10 TO THE -7, AND WIDE-BAND (WB) INTENSITIES IN VOLTS TIMES 10 TO THE -4. THE LISTING CONTAINS (1) SPACECRAFT ATTITUDE POWER CODES, (2) TIME, (3) AVERAGED (OR INSTANTANEOUS) INTENSITY VALUES FOR NB AND WB RECEIVERS, (4) EXPERIMENT STATUS CODES (COLUMNS PHI, L, AND Z, CONTAIN DATA PERTINENT ONLY TO THE IMPEDANCE OBSERVING PORTION OF THE EXPERIMENT), AND (5) MINIMUM AND MAXIMUM INTENSITY VALUES OF 128 OBSERVATIONS BY EACH NB RECEIVER. TO THE RIGHT OF THESE LISTINGS THE DATA ARE MACHINE PLOTTED WITH A LINEAR HORIZONTAL SCALE OF INTENSITY AND A VERTICAL LINEAR SCALE OF TIME. WHEN A SAWTOOTH PATTERN HEADS THIS GRAPH, THEN THE AVERAGED NB DATA LISTED AND PLOTTED RESULT FROM THE 128 OBSERVATIONS TAKEN DURING THE 18.4-SEC SUBCOMMUTATOR INTERVAL. WHEN THE SAWTOOTH IS MISSING, THE NB DATA ARE INSTANTANEOUS VALUES RATHER THAN AVERAGE VALUES. THERE WERE 261 PASSES FROM JANUARY THROUGH DECEMBER 1970 WITH INSTANTANEOUS DATA VALUES. SINCE ONLY THE OBSERVATION TIMES ARE LISTED, LOCATIONS REQUIRE REFERENCE TO WORLD MAP DATA IN DATA SET 69-051A-00C.

DATA SET NAME- VLF AURAL RECORDING (.02 TO 30, 92 TO 107, AND 280 TO 295 KHZ) ON TAPE

NSSDC ID- 69-051A-25C

AVAILABILITY OF DATA SET- DATA AVAILABLE FROM EXPERIMENTER

TIME PERIOD COVERED- 06/10/69 TO 03/04/70
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 0 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF 1376 ANALOG MAGNETIC TAPES THAT CONTAIN RECORDED VLF SIGNALS RECEIVED IN FOUR FREQUENCY BANDS, 0.02 TO 15, 15 TO 30, 92.2 TO 107.5 AND 280 TO 295 KHZ. FOR MOST TAPES ALL FREQUENCY BANDS APPEAR IN THE RANGE 0.02 TO 15 KHZ AND MUST BE PLAYED THROUGH A 70-KHZ DISCRIMINATOR. MOST OF THE TAPES ARE STANDARD TAPE, BUT A FEW OF THE TAPES ARE QUARTER-INCH AND CAN BE USED DIRECTLY ON AN ORDINARY OPEN REEL TAPE RECORDER. IF A LIMITED QUANTITY OF DATA IS NEEDED, THE QUARTER-INCH TAPES CAN BE PREPARED BY THE EXPERIMENTER. THESE DATA ARE RECORDINGS OF THE ORIGINAL VLF SPACECRAFT RECEIVER OUTPUT. THE DATA WERE OBSERVED IN THE VICINITY OF EIGHT TELEMETRY STATIONS BETWEEN JUNE 10, 1969, AND MARCH 4, 1970. SPECIFIC TIME PERIODS FOR WHICH DATA ARE AVAILABLE CAN BE IDENTIFIED FROM RECORDS AT NSSDC, OR AT THE EXPERIMENTER'S OFFICE. ALL THE DATA ARE ALSO AVAILABLE AS SPECTROGRAMS (SEE DATA SET 69-051A-25A). THE TAPES ARE AVAILABLE FOR NO MORE THAN THE COST OF THE TAPE AND COPYING, FROM THE EXPERIMENTER, DR. T. LAASPERE, RADIO PHYSICS LABORATORY, THAYER SCHOOL OF ENGINEERING, DARTMOUTH COLLEGE, HANOVER, NEW HAMPSHIRE, 03755, (PHONE 603-646-2232).

DATA SET NAME- VLF WHISTLER WAVE (AND RELATED TWO COMPONENT GROUND) SONOGRAMS

NSSDC ID- 69-051A-25D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 10/06/71 TO 01/11/72
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 45 B/W PRINT(S)

THIS DATA SET CONSISTS OF A COLLECTION OF SONAGRAMS, EACH COVERING A FREQUENCY RANGE OF 0 TO 8 KHZ AND A TIME PERIOD OF ABOUT 2 MINUTES. EACH SONAGRAM IS ABOUT 2.5 X 6 INCHES. EXPANDED TIME SCALES (APPROX 5 SEC PER 6-INCH PLOT) ARE USED TO SUPPLEMENT 3 RECORDS. BELOW EACH OGO SONAGRAM ARE THE VLF GROUND OBSERVATIONS FROM E-W AND N-S LOOP ANTENNAS FOR CORRESPONDING TIMES, FROM THE SUGADAIRA SPACE RADIO WAVE OBSERVATORY AT 36D31M N AND 138D19M E. TIME CODES OCCUR AT THE TOP OF EACH SONAGRAM.

REBER, OGO 6

EXPERIMENT NAME- NEUTRAL ATMOSPHERE COMPOSITION

NSSDC ID- 69-051A-04

STATUS OF OPERATION- INOPERABLE
DATE LAST DATA RECORDED- 06/26/71

PERSONNEL

PI -	C.A.	REBER	NASA-GSFC GREENBELT, MD
OI -	D.N.	HARPOLD	NASA-GSFC GREENBELT, MD
OI -	G.R.	CARIGNAN	U OF MICHIGAN ANN ARBOR, MI
OI -	D.R.	TAEUSCH	U OF MICHIGAN ANN ARBOR, MI

THE PRIMARY OBJECTIVE OF THIS EXPERIMENT WAS TO STUDY, BY OBTAINING APPROPRIATE DIRECT IN SITU COMPOSITION MEASUREMENTS, THE VARIATION OF THE CONCENTRATIONS OF THE MAJOR CONSTITUENTS (NITROGEN, OXYGEN, HELIUM, AND HYDROGEN) OF THE EARTH'S NEUTRAL UPPER ATMOSPHERE DURING CHANGING SOLAR AND MAGNETIC ACTIVITY AS A FUNCTION OF TIME AND LOCATION. THE SPECTROMETER SYSTEM CONSISTED OF A QUADRUPOLE ANALYZER, IN WHICH MASS SEPARATION OCCURRED WITHIN A DIRECT CURRENT AND A RADIO FREQUENCY ELECTRIC FIELD, AN ENCLOSED DUAL-FILAMENT ELECTRON BOMBARDMENT ION SOURCE, AN ELECTRON MULTIPLIER, SUPPORTING ELECTRONICS FOR OPERATING THE ANALYZER AND SOURCE, AND A BREAK-OFF DEVICE FOR EXPOSING THE EVACUATED MASS SPECTROMETER TO THE ATMOSPHERE AFTER THE SPACECRAFT ACHIEVED ORBIT. ORIENTED CONTINUALLY INTO THE ORBIT PLANE, THE SPECTROMETER'S ENTRANCE APERTURE NORMALLY FACED INTO THE DIRECTION OF MOTION. ENTERING GAS PARTICLES INTERACTED WITH THE SURFACES OF AN ANTECHAMBER BEFORE BEING IONIZED BY A 90-V ELECTRON BEAM. AFTER PASSING THROUGH ELECTRIC FIELDS, THE SELECTED IONS STRUCK THE FIRST DYNODE OF A MULTIPLIER. THE RESULTING MULTIPLIER OUTPUT PULSES WERE COUNTED, AND THE MEASURED COUNT WAS PROPORTIONAL TO THE NUMBER DENSITY OF THE SELECTED MASS IN THE ANTECHAMBER. THIS VERSATILE EXPERIMENT WAS DESIGNED TO OPERATE IN ANY ONE OF THREE MODES, DEPENDING ON THE COMMAND GIVEN. IN MODE 'C' THE SPECTROMETER WAS TUNED TO A PARTICULAR NEUTRAL SPECIES MASS AND MEASURED ITS CONCENTRATION ONLY. IN THE OTHER TWO MODES, BOTH PRETUNED STEPPING AND MASS SWEEPING APPROACHES WERE USED. THE EXPERIMENT WAS AUTOMATICALLY PLACED IN MODE 'A' EACH TIME IT WAS TURNED ON, AND THE BULK OF THE TRANSMITTED DATA WAS OBTAINED IN MODE A. HERE, THE ANALYZER WAS FIXED — TUNED SEQUENTIALLY TO THE MASSES OF PRINCIPAL INTEREST, 2, 4, 16, 28, AND 32. THERE WERE 28 STEPPING SEQUENCES, EACH LASTING 9.2 SEC. IN ADDITION, THERE WERE TWO SWEEPING SEQUENCES, EACH OF 55.2-SEC DURATION, SO THAT A COMPLETE MEASUREMENT CYCLE LASTED 368 SEC. IN THE SWEEPING MODE, THE ANALYZER WAS TUNED OVER THE MASS RANGES 2 TO 1.2, 4 TO 2.2, 16 TO 9, 28 TO 15.5, 32 TO 18, AND 43 TO 25.3 AMU. A COMPLETE MEASUREMENT CYCLE IN MODE B ALSO TOOK 368 SEC AND CONSISTED OF SIX SWEEPING SEQUENCES AND FOUR STEPPING SEQUENCES. MORE DETAILS CAN BE FOUND IN 'NEUTRAL COMPOSITION VARIATION ABOVE 400 KM DURING A MAGNETIC STORM,' D. R. TAEUSCH, G. R. CARIGNAN, AND C. A. REBER, 'JGR,' VOL 76, NO. 34, PP 8318-8325, 1971.

DATA SET NAME- ATMOSPHERIC COMPOSITION AND TEMPERATURE ON MICROFICHE

NSSDC ID- 69-051A-04A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

OGO 6/OSO 5

TIME PERIOD COVERED- 05/27/69 TO 05/13/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 CARD(S) OF B/W MICROFICHE

THIS ANALYZED DATA SET IS IN "EMPIRICAL MODEL OF GLOBAL THERMOSPHERIC TEMPERATURE AND COMPOSITION BASED ON DATA FROM THE OGO 6 QUADRUPOLE MASS SPECTROMETER," A. E. HEDIN, H. G. MAYR, C. A. REBER, N. W. SPENCER, AND G. R. CARIGNAN, "JGR," VOL. 79, NO. 1, JANUARY 1974. THE SPECTROMETER MEASUREMENTS PRESENTED HERE WERE OBTAINED WHEN STRONG MAGNETIC ACTIVITY WAS ABSENT. THE PAPER BEGINS WITH AN INTRODUCTION THAT INCLUDES A DESCRIPTION OF THE DATA SELECTION, COVERAGE, AND ACCURACY, FOLLOWED BY A PRESENTATION OF THE MODEL FORMULA AND DATA FITTING. A DISCUSSION OF THE MEASUREMENTS AND OF THE MANY DATA COMPARISONS IS ALSO INCLUDED. TWENTY-SEVEN DATA GRAPHS SHOW THE VARIATIONS WITH MANY PARAMETERS INCLUDING LOCAL TIME, GEOGRAPHIC LATITUDE, AND SOLAR ACTIVITY.

DATA SET NAME- NEUTRAL ATMOSPHERIC COMPOSITION DATA ON TAPE

NSSDC ID- 69-051A-04B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/06/69 TO 06/26/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 6 REEL(S) OF MAGNETIC TAPE

THIS TIME-ORDERED 9-TRACK MAGNETIC TAPE, EXPERIMENTER-SUPPLIED DATA SET WAS WRITTEN AT 1600 BPI. INCLUDED WITH THE NEUTRAL SPECIES IDENTIFICATION ARE VALUES FOR THE MEASURED CONCENTRATION AND ERROR, ALONG WITH MANY OTHER PERTINENT PARAMETERS. SPECIFICALLY, EACH RECORD CONTAINS 22 WORDS OF DATA IDENTIFIED AS FOLLOWS -(1) YEAR AND DAY OF THE MEASUREMENT, (2) UNIVERSAL TIME OF THE THE MEASUREMENT, (3) MASS IDENTIFICATION, (4) AMBIENT DENSITY, (5) AMBIENT DENSITY ERROR, (6) ALTITUDE, (7) LATITUDE, (8) LONGITUDE, (9) LOCAL TIME, (10) MAGNETIC LATITUDE, (11) VELOCITY ANGLE, (12) SUN ANGLE, (13) INVARIANT LATITUDE, (14) MAGNETIC INDEX (AP), (15) F10.7 FLUX (DAILY), (16) MEAN F10.7 (3-MONTH AVERAGE), (17) TEMPERATURE CALCULATION (J65), (18) DENSITY CALCULATION, (19) MAGNETIC LOCAL TIME, (20) MODIFIED LATITUDE, (21) ORBIT NUMBER, AND (22) TIME FROM PERIGEE.

SHARP, OGO 6

EXPERIMENT NAME- MICROPHONE ATMOSPHERIC DENSITY GAUGE

NSSDC ID- 69-051A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/04/71

PERSONNEL
PI - G.W. SHARP ..... NASA HEADQUARTERS
WASHINGTON, DC
OI - T.J. CROWTHER ..... LOCKHEED PALO ALTO
PALO ALTO, CA

THE MICROPHONE ATMOSPHERIC NEUTRAL DENSITY GAUGE EXPERIMENT MEASURED THE SPATIAL AND TEMPORAL VARIATIONS OF DENSITY IN THE ALTITUDE RANGE FROM 250 TO 700 KM. THE INSTRUMENTATION CONSISTED OF A THIN METAL RIBBON SUSPENDED IN A MAGNETIC FIELD LOOKING ALONG THE SPACECRAFT'S VELOCITY VECTOR AND EXPOSED TO THE MOVING AIR STREAM. THE AIR ENTERING THE APPARATUS WAS MECHANICALLY CHOPPED SO THAT THE RIBBON WAS FORCED TO OSCILLATE IN THE MAGNETIC FIELD. THE AMPLITUDE OF THE OSCILLATIONS BEING PROPORTIONAL TO THE APPLIED PRESSURE. THE ELECTRICAL VOLTAGE GENERATED BY THE MOTION OF THE RIBBON THROUGH THE MAGNETIC FIELD WAS AMPLIFIED AND RECTIFIED TO PROVIDE A DC SIGNAL FOR TELEMETRY. FROM THE PRESSURE VALUES AND FROM KNOWLEDGE OF THE VELOCITY OF THE AIR STREAM (EFFECTIVE SPACECRAFT VELOCITY), ATMOSPHERIC DENSITY COULD BE DEDUCED. ONCE EVERY 2 MIN, THE AIR FLOW WAS STOPPED FOR 20 SEC TO ESTABLISH A ZERO REFERENCE VALUE FOR INFLIGHT CALIBRATION. FOR MORE DETAILS OF EXPERIMENT OPERATION, SEE "JGR," VOL. 67, PP. 1375-1382, AND (NO AUTHOR) "FINAL REPORT FOR MICROPHONE DENSITY RANGE EXPERIMENT FOR OGO F." THE EXPERIMENT WAS A SUCCESS, AND GOOD DATA WERE OBTAINED FROM LAUNCH UNTIL THE SECOND WEEK IN FEBRUARY 1970, WHEN THERE OCCURRED AN UNEXPECTED PHASE SHIFT IN THE SENSOR OUTPUT. THE EXPERIMENT OPERATED IN THIS MANNER UNTIL THE SPACECRAFT WAS DEACTIVATED ON JUNE 28, 1971.

DATA SET NAME- MICROPHONE DENSITY GAUGE DATA TAPES

NSSDC ID- 69-051A-01A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/11/69 TO 01/31/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 8 REEL(S) OF MAGNETIC TAPE

THE MICROPHONE ATMOSPHERIC NEUTRAL DENSITY GAUGE EXPERIMENT MEASURED THE SPATIAL AND TEMPORAL VARIATIONS OF DENSITY IN THE ALTITUDE RANGE FROM 250 TO 700 KM. THE INSTRUMENTATION CONSISTED OF A THIN METAL RIBBON SUSPENDED IN A MAGNETIC FIELD LOOKING ALONG THE SPACECRAFT'S VELOCITY VECTOR AND EXPOSED TO THE MOVING AIR STREAM. THE AIR ENTERING THE APPARATUS WAS MECHANICALLY CHOPPED SO THAT THE RIBBON WAS FORCED TO OSCILLATE IN THE MAGNETIC FIELD. THE AMPLITUDE OF THE OSCILLATIONS BEING PROPORTIONAL TO THE APPLIED PRESSURE. THE ELECTRICAL VOLTAGE GENERATED BY THE MOTION OF THE RIBBON THROUGH THE MAGNETIC FIELD WAS AMPLIFIED AND RECTIFIED TO PROVIDE A DC SIGNAL FOR TELEMETRY. FROM THE PRESSURE VALUES AND FROM KNOWLEDGE OF THE VELOCITY OF THE AIR STREAM (EFFECTIVE SPACECRAFT VELOCITY), ATMOSPHERIC DENSITY COULD BE DEDUCED. ONCE EVERY 2 MIN, THE AIR FLOW WAS STOPPED FOR 20 SEC TO ESTABLISH A ZERO REFERENCE VALUE FOR INFLIGHT CALIBRATION. GOOD DATA WERE OBTAINED FROM LAUNCH UNTIL SPACECRAFT DEACTIVATION ON JUNE 28, 1971. HOWEVER, THE RAW DATA COLLECTED AFTER FEBRUARY 1970 (WHEN PHASE SHIFT IN SENSOR OUTPUT OCCURRED) WAS NOT REDUCED. THESE DATA ARE ON 7-TRACK, BINARY, 800 BPI, MULTIFILE, TAPE PREPARED ON AN IBM 7094.

SPACECRAFT COMMON NAME- OSO 5

ALTERNATE NAMES- OSO-F, PL-684A
03663

NSSDC ID- 69-006A

LAUNCH DATE- 01/22/69 WEIGHT- 645. KG

STATUS OF OPERATION- PARTIAL

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 01/22/69
ORBIT PERIOD- 95.77 MIN INCLINATION- 32.965 DEG
PERIAPSIS- 532.000 KM ALT APOAPSIS- 570.000 KM ALT

THE OBJECTIVES OF THE OSO SATELLITE SERIES WERE TO PERFORM SOLAR PHYSICS EXPERIMENTS ABOVE THE ATMOSPHERE DURING A COMPLETE SOLAR CYCLE AND TO MAP THE ENTIRE CELESTIAL SPHERE FOR DIRECTION AND INTENSITY OF UV LIGHT, X RAY, AND GAMMA RADIATION. THE OSO 5 PLATFORM CONSISTED OF A "SAIL" SECTION THAT POINTED TWO EXPERIMENTS CONTINUALLY TOWARD THE SUN AND A "WHEEL" SECTION THAT SPUN ABOUT AN AXIS PERPENDICULAR TO THE POINTING DIRECTION OF THE SAIL AND CARRIED SIX EXPERIMENTS. ATTITUDE ADJUSTMENTS WERE PERFORMED BY GAS JETS AND A MAGNETIC TORQUING COIL. POINTING CONTROL PERMITTED THE POINTED EXPERIMENTS TO SCAN THE REGION OF THE SOLAR DISK IN A 40- BY 40-ARC-MIN RASTER PATTERN. IN ADDITION, THE POINTED SECTION COULD BE COMMANDED TO SELECT AND SCAN A 7-.5- BY 7-ARC-MIN REGION NEAR THE SOLAR DISK. DATA WERE SIMULTANEOUSLY RECORDED ON TAPE AND TRANSMITTED BY PCM/PM TELEMETRY. A COMMAND SYSTEM PROVIDED FOR 155 GROUND-BASED COMMANDS. THE SPACECRAFT WAS COMMANDED OFF ON DECEMBER 31, 1972- AFTER THE REENTRY OF OSO 7 IN JULY 1974. THE OSO 5 SPACECRAFT WAS COMMANDED BACK ON IN JULY 1974.

NEY, OSO 5

EXPERIMENT NAME- ZODIACAL LIGHT MONITOR

NSSDC ID- 69-006A-07

STATUS OF OPERATION- PARTIAL

PERSONNEL
PI - E. NEY ..... U OF MINNESOTA
MINNEAPOLIS, MN

THIS EXPERIMENT, A MODIFIED VERSION OF AN OSO 2 EXPERIMENT (65-007A-04), WAS DESIGNED TO MEASURE THE INTENSITY AND DEGREE OF POLARIZATION OF ZODIACAL LIGHT AS A FUNCTION OF ECLIPTIC LATITUDE AND TO SEARCH FOR CHANGES IN ZODIACAL LIGHT RESULTING FROM SOLAR DISTURBANCES. IT WAS ALSO INTENDED TO STUDY THE INTENSITY OF THE AIRGLOW CONTINUUM LAYER AND TO STUDY THE DISTRIBUTION OF NIGHTTIME LIGHTNING STORMS. SIX PHOTOMULTIPLIER/FILTER PHOTOMETERS WERE USED WITH VARIOUS APERTURES AND ORIENTATIONS. THESE PHOTOMETERS WERE PM-1, PM-2, PM-3, PM-4, PM-5, AND PM-6. PM-1 WAS ORIENTED PARALLEL TO THE SPIN AXIS WITH A 9.25- BY 57-DEG FOV AND A RED/VISUAL

PASSBAND. PM-2 WAS ORIENTED ANTIPARALLEL TO THE SPIN AXIS WITH A 9.25- BY 57-DEG FIELD OF VIEW AND A BLUE (3500 TO 5000 A) PASSBAND. PM-3 WAS ORIENTED PARALLEL TO THE SPIN AXIS WITH AN 11-DEG-DIAMETER CONICAL FIELD OF VIEW AND A BLUE (3500 TO 5000 A) PASSBAND. PM-4 WAS ORIENTED PARALLEL TO THE SPIN AXIS WITH A 10.5-DEG OFFSET, A 9.5-DEG-DIAMETER CONICAL FOV, AND A BLUE (3500 TO 5000 A) PASSBAND. PM-5 WAS ORIENTED ANTIPARALLEL TO THE SPIN AXIS WITH A 9-DEG-DIAMETER CONICAL FIELD OF VIEW AND A RED (6000 TO 8500 A) PASSBAND. PM-6 WAS ORIENTED ANTIPARALLEL TO THE SPIN AXIS WITH A 9-DEG OFFSET, A 9.5-DEG-DIAMETER FOV AND A VISUAL/RED PASSBAND. PM-1, PM-2, AND PM-3 WERE READ OUT THREE TIMES DURING EACH SPACECRAFT MAIN FRAME (TELEMETRY), AND PM-4, PM-5, AND PM-6 WERE READ OUT TWICE DURING EACH SPACECRAFT MAIN FRAME. THESE PHOTOMETERS MEASURED LIGHT INTENSITY UP TO ABOUT 1000 TIMES THAT OF A TENTH MAGNITUDE STAR, ON A SCALE FROM 0 TO 4096. PM-3, PM-4, AND PM-5 WERE EQUIPPED WITH FIXED POLAROID FILTERS. IN ADDITION, TWO PHOTODIODES, EACH WITH A SENSITIVITY ABOUT ONE-SIXTEENTH THAT OF THE PHOTOMETERS, FUNCTIONED AS MONITOR EYES AND WERE SAMPLED ONCE EVERY 5 SEC. EYE-1 WAS ORIENTED PARALLEL TO THE SPIN AXIS WITH A 10.5-DEG OFFSET AND HAD A 21-DEG-DIAMETER CONICAL FIELD OF VIEW. EYE-2 WAS ORIENTED ANTIPARALLEL TO THE SPIN AXIS, OFFSET BY 5 DEG, AND HAD A 17.5-DEG-DIAMETER FOV.

DATA SET NAME- ZODIACAL LIGHT AND AIRGLOW PLOTS ON MICROFILM

NSSDC ID- 69-006A-07A

AVAILABILITY OF DATA SET- DATA AT NSSDC PROCESSING DEFERRED

TIME PERIOD COVERED- 01/27/69 TO 03/15/71
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 400 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF SETS OF PLOTS OF 20-SEC MAX/MIN VALUES FOR FOUR OF THE SIX PHOTOMETERS AND TWO MONITOR EYES (PHOTODIODES) PLOTTED VS TIME. THIS DATA SET IS A SUBSET OF 69-006A-07A. APPROXIMATELY 40 MIN OF DATA ARE ON EACH PLOT, AND A SET OF FOUR PLOTS COVERS A GIVEN TIME PERIOD. ONE PLOT CONTAINS THE INTENSITIES MEASURED BY PHOTOMETERS 3 AND 5, ANOTHER CONTAINS THE INTENSITIES MEASURED BY PHOTOMETERS 4 AND 6, AND THE LAST CONTAINS THE INTENSITIES MEASURED BY THE PHOTODIODES. THE INTENSITY SCALES ARE 0 TO 4000 FOR THE PHOTOMETERS, AND 0 TO 256 FOR THE PHOTODIODES. THE DATE OF OBSERVATION IS GIVEN ON THE PLOTS. THE DATA ARE PARTLY REDUCED DATA SUPPLIED BY THE EXPERIMENTER AND ARE CONTAINED ON 16-MM MICROFILM.

DATA SET NAME- ZODIACAL LIGHT AND AIRGLOW TABLES ON MICROFILM

NSSDC ID- 69-006A-07B

AVAILABILITY OF DATA SET- DATA AT NSSDC PROCESSING DEFERRED

TIME PERIOD COVERED- 01/27/69 TO 03/15/71
(AS REPORTED BY THE EXPERIMENTER)

QUANTITY OF DATA- 300 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF PHOTOMETER AND MONITOR EYE DATA IN TABULAR FORM ON MICROFILM. ALL PHOTOMETER OUTPUTS ARE LISTED AS A FUNCTION OF MAIN-FRAME TIME FOR EACH PERIOD OF SPACECRAFT NIGHT. EACH PAGE CONTAINS DATA FROM 15.36 SEC OF TIME. AT THE TOP OF EACH PAGE, IN THE HEADER, THE OUTPUTS FROM THE MONITOR EYES, SUNRISE/SUNSET TIMES, SPACECRAFT POSITION, AND SPACECRAFT ORIENTATIONS ARE GIVEN. THESE DATA ARE PARTLY REDUCED DATA SUPPLIED BY THE EXPERIMENTER AND ARE CONTAINED ON 16-MM MICROFILM. A SUBSET OF THESE DATA APPEARS ON PLOTS AS DATA SET 69-006A-07A. THE DATA IN THIS DATA SET ARE READABLE BUT ARE NOT REPRODUCIBLE. USERS MAY HAVE ACCESS TO THE DATA ON THE PREMISES OF NSSDC.

DATA SET NAME- REDUCED PHOTOMETER DATA ON MAGNETIC TAPE

NSSDC ID- 69-006A-07C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/26/69 TO 07/12
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 78 REEL(S) OF MAGNETIC TAPE

THIS DATA SET, RECEIVED FROM THE EXPERIMENTER, IS CONTAINED ON ODD-PARITY, 7-TRACK, 800 BPI, BINARY MAGNETIC TAPES WRITTEN ON A CDC 6600. DATA COVER ONLY NIGHTTIME OPERATION OF THE SPACECRAFT, AND EACH NIGHTTIME PERIOD COVERED INCLUDES COMPLETE SPACECRAFT ALTITUDE, ASPECT, AND EPHEMERIS INFORMATION ALONG WITH RELEVANT HOUSEKEEPING INFORMATION, AND THE COUNT RATES OF THE SIX TELESCOPES. THE DATA FROM THE INDIVIDUAL TELESCOPES ARE PACKED AS 12-BIT WORDS, YIELDING A COUNT RATE RANGE OF FROM ZERO TO 4095. THE THIRD WORD OF TELESCOPE 3 IS INCOMPLETE, CONTAINING ONLY 6 BITS, AND SHOULD NOT BE USED FOR DETAILED ANALYSIS. QUESTIONABLE OR MISSING DATA WERE SET TO ZERO, WHEN TURNED OFF BECAUSE OF EXCESSIVE LIGHT. THE TELESCOPES READ A SMALL NUMBER OF COUNTS (LESS THAN 20).

SPACECRAFT COMMON NAME- OV1-15

ALTERNATE NAMES- PL-682F, SPADES 1968-059A
03318, ARSP 68-1

NSSDC ID- 68-059A

LAUNCH DATE- 07/11/68 WEIGHT- 215. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 11/06/68

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 07/12/68
ORBIT PERIOD- 104.8 MIN INCLINATION- 89.90 DEG
PERIAPSIS- 154.000 KM ALT APOAPSIS- 1818.00 KM ALT

OV1-15, ALSO REFERRED TO AS SPADES (SOLAR PERTURBATION OF ATMOSPHERIC DENSITY EXPERIMENTAL SATELLITE), WAS DESIGNED TO STUDY SYNOPTICALLY THE FLUCTUATIONS OF ATMOSPHERIC DENSITY, COMPOSITION, AND TEMPERATURE IN THE REGION FROM 150 TO 500 KM AS A FUNCTION OF SOLAR MAGNETOSPHERIC DISTURBANCES. THE CYLINDRICAL SPACECRAFT, 27 INCHES IN DIAMETER, WAS 54 INCHES LONG. ELECTRICAL POWER WAS SUPPLIED BY SOLAR CELLS MOUNTED ON MULTIFACETED DOMES ON EACH END OF THE SPACECRAFT. OV1-15 WAS SPIN-STABILIZED. INSTRUMENTATION CONSISTED OF A MICROPHONE DENSITY GAUGE, ION GAUGE, MASS SPECTROMETERS, ENERGETIC PARTICLE DETECTORS, SOLAR X-RAY AND UV FLUX MONITOR, AN IONOSPHERIC MONITOR, AND A TRIAXIAL ACCELEROMETER. THE SPACECRAFT PERFORMED NORMALLY AFTER LAUNCH, REENTERING THE EARTH'S ATMOSPHERE ON NOVEMBER 6, 1968, AFTER SUCCESSFULLY COMPLETING THE MISSION OBJECTIVES.

CHAMPION, OV1-15

EXPERIMENT NAME- TRIAXIAL ACCELEROMETER

NSSDC ID- 68-059A-01

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 11/06/68

PERSONNEL
PI - K.S.W.CHAMPION ..... USAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - F.A. MARCOS ..... USAF CAMBRIDGE RES LAB
BEDFORD, MA

THE ACCELEROMETER EXPERIMENT ON OV1-15 WAS DESIGNED TO OBTAIN ATMOSPHERIC DENSITIES BETWEEN 100 AND 200 KM. THE ACCELEROMETER SYSTEM CONSISTED OF THREE MUTUALLY PERPENDICULAR ELECTROSTATICALLY SUSPENDED AND ELECTROSTATICALLY PULSE-REBALANCED UNITS MOUNTED NEAR THE CENTER OF THE SPACECRAFT AND ALIGNED ALONG ITS NOMINAL SPIN AXIS. THE INSTRUMENT MEASURED THE ELECTROSTATIC FORCE REQUIRED TO RESTORE A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION. FROM THESE DATA, ATMOSPHERIC DENSITIES WERE CALCULATED. THE EXPERIMENT WAS A SUCCESS, AND GOOD DATA WERE OBTAINED UNTIL VEHICLE REENTRY ON NOVEMBER 6, 1968.

DATA SET NAME- TRIAXIAL ACCELEROMETER ATMOSPHERIC DENSITY PLOTS

NSSDC ID- 68-059A-01A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 07/14/68 TO 09/28/68
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 BOOK(S) OR BOUND VOLUME(S)

THIS DATA SET CONSISTS OF NEUTRAL ATMOSPHERIC DENSITY

OV1-15/PIONEER 6

PROFILES IN HARDCOPY DETERMINED FROM ACCELEROMETER MEASUREMENTS OF SATELLITE DECELERATION INDUCED BY AERODYNAMIC DRAG. EACH PROFILE REPRESENTS ONE ORBIT AND CONSISTS OF NUMEROUS MEASUREMENTS TAKEN BETWEEN SATELLITE PERIGEE (150 KM) UP TO A HEIGHT OF 250 KM ABOVE THE EARTH'S SURFACE. THE DATA ARE FOR SELECTED ORBITS BETWEEN JULY 14 AND SEPTEMBER 28, 1968. THERE IS ONE SIGNIFICANT GAP IN DATA FROM AUGUST 9 TO AUGUST 28 WHEN THE ACCELEROMETER WAS NOT FUNCTIONING PROPERLY. THE GEOGRAPHIC LATITUDE AND LONGITUDE AND TIME OF PERIGEE IN BOTH LOCAL AND UNIVERSAL TIME IS GIVEN FOR EACH PROFILE. THE DATA CAN BE FOUND IN APPENDIX A OF AFCRL-72-0608. "ATMOSPHERIC DENSITY RESULTS OBTAINED FROM THE SPADES SATELLITE ACCELEROMETER DATA," OCTOBER 1972. ALSO PRESENTED IN THE DOCUMENT IS A DESCRIPTION OF THE SPACECRAFT OPERATION, THE INSTRUMENTATION, AND THE DATA REDUCTION PROCEDURE. IN ADDITION, THESE DATA INCLUDE DENSITY VALUES COMPARED WITH THOSE CALCULATED USING "JACCHIA'S 1971 MODEL ATMOSPHERE."

SPACECRAFT COMMON NAME- PIONEER 6

ALTERNATE NAMES- PIONEER-A, 01841

NSSDC ID- 65-105A

LAUNCH DATE- 12/16/65 WEIGHT- 146. KG

STATUS OF OPERATION- PARTIAL

ORBIT PARAMETERS

ORBIT TYPE- HELIOCENTRIC	EPOCH DATE- 12/16/65
ORBIT PERIOD- 311.3 DAYS	INCLINATION- .1639 DEG
PERIAPSIS- .8143 AU RAD	APOAPSIS- .936 AU RAD

PIONEER 6 WAS THE FIRST IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS ON A CONTINUING BASIS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE. ITS EXPERIMENTS STUDIED THE POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, AND THE INTERPLANETARY MAGNETIC FIELD. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE, BY GROUND COMMAND, ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS FOR USE AT THE TWO HIGHEST BIT RATES. ANOTHER WAS FOR USE AT THE THREE LOWEST BIT RATES. THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE REAL TIME, TELEMETRY STORE, DUTY CYCLE STORE, AND MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME INTERVAL BETWEEN THE COLLECTION AND STORAGE OF SUCCESSIVE FRAMES COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR, AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE WAS 512 BPS FROM DECEMBER 16, 1965, TO FEBRUARY 28, 1966, 256 BPS FROM MARCH 1, 1966, TO MARCH 17, 1966, 64 BPS FROM MARCH 18, 1966, TO APRIL 13, 1966, AND 16 OR 8 BPS FOR ALL SUBSEQUENT PERIODS. THE REAL-TIME TRANSMISSION MODE WAS USED PREDOMINANTLY THROUGHOUT THE FLIGHT WHEN TRACKING STATIONS WERE AVAILABLE. BETWEEN TRACKING PERIODS, THE DUTY CYCLE STORE MODE WAS GENERALLY USED. DATA COVERAGE AMOUNTED TO ALMOST 100 PERCENT FOR THE FIRST 23 WEEKS AFTER LAUNCH. THEN THE COVERAGE DROPPED TO BETWEEN 10 AND 20 PERCENT UNTIL NOVEMBER, 1969, AT WHICH TIME THE DATA COVERAGE ROSE TO BETWEEN 20 AND 60 PERCENT. THERE HAS BEEN ALMOST NO TRACKING SINCE JULY, 1972. A LEAK IN THE ATTITUDE GAS SYSTEM PREVENTED FURTHER ATTITUDE CORRECTIONS FOLLOWING AN ADJUSTMENT MADE ON JUNE 9, 1966. HOWEVER, THE SENSORS THAT DETERMINED THE SPIN-AXIS DIRECTION CONTINUED TO WORK AND INDICATED THAT THE SPIN-AXIS DIRECTION REMAINED CLOSE TO NOMINAL DURING THE MAJOR PERIODS OF DATA ACQUISITION.

ESHLEMAN, PIONEER 6

EXPERIMENT NAME- TWO-FREQUENCY BEACON RECEIVER

NSSDC ID- 65-105A-04

STATUS OF OPERATION- NORMAL

PERSONNEL

PI -	V.R.	ESHLEMAN	STANFORD U STANFORD, CA
OI -	T.A.	CROFT	STANFORD U STANFORD, CA
OI -	R.L.	LEADABRAND	STANFORD RES INST MENLO PARK, CA
OI -	G.L.	GARRIOTT	STANFORD U STANFORD, CA
OI -	A.M.	PETERSON	STANFORD U STANFORD, CA

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 46-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY LENGTHENED BY ELECTRONS ALONG THE PATH. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES, THE IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS COVERING OTHER TIME PERIODS SEE 68-100A-03, 67-123A-03, 66-075A-04, AND 67-060A-02. MORE DETAILED DESCRIPTIONS OF THE EXPERIMENT CAN BE FOUND IN "JOURNAL OF GEOPHYSICAL RESEARCH," VOL 71, P 3325-3327, AND IN "RADIO SCIENCE," VOL 6, P 55-63.

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON MAGNETIC TAPE

NSSDC ID- 65-105A-04A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/16/65 TO 07/11/66 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF DIGITIZED HOURLY VALUES OF TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY OF SIGNALS FROM EARTH TO THE SPACECRAFT. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON ONE 556-BPI, 7-TRACK, BCD MAGNETIC TAPE GENERATED AT NSSDC FROM PUNCHED CARDS SUPPLIED BY THE EXPERIMENTER. THE TAPE ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 7 (66-075A-04A), 8 (67-123A-03A), AND 9 (68-100A-03A), AND MARINER 5 (67-060A-02A).

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON MICROFILM

NSSDC ID- 65-105A-04B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/16/65 TO 07/11/66 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF DIGITIZED AND PLOTTED HOURLY VALUES OF TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY OF SIGNALS FROM EARTH TO THE SPACECRAFT. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON ONE REEL OF 35-MM MICROFILM GENERATED AT NSSDC FROM DATA SUPPLIED BY THE EXPERIMENTER. THIS REEL OF MICROFILM ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEER 7 (66-075A-04B), 8 (67-123A-03B), 9 (68-100A-03B), AND MARINER 5 (67-060A-02B), AND SOLAR WIND ELECTRON DENSITY PLOTS FROM PIONEERS 6 (65-105A-04E), 7 (66-075A-04E), 8 (67-123A-03D), AND 9 (68-100A-03D).

DATA SET NAME- DIGITAL VALUES OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1 AU ON TAPE

NSSDC ID- 65-105A-04D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/09/66 TO 05/25/66
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE DATA WERE PREPARED FROM THE ORIGINAL ANALOG RECORDS BY THE EXPERIMENTER'S STAFF. THE PRIMARY DATA CONSIST OF HOURLY VALUES OF NORMALIZED ELECTRON NUMBER DENSITY IN THE SOLAR WIND. TO OBTAIN THESE DATA, THE IONOSPHERIC TOTAL CONTENT WAS REMOVED FROM THE OBSERVED TOTAL CONTENT VALUES, AND THE TOTAL CONTENT PATH LENGTH WAS USED TO CONVERT TOTAL CONTENT TO DENSITY. THE RESULTING VALUES WERE THEN NORMALIZED TO 1 AU ASSUMING DENSITY TO BE PROPORTIONAL TO THE INVERSE SQUARE OF THE SATELLITE-SOLAR DISTANCE. VALUES RESULTING FROM INTERPOLATION ARE FLAGGED. NO INTERPOLATED VALUES WERE RECORDED WHEN DATA GAPS EXCEEDED 4 DAYS. THIS DATA SET IS ON ONE 800-BPI, 7-TRACK, ODD PARITY, BINARY MAGNETIC TAPE GENERATED ON A SIGMA 5 COMPUTER. AUXILIARY DATA ON THE TAPE INCLUDE UT AND CARRINGTON ROTATION NUMBER. DATA ARE AVAILABLE FOR ABOUT 12 HR PER DAY WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 7 (66-075A-04D), 8 (67-123A-03C), AND 9 (68-100A-03C), AND MARINER 5 (67-060A-02C) ALSO APPEAR ON THIS TAPE.

DATA SET NAME- DIGITAL VALUES OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1AU (MFILM)

NSSDC ID- 65-105A-04E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 01/10/66 TO 06/01/66
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THESE DATA WERE PREPARED FROM THE ORIGINAL ANALOG RECORDS BY THE EXPERIMENTER'S STAFF. THE PRIMARY DATA CONSIST OF PLOTS OF ELECTRON DENSITY VS TIME IN THE SOLAR WIND. TO OBTAIN THESE DATA, THE IONOSPHERIC TOTAL CONTENT FOR THE SAME TIMES AT A NEARBY LOCATION WERE REMOVED FROM THE OBSERVED TOTAL CONTENT VALUES. THEN THE OBSERVED TOTAL CONTENT PATH LENGTH WAS USED TO CONVERT TOTAL CONTENT TO DENSITY. THE RESULTING VALUES WERE NORMALIZED TO 1 AU, ASSUMING DENSITY TO BE PROPORTIONAL TO THE INVERSE SQUARE OF THE SATELLITE-SOLAR DISTANCE. THIS DATA SET IS ON ONE REEL OF 35-MM MICROFILM. THIS REEL OF MICROFILM ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 7 (66-075A-04E), 8 (67-123A-03D), AND 9 (68-100A-03D), AND HOURLY VALUES OF TOTAL ELECTRON CONTENT FROM PIONEERS 6 (65-105A-04B), 7 (66-075A-04B), 8 (67-123A-03B), AND 9 (68-100A-03B), AND MARINER 5 (67-060A-02B). THIS DATA SET IS ALSO AVAILABLE ON TAPE (65-105A-04D).

SPACECRAFT COMMON NAME- PIONEER 7

ALTERNATE NAMES- PIONEER-B, 02398

NSSDC ID- 66-075A

LAUNCH DATE- 08/17/66 WEIGHT- 138. KG

STATUS OF OPERATION- PARTIAL

ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC
ORBIT PERIOD- 402.9 DAYS
PERIAPSIS- 1.0100 AU RAD
EPOCH DATE- 08/17/66
INCLINATION- .09767 DEG
APOAPSIS- 1.1250 AU RAD

PIONEER 7 WAS THE SECOND IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, AND THE INTERPLANETARY MAGNETIC FIELD. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED APPROXIMATELY TOWARD THE SOUTH ECLIPTIC POLE- BY GROUND COMMAND. ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF 32 SEVEN-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED FOR THE TWO HIGHEST BIT RATES. ANOTHER WAS USED FOR THE THREE LOWEST BIT RATES. THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE (1) REAL TIME, (2) TELEMETRY STORE, (3) DUTY CYCLE STORE, AND (4) MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME PERIOD BETWEEN WHICH SUCCESSIVE FRAMES WERE COLLECTED AND STORED COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR, AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM AUGUST 17, 1966, TO OCTOBER 23, 1966, 256 BPS FROM OCTOBER 25, 1966, TO NOVEMBER 6, 1966, 64 BPS FROM NOVEMBER 9, 1966, TO DECEMBER 16, 1966, 16 BPS FROM DECEMBER 16, 1966, TO MAY 15, 1967, AND 8 BPS FROM MAY 15, 1967, AND THEREAFTER. HIGHER BIT RATES WERE POSSIBLE WHEN THE SPACECRAFT WAS BEING TRACKED BY THE 64-M ANTENNA, BUT THE DATA COVERAGE AT THESE TIMES WAS LOW. BY FEBRUARY 1968, ALL REAL-TIME DATA WERE BEING RECEIVED AT 8 BPS. DATA COVERAGE AVERAGED BETWEEN 50 AND 100 PERCENT COVERAGE FOR THE FIRST 30 WEEKS AFTER LAUNCH. THE DATA COVERAGE THEN FELL TO BETWEEN 20 AND 30 PERCENT UNTIL SEPTEMBER 1968. AT ∼ THIS TIME, IT DROPPED TO BETWEEN 0 AND 20 PERCENT THROUGH JANUARY 1971. ONLY AN INSIGNIFICANT AMOUNT OF DATA HAS BEEN OBTAINED SINCE JANUARY 1971. REAL-TIME TRANSMISSION WAS GENERALLY USED WHEN TRACKING STATIONS WERE AVAILABLE. OTHERWISE, THE DUTY CYCLE STORE MODE WAS USED. SOMETIME BETWEEN FEBRUARY 9, 1969, AND FEBRUARY 16, 1969, THE SUN SENSOR THAT GENERATED THE SPACECRAFT SUN PULSES FOR ONBOARD SECTORING OF EXPERIMENTS FAILED. HOWEVER, THE REMAINING SUN SENSORS CONTINUED TO FUNCTION, THUS PERMITTING DETERMINATION OF THE SPIN AXIS DIRECTION UNTIL ABOUT JANUARY 1972.

ESHLEMAN, PIONEER 7

EXPERIMENT NAME- TWO-FREQUENCY BEACON RECEIVER

NSSDC ID- 66-075A-04

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 05/20/69

PERSONNEL
PI - V.R. ESHLEMAN ..... STANFORD U
STANFORD, CA
OI - T.A. CROFT ..... STANFORD U
STANFORD, CA

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 4.6-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY DELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES, THE IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) WAS SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. THE EXPERIMENT OPERATED NOMINALLY FROM LAUNCH TO MAY 20, 1969. FOR SIMILAR EXPERIMENTS COVERING OTHER TIME PERIODS, SEE 68-100A-03, 67-123A-03, 65-105A-04, AND 67-060A-02. MORE DETAILED DESCRIPTIONS OF THE EXPERIMENT CAN BE FOUND IN "JGR," VOL 71, PP 3325-3327, 1966, AND IN "RADIO SCIENCE," VOL 6, PP 55-63, 1971.

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON TAPE

NSSDC ID- 66-075A-04A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/18/66 TO 11/29/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF DIGITIZED HOURLY VALUES OF

PIONEER 7/PIONEER 8

TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON ONE 556-BPI, 7-TRACK, BCD MAGNETIC TAPE GENERATED AT NSSDC FROM PUNCHED CARDS SUPPLIED BY THE EXPERIMENTER. THE TAPE ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04A), 8 (67-123A-03A), AND 9 (68-100A-03A), AND MARINER 5 (67-060A-02A).

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON MICROFILM

NSSDC ID- 66-075A-04B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/18/66 TO 11/29/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF DIGITIZED AND PLOTTED HOURLY VALUES OF TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON ONE REEL OF 35-MM MICROFILM GENERATED AT NSSDC FROM DATA SUPPLIED BY THE EXPERIMENTER. THIS REEL OF MICROFILM ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04B), 8 (67-123A-04B), AND 9 (68-100A-03B), AND MARINER 5 (67-060A-02B), AND SOLAR WIND ELECTRON DENSITY PLOTS FROM PIONEERS 6 (65-105A-04E), 7 (66-075A-04E), 8 (67-123A-03D), AND 9 (68-100A-03D).

DATA SET NAME- DIGITAL VALUES OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1 AU ON TAPE

NSSDC ID- 66-075A-04D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/17/66 TO 10/26/67
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE DATA WERE PREPARED FROM THE ORIGINAL ANALOG RECORDS BY THE EXPERIMENTER'S STAFF. THE PRIMARY DATA CONSIST OF HOURLY VALUES OF NORMALIZED ELECTRON NUMBER DENSITY IN THE SOLAR WIND. TO OBTAIN THESE DATA, THE IONOSPHERIC TOTAL CONTENT WAS REMOVED FROM THE OBSERVED TOTAL CONTENT VALUES, AND THE TOTAL CONTENT PATH LENGTH WAS USED TO CONVERT TOTAL CONTENT TO DENSITY. THE RESULTING VALUES WERE THEN NORMALIZED TO 1 AU ASSUMING DENSITY TO BE PROPORTIONAL TO THE INVERSE SQUARE OF THE SATELLITE-SOLAR DISTANCE. VALUES RESULTING FROM INTERPOLATION ARE FLAGGED. NO INTERPOLATED VALUES WERE RECORDED WHEN DATA GAPS EXCEEDED 4 DAYS. THIS DATA SET IS ON ONE 800-BPI, 7-TRACK, ODD-PARITY, BINARY MAGNETIC TAPE WRITTEN ON AN IBM 7094 COMPUTER. AUXILIARY DATA ON THE TAPE INCLUDE UT AND CARRINGTON ROTATION NUMBER. DATA ARE AVAILABLE FOR ABOUT 12 HR PER DAY WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04D), 8 (67-123A-03C), AND 9 (68-100A-03C), AND MARINER 5 (67-060A-02C) ALSO APPEAR ON THIS TAPE.

DATA SET NAME- DIGITAL VALUES OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED 1AU (MICROFILM)

NSSDC ID- 66-075A-04E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/12/66 TO 05/20/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THESE DATA WERE PREPARED FROM THE ORIGINAL ANALOG RECORDS BY THE EXPERIMENTER'S STAFF. THE PRIMARY DATA CONSIST OF PLOTS OF ELECTRON DENSITY VS TIME IN THE SOLAR WIND. TO OBTAIN THESE DATA, THE IONOSPHERIC TOTAL CONTENT FOR THE SAME TIMES AT A NEARBY LOCATION WERE REMOVED FROM THE OBSERVED TOTAL CONTENT VALUES. THEN THE OBSERVED TOTAL CONTENT PATH LENGTH WAS USED TO CONVERT TOTAL CONTENT TO DENSITY. THE RESULTING VALUES WERE NORMALIZED TO 1 AU, ASSUMING DENSITY TO BE PROPORTIONAL TO THE INVERSE SQUARE OF THE SATELLITE-SOLAR DISTANCE. THIS DATA SET IS ON ONE REEL OF 35-MM MICROFILM. THIS REEL OF MICROFILM ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04E), 8 (67-123A-03D), AND 9 (68-100A-03D), AND HOURLY VALUES OF TOTAL ELECTRON CONTENT FROM PIONEERS 6 (65-105A-04B), 7 (66-075A-04B), 8 (67-123A-03B), 9 (68-100A-03B), AND MARINER 5 (67-060A-02B). THIS DATA SET IS ALSO AVAILABLE ON TAPE (66-075A-04D).

SPACECRAFT COMMON NAME- PIONEER 8

ALTERNATE NAMES- PIONEER-C; 03066

NSSDC ID- 67-123A

LAUNCH DATE- 12/13/67 WEIGHT- 146. KG

STATUS OF OPERATION- PARTIAL

ORBIT PARAMETERS

ORBIT TYPE- HELIOCENTRIC	EPOCH DATE- 12/13/67
ORBIT PERIOD- 386.6 DAYS	INCLINATION- .0578 DEG
PERIAPSIS- .9892 AU RAD	APOAPSIS- 1.0880 AU RAD

PIONEER 8 WAS THE THIRD IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, SOLAR-CELL, AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY THE POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, THE INTERPLANETARY MAGNETIC FIELD, COSMIC DUST, AND ELECTRIC FIELDS. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND, ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS WERE USED PRIMARILY FOR SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED AT THE TWO HIGHEST BIT RATES. ANOTHER WAS USED AT THE THREE LOWEST BIT RATES. THE THIRD WAS USED FOR DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT WAS USED MAINLY FOR ENGINEERING DATA. THE FOUR OPERATING MODES WERE (1) REAL TIME, (2) TELEMETRY STORE, (3) DUTY CYCLE STORE, AND (4) MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME INTERVAL BETWEEN THE COLLECTION AND STORAGE OF SUCCESSIVE FRAMES COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR, AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM DECEMBER 13, 1967, TO MARCH 20, 1968, 256 BPS FROM MARCH 20 TO MAY 6, 1968, 64 BPS FROM MAY 6 TO AUGUST 29, 1968, AND 16 OR 8 BPS THEREAFTER. HIGHER BIT RATES WERE USED WHEN THE SPACECRAFT WAS TRACKED BY THE 64-M ANTENNA, BUT THE DATA COVERAGE BY THIS ANTENNA WAS LOW. DATA COVERAGE AVERAGED CLOSE TO 100 PERCENT FOR THE FIRST YEAR AFTER LAUNCH. AFTER THAT, THE DATA COVERAGE AVERAGED BETWEEN 50 AND 80 PERCENT UNTIL NOVEMBER 1970 WHEN COVERAGE DROPPED TO BETWEEN 50 AND 0 PERCENT. ALMOST NO DATA HAVE BEEN ACQUIRED SINCE MAY 1971. DURING A REORIENTATION MANEUVER IN MARCH 1968, ONE OF THE FOUR SUN SENSORS (WHICH WAS CONNECTED TO THE ATTITUDE GAS SYSTEM USED TO KEEP THE SPIN AXIS POINTED) WAS FOUND TO BE INOPERATIVE. IT WAS NOTED AT THIS TIME THAT THE SPACECRAFT ATTITUDE WAS OFF 4 DEG. ANOTHER ORIENTATION WAS ATTEMPTED IN JUNE 1968, AND IT WAS FOUND THAT THREE OF THE FOUR ATTITUDE SUN SENSORS WERE INOPERATIVE.

ESHLEMAN, PIONEER 8

EXPERIMENT NAME- TWO-FREQUENCY BEACON RECEIVER

NSSDC ID- 67-123A-03

STATUS OF OPERATION- NORMAL

PERSONNEL

PI –	V.R.	ESHLEMAN	STANFORD U STANFORD, CA
OI –	T.A.	CROFT	STANFORD U STANFORD, CA
OI –	H.T.	HOWARD	STANFORD U STANFORD, CA
OI –	R.L.	LEADABRAND	STANFORD RES INST MENLO PARK, CA
OI –	R.A.	LONG	STANFORD RES INST MENLO PARK, CA
OI –	A.H.	PETERSON	STANFORD U STANFORD, CA

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-KHZ SIGNALS WERE TRANSMITTED FROM A 46-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY DELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES, THE IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS COVERING OTHER TIME PERIODS, SEE 68-100A-03, 66-075A-04, 65-105A-04, AND 67-060A-02. A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN "JGR," VOL 17, PP 3325-3327, AND IN "RADIO SCIENCE," VOL 6, PP 55-63.

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON PUNCHED CARDS

NSSDC ID- 67-123A-03A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/14/67 TO 08/25/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF DIGITIZED HOURLY VALUES OF TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON 556-BPI, 7-TRACK, BCD MAGNETIC TAPE GENERATED AT NSSDC FROM PUNCHED CARDS SUPPLIED BY THE EXPERIMENTER. THE TAPE ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04A), 7 (66-075A-04A), AND 9 (68-100A-03A), AND MARINER 5 (67-060A-02A).

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON MICROFILM

NSSDC ID- 67-123A-03B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/14/67 TO 08/25/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF DIGITIZED AND PLOTTED HOURLY VALUES OF TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON ONE REEL OF 35-MM MICROFILM GENERATED AT NSSDC FROM DATA SUPPLIED BY THE EXPERIMENTER. THIS REEL OF MICROFILM ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04B), 7 (66-075A-04B), 9 (68-100A-03B), AND MARINER 5 (67-060A-02B), AND SOLAR WIND ELECTRON DENSITY PLOTS FROM PIONEERS 6 (65-105A-04E), 7 (66-075A-04E), 8 (67-123A-03D), AND 9 (68-100A-0ED).

DATA SET NAME- DIGITAL VALUES OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1 AU ON TAPE

NSSDC ID- 67-123A-03C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/19/67 TO 03/07/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE DATA WERE PREPARED FROM THE ORIGINAL ANALOG RECORDS BY THE EXPERIMENTER'S STAFF. THE PRIMARY DATA CONSIST OF HOURLY VALUES OF NORMALIZED ELECTRON NUMBER DENSITY IN THE SOLAR WIND. TO OBTAIN THESE DATA, THE IONOSPHERIC TOTAL CONTENT WAS REMOVED FROM THE OBSERVED TOTAL CONTENT VALUES, AND THE TOTAL CONTENT PATH LENGTH WAS USED TO CONVERT TOTAL CONTENT TO DENSITY. THE RESULTING VALUES WERE THEN NORMALIZED TO 1 AU ASSUMING DENSITY TO BE PROPORTIONAL TO THE INVERSE SQUARE OF THE DISTANCE OF THE SATELLITE FROM THE SUN. VALUES RESULTING FROM INTERPOLATION ARE FLAGGED. NO INTERPOLATED VALUES WERE RECORDED WHEN DATA GAPS EXCEEDED 4 DAYS. THIS DATA SET IS ON 800-BPI, 7-TRACK, ODD-PARITY, BINARY MAGNETIC TAPE CREATED ON A XEROX SIGMA 5 COMPUTER. AUXILIARY DATA ON THE TAPE INCLUDE UT AND CARRINGTON ROTATION NUMBER. DATA ARE AVAILABLE FOR ABOUT 12 HR PER DAY WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04D), 7 (66-075A-04D), 9 (68-100A-03C), AND MARINER 5 (67-060A-02C) ALSO APPEAR ON THIS TAPE.

DATA SET NAME- MICROFILM PLOTS OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1 AU

NSSDC ID- 67-123A-03D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/20/68 TO 08/30/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THESE DATA WERE PREPARED FROM THE ORIGINAL ANALOG RECORDS BY THE EXPERIMENTER'S STAFF. THE PRIMARY DATA CONSIST OF PLOTS OF ELECTRON DENSITY VS TIME IN THE SOLAR WIND. TO OBTAIN THESE DATA, THE IONOSPHERIC TOTAL CONTENT FOR THE SAME TIMES AT A NEARBY LOCATION WERE REMOVED FROM THE OBSERVED TOTAL CONTENT VALUES. THEN THE OBSERVED TOTAL CONTENT PATH LENGTH WAS USED TO CONVERT TOTAL CONTENT TO DENSITY. THE RESULTING VALUES WERE NORMALIZED TO 1 AU, ASSUMING DENSITY TO BE PROPORTIONAL TO THE INVERSE SQUARE OF THE SATELLITE-SOLAR DISTANCE. THIS DATA SET IS ON ONE REEL OF 35-MM MICROFILM. THIS REEL OF MICROFILM ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04E), 7 (66-075A-04E), AND 9 (68-100A-03D), AND HOURLY VALUES OF TOTAL ELECTRON CONTENT FROM PIONEERS 6 (65-105A-04B), 7 (66-075A-04B), 8 (67-123A-03B), 9 (68-100A-03B), AND MARINER 5 (67-060A-02B). THIS DATA SET IS ALSO AVAIABLE ON TAPE (67-123A-03C).

SPACECRAFT COMMON NAME- PIONEER 9

ALTERNATE NAMES- PIONEER-D, PL-684K
03533

NSSDC ID- 68-100A

LAUNCH DATE- 11/08/68 WEIGHT- 147. KG

STATUS OF OPERATION- PARTIAL

ORBIT PARAMETERS

ORBIT TYPE- HELIOCENTRIC	EPOCH DATE- 11/08/68
ORBIT PERIOD- 297.6 DAYS	INCLINATION- .986509 DEG
PERIAPSIS- 0.7542 AU RAD	APOAPSIS- 0.9905 AU RAD

PIONEER 9 WAS THE FOURTH IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY THE POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, THE INTERPLANETARY MAGNETIC FIELD, COSMIC DUST, AND ELECTRIC FIELDS. ALSO, A NEW CODING PROCESS WAS IMPLEMENTED FOR PIONEER 9. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE. BY

PIONEER 9

GROUND COMMAND. ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED AT THE TWO HIGHEST BIT RATES, ANOTHER WAS USED AT THE THREE LOWEST BIT RATES, AND THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE REAL TIME, TELEMETRY STORE, DUTY CYCLE STORE, AND MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME PERIOD BETWEEN WHICH SUCCESSIVE FRAMES WERE COLLECTED AND STORED COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS OF UP TO 19 HR, AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM NOVEMBER 8, 1968, TO JANUARY 15, 1969, 256 BPS FROM JANUARY 16, 1969, TO JANUARY 29, 1969, 64 BPS FROM JANUARY 30, 1969, TO MARCH 27, 1969, AND 16 OR 8 BPS THEREAFTER. HIGHER BIT RATES WERE USED WHEN THE SPACECRAFT WAS TRACKED BY THE 64-CM ANTENNA, BUT THE DATA COVERAGE BY THIS ANTENNA WAS LOW. THE DATA COVERAGE AVERAGED CLOSE TO 100 PERCENT FOR THE FIRST 29 WEEKS AFTER LAUNCH. AFTER THIS, DATA COVERAGE DROPPED TO CLOSE TO 50 PERCENT UNTIL DECEMBER 1969, AND IT VARIED BETWEEN 10 AND 30 PERCENT THROUGH JULY 1971. ALMOST NO DATA WERE ACQUIRED BETWEEN JULY 1971 AND JUNE 1972. FOR THE NEXT 10 MONTHS COVERAGE WAS TYPICALLY BETWEEN 10 AND 30 PERCENT, WITH 100 PERCENT COVERAGE FOR THE MAJOR SOLAR ACTIVE PERIOD OF AUGUST 1972. FROM APRIL 1973 THROUGH AUGUST 1974 COVERAGE AVERAGED 5 PERCENT.

CROFT, PIONEER 9

EXPERIMENT NAME- TWO-FREQUENCY BEACON RECEIVER

NSSDC ID- 68-100A-03

STATUS OF OPERATION- NORMAL

PERSONNEL

PI -	T.A.	CROFT	STANFORD U STANFORD, CA
OI -	V.R.	ESHLEMAN	STANFORD U STANFORD, CA
OI -	H.T.	HOWARD	STANFORD U STANFORD, CA
OI -	R.L.	LEADABRAND	STANFORD RES INST MENLO PARK, CA
OI -	R.A.	LONG	STANFORD RES INST MENLO PARK, CA
OI -	A.M.	PETERSON	STANFORD U STANFORD, CA

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 4.6-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY DELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION AND USED TO CALCULATE THE TOTAL ELECTRON CONTENT. THE IONOSPHERIC CONTRIBUTION (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS FOR OTHER TIME PERIODS SEE 67-123A-03, 66-075A-04, 65-105A-04, AND 67-060A-02. MORE DETAILED DESCRIPTIONS OF THE EXPERIMENT CAN BE FOUND IN 'JOURNAL OF GEOPHYSICAL RESEARCH,' VOL 17, PP 3325-3327, AND IN 'RADIO SCIENCE,' VOL 6, PP 55-63.

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON PUNCHED CARDS

NSSDC ID- 68-100A-03A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/08/68 TO 07/16/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THIS DATA SET CONSISTS OF DIGITIZED HOURLY VALUES OF TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON ONE 556-BPI, 7-TRACK, BCD MAGNETIC TAPE GENERATED AT NSSDC FROM PUNCHED CARDS SUPPLIED BY THE EXPERIMENTER. THE TAPE ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04A), 7 (66-075A-04A), AND 8 (67-123A-03A), AND MARINER 5 (67-060A-02A).

DATA SET NAME- HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON MICROFILM

NSSDC ID- 68-100A-03B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/09/68 TO 07/16/69
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THIS DATA SET CONSISTS OF DIGITIZED AND PLOTTED HOURLY VALUES OF TOTAL ELECTRON CONTENT THROUGH THE IONOSPHERE AND THE SOLAR WIND. THESE ARE REDUCED DATA CALCULATED FROM MEASUREMENTS OF THE DIFFERENTIAL DELAY OF THE GROUP VELOCITY. THE HOURLY DATA ARE REPRESENTATIVE VALUES MANUALLY SELECTED FROM ANALOG RECORDS. EACH SET OF HOURLY VALUES IS FOR THE PORTION OF THE DAY (ABOUT 12 HR PER DAY) WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. THIS DATA SET IS ON ONE REEL OF 35-MM MICROFILM GENERATED AT NSSDC FROM DATA SUPPLIED BY THE EXPERIMENTER. THIS REEL OF MICROFILM ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04B), 7 (66-075A-04B), 8 (67-123A-03B), AND MARINER 5 (67-060A-02B), AND SOLAR WIND ELECTRON DENSITY PLOTS FROM PIONEERS 6 (65-105A-04E), 7 (66-075A-04E), 8 (67-123A-03D), AND 9 (68-100A-03D).

DATA SET NAME- DIGITAL VALUES OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1 AU ON TAPE

NSSDC ID- 68-100A-03C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/11/68 TO 03/07/71
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MAGNETIC TAPE

THESE DATA WERE PREPARED FROM THE ORIGINAL ANALOG RECORDS BY THE EXPERIMENTER'S STAFF. THE PRIMARY DATA CONSIST OF HOURLY VALUES OF NORMALIZED ELECTRON NUMBER DENSITY IN THE SOLAR WIND. TO OBTAIN THESE DATA, THE IONOSPHERIC TOTAL CONTENT WAS REMOVED FROM THE OBSERVED TOTAL CONTENT VALUES, AND THE TOTAL PATH LENGTH WAS USED TO CONVERT TOTAL CONTENT TO DENSITY. THE RESULTING VALUES WERE THEN NORMALIZED TO 1 AU ASSUMING DENSITY TO BE PROPORTIONAL TO THE INVERSE SQUARE OF THE SATELLITE-SOLAR DISTANCE. VALUES RESULTING FROM INTERPOLATION ARE FLAGGED. NO INTERPOLATED VALUES WERE RECORDED WHEN DATA GAPS EXCEEDED 4 DAYS. THIS DATA SET IS ON ONE 800-BPI, 7-TRACK, ODD-PARITY, BINARY MAGNETIC TAPE WRITTEN ON AN IBM 7094 COMPUTER. AUXILIARY DATA ON THE TAPE INCLUDE UT AND CARRINGTON ROTATION NUMBER. DATA ARE AVAILABLE FOR ABOUT 12 HR PER DAY WHEN THE SPACECRAFT WAS IN VIEW FROM THE STANFORD TRANSMITTER. IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04D), 7 (66-075A-04D), AND 8 (67-123A-03C), AND MARINER 5 (67-060A-02C) ALSO APPEAR ON THIS TAPE.

DATA SET NAME- MICROFILM PLOTS OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1 AU

NSSDC ID- 68-100A-03D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/04/69 TO 08/27/70
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THESE DATA WERE PREPARED FROM THE ORIGINAL ANALOG RECORDS BY THE EXPERIMENTER'S STAFF. THE PRIMARY DATA CONSIST OF PLOTS OF ELECTRON DENSITY VS TIME IN THE SOLAR WIND. TO OBTAIN THESE DATA, THE IONOSPHERIC TOTAL CONTENT FOR THE SAME TIMES AT A NEARBY LOCATION WERE REMOVED FROM THE OBSERVED TOTAL CONTENT VALUES. THEN THE OBSERVED TOTAL CONTENT PATH LENGTH WAS USED TO CONVERT TOTAL CONTENT TO DENSITY. THE RESULTING VALUES WERE NORMALIZED TO 1 AU, ASSUMING DENSITY TO BE PROPORTIONAL TO THE INVERSE SQUARE OF THE SATELLITE-SOLAR DISTANCE. THIS DATA SET IS ON ONE REEL OF 35-MM MICROFILM. THIS REEL OF MICROFILM ALSO CONTAINS IDENTICAL DATA FOR OTHER TIME PERIODS FROM PIONEERS 6 (65-105A-04E), 7 (66-075A-04E), AND 8 (67-123A-03D), AND HOURLY VALUES OF TOTAL ELECTRON CONTENT FROM PIONEERS 6 (65-105A-04B), 7 (66-075A-04B), 8 (67-123A-03B), AND 9 (68-100A-03B), AND MARINER 5 (67-060A-02B). THIS DATA SET IS ALSO AVAILABLE ON TAPE (68-100A-03C).

SPACECRAFT COMMON NAME- TIROS 7

ALTERNATE NAMES- A S2, 00604

NSSDC ID- 63-024A

LAUNCH DATE- 06/19/63 WEIGHT- 135. KG

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 12/31/65

ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 06/19/63
ORBIT PERIOD- 97.42 MIN INCLINATION- 58.236 DEG
PERIAPSIS- 621.000 KM ALT APOAPSIS- 649.000 KM ALT

TIROS 7 (TELEVISION AND INFRARED OBSERVATION SATELLITE) WAS A SPIN-STABILIZED METEOROLOGICAL SPACECRAFT DESIGNED TO TEST EXPERIMENTAL TELEVISION TECHNIQUES AND INFRARED EQUIPMENT. THE SATELLITE WAS IN THE FORM OF AN 18-SIDED RIGHT PRISM, 107 CM IN DIAMETER AND 56 CM HIGH. THE TOP AND SIDES OF THE SPACECRAFT WERE COVERED WITH APPROXIMATELY 9000 1- BY 2-CM SILICON SOLAR CELLS. IT WAS EQUIPPED WITH TWO INDEPENDENT TELEVISION CAMERA SUBSYSTEMS FOR TAKING CLOUDCOVER PICTURES, PLUS AN OMNIDIRECTIONAL RADIOMETER AND A FIVE-CHANNEL SCANNING RADIOMETER FOR MEASURING RADIATION FROM THE EARTH AND ITS ATMOSPHERE. THE SATELLITE SPIN RATE WAS MAINTAINED BETWEEN 8 AND 12 RPM BY THE USE OF FIVE DIAMETRICALLY OPPOSED PAIRS OF SMALL, SOLID-FUEL THRUSTERS. A MAGNETIC ATTITUDE CONTROL DEVICE PERMITTED THE SATELLITE SPIN AXIS TO BE ORIENTED TO WITHIN 1 TO 2 DEG OF A PREDETERMINED ATTITUDE. THE FLIGHT CONTROL SYSTEM ALSO OPTIMIZED THE PERFORMANCE OF THE SOLAR CELLS AND TV CAMERAS AND PROTECTED THE FIVE-CHANNEL INFRARED RADIOMETER FROM PROLONGED EXPOSURE TO DIRECT SUNLIGHT. THE SPACECRAFT PERFORMED NORMALLY UNTIL DECEMBER 31, 1965, AND SPORADICALLY UNTIL FEBRUARY 3, 1967. THE SPACECRAFT WAS OPERATED FOR AN ADDITIONAL 1.5 YEARS TO COLLECT ENGINEERING DATA. IT WAS DEACTIVATED ON JUNE 3, 1968. A MORE COMPLETE DESCRIPTION OF THE SPACECRAFT AND EXPERIMENT CONFIGURATIONS ARE PRESENTED IN THE "JOURNAL OF THE BRITISH INTERPLANETARY SOCIETY," VOL 19, PP 386-409, 1963-64.

BRACE, TIROS 7

EXPERIMENT NAME- LANGMUIR PROBE

NSSDC ID- 63-024A-03

STATUS OF OPERATION- INOPERABLE
DATE LAST USABLE DATA RECORDED- 07/14/63

PERSONNEL
PI - L.H. BRACE ..... NASA-GSFC
GREENBELT, MD
OI - N.W. SPENCER ..... NASA-GSFC
GREENBELT, MD

A LANGMUIR PROBE WAS USED TO MEASURE ELECTRON DENSITY AND TEMPERATURE. THE CYLINDRICAL PROBE CONSISTED OF TWO CONCENTRIC ELECTRODES. THE INNER ELECTRODE, WHICH WAS 0.056 CM IN DIAMETER AND 23 CM LONG, WAS USED AS A COLLECTOR. THE OUTER ELECTRODE SERVED AS A GUARD ELECTRODE AND WAS 0.162 CM IN DIAMETER AND 10 CM LONG. THE PROBE WAS SWEPT THROUGH THE VOLTAGE RANGE 0 TO 1.5 V IN 2 SEC. THE CURRENT AT THE COLLECTOR WAS MEASURED AS THE VOLTAGE WAS VARIED, AND THE SIGNAL WAS STORED ON A TAPE RECORDER AND PLAYED BACK UPON INTERROGATION BY A GROUND STATION. THIS EXPERIMENT AND THE INFRARED EXPERIMENT TIME SHARED A SUBCARRIER OSCILLATOR, AND THE TELEMETRY FORMAT SEQUENCE CONSISTED OF 18 SEC OF PROBE DATA AND 12 SEC OF IR DATA. THE EXPERIMENT OPERATED NORMALLY FROM LAUNCH UNTIL JULY 14, 1963, WHEN AN ELECTRICAL FAILURE PREVENTED THE TAPE RECORDER FROM OPERATING NORMALLY. ALTHOUGH THE EXPERIMENT WAS DESIGNED TO ALLOW FOR COMPUTER DETERMINATION OF ELECTRON TEMPERATURE VALUES, THIS WAS IMPRACTICAL BECAUSE OF THE MARGINAL RESOLUTION OF THE DATA AND THE LOW INFORMATION RATE OF THE SUBCARRIER. I.E., THERE WERE NOT ENOUGH DATA POINTS PER SECOND.

DATA SET NAME- TABLE OF ELECTRON DENSITIES ON MICROFILM

NSSDC ID- 63-024A-03A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 06/19/63 TO 07/09/63
(AS VERIFIED BY NSSDC)

QUANTITY OF DATA- 1 REEL(S) OF MICROFILM

THE ANALYZED DATA SET, WHICH WAS RECEIVED FROM THE EXPERIMENTER, PRESENTS ELECTRON DENSITY DATA IN TABULAR FORM ON 35-MM MICROFILM. OTHER TYPES OF INFORMATION GIVEN ARE TIME (UT AND LOCAL), PASS NUMBER, STATION, LOCATION (GEOGRAPHIC AND GEOMAGNETIC), ALTITUDE, ELECTRON CURRENT, VOLTS, MAGNETIC LATITUDE, DIP ANGLE, AND SOLAR AND MAGNETIC INDICES. THERE IS APPROXIMATELY ONE DATA POINT PER MINUTE. A DESCRIPTION OF THE DATA IS CONTAINED IN A DATA USERS NOTE (NSSDC 67-24), "TIROS 7 (1963 24A) ELECTROSTATIC PROBE EXPERIMENT."

3. INDEXES

This section comprises five different indexes that contain additional information and cross-referencing items to assist the user in finding specific information he may require.

3.1 SPACECRAFT NAME INDEX

This index contains information on spacecraft, experiments, and data sets and is sorted by spacecraft name, principal investigator's name, and data set ID. The sort is the same as in the body of the report (section 2.3), except spacecraft alternate names have been interspersed with common names. For a given data set, this index enables a reader to readily determine data form, quantity, and time period covered.

INDEX TO NSSDC DATA HOLDINGS BY SPACECRAFT NAME/ PRINCIPAL INVESTIGATOR LAST NAME

SPACECRAFT, EXPERIMENT, DATA SET NAME	NSSDC ID	TIME COVERAGE	QUANTITY AND FORM	PAGE
1962 ALPHA RHO 1 SEE MARINER 2	62-041A			49
1962 BETA ALPHA 1 SEE ALOUETTE 1	62-049A			9
1962 OMICRON 1 SEE ARIEL 1	62-015A			27
1972-032A	72-032A			7
CARTER - NEUTRAL DENSITY (MAGNETRON) GAUGE	72-032A-01			7
DENSITY OBSERVATIONS FROM 160 TO 300 KM				
NEAR NOON + MIDNIGHT IN APR + MAY, 1972	72-032A-01A	04/21/72 - 05/09/72	1 BOOK(S)	7
A 52 SEE TIROS 7	63-024A			81
AE-A	63-009A			7
BRACE - LANGMUIR PROBES	63-009A-02			7
TABLES OF ELECTRON TEMPERATURES AND ION DENSITIES ON MICROFILM	63-009A-02A	04/04/63 - 04/04/63	1 M/FILM	7
NEWTON - PRESSURE GAUGE	63-009A-03			7
NEUTRAL DENSITY DATA IN TABULAR FORM ON MICROFICHE	63-009A-03A	04/03/63 - 06/08/63	1 FICHE	8
REBER - MASS SPECTROMETER	63-009A-01			8
ATMOSPHERIC COMPOSITION DENSITY DATA IN TABULAR FORM ON MICROFICHE	63-009A-01A	04/03/63 - 06/01/63	2 FICHE	8
AE-B	66-044A			8
BRINTON - ION MASS SPECTROMETER	66-044A-01			8
ION MASS SPECTROMETER DATA ON MAGNETIC TAPE	66-044A-01A	06/09/66 - 01/17/67	1 TAPE(S)	9
ION MASS SPECTROMETER DATA ON MICROFILM	66-044A-01B	06/09/66 - 01/17/67	1 M/FILM	9
REBER - NEUTRAL PARTICLE MAGNETIC MASS SPECTROMETER	66-044A-02			9
NEUTRAL PARTICLE DENSITIES IN TABULAR FORM	66-044A-02A	05/26/66 - 05/31/66	1 BOOK(S)	9
ALOUETTE 1	62-049A			9
GSFC REFINED WORLD MAPS ON MICROFILM	62-049A-00B	09/29/62 - 06/20/71	27 M/FILM	10
GSFC EXTENDED WORLD MAPS ON MICROFILM	62-049A-00C	07/01/64 - 02/28/72	70 M/FILM	10
CRC INDEX OF EXPERIMENT "DATA AVAILABLE" ON TAPE	62-049A-00G	01/01/66 - 12/31/67	2 TAPE(S)	10
CRPL EXTENDED WORLD MAPS ON MICROFILM	62-049A-00H	09/29/62 - 06/30/64	16 M/FILM	10
CRC PUBLISHED INDEX OF EXPERIMENT "DATA AVAILABLE"	62-049A-00I	01/01/66 - 12/31/68	0 BOOK(S)	10
BELROSE - VLF RECEIVER	62-049A-03			10
VLF SPECTROGRAMS	62-049A-03A	11/00/62 - 09/00/72	0 M/FILM	11
WHITTEKER - SWEEP-FREQUENCY SOUNDER	62-049A-01			11
SWEEP-FREQUENCY REDUCED IONOGRAMS ON MICROFILM	62-049A-01A	09/29/62 - 11/30/70	5067 M/FILM	11
ALOUETTE SYNOPTIC (ALOSYN) SCALED DATA ON TAPE	62-049A-01C	09/29/62 - 06/30/67	6 TAPE(S)	11
RSRS ELECTRON DENSITY VALUES AT 10-KM INTERVALS ON MICROFICHE	62-049A-01E	11/26/62 - 07/31/63	7 FICHE	11
CRC ELECTRON DENSITY VALUES AT LAMINA BOUNDARIES IN BOOKS	62-049A-01F	09/30/62 - 07/28/68	11 BOOK(S)	12
NASA-ARC ELECTRON DENSITY VALUES AT 50-KM INTERVALS IN BOOKS	62-049A-01H	11/01/62 - 01/28/64	6 BOOK(S)	12
NASA-ARC ELECTRON DENSITY VALUES AT 100-KM INTERVALS	62-049A-01I	10/31/62 - 01/27/64	1 TAPE(S)	12
ALOUETTE SYNOPTIC (ALOSYN) SCALED DATA ON MICROFICHE	62-049A-01K	09/29/62 - 12/31/68	9 BOOK(S)	12
CRC ELECTRON DENSITY VALUES AT 50-KM INTERVALS ON MICROFICHE	62-049A-01L	09/30/62 - 07/28/68	47 FICHE	12
CRC ELECTRON DENSITY PROFILES AT LAMINA BOUNDARIES ON TAPE	62-049A-01M	01/22/63 - 07/28/68	1 TAPE(S)	12
CRC ELECTRON DENSITY PROFILES AT 50-KM INTERVALS ON TAPE	62-049A-01N	09/29/62 - 03/30/66	3 TAPE(S)	13
IONOGRAM INVENTORY ON TAPE	62-049A-01O	09/29/62 - 11/30/70	6 TAPE(S)	13
UCLA INTERPOLATED ELECTRON DENSITY PROFILES AT 25-KM INTERVALS ON TAPE	62-049A-01P	09/30/62 - 05/02/64	2 TAPE(S)	13
INDEX OF IONOGRAMS SHOWING DUCTED ECHOES	62-049A-01Q	12/01/62 - 12/31/68	1 TAPE(S)	13
RSRS ELECTRON DENSITY (AND SCALE HEIGHT) PLOTS AND LISTINGS WITH PASS SUMMARY PLOTS	62-049A-01R	10/03/62 - 09/04/66	7 M/FILM	13
ALOUETTE 2	65-098A			14
GSFC EXTENDED WORLD MAPS ON MICROFILM	65-098A-00C	11/29/65 - 03/31/73	63 M/FILM	14
CRC INDEX OF EXPERIMENT "DATA AVAILABLE" ON TAPE	65-098A-00E	11/29/65 - 12/31/66	1 TAPE(S)	14
CRC PUBLISHED INDEX OF EXPERIMENT "DATA AVAILABLE"	65-098A-00F	11/29/65 - 12/31/68	0 BOOK(S)	14
BELROSE - VLF RECEIVER	65-098A-02			14
VLF SPECTROGRAMS	65-098A-02A	12/00/65 - 06/00/73	0 M/FILM	14
BRACE - CYLINDRICAL ELECTROSTATIC PROBE	65-098A-05			15
ELECTRON DENSITY AND TEMPERATURE ON TAPE	65-098A-05A	02/21/66 - 11/13/67	1 TAPE(S)	15
ELECTRON DENSITY AND TEMPERATURE ON MICROFILM	65-098A-05B	02/21/66 - 11/13/67	1 M/FILM	15
ELECTRON DENSITY AND TEMPERATURE PLOTS ON MICROFILM	65-098A-05C	02/21/66 - 03/01/67	1 M/FILM	15
WHITTEKER - SWEEP-FREQUENCY SOUNDER	65-098A-01			15
SWEEP-FREQUENCY IONOGRAMS ON MICROFILM	65-098A-01A	11/29/65 - 04/23/73	2554 M/FILM	15
RRL PUBLISHED ELECTRON DENSITY AND SCALE HEIGHT PROFILES ON MICROFICHE	65-098A-01D	10/12/66 - 12/27/68	20 FICHE	16
INDEXING INFORMATION FOR SWEEP-FREQUENCY IONOGRAMS WITH DUCTED ECHOES	65-098A-01E	12/01/65 - 08/13/68	2 TAPE(S)	16
PHOTOGRAPHIC PRINTS OF SWEEP-FREQUENCY IONOGRAMS WITH DUCTED ECHOES	65-098A-01F	12/01/65 - 08/13/68	2451 PRINT(S)	16

SPACECRAFT, EXPERIMENT, DATA SET NAME	NSSDC ID	TIME COVERAGE	QUANTITY AND FORM	PAGE
CRC INTERPOLATED ELECTRON DENSITY PROFILES ON MICROFICHE	65-098A-01G	12/15/65 - 03/09/70	6 FICHE	16
CRC ELECTRON DENSITY VALUES AT LAMINA BOUNDRIES-REDUCED IONOGRAMS ON MICROFICHE	65-098A-01H	12/29/65 - 03/09/70	10 FICHE	16
IONOGRAM INVENTORY ON TAPE	65-098A-01I	11/29/65 - 04/23/73	3 TAPE(S)	17
NASA-ARC ELECTRON DENSITIES INTERPOLATED TO 100-KM INTERVALS ON (PACKED) TAPE	65-098A-01J	11/29/65 - 02/15/72	2 TAPE(S)	17
AHES INTERPOLATED ELECTRON NUMBER DENSITY VERSUS REAL HEIGHT PROFILES ON MICROFILM	65-098A-01K	11/29/65 - 03/11/70	8 M/FILM	17
INDEX OF IONOGRAMS SHOWING DUCTED ECHOES	65-098A-01N	11/29/65 - 10/30/71	1 TAPE(S)	17
CRC ELECTRON DENSITY PROFILES AT SCALED POINTS ON MAGNETIC TAPES	65-098A-01O	12/15/65 - 07/10/72	3 TAPE(S)	17
RSRS ELECTRON DENSITY (AND SCALE HEIGHT) PLOTS AND LISTINGS WITH PASS SUMMARY PLOTS	65-098A-01P	12/12/65 - 08/11/68	5 M/FILM	17
ALOUETTE-A — SEE ALOUETTE 1	62-049A			9
ALOUETTE-B — SEE ALOUETTE 2	65-098A			14
ALSEP 12 — SEE APOLLO 12 LM/ALSEP	69-099C			18
ALSEP 14 — SEE APOLLO 14 LM/ALSEP	71-008C			20
ALSEP 15 — SEE APOLLO 15 LM/ALSEP	71-063C			22
ALSEP 16 — SEE APOLLO 16 LM/ALSEP	72-031C			25
ALSEP 17 — SEE APOLLO 17 LM/ALSEP	72-096C			26
APOLLO 9	69-018A			18
ALLENBY, JR. - 70-MM HASSELBLAD SPECTRAL TERRAIN PHOTOGRAPHS	69-018A-01			18
COMPLETE SET OF COLOR POSITIVE 70-MM PHOTOS	69-018A-01A	03/03/69 - 03/13/69	0 FILM	18
MULTISPECTRAL POSITIVE 70-MM INFRARED PHOTOS	69-018A-01B	03/03/69 - 03/13/69	0 FILM	18
APOLLO 12 LM/ALSEP	69-099C			18
FREEMAN - SUPRATHERMAL ION DETECTOR	69-099C-05			19
PLOTS OF MASS ANALYZER AND TOTAL ION DATA ON 16-MM MICROFILM, 24-SEC RES DATA	69-099C-05A	09/14/71 - 02/01/73	82 M/FILM	19
LISTS OF MASS ANALYZER AND TOTAL ION DATA ON 16-MM MICROFILM, 24-SEC RES DATA	69-099C-05B	09/14/71 - 02/03/73	37 M/FILM	19
MASS ANALYZER DATA ON TAPE	69-099C-05C	11/19/69 - 03/03/73	14 TAPE(S)	19
TOTAL ION ENERGY ANALYZER DATA	69-099C-05F	11/19/69 - 03/14/73	14 TAPE(S)	19
SNYDER - SOLAR WIND SPECTROMETER	69-099C-02			19
28-SEC TIME RESOLUTION PLASMA PARAMETERS ON MAGNETIC TAPE	69-099C-02A	11/19/69 - 02/21/72	13 TAPE(S)	20
HOURLY AVERAGED PLASMA PARAMETERS ON MAGNETIC TAPE	69-099C-02B	11/19/69 - 02/10/72	4 TAPE(S)	20
PLOTS OF HOURLY AVERAGED PLASMA PARAMETERS	69-099C-02C	11/20/69 - 05/16/74	1 M/FILM	20
APOLLO 12C — SEE APOLLO 12 LM/ALSEP	69-099C			18
APOLLO 14 LM/ALSEP	71-008C			20
FREEMAN - SUPRATHERMAL ION DETECTOR	71-008C-06			20
PLOTS OF MASS ANALYZER AND TOTAL ION DATA ON 16-MM MICROFILM, 24-SEC RES DATA	71-008C-06A	08/26/72 - 03/03/73	47 M/FILM	20
LISTS OF MASS ANALYZER AND TOTAL ION DATA ON 16-MM MICROFILM, 24-SEC RES DATA	71-008C-06B	08/26/72 - 02/28/73	41 M/FILM	21
MASS ANALYZER DATA ON MAGNETIC TAPE	71-008C-06C	02/06/71 - 04/11/73	14 TAPE(S)	21
TOTAL ION DETECTOR DATA ON MAGNETIC TAPE	71-008C-06F	02/06/71 - 04/11/73	14 TAPE(S)	21
JOHNSON - COLD CATHODE ION GAUGE EXPERIMENT	71-008C-07			21
PLOTS OF LUNAR ATMOSPHERE DENSITY MEASUREMENTS VERSUS TIME	71-008C-07A	02/09/71 - 12/31/73	3 M/FILM	21
APOLLO 14C — SEE APOLLO 14 LM/ALSEP	71-008C			20
APOLLO 15 CSM	71-063A			21
HOFFMAN - MASS SPECTROMETER	71-063A-13			21
MASS SPECTROMETER DATA ON MAGNETIC TAPE	71-063A-13A	07/30/71 - 08/07/71	3 TAPE(S)	22
MASS SPECTROMETER DATA ON MICROFILM	71-063A-13B	07/30/71 - 08/07/71	6 M/FILM	22
APOLLO 15 LM/ALSEP	71-063C			22
FREEMAN - SUPRATHERMAL ION DETECTOR	71-063C-05			22
PLOTS OF MASS ANALYZER AND TOTAL ION DATA ON 16-MM MICROFILM, 24-SEC RES DATA	71-063C-05A	08/24/72 - 01/01/74	99 M/FILM	22
LISTS OF MASS ANALYZER AND TOTAL ION DATA ON 16-MM MICROFILM, 24-SEC RES DATA	71-063C-05B	08/26/72 - 12/31/73	117 M/FILM	23
MASS ANALYZER DATA ON TAPE	71-063C-05C	08/03/71 - 06/02/73	10 TAPE(S)	23
TOTAL ION DETECTOR DATA ON TAPE	71-063C-05F	08/03/71 - 12/29/72	10 TAPE(S)	23
JOHNSON - COLD CATHODE ION GAUGE EXPERIMENT	71-063C-07			23
PLOTS OF LUNAR ATMOSPHERE DENSITY MEASUREMENTS VERSUS TIME	71-063C-07A	07/31/71 - 12/09/73	3 M/FILM	23
SNYDER - SOLAR WIND SPECTROMETER	71-063C-04			23
28-SEC TIME RESOLUTION PLASMA PARAMETERS ON MAGNETIC TAPE	71-063C-04A	07/31/71 - 06/30/72	3 TAPE(S)	23
HOURLY AVERAGED PLASMA PARAMETERS ON MAGNETIC TAPE	71-063C-04B	07/31/71 - 12/06/71	1 TAPE(S)	23
PLOTS OF HOURLY AVERAGED PLASMA PARAMETERS	71-063C-04C	08/02/71 - 06/30/72	1 M/FILM	24
APOLLO 15C — SEE APOLLO 15 LM/ALSEP	71-063C			22

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INDEX TO NSSDC DATA HOLDINGS BY SPACECRAFT NAME/PRINCIPAL INVESTIGATOR LAST NAME

INDEX TO NSSDC DATA HOLDINGS BY SPACECRAFT NAME/PRINCIPAL INVESTIGATOR LAST NAME

SPACECRAFT, EXPERIMENT, DATA SET NAME	NSSDC ID	TIME COVERAGE	QUANTITY AND FORM	PAGE
EXPLORER 17 — SEE AE-A	63-009A			74
EXPLORER 20 — SEE IE-A	64-051A			38
EXPLORER 22 — SEE BE-B	64-064A			30
EXPLORER 31 — SEE DME-A	65-098B			30
EXPLORER 32 — SEE AE-B	66-044A			8
EXPLORER 40 — SEE INJUN 5	68-066B			39
FR 1	65-101A			32
STOREY - VLF RECEIVER	65-101A-01			32
QUICK-LOOK VLF MAGNETIC FIELD DATA ON MICROFILM	65-101A-01A	12/07/65 - 08/01/68	2 M/FILM	32
FRANCE-1 — SEE FR 1	65-101A			32
GEMINI 3	65-024A			33
LOWMAN, JR. - 70-MM HASSELBLAD EARTH PHOTOGRAPHY	65-024A-03			33
COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS	65-024A-03A	03/23/65 - 03/23/65	0 FILM	33
GEMINI 4	65-043A			33
LOWMAN, JR. - 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS	65-043A-01			33
COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS	65-043A-01A	06/03/65 - 06/07/65	0 FILM	33
GEMINI 5	65-068A			34
LOWMAN, JR. - 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS	65-068A-02			34
COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS	65-068A-02A	08/21/65 - 08/29/65	0 FILM	34
GEMINI 6A	65-104A			34
LOWMAN, JR. - 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS	65-104A-01			34
COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS	65-104A-01A	12/15/65 - 12/16/65	0 FILM	34
GEMINI 7	65-100A			34
LOWMAN, JR. - 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS	65-100A-01			35
COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS	65-100A-01A	12/04/65 - 12/18/65	0 FILM	35
NAGLER - SYNOPTIC WEATHER PHOTOGRAPHY	65-100A-02			35
COLOR POSITIVE 70-MM SYNOPTIC WEATHER PHOTOS	65-100A-02A	12/04/65 - 12/18/65	0 FILM	35
GEMINI 8	66-020A			35
LOWMAN, JR. - SYNOPTIC TERRAIN PHOTOGRAPHY	66-020A-01			35
COLOR POSITIVE 70-MM SYNOPTIC WEATHER PHOTOS	66-020A-01A	03/16/66 - 03/16/66	0 FILM	36
GEMINI 9	66-047A			36
LOWMAN, JR. - 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS	66-047A-05			36
COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS	66-047A-05A	06/03/66 - 06/06/66	0 FILM	36
GEMINI 9A — SEE GEMINI 9	66-047A			36
GEMINI 10	66-066A			36
LOWMAN, JR. - 70-MM HASSELBLAD SYNOPTIC TERRAIN PHOTOGRAPHS	66-066A-02			36
COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS	66-066A-02A	07/18/66 - 07/21/66	0 FILM	37
GEMINI 11	66-081A			37
LOWMAN, JR. - 70-MM SYNOPTIC TERRAIN PHOTOGRAPHS	66-081A-05			37
COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS	66-081A-05A	09/12/66 - 09/15/66	0 FILM	37
GEMINI 12	66-104A			37
LOWMAN, JR. - 70-MM SYNOPTIC TERRAIN PHOTOGRAPHS	66-104A-02			37
COLOR POSITIVE 70-MM SYNOPTIC TERRAIN PHOTOS	66-104A-02A	11/11/66 - 11/15/66	0 FILM	37
IE-A	64-051A			38
GSFC REFINED WORLD MAPS ON MICROFILM	64-051A-00B	08/25/64 - 01/08/68	9 M/FILM	38
KNECHT - FIXED-FREQUENCY IONOSONDE	64-051A-01			38
TIME-ORDERED FIXED-FREQUENCY IONOGRAMS ON MICROFILM	64-051A-01A	08/25/64 - 12/29/65	1017 M/FILM	38
SINGAPORE AND WINKFIELD TIME-ORDERED, FIXED-FREQUENCY IONOGRAMS ON MICROFILM	64-051A-01C	08/27/64 - 12/22/65	110 M/FILM	38
IONOGRAM INVENTORY ON TAPE	64-051A-01D	08/25/64 - 12/22/65	1 TAPE(S)	39
INJUN 5	68-066B			39
GURNETT - VLF RECEIVER	68-066B-02			39
MASTER DATA TAPE INCLUDING VLF SIGNAL STRENGTH	68-066B-02A	08/09/68 - 05/29/70	949 TAPE(S)	39

INDEX TO NSSDC DATA HOLDINGS BY SPACECRAFT NAME/PRINCIPAL INVESTIGATOR LAST NAME

SPACECRAFT, EXPERIMENT, DATA SET NAME	NSSDC ID	TIME COVERAGE	QUANTITY AND FORM	PAGE
INJUN IE-C — SEE INJUN 5	68-066B			39
INJUN-C — SEE INJUN 5	68-066B			39
ISIS 1	69-009A			40
GSFC EXTENDED WORLD MAPS ON MICROFILM	69-009A-00C	02/01/69 - 06/30/75	78 M/FILM	40
BARRINGTON - VLF RECEIVER	69-009A-03			40
VLF SPECTROGRAMS	69-009A-03A	01/30/69 - 00/00/75	0 M/FILM	40
BRACE - CYLINDRICAL ELECTROSTATIC PROBE	69-009A-07			40
AVERAGED VALUES OF ELECTRON DENSITY AND TEMPERATURE ON MAGNETIC TAPE	69-009A-07A	01/30/69 - 06/01/71	1 TAPE(S)	41
AVERAGED VALUES OF ELECTRON DENSITY AND TEMPERATURE ON MICROFILM	69-009A-07B	01/30/69 - 06/01/71	2 M/FILM	41
ELECTRON DENSITY AND TEMPERATURE PLOTS IN BOOKS	69-009A-07D	01/30/69 - 06/05/70	1 BOOK(S)	41
CALVERT - FIXED-FREQUENCY SOUNDER	69-009A-02			41
FIXED-FREQUENCY IONOGRAMS ON MICROFILM	69-009A-02A	01/30/69 - 10/12/73	2027 M/FILM	41
SAGALYN - SPHERICAL ELECTROSTATIC ANALYZER	69-009A-08			41
ION DENSITY ON 35-KM FILM	69-009A-08A	01/31/69 - 05/17/69	4 M/FILM	42
ION TEMPERATURE AND DENSITY ON MAGNETIC TAPE	69-009A-08B	01/31/69 - 11/30/69	4 TAPE(S)	42
WHITTEKER - SWEEP-FREQUENCY SOUNDER	69-009A-01			42
SWEEP-FREQUENCY IONOGRAMS ON MICROFILM	69-009A-01A	01/30/69 - 03/28/75	2063 M/FILM	42
IONOGRAM INVENTORY ON TAPE	69-009A-01B	01/30/69 - 10/12/73	1 TAPE(S)	43
NASA-ARC ELECTRON DENSITIES INTERPOLATED TO 100-KM INTERVALS ON (PACKED) TAPE	69-009A-01C	02/03/69 - 06/07/72	1 TAPE(S)	43
INDEX OF IONOGRAMS SHOWING DUCTED ECHOES	69-009A-01E	02/01/69 - 12/27/71	1 TAPE(S)	43
CRC ELECTRON DENSITY PROFILES AT SCALED POINTS ON MAGNETIC TAPES	69-009A-01F	02/01/69 - 07/10/72	2 TAPE(S)	43
ISIS 2	71-024A			43
EXTENDED WORLD MAPS ON MICROFILM	71-024A-00C	04/17/71 - 06/30/75	73 M/FILM	43
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HOURLY VALUES OF REDUCED TOTAL ELECTRON CONTENT DATA ON MICROFILM	68-100A-03B	11/09/68 - 07/16/69	1 M/FILM	80
DIGITAL VALUES OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1 AU ON TAPE	68-100A-03C	11/11/68 - 03/07/71	1 TAPE(S)	80

INDEX TO NSSDC DATA HOLDINGS BY SPACECRAFT NAME/PRINCIPAL INVESTIGATOR LAST NAME

SPACECRAFT, EXPERIMENT, DATA SET NAME		NSSDC ID	TIME COVERAGE	QUANTITY AND FORM	PAGE
MICROFILM PLOTS OF SOLAR WIND ELECTRON DENSITY VS TIME NORMALIZED TO 1 AU		68-100A-03D	04/04/69 - 08/27/70	1 M/FILM	80
PIONEER-A	SEE PIONEER 6	65-105A			76
PIONEER-B	SEE PIONEER 7	66-079A			77
PIONEER-C	SEE PIONEER 8	67-123A			78
PIONEER-D	SEE PIONEER 9	68-100A			79
POGO 1	SEE OGO 2	65-081A			65
POGO 2	SEE OGO 4	67-073A			66
POGO 3	SEE OGO 6	69-051A			70
ROVER 15	SEE APOLLO 15 LM/ALSEP	71-063C			22
ROVER 16	SEE APOLLO 16 LM/ALSEP	72-031C			25
ROVER 17	SEE APOLLO 17 LM/ALSEP	72-096C			26
S 6	SEE AE-A	63-009A			7
S 6A	SEE AE-B	66-044A			8
S 27	SEE ALOUETTE 1	62-049A			9
S 27A	SEE ALOUETTE 1	62-049A			9
S 27B	SEE ALOUETTE 2	65-098A			14
S 30A	SEE DME-A	65-098B			30
S 46	SEE IE-A	64-051A			38
S 48	SEE IE-A	64-051A			38
S 49	SEE OGO 1	64-054A			64
S 50	SEE OGO 2	65-081A			65
S 50A	SEE OGO 4	67-073A			66
S 51	SEE ARIEL 1	62-015A			27
S 53	SEE ARIEL 3	67-042A			27
S 59	SEE OGO 5	68-014A			68
S 60	SEE OGO 6	69-051A			70
S 60B	SEE BE-B	64-064A			30
SA-504	SEE APOLLO 9	69-018A			18
SESP 71-3	SEE 1972-032A	72-032A			7
SPADES 1968-059A	SEE OVI-15	68-059A			75
TIROS 7		63-024A			81
BRACE - LANGMUIR PROBE		63-024A-03			81
TABLE OF ELECTRON DENSITIES ON MICROFILM		63-024A-03A	06/19/63 - 07/09/63	1 M/FILM	81
TOPSI	SEE IE-A	64-051A			38
UK 1	SEE ARIEL 1	62-015A			27
UK 3	SEE ARIEL 3	67-042A			27
UK-E	SEE ARIEL 3	67-042A			27
USAF METSAT(72-018A)	SEE DMSP(72-018A)	72-018A			31
USAF METSAT(72-089A)	SEE DMSP(72-089A)	72-089A			32

Original Experiment Institution Index

3.2 ORIGINAL EXPERIMENT INSTITUTION INDEX

The following index is sorted alphabetically by institution and lists all the experiments appearing in this catalog which were originally contracted to each installation.

Investigator Name Index

3.3 INVESTIGATOR NAME INDEX

This index lists both principal investigators and coinvestigators, sorted alphabetically by name. The index is designed to enable the reader to locate all the experiments associated with a given investigator. An asterisk indicates principal investigator.

INVESTIGATORS AND EXPERIMENTS

INVESTIGATORS AND EXPERIMENTS

Phenomenon Measured Index

3.4 PHENOMENON MEASURED INDEX

The following outline is used for categorizing experiments according to the phenomenon measured:

1. Electromagnetic Radiation Measurements
   - +1.1 Electric Field Measurements
   - +1.2 Magnetic Field Measurements
   - 1.3 Electromagnetic Radiation
     - 1.3.1 Sensing sources below 65 km
     - \+ 1.3.2 Sensing sources from 65 to 3000 km
     - 1.3.3 Sensing magnetospheric sources above 3000 km
     - 1.3.4 Sensing interplanetary space
     - 1.3.5 Sensing cold (planetary) sources
     - 1.3.6 Sensing the Sun
     - 1.3.7 Sensing hot (star) sources

*2. Charged Particle Measurements
   - 2.1 Sensing Electrons
     - \+ 2.1.1 Electrons of thermal energies ($\leqslant$ 1 kev)
     - 2.1.2 Electrons of energies greater than thermal ($>$ 1 kev)
   - 2.2 Sensing Protons or Hydrogen Ions
   - 2.3 Sensing Helium Nuclei
   - 2.4 Sensing Other Particle Species

*3. Microscopic Neutral Measurements
   - 3.1 Sensing Neutrons
   - +3.2 Sensing Individual Atoms and/or Molecules
   - +3.3 Sensing Atoms and/or Molecules Collectively

4. Observations of Macroscopic Bodies
   - 4.1 Sensing Mercury
   - 4.2 Sensing Venus
   - 4.3 Sensing Earth
   - 4.4 Sensing Earth's Moon
     - 4.4.1 Geographic features
     - 4.4.2 Nongeographic features
   - 4.5 Sensing Mars
   - 4.6 Sensing Jupiter
   - 4.7 Sensing the Sun
   - 4.8 Sensing Comets, Stars, and Galactic Regions
   - 4.9 Sensing Micrometeorites, Meteors, etc.
   - 4.10 Sensing Other Bodies

5. Other (Communications, Engineering, Life Sciences, Materials Science, Navigation, etc.)

+Indicates data indexed in section 3.4 of this catalog.
*Indicates data indexed in section 3.5 of this catalog.

The information contained under each major heading in the outline is uniquely sorted (the sort sequence of indexes is indicated by a triangle (▾) over the column sorted):

1. For Electromagnetic Radiation Measurements, the sort sequence is by: (1) minimum frequency observable, (2) maximum frequency observable, (3) earliest date of NSSDC data, and (4) NSSDC ID code. For dc field measurements, the minimum frequency is zero and the maximum frequency observable is usually the Nyquist frequency.

2. For Charged Particle Measurements, the sort sequence is by: (1) particle energy threshold, (2) earliest date of NSSDC data, and (3) NSSDC ID code.

3. For Microscopic Neutral Measurements, the listing is sorted alphabetically by: (1) technique, (2) earliest date of NSSDC data, and (3) NSSDC ID code. The keywords applicable to define technique are as follows:

   Drag Density
   Imagery
   Mass Spectrometry
   Other EM Technique
   Other (Not EM Technique)
   Reentry Package
   Total Density Sensor

This index presents information in tabular form, with a variety of column headings. The headings that are common to each item in the outline are:

Spacecraft Common Name
NSSDC Experiment ID Code
Principal Investigator Name
NSSDC Experiment Title
Region of Observation
Time Span of Data
Pertinent Report Page Number (where the complete experiment entry is located)

The remaining column headings are self-explanatory, except for (1) Planet, (2) Region, (3) RES, and (4) *. Brief explanations of these columns are:

1. Planet: The planets are indicated in numerical order from the Sun. The Sun is designated as zero (0); numbers 1 through 9 indicate Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto, respectively. Letter M indicates the Earth's Moon.

2. Region: Locations not covered or inadequately covered under "Planet" are identified alphabetically by:

   A = < 65 km altitude
   B = > 65 km altitude; < 3000 km, Lat < 65°
   C = > 65 km altitude; < 3000 km, Lat 65° to 90°

3. RES: This column indicates species resolution for charged particle measurements:

   R = Resolved
   P = Partially resolved
   N = Unresolved
   U = Unknown resolution

   A given species is considered resolved when a flux is associated with that species with a probability of erroneous flux species association of less than 10 percent. A species is considered unresolved if the probability of erroneous association is greater than 40 percent.

4. *: For Electromagnetic Radiation Measurements, this column indicates ambient or remote sensor:

   A = Ambient
   R = Remote

   For Microscopic Neutral Measurements, this column represents operational or experimental projects:

   O = Operational
   X = Experimental

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	LIMITING DATES OF DATA AT NSSDC EARLIEST HH/DD/YY	LATEST HH/DD/YY	*	RANGE OF MEASUREMENTS MIN VALUE MAX VALUE	(F OR E) (LAMBDA)	REGION ABC	PLANET 012345 6789	PAGE
1. ELECTROMAGNETIC RADIATION MEASUREMENTS										
1.1 ELECTRIC FIELD MEASUREMENTS										
OGO 6	(69-051A-25)	LAASPERE								
WHISTLER AND AUDIOFREQUENCY ELECTROMAGNETIC WAVES			06/10/69	TO 01/11/72	A	1.000E 01 TO 5.400E 05	HZ	C		72
INJUN 5	(68-066B-02)	GURNETT								
VLF RECEIVER			08/09/68	TO 05/29/70	A	3.000E 01 TO 1.050E 05	HZ	C		39
ALOUETTE 2	(65-098A-02)	BELROSE								
VLF RECEIVER			12/00/65	TO 06/00/73	A	5.000E 01 TO 3.000E 04	HZ	C		14
ISIS 1	(69-009A-03)	BARRINGTON								
VLF RECEIVER			01/30/69	TO 00/00/75	A	5.000E 01 TO 3.000E 04	HZ	C		40
ISIS 2	(71-024A-03)	BARRINGTON								
VLF RECEIVER			04/08/71	TO / /	A	5.000E 01 TO 3.000E 04	HZ	C		44
ALOUETTE 1	(62-049A-03)	BELROSE								
VLF RECEIVER			11/00/62	TO 09/00/72	R	4.005E 02 TO 1.000E 04	HZ	C		10
FR 1	(65-101A-01)	STOREY								
VLF RECEIVER			12/07/65	TO 08/31/68	A	1.680E 04 TO 2.400E 04	HZ	C		32
1.2 MAGNETIC FIELD MEASUREMENTS										
INJUN 5	(68-066B-02)	GURNETT								
VLF RECEIVER			08/09/68	TO 05/29/70	A	3.000E 01 TO 1.050E 04	HZ	C		39
OGO 1	(64-054A-08)	HELLIWELL								
WIDEBAND AND NARROW-BAND STEP FREQUENCY VLF RECEIVERS			09/07/64	TO 12/29/65	R	2.000E 02 TO 1.000E 05	HZ	B		64
OGO 2	(65-081A-02)	HELLIWELL								
VLF RECEIVERS, WIDEBAND, NARROW-BAND, STEP FREQUENCY, AND TUNABLE			10/17/65	TO 09/02/66	A	2.000E 02 TO 1.000E 05	HZ	C		66
FR 1	(65-101A-01)	STOREY								
VLF RECEIVER			12/07/65	TO 08/31/68	A	1.680E 04 TO 2.400E 04	HZ	C		32
ARIEL 3	(67-042A-05)	KAISER								
VLF RECEIVER, FIXED-FREQUENCY SIGNAL STRENGTH			05/05/67	TO 04/14/68	A	3.200E 06 TO 1.600E 07	HZ	C		28
1.3.2 SENSING SOURCES FROM 65 TO 3000 KM										
ISIS 1	(69-009A-01)	WHITTEKER								
SWEEP-FREQUENCY SOUNDER			01/30/69	TO 03/28/75	R	1.000E 05 TO 2.000E 07	HZ	C		42
ISIS 2	(71-024A-01)	WHITTEKER								
SWEEP-FREQUENCY SOUNDER			04/08/71	TO 12/19/74	R	1.000E 05 TO 2.000E 07	HZ	C		46
ISIS 2	(71-024A-02)	CALVERT								
FIXED-FREQUENCY SOUNDER			04/08/71	TO 11/30/73	R	1.200E 05 TO 9.300E 06	HZ	C		45
ALOUETTE 2	(65-098A-01)	WHITTEKER								
SWEEP-FREQUENCY SOUNDER			11/29/65	TO 04/23/73	R	1.200E 05 TO 1.450E 07	HZ	C		15
ISIS 1	(69-009A-02)	CALVERT								
FIXED-FREQUENCY SOUNDER			01/30/69	TO 10/12/73	R	2.500E 05 TO 9.300E 06	HZ	C		41
ALOUETTE 1	(62-049A-01)	WHITTEKER								
SWEEP-FREQUENCY SOUNDER			09/29/62	TO 11/30/70	R	5.000E 05 TO 1.200E 07	HZ	C		11
IE-A	(64-051A-01)	KNECHT								
FIXED-FREQUENCY IONOSONDE			08/25/64	TO 12/29/65	R	1.700E 06 TO 7.220E 06	HZ	C		38
PIONEER 7	(66-075A-04)	ESHLEMAN								
TWO-FREQUENCY BEACON RECEIVER			08/17/66	TO 05/20/69	R	4.980E 07 TO 4.230E 08	HZ	B		77

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	LIMITING DATES OF DATA AT NSSDC EARLIEST HH/DD/YY	LATEST HH/DD/YY	R E S	RANGE OF MEASUREMENTS MIN VALUE MAX VALUE	(F OR E) (LAMBDA)	REGION ABC	PLANET 012345 6789	PAGE
2. CHARGED PARTICLE MEASUREMENTS										
2.1 SENSING ELECTRONS										
2.1.1 ELECTRONS OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)										
ARIEL 1	(62-015A-01)	SAYERS								
RADIO FREQUENCY CAPACITANCE PROBE			04/27/62	TO 07/08/62	R	THERMAL ENERGIES		B		27
AE-A	(63-009A-02)	BRACE								
LANGMUIR PROBES			04/04/63	TO 04/04/63	R	THERMAL ENERGIES		B		7
TIROS 7	(63-024A-03)	BRACE								
LANGMUIR PROBE			06/19/63	TO 07/09/63	R	THERMAL ENERGIES		B		81
BE-B	(64-064A-02)	BRACE								
LANGMUIR PROBE			10/10/64	TO 05/31/65	R	THERMAL ENERGIES		BC		30
OGO 1	(64-054A-05)	HARGREAVES								
RADIO PROPAGATION			12/12/64	TO 05/20/67	R	THERMAL ENERGIES		B		64

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	LIMITING DATES OF DATA AT NSSDC: EARLIEST MM/DD/YY	LATEST MM/DD/YY	R/S/E	RANGE OF MEASUREMENTS: MIN VALUE	MAX VALUE	(F OR E) (ANGSTROMS)	REGION: MAX	MIN	(PLANET 012345H 6789)	PAGE
2.1.1 ELECTRONS OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)												
PIONEER 6	(65-105A-04)	ESHLEMAN										
TWO-FREQUENCY BEACON RECEIVER			12/16/65	TO 07/11/66	R	THERMAL ENERGIES			B		0	76
ARIEL 3	(67-042A-01)	SAYERS										
LANGMUIR PROBE			05/05/67	TO 04/15/68	R	THERMAL ENERGIES			BC			28
ARIEL 3	(67-042A-05)	SAYERS										
RADIO FREQUENCY CAPACITANCE PROBE			05/05/67	TO 04/14/68	R	THERMAL ENERGIES			BC			29
MARINER 5	(67-060A-02)	ESHLEMAN										
TWO-FREQUENCY BEACON RECEIVER			06/14/67	TO 11/21/67	R	THERMAL ENERGIES			B		0	53
PIONEER 8	(67-123A-03)	ESHLEMAN										
TWO-FREQUENCY BEACON RECEIVER			12/14/67	TO 03/07/71	R	THERMAL ENERGIES			B			78
PIONEER 9	(68-100A-03)	CROFT										
TWO-FREQUENCY BEACON RECEIVER			11/08/68	TO 03/07/71	R	THERMAL ENERGIES						80
ISIS 1	(69-009A-02)	CALVERT										
FIXED-FREQUENCY SOUNDER			01/30/69	TO 10/12/73	R	THERMAL ENERGIES			C			41
ISIS 2	(71-024A-01)	WHITTAKER										
SWEEP-FREQUENCY SOUNDER			04/08/71	TO 12/19/74	R	THERMAL ENERGIES			C			46
ISIS 2	(71-024A-02)	CALVERT										
FIXED-FREQUENCY SOUNDER			04/08/71	TO 11/30/73	R	THERMAL ENERGIES			C			45
ISIS 2	(71-024A-07)	BRACE										
CYLINDRICAL ELECTROSTATIC PROBE			06/01/71	TO 03/31/73	R	THERMAL ENERGIES			C			44
ALOUETTE 1	(62-049A-01)	WHITTAKER										
SWEEP-FREQUENCY SOUNDER			09/29/62	TO 11/30/70	R	THERMAL ENERGIES			C			11
ALOUETTE 2	(65-098A-01)	WHITTAKER										
SWEEP-FREQUENCY SOUNDER			11/29/65	TO 04/23/73	R	THERMAL ENERGIES			C			15
PIONEER 7	(66-075A-04)	ESHLEMAN										
TWO-FREQUENCY BEACON RECEIVER			08/17/66	TO 05/20/69	R	THERMAL ENERGIES			B			77
ISIS 1	(69-009A-01)	WHITTAKER										
SWEEP-FREQUENCY SOUNDER			01/30/69	TO 03/28/75	R	THERMAL ENERGIES			C			42
APOLLO 12 LM/ALSEP	(69-099C-02)	SNYDER										
SOLAR WIND SPECTROMETER			11/19/69	TO 05/16/74	N	6.000E 00	TO 1.330E 03	EV			H	19
APOLLO 15 LM/ALSEP	(71-063C-04)	SNYDER										
SOLAR WIND SPECTROMETER			07/31/71	TO 06/30/72	R	6.200E 00	TO 8.170E 03	EV			H	23

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	LIMITING DATES OF DATA AT NSSDC: EARLIEST MM/DD/YY	LATEST MM/DD/YY	*	TECHNIQUE	REGION: MAX	MIN	PLANET 012345H 6789	PAGE
3. MICROSCOPIC NEUTRAL MEASUREMENTS										
3.2 SENSING INDIVIDUAL ATOMS AND/OR MOLECULES										
AE-A	(63-009A-01)	REBER								
MASS SPECTROMETER			04/03/63	TO 06/01/63	X	MASS SPECTROMETRY	B			8
AE-B	(65-044A-02)	REBER								
NEUTRAL PARTICLE MAGNETIC MASS SPECTROMETER			09/26/66	TO 05/31/66	X	MASS SPECTROMETRY	B			9
OGO 6	(69-051A-04)	REBER								
NEUTRAL ATMOSPHERE COMPOSITION			06/06/69	TO 06/26/71	X	MASS SPECTROMETRY	BC			73
APOLLO 15 CSM	(71-063A-13)	HOFFMAN								
MASS SPECTROMETER			07/30/71	TO 08/07/71	X	MASS SPECTROMETRY			H	21
APOLLO 16 CSM	(72-031A-11)	HOFFMAN								
ORBITAL MASS SPECTROMETER			04/20/72	TO 04/24/72	X	MASS SPECTROMETRY			H	24
APOLLO 17 LM/ALSEP	(72-096C-08)	HOFFMAN								
ATMOSPHERIC COMPOSITION			01/02/73	TO 10/04/73	X	MASS SPECTROMETRY			H	26
MARINER 6	(69-014A-06)	KLIORE								
S-BAND OCCULTATION			07/00/69	TO 08/00/69	X	OTHER (NOT EM TECHNIQUE)			4	52
MARINER 7	(69-030A-06)	KLIORE								
S-BAND OCCULTATION			08/00/69	TO 08/00/69	X	OTHER (NOT EM TECHNIQUE)			4	54
OGO 6	(69-051A-01)	SHARP								
MICROPHONE ATMOSPHERIC DENSITY GAUGE			06/11/69	TO 01/31/70	X	TOTAL DENSITY SENSOR	C			74
APOLLO 14 LM/ALSEP	(71-008C-07)	JOHNSON								
COLD CATHODE ION GAUGE EXPERIMENT			02/09/71	TO 12/31/73	X	TOTAL DENSITY SENSOR			H	21
APOLLO 15 LM/ALSEP	(71-063C-07)	JOHNSON								
COLD CATHODE ION GAUGE EXPERIMENT			07/31/71	TO 12/09/73	X	TOTAL DENSITY SENSOR			H	23
3.3 SENSING ATOMS AND/OR MOLECULES COLLECTIVELY										
MARINER 2	(62-041A-02)	NEUGEBAUER								
INFRARED RADIOMETER			12/14/62	TO 12/14/62	X	IMAGERY			2	49
GEMINI 7	(65-100A-02)	NAGLER								
SYNOPTIC WEATHER PHOTOGRAPHY			12/04/65	TO 12/18/65	X	IMAGERY	A		3	35
OGO 4	(67-073A-13)	HANGE								
LYMAN-ALPHA AND UV AIRGLOW STUDY			07/29/67	TO 07/12/68	X	OTHER EM TECHNIQUE	BC			67
OGO 4	(67-073A-12)	REED								
AIRGLOW PHOTOMETER			08/19/67	TO 01/29/68	X	OTHER EM TECHNIQUE	BC			67
OGO 4	(67-073A-14)	BARTH								
UV SPECTROMETER 1100-1750A, 1750-3400A			08/30/67	TO 02/29/68	X	OTHER EM TECHNIQUE	BC			67
OGO 5	(68-014A-21)	BARTH								
ULTRAVIOLET AIRGLOW			03/04/68	TO 06/28/72	X	OTHER EM TECHNIQUE				69
OGO 5	(68-014A-22)	BLAMONT								
GEOCORONAL LYMAN-ALPHA MEASUREMENT			03/05/68	TO 12/31/69	X	OTHER EM TECHNIQUE				69

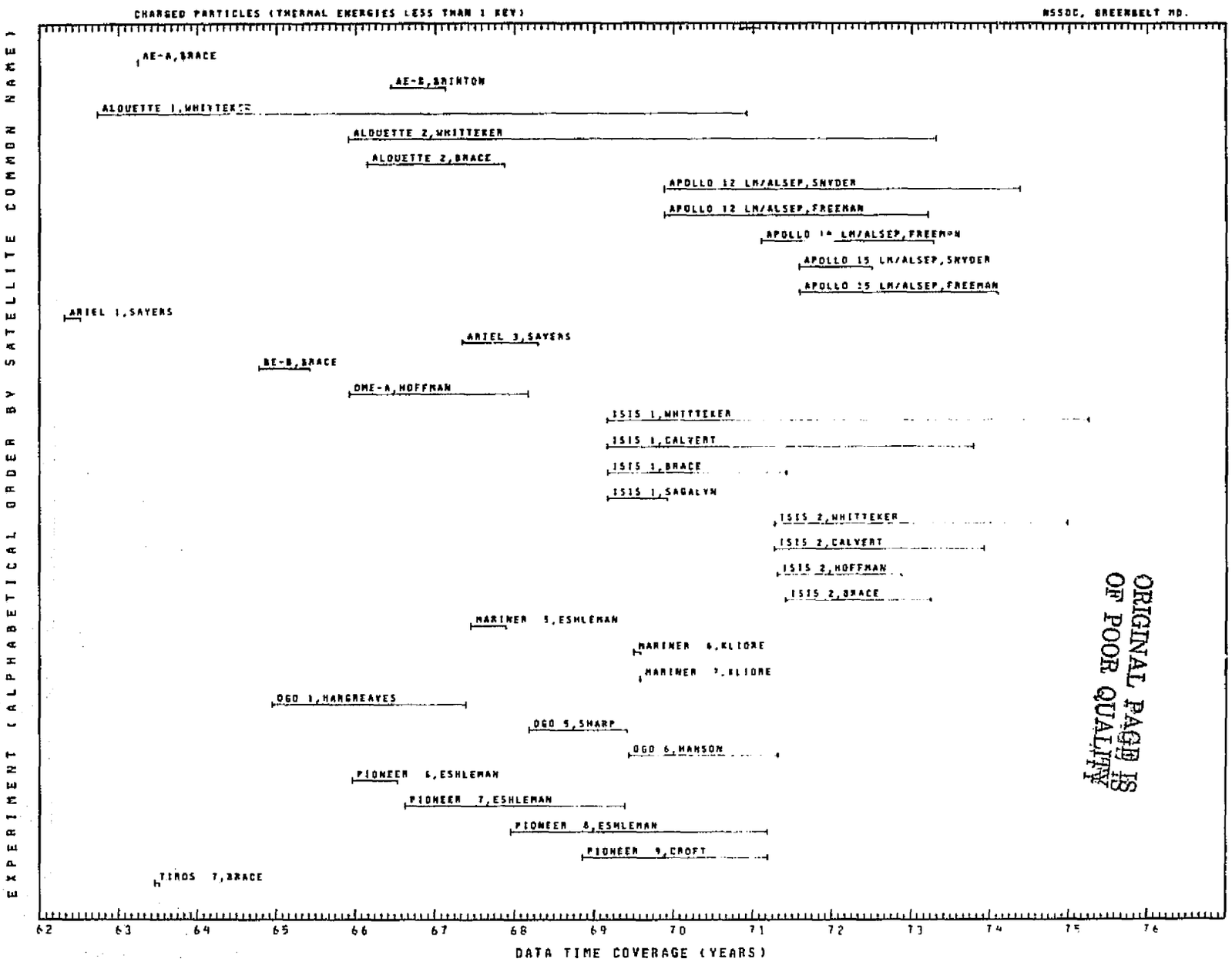
SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	LIMITING DATES OF DATA AT NSSDC EARLIEST HH/DD/YY	LATEST HH/DD/YY	*	TECHNIQUE	REGION AOC	PLANET 012345H 6789	PAGE
3.3 SENSING ATOMS AND/OR MOLECULES COLLECTIVELY									
OGO 6	(69-051A-13)	BARTH							
UV PHOTOMETER			06/09/69	TO 11/05/70	X	OTHER EM TECHNIQUE	BC		71
MARINER 6	(69-014A-02)	PINKNTEL							
IR SPECTROMETER			07/31/69	TO 07/31/69	X	OTHER EM TECHNIQUE		4	53
MARINER 6	(69-014A-04)	BARTH							
UV SPECTROMETER			07/31/69	TO 07/31/69	X	OTHER EM TECHNIQUE		4	51
MARINER 7	(69-030A-02)	PINKNTEL							
IR SPECTROMETER			08/05/69	TO 08/05/69	X	OTHER EM TECHNIQUE		4	56
MARINER 7	(69-030A-04)	BARTH							
UV SPECTROMETER			08/05/69	TO 08/05/69	X	OTHER EM TECHNIQUE		4	54
NIMBUS 4	(70-025A-05)	HEATH							
BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER			04/11/70	TO 12/31/70	X	OTHER EM TECHNIQUE	A	3	63
ISIS 2	(71-024A-11)	ANGER							
3914- AND 5577-A PHOTOMETER			04/23/71	TO 12/31/71	X	OTHER EM TECHNIQUE	BC		44
ISIS 2	(71-024A-12)	SHEPHERD							
6300-A PHOTOMETER			04/23/71	TO 12/31/71	X	OTHER EM TECHNIQUE	BC		46
MARINER 9	(71-051A-02)	BARTH							
ULTRAVIOLET SPECTROMETER (UVS)			11/12/71	TO 02/08/72	X	OTHER EM TECHNIQUE		4	57
MARINER 9	(71-051A-03)	HANEL							
INFRARED INTERFEROMETER SPECTROMETER (IRIS)			11/14/71	TO 10/16/72	X	OTHER EM TECHNIQUE		4	58
ONSP(72-089A)	(72-089A-01)	SNYDER							
VISUAL AND IR IMAGERY			06/12/72	TO 03/31/75	X	OTHER EM TECHNIQUE	C		32
ONSP(72-018A)	(72-018A-01)	SNYDER							
EARTH IMAGERY			06/16/72	TO 03/31/75	X	OTHER EM TECHNIQUE	C		31
OSO 5	(69-006A-07)	NEY							
ZODIACAL LIGHT MONITOR			01/26/69	TO 03/15/71	X	OTHER EM TECHNIQUE	B		74
LOGACS 1, AGENA	(67-050B-02)	CHIU							
WIND COMPONENT NORMAL TO ORBIT PLANE BELOW 200 KM			05/25/67	TO 05/27/67	X	OTHER (NOT EM TECHNIQUE)	C		48
AE-A	(63-009A-03)	NEWTON							
PRESSURE GAUGE			04/03/63	TO 06/08/63	X	TOTAL DENSITY SENSOR	B		7
LOGACS 1, AGENA	(67-050B-01)	BRUCE							
LOGACS 1, ATMOSPHERIC DENSITY SYSTEM			05/23/67	TO 05/26/67	X	TOTAL DENSITY SENSOR	C		48
OVI-15	(68-059A-01)	CHAMPION							
TRIAXIAL ACCELEROMETER			07/14/68	TO 09/20/68	X	TOTAL DENSITY SENSOR	C		75
1972-032A	(72-032A-01)	CARTER							
NEUTRAL DENSITY (MAGNETRON) GAUGE			04/21/72	TO 05/09/72	X	TOTAL DENSITY SENSOR	C		7

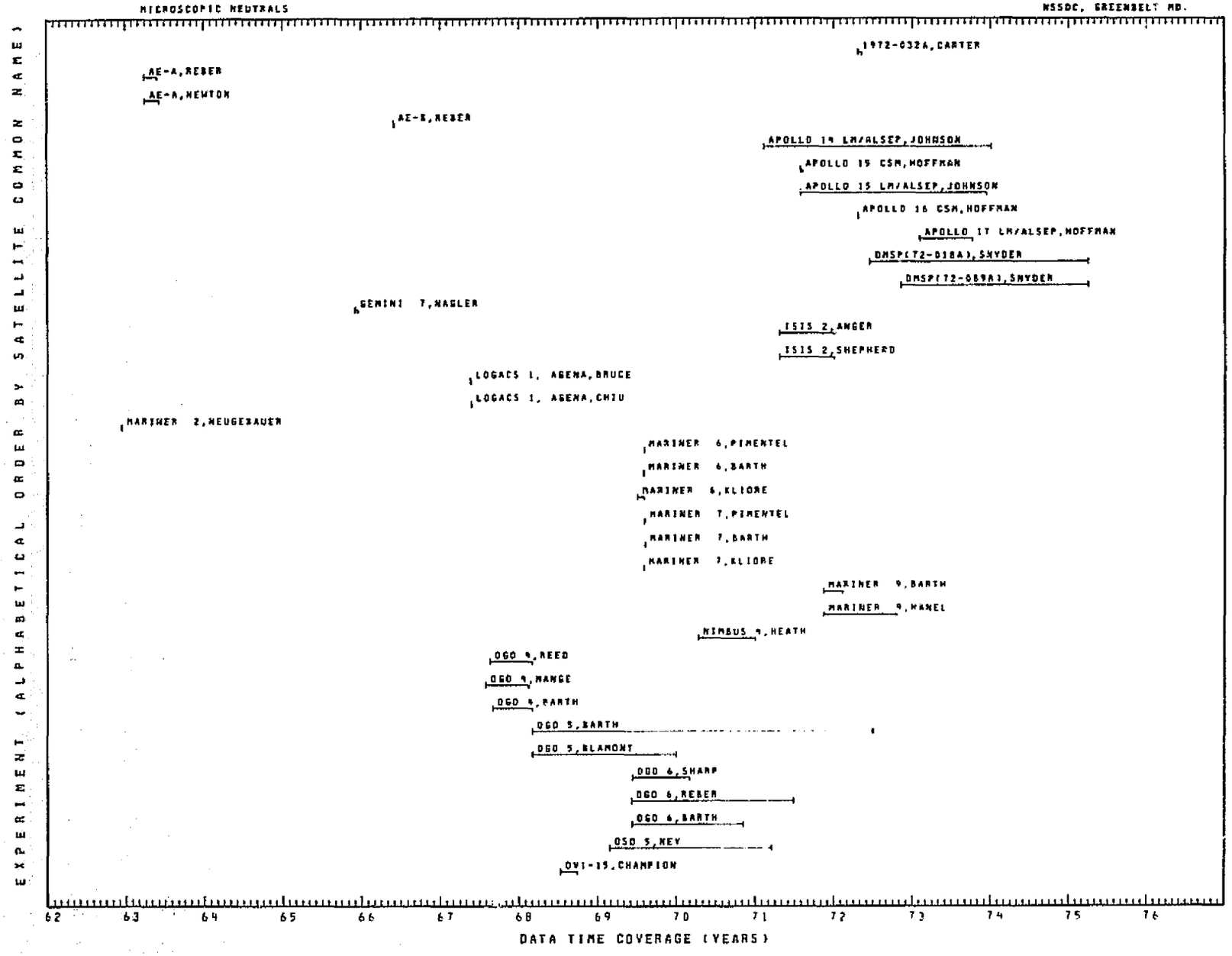
Bar Graphs by Phenomenon Measured

3.5 BAR GRAPHS BY PHENOMENON MEASURED

The time periods covered by charged particle and microscopic neutral particle data sets appearing in this catalog are indexed by means of a series of bar graphs generated from the AIM File. The plots allow the space-phenomenon-oriented user to easily identify the data available for a given time interval. Each plot is arranged alphabetically by spacecraft common name versus data times available from any experiment.

Users of this section should be aware that these plots represent an incomplete presentation of information coded into keyword strings; these keyword strings are, by themselves, incomplete codifications of information available as brief descriptions in the main body (section 2.3) of this catalog. More complete information from these "phenomena" indexes is shown in outline form in section 3.4.




MICROSCOPIC NEUTRALS
NSSDC, GREENBELT MD.
EXPERIMENT (ALPHABETICAL ORDER BY SATELLITE COMMON NAME)
1972-032A,CARTER
AE-A,REBER
AE-A,NEWTON
AE-E,REBER
APOLLO 14 LM/ALSEP,JOHNSON
APOLLO 15 CSM,HOFFMAN
APOLLO 15 LM/ALSEP,JOHNSON
APOLLO 16 CSM,HOFFMAN
APOLLO 17 LM/ALSEP,HOFFMAN
DMSP(T2-018A),SNYDER
DMSP(T2-089A),SNYDER
GEMINI 7,NAGLER
ISIS 2,ANGER
ISIS 2,SHEPHERD
LOGACS 1, AGENA,BRUCE
LOGACS 1, AGENA,CHIU
MARINER 2,NEUGEBAUER
MARINER 6,PIMENTEL
MARINER 6,BARTH
MARINER 6,KLIORE
MARINER 7,PIMENTEL
MARINER 7,BARTH
MARINER 7,KLIORE
MARINER 9,BARTH
MARINER 9,MANEL
NIMBUS 4,HEATH
OGO 4,REED
OGO 4,MANGE
OGO 4,BARTH
OGO 5,BARTH
OGO 5,BLAMONT
OGO 6,SHARP
OGO 6,REBER
OGO 6,BARTH
OSO 5,KEY
OVI-19,CHAMPION
62
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DATA TIME COVERAGE (YEARS)

APPENDIX: ABBREVIATIONS AND ACRONYMS

A	angstrom
ABMA	Army Ballistic Missile Agency
ACAD	Academy
ACIC	Aeronautical Chart and Information Center (now Defense Mapping Agency Aerospace Center)
ACS	attitude control system
AD	Dual Air Density Explorer (satellite, NASA)
A/D	analog to digital
AE	Atmosphere Explorer (satellite, NASA)
AEC	Atomic Energy Commission
AEROPROPUL	aeropropulsion
AEROSAT	Aeronautical Satellite (NASA-ESRO)
AEROSP	aerospace
AFB	Air Force Base
AFCRL	Air Force Cambridge Research Laboratories
AFO	Announcements of Flight Opportunities
AFSC	Air Force Systems Command
AGC	automatic gain control
AGCY	agency
AIMP	Anchored Interplanetary Monitoring Platform (satellite, NASA)
ALOSYN	Alouette topside sounder synoptic (data)
ALPO	Apollo Lunar Polar Orbiter (satellite, NASA); Association of Lunar and Planetary Observers
ALSEP	Apollo Lunar Surface Experiments Package (NASA)
ALT	altitude
AM	amplitude modulation
AMP	ampere
AMPS	Atmosphere, Magnetosphere, and Plasmas in Space (satellite, NASA)
AMS	Army Map Service (now Defense Mapping Agency Topographic Center)
AMSAT	Radio Amateur Satellite Corporation
AMU	atomic mass unit; astronaut maneuvering unit
ANIK	Canadian Telecommunications Satellite; also referred to as TELESAT
ANNA	Army, Navy, NASA, Air Force (geodetic satellite)
ANS	Astronomical Netherlands Satellite (Netherlands-NASA)
AOSO	Advanced Orbiting Solar Observatory
AP	magnetic activity index A_p
APL	Applied Physics Laboratory of Johns Hopkins University
APPL	application
APT	automatic picture transmission
A/R	acquisition/reference
ARC	Ames Research Center (NASA)
ARC-MIN	arc-minute
ARC-SEC	arc-second
ARDC	Air Research and Development Command (now AFSC)
ARPA	Advanced Research Projects Agency
ARSP	Aerospace Research Support Program (USAF)
AS+E	American Science & Engineering, Inc.
ASOS	antimony-sulfide oxy-sulfide
ASTP	Apollo-Soyuz Test Project (USSR-NASA)
ASTROPHYS	astrophysics
AT	atomic
ATCOS	Atmospheric Composition Satellite (NASA)
ATDA	Alternate Target Docking Adapter
ATM	Apollo Telescope Mount
ATMOS	atmosphere; atmospheric
ATS	Applications Technology Satellite (NASA)
AT+T	American Telephone & Telegraph Corp.
AU	astronomical unit
AUST	Australia
AVCS	advanced vidicon camera system
AVG	average
AVHRR	advanced very high resolution radiometer
AWRE	Atomic Weapons Research Establishment (Australia)
BCD	binary coded decimal
BE	Beacon Explorer (satellite, NASA); beryllium
BESYS	Bell System
BEV	billion electron volts
BIC	barium iodide cloud
BIOS	Biological Satellite (NASA)
BPI	bits per inch
BPS	bits per second
BTL	Bell Telephone Laboratories
BUV	backscatter ultraviolet
BV	billion volts
B/W	black and white
BWF	Bundesminister für Wissenschaftliche Forschung (Fed Rep of Germany)
CAL	calorie
CAL TECH	California Institute of Technology
CALSPHERE	calibration sphere

CAN	Canada
CAS	Cooperative Applications Satellite (France-NASA)
CAV	composite analog video
CBTT	calibrated brightness temperature tape
CC	cubic centimeter
CDA	command and data acquisition (station)
CDC	Control Data Corporation
CDS	cadmium sulfide
CENS	Centre d'Etudes Nucleaires de Saclay (France)
CHEM	chemical
CM	command module; centimeter
CMD	command
CNES	Centre National d'Etudes Spatiales (France)
CNET	Centre National d'Etudes des Telecommunications (France)
CNRS	Centre National de la Recherche Scientifique (France)
COMM	commission
COMSAT	Communications Satellite Corporation
CONIE	Comision Nacional de Investigacion del Espacio (Spain)
CORSA	Cosmic-Ray Satellite (Japan)
COS	Cosmic-Ray Satellite (ESRO); cosmic
COSPAR	Committee on Space Research
COUNC	council
CPS	cycles per second
CPU	central processing unit
CRC	Communications Research Centre (Canada)
CRPL	Central Radio Propagation Laboratories (formerly ITSA or part of ESSA; now NOAA/ERL)
CRREL	Cold Region Research & Engineering Laboratories
CRS	Commission for Space Research (Italy)
CRT	cathode ray tube
CSI	cesium iodide
CSM	command service module
CTR	center
CTS	Canadian Telecommunications Satellite
CZCS	coastal zone ocean color scanner
DAC	data acquisition camera
DADE	Dual Air Density Explorer (satellite, NASA)
DAN	Danish
DAPP	Defense Acquisition and Processing Program (DOD)
DAS	data automation subsystem
DASA	Defense Atomic Support Agency
DATS	Despun Antenna Test Satellite (DOD)
DB	decibel
DCP	data collection platform
DCS	direct couple system; data collection system
DEF	defense
DEG	degree
DENPA	Density Phenomena (satellite, Japan)
DEV	development
DFVLR	Deutsche Forshungs-und Versuchsanstalt für Luft-und Raumfahrt; English translation, Research Laboratory for Aeronautics and Astronautics, Fed Rep of Germany
DIAL/MIKA	Diament Allemande/Mini Kapsel (satellite, Fed Rep of Germany-France)
DIAL/WIKA	Diament Allemande/Wissenschaftliche Kapsel (satellite, Fed Rep of Germany-France)
DIAM	diameter
DIAPO	Diapason (satellite, France)
DIT	Drexel Institute of Technology
DMAAC	Defense Mapping Agency Aerospace Center
DMATC	Defense Mapping Agency Topographic Center
DME	Direct Measurements Explorer (satellite, NASA)
DMSP	Defense Military Satellite Program (DOD)
DOD	Department of Defense
DODGE	Department of Defense Gravity Experiment (satellite, DOD)
DRID	direct readout image dissector (camera system)
DRIR	direct readout infrared radiometer
DRTE	Defence Research Telecommunications Establishment (now CRC)
DSAP	Defense System Applications Program (DOD)
DSCS	Defense Satellite Communications System (DOD)
DSIR	Department of Science and Industrial Research (England)
DSN	Deep Space Network
DV	digital video
DYN	dynamic
E	energy
EASEP	Early Apollo Scientific Experiment Package
ECA	electric-field component antenna
ECR	electric-field component receiver
ECS	Experimental Communications Satellite (NASA)
EDS	Environmental Data Service (NOAA)
EGO	Eccentric (Orbiting) Geophysical Observatory (satellite, NASA)
EGRS	Engineers Satellite (DOD)
EIRP	effective isotropic radiative power
EL	electric (data camera carried on Apollo)
ELDO	European Launch Development Organization (ESRO)

ELEC	electric
ELECTR	electronics
ELMS	Earth Limb Measurement Satellite (NASA-USAF)
EME	environmental measurement experiment
EMR	Electromechanical Research (Company, England)
ENVIRON	environment; environmental
EOF	end of file
EOGO	Eccentric Orbiting Geophysical Observatory (satellite, NASA)
EOS	Earth Observation Satellite (NASA)
EPE	Energetic Particle Explorer (satellite, NASA)
E/Q	energy per unit charge
ERB	Earth radiation budget (experiment)
ERDC	Earth Resources Data Center
ERGS	Earth Geodetic Satellite (USAF)
ERL	Environmental Research Laboratory (NOAA)
EROS	Earth Resources Observation System
ERS	Environmental Research Satellite (USAF)
ERT	extended range telescope
ERTS	Earth Resources Technology Satellite (NASA)
ESGEO	ESRO Geostationary Earth-Orbiting (satellite)
ESMR	electrically scanning microwave radiometer
ESOC	European Space Operations Centre (ESRO)
ESRO	European Space Research Organization
ESSA	Environmental Science Services Administration (now NOAA)
ESTABL	establishment
ESTEC	European Space Technology Center (ESRO)
ETR	Eastern Test Range (also referred to as Cape Canaveral)
ETS	Engineering Test Satellite
EUV	extreme ultraviolet
EV	electron volt
EVA	extravehicular activity
EVM	Earth viewing (equipment) module
EXOS	Exospheric Satellite (Japan)
EXOSAT	European X-ray Observation Satellite (ESRO)
EXTRATERR	extraterrestrial
FARO	Flare-Activated Radiobiological Observatory (satellite, DOD)
FED	Federal
FLT-SAT	Fleet Satellite (USN)
FM	frequency modulation
FMRT	final meteorological radiation tape
FOUND	foundation
FOV	field of view
FPP	flat plate radiometer
FR	French Research (satellite, France)
FRC	Flight Research Center (NASA)
FSC	FLEETSATCOM (satellite, USN-USAF)
FSK	frequency shift key
FWHM	full width at half maximum
FWS	filter wedge spectrometer
GARP	Global Atmospheric Research Program
GCA	Geophysics Corporation of America
GE	General Electric (Company)
.GE.	greater than or equal to
GEMS	Geostationary European Meteorological Satellite (ESRO)
GEOPHYS	geophysical
GEOS	Geodetic Earth-Orbiting Satellite (NASA); Geostationary Earth-Orbiting Satellite (ESRO)
GES FUR WELTRAUM-FORSCH	Gesellschaft für Weltraumforschung (Center for Space Research, Fed Rep of Germany)
G.E.T.	ground elapsed time
GEV	gigaelectron volt
GGSE	gravity gradient stabilization experiment
GHZ	gigahertz
GISS	Goddard Institute for Space Studies (NASA)
GM	Geiger-Mueller; gram
GMS	Geostationary Meteorological Satellite (Japan)
GMT	Greenwich mean time
GOES	Geosynchronous Operational Environmental Satellite (NASA-NOAA; also called SMS)
GP	Gravitational Redshift Space Probe (NASA)
GRAVR	Gravitational Redshift Space Probe (NASA)
GRE	ground reconstruction equipment; ground reconstruction electronics
GREB	Galactic Radiation Experiment Background (satellite, USN)
GRI	Groupe de Recherche Ionospherique (France)
GROC	Netherlands Committee for Geophysics and Space Research
GRS	German Research Satellite (NASA-Fed Rep of Germany)
GSD	Grid Sphere Drag (satellite, DOD)
GSE	geocentric solar ecliptic (coordinate system)
GSFC	Goddard Space Flight Center (NASA)
GSM	geocentric solar magnetospheric (coordinate system)
.GT.	greater than
GUGMS	Glavnoye Upravleniye Gidrometeorologicheskoi Sluzhby (Main Administration of the Hydrometeorological Service, USSR)

GV	gigavolt
GVHRR	geosynchronous very high resolution radiometer
HAO	High Altitude Observatory
HCMM	Heat Capacity Map Mission (satellite, NASA)
HCMR	Heat Capacity Mapping Radiometer
HCO	Harvard College Observatory
HDRSS	high data rate storage system
HE	helium
HEAO	High-Energy Astrophysical Observatory (NASA)
HEOS	High-Eccentricity Earth-Orbiting Satellite (ESRO)
HEPAT	high-energy proton alpha telescope
HET	health, education, telecommunications (experiment)
HETS	high-energy telescope system
HFE	heat-flow experiment; heat-flow electronics
HR	high resolution; hour
HRIR	high-resolution infrared radiometer
HRIRS	high-resolution infrared radiometer sounder
H.S.	high school
HYDROMET	hydrometeorological
HZ	hertz (cycles per second)
IAP	Institute of Atmospheric Physics (USSR)
IBM	International Business Machines (Corp.)
ICBM	intercontinental ballistic missile
ICSU	International Council of Scientific Unions
ID	identification
IDC	image dissector camera
IDCS	image dissector camera system
IDCSP	Initial (or Interim) Defense Communication Satellite Program (or Project) (DOD)
IDSCS	Initial Defense Satellite Communication System (DOD)
IDT	instrument definition team
IE	Ionospheric Explorer (satellite, NASA-NBS)
IFOV	instrument field of view
IGRF	International Geomagnetic Reference Field
IGY	International Geophysical Year
IME	International Magnetospheric Explorer (satellite, NASA-ESRO)
IMP	Interplanetary Monitoring Platform (satellite, NASA)
IMS	International Magnetospheric Study
INDASAT	Indian Scientific Satellite (ISRO-USSR)
INOP	inoperable
INSAT	Indian National Satellite (ISRO-USSR)
INST	institute
INTA	Instituto Nacional de Tecnica Aeroespacial (Spain); the National Institute of Aerospace Science
INTASAT	satellite (INTA, Spain)
INTELSAT	International Telecommunications Satellite (NASA-COMSAT)
ION COMP	Ionospheric Composition (satellite – see DIAPO)
IPA	Institute for Physics of the Atmosphere (SAS)
IQSY	International Quiet Sun Year
IR	infrared
IRBM	intermediate range ballistic missile
IRIG	Inter-Range Instrumentation Group
IRIS	infrared-interferometer spectrometer; International Radiation Investigation Satellite (NASA-ESRO)
IRLS	interrogation, recording, and location system
IRR	infrared radiometry
IRTRN	infrared transmission
ISAS	Institute of Space & Aeronautical Science (Japan)
ISEE	International Sun-Earth Explorer (satellite, NASA-ESRO)
ISIS	International Satellite for Ionospheric Studies (NASA-Canada)
ISRO	Indian Space Research Organization
ISS	Ionospheric Sounding Satellite (Japan)
ITCZ	intertropical convergence zone
ITOS	Improved TIROS Operational Satellite (NOAA)
ITPR	infrared temperature profile radiometer
ITR	incremental tape recorder
ITSA	Institute for Telecommunication of Sciences and Aeronomy (formerly a subdivision of ESSA; now NOAA-ERL)
IU	instrument unit
IUE	International Ultraviolet Explorer (satellite, NASA-UK-ESRO)
IZMIRAN	Institute of Terrestrial Magnetism and Aeronomy of the Academy of Sciences (USSR)
JGR	Journal of Geophysical Research
JHU	Johns Hopkins University
JPL	Jet Propulsion Laboratory (NASA)
JSC	Johnson Space Center (NASA)
KBS	kilobits per second
KEV	kiloelectron volt
KG	kilogram
KHZ	kilohertz
KM	kilometer
KP	magnetic activity index K_p

KPNO	Kitt Peak National Observatory
KSC	Kennedy Space Center (NASA)
LA	Los Angeles
LAB	laboratory
LACATE	lower atmosphere composition and temperature
LAGEOS	Laser Geodetic Earth-Orbiting Satellite (NASA)
LARC	Langley Research Center (NASA)
LAS	Large Astronomical Satellite (ESRO)
LASL	Los Alamos Scientific Laboratory
LCS	Lincoln Calibration Sphere
.LE.	less than or equal to
LEM	lunar excursion module
LEPAT	low-energy proton alpha telescope
LEPEDEA	low-energy proton and electron differential energy analyzer
LERC	Lewis Research Center (NASA)
LES	Lincoln Experimental Satellite (DOD)
LETS	low-energy telescope system
LL	Lincoln Laboratory (MIT)
LM	lunar module
LMD	Laboratory of Meteorological Dynamics
LOFTI	Low-Frequency Trans-Ionospheric (satellite, USN-NRL)
LOGACS	Low-G Accelerometer Calibration System (USAF)
LPSP	Laboratoire de Physique Stellaire et Planetaire (CNRS)
LRIR	limb radiance inversion radiometer; low-resolution infrared radiometer
LRL	Lunar Receiving Laboratory (JSC)
LRV	lunar roving vehicle
LST	Large Space Telescope (satellite, NASA)
.LT.	less than
LTV	Ling-Temco-Vought (Company)
M	meter, milli- (prefix)
MA	Mercury Atlas
MAPS	measurement of air pollution from satellite
MARENTS	Modified Advanced Research Environmental Test Satellite (USAF)
MAS	Ministry of Aviation Supply (UK)
MASC	magnetic attitude spin coil
MASS	Massachusetts
MATER	material
MB	millibar
MC	megacycle
MCA	Magnetic-field component antenna
MCR	Magnetic-field component receiver
MED	medicine; medical
METEC	Meteoroid Technology (satellite, NASA)
METEOSAT	Meteorological Satellite (ESRO)
MEV	million electron volts
MG	milligram
MHZ	megahertz
MIDAS	Missile Defense Alarm System (USAF)
MIN	minute
MIT	Massachusetts Institute of Technology
MJS	Mariner Jupiter/Saturn (spacecraft, NASA)
MM	millimeter
MMW	millimeter wave
MOL	Manned Orbiting Laboratory (satellite, DOD)
M-P	minus to plus
MPI	Max-Planck-Institut (Fed Rep of Germany)
MR	medium resolution
MRIR	medium-resolution infrared radiometer
MS	microsecond
MSC	Manned Spacecraft Center (now Johnson Space Center)
MSEC	millisecond
MSFC	Marshall Space Flight Center (NASA)
MSN	mission
MSS	Magnetic Storm Satellite (NASA-AFCRL); multispectral scanner
MSSCC	multicolor spin-scan cloudcover camera
MTS	Meteoroid Technology Satellite (NASA)
MUSE	monitor of ultraviolet solar energy
MW	milliwatt
NA	not applicable; Nora Alice (satellite, DOD)
NACE	neutral atmosphere composition experiment
NADUC	Nimbus/ATS Data Utilization Center
NASA	National Aeronautics and Space Administration (Washington, D.C., Headquarters)
NASC	National Aeronautics and Space Council
NASDA	National Space Development Agency (Japan)
NATL	national
NATO	North Atlantic Treaty Organization
NB	narrow band
NBS	National Bureau of Standards
NCAR	National Center for Atmospheric Research
NCC	National Climatic Center (NOAA)
NDRE	Norwegian Defence Research Establishment
NEMS	Nimbus-E microwave spectrometer; Near-Earth Magnetospheric Satellite (ESRO)
NESC	National Environmental Satellite Center (now NESS)
NESS	National Environmental Satellite Service (NOAA)
NGSP	National Geodetic Satellite Program
NHC	National Hurricane Center
NIH	National Institutes of Health
NMC	National Meteorological Center
NMRT	Nimbus meteorological radiation tape

NNN	no national name
NNSS	Navy Navigational Satellite System
NOAA	National Oceanic and Atmospheric Administration (formerly ESSA)
NOMSS	National Operational Meteorological Satellite System
NORAD	North American Air Defense Command
NORW	Norwegian
NOS	National Ocean Survey (NOAA)
NOTS	Naval Ordnance Test Station
N-P	negative to positive
NRC	National Research Council
NRL	Naval Research Laboratory
NSA	National Security Agency
NSF	National Science Foundation
NSSDC	National Space Science Data Center
NUCL	nuclear
NWL	Naval Weapons Laboratory
NWRC	National Weather Records Center (now NCC)
OA	Office of Applications (NASA)
OAO	Orbiting Astronomical Observatory (satellite, NASA)
OAR	Office of Aerospace Research (USAF-AFSC)
OART	Office of Advanced Research and Technology (NASA)
OAST	Office of Aeronautics and Space Technology (NASA)
OBS	observatory
OCC	OPLE Command Center
OFO	Orbiting Frog Otolith (NASA experimental spacecraft)
OGO	Orbiting Geophysical Observatory (satellite, NASA)
OI	other investigator
OMNI	low-resolution omnidirectional radiometer (on Explorer 7)
OMSF	Office of Manned Space Flight (NASA)
ONR	Office of Naval Research
OPEP	orbital-plane experiment package
OPLE	Omega position and location experiment
OP OFF	operational off
ORBIS	Orbiting Radio Beacon Ionospheric Satellite (NASA)
ORS	Octahedral Research Satellite (NASA); Orbiting Research Satellite (DOD)
OSCAR	Orbiting Satellite Carrying Amateur Radio
OSO	Orbiting Solar Observatory (satellite, NASA)
OSS	Office of Space Science (NASA)
OSSA	Office of Space Science and Applications (NASA; now two separate offices)
OT	Operational TIROS (satellite, NASA)
OTDA	Office of Tracking and Data Acquisition (NASA)
OV	Orbiting Vehicle (satellite, USAF)
PAC	Packaged Attitude Control (satellite, NASA)
PAET	Planetary Atmosphere Experiment Test
PAGEOS	Passive Geodetic Earth-Orbiting Satellite (NASA)
PAM	pulse amplitude modulation
PCM	pulse coded modulation
PE	Planetary Explorer
PEP	platform electronic package
PFM	pulse frequency modulation
PHASR	Personnel Hazards Associated with Space Radiation (satellite, USAF)
PHYS	physics
PI	principal investigator
PIXEL	picture element
PL	prelaunch
PLACE	Position, Location and Aircraft Communication Experiment
PM	pulse modulation; photomultiplier
PMR	pressure modulation radiometer; Pacific Missile Range
PMT	photomultiplier tube
P-N	positive-negative (junction)
POD	proton omnidirectional detector
POGO	Polar Orbiting Geophysical Observatory (satellite, NASA)
PPS	pulses per second
PROT	protection
PS	pressure sensor
PSE	passive seismograph experiment
PTL	Photographic Technology Laboratory (JSC)
QOMAC	quarter-orbit magnetic attitude control (system)
RA	Ranger (spacecraft, NASA)
RAD	radium; radiation
RADCAT	Radar Calibration Target (satellite, ARPA)
RADOSE	Radiation Dosimeter (satellite, DOD)
RAE	Radio Astronomy Explorer (satellite, NASA)
RAM	random access memory (system)
RBV	return beam vidicon (camera)
RC	resistance capacitor
RCA	Radio Corporation of America
R+D	research and development
REP	republic
RES	research
REXS	Radio Exploration Satellite (Japan)
RF	radio frequency

RM	Radiation Meteoroid (satellite, NASA); Radiometric Measurement (satellite, DOD)
RMS	root mean square; Radiation Meteoroid Satellite (NASA); Radiometric Measurement Satellite (DOD)
RPA	retarding potential analyzer
RPM	revolutions per minute
RPS	revolutions per second
RRL	Radio Research Laboratories (Japan)
RSRS	Radio and Space Research Station (England)
RTD	Research Technology Division (USAF)
RTG	radioisotope thermoelectric generator
RTTS	real-time transmissio ystem
SAM	stratospheric aerosol measurement
SAMOS	Satellite Mission Observation System (satellite, USAF)
SAMS	stratospheric and mesospheric sounder
SAMSO	Space and Missile Systems Organization (USAF)
SAO	Smithsonian Astrophysical Observatory
SAPPSAC	spacecraft attitude precision pointing and slewing adaptive control (experiment)
SAS	Small Astronomy Satellite (NASA); Soviet Academy of Sciences
SATAR	Satellite for Aerospace Research (NASA)
SATELL	satellite
SATS	Satellite Antenna Test System (NASA)
SBRC	Santa Barbara Research Center
SCAMS	scanning microwave spectrometer
SCEL	Signal Corps Engineering Laboratories
SCH	school
SCI	science
SCMR	surface composition mapping radiometer
SCORE	Signal Communication by Orbiting Relay Equipment (satellite, DOD)
SCR	selective chopper radiometer
SD	San Diego
SE	Solar Explorer (satellite, NASA)
SEASAT	Ocean Dynamic Satellite (NASA)
SEC	second; secondary electron conduction (vidicon tube)
SECOR	Sequential Collation of Range (satellite, USAF)
SEM	space environment monitor
SERT	Spinning Satellite for Electric Rocket Test (NASA)
SESP	Space Experiment Support Program
SESPO	Space Environmental Support Project Office
SHS	Soviet Hydrometeorological Service
SIBS	Salk Institute for Biological Studies
SIDS	Space Investigations Documentation System (NASA)
SIM	scientific instrument module
SIRS	satellite infrared spectrometer; System for Information Retrieval and Storage (NSSDC)
SM	San Marco (satellite, NASA-Italy)
SMMR	scanning multispectral microwave radiometer
SMS	Synchronous Meteorological Satellite (NASA)
SNAP	systems for nuclear auxiliary power
SOEP	solar-oriented experiment package
SOLRAD	Solar Radiation (satellite, NASA-DOD)
SPADES	Solar Perturbation and Atmospheric Density Measurement Satellite (DOD)
SPHINX	Space Plasma High Voltage Interactive Experiment (satellite, NASA)
SPM	solar proton monitor
SR	Solar Radiation (satellite, NASA); scanning radiometer; sounding rocket
SRATS	Solar Radiation and Thermospheric Satellite (Japan)
SRC	Space Research Council; Science Research Council
SRI	Stanford Research Institute
SRT	supporting research and technology
SSCC	spin-scan cloudcover camera
SSD	Space Science Division (JPL)
SSS	Small Scientific Satellite (NASA)
SST	satellite-to-satellite tracking
STADAN	Spacecraft Tracking and Data Acquisition Network (now STDN)
STARAD	Starfish Radiation (satellite, NASA)
STD	standard
STDN	Spaceflight Tracking and Data Network (NASA)
STER	steradian
STL	Space Technology Laboratories (now TRW Systems Group)
STN	station
STP	Solar Terrestrial Probe (satellite, NASA); Solar Terrestrial Physics
STRATOS	stratosphere
STUD	studies
SUI	State University of Iowa (now University of Iowa)
SURCAL	Surveillance Calibration (satellite, DOD)
SVC	service
SW	southwest
SWRF	Sine Wave Response Filter (program)
SYNCOM	Synchronous Communication (satellite, NASA)
SYST	system
TAC	Technology Application Center
TACOMSAT	Tactical Communications Satellite (DOD)

TATS	Test and Training Satellite (NASA)
TATSACOM	Tactical Satellite Communications (program, DOD)
TD	Thor-Delta (satellite, ESRO); launch vehicle (NASA-USAF)
TDP	Tracking Data Processor (program)
T+DR	tracking & data relay
TDRSS	tracking and data relay satellite system
TEC	telemetry and command; transearth coast; total electron content
TECH	technical; technology
TED	total energy detector
TEI	transearth injection
TELESAT	satellite, Canada (also referred to as ANIK)
TEMP	temporal; temperature
TET	telescope and electron telescope
TETR	Test and Training (satellite, NASA)
THIR	temperature-humidity infrared radiometer
THORAD-AGE	Thor Augmented Delta Agena (launch vehicle)
TIMATION	Time Location System (USN)
TIP	Tracking Impact Prediction (satellite, DOD)
TIROS	Television and Infrared Observation Satellite (NASA)
TL	team leader
TLI	translunar injection
TM	team member
TOMS	total ozone mapping system
TOPO	topographic
TOPS	Thermal Noise Optical Optimization Communication System (NASA)
TOPSI	topside (sounder) (satellite, NASA)
TOS	TIROS Operational Satellite (or System) (NASA)
TOVS	TIROS operational vertical sounder
TR	tape recorder
TRAAC	Transit Research and Attitude Control (satellite, USN)
TRANET	Doppler Tracking Network (USN)
TRANSP	transportation
TRS	Tetrahedral Research Satellite (USAF)
TRW	Thompson, Ramo, Wooldridge, Inc.
TTS	Test and Training Satellite (NASA) (also called TATS, TETR)
TWERLE	tropical wind energy conversion and reference level experiment
U	university
UCLA	University of California at Los Angeles
UHF	ultrahigh frequency
UK	United Kingdom
US	United States
USA	United States Army; United States of America
USAF	United States Air Force
USN	United States Navy
USSR	Union of Soviet Socialist Republics
UT	universal time
UV	ultraviolet
UVNO	ultraviolet nitric-oxide experiment
UVS	ultraviolet spectrometer
V	volt
VAR	variation
VHF	very high frequency
VHRR	very high resolution radiometer
VISSR	visible infrared spin-scan radiometer
VLF	very low frequency
VTPR	vertical temperature profile radiometer
W	watt
WBVTR	wideband video tape recorder
WDC	World Data Center
WDC-A-R&S	World Data Center A for Rockets and Satellites
WEFAX	weather facsimile
WEP	Wisconsin Experiment Package
WFC	Wallops Flight Center (NASA)
WGSPR	Working Group for Space Physics Research
WMO	World Meteorological Organization
WPM	words per minute
WRESAT	Weapons Research Establishment Satellite (Australia)
WS	Wallops Station (NASA; now Wallops Flight Center)
WSMR	White Sands Missile Range
WTR	Western Test Range (also referred to as Vandenberg AFB)
WWW	World Weather Watch
Z	atomic number