

# NPO SATURN

Expertise  
Products  
Services



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**Aircraft engines for commercial applications**

- SaM146 engine for regional-mainline commercial jets (Sukhoi Superjet 100)
- D-30KU/KP engine family for mainline commercial jets (Ilyushin-62M, Tupolev-154M) and cargo jets (Ilyushin-76TD)

**Gas turbines for industrial applications**

- GTD-110 gas turbine, GTE-110 simple (and cogeneration) cycle and PGU-170/325/500 combined cycle power generating plants with output capacity from 110 to 500 MW and above
- DO49R, GTD-6/8RM, GTD-4/6.3/10RM gas turbines for power generating and pumping stations with output capacity from 2.5 to 80 MW and above

**Aircraft engines for military applications**

- AL-31F/FP/117S engine family for Sukhoi-27/30/35 fighters
- D-30KP engine for military transport aircraft (Ilyushin-76MD/78/A-50)



- AL-55 engine for advanced trainers and light attack aircraft
- Small-sized engines for aircraft-based and ship-based cruise missiles

**Gas turbines for marine applications**

- M75RU and M70FRU marine gas turbines and related power units for warships, boats, civil ships, oil and gas on-shore and off-shore projects



NPO Saturn is a Russian company with 90-years experience on the aviation and gas turbine markets.

NPO Saturn provides the full life cycle for the products:

**development, production, marketing and sales, after sale support and services**

## Development



- Full cycle of new products development from designing and engineering to testing and serial production
- Integrated information technologies at all stages of product life cycle, two computing clusters in operation
- Advanced testing facilities for full range of engineering and certification tests in accordance with IAC AR (CIS) and EASA (EU) standards

## Production



- Advanced technologies in metal-cutting of any complexity / dimension parts, casting (blades with directional crystallization and single-crystal structure), welding (electron-beam, laser and friction welding), brazing, gas-thermal sputtering, protective coating, laser-cutting, tools production, MRO, etc
- Production (incl. MRO) certified in accordance with IAC AR (CIS) and EASA (EU) standards; quality management system certified in accordance with ISO 9000 standards

## Marketing and sales



- Product development and full package offering in accordance with Customer needs and requirements; global sales activity
- Mutually beneficial collaboration, flexible pricing, personal approach to each Customer
- Persistent quality improvement, products/services improvement and modernization, Customer satisfaction care

## After sale support and services



- Advanced after sales support and services system focused on product service life extending, operating and maintenance cost reduction
- Customer support 24 hours a day / 7 days a week; spare parts, equipment, tools and technical documentation provisioning
- Customer personnel training and troubleshooting for efficient operation and maintenance

**RD-600V**



Power rating	1300 shp
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**TVD-1500B**



Power rating	1300 shp
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**SaM146\***



Thrust	7 684 kgf
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**D-30KU-154**



Thrust	10 500 kgf
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**D-30KP/KP-2/KP-3**



Thrust	up to 13 000 kgf
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**Kamov-62**



Capacity	14 pax
Range	770 km

**General aviation**



Capacity	30 pax
Range	1000 km

**SSJ100**



Capacity	98 pax
Range	4 250 km

**Tupolev-154M**



Capacity	164 pax
Range	3 460 km

**Ilyushin-76TD**



Payload	up to 50 t
Range	up to 4 100 km

\* SaM146 engine is developed and produced in partnership with Snecma company (50/50 Saturn/Snecma)

**37-01E\***



Thrust	325 kgf
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**36MT**



Thrust	450 kgf
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**AL-55I\*\***



Thrust	1 760 kgf
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**D-30KP/KP-2/KP-3**



Thrust	up to 13 000 kgf
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**AL-31F/FP/117S\*\*\***



Thrust	up to 14 500 kgf
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**3M-54E/E1**



Warhead	up to 400 kg
Range	up to 300 km

**Kh-59MK/ME**



Warhead	up to 320 kg
Range	up to 285 km

**HJT-36**



Armament	up to 1000 kg
Range	up to 1200 km

**Ilyushin-76MD/78/A-50**



Payload	up to 50 t
Range	up to 4 100 km

**Sukhoi-27/30/35**



Armament	up to 8 t
Range	up to 3600 km

\* 37-01E engine is produced by NPO Saturn under license of OMKB

\*\* AL-55I engine is developed by NPO Saturn and produced in partnership with UMPO company (50/50 Saturn/UMPO)

\*\*\* AL-31F/FP and 117S engines are developed by NPO Saturn (Luytk Design Bureau) and produced by UMPO company in partnership with NPO Saturn

**DO49R**



Power rating	2.8 MW
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**GTD-6/8RM**



Power rating	6.5/8.6 MW
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**GTD-4/6.3/10RM**



Power rating	up to 10 MW
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**GTD-110**



Power rating	114.5 MW
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**GTES-2.5\***



Power output	2.5..15 MW
Efficiency**	74%

**GTES-12/24\***



Power output	6..64 MW
Efficiency**	>80%

**GPA- 4/6.3/10RM\***



Power output	up to 10 MW
Efficiency**	up to 85%

**GTE-110,  
PGU-170/325/500**



Power output	110..500 MW
Efficiency***	52%

\* GTES / GPA packaging, starting-up and adjustment by Saturn-GT company (subsidiary company of NPO Saturn)  
 \*\* Efficiency in cogeneration cycle  
 \*\*\* Efficiency in combined cycle

**M75RU**

Power output 7000 shp



- Navy and Coast Guard warships and boats
- Civil ships
- Oil and gas on-shore and off-shore projects

**M70FRU**

Power output 14000 shp



- Navy and Coast Guard warships and boats
- Hovercrafts
- Civil ships
- Oil and gas on-shore and off-shore projects

# D-30KP-3 Engine

*For Ilyushin-76/78 powerplant  
modernization*







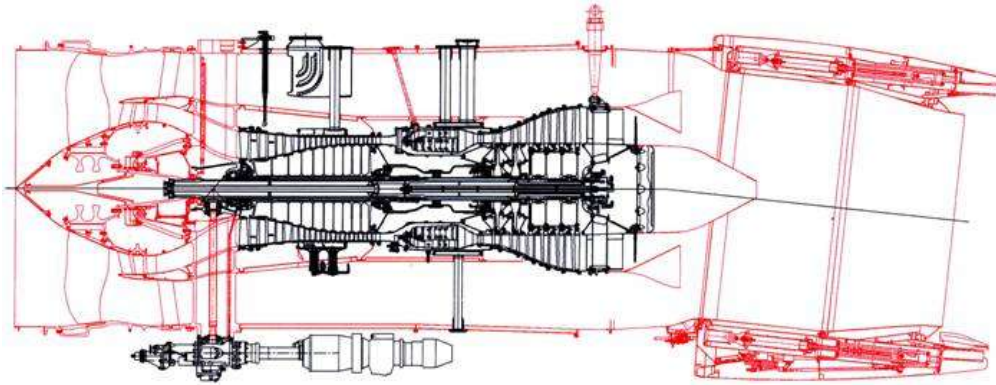
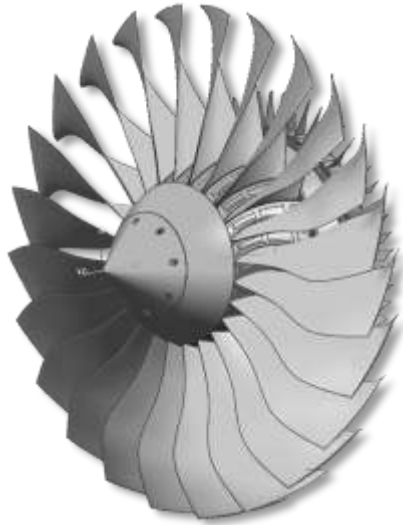
- Take-off thrust increased up to 13000 kgf and retained up to Ta=+30C
- On-condition maintenance concept
- SFC improvement
- Compliance with current ICAO requirements

Specifications	D-30KP-3	D-30KP-2
<b>Take-off performances</b>		
Thrust, kgf	13 000 (up to Ta=+30 C)	12 000 (up to Ta=+23 C)
Bypass ratio	3.62	2.24
Overall pressure ratio	17.99	20.1
SFC, kg/kgf/h	0.404	0.51
<b>Cruise performances</b>		
Thrust, kgf	2 750	2 750
SFC, kg/kgf/h	0.643	0.71
<b>Engine dimensions</b>		
Fan diameter, mm	1 662	1 455
Length, mm	5 734	5 457

**D-30KP-3** engine – deep modernization of **D-30KP-2** serial engine for **Ilyushin-76** cargo aircraft and military transport (incl. all its modifications)

# D-30KP-3 ENGINE

## Modernization concept



New parts and modules

Serial parts and modules

Up to 70% modules commonality (D-30KU/KP/KU154 parts and modules)

- New fan with wide chord blades
- Enhanced acoustic linings
- Updated thrust reverser
- Core and low-pressure turbine derived from D-30KP-2 engine
- Low emission combustor derived from D-30KU-154 engine
- Electronic engine overspeed unit derived from D-30KU-154 engine
- Automatic fuel control system derived from D-30KU/KP engine family

Modernization features the low-noise wide chord bladed fan with outstanding efficiency and FOD resistance



Performances	<b>Ilyushin-76 with D-30KP-3</b>	<b>Ilyushin-76 with D-30KP-2</b>
Fuel flow, kg/h (H=12 km, M=0,8max)	7 550	8 350
Range:		
• with 50t payload, km	4 100	3 700
• with 40t payload, km	5 250	4 900
Noise compliance	Chapter 4 ICAO	Chapter 2 ICAO
Emission compliance	ICAO 2008 requirements	ICAO 1996 requirements

- Compliance with ICAO Chapter IV (2004) for noise and CAEP 6 (2008) for emission
- Fuel flow improvement (9% lower)
- Increased range capability
- Based on D-30KU/KP engine family heritage (over 50 millions flight hours in operation)
- Competitive modernization cost thanks to keeping Ilyushin-76 pylon and many other systems
- Fully retained current operational infrastructure of Ilyushin-76
- No need to retrain pilots and technicians
- Engine deliveries starting from 2013

**Ilyushin-76/78** powerplant modernization by **D-30KP-3** engine provides maximum environmental, operational and economical improvements at the minimum cost

# SaM146 Engine

*For regional-mainline commercial jets*





PowerJet



**Integrated Propulsion System**  
*(engine, nacelle and equipment)*

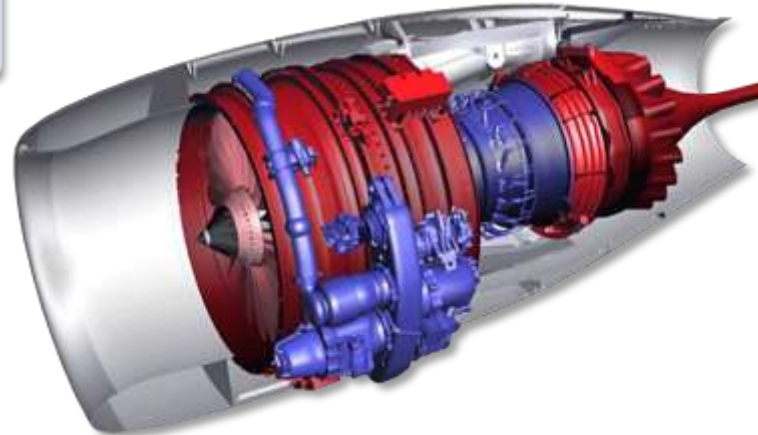


**Core Engine**  
**Accessory Drive**  
**Control System**

**Fan**  
**Low pressure compressor**  
**Low pressure turbine**

**Responsible for propulsion system integration**

**Responsible for test and final engine assembly**



Every activity shared 50/50 between Snecma and NPO Saturn engineering, production, marketing & sales, customer support & services

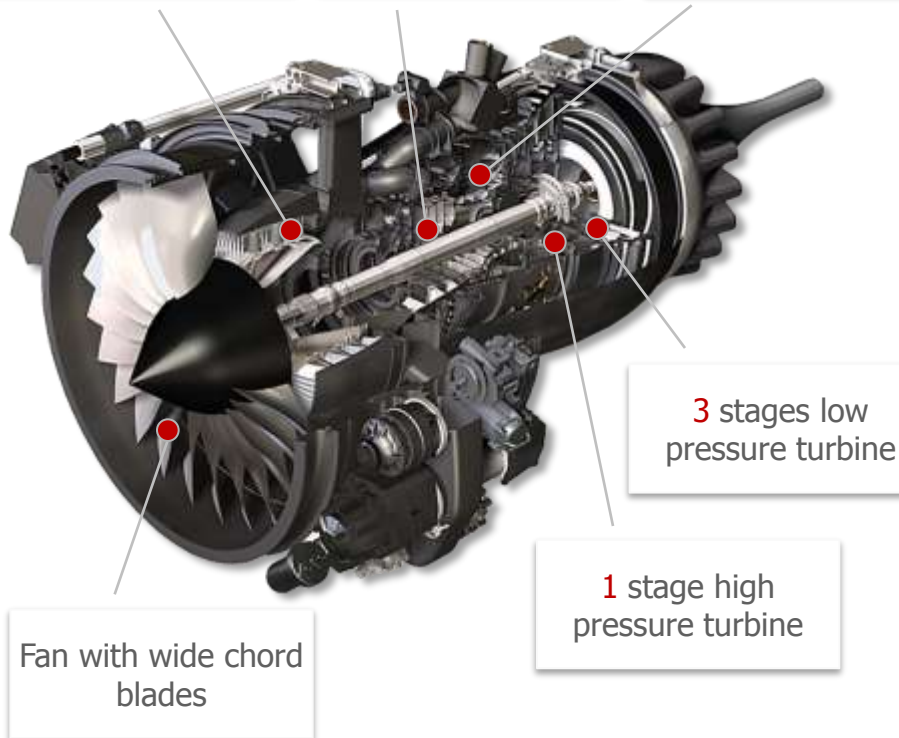
# SaM146 ENGINE

## Design and specifications

3 stages low pressure compressor

6 stages high pressure compressor

Single annular combustor



Specifications	SaM146 Low Rating	SaM146 High Rating
<b>Take-off performances</b>		
Thrust class with APR*, kgf	6 985	7 684
Take-off thrust, kgf	6 125	6 982
Bypass ratio	4.43	4.43
<b>In-flight performances</b>		
Maximum climb thrust, kgf	1 650	1 700
Overall pressure ratio	27.53	27.97
Cruise SFC, kg/kgf/h	0.629	0.629
<b>Engine dimensions</b>		
Fan diameter, mm	1 224	1 224
Length, mm	2 070	2 070

\* APR – Automatic Power Reserve

- High reliability (on a par with CFM56 standard)
- Low cost of ownership
- Meets or exceeds the most stringent current and upcoming noise and emissions ICAO standards
- A single engine for entire family of regional jets

**SaM146** – compact, reliable, efficient and eco-friendly engine based on combination of Western and Russian expertise, advanced and proven technologies.  
 Certified in accordance with EASA (EU) and IAC AR (CIS) standards in 2010



- Wide range of thrust: from 6125 to 7684 kgf
- Full commonality for entire family of 70 to 120-seat aircraft
- Lower cost of ownership due to reduced spare parts count, savings on tools and training



### SSJ100 Family

**SSJ100/115**  
(120 pax @ 32")



**Cargo version**



**SSJ100/95B/LR**  
(98 pax @ 32")



**VIP version**



**SSJ100/75B/LR**  
(78 pax @ 32")



# 117S Engine

*For Sukhoi-35 multirole fighter*





# 117S ENGINE

## Design and specifications



**117S engine has been created for Su-35 multirole fighter developed by Sukhoi company**

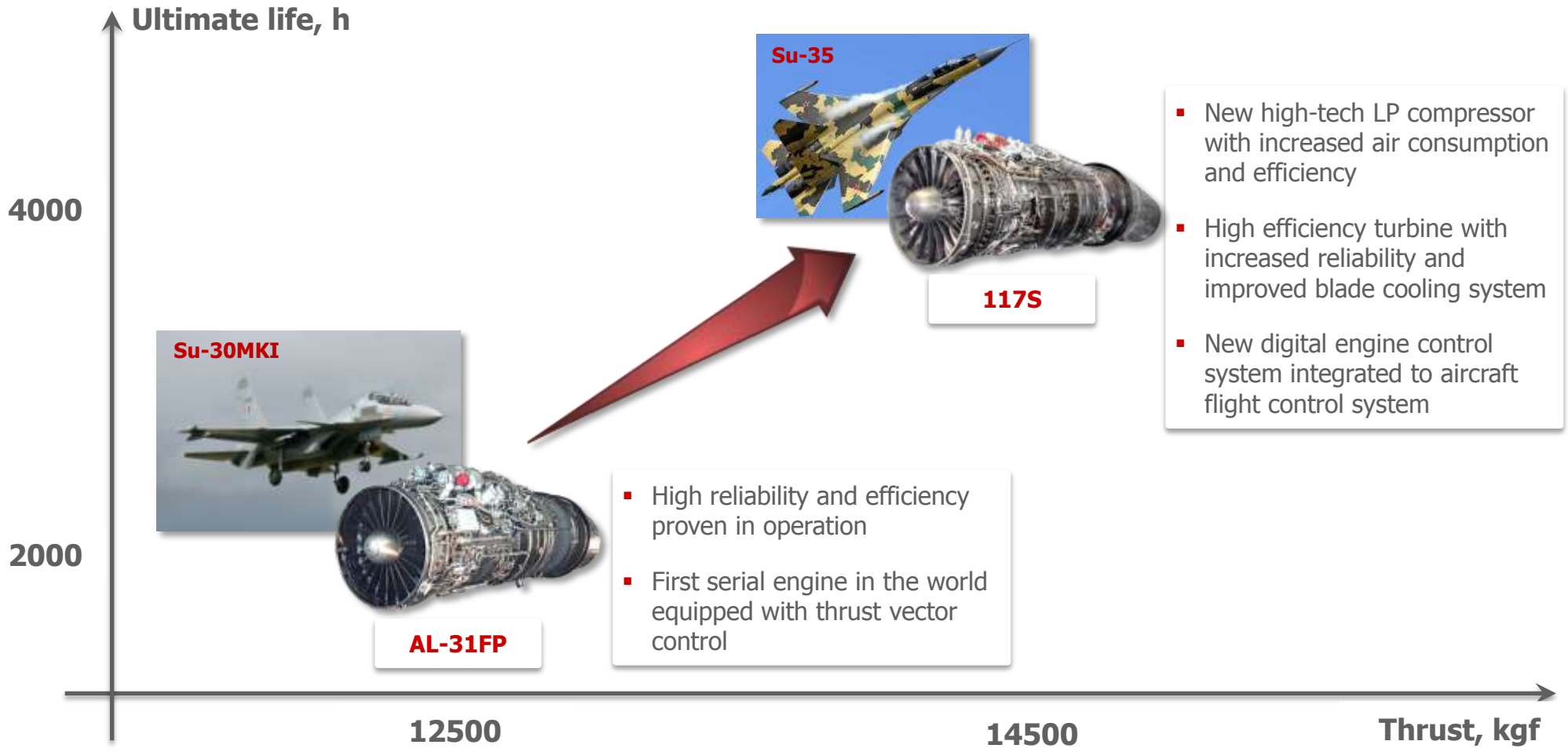
Specifications	117S
Maximum afterburning thrust, kgf	14 500
Combat mode thrust:	
• Full afterburning thrust, kgf	14 000
• Maximum dry thrust, kgf	8 800
Ultimate life, h	4 000

- 16% increased thrust (up to 14500 kgf) and doubled ultimate life (up to 4000 hours) with retention of AL-31FP prototype engine weight and dimensions
- 117S can be used, with slightly retrofitted nacelle and equipment, for re-engining of earlier built Sukhoi-27/30 fighters, operational by Russian and foreign Air Forces

**117S engine** is an afterburning turbofan engine with variable axisymmetric vectoring nozzle; **117S** is a deep thrust-life modernization of the **AL-31FP** engine

# 117S ENGINE

New stage in AL-31F/FP engine family development



Operational proven architecture in combination with new generation technologies

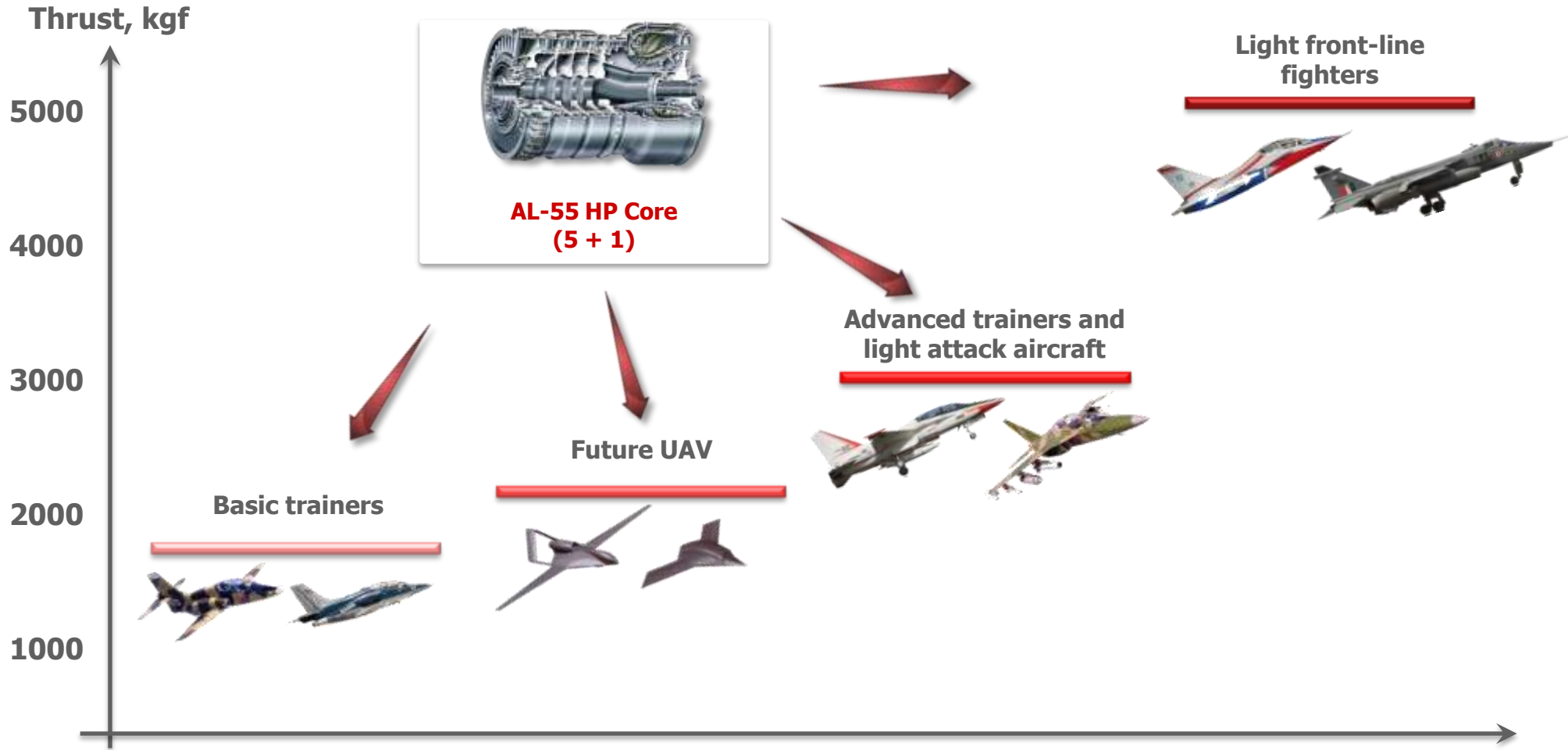
# AL-55 Engine

*For advanced trainers  
and light attack aircraft*



# AL-55 ENGINE

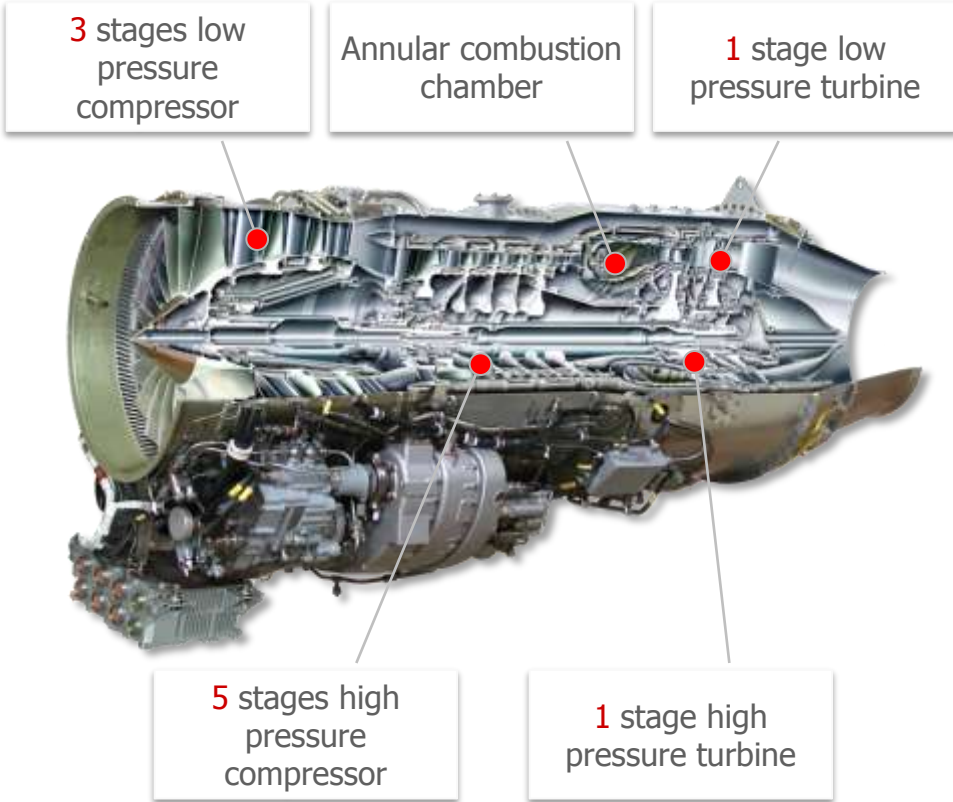
## Single HP Core



Single **AL-55 HP Core** enables development of entire engine family for various applications with thrust ranging from **1760** to **5000 kgf**, incl. afterburning and thrust vectoring modifications

# AL-55 ENGINE

AL-55I for HJT-36 basic trainer (India)



Specifications	AL-55I
Take-off thrust, kgf	1 760
Bypass ratio	0.515
Overall pressure ratio	17.5
Inlet diameter, mm	462
Length, mm	1 950

- Advanced design solutions and materials, including AL-31F/FP/117S engine family derived ones
- Modular design provides high maintainability and lower operating cost
- Up-to-date engine automatic control system provides flight safety and high diagnostic capability

**AL-55I engine** has been created for **HJT-36** basic trainer developed by **HAL Corporation (India)**

# Small-sized Engines

*For subsonic cruise missiles and  
unmanned aerial vehicles*

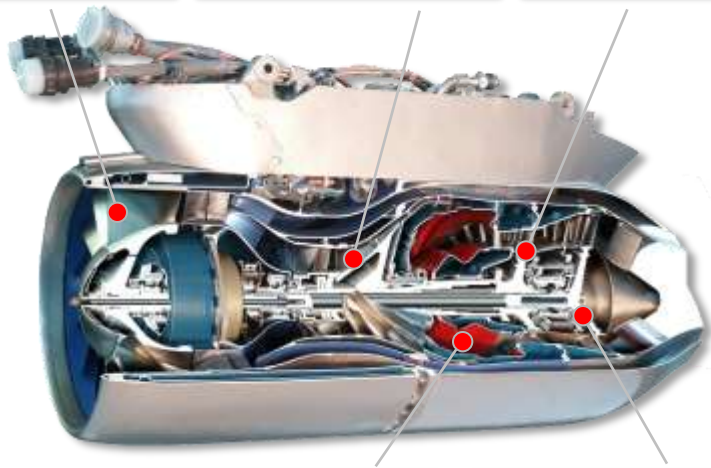


### 36MT engine

1 stage fan

Axial-diagonal high pressure compressor

1 stage high pressure turbine



Annular combustion chamber

1 stage low pressure turbine

Specifications	36MT	37-01E
Maximum thrust, kgf	450	325
Maximum length, mm	850	
Maximum diameter, mm	330	
Weight, kg	≤100	

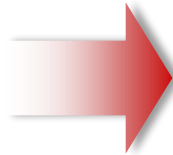
- High fuel efficiency
- High resistance to small foreign objects ingestion (birds, dust, etc.) at the engine inlet
- Resistance to impact and thermal loads
- Self-dependent surge recovery upon surge cause leaving
- Reliable starting under various environmental operating conditions

**36MT** and **37-01E** – high efficiency small-sized turbofan engines in pylon and fuselage mounting configurations

# SMALL-SIZED ENGINES

## Application

**36MT**



**Kh-59MK/ME family of aircraft-based cruise missiles developed by GosMKB Raduga**

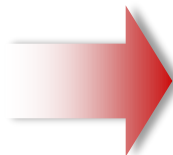
**Kh-59MK**



**Kh-59ME**



**37-01E**



**3M-14E and 3M-54E/E1 family of ship-based cruise missiles developed by OKB Novator**

**3M-14E**



**3M-54E**



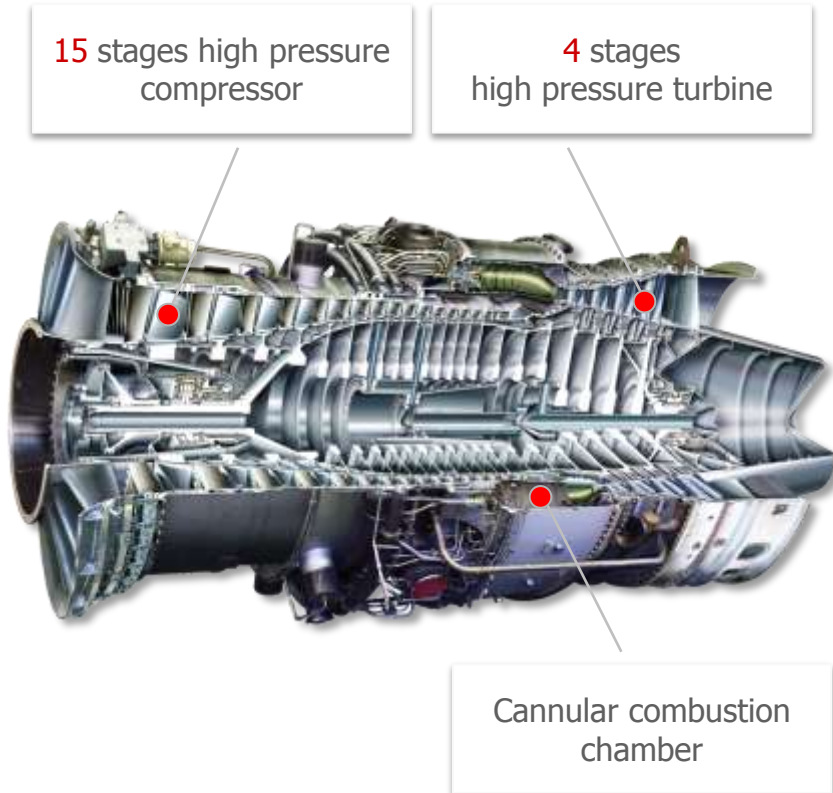
**36MT** and **37-01E** are used as a mid-flight propulsion systems of aircraft-based and ship-based cruise missiles



# Power Generating Plants Based on GTD-110 Heavy Gas Turbine

*For high capacity  
power generating plants  
(from 110 to 500 MW and above)*





Specifications	GTD-110
Nominal power rating, MW	114.5
Efficiency (ISO 2314), %	36.0
Output shaft speed, rpm	3 000
Fuel consumption, kg/h <ul style="list-style-type: none"> <li>• fuel gas</li> <li>• liquid fuel</li> </ul>	23 000 27 300
Exhaust gas temperature, °C	517
Exhaust gas flow, kg/s	362
Dimensions (L x B x H), m	7.1 x 3.6 x 4.3
Weight, t	55

**GTD-110** – compact, single-shaft, high-efficiency gas turbine for electric generator driving.  
**GTD-110** – core of simple-cycle, combined-cycle and cogeneration-cycle power generating plants with output capacity from **110** to **500 MW** and above



**GTE-110 is a block-module complex of technological equipment for high capacity power generation**

Specifications	GTE-110
Electric power output, MW	110
Heat power output, Gcal/h	118.8
Efficiency (simple cycle, ISO 2314), %	34.5
Efficiency (cogeneration cycle, ISO 2314), %	85
Electric current frequency, Hz	50

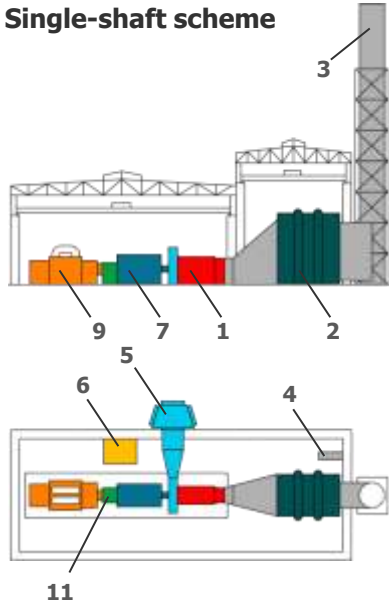
### GTE-110 main components:

- GTD-110 gas turbine on the frame with external air-cooling system of HP turbine blades
- 110MW electric generator on the frame with enclosure air-cooling system of active parts and built-in liquid-cooling system
- Automatic control system (ACS)

**GTE-110** – complete power plant based on **GTD-110** gas turbine for electric and heat energy generation in simple and cogeneration cycle with base, intermediate and peak loads

### PGU-170

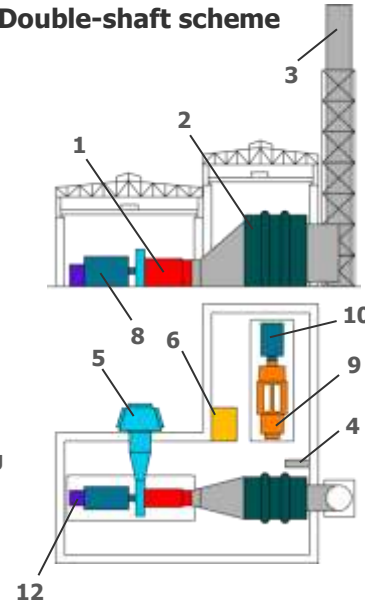
#### Single-shaft scheme



- 1 - GTD-110 gas turbine
- 2 - exhaust-heat boiler
- 3 - chimney
- 4 - high-pressure and low-pressure feeding pumps location area
- 5 - air cleaner system
- 6 - control switchboard
- 7 - generator (165MW)
- 8 - generator for gas turbine (110MW)
- 9 - steam turbine (55MW)
- 10 - generator for steam turbine (60MW)
- 11 - automatic disengaging overrunning clutch
- 12 - accessory drive gear box (with barring gear)

### PGU-170

#### Double-shaft scheme

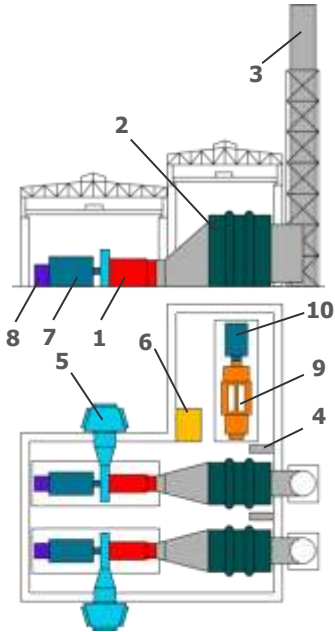


Specifications	PGU-170
Electric power output, MW	170
Efficiency (combined cycle, ISO 2314), %	52.5
Electric current frequency, Hz	50
Operating temperature range, °C	-40 ... +45
Range of load automatic control, %	25 ... 100

- Two schemes of PGU-170, depending on power station floor plan:
  - Single-shaft scheme: 165MW generator on the common shaft with gas turbine and steam turbine → easier packaging, lower cost of ownership (in comparison with double-shaft scheme)
  - Double-shaft scheme: 110MW generator on the common shaft with gas turbine and 60MW generator on the common shaft with steam turbine → higher integration flexibility, better start-stop characteristic

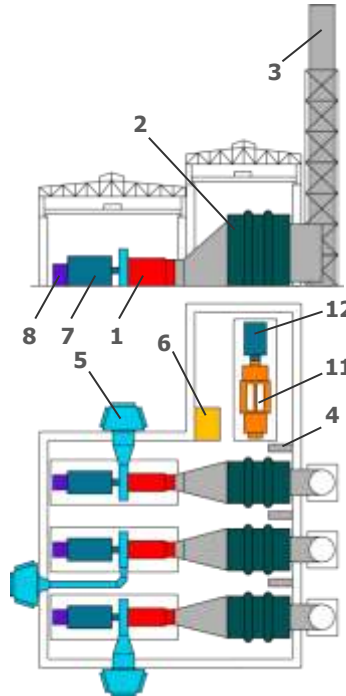
**PGU-170** – combined-cycle power plant based on **GTD-110** gas turbine for electric power generation with base, intermediate and peak loads

### PGU-325



- 1 - GTD-110 gas turbine
- 2 - exhaust-heat boiler
- 3 - chimney
- 4 - high-pressure and low-pressure feeding pumps location area
- 5 - air cleaner system
- 6 - control switchboard
- 7 - generator for gas turbine (110MW)
- 8 - accessory drive gear box (with barring gear)
- 9 - steam turbine (100MW)
- 10 - generator for steam turbine (100MW)
- 11 - steam turbine (165MW)
- 12 - generator for steam turbine (165MW)

### PGU-500



Specifications	PGU-325	PGU-500
Electric power output, MW	325	500
Efficiency (combined cycle, ISO 2314), %	51.7	52.0
Electric current frequency, Hz	50	50
Operating temperature range, °C	-40 ... +45	-40 ... +45
Range of load automatic control, %	25 ... 100	25 ... 100

- PGU-170/325/500 are full-fledged power generating packages, which comprise all functional systems ensuring its efficient operation
- High efficiency and start-stop characteristic, competitive fuel flow; optimal environmental characteristics; low cost of ownership

**PGU-325 / PGU-500** – combined-cycle power plants based on **two / three GTD-110** gas turbines for electric power generation with base, intermediate and peak loads

# GTD-4/6.3/10RM Gas Turbine Family

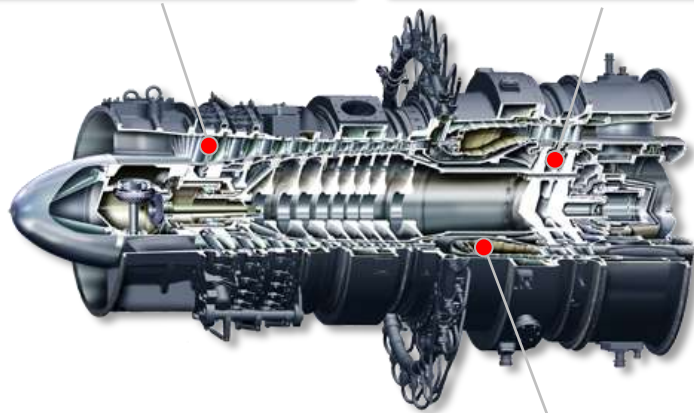
*For low-to-medium capacity  
pumping and power generating stations  
(from 4 to 80 MW and above)*



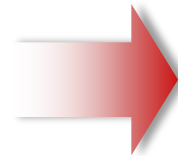
### Single HP Core

9 stages high pressure compressor

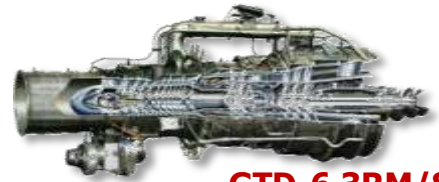
2 stages high pressure turbine



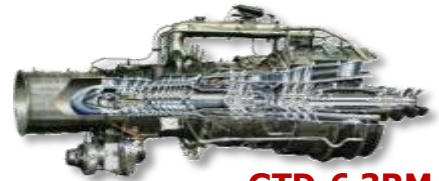
Annular combustion chamber



**GTD-10RM**



**GTD-6.3RM/8**



**GTD-6.3RM**



**GTD-4RM**

**GTD-4/6.3/10RM** gas turbine family based on high-efficient single HP Core, developed by NPO Saturn for new generation gas-turbine engines

**GTD-4/6.3/10RM gas turbine family is developed by NPO Saturn in partnership with Gazprom company for modernization of gas-transportation system**

**GTD-4RM**



**GTD-6.3RM, -6.3RM/8**



**GTD-10RM**



- High efficiency (up to 36%)
- Competitive fuel consumption
- High reliability and safety in operation

Specifications	<b>GTD-4RM</b>	<b>GTD-6.3RM</b>	<b>GTD-6.3RM/8</b>	<b>GTD-10RM</b>
Nominal power rating, MW	4	6,3	8	10
Efficiency (ISO 2314), %	32.5	32.5	34.5	35.5
Output shaft speed, rpm	10 500	8 200	8 200	4 800
Fuel consumption, kg/h	900	1 418	1 730	2 055
Exhaust gas temperature, °C	385	480	540	520
Exhaust gas flow, kg/s	21.52	25.80	28.00	32.85

**GTD-4RM, GTD-6.3RM, GTD-6.3RM/8, GTD-10RM** – family of gas turbines for pumping and power generating stations with output capacity from 4 to 80 MW and above



- NPO Saturn** – **GTD-4/6.3/10RM manufacturer**
- Saturn-GT\*** – **GPA-4/6.3/10RM packaging, starting-up and adjustment**

**GPA-4RM**



**GPA-6.3RM**



**GPA-10RM**



- Full compliance with gas-transportation system technical and operational requirements
- Advanced diagnostic and control system with high degree protection; high usability and safety in operation
- Packaging in accordance with Customer requirements

Specifications	<b>GPA-4RM</b>	<b>GPA-6.3RM</b>	<b>GPA-10RM</b>
Gas turbine type	GTD-4RM	GTD-6.3RM	GTD-10RM
Power consumption by pump, MW	3.5 – 3.8	5.7 – 5.9	9.3 – 10.0
Polytropic efficiency at nominal power, %	0.83 – 0.87	0.84 – 0.85	0.82 – 0.85
Output gas pressure, MPa	3.9 – 11.6	5.4 – 7.5	6.3 – 7.4
Pump pressure ratio	1.4 – 2.4	1.3 – 1.7	1.2 – 1.4
Operating temperature range, °C	-55 ... +45		

\* Saturn - Gas Turbines is a subsidiary company of NPO Saturn

**GPA-4RM, GPA-6.3RM, GPA-10RM** – family of gas pumping units in block-module configuration for gas transportation and storing stations modernization and construction

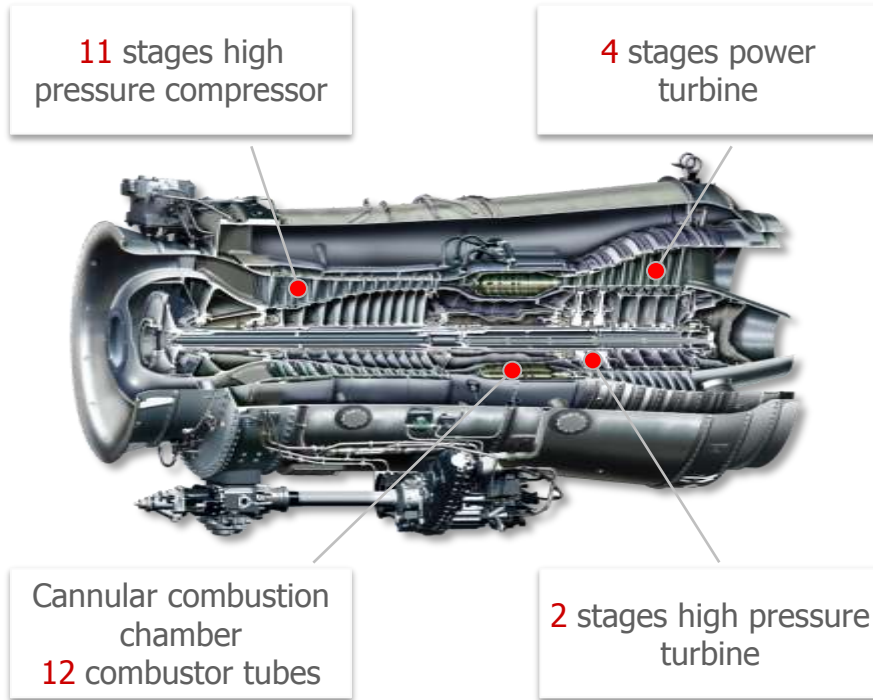
# GTD-6/8RM Gas Turbines

*For low-to-medium capacity  
power generating stations  
(from 6 to 64 MW and above)*



# GTD-6/8RM GAS TURBINES

## Design and specifications



Specifications	GTD-6RM	GTD-8RM
Nominal power rating, MW	6	8
Output shaft speed, rpm	3 000	3 000
Fuel consumption, kg/h <ul style="list-style-type: none"> <li>• fuel gas</li> <li>• liquid fuel</li> </ul>	1 830 2 180	2 360 2 820
Exhaust gas temperature, °C	471	550
Exhaust gas flow, kg/s	48	50.5
Dimensions (L x B x H), m	3.4 x 2.3 x 2.5	
Weight (with frame), t	5.1	

**GTD-6/8RM** based on D30KU/KP aircraft engines – the most abundant and reliable engines for passenger and cargo/military transport aircraft in Russian aviation history (over 55 millions flight hours at Ilyushin-62M, Tupolev-154M, Ilyushin-76)



Specifications	GTA-6RM	GTA-8RM
Electric power output, MW	6	8
Electric current frequency, Hz	50	50
Required fuel gas pressure, kgf/cm <sup>2</sup>	14 ... 18	16 ... 20
Fuel consumption, kg/h		
• fuel gas	1 950	2 540
• liquid fuel	2 263	2 947
Dimensions (L x B x H), m	11,6 x 3,6 x 3,8	
Weight, t	< 54,1	

- Packaging in accordance with Customer requirements (generators, water/steam exhaust-heat boilers, fuel gas boosters, etc)
- Shop and block-module configurations available
- Gas fuels (natural gas, oil gas) and liquid fuels (kerosene, diesel oil) applicable

**GTA-6/8RM** – power generating units based on GTD-6/8RM gas turbines for electrical and heat power generating stations (cogeneration and combined cycle) with output capacity **from 6 to 64 MW** and above

**NPO Saturn** – GTD-6RM gas turbine manufacturer  
**Saturn-GT\*** – GTA-6RM/GTES-12 packaging, starting-up and adjustment



**GTD-6RM**



**GTA-6RM**



**GTES-12**

- High efficiency in cogeneration (>80%) and combined cycles (>50%)
- High integration flexibility in power systems of municipal services and industrial projects
- Optimal environmental performances

Specifications	GTES-12
Electric power output, MW	12
Heat power output, Gcal/h	28.2
Efficiency (combined cycle, ISO 2314), %	>50
Efficiency (cogeneration cycle, ISO 2314), %	>80
Fuel consumption (fuel gas), kg/h	3 900
Operating temperature range, °C	-45 ... +45

\* Saturn - Gas Turbines is a subsidiary company of NPO Saturn

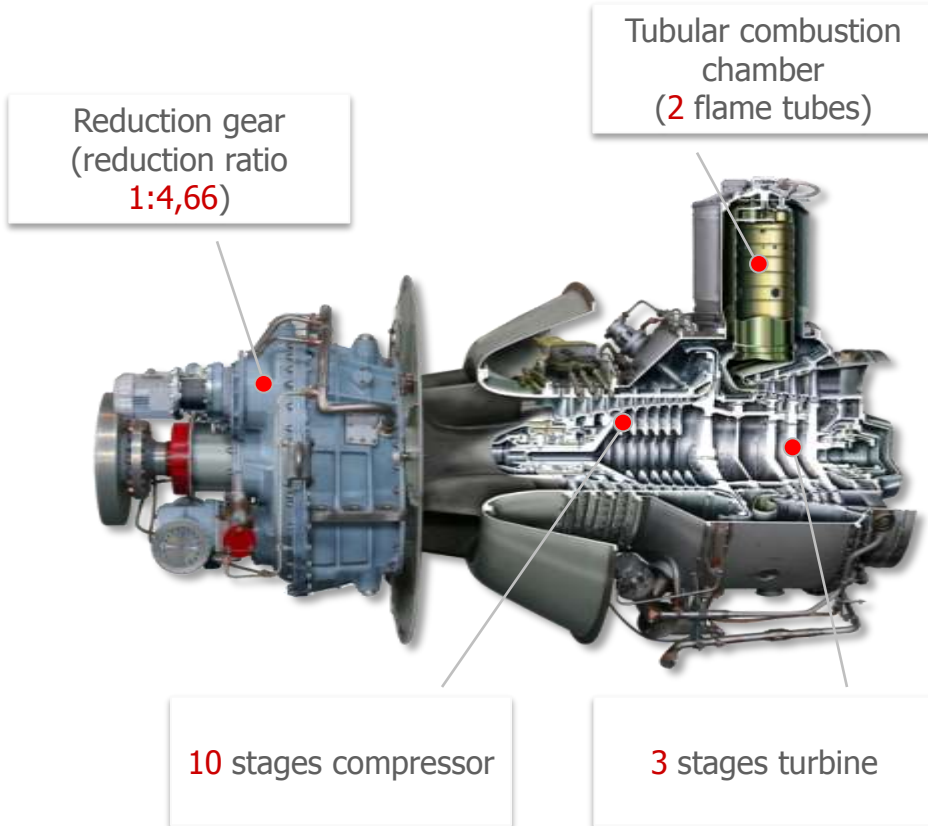
# D049R Gas Turbine

*For low capacity  
power generating and pumping stations  
(from 2.5 to 15 MW and above)*



# DO49R GAS TURBINE

## Design and specifications



Specifications	DO49R
Nominal power rating, MW	2.85
Efficiency (ISO 2314), %	28.5
Output shaft speed, rpm <ul style="list-style-type: none"> <li>reduction gear</li> <li>gas turbine</li> </ul>	3 000 14 000
Exhaust gas temperature, °C	460
Exhaust gas flow, kg/s	15.0
Dimensions (L x B x H), m	2.61 x 1.25 x 1.9
Weight, t	2.3

- High sulfur corrosion and maritime climate resistance
- Different fuels applicable, including heavy oil fuel

**DO49R** – single-shaft gas turbine for power generating (simple and cogeneration cycles) and pumping stations with output capacity **from 2.5 to 15 MW** and above

**NPO Saturn  
Saturn-GT\***

**– DO49R gas turbine manufacturer  
– GTES-2.5 packaging, starting-up and adjustment**



- GTES-2.5 consists of full-readiness, transportable and quick-assembling blocks
- Shop and block-module configurations available
- Power supplying for industries, municipal services, objects and inhabited locality in difficult to access regions and emergency situations

Specifications	GTES-2.5
Electric power output, MW	2.5
Heat power output, Gcal/h	3.87
Efficiency (simple cycle, ISO 2314), %	26.5
Efficiency (cogeneration cycle, ISO 2314), %	74
Fuel consumption, kg/h	
• fuel gas	660
• liquid fuel	770
Operating temperature range, °C	-45 ... +45
Dimensions (L x B x H), m	15.7 x 6.7 x 15.2
Weight, t	50

\* Saturn - Gas Turbines is a subsidiary company of NPO Saturn

**GTES-2.5** – block-module power station based on DO49R gas turbine for electric and heat power generating (simple and cogeneration cycles) offline or inline with main power supply system



# M75RU, M70FRU Marine Gas Turbines

*For Navy and Coast Guard warships and  
boats, civil ships, oil and gas  
on-shore and off-shore projects*



**M75RU and M70FRU marine gas turbines are created by NPO Saturn for Russian Navy**

**M75RU**



**M70FRU**



Specifications	M75RU	M70FRU
Lives (ultimate / between overhauls), h	40 000 / 20 000	40 000 / 20 000
<b>Boost mode</b>		
Power rating, shp	7 000	14 000
Specific fuel consumption, kg/shp/h	0.190	0.172
HP compressor inlet airflow, kg/s	23,1	33,3
<b>Nominal mode</b>		
Power rating, shp	6 000	12 000
Specific fuel consumption, kg/shp	0.198	0.178

- High-efficient unificated HP Core (efficiency 36%), which have accumulated over 100 000 operational hours as gas turbines for gas pumping mechanical drives
- Corrosion resistant design
- High reliability and long lives of gas turbines and derived propulsion systems

**M75RU** and **M70FRU** – base of powerplants / units for wide range of warships and boats, civil ships, as well as mechanical drive for electricity generators and gas compressors of on-shore and off-shore projects

# M75RU, M70FRU MARINE GAS TURBINES

## Potential applications

### M75RU



Power rating 7000 shp

**Project.1155 warship modernization**



**Project.1164 warship modernization**



**Project.1241.8 «Molniya»**



**Project.14232 «Merkuriy»**



**Project.14310 «Mirage»**



**Project.21630 «Buyan»**



**Project.14230 «Sokhoy»**



**Project.14231 «Ikar»**



### M70FRU



Power rating 14000 shp

**Project.20382 «Tigr»**



**Project.1241.8 «Molniya»**



**Coast guard ship for Russian Frontier Guard**



**Project.12322 «Zubr»**



**Project.12061 «Murena»**



**Drilling platforms**



**Container vessels**



**LNG tankers**



**Autopassenger ferries**



# Customer Support and Services

*To meet Customers' needs and expectations*





- Customer support and services for engines / turbines diagnostics, maintenance and repair
- Customer personnel training and consulting in the efficient operation and maintenance
- Technical publications (on paper and electronic format)
- Spare parts provisioning
- Special tooling and equipment for condition monitoring and maintenance
- Maintenance in operation (on Customer site) by dedicated team of specialists

**NPO Saturn** offers a wide range of customer support and services focused on product service life extending, operating and maintenance cost reduction



### Maintenance

- Maintenance support on Customer site and other airports if required
- Engine and equipment performances adjustment
- Scope of works in accordance with Airworthiness directives and technical notes, on Customer side as well
- Customer complaints
- Customer personnel consulting in engine design, technical specifications, operation and maintenance
- Engine parts and modules condition assessment by special diagnostic tools



### Services

- Time between removals extension on technical condition
- Ultimate life extension
- Technical documentation, spare parts, tooling and equipment for engine monitoring and diagnostic



### Field representatives

- In more than 40 airports of Russia, CIS and abroad
- Equipped with all necessary tools, equipment and tooling

**NPO Saturn** provides an entire aftersale support for **D-30KU/KP** engines including: maintenance, repair and overhaul, spare parts provisioning, on-wing support



### Overall support for entire SaM146 propulsion system (engine, nacelle) in accordance with international standards

- Customer support team
- Field representatives on Customer site
- New training center for Customer personnel training
- Customer support center (24 hours a day / 7 days a week)
- Interactive technical documentation (CD, Web portal)
- Spare parts provisioning based on new information technologies (stock reserve management, spare parts ordering, delivery monitoring)
- Engine on-wing support
- Tools and equipment
- Engine maintenance



### NPO Saturn, on behalf of PowerJet, proposes a wide service package in a frame of long-term by the hour contracts

- Engineering support
- Remote diagnostic
- Engine fleet management
- Engine, nacelle and LRU repair in shop
- Support on-wing by "Engine Maintenance On-Site" (EMOS™) specialists as required



**NPO Saturn** provides an entire after sale support and services for Customers on SaM146 propulsion system for **Superjet 100** regional jet



### Power generating and gas pumping stations customer support

- Installation and commissioning
- Maintenance in operation
- Scope of works in accordance with technical documentation
- Customer personnel consulting and training in gas turbines design, technical specifications, operation and maintenance
  - Gas turbines in operation monitoring
  - Gas turbines in operation support
- Technical condition assessment

### Wide range of services

- Maintenance in operation
- Parts and modules replacement in operation
- Gas turbine balancing
- Gas turbine washing
- Repair
- Technical documentation, spare parts, tooling for gas turbine monitoring and diagnostic

**NPO Saturn** provides a wide range of after sale support and services for industrial gas turbines focused on service life extending, operating and maintenance cost reduction



**Main objectives**

- Technical personnel training in aircraft engines operation and maintenance
- Technical personnel training in gas turbines and stations operation and maintenance
- NPO Saturn specialist training in products operation and maintenance
- Independent MRO providers personnel training

**Wide range of training courses**

- General familiarization
- Maintenance
- Borescope inspection
- Condition monitoring
- Balancing

**Training center equipment**

- Three auditorium and conference-hall
- Shop for practical training (total area 400 sq.m., up to 4 engine mock-up location)
- Tools and equipment for line and shop maintenance training

**NPO Saturn training center** was built within the framework of after sales support system for personnel training in aircraft engines and gas turbines maintenance

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