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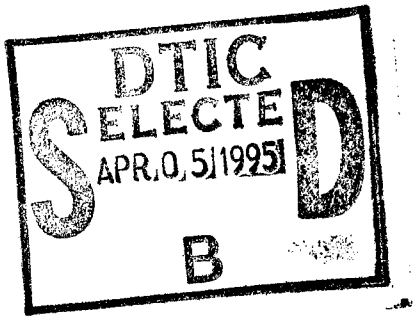

NAESU MANAGEMENT OF ENGINEERING AND TECHNICAL SERVICES

by

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13. ABSTRACT (Maximum 200 words)

This research reports the views of Engineering and Technical Specialists (ETS or techreps) and their customers. The views were gathered from a variety of locations using group interviews and questionnaires. The questionnaires asked techreps to rate the Importance of various activities and the Time Spent on them. The customer questionnaire rated the Importance and Value Added of the activities. Although the focus is on the Naval Aviation Engineering Service Unit (NAESU), it also includes data from the Army, Air Force, and Navy Fleet.

Techreps' principal activities relate to on-the-job training, classroom training, and maintenance advice and assistance. There are distinct differences between the priority and time spent on various activities by techreps from the four service groups.

Customers, operations and maintenance personnel at various levels, believe techreps are essential to enable military personnel to operate and maintain the equipment assigned to their units. Both techreps and customers state that the need for techreps results from deficiencies in military training, assignment practices, lack of experienced personnel, inadequate technical data, parts shortages, sophistication of equipment, and other systemic problems. Techreps help compensate for mismatches in the overall logistics system.

The report concludes with recommendations designed to improve the overall management of techreps.

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SUMMARY

This study examines how the Naval Aviation Engineering Service Unit (NAESU) manages and provides engineering and technical services (ETS) and provides recommendations to improve the management and provision of those services. This study was commissioned by the Commanding Officer of NAESU. Accordingly, we focused on ETS provided to the Navy's aviation community, NAESU's primary customer. However, we also studied the Air Force, the Army and the Navy ship-side as they also have organizations similar to NAESU that provide ETS programs.

The military services' philosophy is that military personnel should be able to operate and support basic maintenance requirements for most equipment. National security commitments dictate an ongoing need for a continuous military presence around the globe or the capability to mobilize quickly and effectively. Whether those commitments are sustained operations at sea or troop deployments to remote, hostile locations, the need to meet these challenges supports the services' philosophy. To achieve this mission effectively requires that all logistics elements must operate at full efficiency. Our research indicates it is a rare organization in which this occurs.

Personnel drawdowns, reduced training resources, changes in maintenance training delivery, the nature of the (current) military personnel system, and other factors, have created a shortage of qualified military technicians. The impact has been dramatic and unmistakable. However, the services have significantly mitigated the impact of these shortages by increasingly relying on a corps of highly qualified civilians (and some military) technicians who perform engineering and technical services. Generically these employees are referred to as "techreps." NAESU has overall responsibility for techreps who provide ETS to the naval aviation community.

Techreps perform a variety of tasks including on-the-job training, classroom training, trouble shooting, performing equipment modifications, providing advice and a host of other essential services. Without question the fleet would continue to operate without techreps. However, operational commands would continue to require technical assistance from outside their assigned military technicians. It is likely that fleet operations would become more costly as operators turn to contractors for many of the services techreps now perform. Alternatively, with declining budgets, more units might remain non-operational longer, thereby adversely impacting fleet readiness and effectiveness.

The current environment will persist into the foreseeable future. Using Navy civilian techreps to provide ETS is less costly than other alternatives, providing the Navy continues to execute its mission as in the past. The services' underlying maintenance philosophy notwithstanding, civilian employee techreps have become an essential element in the logistic support of our military forces.

Our data was based on surveys and interviews of techreps and their customers. We asked techreps the importance and time spent on their activities. Preceding the survey was an interview,

conducted in a group setting without supervisors or managers present. We elicited techrep attitudes about what they do, how they do it, command support, etc. We asked customers questions that paralleled the techrep survey and interview. We found a significant correlation between what techreps said was important and that customers said was important. This seems to indicate that techreps understand the needs of their customers. We found significant differences between the services in the importance of various activities that reflect the techrep mission assigned by each service. For example, techreps providing supply assistance was deemed very important in the Army but much less so in either the Navy or Air Force.

Our principal conclusions and recommendations are:

* Engineering and technical services should be considered for inclusion as a distinct, eleventh element of integrated logistic support (ILS).

* The Naval Air Systems Command (NAVAIR) must recognize the significant value of ETS and take a strong stand that techreps are a desirable and necessary part of the logistics support system. This would enhance techrep effectiveness at virtually no additional cost.

* If the Navy desires to reduce or eliminate ETS, it must make immediate major changes and improvements in personnel, training, and other logistics support systems.

* The continued needs for ETS suggests the Navy should retain NAESU. Centrally controlling ETS administrative functions such as funding and personnel management appears to be the most efficient method.

* NAESU should eliminate their Detachments' military OICs; customers should have functional management control with administrative and technical support from NAESU, through a Det lead techrep.

* NAESU must improve the quality of techrep training and should work to ensure adequate technical data is procured for each program in a timely manner.

* NAESU must improve its responsiveness to field personnel issues.

* NAESU, in conjunction with other ETS providers, should pursue establishing a new, separate job series for techreps.

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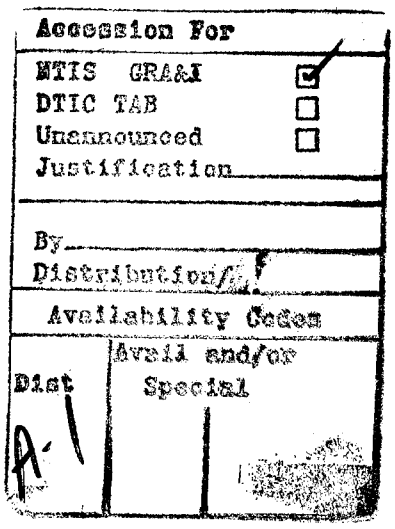

NAESU MANAGEMENT OF ENGINEERING AND TECHNICAL SERVICES

INTRODUCTION

Engineering and technical services, ETS, are provided to DoD military technicians by all of the military services. Their function is to provide an on-call level of expertise above and beyond that available from within the military units. Engineering and technical services are delivered by engineering and technical specialists who are primarily DoD civilians, with some military personnel, and decreasingly by private industry contracts. The Naval Aviation Engineering Service Unit, NAESU, provides those services to the Navy and Marine air communities. The Army Materiel Command, AMC, administers ETS or LARS, Logistics Assistance Representatives, on behalf its subordinate commands. The Air Force Air Combat Command, ACC, administers AFETS for ACC, AF Europe, Pacific Air Force, and AF communications commands. The Navy provides ETS support through the Fleet Technical Support Centers located in Norfolk (FTSCLANT) and San Diego (FTSCPAC). Each provides its services through detachments, assignments, or tech assists to various unit locations[1].

PURPOSE

This study was commissioned by Commander John Van Sickle, USN, Commanding Officer of NAESU. Commander Van Sickle asked that we examine NAESU's management of engineering and technical services and make recommendations regarding their improvement. Particularly as budgetary resources become more scarce, operational efficiency and clear justification of the need for a product or service become increasingly important.

BACKGROUND

The military services operate under a philosophy that military personnel should be able to

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[1]The authors express their appreciation to the men and women at all levels whose cooperation made this research possible. We also thank Dr. Roger Evered and Marilyn Schneider, Naval Postgraduate School, for their assistance.

operate and provide basic maintenance for all equipment. The services design technical training, skill development, and personnel and management systems toward this end. Under this philosophy, depot maintenance is performed by civilians or contractors, while operation, "O" (operations) level maintenance, and "I" (intermediate) level maintenance, if it exists, are military functions.

The basic philosophy is to provide initial and advanced technical training in service schools and then put the new young service members to work in their assigned fields. The basic school graduate could be considered to be a beginning apprentice in the field. It is expected that the technician will become a journeyman through a combination of experience, on-the-job training, mentoring by more experienced military personnel, and attending specialty schools. For this system to be effective requires that all elements of the logistics functions work at full efficiency. To cite only a few examples, this means that: the parts are available; manuals are complete, up-to-date and appropriate for the particular equipment installed on the weapon platform; there is a full complement of higher ranked people who are fully experienced on that equipment; test equipment is properly designed, available and fully functioning; advanced schools are available as needed and provide appropriate training; travel money is available; equipment modifications and changes are properly carried out and documented; the basic schools provide a sufficient level of training so the apprentice is ready to go to work; sufficient time is available to learn as well as do; personnel are not diverted from tasks for other duties; simulators or vestibule training activities are available to enable learning in a safe environment; and a technical information system keeps all persons informed of common problems and solutions. The basic structure of the inter-relationships is illustrated in Figure 1.

Engineering and technical services are provided to DoD military personnel to assist them in the installation, modification, operation, and maintenance of equipment and systems. The services are provided by contractor and DoD civilian and military personnel. The services generally take the form of advice and training, although direct performance of maintenance may be performed occasionally.

It is the intent of the military services that military personnel conduct the routine operation and maintenance of weapons, systems, and platforms. The services design their training, supply,

and other logistics programs with this end in mind. Due to the random nature of some of the processes, military technicians seldom are able to maintain a sufficiently high level of competence without the assistance of engineering and technical services.

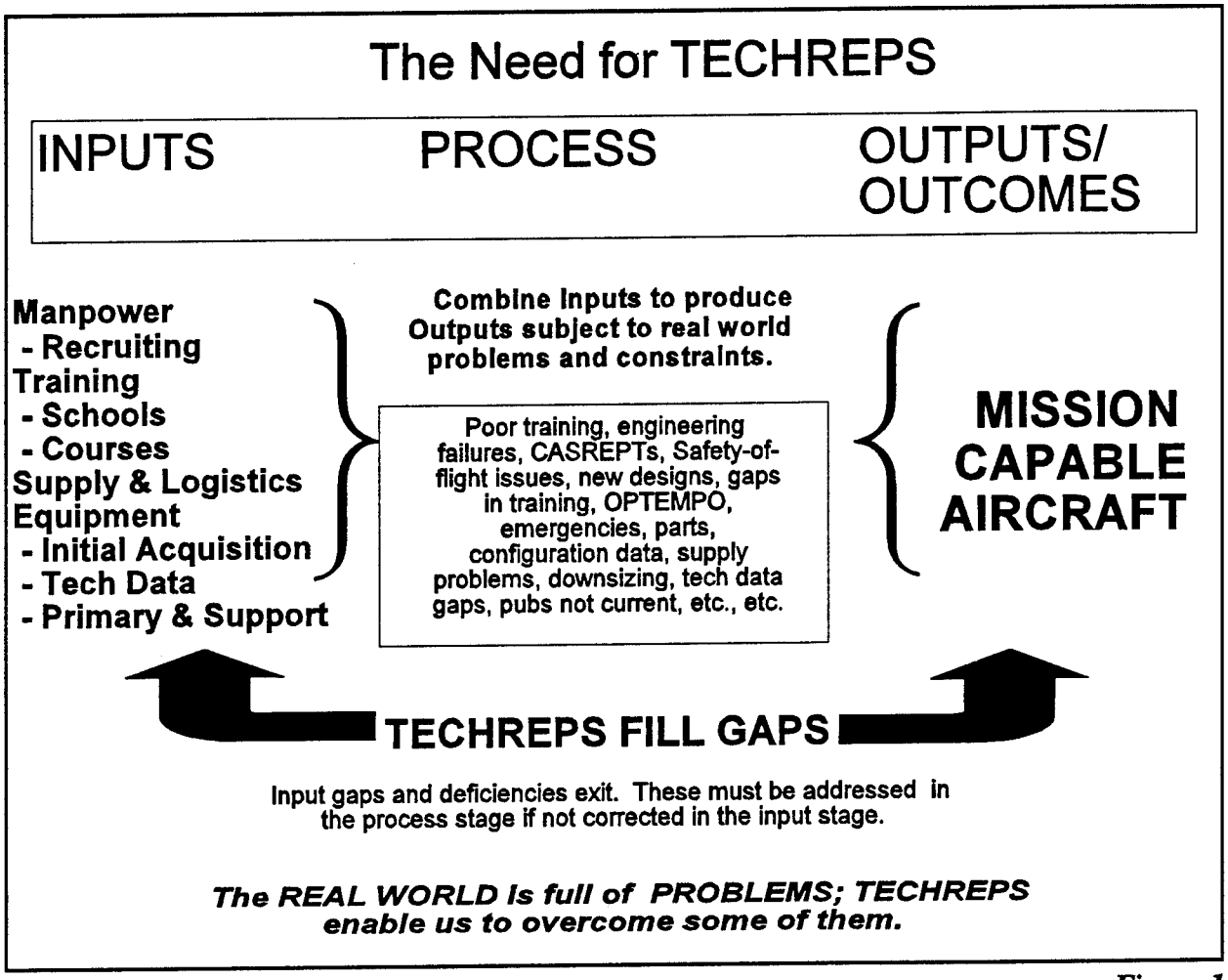


Figure 1

With the advent of radar and other electronic devices during World War II, the need for trained support technicians became apparent. In 1942, the Naval Bureau of Aeronautics established the Airborne Coordinating Group to provide a pool of highly trained technical specialists. These specialists were assigned to provide training on airborne electronic equipment to unit personnel. In 1948, this unit was renamed as the Naval Aviation Electronics Services Unit, and later to Naval Aviation Engineering Services Unit, NAESU, and tasked to provide field

engineering assistance and instruction. Although the primary purpose of Engineering and Technical Services is the provision of training, they perform a broad range of activities. The ETS activities include: training personnel, evaluating systems, equipment and publications, recommending improvements, identifying training needs, and providing technical assists to the operating forces. Further information on ETS activities is provided in later parts of this report.

NAESU provides these services through the use of DoD personnel, civilian and military, and through contracts with private companies. As of August 1994, ETS were managed through three Regional Offices and 40 detachments worldwide, with about 600 Navy Engineering and Technical Specialists (NETS) and 250 Contractor Engineering and Technical Specialists (CETS). The Federal Acquisition Regulation (FAR) includes Engineering and Technical Service as a subset of Part 37.2 - Advisory and Assistance Services. An additional 900 CETS provide services through Foreign Military Sales (FMS) and Contractor Maintenance Services (CMS). Contractor personnel who are engaged in CMS or are FMS funded are not considered ETS under the FAR, but are included in this paragraph since their contracts are part of the overall NAESU workload.

The overall number of Navy CETS, excluding FMS cases and CMS, has declined by 43% from 1266 contractor personnel in Fiscal Year (FY) 1987 to 718 contractor personnel in FY 93. The overall decline has been accompanied by a shift of tasks from CETS to NETS, since DoD personnel are generally less costly than contractors. NAESU estimates the average FY 93 cost of a CET at $105,000 and a NET at $56,000.

STUDY APPROACH

Through the efforts of Commander Van Sickle, we have secured the cooperation of Mr. Dick Speakman of the Air Force Air Combat Command, manager of Air Force Engineering and Technical Services (AFETS) and Mr. Bob Porter of the Army Materiel Command, manager of the Army Logistics Assistance Representatives (LARS). Additional cooperation and access to personnel and data was provided by Mr. Robert Turner and Mr. Mac McMahon and their staffs at the Fleet Technical Support Center, Atlantic and Pacific Fleets respectively, the MOTUs, and the Atlantic and Pacific Fleet Maintenance Officers. These organizations recognize the commonality of interest they have in the management of Engineering and Technical Services, or techreps. Examination of the management of ETS by these other organizations may provide points of comparison when viewing NAESU.

DESIGN

We have taken the approach that there are several key factors to be investigated in the management of ETS, including:

1. Why are techreps needed and by whom?
2. What do techreps do?
3. What support do techreps need?
4. Are their customers pleased with the quality of their services?
5. In the customers' view, how could techrep service quality be improved?

SAMPLE CHARACTERISTICS

The principal data was gathered by visits to a variety of installations, as shown in Table 1. We conducted interviews with customers, ETS managers, and techreps and asked techreps and customers to complete ETS activity questionnaires. The sample of installations is not random. Except for the Army, the sample of installations is broadly representative, particularly of those installations with fairly large numbers of techreps or where the presence of techreps is particularly critical to the organization.

NAVY AIR	U.S.ARMY	U.S.AIR FORCE
NAESU Headquarters	Fort Ord	Air Force Materiel Command Headquarters
Eastern Region Office	Fort Lewis	Air Combat Command
Western Region Office	Kaiserslautern	Nellis AFB
Whidbey Island NAS	Schofield Barracks	Travis AFB
Oceana NAS		Langley AFB
Norfolk NAS	NAVY FLEET	Misawa AFB
North Island NAS	Yokosuka Naval Base	Hickam AFB
Miramar NAS	Naples Naval Base	McChord AFB
Atsugi NAS	LOGCENPAC,Singapore	RAFB Mildenhall
USS Independence	FTSCLANT & PAC	RAFB Lakenheath
Sigonella	NAVSEA	Ramstein AFB
Barber's Pt MCAS	CINCLANT & PAC FLTs	Joint Logistics System Center
Kaneohe Bay MCAS	SUBDEVGRU 12	
Willow Grove NRAS	MOTUs 1, 3, 15	

Table 1

The interviews used a structured format of questions dealing with broad areas of concern. The interviewers made notes regarding the responses of customers, ETS managers and supervisors, and techreps. The question formats and the summarized responses are provided in the appendices of this report. The questionnaires used with techreps and customers are also provided in the appendices. The customers were asked to rate a series of 17 ETS activities according to their importance and the value added to the organization. The techreps were asked to rate the same 17 activities according to their importance and the amount of their time spent on each activity. All questions used a scale of *Very Great, Great, Some, Little, Very Little.* To quantify the questionnaires, responses were subsequently coded 5,4,3,2,1, respectively. The questionnaire also provided an opportunity to list additional techrep activities. Responses to the questionnaire were obtained from 58 customers, 32 of them NAESU, and 233 techreps, including 94 from NAESU. The overall distribution of the sample is shown in Appendix B.

RESULTS

It appears that it is a rare organization in which all of the required logistics elements exist consistently over time. Mismatches between the necessary elements are common throughout all the services. In addition, some types of equipment malfunctions require a depth of expertise beyond that of the normal. The techrep is the primary resource called on to compensate for mismatches in the other elements.

Organization representatives and techreps alike cite many instances in which some of the required elements do not match the situation. Operational requirements commonly take precedence over training and development activities. Modifications are made to equipment without full training and documentation being provided in advance of, or concurrently with, the modification. Senior personnel are not familiar with the equipment. The basic schools, advanced schools and the introduction of new equipment are not synchronized. Frequently equipment is not designed for ease of operation and maintenance or modification. The unit lacks a full complement of qualified personnel. Travel funds are not available to send personnel to advanced service or factory training. Built-in test equipment fails to provide appropriate information to personnel.

Techreps are called on to fill the gaps left by a performance failure in some other part of the system. As long as there are mismatches, there will be a need for techreps. (See Figure 1.)

TECHREP ACTIVITIES

Table 2 provides a list of the most common activities of techreps. This list was compiled from discussions with techreps and unit officials. While not all inclusive, it represents most of the activities of most techreps. This list provided the basis for a questionnaire for techreps to evaluate their activities. The questionnaire asks techreps to evaluate each activity in terms of its importance to their overall job performance and the relative amount of their time spent on each activity.

The specific validity of the questionnaire has not been measured, but its face validity is quite high. Techreps confirm that this is what they do. There are strong but not perfect

CUSTOMER AND ETS RANKING OF NAESU ETS ACTIVITIES

ETS ACTIVITIES	ETS IMPORT-ANCE	ETS TIME SPENT	CUSTOMER IMPORT-ANCE	CUSTOMER VALUE ADDED
	1	1	1	2
Provide OJT	4	5	4	4
Provide classroom training	5	6	5	11
Liaison/Coordination	10	7	13	13
Determine/report status of customer equipment	15	13	16	16
Advice on Personnel or Management	6	8	8	6
Update/verify technical publications or data	17	16	14	14
Design or build peculiar test equipment	12	15	12	12
ILS/TPF Reviews	13	17	15	15
Pre-design reviews	11	14	6	8
Investigate EIs as Tech Advisor	8	4	9	5
Actual hands-on maintenance	14	12	9	7
Supply assistance	7	9	11	10
Recommend modifications or improvements	15	10	17	17
Administration or paperwork	2	2	1	1
Off-site technical assistance visits				
Education and development of techrep's skills	9	11	7	9
Initiated by the organization	3	3	3	3
Self-initiated				

Table 2

correlations between the rating given for importance and that for time spent, ranging from .43 to .84 for the individual items. This indicates that "Importance" and "Time Spent" are different but related aspects of the activities. There are differences between the techreps' responses from the different organizations, which seem related to the difference in the missions/tasks which the organizations expect of techreps. Overall, this leads us to believe this list of activities and the resulting questionnaire to be useful in our determination of what techreps do.

Average responses were computed for each activity by category and used to develop correlation coefficients. There is a high correlation (r = .83) of importance responses of the 34 NAESU customers and the 94 NAESU techreps. There is also a large correlation (r = .66)

between the time ETS spend on an activity and the value added as rated by the customer. These indicate NAESU techreps understand quite well what is important and of value to NAESU customers. The sample sizes for techrep customers in the Army, Air Force and Fleet are not of sufficient size to make valid comparisons. The correlation matrix is provided in Appendix B. The average responses for each activity were converted to rank orders. Table 2 shows the rank order for NAESU techreps and customers. Appendix B contains additional tables of mean values and ranks for techreps and customers.

Table 3 provides a comparison of relative rankings of the activities in terms of time spent and importance, as seen by the techreps from the different services. The sample size for the Air

COMPARATIVE RANKINGS OF ETS ACTIVITIES

Service:

A - Army AF- Air Force N - NAESU F - Fleet

IMPORTANCE A	IMPORTANCE AF	IMPORTANCE N	IMPORTANCE F	Activity	TIME SPENT A	TIME SPENT AF	TIME SPENT N	TIME SPENT F
21	34	94	84	SAMPLE SIZE	21	34	94	84
				Activity				
3	1	1	2	On-the-Job Training	8	1	1	5
12	10	4	14	Classroom Training	14	11	5	14
2	2	5	6	Liaison	2	2	6	6
1	7	10	4	Equipment Status Reporting	1	7	7	3
14	17	15	13	Management Advice	13	15	13	12
8	6	6	8	Pubs	11	4	8	11
16	12	17	17	Build Test Equipment	16	13	16	16
15	8	12	15	ILS Review	15	14	15	15
17	15	13	15	Design Review	17	16	17	17
13	13	11	12	Engineering Incidents	12	9	14	13
10	5	8	3	Hands-on Maintenance	10	5	4	1
6	9	14	10	Supply Assistance	3	7	12	8
10	4	7	9	Modifications	9	5	9	10
10	16	15	11	Administration/Paperwork	7	12	10	4
5	11	2	1	Off-Site Technical Assistance	5	9	2	2
7	14	9	7	Organization-Initiated Education	6	16	11	9
4	3	3	5	Self-Initiated Education	4	3	3	7

Table 3

Force (34) and Army (21) urge caution in interpretation. The rank order of the activities among the services differ in a manner that relates to the differences in the techreps' tasking, as the examples below indicate. This provides strong evidence of the validity of the questionnaire.

Fleet techreps rank Hands-on Maintenance higher than the other groups in both time and importance. Their tasking is to provide maintenance when technicians assigned to the unit are unable to do so, although they attempt to use such situations to also provide OJT. Fleet techreps tend to deal with specific problems of ships one at a time, thus there is less opportunity for classroom training, thus the low ranking. Fleet techreps are also involved in a complete checkout of equipment and reporting of status for ships prior to deployment, leading them to place higher emphasis on this activity.

The Army techreps are called Logistics Assistance Representatives and deal more often with Supply problems. The Army LARS are tasked to provide status reports to their sponsoring commands, such as the Tank and Automotive Command or Missile Command, and to the units to which they are attached and thus give a higher rank to that activity. They also act as liaison between their assigned unit and the home command. Since they often deploy with their units, they have less likelihood of off-site tech assists. This is also true of the Air Force.

Classroom Training is an important NAESU activity, but less so for the other groups. At the time of the survey, Air force squadrons/wings had an attached training element making it less important for techreps.

The questionnaire provided an opportunity for respondents to add activities. Customers from all the services added 26 activities, with 14 of those from NAESU customers. Techreps from all services added 36 activities, including 11 by NAESU techreps. A list of 79 potential techrep activities (the 62 items added and the original 17), was used in an exercise with NAESU Detachment (Det) Officers in Charge (OICs) and Headquarters (HQ) personnel to develop activity groupings. Six groups of about six persons per group were asked to consolidate duplicates, remove non-relevant items, then sort the items into clusters and name each cluster. - The results indicate a general consensus of clusters of activities that can be called *Training, Liaison, Supply, Administration/paperwork, Tech Assists, and Advice.* Further research is needed to validate these major clusters, but they may form the basis for development of performance measures.

Some of the added items were not activities, e.g. continuity or resident expert, others were duplicative of the original 17 or those listed by other respondents. The following list of

ACTIVITIES ADDED BY CUSTOMERS

Maintenance direction/advice
Advice on safety related items/maintenance concerns
Advice on work-arounds to maintenance
Advice on trouble shooting accuracy
Trouble shooting beyond, or not covered by, tech manuals
Provide feedback to training community
Recommendations for Condition-Based maintenance

ACTIVITIES ADDED BY ETS

Coordination of Fitwing/NAESU training (IWSR, advanced training, etc)
Maintenance technique improvement
Providing technical guidance to other personnel
Identifying fleet problems/systems
Liaison with other groups on EW
Working military operations

ETS INTERVIEWS

This section provides brief summaries of the interview responses by NAESU techreps. Detailed responses to the questions asked in the interviews are provided in Appendix A. The questions did not limit the ETS to any specific categories of response, therefore responses are quite wide-ranging. The responses to each question have been sorted into general categories for ease of summarization.

A. What would help you to be more effective on the job?

1. The principal customer-related responses to this question dealt with promoting better customer understanding of what ETS will and can do and a better ETS understanding of customer needs. There also is a strong indication that the customers do not consistently treat ETS with the courtesy and respect due a valued member of the Naval aviation team. Further, there was some indication that customers could provide better on-site support to the ETS. Examples included: ensuring appropriate personnel are present during the techrep visit and minimizing interruption of techrep or personnel assigned.

2. NAESU-related responses indicate a feeling that headquarters (HQ) is not sufficiently oriented to the needs of ETS in the field.

3. A number of responses can be viewed as relating to NAESU-provided support resources. The most common needs seem to be computer support, access to information, specific support contracts with the manufacturers, and support by contact personnel at CFAs and depots.

4. The availability of training, such as factory training, that is more in depth than that provided to Navy techs is a very important issue. Naval Air Maintenance Training Activity (NAMTRA) training was cited as inappropriate for ETs, as it does not provide enough information and puts the techrep in the difficult position of later having to advise a person who was in the same NAMTRA class.

5. There were also a number of comments that relate to the particular situation, such as overseas base housing, and competition between CETS and ETS.

B. What are the principal reasons why the organization requires your services?

1. Technology cuts both ways here, older equipment is hard to maintain and not updated in the publications. New equipment is quite complex and may well be software driven, which is difficult for military techs to understand and troubleshoot.

2. The Navy personnel system creates a lot of turbulence which defeats efforts to achieve and maintain military technicians' capability. Navy promotion criteria require techs to have experience at "O" and "I" levels and on multiple platforms. Since the maintenance work/expertise is different in each situation, techs do not develop acceptable levels of competence. Sea-shore rotation typically involves assignment of techs out of their area of expertise, and even if they rotate back to the same platform or equipment they have lost the expertise by being out of touch with the systems for an extended period. The promotion system requires and rewards movement out of the technical arena and into supervisory and administrative areas. The recent early-out incentives have decimated the ranks of qualified E4-E7 that are critical to maintaining system-wide technical expertise level.

3. The lack of adequate training for incoming techs is also a major cause of the need for ETS. Cutbacks in training, both for neophytes and for more senior techs, place the responsibility for training on the ETS.

4. The Navy's need for expertise that cannot be obtained within the military also creates a need for ETS. The lack of experience, lack of depth of expertise, and the need for continuity and a resident expert all contribute to this view.

C: To what extent do you feel a part of a team? Who are the principal members of the team?

Most of the ETS felt they were members of a team, but the identity of the other members was highly variable, depending on the particular location. They suggested that efforts be made to develop more team feeling through locating the ETS in common office spaces, more sharing of information, etc. There was little indication that they felt that NAESU HQ was a part of the team.

D: What measures indicate the level of performance you are attaining on the job?

1. The attitude of the military techs and others they work with. This encompasses feedback, the apparent opinion of the low level techs, rapport, instant recognition and credibility of the NAESU symbol, and a feeling that the customer is satisfied.

2. Specific comments and thanks received, including tech assist reports, letters of appreciation, and customer comment sheets.

3. The fact that the sailors and marines seek out the tech reps and request repeat visits.

4. The apparent increase in the military techs' proficiency. How they are performing, their ability to solve problems after training, and not receiving calls when a unit is on deployment, are examples of this.

5. Some aspects of time enter here. Such as measuring how long it takes to solve a problem, the number of hours spent on various tasks, and the spectrum of daily activities.

E: How do your activities add value to your organization's output of goods and services?

1. Techreps cited various outcomes, such as an increase in the number of Full Mission Capable (FMC) aircraft, a decrease in partially mission capable aircraft, better trained sailors, repair equipment and test benches that work and stay up, regularly providing input for safety of flight decision, and readiness increases are indicative of value added.

2. Resource savings were often cited, including reducing depot repair requirements, not having to send military techs away to school, and the ability to do contractor work at less cost. Cost savings can also result from development of new test and maintenance procedures, as well as obtaining usable equipment from the Defense Reuse Organization.

3. Value was also attributed to reassuring officers by providing a second qualified opinion that legitimatize the military techs, making the work easier, avoiding down-time due to knowledge of recurrent problems from other units, and giving NAESU reasons to get budget funds.

F: Do you think techreps should be certified? How might this be done?

Opinion here is split for and against certification, but is generally opposed. They felt it was possible in certain areas, as it is done by FCC for licensing or FAA airframes or powerplants certificates. The certification seems to revolve around minimum standards and requirements, including ability to write clearly, but there is doubt that the level of expertise needed for a tech rep could be certified. By and large, they felt no need to expand this beyond the areas that currently require certification.

G: If you were redesigning NAESU, what things would you change? This was also phrased as: What would make NAESU work better?

1. A number of responses dealt with the relations with NAESU HQ, including the need for more training resources, more HRO support, and more responsive program managers. The tech reps in the field sometimes feel that they are too low in HQ priority, in the sense that they are not consulted on actions, that actions are not well thought out (e.g., the uniform program), and that HQ acts as though information or action requests going from them are a different priority than those coming to them.

2. Comments regarding the Regional Offices, often indicated them as being unnecessary, lacking authority, and having been outdated by present communication methods.

3. With regard to the Dets, there is a high level of dissatisfaction with the military OICs. The OIC is often unfamiliar with NAESU, does not understand the civilian world, and does not provide needed continuity. ETS recognize the need for military liaison and interface, but feel the need for continuity is not being met. Some suggest that each Det have a civilian technical director as a strong civilian deputy to the OIC. Present part-time supervisors in the Dets find they cannot do the work in the 25% of time allowed, and must spend considerable extra time to accomplish the supervisory duties.

4. NAESU techreps currently have a grade ceiling as GS-11 unless they have supervisory duties. They would like to be able to get promotions beyond GS-11 as their capability increases. Most NAESU techreps are in the 1670 job class. A number of other classifications are used for techreps by the other services.

CUSTOMER VIEWS

The following summary of customer views results from interviews with a small number of customers. The questions asked of the customers parallel, but do not duplicate those asked of ETS. Ultimately, customers view techreps as another resource to help get aircraft and equipment FMC in the shortest time possible. The bottom line-- get planes flying and keep them flying.

A. What would make for better ETS performance?

This question parallels Question A above posed to the techreps, but yields a different perspective. ETS-related responses were to provide more ETS and provide ETS with up-to-date training on current test bench modifications. Information provided to the units on the ETS tasking and provision of an ETS services directory would help units know how to make better use of ETS.

B. What do ETS provide the customer?

This question parallels Question B above posed to the techreps. The customer views reflect similar responses to those of the ETS. ETS provide needed classroom and OJT training in trouble-shooting and special areas such as test cell qualification. The constant turnover of military techs, due to short term assignments and rotation to other duties, along with the lack of funding for schools or the lack of an appropriate school at all creates a constant need for ETS to provide training, "for the 60% who don't understand." Further, the experience of ETS provides the customer with expertise to solve equipment problems with vague symptoms, special problems with new equipment, trouble shooting training, as well as having a ready source for a super-tech for repair.

Customers placed more emphasis than ETS on their availability as an information resource. They provide supply help, e.g which parts to stock or special tools to have available, contacts at other Dets or NADEPS to get information. They noted that CETS can provide a link to the Interim Contract Support Systems (ICSS) warehouse.

C. What would have to change to make it possible to eliminate ETS?

This question also parallels Question B, as both relate to why ETS are needed. Customers focused on the personnel and personnel system problems which included: the lack of closed loop detailing, personnel shortages, high turnover rates that result in as little as "20% of people [on board] with experience on this aircraft," shore rotations where only 1/5 of the specialty billets are ashore, manpower caps, the performance evaluation system, and the way senior techs must be used, that is, in administrative positions rather than as technicians. The system also eliminates alternatives. For example, if you are assigned an incompetent tech and try to get rid of him/her you only gap the billet. A related comment is the need to eliminate the personnel shortage, provide full manning, and not allow undermanning, sometimes as low as 50-65%.

The training problems expressed by the ETS are also echoed by the customers in the need to bring up the current low experience level and buy training in depth. The present school, NAMTRA, and FRAMP training do not deal with the practical things the techs need and lack a strong connection between the schools and the actual equipment.

Other comments suggested establishing an information network of Navy units, buying technical data in depth at the beginning of weapon procurement, slowing the rate of technology introduction, and allowing units to contact directly the test bench manufacturer rather than going through the chain of command to the CFA.

D. What measures of the quality of ETS performance might be used?

This question parallels ETS question D above. The customers suggested a report card, evaluating ETS timeliness and responsiveness to requests, and assessing their approachability and professional appearance.

DISCUSSION AND RECOMMENDATIONS

ITEM 1: THE NEED FOR ETS

DoD Instruction 5000.2 specifies the ten elements of Integrated Logistics Systems (ILS) that "must be addressed for both hardware and software in both peacetime and wartime conditions." The ten elements are:

1. Maintenance Planning
2. Manpower and Personnel
3. Supply Support
4. Support Equipment
5. Technical Data
6. Training and Training Support
7. Computer Resources Support
8. Facilities
9. Packaging, Handling, Storage and Transportation
10. Design Interface

The intent of the ILS is to assure that the various elements work together to provide a fully supported operational weapon system. Engineering and Technical Services are not a part of the ILS. Colon (1994) has argued that they should be added as an eleventh ILS element.

Our data and the list of 30 ETS activities, see above, indicate that the ILS does not provide the military with the ability to operate and maintain present equipment without the use of ETS. We have documented the failures of training, the assignment of inexperienced personnel, the lack of technical data, the introduction of modifications or new equipment without adequate support, the need to design special test equipment, the lack of timely parts support, the inadequacies of test procedures, the failure of the personnel rotation system to assure the currency of skills of assigned personnel, the diversion of senior personnel from maintenance and the development of junior personnel into management and paperwork, the lack of a maintenance management information system, the pace of technological change, and the diversion of maintenance personnel to ancillary duties. To change all the things that must change in order to eliminate the need for ETS is clearly not feasible in the present environment.

The situation has shown little change since 1984 when Boynton documented some of the

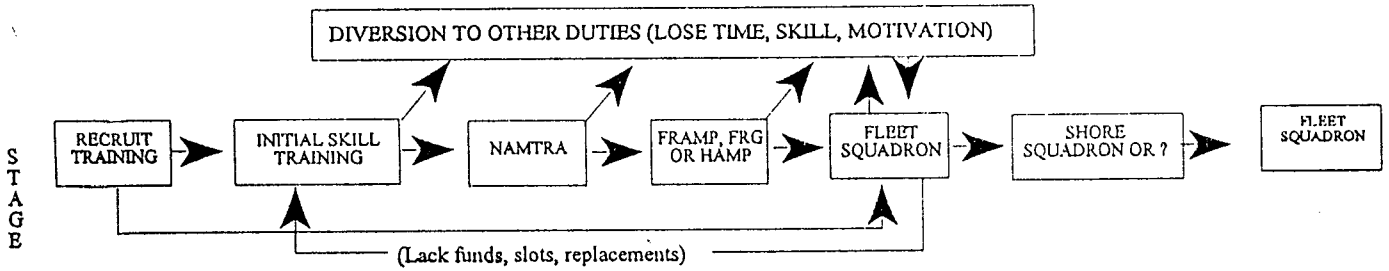
personnel system deficiencies as shown in Figure 2. The recent cutbacks in the force size have further aggravated the situation. These cutbacks have resulted in early retirement of senior techs, reduction in first term re-enlistment rates, the assignment of E1-3s to jobs for which they are not trained or qualified, and continual distraction from technical to non-technical matters.

The situation and resultant problems are not just a criticism of the Navy air community. It is a broad description of systemic failure. Our research indicates that the Army, Air Force, and surface Navy also utilize ETS, LARS and techreps to enable the military to carry out its functions. Although the services vary somewhat in the list of duties and the emphasis placed on certain activities, they all want, need and use techreps. This is also indicated by a recent survey of NAESU customers.

In mid-1994, NAESU conducted a Customer Service Improvement Survey of customers as part of its Total Quality Leadership program. An IIT Research Institute report provided an analysis of the 1175 questionnaires returned in the survey. One of the sections of the questionnaire asked respondents to rank order ten technical services in order of priority to the customer. The resulting rank order is shown below.

System troubleshooting
Technical advice
On-the-job training
Formal training
System repair
Liaison
Logistics
Certification
Verification
Technical writing

The strong emphasis placed on trouble-shooting, advice, and training indicate the need for ETS support services felt by Navy air customer community. The survey also indicated that the customers feel well served by the techreps. They were asked to respond on a five point scale, Disagree Strongly to Agree Strongly, to statements about these services. Combining the Agree and Agree Strongly categories yields an approval rating for the various statements as



STAGE	RECRUIT TRAINING	INITIAL SKILL TRAINING	NAMTRA	FRAMP, FRG OR HAMP	FLEET SQUADRON	SHORE SQUADRON OR ?	FLEET SQUADRON
PURPOSE	Military training. Socialization.	Concepts. Basics skills.	Intro to aircraft & equipment.	Hands-on operational training.	First Tour Job use. OJT. Raise skill level.	Job use. Respite from sea duty. Raise skill level.	Senior PO Job use. Trainer. Admin. Supervisor.
PROBLEMS	Quality level?	Poor to weak: Skill level too low even in basics. Unpredictable quality. No systems understanding. Behind the times. Inappropriate for "O" level?	Good: Poor/old AC & equipment. Variable training quality. No hands-on. Inappropriate for "O' level. Too much time.	OK to Good: AC & equipment. not available or current. Over emphasis on flying. Standards too low. Inappropriate for "I" level. Need to balance OJT and CR.	Lack time to train (SQDRN busy flying). Lack: *Mgmt concern *Pubs *Equipment *Parts *Tools *Skills *Experience Sr POs not available as trainers/techs. TDY/TAD.	Different job, so lose skill. Change AC.	Diverted to admin. Change AC. Skill outdated. No time to train. Don't know equipment. No refresher or cross training. Excess paperwork.

SCHEMATIC OF PERSONNEL FLOWS

Figure 2

shown below.

90.5% Quality of ETS services is adequate.
90.1% ETS services are provided in a professional and timely manner.
89.6% ETS services received are consistent with ETS services requested.
88.9% ETS services received within the last year were satisfactory.
86.8% Past ETS training and services received met command needs.
85.7% Currently available ETS services are adequate for command needs.

The questionnaire also included a series of statements, with responses limited to Yes or No, about the services rendered by ETS. Only 1% answered No to the statement, "ETS services received within the past year were satisfactory."

We have not made a systematic investigation of the procedures of other nations, but anecdotal evidence suggests that elimination of techreps would require a major philosophical shift by the U.S. military services. In Norway, for example, the military maintenance personnel are trained in a complete 4 year technical school program and are dedicated to maintenance. A similar, but less extensive program is used in New Zealand. Additional international comparisons may show that if the U.S. military wishes to get rid of techreps they must rethink and redesign the training, assignment and support processes. In contrast, promotion to higher ranks in the Navy air community requires technical military personnel to have experience at "O" and "I" levels and with different aircraft and equipment. This is a guarantee that senior personnel will always lack depth of experience and must rely on ETS.

RECOMMENDATION 1-A: Given the expected continuity of the present systems, NAVAIR must take a strong stand that ETS are a desirable and necessary part of the fleet's ability to operate and maintain its equipment. Further NAVAIR must work with other Navy elements to assure that techreps are treated in a manner consistent with their value and function. This includes assignment, berthing when aboard ship, travel accommodations, among others.

Minimizing the need for ETS requires:

1. The Navy recognizing that maintenance is a specialty. Just as it needs supply officers

and EDOs, it also needs maintenance personnel. This requires a rethinking of the idea that everyone should be a generalist. Given the current and projected level of military technology, one cannot be a generalist and also attain a sufficient depth of maintenance expertise.

2. Requiring project/program managers to provide for complete technical data, preferably in electronic format, in the systems acquisition process. Reducing the amount of technical data, spares, or test/support equipment should not be viewed as acceptable tradeoffs. The simple fact is that providing the necessary support actually increases the operational capability more than providing additional quantities of the system.

3. Recognizing that minimizing the cost of training by reducing course length and combining specialties into joint courses is a false economy. This involves changing the mindset that views training as a cost rather than an investment.

4. Fixing the present evaluation system that gives priority to meeting the numbers in terms of flight hours, etc, to the detriment of building organization competence.

5. Charging the full cost of tech assists to the using organization, to emphasize the value of ETS in training. This will make obvious the desirability of training before deployment. It will also help organizations see the value of completing the tech assist quickly and allowing the ETS to return home, since there would be a budgetary cost to keep them aboard ship for 30 days or until it is convenient to get them home.

6. Making a concerted effort to develop computer-based systems and forms to relieve the paperwork burden on senior techs. This should include a value-added analysis of every form and report.

7. Taking the TQL approach seriously by pushing decisions to lower levels, expanding training to build competence, attacking the systemic nature of the problem, and helping managers/officers to understand that their role is to facilitate and provide resources to the people who add value to the organization's output.

RECOMMENDATION 1-B: The military services need to recognize their opportunity and launch full scale attacks on the organizational systemic problems outlined above.

ITEM 2: **NEED FOR NAESU**

It is clear that there is a need for techreps. The larger question is how should techrep programs be managed? Presently NAESU provides a focal point for all aspects of engineering and technical services. NAESU:

- Advises and negotiates with squadrons, wings, and other organizations regarding their need for ETS.
- Develops plans for ETS/CETS based on expected changes in equipment or location.
- Recruits, screens, hires and deploys ETS.
- Provides for the personnel, budget and other administrative functions for ETS.
- Develops contract specifications for CETS, reviews bids, advises the contracting officer, and administers the contracts.
- Provides program managers to coordinate requirements.
- Represents users to NAVAIR.
- Provides a composite reporting function.

In addition, NAESU also performs the contract functions for Foreign Military Sales (FMS) buyers of Contract Engineering and Technical Services (CETS) and Contract Maintenance Services (CMS).

Since most of the ETS are NAVAIR funded, they benefit by having only one entity to deal with for these functions. This research has not attempted to compare NAESU with alternative providers of these functions, such as the NADEPs. An earlier analysis by Colot and Ricci (1993) indicated that retaining a centralized organization, such as NAESU, is more efficient and economical than other alternatives. On the fleet side, the Navy has recently combined the technical fleet support offices (formerly Nav Sea Technical Centers) and the Mobile Technical Units from various locations into two centralized units called the Fleet Technical Support Centers for the Atlantic and Pacific areas. These centers are now under the administrative cognizance of their respective fleet commanders and provide direct fleet support. In the Air Force, the Air Combat Command, Air Forces Pacific, U.S. Air Forces Europe, and the Communications Command techreps are centrally administered by ACC. It appears advantageous to have a centralized unit to handle the administrative details of ETS.

RECOMMENDATION 2-A: NAESU headquarters maintain a central authority for

funding, administering, and contracting as presently exists.

Regional Offices: One of the principal areas of ETS concerns is the role of the regional offices. Opinions differ with some calling for the abolition of the regions and other asking for more authority for the regions to make decisions without having to defer to headquaters. The authority and responsibility of the regions needs to be made very clear and that clarification must be communicated to the field offices. If a requested action is not within the purview of the regional office then requests would be directed to HQ, with an information copy sent to the region.

RECOMMENDATION 2-B: NAESU should ensure the role of the regional office is sufficiently clear and has been communicated to all employees. Communications to headquarters "via" regional offices should be minimized, that is, NAESU should allow and encourage Dets direct headquarters access when a decision is beyond the scope of the Regional Office.

Det OIC: The role of the OIC is also a matter of much concern. In the view of the techreps, a military officer assigned as a Det OIC may sometimes be more concerned with his/her next assignment or promotion than with providing ETS with needed support. Whether this is true is less important than the perception, since we act on what we perceive to be true. The standard military rotation means that the OIC and AOIC are replaced every two to three years. Since many of the officers have no previous experience in NAESU and little knowledge of ETS, this causes significant problems in the Det while they train the new boss. ETS recognize the need for a military person to interface with unit officers. Wing and squadron officers often do not like to have civilians attending briefings and meetings. A military OIC is much more acceptable as being "one of us" when attending such meetings. The OIC then acts as a conduit to provide information about concerns and plans to the civilian ETS. A further difficulty results from the fact that most OICs are Warrant Officers or junior Limited Duty Officers (usually 0-3 or below) and have little clout with squadron or wing COs/MOs.

The second source of difficulty with the military OIC is that he/she seldom understands the

civilian work force. Civilians work under different laws, rules and regulations. They have different problems and procedures for resolution than the military officer is familiar with. Alternative approaches include:

1. Making Dets all civilian organizations. This alleviates the turbulence created by the constant turnover at the top of the Det, but does not provide for a military liaison with the customer.

2. Leaving the OIC as military and add a civilian Technical Director or Deputy. This provides the military liaison and allows the civilian to direct the ETS and provide the needed continuity in the Det. This is similar to current practice at HQ and the Regional Offices and has a good record as a workable structure which minimizes difficulties.

3. Eliminate the OIC and give the Det a dual reporting role. The Det is assigned to the Squadron or Wing Maintenance Officer or Commanding Officer, eliminating the need for a Det liaison. The ETS, under a civilian supervisor, report to NAESU HQ through a civilian supervisor for technical questions and civilian personnel matters. This is the procedure currently in use by some Air Force commands.

RECOMMENDATION 2-C: Eliminate the OIC and give the Det a dual reporting role. Continue with centralized funding and program management, but decentralize control and use to the customer. This has the additional advantage of making the ETS a part of the using organization. This is advantageous in the event of deployment of the ETS since they would be deployed as an integral part of the unit. NAESU ETS and Army LARS experience difficulty when deploying, since they are not part of the unit plans. This obviates that problem.

ETS Training and Technical Data: The practice of sending ETS to NAMTRAs and other Navy schools creates a number of problems. It makes it difficult for the ETS to gain credibility as an expert when the military tech he is to teach or advise attended the same school. The focus of NAMTRA is generally not what the ETS needs to be able to do his job. Some changes in this area may already be underway, with the formation of the new training department at HQ.

area may already be underway, with the formation of the new training department at HQ.

ETS also require sufficient technical data on aircraft, equipment and components to ensure their currency, accuracy and competency in training and repair. ETS cited that frequently, technical data is not procured initially, as a cost saving measure. This is false economy. If the Navy desires to have organic repair capability, then the Navy's techs need appropriate technical data.

RECOMMENDATION 2-D: Provide factory or other training specifically designed for ETS whenever needed. Budget and plan for factory training coincident with new design aircraft and equipment. Work with NAVAIR program offices to ensure ETS factory training is considered early enough in a program to economically obtain such training. Provide input to NAVAIR to ensure appropriate technical data is procured early.

Certification of ETS: Most of the ETS we talked to seemed surprised that the subject of certification was raised. There is little support for the idea among the ETS. They see no reason to develop a certification program and doubt that current certification processes, such as those of the FCC and FAA, would be adequate. In general, certification or licensing is used in situations in which the user or customer of the service is not in a position to judge the competence of the professional. Thus we do not allow a person to practice as a physician without certification of competence. The exception is the laws of some states which provide for licensing of beauticians or plumbers. These laws are typically aimed at restricting competition. In the case of ETS, NAESU and the customer can determine the competence so certification would serve no purpose. The responsibility for determining competence lies within the purview of NAESU as the hiring organization. NAESU must also encourage customers to provide on-going feedback of their perception of ETS competence.

RECOMMENDATION 2-E: Do not institute a certification process.

Personal Concerns: ETS raised a number of personal issues, especially those assigned to overseas Dets, such as housing, shipboard accommodations, access to a DSN capable telephone, handling of bills, etc while on deployment, or resolving an issue with HRO. From the standpoint of ETS, HQ is too much oriented toward higher commands, the military OIC is often not helpful, and no one intervenes for the ETS. While HQ must clearly be responsive to NAVAIR it must recognize that ETS are also their customers.

RECOMMENDATION 2-F: HQ must recognize ETS as primary customers and provide for rapid response to their requests. Requests which cannot be responded to within 48 hours should be referred to an ombudsman whose job it is to intervene anywhere in the structure to satisfy the needs of ETS. Note that if the Dets are assigned as part of a squadron or wing, some of the existing problems will be more easily resolved through those units.

Job Classification: There is a disparity between the grade level ceiling for the Army, GS-12, and the other services, GS-11. All services have additional level for supervisory duties. The disparity creates dissatisfaction among the techreps. They also point out that the job series does not accurately reflect the job they actually do. Most NAESU techreps are in the 1670 job class. In the other services we found a number of 85x and 86x occupations as well as 2003, 1780, and 346.

RECOMMENDATION 2-G: NAESU in conjunction with the other ETS providers should pursue the establishment of a techrep job classification. The classification should provide the opportunity to advance beyond GS-11 as the techrep develops higher levels of capability.

ITEM 3: **MEASUREMENT ISSUES**

One of the major aims of the project was to enroll customers and ETS in the task of finding measures of performance for ETS and their organizations. The need to justify ETS on the basis of performance measures is rapidly becoming mandatory, due to budget cuts and focus on performance as a public sector goal. Additionally, the Government Performance Review Act of 1993 mandates government activities develop and use performance measures and implement benchmarking as standard management practices. The development of NAESU performance measures would enable NAESU to better measure success and comply with law.

Performance measures of techrep organizations as a whole encompass a wide variety of areas not typically thought of as techrep activities, but adding to the overall value to the Department of Defense. For example, one measure examined was the Army Logistics Assistance Program which has reported a cost avoidance of nearly $85 million in 1994. The Army techreps regularly visit the local Defense Reutilization and Marketing Offices and reclaim items turned in for disposal. The lack of experience of military technicians leads them to dispose of items no longer of use to them. The techreps, because of their experience and their networking with others, are aware that the equipment can be used by other organizations with potentially significant savings to the military. Base closures, unit relocations, and changes in mission equipment result in turbulence that increase the likelihood of significant costs unless the techreps are present.

As another example, techreps from all the services cited instances in which they were able to make significant savings by repairing an item locally that would otherwise have required depot repair. Again, this situation resulted from the low experience level of the technicians. The service approach emphasizes module replacement incurring depot costs. If the module can be repaired locally by techreps, the cost of obtaining a replacement item is avoided. Depot and contract repair costs are often over 50 thousand dollars for some units.

A techrep may initiate a proposal to change a maintenance procedure that results in very large savings. These examples are not unique, but are fairly common throughout the services. Even though their primary charge is training, these other activities contribute greatly to their value

to the services. Performance measures developed for techrep organizations must take cognizance of these seemingly peripheral activities. However, performance measures must include much more than just cost avoidance. This approach could create inappropriate incentives. Techreps might begin to focus on reclaiming items for disposal rather than training if they perceived they were measured on that dimension alone.

The NAESU Customer Service Improvement survey was an initial attempt to measure some of the important areas of service provided and quality level achieved. The perceived quality is quite high, with 99% of a broad spectrum of customers agreeing with the statement that "ETS services received within the last year were satisfactory." The customer responses to some questions that differentiated between CETS and NETS showed some differences that are pertinent for the development of future surveys or measures. The officers indicated "complete confidence" in the ability of CETS (96%) more than NETS (86%). The work center technicians/mechanics indicated that confidence in CETS (91%) and NETS (95%). The technicians were also more likely to say that CETS (22%) rather than NETS (14%) were not providing the required formal training. In like manner, the higher organization levels were more likely to indicate that their CETS provided the necessary OJT training, while the lower levels were more approving of the NETS doing the required OJT. These responses seems to reinforce the view of some NETS that the CETS spend their time talking to the officers and chiefs rather than in the work areas assisting the technicians. This can create considerable friction in work centers where both CETS and NETS are assigned. It also indicates that considerable care be taken in the development of measures to avoid contamination of responses. This is particularly true since NETS are directly responsible to NAESU, and CETS are responsible to the hiring contractor.

Development of performance measures has proved to be a significant challenge to both practitioners and academics. We discovered no particular measurement methods in use by either NAESU detachments or other organizations providing similar services that proved especially useful. Work on this issue is ongoing. The use of the list of techrep activities resulting from this study may form the basis for clustering activities in a manner that permits the development of proxy measures for techrep performance. The recent establishment at NAESU of a task-hour

reporting system may also provide useful data concerning what techreps actually do on a continuing basis.

RECOMMENDATION 3: Continue work on measurement issues. Under the Government and Performance Review Act, organizational budgets will be tied to quantified measures and benchmark. Although difficult, development of sound, comprehensive measures helps management assess organizational progress over time and target areas needing attention.

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APPENDIX A
ETS AND CUSTOMER INTERVIEW RESPONSES

This appendix contains listings of the comments received during the group interviews. Seperate interviews were held with Engineering Technical Representatives (ETS) and with customers. The questions asked reflect both the concerns of the researchers and those of NAESU.

Since the comments are from a number of different locations, there are many redundant comments. These indicate the commonality of feelings across the several locations. We have reproduced the essence of the comments from our notes, so they are considerably shorter than the actual comments.

The first section of this Appendix provides the responses of the ETS, questions A-G. The second section gives the responses of the Customers to a different, but related, set of questions, 1-4. The responses are tabulated under the specific question for ease of reference. Due to the large number of responses, they have been categorized to assist the reader, however, no set of categories was presented to the respondents.

ETS INTERVIEWS

QUESTION A. Please indicate the top 3-5 things which would help you to be more effective on the job.

CUSTOMER RELATED

- Improve travel accommodations
- Request tech reps during work ups
- Ride boat for 30 days during tech assists
- Get more involved in conferences when new systems are coming aboard
- Getting off ships when their work is done
- Berthing problems on the ships
- Tech reps keep getting cancelled
- Ship board berthing needs to be improved
- Enforce berthing requirements
- Feedback, now only occasional LOA, but get applause after class.
- Tell customer what job is ... tell them: Job is Training and that a Tech Assist is not maintenance - Credibility means everything
- Standard? greater knowledge of customer requirements
- Equipment were Available for Maintenance (AFM)
- Accessibility to personnel
- "Might needs" is the wrong reason to go "O" level
- Underway - ETS are going as "baby sitter"
- Customer put higher priority on training
- Why go to sea? To affect a specific problem
- Squadron pays
- Good relationship between DET and Wing
- More feedback from customers
- Customer understood ETS job
- Knowledge of customer requirements
- Training done on a real aircraft, e.g., F-14 only at Oceana
- Contractor should not be doing maintenance
- Establish a standard of conduct by Fleet, NETS often get treated like a scumbag. Customer officers show NETS no respect. CETS act more political with the officers, NETS focus on lower echelon workers

NAESU RELATED

- Time sheet - instructions don't match sample
- NAESU should be located at Pax River so tech reps could stay current on new systems and provide training (and comments) on changes
- Tech reps need to be involved in systems training

- Educate people: NAESU supports all air activities, ships and stations
- NAESU does compass rose work, but one station didn't know that and contracted out for the work
- Promotional opportunities are poor
- "I get what I ask for ..." seems to be management's attitude at high levels
- NAESU will pay for tech, not non-tech training
- Position description too general
- Clearer understanding of what NAESU expects of us, clarify goals
- Way to handle pay or administration problems 10 time zones away
- Information from HQ on existing contracts
- Broaden scope of job (EWE); i.e., maintenance & operation
- Goodies - tie tacks, etc.
- Clout of OIC - higher rank would be better
- Build relationships with Squadron personnel
- ETS should be assigned by Squadron to: Better know A/C type; and the people
- Added as action addressees on messages about conferences, etc.

SUPPORT RESOURCES

- DET workload up as fleet training down
- Increase manpower and make schooling available
- Trade off: Fleet is losing Engineering Service/TA
- More computer resources both for home and office
- Support of personnel and equipment is a problem
- Substituting tech rep training for "A" and "C" level schools
- No troubleshooting - only get it running
- 2 Factors: (a) poor prior planning - small $
  (b) equip avail - resource constraint
  Results: hard to train
- Better material support from customer
- Parties: (1) AIMD
  (2) EMERALD (a list of required support Engineering)
- Support bought from factory for ETS to enable contact with design engineers & supply people. For example, let a contract with McDonnel Douglas and Electro-Optics
- Need more support equip to do job in more timely fashion
- More attendance at conferences
- Pubs and training log prior to fleet introduction
- Contacts help
- Contract with manufacturer to allow ETS to contact between tech
- QII - Quality Improvement Initiative → too general not A/C specific
- CASS (Cons. Auto. Supp. Syst)
- Need to be on front end of new systems coming on line
- Squadron techs should have, at a minimum, "A" school in basic electronics

- Engineering support out of North Island
- Network more with other DETs
- Attend or get info from ILS team meetings or conferences
- Geographic location away from Squadron
- Informed in advance of conferences, publication reviews, etc you can schedule attendance. Funding available for attendance
- No "A" or "C" schools for many Airmen
- Info does not flow to ETS at small and overseas DETs; i.e., upcoming problems, problems others ran into, so we don't need to reinvent wheel. Can have a NAESU contact at each Cognizant Field Activity (maybe an engineer). Get summary of conferences from attendee

TRAINING

- Training budget for providing training, classrooms, pencils, books, facilities
- Training for ourselves (collateral duties)
- More schooling, particularly factory schools
- Training we receive is important; needs to be improved
- Tech rep training schools should be different than the schools sailors attend
- Training
- Should never go to NAMTRADET training. Must get better quality training. Have to advise and assist techs that sat in same class with you
- Factory training, not regular low level Navy training.
- More source (factory) training - instead of NAMTRA
- NAMTRADET doesn't provide necessary training
- Systems on line before NAESU ETS got training
- Need ETS training so ETS can provide training to Fleet
- Funds for training (factory tech support)
- Factory school needed
- Update training available on time
- More factory training available
- Interpersonal/communication skills
- Part time to get degree (AS or BS) and paid by NAESU

MISCELLANEOUS

- Factory Reps - fix without doing training
- Put CETS and ETS in same office, would reduce competition.
- "O" vs "I" level split
- Integrated Weapons System Review (IWSR) key ingredient to success
- Migration away from CETS to NETS: How do we convey knowledge CETS provided?
- Experience and troubleshooting: tell them what they don't know
- Improve opportunities (reduce CETS)
- How to pay bills, etc., when you are on a ship for 6 months
- Base housing needed for GS-11 at Atsugi. Housing should be arranged with DSN phone

- Competition with factory rep
- No household appliances for unaccompanied persons
- Establish some ground rules for NAESU ETS vs CETS
- Competition between CETS and ETS

QUESTION B: What are the principal reasons that the organization requires your services?

EQUIPMENT RELATED

- Technological change - computer program drives results not hardware
- Technology complex
- Old equip hard to maintain, not updated in pubs

PERSONNEL SYSTEM

- Downsizing is affecting the operating forces. E-6's are retiring, E-4's are being turned down for reenlistment. E-5's have to carry brunt of the maintenance effort. E-1/2's being brought in to fill the holes. No one, except NAESU, is available to perform training
- Talented techs leaving due to draw down - unplanned losses
- Turnover
- Obstacles - people leave etc.
- Downsizing causing mixes of people without appropriate skills
- Lack of closed loop assignment - too hard
- Turnover of personnel
- Senior techs promoted to administration and out of tech area
- Depth of expertise lacking
- Turnover - sailors:
  - 1. E-5 → E-6 become admin, no longer techs
  - 2. Different platforms
  - 3. Report too hard
- Turnover - lack of experience
- Rotation is not closed loop, so can't maintain expertise level
- Diversion to other duties on regular basis, maintenance and maintenance training are low priority
- Job reassignment
- Lack of experience
- Transfer between "O" and "I" level - lose expertise
- Personnel who are supposed to maintain do not have support

ETS QUALIFICATIONS AND CONTINUITY

- We're an insurance policy - blame it on the tech reps
- Tech reps are an insurance policy that things will keep working

- Continuity (stop gap)
- ETS usually have 10 yrs experience on that equip
- Solve problems techs can't, due to depth of expertise
- ETS are subject matter experts
- Seek owners of knowledge
- NAESU provides experience ... sailors are too inexperienced
- No trained Navy people in my area (oil analysis)
- At "I" level ETS can maintain test equipment that otherwise would have to send off
- Continuity - personnel turnover civilian vs mil
- Resident subject matter expert

EDUCATION AND TRAINING

- MTIP - formalized training
- OJT
- Timing of training - tech not ready
- ETS are teaching basics ... theory
- Mechanics are only box changers
- NAMTRADET teaches to the test not for use, too much memorization, no integration
- No formal training for tech on the specific equipment
- Cutbacks in training course length
- Incoming skills lower than a few years ago
- People
- Basic stuff not in people - NAESU is teaching this info
- Training - reduced training: programmed instruction being reduced, with better "A" and "C" schools
- Lack of training of military
- Long time lag between starting school and seeing working equipment and aircraft
- Navy schools do not provide hands-on training

MISCELLANEOUS

- Our job is to "get it off the pointy end"
- Poll all NAESU activities and ask them what they do
- Job is to provide service to the fleet
- Role is being redefined
- Customer does not pay for NAESU tech assists
- Avoiding problems ...
- E-5 through O-3 may vegetate and stagnate, need to keep them alive
- Burning Ducks; fixing crisis
- Supply shortages
- ETS work mostly with E-1to E-5, easier for them to talk to civilian, even maintainers
- Higher priority of ship for ancillary duties
- Techs in shop only 50% of time

QUESTION C: To what extent do you feel part of a team? Who are the principal members of the team?

YES, PART OF A TEAM

- Feel they are part of the Miramar night shift tech rep team
- Perhaps only as a small group, e.g. F-14 electricians
- Expert on my equipment
- ETS - especially boat people in the specific shop
- NAESU - home and other DETs but not program manager, types of projects conflict, should be but aren't on team. Need to understand each other's jobs
- "O" level, "I" level, other EW experts
- "O" - "I" level sharing
- Systems integrations - systems approach
- NAESU Det
- Wings - Squadron - F-14 vs A-2
- NAESU - Wing customer
- High loyalty to DET
- Pride and professionalism → NAESU rep → reputation busters (bad apples)

NO, NOT PART OF A TEAM

- Do not feel part of a team
- Do not feel part of a NAESU team
- Not on the ship when deploy with Squadron. They need you but do not want you there
- Squadron officers seldom consult ETS, no team
- No time to get together. Could have central offices or near shop

QUESTION D: What measures indicate the level of performance that you are attaining on the job?

ATTITUDE

- Personal visits to user activities
- Active feedback within DET
- Reputation at sea is a plus
- Being referred to as "my tech rep"
- Opinion of the military who ETS are there to assist
- The low level people have very high opinion of ETS
- Attitude of people I work with - rapport
- The fact that the NAESU symbol is instantly credited in Squadrons, even if NAVAIR or DON don't recognize it
- They see negative, not positive
- Job satisfaction - helping people. Customer satisfaction

COMMENTS/THANKS

- Customer Satisfaction - customer feedback
- Customer comment sheets cover IWSR, Depot
- Feedback reports from tech assists are not valid measure of performance
- Customer feedback - direct, "applause"
- You're doing your job ... no additional LOA needed
- Letters of Appreciation- depends on situation/personality
- Customer could provide regular input but it must come from the right level
- Not the feedback reports

SEEKING HELP

- Workload indication; continual demand
- Not called by military techs for fear of getting in trouble
- Troops seek you out
- Credibility with work center; repeat request visit
- Customer repeat requests

MILITARY TECHS PROFICIENCY

- Seeing the men solve a problem after your training
- Can techs get job done?
- Previous trainees can fix problems
- If the DET is on deployment and there are no calls it indicates they were properly trained
- Proficiency of techs after my training - how they are progressing?
- How techs perform after training
- Work yourself out of a job

TIME/RECORDS

- Monthly feedback reports
- If maintenance is the first priority then we could measure something
- Man hours of training provided
- Recommending changes to equipment or procedures
- Improvement in Squadron after IWSR (Integrated Weapon System Review)
- Readiness is not a good measure
- Spectrum of daily activity to annual summary
- Number of hours on various tasks
- How long to solve a problem

MISCELLANEOUS

- Chiefs just want their aircraft fixed
- Organizational differences - F-14 vs E-2
- Not quantifiable
- You get letters if your asking for them

- If aircraft fixed - good, not bad
- Ask customer
- Observation
- Get asset RFI

QUESTION E: How do your activities add value to your organization's output of goods and services?

ATTITUDE
- NAESU's reputation of effectiveness
- NAESU means credibility to Fleet and to NAS
- Reassure officers: legitimize their techs by providing a second opinion.
- Being able to deploy

OUTCOMES
- Provided corrosion training to 120 NADEP personnel
- Provide oil spectrometry service
- Enable pilots to survive (EW)
- Airplane FMC
- Readiness increases by better training
- At "I" level → production (number of RFI assets)
- Increased readiness
- Better trained sailors
- Benches stay up and work
- Mission success rate is affected by DET
- Decrease in the number of partially mission capable
- Making planes fly
- Safety of flight - to Wing
- Make Squadrons more effective
- NAESU: A "good job" provides reasons to get resources

PROCESS
- Make work easier
- Avoiding down-time by communicating about recurrent problems so they can be avoided by other units
- Production/criticality drives resources

RESOURCE SAVINGS
- OJT most effective method of providing maintenance training
- Saving money for govt by writing new procedures
- Saving money by developing new test procedures
- Could save more given opportunity (goes back to ground rules)
- Save money by less depot repair, eg, communication set
- Save organization money - cost savings - don't have to send technicians to mainland for training
- Saves money for government. ETS can do contractor work for less dollars

QUESTION F: Do you think that tech reps should be certified? How might this be done?

YES

- Build an accreditation program
- Experience + education + hands on
- Should have standards and requirements including writing ability
- Yes - some schools certify
- GS-11 Journeyman - may hire in as GS-9 and get promoted with training and experience. DET not in good position to determine needs, training requirements, and actual qualifications.
- No clear channel for training requests or other ETS development
- Job screening - submit written work?
- Good idea in some areas
- QII used in hiring → test potential conditions
- Continuing education
- At apprentice level
- Higher competence

NO

- Get me someone who is trained, not certified
- No - too costly - need to learn continually
- Certified - by who?
- Contractors are not certified
- Some areas where certifications need → ordnance annual
- Fix - don't fix engines
- What does it mean?
- How to not what to
- Bad things - another item that is not related to making us effective
- Who are we "pleasing"? Why?
- We already get evaluated
- Idea is ok but problems are too great
- Tech reps shouldn't be tested
- Unionization might become an issue
- Degree of equivalent experience
  - Yes. Job specific exam (oral, written) yes to qualifications, no to certifications
  - Multifaceted - human interfaces; technical
  - Screening
- NAESU = Tech
- Possible in some cases, example- radio ETS to be certified like FCC license. FAA airframes and powerplants certificate
- OK on fundamentals, but mean nothing on specific aircraft

QUESTION G: If you were redesigning NAESU, what things would you change? This was also phrased as: What would make NAESU work better?

DETACHMENT

- Rotating military doesn't work - don't understand
- Add Technical Director civilian to DET supervision (keep mil). HQ has this arrangement
- Eliminate OIC or permanent with NAESU; or all civilians
- Every DET OIC (CDR or higher) HQ CDR
- Squadron Assignment
- 25% Supervisor - either or ?
- Need military interface
- TPDR/Tech Docs/Tech Library @ DET level
- Tech Reports?
- Better clerical and admin support
- Need liaison but need continuity
- Provide continuity at the DETS, maybe by civilian management
- Make it a civilian organization. Military does not understand and there is no civilian point of view.
- Lack of DET management continuity due to military rotation and lack of strong civilian director or deputy
- No on-site supervisors
- Strong civilian deputy if military OIC
- PR would help NAESU justify its existence, need to tell people what we're doing
- Get out and talk to people who aren't using NAESU services
- It is important to send new hires to Philadelphia

FACILITIES

- Private contractor have flex → must leave sometimes
- Staff DET Library?
- Update first office library
- Travel: No room at BOQ, must request permission to get hotel
- Pager?
- Better information flows

HEADQUARTERS

- TQM or TQL are only effective if the Skipper or XO listens
- "Open Door" policy is difficult
- Have seen no feedback from TQM
- Not sure that NAESU itself is aware of all the services it performs
- Job descriptions do not touch what we do
- HQ provides internal training and money
- NAESU doesn't seem to care, perhaps NAVAIR should intervene

- NAESU should keep tech reps informed
- Keep people better informed
- Split PM workload over more PMs if eliminate RO
- Need responsive PM in HQ ... w/o need RO
- Urgency should be the same coming or going
- Think through and follow-up on ideas. Uniform program not well done
- Not local but international service organization
- HRO support should be more available
- Standardize - same training, grades, etc., for all DETs
- NAESU instruction out of date
- Consult ETS on programs
- Take over Lakehurst test facility
- PM visit Dets regularly
- Change training hierarchy → more training
- No clear channel for training requests or other ETS development
- Relax rules - call back ok
- DETs higher on HQ priority list..
- Leaders with higher rank and more clout in DON and NAVAIR
- More training funding
- More capable people on top of things at HQ
- Require NAVAIR to use NAESU instead of contracting with some body shop
- Civilian personnel office is in Philadelphia; this is a problem

REGIONS

- No Regional Offices - were needed with old communications
- Regional office, OIC often gets in the way, has no authority
- Communications - Requirement: Det to Regional Office to HQ (admin only - very rare tech)
  In reality: Det to HQ
- Training varies by region

MISCELLANEOUS

- Money not being spent for non-technical training. Spending money on tech writing, effectiveness briefings, instructor training
- When will NAESU people get trained
- Maintenance Training Improvement Program
- Training
- Serve the customer
- Self starters don't need supervisors
- All CETS, because civilians have no incentive to work harder
- Not enough time
- Like it that management is not too high above employee
- New titles → occasionally

- ETS don't really need management, are self-directed
- Not rebuild NAESU, assign ETS to NADEPS
- Documentation doesn't flow back to the Fleet
- Parts screening at DRMO
- DRMO uses: replace new item - > no hits on stock - > material declared excess -> deleted from stock
- NADEP is a customer of NAESU
- Someone has to represent the ships (i.e. Squadrons are represented, but not the carriers)

CUSTOMER INTERVIEWS

QUESTION 1. What do ETS provide to the customer?

TRAINING

- Training, both classroom and OJT.
- Test cell qualification.
- Many techs are on 2 year orders, so turnover is high in the squadron.
- Training for trouble-shooting, etc
- Formal (classroom) and informal (OJT) training
- Ship techs often rotate to other duties, so there is a constant need for training.
- Schools not available or too expensive, so use NAESU ETs to do training.
- Help for the 60% who don't understand.

EXPERTISE

- Help with special problems with new equipment.
- Stability.
- ETS provide experience on systems that the techs lack.
- Technical training based on their past experience.
- Help in problems with vague symptoms.
- Willing to help anytime.
- Super Techs for repair, even though the job description is logistics and training.

INFORMATION ACCESS

- Supply help, e.g., which parts to stock, knowledge of special tools.
- Obtain information from depots or manufacturers.
- Link to factory and network to other units.
- CETS provide a link to ICSS warehouse (Interim Contractor Support System).
- Call back to other DETs & NADEPS to find needed information

QUESTION 2. What would make for better ETS performance?

- ETS had received the most current training on current bench modifications.
- Provide more ETS.
- Units had knowledge of ETS tasks.
- Provide a directory of services available so units can call directly.

QUESTION 3. What would have to change to make it possible to eliminate ETS?

PERSONNEL SYSTEM
- Closed loop detailing
- Eliminate manpower caps
- Provide full manning rather than the current 50-65%.
- Eliminate the personnel shortage
- Allow us to transfer people between "O" and "I" levels to broaden experience and even out workload
- Reduce the high turnover, which results in no experience on the AC. Only 20% of people with experience on this AC.
- In Army you stay in Apaches, in Navy go from H60 to F-16 to A-6.
- Difficult to get people to come to Japan, so they tend to transfer those who want to stay to other duties, reducing the depth of experience.
- Keep techs on sea duty. For some specialties, 80% of billets are sea duty, 20% are shore so can't rotate in same specialty.
- Change evaluation system.
- Change assignment system to get of incompetent techs; now if you send a tech away you simply gap the billet. Lack of performance is no reason to get rid of techs.

TRAINING
- Bring up the current low experience levels
- Establish a connection of school with actual equipment.
- "A" school should match field work requirements including combining MOS fields.
- Broaden the present low experience base. We currently send the most experienced on dets leaving a training deficit in the unit.
- School & FRAMP training in classroom not practical.
- Buy training in depth
- Change use of senior personnel

OTHER
- Can't get rid of ETS, technology is changing too fast.
- Buy technical data in depth
- Allow unit direct access to manufacturer of test bench rather through than chain of command to CFA, etc.
- Establish network of Navy units.

QUESTION 4. What measures of the quality of ETS performance might be used?

- Report card
- Availability for contact/visibility

- Responsiveness to requests
- Timeliness
- Personality-Approachability by troops
- Professionalism - Appearance

APPENDIX B

SURVEY QUESTIONNAIRE RESPONSES

Appendix B contains copies of the techrep and customer questionnaires used in the research. The questionnaire responses were coded Very Great = 5, Great = 4, Some = 3, Little = 2, and Very Little = 1 to convert the qualitative responses into numerical values. It also includes tables showing the questionnaire responses from NAESU, Navy Fleet, Army, and Air Force.

Figure B1 is the questionnaire given to the techreps. Table B1 shows the averages and rank orders of the 233 responses divided into the four techrep groups of the *Importance* of the 17 activities. Table B2 provides the same information on *Time Spent* on these activities.

Tables B3-B6 provide the responses by service group. The responses are arrayed by *Time Spent* to enable visual comparison of the correspondence between *Importance* and *Time Spent*. Due to the small sample sizes of Army and Air Force techreps, the responses may not be truly representative.

Figure B2 is the questionnaire given to techrep customers. Table B7 shows the average values and rank order for the customer views of *Importance* and *Value Added*. The Army and Navy Fleet are omitted due to inadequate sample sizes.

Figures B3-B4 provide plots of the average values of NAESU techreps versus NAESU Customers for *Importance* and *Time Spent* versus *Value Added*. Figures B5-B6 display the same information for Air Force respondents.

Figure B7 is a correlation matrix of the average responses for the 17 activities. It includes the four techrep groups, NAESU Customers, and Air Force Customers.

ENGINEERING AND TECHNICAL SUPPORT PROJECT

Please complete both sections I and II below.

I. NAME: (Optional) ORGANIZATION:

JOB TITLE & SERIES: SPECIALTY AREA:

NUMBER OF YEARS OF MAINTENANCE/LOGISTICS EXPERIENCE:

II. Below is a listing of typical tech rep activities. Please rate them from your perspective as a customer of these services.

How IMPORTANT is this tech rep activity to your organization?
VG Very Great, G Great, S Some, L Little, VL Very Little.

To what extent does a tech rep's performance of this activity provide ADDED VALUE to your organization?
VG Very Great, G Great, S Some, L Little, VL Very Little.

ACTIVITY	IMPORTANCE					VALUE ADDED				
Provide OJT	VG	G	S	L	VL	VG	G	S	L	VL
Provide classroom training	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Liaison/Coordination	VG	G	S	L	VL	VG	G	S	L	VL
Report on equipment status	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Advice on Personnel or Mgmt	VG	G	S	L	VL	VG	G	S	L	VL
Update/verify tech pubs/data	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Design/Build peculiar test equip	VG	G	S	L	VL	VG	G	S	L	VL
ILS/TPF Reviews	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Pre-design reviews	VG	G	S	L	VL	VG	G	S	L	VL
Investigate EIs as Tech Advisor	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Actual hands-on maintenance	VG	G	S	L	VL	VG	G	S	L	VL
Supply assistance	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Recommend mods/improvements	VG	G	S	L	VL	VG	G	S	L	VL
Admin/paperwork	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
On-site tech assists	VG	G	S	L	VL	VG	G	S	L	VL
Education/Development of tech rep's own skills:										
Initiated by organization	VG	G	S	L	VL	VG	G	S	L	VL
Self initiated	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Other, please specify:										
_____	VG	G	S	L	VL	VG	G	S	L	VL
_____	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
_____	VG	G	S	L	VL	VG	G	S	L	VL
_____	VG	G	S	L	VL	VG	G	S	L	VL

THANKS FOR YOUR HELP.

4/27/94 CUSTQST.FRM

Figure B1

IMPORTANCE OF ETS/LARS ACTIVITIES

Rank Order of Importance					Average Importance Value			
ARMY	AIRFORC	NAESU	FLEET	Activity n=	ARMY 21	AIRFORC 34	NAESU 94	FLEET 84
3	1	1	2	OJT	4.15	4.53	4.76	4.37
12	10	4	14	CLASSROOM TRAINING	3.11	3.29	3.89	2.67
2	2	5	6	LIAISON	4.35	4.26	3.83	3.93
1	7	10	4	EQUIPMENT STATUS RPT	4.6	3.44	3.35	4.07
14	17	15	13	MGMT ADVICE	2.8	2.55	2.67	2.96
8	6	6	8	PUBS	3.45	3.67	3.61	3.72
16	12	17	17	BUILD TEST EQP	2.05	3.09	2.35	2.07
15	8	12	15	ILS REVIEW	2.15	3.4	3.16	2.45
17	15	13	15	DESIGN REVIEW	1.65	2.79	3.03	2.45
13	13	11	12	EI	2.9	3.06	3.32	2.97
10	5	8	3	HANDS-ON MNT	3.35	3.85	3.52	4.23
6	9	14	10	SUPPLY	3.75	3.38	2.83	3.02
10	4	7	9	MODS	3.35	3.88	3.6	3.57
10	16	15	11	ADMIN/PAPERWORK	3.35	2.65	2.67	3.01
5	11	2	1	OFF-SITE TECH ASST	3.94	3.37	4.15	4.39
7	14	9	7	ORG-INIT EDUC	3.71	2.96	3.48	3.77
4	3	3	5	SELF-INIT EDUC	4.06	4.18	3.97	4.1

Table B1

TIME SPENT ON ETS/LARS ACTIVITIES

Rank order of ETS/LARS Time					Average ETS/LARS Time Spent			
ARMY	AIRFORC	NAESU	FLEET	Activity n=	ARMY 21	AIRFORC 34	NAESU 94	FLEET 84
8	1	1	5	OJT	3.5	3.97	4.37	3.49
14	11	5	14	CLASSROOM TRAINING	2.58	2.82	3.28	2.02
2	2	6	6	LIAISON	4	3.85	3.23	3.45
1	7	7	3	EQUIPMENT STATUS RPT	4.35	3.03	3	3.65
13	15	13	12	MGMT ADVICE	2.7	2.29	2.24	2.38
11	4	8	11	PUBS	3	3.47	2.99	2.51
16	13	16	16	BUILD TEST EQP	1.95	2.69	1.96	1.59
15	14	15	15	ILS REVIEW	2	2.5	2.17	1.78
17	16	17	17	DESIGN REVIEW	1.45	2.21	1.73	1.47
12	9	14	13	EI	2.95	2.83	2.19	2.33
10	5	4	1	HANDS-ON MNT	3.3	3.41	3.33	3.87
3	7	12	8	SUPPLY	3.95	3.03	2.4	2.85
9	5	9	10	MODS	3.4	3.41	2.93	2.71
7	12	10	4	ADMIN/PAPERWORK	3.55	2.76	2.62	3.57
5	9	2	2	OFF-SITE TECH ASST	3.82	2.83	3.49	3.68
6	16	11	9	ORG-INIT EDUC	3.64	2.21	2.61	2.84
4	3	3	7	SELF-INIT EDUC	3.88	3.68	3.4	3.28

Table B2

94 NAESU ETS: Activities sorted by Time

IMPORTANCE			TIME	
Rank	Average	Activity	Average	Rank
1	4.76	OJT	4.37	1
2	4.15	OFF-SITE TECH	3.49	2
3	3.97	SELF-INIT EDU	3.4	3
8	3.52	HANDS-ON MNT	3.33	4
4	3.89	CLASSROOM T	3.28	5
5	3.83	LIAISON	3.23	6
10	3.35	EQUIPMENT ST	3	7
6	3.61	PUBS	2.99	8
7	3.6	MODS	2.93	9
15	2.67	ADMIN/PAPER	2.62	10
9	3.48	ORG-INIT EDUC	2.61	11
14	2.83	SUPPLY	2.4	12
15	2.67	MGMT ADVICE	2.24	13
11	3.32	EI	2.19	14
12	3.16	ILS REVIEW	2.18	15
17	2.35	BUILD TEST EQ	1.96	16
13	3.03	DESIGN REVIE	1.73	17

Table B3

84 FLEET ETS: Activities sorted by Time

IMPORTANCE			TIME	
Rank	Average	Activity	Average	Rank
3	4.23	HANDS-ON MNT	3.87	1
1	4.39	OFF-SITE TECH ASST	3.68	2
4	4.07	EQUIPMENT STATUS RP	3.65	3
11	3.01	ADMIN/PAPERWORK	3.57	4
2	4.37	OJT	3.49	5
6	3.93	LIAISON	3.45	6
5	4.1	SELF-INIT EDUC	3.28	7
10	3.02	SUPPLY	2.85	8
7	3.77	ORG-INIT EDUC	2.84	9
9	3.57	MODS	2.71	10
8	3.72	PUBS	2.51	11
13	2.96	MGMT ADVICE	2.38	12
12	2.97	EI	2.33	13
14	2.67	CLASSROOM TRAINING	2.02	14
15	2.45	ILS REVIEW	1.78	15
17	2.07	BUILD TEST EQP	1.59	16
15	2.45	DESIGN REVIEW	1.47	17

Table B4

34 AIR FORCE ETS: Activities sorted by Time

IMPORTANCE			TIME	
Rank	Average	Activity	Average	Rank
1	4.53	OJT	3.97	1
2	4.26	LIAISON	3.85	2
3	4.18	SELF-INIT EDU	3.68	3
6	3.67	PUBS	3.47	4
4	3.88	MQDS	3.41	5
5	3.85	HANDS-ON MNT	3.41	5
9	3.38	SUPPLY	3.03	7
7	3.44	EQUIPMENT ST	3.03	7
13	3.06	EI	2.83	9
11	3.25	OFF-SITE TECH	2.83	9
10	3.29	CLASSROOM T	2.82	11
16	2.65	ADMIN/PAPER	2.76	12
12	3.09	BUILD TEST EQ	2.69	13
8	3.4	ILS REVIEW	2.5	14
17	2.55	MGMT ADVICE	2.29	15
14	2.96	ORG-INIT EDUC	2.21	16
15	2.79	DESIGN REVIE	2.21	16

Table B5

21 ARMY LARS Activities sorted by Time

IMPORTANCE			TIME	
Rank	Average	Activity	Average	Rank
1	4.6	EQUIPMENT ST	4.35	1
2	4.35	LIAISON	4	2
6	3.75	SUPPLY	3.95	3
4	4.06	SELF-INIT EDU	3.88	4
5	3.94	OFF-SITE TECH	3.82	5
7	3.71	ORG-INIT EDUC	3.64	6
10	3.35	ADMIN/PAPER	3.55	7
3	4.15	OJT	3.5	8
10	3.35	MODS	3.4	9
10	3.35	HANDS-ON MNT	3.3	10
8	3.45	PUBS	3	11
13	2.9	EI	2.95	12
14	2.8	MGMT ADVICE	2.7	13
12	3.1	CLASSROOM T	2.58	14
15	2.15	ILS REVIEW	2	15
16	2.05	BUILD TEST EQ	1.95	16
17	1.65	DESIGN REVIE	1.45	17

Table B6

ENGINEERING AND TECHNICAL SUPPORT PROJECT

Please complete both sections I and II below.

I. NAME: (Optional) ORGANIZATION:

JOB TITLE & SERIES: SPECIALTY AREA:

NUMBER OF YEARS OF MAINTENANCE/LOGISTICS EXPERIENCE:
NUMBER OF YEARS IN ENGINEERING & TECHNICAL SUPPORT:

II. Please rate each of the following activities in terms of its importance and the amount of time which you spend on it.

How IMPORTANT is this activity to your overall job performance?
VG Very Great, G Great, S Some, L Little, VL Very Little.

What amount of your TIME is spent on this activity?
VG Very Great, G Great, S Some, L Little, VL Very Little.

ACTIVITY	IMPORTANCE					TIME SPENT				
Provide OJT	VG	G	S	L	VL	VG	G	S	L	VL
Provide classroom training	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Liaison/Coordination	VG	G	S	L	VL	VG	G	S	L	VL
Report on equipment status	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Advice on Personnel or Mgmt	VG	G	S	L	VL	VG	G	S	L	VL
Update/verify tech pubs/data	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Design/Build peculiar test equip	VG	G	S	L	VL	VG	G	S	L	VL
ILS/TPF reviews	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Pre-design reviews	VG	G	S	L	VL	VG	G	S	L	VL
Investigate EIs as Tech Advisor	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Actual hands-on maintenance	VG	G	S	L	VL	VG	G	S	L	VL
Supply assistance	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Recommend mods/improvements	VG	G	S	L	VL	VG	G	S	L	VL
Admin/paperwork	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Off-site tech assists	VG	G	S	L	VL	VG	G	S	L	VL
Education/Development of your skills:										
Initiated by organization	VG	G	S	L	VL	VG	G	S	L	VL
Self initiated	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
Other, please specify:										
_____	VG	G	S	L	VL	VG	G	S	L	VL
_____	*VG*	*G*	*S*	*L*	*VL*	*VG*	*G*	*S*	*L*	*VL*
_____	VG	G	S	L	VL	VG	G	S	L	VL
_____	VG	G	S	L	VL	VG	G	S	L	VL

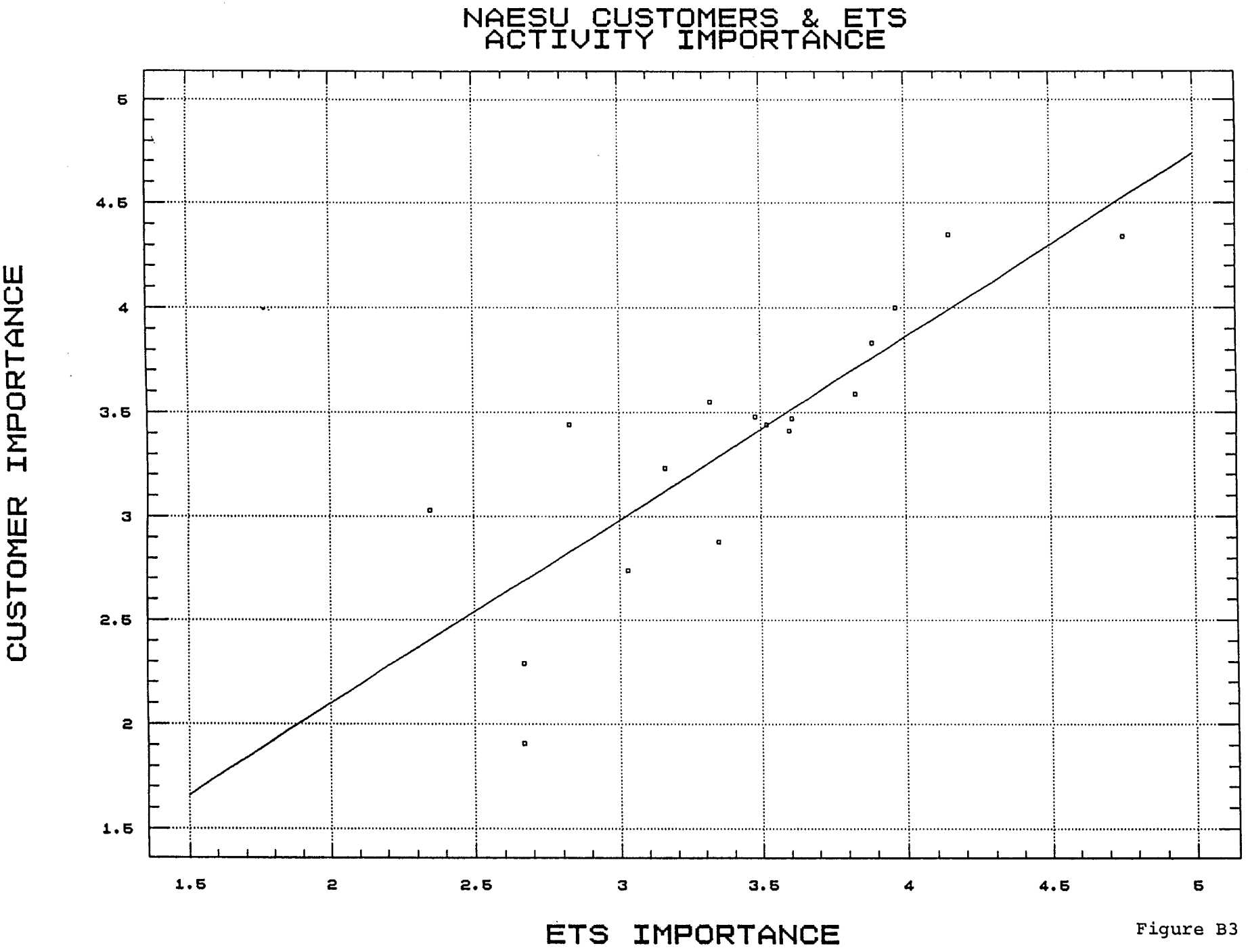
THANKS FOR YOUR HELP

4/27/94 ETQUEST.FRM
Figure B2

AVERAGE IMPORTANCE & VALUE FOR CUSTOMERS

IMPORTANCE AIRFORCE 20		NAESU 34			VALUE ADDED AIR FORCE 20		NAESU 32	
RANK	AVG	AVG	RANK	Activity n=	RANK	AVG	AVG	RANK
3	4.3	4.35	1	OJT	3	4.4	4.38	2
8	3.6	3.83	4	CLASSROOM TRAINING	6	4	3.81	4
2	4.5	3.59	5	LIAISON	2	4.55	3.47	11
13	3.3	2.88	13	EQUIPMENT STATUS RPT	15	3.2	3.03	13
15	2.9	2.29	16	MGMT ADVICE	16	2.75	2.34	16
9	3.5	3.47	8	PUBS	12	3.55	3.58	6
11	3.4	3.03	14	BUILD TEST EQP	10	3.65	3	14
10	3.44	3.23	12	ILS REVIEW	11	3.61	3.33	12
14	3.16	2.74	15	DESIGN REVIEW	13	3.47	2.93	15
7	3.63	3.55	6	EI	9	3.72	3.55	8
5	4.21	3.44	9	HANDS-ON MNT	6	4	3.75	5
16	2.79	3.44	9	SUPPLY	14	3.21	3.56	7
4	4.22	3.41	11	MODS	4	4.33	3.5	10
17	2.15	1.91	17	ADMIN/PAPERWORK	17	2.25	2.03	17
1	4.74	4.35	1	OFF-SITE TECH ASST	1	4.67	4.44	1
12	3.37	3.48	7	ORG-INIT EDUC	8	3.82	3.54	9
6	3.94	4	3	SELF-INIT EDUC	6	4	3.92	3

Table B7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ACTIVITY IMPORTANCE
CUSTOMER IMPORTANCE
ETS IMPORTANCE
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4.5
4
3.5
3
2.5
2
1.5
1.5
2
2.5
3
3.5
4
4.5
5

Figure B3

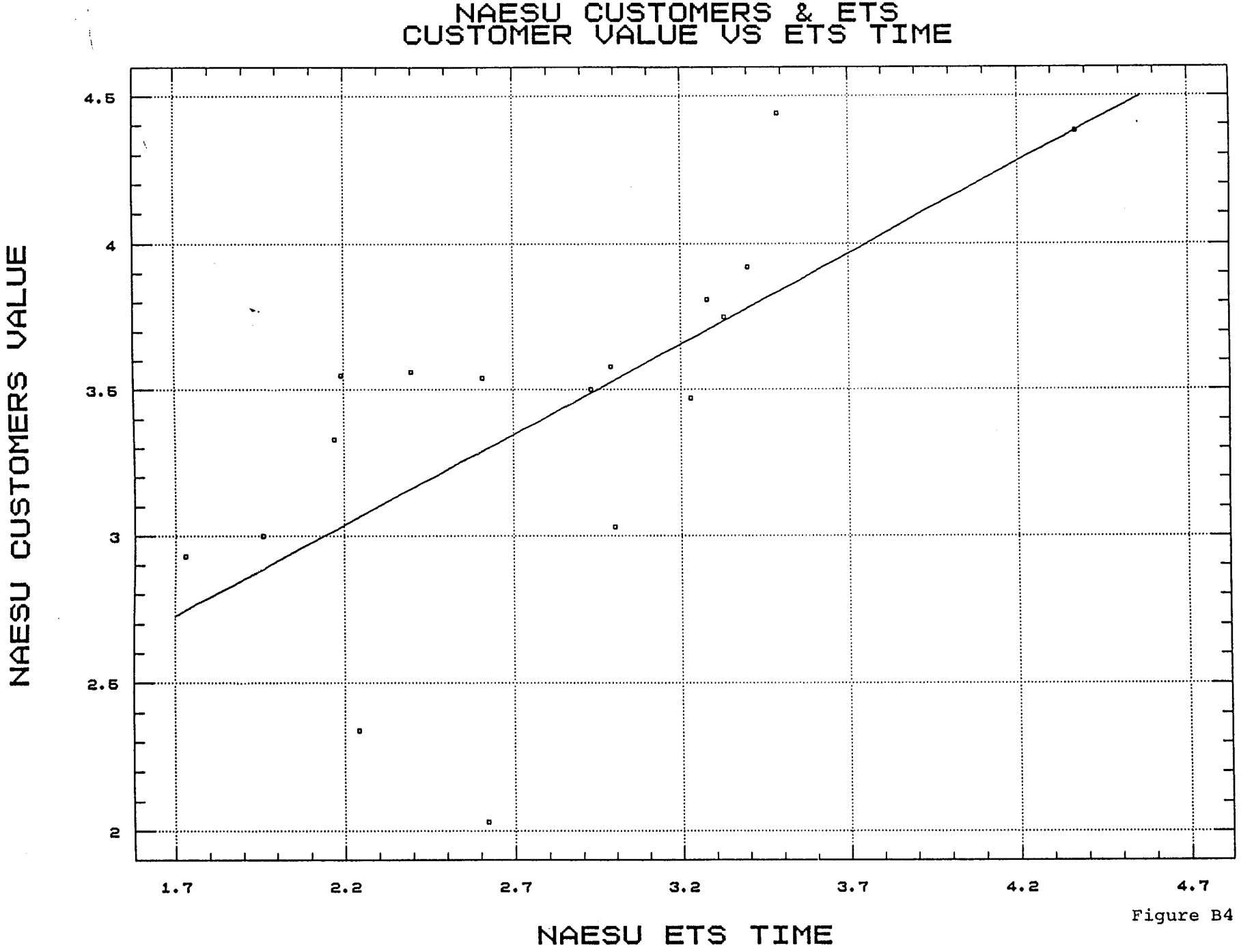
NAESU CUSTOMERS & ETS
CUSTOMER VALUE VS ETS TIME
NAESU CUSTOMERS VALUE
4.5
4
3.5
3
2.5
2
1.7
2.2
2.7
3.2
3.7
4.2
4.7
NAESU ETS TIME

Figure B4

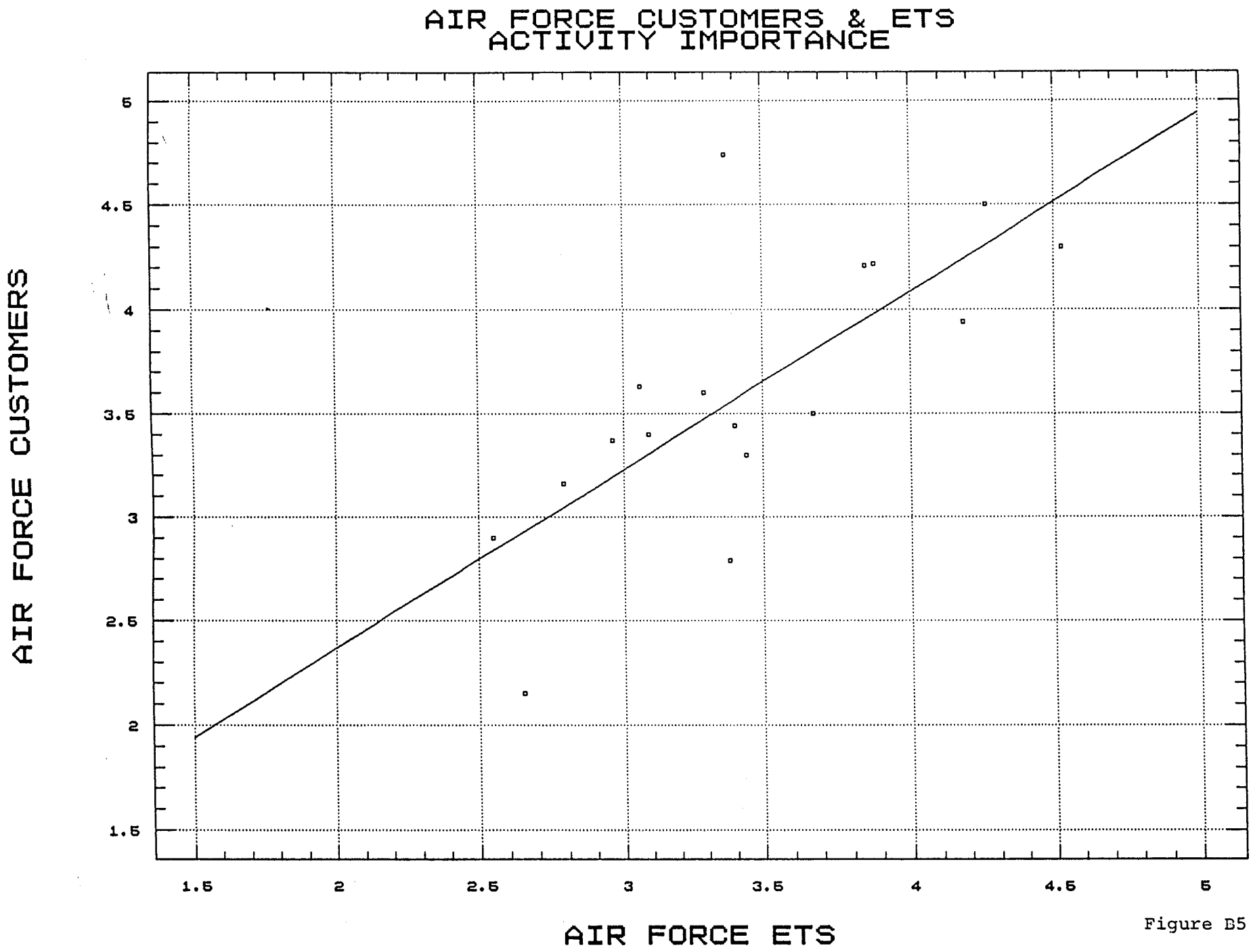
AIR FORCE CUSTOMERS & ETS
ACTIVITY IMPORTANCE
AIR FORCE CUSTOMERS
AIR FORCE ETS
5
4.5
4
3.5
3
2.5
2
1.5
1.5
2
2.5
3
3.5
4
4.5
5

Figure B5

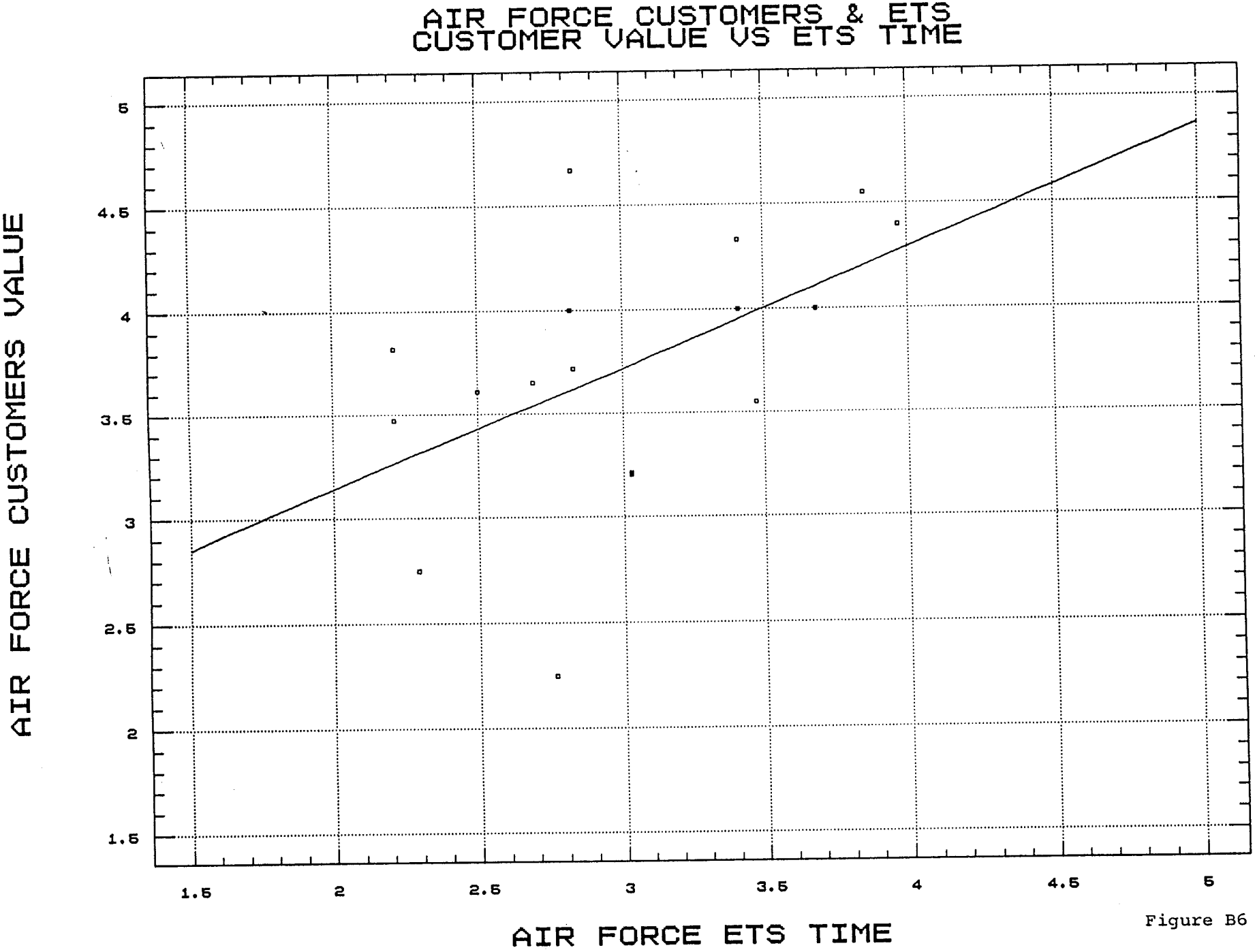
AIR FORCE CUSTOMERS & ETS
CUSTOMER VALUE VS ETS TIME
AIR FORCE CUSTOMERS VALUE
AIR FORCE ETS TIME
5
4.5
4
3.5
3
2.5
2
1.5
1.5
2
2.5
3
3.5
4
4.5
5

Figure B6

CORRELATION MATRIX FOR NAESU ETS RESEARCH

Correlates the mean value for each category of respondent for the 17 activities.

Asterisk * indicates the correlation is significant at least at the .01 level.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
NAESU CUSTOMERS												
1. IMPORTANCE	1.0											
2. VALUE ADDED	.987*	1.0										
NAESU ETS												
3. IMPORTANCE	.829*	.828*	1.0									
4 TIME SPENT	.664*	.668*	.977*	1.0								
AIR FORCE ETS												
5. IMPORTANCE	.705*	.691*	.754*	.768*	1.0							
6. TIME SPENT	.533	.514	.637*	.763*	.921*	1.0						
AIR FORCE CUSTOMERS												
7. IMPORTANCE	.807*	.802*	.768*	.632*	.731*	.576	1.0					
8. VALUE ADDED	.874*	.858*	.762*	.567	.704*	.504	.956*	1.0				
FLEET ETS												
9. IMPORTANCE	.527	.561	.737*	.817*	.643*	.638*	.606*	.481	1.0			
10. TIME SPENT	.234	.267	.465	.714*	.461	.567	.325	.177	.867*	1.0		
ARMY ETS/LARS												
11. IMPORTANCE	.417	.404	.586	.753*	.571	.637*	.357	.288	.846*	.854*	1.0	
12. TIME SPENT	.287	.282	.408	.604	.437	.534	.237	.163	.784*	.877*	.959*	1.0
13. ACTIVITY NUMBER	.001	.031	-.138	-.166	-.191	-.204	-.071	-.046	.136	.198	.018	.223

Figure B7

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