
State Enterprise Specialized Foreign Trade Firm
PROGRESS
02
UKRAINE NATIONA
UKROBORONPROM
Ukrainian Defence Industry

AIRCRAFT ENGINEERING AND MAINTENANCE

WE DO:

- aircrafts research, design, production, overall repair and modernization
- design, development, production and certification of aircraft engines
- production of:
  - relevant equipment, systems, aggregates and devices
  - radio-electronic equipment
  - ground launchers, maintenance equipment
  - and control systems

AN -178

MEDIUM TRANSPORT MULTIPURPOSE AIRCRAFT

The AN -178 is medium transport multipurpose aircraft of the family AN -148/-158 (avionics and systems from AN-148/AN-158).
It was designed to replace AN -12 and C-160 and provides the following:
- full replacement through dimensions and cargo-lifting capacity;
- maximum efficiency over superiority of all flight and technical characteristics;
- reduce of operation cost over replacement of two turbojets instead of four or two turboprops;
- Compliance to all modern requirements and standards due to on-board equipment and avionics of new generation.

Cruising altitude:
12 200 m

Cruising speed:
825 km/h

Cabin volume with cargo ramp:
167 m^3

Cabin volume without cargo ramp:
122 m^3

Cargo compartment dimensions:
13,21 (16,54) m x 2,73 m x 2,73 m

Crew:
2+1

Engines:
2 x D436-148FM

Soldiers:
90 pers.

Paratroopers:
70 pers.

Wounded at the stretchers + at seats:
48+15 pers.

Main Specifications:

	Civ	Military Airlifter		
	Ordin			STOL
Maximum payload				7,0 t
Practical range with cargo, km				
18 t	-	-	990	-
15 t (16 t for civil aircraft)	1620	1610	2040	-
10 t	3950	3500	3890	-
5 t	4700	4620	4620	2000
ferry range	5300	5230	5230	4380

AN-178 – cargo compartment's capabilities:

Carriage	Items	Weight
Containers, inch (m):		
M1 96"x96"x125" (2,438x2,438x3,175)	4	16,0 t
M2 96"x96"x238,5" (2,438x2,438x6,058)	2	16,0 t
M3 88"x96"x125" (2,235x2,438x3,175)	4	16,0 t
1D 96"x96"x117,8" (2,438x2,438x2,991)	2	16,0 t
1C 96"x96" x238,5" (2,438x2,438x6,058)	2	16,0 t
Pallets, inch (m):		
88"x108" (2,235x2,743)	5	16,0 t
88"x125" (2,235x3,175)	4	16,0 t
96"x125" (2,438x3,175)	4	16,0 t
96" x238,5" (2,438x6,058)	5	16,0 t

AN-132

LIGHT MULTIPURPOSE TRANSPORT AIRCRAFT

The AN-132 aircraft is a new generation of light multipurpose transport aircraft. It is designed for transportation of personnel, paratroops and wounded persons, various special-purpose vehicles, as well as for cargo airdropping.

Main Specifications:

Flight range with max. payload (45 min. fuel reserve)	1400 km
Flight range with 6 t payload	3320 km
Ferry range	4540 km
Maximum payload	9,2 t

Cruising altitude: 9000 m

Cruising speed: 550 km/h

Cargo cabin volume: 65 m^3

Cargo compartment dimensions: 12,07 (15,275) m x 2,4m x 1,84 m

Crew: 2

Engines: 2 x PW 150A

AN-132 has main features:

- new avionics and two-man "Glass" cockpit
- R408 Dowty propellers
- PW 150A engines
- new control system
- new interior of the cargo compartment

Soldiers: 71 pers.

Paratroopers: 46 pers.

Wounded at the stretchers: 27 pers.

AN -225 MRIYA

SUPER HEAVY CARGO AIRCRAFT

The unique aircraft has been created to perform wide-range of cargo transportation services (large-sized, heavy, long-size) with total weight up to 250 t.

Main Specifications:

Flight range with 200 t payload	4000 km
Flight range ferry	14400 km
Runway lenght	3000-3500 m
Maximum payload	250 t

Cruising altitude:
up to 12000 m

Cruising speed:
850 km/h

Cargo compartment volume:
1160 m^3

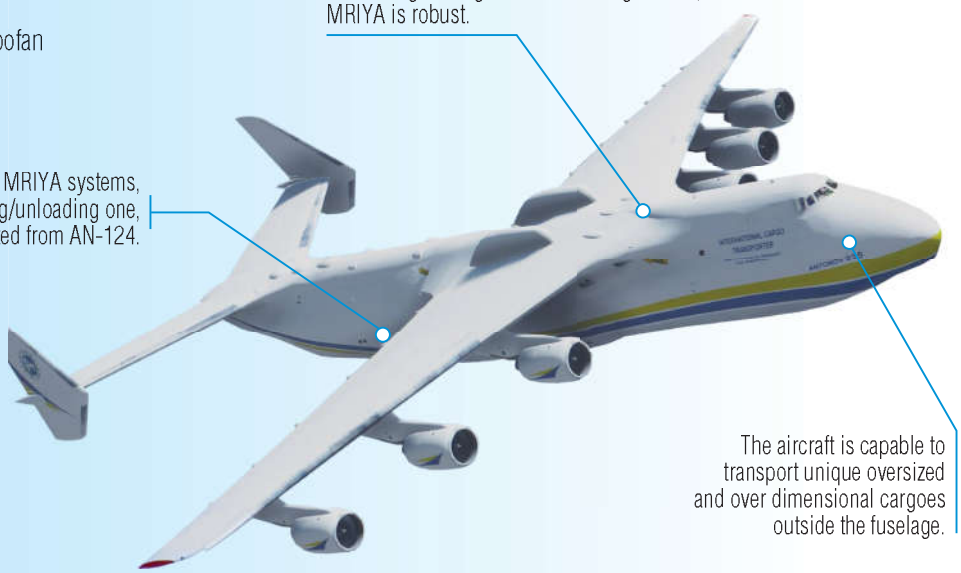
Cargo compartment dimensions:
43,32m x 6,4m x 4,4m

Crew:
4

Engines:
6 x D-18T Turbofan

MRIYA has set up 240 world records, including transportation of the heaviest cargo of 253 tons, the heaviest single piece cargo of 186,7 t, as well as the longest cargo with a total length of 42,1 m. MRIYA is robust.

Most of the MRIYA systems, including the loading/unloading one, were adopted from AN-124.



The aircraft is capable to transport unique oversized and over dimensional cargoes outside the fuselage.

AN-124 RUSLAN

HEAVY CARGO AIRCRAFT

The RUSLAN is heavy military transport aircraft. It is the biggest serial heavy lifter in the world. It is intended for the transportation of heavy and oversized cargo and various special-purpose vehicles.

Main Specifications:

	AN-124-100M-150 aircraft			AN-124-100 aircraft
	150 t	120 t	100 t	120 t
Flight range with payload	2600 km	4600 km	6200 km	4650 km
Flight range ferry	14400 km			14200 km
Runway lenght	3000 m			2800 m
Maximum payload	150 t			120 t

Cruising altitude: 8000-9000 m

Cruising speed: 775-850 km/h

Cargo cabin volume: 1160 m^3

Cargo compartment dimensions: 36,5 (43,7)m x 6,4m x 4,4m

Crew AN-124-100M-150: 6

Crew AN-124-100: 4

Engines: 4 x D-18T, Series 3

Types:

- The AN-124-100 aircraft is designed for transportation of cargoes with 120 t payload.
- The AN-124-100M-150 aircraft payload has been increased from 120 t to 150 t.

The aircraft has double-deck fuselage. Two crew cabins and cabin for cargo escort are located on the upper deck. The lower deck of cargo compartment is an airproof.

Design and dimensions of front and rear cargo doors of the aircraft provide quick and easy loading/ unloading operations. Loading/unloading operations arecarried out by means of on-board cargo complex without use of ground cargo handling equipment.

Multi-strut landing gear of high floatation, two APUs and mechanization of loading process provide the autonomous operation of the aircraft on poorly equipped airfields.

AN -70

MILITARY TRANSPORT AIRCRAFT

AN-70 is a short take-off/landing military transport aircraft, designed for transportation of a full range of airmobile equipment and weapons.

Cruising altitude:
9000-12000 m

Cruising speed:
700-750 km/h

Cargo compartment dimensions:
36,5 (43,7)m x 6,4m x 4,4m

Crew:
5

Engines:
4 x D-27, PROPFAN

Main Specifications:

Flight range with 47 t/ 35 /t 20 t payload	3000 km/ 5100 km/ 6600 km
Flight range ferry	8000 km
Runway length	
▮Short	600-700m Unpaved /Ground
▮Conventional	1550-1800m paved/concrete
Maximum payload	250 t

AN -74T-200A

MILITARY TRANSPORT AIRCRAFT

It is designed for transportation of cargo in containers or on pallets. The aircraft can be converted to carry out the following missions:

- Transportation of personnel (67 people)
- Paratroops (42 people)
- Air-drop up to 3.5 t (seven airdrop platforms per 0.5 t each)

Cruising altitude:
10 100 m

Cruising speed:
650 km/h

Cargo compartment dimensions:
25,74 m x 3,10 m

Crew:
3

Main Specifications:

Engines	2 x D-36, Series 3A turbofan engine
Maximum payload	10 t

AN-74TK-200

CONVERTIBLE TRANSPORT/PASSENGER AIRCRAFT

The aircraft is designed for transportation of up to 10 t payload or 52 passengers; AN-74TK-200 can also perform both cargo and passengers transportation.
The aircraft can be converted from all-cargo to all-passenger layout and vice-versa. It can operate on paved, as well as on unpaved runways.

Cruising altitude:
10 100 m

Cruising speed:
650 km/h

Cargo compartment dimensions:
25,74 m x 3,10 m

Crew:
2-3

Main Specifications:

Engines	2 x D-36, Series 3A turbofan engine
Maximum payload	10 t

AN -74-MP

SEA PATROL AIRCRAFT

The aircraft is capable for maritime patrolling, search and rescue operations, sea-surface pollution detecting, fishing control, as well as for air transport operations.
Cabin is equipped with additional space for the navigator and radio operator. Both workplaces are located near the blisters to conduct visual inspection of the surface of the land or sea area.

Cruising altitude:
10100 m

Cruising speed:
600-700 km/h

Crew:
5-7

Main Specifications:

Patrolling altitude	500-1000 m
Patrolling speed	280 km/h
Engines	2x D-36, Series 4A turbofan engine
Maximum payload	10 t

AN -32P

FIRE-FIGHTING AIRCRAFT

The aircraft is designed for firefighting by draining-off the extinguishing liquids. It is also capable of delivering and airdropping the smoke jumpers and special equipment, fire-extinguishing means to
the fire sites. When dropping 8 t of extinguishing liquid out of two tanks from an altitude up to 50 m at speed of 260 km/h, a water spot of 120-160 m long and 10-35 m wide is formed on the ground.

Main Specifications:

Minimum flight speed when draining liquid off	220-240 km/h
Maximum weight of extinguishing liquid	8000 kg
Total volume of liquid dropped for an hour of work in the flight range of:	
▮15 km	32 t
▮150 km	16 t
▮300 km	8 t
Flight ferry range	1700 km
Runway length	1950 m
Operating range with maximum liquid and 30-min fuel reserve	330 km
Smoke jumpers, incl. special equipment	27-30 pers

Cruising speed:
500 km/h

Crew:
3

Engines:
2 x AI-20D, Series 5

AN-148-100EM

MEDICAL AIRCRAFT

The AN-148-100EM – convertible medical aircraft – aircraft convertible by technical crew into the medical evacuation aircraft in 2 hours due to ability to hold medical modules and seats in the aircraft cargo compartment. AN-148-100EM has a main passenger cabin (staff lounge) and six mobile medical modules to provide the necessary aid to sustain patient's life functions.

Cruising altitude:
12200 m

Cruising speed:
850 km/h

Crew:
2

Engines:
2 x D-436-148 turbofan engine

Main Specifications:

Maximum payload	9 t
Flight range with 35 pers	4800 km
Passenger capacity	51 pers
Runway length	1800 m

AN -158

REGIONAL JET AIRLINER

It is an upgraded version of AN-148 regional jet airliner. It can perform transportation of 86 passengers in a double-class layout with a flight range up to 3100 km and up to 99 passengers in a single-class layout with a flight range up to 2500 km.
An-158 is able to operate at high altitudes and get into the aerodromes, located at altitude of 4000 meters above sea level.

Cruising altitude:
12200 m

Cruising speed:
870 km/h

Crew:
2

Engines:
2 x D-436-148 turbofan engine

Main Specifications:

Maximum payload	9,8 t
Flight ferry range	3100 km
Passenger capacity	99 pers
Runway length	2000 m

R-27-AIR-TO-AIR

GUIDED MISSILES

R -27 medium range missile is designed for interception and destruction of piloted and unpiloted aircraft, as well as cruise missiles in long and close-range maneuvering air combat. The construction consists of unit with target-seeking device, payload and solid-propellant engine with three missile thrust fittings. It is a part of MiG and Su-types aircrafts' armament.

Length:
3,7 - 4,7 m

Caliber:
0,23 m

Weight:
245 - 350 kg

Main Specifications:

Launch range:	
▮max range	50 — 95 km
▮min range	0,5 km

GLIDE BOMB

The bomb is designed for destruction of the ground-based targets like railway bridges, concrete constructions, runways, radar stations, positions of operative and tactical missiles, antiaircraft missile systems as well as water-surface targets during the carrier's level flight, diving and pitch-up. It is equipped with a television seeker which ensures the targets locking-on under the aircraft and automatic target seeking in autonomy flight.

Main Specifications:

Operational range:	
▮from the altitude of 0,5 km	up to 8 km
▮from the altitude of 5 km	up to 20 km
Target aiming accuracy (CEP)	3 – 5 m
Aircraft velocity while dropping	200 – 300 m/s
Warhead type	high-explosive
Type of suspension	AKU-58

Diameter:
400 mm

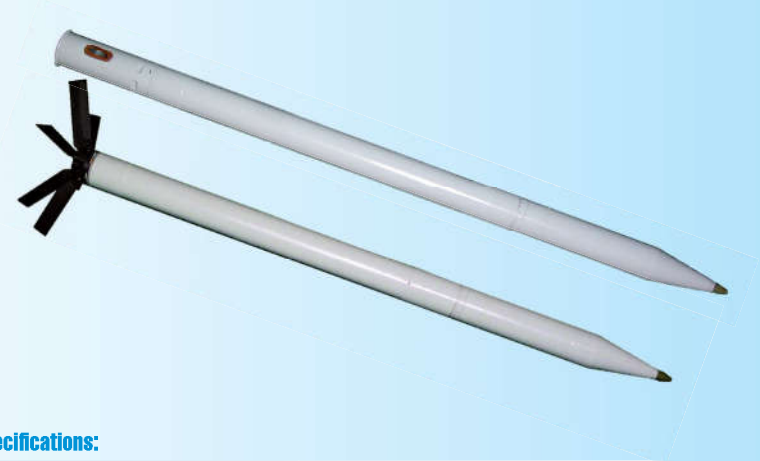
Weight:
850 kg

Warhead weight:
650 kg

AR-8

AIRCRAFT ROCKET

AR-8 aircraft rocket is designed for destruction of different kinds of ground targets (tanks, APC, self-propelled artillery launchers, missile launchers, radar stations, parked aircrafts, ammunition depots, special trains, manpower). The rocket is launched from the B8M and B8V20 launching units which constitute a part of the air-launched weapons of the following types of aircrafts: SU-17, SU-24, SU-25, SU-27, MiG-23, MiG-27, MiG-29 as well as helicopters: Mi-24, Mi-28 and Mi-8.



Missile length:
1590 mm

Caliber:
80 mm

Missile weight:
12,9 kg

Main Specifications:

Firing range	1200–4000 m
Warhead weight	4,3 kg
Warhead type	hollow-charge and fragmentation
Damage effect:	
▮ armor penetration	not less than 400 mm
▮ amount of fragments	not less than 500 pcs

GUIDED AIR-TO-AIR MISSILE

GUIDED AIR-TO-AIR MISSILE OF CLOSE AIR COMBAT

Main Specifications:

Carrier altitude	20 – 20000 m
Target altitude	20 – 20000 m
Carrier speed	650 – 2500 km/h
Target speed	not more than 2700 km/h
Target location above (under) carrier	0 – 5000 m
Angles of target designation	±60 °C

High maneuverable guided air-to-air missile of close air combat with infra-red homing head, noncontact radar target sensor in the millimetric range and controllable vector of the engine thrust is intended for interception and destruction of high maneuverable means of air attack and reconnaissance during assault:

- at any time of day or night;
- at front and rear hemisphere of targets;
- against ground, sky and water surface backgrounds;
- under ordinary and adverse weather conditions;
- with active informational and maneuverable counteraction of the enemy.

The missile is designed for use in the weapons systems of fighters, front bombers and ground-attack aircrafts.

MK-80, MK-2200

OPTICAL SEEKERS FOR AIR-TO-AIR MISSILES

Specifications:

	MK-80:	MK-2200:
	(for R'73 missile)	(for R-73 missile modernization)
Spectral range	IR middle waves	IR middle waves, two-band
Target lock-on range	10...12km	14...16km
Field of view	+2.5°	2.5° x 3.5°
Field of regard	+ 75°	+ 75°
Targeting angles	o to +1	±60°
Angu[illegible]acking speed	60 °/s max	60 °/s max
Calit[illegible]	170 mm	170 (140...200) mm

A3-20

OPTICAL SEEKERS FOR AIR-TO-AIR MISSILES

Specifications:

Spectral range	IR middle waves, two-band
Target lock-on range	up to 30 km
Field of view	3.5° x 3.6° max
Field of regard	±50°
Targeting angles	+ 40°
Angular autotracking speed	40 °/s max
Caliber	230 (200...230) mm

R-27T

MIDDLE-RANGE AIR-TO-AIR MISSILE

OS-27T features:
- phase-pulse modulation method;
- two-spectral multi-element photodetector device;
- digital methods of data processing using of microprocessor units;
- reprogramming possibility of noise immunity algorithms.

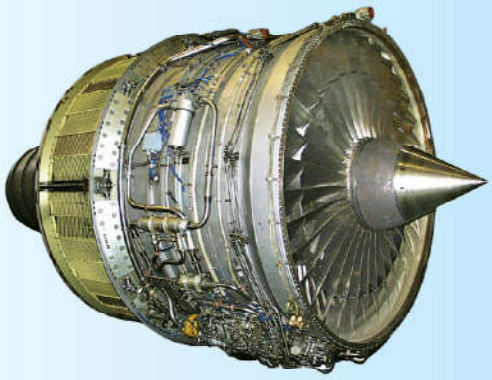
Target rear hemisphere

Key features	36T optical seeker	OS-27T
Typical target lock-on range (km): -forward hemisphere, aspect angle (q = 10...30°) - rear hemisphere, aspect angle (q = 170...180°)	 16-18 60-70	 30 >100
Modulation method	pulse-amplitude	phase-pulse
Maximum autotracking angular velocity, °/s	15	40
Lock-on zone, deg	±1 (increased sensitivity zone)	3,5 x 3,6
Bearing angle, deg	±60	±60
Target designation angles, deg	±45	±50
Readiness time, minutes	<10	<2
Continuous operation time, (balloon V=7.3 L(8)), hr.	3	5
Jamming protection probability, P	0,7	0,8 (algorithm reprogramming possibility)
Mass, kg	24,5	<10 (without external housing)
Length, mm	835	440

D-18T SERIES 3

TURBOFAN AERO ENGINE

It is designed to power the AN-124, AN-124-100 RUSLAN and AN-225 MRIYA ramp-equipped heavy cargo aircrafts. The engine design allows operating it on technical condition up to depletion of the engine main components life. The engine has Type Certificate. It meets the current environmental requirements of ICAO standards.



Dimensions:
5400x2937x2792 mm

Weight, dry:
4100 kg

Main Specifications:

Take-off performance (SLS; ISA)	
▮ thrust	23430 kgf
▮ specific fuel consumption	0,34 kg/kgf•h
Maximum cruise performance (H=11000 m; Mfl=0,75; ISA)	
▮ thrust	4860 kgf
▮ specific fuel consumption	0,546 kg/kgf•h

D-436-148FM

TURBOFAN AERO ENGINE

D-436-148FM Turbofan Aero Engine is designed to power the An-178 short-distance military transport aircraft and regional An-148 and An-158 passenger aircraft. The engine has Type Certificate. It meets the effective environmental requirements of ICAO standards.

Main Specifications:

Automatic control system adjustment types:	D-436-148B	D-436-148D	D-436TP	D-436T1
Emergency performance (SLS)				
▮ thrust	7280* kgf	7690** kgf	-	-
Takeoff performance (S/L static; ISA)				
▮ thrust	6570* kgf	7010** kgf	7500 kgf	7500 kgf
▮ specific fuel consumption	0,351 kg/kgf•h	0,351 kg/kgf•h	0,37 kg/kgf•h	0,37 kg/kgf•h
Max cruise rating (H=11000 m, Mfl=0,75, MCA+10°C)				
▮ thrust	1560 kgf	1560 kgf	1500 kgf	1670 kgf
▮ specific fuel consumption	0,6 kg/kgf•h	0,6 kg/kgf•h	0,650 kg/kgf•h	0,608 kg/kgf•h
Dimensions	4,034 x 1,784 x 1,930 mm		4170x1640x1915 mm	4170x1802x1949 mm
Weight, dry	1400 kg		1450 kg	

*-tAMB =+37,5 oC / **- tAMB =+30 oC

D-36 SERIES 1/1A/2A/3A/4A

TURBOFAN AERO ENGINE

The engines are designed to power the Yak-42 passenger aircraft and the AN-74 transport aircraft. There is the Type Certificate for this engine. The engine series 4a is designed to power the AN-74TK-300 convertible aircraft.
It also meets the current environmental requirements of ICAO standards.

Main Specifications:

Series	1	1A/2A	3A	4A
Emergency performance (SLS; ISA +15°C)				
▮thrust	-	-	6500 kgf	6500 kgf
Take-off performance (SLS; ISA)				
▮thrust	6500 kgf	6500 kgf	6500 kgf	6500 kgf
▮specific fuel consumption	0,365 kg/kgf•h	0,365 kg/kgf•h	0,358 kg/kgf•h	0,358 kg/kgf•h
Maximum cruise performance (H=8000 m; Mfl=0.75; ISA)				
▮thrust	1600 kgf	1600 kgf	1600 kgf	1600 kgf
▮specific fuel consumption	0,650 kg/kgf•h	0,650 kg/kgf•h	0,630 kg/kgf•h	0,630 kg/kgf•h
Dimensions	3470x1541x1412	3192x1541x1712	3192x1541x1712	3732,5x1802,3x1987,4
Weight, dry	1124 kg	1124 kg	1124 kg	1130 kg

AI-222-25F

TURBOFAN AERO ENGINE WITH AFTERBURNER

The engine is designed to power training, combat training and light combat aircrafts and complies with strict requirements for the engines of this class. The turbine compressor section of the engine is fully unified with the AI-222-25 baseline engine.

Main Specifications:

Series	AI-222-25F	AI-222-25
Full afterburning power (SLS, ISA, Qinlet = 1,0):		
▮thrust	4200 kgf	-
▮specific fuel consumption	1,9 kg/kgf•h	-
Full afterburning power (H 11000 m, M 1,4, ISA, Qinlet = 0,97):		
▮thrust	2760 kgf	-
Maximum power (SLS, ISA, Qinlet = 1,0):		
▮thrust	2500 kgf	2500 kgf
▮specific fuel consumption	0,66 kg/kgf•h	0,64 kg/kgf•h
Maximum performance (H-5000M; Mfl =0,6; ISA; Qinlet =0,97):		
▮thrust	-	1450 kgf
Cruise performance (H=10000m; Mfl =066; ISA; Qinlet =0,97)		
▮thrust	-	300 kgf
▮specific fuel consumption	-	0,875 kg/kgf•h
Dimensions	3070x1084x860	2238x1093x860
Weight, dry	560 kg	440 kg

AI-25TLSH

TURBOFAN AERO ENGINE

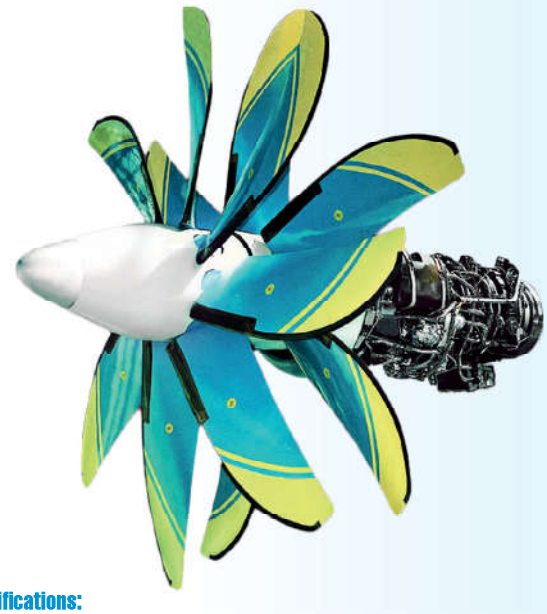
Designed to power other existing trainers and combat trainers used as light attack aircraft. In this respect, a combat maximum power rating of enhanced thrust, employed for strike operations, has been additionally introduced and engine acceleration time has been substantially reduced.

Dimensions:
3358x985x958 mm

Weight, dry:
350 kg

Main Specifications:

	Combat	Training
Maximum performance (SLS; ISA)		
▮thrust	1850 kgf	1720 kgf
▮specific fuel consumption	0,58 kg/kgf•h	
Maximum cruise performance (H=0 m; Mfl=0,6; ISA+15°C)		
▮thrust	1250 kgf	1100 kgf
Acceleration time	6 sec	



D-27

TURBOFAN AERO ENGINE

D-27 Tubofan Aero Engine is designed for installation on An-70 highly efficient transport aircraft featuring improved takeoff and landing characteristics. It offers efficiency increased by 30% to aircraft. It meets the effective environmental requirements of ICAO standards. It is passing flight and state bench tests.

Dimensions:
4575x1570x1372

Propfan diameter:
4500 mm

Weight, dry:
1650 kg

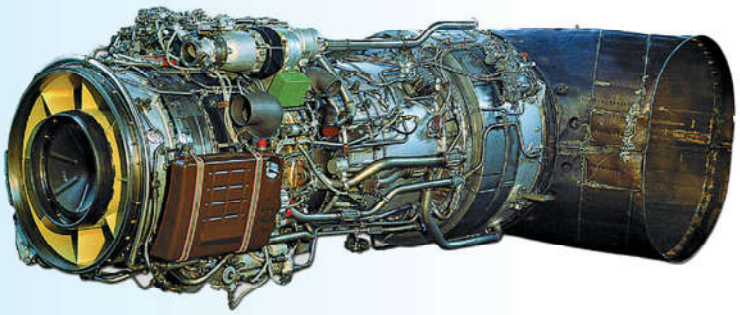
Main Specifications:

Take-off performance (SLS; ISA)	
▮power	14000 ehp
▮specific fuel consumption	0,170 kg/ehp•h
Maximum cruise performance (H=11000 m; Mfl=0,7; ISA)	
▮power	6750 ehp
▮specific fuel consumption	0,130 kg/ehp•h

D-136, D-136 SERIES 1

TURBOSHAFT AERO ENGINE

Designed to power the largest in the world Mi-26, Mi-26T transport helicopters. The most powerful turboshaft engine in the world has low specific fuel consumption and gravity of engine. It has undergone state bench tests and certification. The engine has Type Certificate. It meets the effective environmental requirements of ICAO standards.



Dimensions:
3715x1382x1124

Weight, dry:
1077 kg

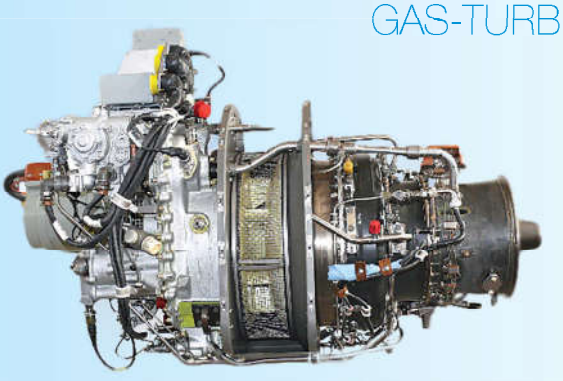
Main Specifications:

Take-off performance (SLS; ISA)	
power	11400 hp
specific fuel consumption	0,194 kg/hp•h

AI-450M

GAS-TURBINE TURBOSHAFT AERO ENGINE

Gas Turbine Turboshaft Aero Engine AI-450M is intended for upgraded Mi-2M helicopter and multipurpose helicopters MSB-2, Rusmas.



Dimensions:
1047x538x684

Weight, dry:
115 kg

Main Specifications:

Take-off performance (SLS; ISA; Ointel=1,0)	
power	400 hp
specific fuel consumption	0,280 kg/hp•h
Maximum cruise performance (SLS; ISA; Ointel=1,0)	
power	285 hp
specific fuel consumption	0,320 kg/hp•h

AI-450-MC

AI-450-MS GAS-TURBINE AUXILIARY ENGINE

The AI-450-MS is an up-to-date gas-turbine auxiliary engine of two-shaft design featuring equivalent power of 222 kW. The engine is to be used in the An-148 passenger plane andother various-purpose planes. High efficiency of application of the AI-450-MS auxiliary engine
built by Motor Sich JSC on the basis of the gas generator of AI-450 gas-turbine engine.

Specifications:

(SLS; ISA) Absorbed power to drive	
generator, kW	40
Bleed air consumption, kg/s	1.127
Bled air pressure, kgf/cm2	4.75
Bled air temperature, oC	230
Fuel consumption, kg/h	118

Purpose:

- generation of compressed air for starting propulsion gas-turbine engines;
- electrical power supply with 200/115 VAC, 400 Hz, power up to 40 kVA;
- generation of compressed air for aircraft conditioning system;
- generation of compressed air for aircraft anti-icing system.

MS400

MS400 SMALL-SIZE TURBOFAN ENGINE

The engine is designed for installation in light air vehicles.

Specifications:

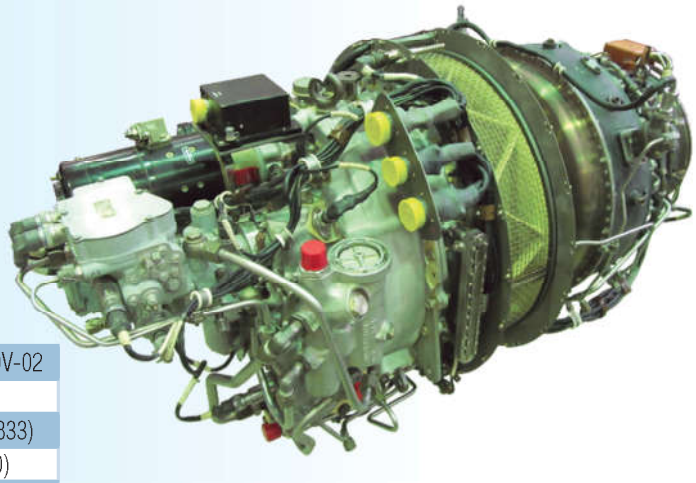
Maximum power SLS, ISA	
Thrust, kgf (kN)	400 (3.92)
SFC, kg/kgf•h (kg/kN•h)max	0.85(81.5)
Overall dimensions	
Engine diameter with respect to cowling, mm	315
Length, mm	850
Dry weight, kg	85

The MS400 engine features:

- high reliability
- high fuel efficiency
- low thrust-to-weight ratio
- long period of operation and storage in aircraft and insignificant scope of maintenance operations
- quick and reliable starting within wide range of environmental conditions as well as altitudes and airspeed
- resistance to instability of engine inlet air pressure and temperature
- capability of inadvertent surge recovery
- compact and simple single-shaft design
- built-in electric generator providing power supply to aircraft systems
- electronic-and-hydraulic automatic control system which does not need adjustment during storage and operation
- feasibility of air bleeds for aircraft needs

MS-500V

The engines are intended for installation in civil purpose helicopters with takeoff mass of 3.5 to 6 t and permit to attain high economic standards in the course of commercial use.



Basic specifications:

Engine	MS-500V	MS-500V-01	MS-500V-02
With one engine inoperative (OEI) (SLS, ISA):			
2,5-min power; hp (kW)	710 (522)	1000 (735)	1200 (833)
(flat-rated to t_{AMB}, °C)	(+35)	(+15)	(+20)
30,0-min power; hp (kW)	659 (485)	850 (625)	1000 (735)
(flat-rated to t_{AMB}, °C)	(+40)	(+30)	(+35)
Take-off power rating (SLS, ISA):			
Power, hp (kW)	630 (463)	810 (596)	950 (699)
(flat-rated to t_{AMB}, °C)	(+35)	(+35)	(+35)
Cruise power rating (SLS, ISA)			
Power, hp (kW)	450(331)	450(331)	500(368)
(flat-rated to t_{AMB}, °C)	(+50)	(+50)	(+50)

Main advantages of the engine:

- simple and effective design;
- high reliability;
- low specific fuel consumption;
- high stability of characteristics in service;
- compliance with current and future environmental requirements;
- extended service life and durable calendar life;
- ease and convenience of maintenance and repair;
- low cost of life cycle.

TV3-117VMA-SBM1V SERIES 1

Basic specifications:

2.5-min power 60-min continuous power I (1CP) with OEI (H=0, M=0, ISA):	
Power,h.p. (kW)	2800(2059)
flat-rated up to toat, °C	+38
60-min continuous power II (2CP) with OEI 30-min continuous take-off power Take-off power (H=0, M=0, ISA):	
Power, h.p. (kW)	2000*(1470) ... 2500*(1838)
flat-rated up to toat, °C	+58 ...+37
Specific fuel consumption,kg/h.p.•h (kg/kW•h)	0.220(0.299) ... 0.209(0.284)
Cruise power (H=0, M=0, ISA):	
Power, h.p. (kW)	1500(1104) ...1750(1278)
flat-rated up to toat, °C	+45 ...+35
Engine dry weight, kg	295

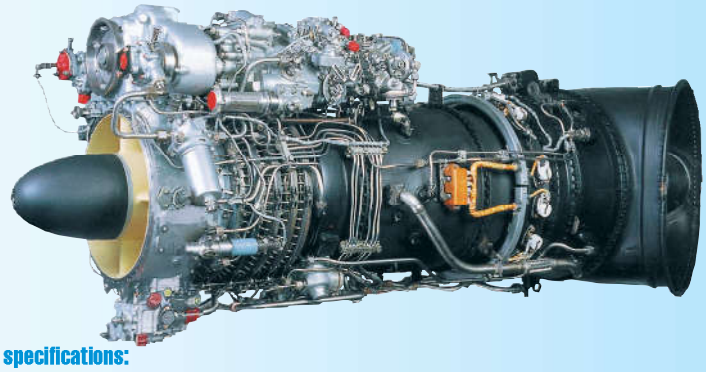
* Engine automatic control system allows adjusting take-off power rating value – 2500, 2400, 2200 и 2000 h.p. (depending on aircraft type, powered by the engine).

The TV3-117VMA-SBM1V Series 1 is being designed on the basis of the certified TV3-117VMA-SBM1V by implementing an upgraded automatic control system which allows:

- increasing precision of maintenance and limitation of engine operation parameters
- eliminating mechanical drive of MR speed governor ("flexible shaft")
- keeping a record of engine service life in different power ratings
- realizing engine anti-surge protection algorithm
- implementing torque measurement system into engine design

TV3-117VM

The TV3-117VM turboshaft engine is used to power in civil helicopters.
The TV3-117VM turboshaft is one of the world`s best engines as regards its fuel efficiency and weight performances. High-tech development and perfect mass-production process have ensured the engine`s superior reliability and extensive service life.



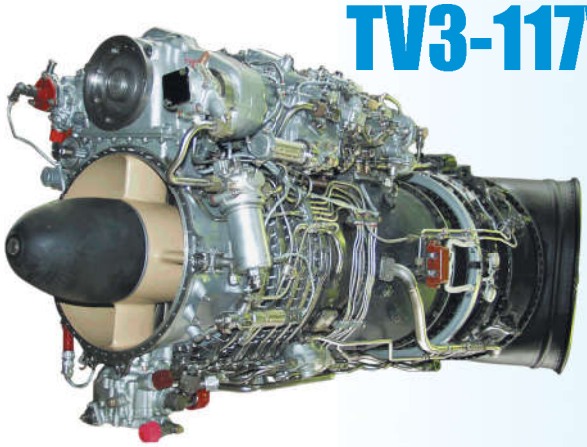
Main advantages of the engine:

- Low specific fuel consumption;
- Low weight-to-power ratio;
- High reliability;
- Long service life;
- High maintainability;
- High repairability;
- Emergency power condition allowing to complete a flight with one engine inoperative;
- Possibility for installing a dust protection device.

Basic specifications:

	TV3-117VM
2.5- minute power rating, with one engine inoperative (OEI) (SLS, ISA):	
Power, shp (kW)	2200 (1618)
30- minute power rating, with one engine inoperative (OEI) (SLS, ISA):	
Power, shp (kW)	2000(1471)
Specific fuel consumption, kg/hp•h (kg/kW•h)	0.215 (0.296)
Cruise power condition (SLS, ISA):	
Power, shp (kW)	1500 (1103)
Dry weight, kg	294

TV3-117VMA-SBM1V 4E SERIES



This engine is intended for civil helicopters.
Compared with helicopters powered by TV2-117 engines, TV3-117VMA-SBM1V engines can keep their power up to high environment temperatures and high altitudes of location and flight.
2.5-minute power setting provides safe helicopter take off and landing with one engine inoperative (OEI).

Basic specifications:

2.5-minute power rating and continuous power rating - 60 min (Cont 1) OEI (SLS, ISA+10°C)	
Power, shp (KW)	1700 (1251)
Continuous power rating - 60 min (Cont 2) OEI Continuous take-off power rating (CTO) 30-min, Take-off power rating (SLS, ISA)	
Power, shp (kW)	1500 (1104)
The power can be kept up to environment temperature, °C	+55
Specific fuel consumption, kg/hp•h	0,261
Cruise power setting (SLS, ISA):	
Power, shp (kW)	1000(736)
The power can be kept up to environment temperature, °C	+60
Specific fuel consumption, kg/hp•h	0,290
Dry weight, kg	295

Main advantages of the engine:

- high reliability;
- increased power maintained in hot and high conditions;
- low SFC;
- long service life;
- easy in-service maintenance;
- high repairability;
- stable operation under conditions of heavy smoke and dust;
- low cost of life cycle.

AI-9V, AI-9V SER. 1

AUXILIARY TURBINE ENGINE

AI-9V, AI-9V SER. 1 used as power source effecting supply of compressed air to starting system of helicopter engines and electric power supply to helicopter electric power system when checking helicopter electrical and radio equipment. Installed on Mi-8 (Mi-8AMT, Mi-8MTV, Mi-17, Mi-171, Mi-172), Mi-24 (Mi-35), Mi-28 helicopters.

Bled air temperature: 160 °C

Weight, dry: 57 kg

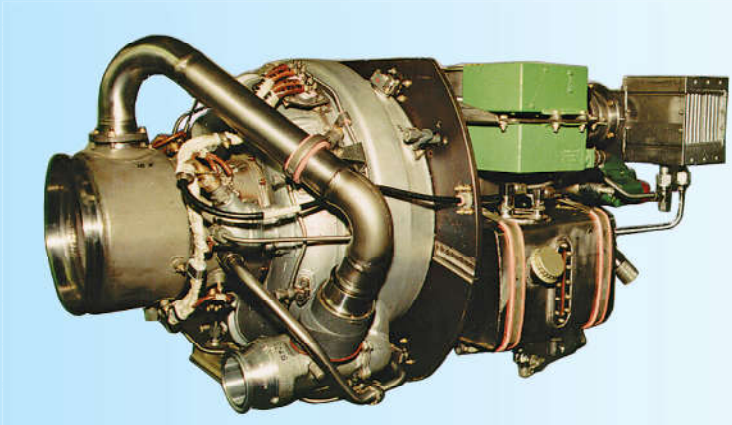
Main Specifications:

Engine	AI-9V	AI-9V ser. 1
Bled air consumption	0,4 kg/s	
Bled air total pressure	not less than 2,9 kgf/cm^2	not less than 3,1 kgf/cm^2
Electric power takeoff in generator operating mode	3 kW	4,5 kW

AI9-3B

AUXILIARY TURBINE ENGINE

AI9-3B used for starting aircraft propulsive engines and conditioning cockpits and cabins, and also for powering airborne electric equipment.



Bled air temperature: 260 °C

Weight, dry: 128 kg

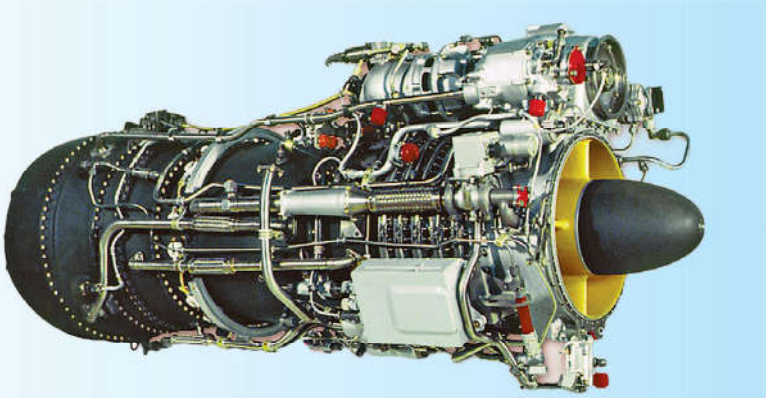
Main Specifications:

Aircraft electric system DC power	16 kV•A
Bled air consumption	0,4 kg/s
Bled air total pressure	not less than 4,0 kgf/cm^2
Fuel consumption	92 kg/h

TV3-117 (-KM, -M, -MT) SERIES 3

TURBOSHAFT ENGINES

The engines are intended for the following helicopters:
- TV3-117 ser.3 – for Mi-24, Mi-25, Mi-35;
- TV3-117 KM ser.3 – for Ka-27, Ka-29;
- TV3-117 M ser.3 – for Mi-14;
- TV3-117 MT ser. 3 – for Mi-8MT, Mi-17.



Power:
2225 hp

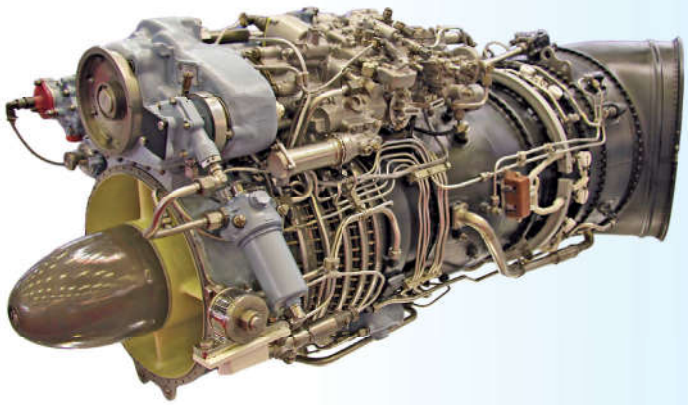
Weight, dry:
285 kg

Main Specifications:

Take-off performance (SLS; ISA)	
▮specific fuel consumption	0,230 kg/hp•h

TV3-117VMA

TURBOSHAFT ENGINE



The TV3-117VMA turboshaft engine is used to power in various-purpose helicopters. The TV3-117VMA turboshaft is one of the world`s best engines as regards its fuel efficiency and weight performances. High-tech development and perfect mass-production process have ensured the engine`s superior reliability and extensive service life.

Main advantages of the engine:
- low specific fuel consumption;
- low weight-to-power ratio;
- high reliability;
- high reliability;
- long service life;
- high maintainability;
- high repairability;
- steady operation in harsh dust and smoke conditions;
- possibility of long-time operation in maritime conditions.

Main Specifications:

2.5- minute power rating, with one engine inoperative (OEI) (SLS, ISA):	
▮power	1765 kW
30- minute power rating, with one engine inoperative (OEI) (SLS, ISA):	
▮Power	1618 kW
▮Specific fuel consumption	0.286 kg/kW•h
Cruise power condition (SLS, ISA):	
▮Power	1103 kW
Weight dry	294 kg

"ADROS" KT-01 AVE

ELECTRO OPTICAL JAMMING STATION

The electro optical jamming station "Adros" KT-01 AVE is designed for active protection of helicopters against guided missiles with infrared seekers. Stations of this type are designed for suppression of infrared homing heads with amplitude-phase modulation (APM).

Power supply:
DC 27V

Weight:
25 kg

Main Specifications:

Locking-in failure probability of «Stinger»-type missile attack	0,7... 0,8
Time of full locking in failure for MPAD «Stinger»	0,5...0,8 sec
Supplied by helicopter on-board power system, AC:	
▮ three-phase	208 V, 400 Hz
▮ single-phase	115 V, 400 Hz

LASER SYSTEM FOR SIGHT MARK FORMING «ADROS» FPM-01KV

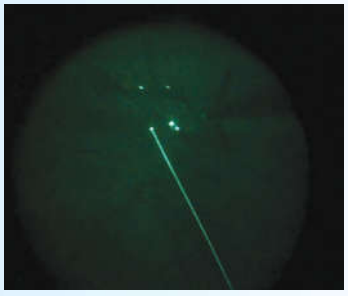
Laser system for sight mark forming «Adros» FPM-01KV provides operative combat application of helicopter unguided munition in dark conditions. It forms sight mark directly on the ground target visible through pilot night goggles.

Laser system for sight mark forming «Adros» FPM-01KV increases helicopter original sight capabilities and can be used with different aiming and observing systems both independently and as reserve for FLIR systems.

«Adros» FPM-01KV system is designed for installing on Mi-8, Mi-17, Mi-171, Mi-24, Mi-35, Mi-2, as well as similar class helicopters.

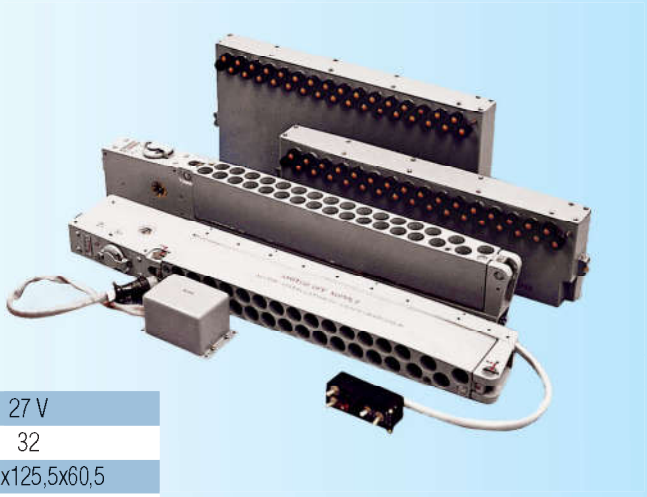
Technical specification

laser beam angular velocity	not less than 20 deg/s
beam deviation angles	± 20° by azimuth from – 30° to +6° by elevation
beam positioning accuracy	not worse than 1.5 mrad
power supply	27 V DC, 40W 36 V, 400 Hz, 70VA
readiness time less than	3 min
weight less than	5 kg



ASO-2V, ASO-2VM

AUTOMATIC CHAFF DISPENSER



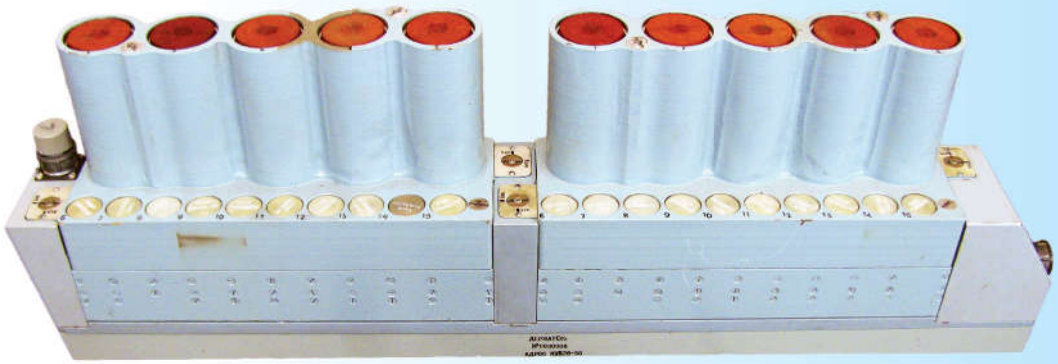
It is used on the An-Series aircrafts and Mi-Series helicopters and designed for jamming missile radars and IR seekers.

Main Specifications:

Operating voltage	27 V
Magazine capacity (Qty of rounds in 1 section)	32
Overall dimensions (without connectors)	768,5x125,5x60,5
Weight:	
▮ ASO-2V	12,7 kg
▮ ASO-2VM	14,9 kg

"ADROS" KUV 26-50

COMBINATION JAMMING DISPENSER



Combination jamming dispenser "Adros" KUV 26-50 is designed to contain and throw-out false thermal targets (FTT) and passive radar clutters of 26 mm and 50 mm caliber from each unit. Dispensing is implemented with special programs, thus a complex jamming environment for infrared seekers of all type missiles is creating, and as well there is a system of FTT selection.
"Adros" KUV 26-50 can be installed on helicopters, military transport and attack aircrafts.

Caliber of rounds:
26 mm and 50 mm

Power supply:
+27 V

Power consumption:
not more 250 W

Main Specifications:

Quantity of rounds in one section	20 of 26 mm caliber, 10 of 50 mm caliber
Quantity of section	up to 16
Readiness time	30 s
Integrated Control System	yes

SURA, SURA-K, SURA-M

HELMET-MOUNTED TARGET DESIGNATION SYSTEMS

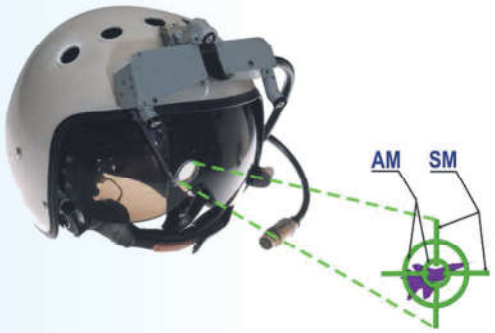
Sura, Sura-K, Sura-M helmet-mounted target designation systems (HMTDS) are designed for prompt aiming of guided weapons (IR seeker missiles, turret guns) and viewing systems by turn of the pilot's head.
Aiming (AM) and signal (SM) marks are indicated in the pilot's field of view.
DESCRIPTION OF UPGRADING:
Indication of additional realtime aiming and flight information (altitude, speed, distance to target, etc.), other than the aiming and signal marks. Information type is specified for each type of carrier. The angular size of the displayed information is 6x4 deg.
Upgrading is performed by replacing the helmet-mounted unit and two boards in electronic unit.

Hmtds main characteristics:

Target designation angles range:	+70...-70 in azimuth +65...-35 in elevation
Target designation accuracy (RMS error):	<3mrad
Weight: Sura, Sura-K (set)	10 kg
Sura-M (set)	6 kg
helmet-mounted unit	0,39 kg (with cable)

Hmtds main characteristics:

HMTDS type	Sura	Sura-K	Sura-M
Combat aircraft types	Su-30MKI Su-30MKM Su-30MKI(A)	SU-30MKK SU-30MK2 Su-27SM SU-27SK	Su-35 SU-30SM MiG-29SMT МиG-29UB



Sura, Sura-K HMTDS

Sura-M HMTDS

VDK-558

AIMING SYSTEM COMPUTERS

Vdk-558 additional channel computer for su-22 aircraft modernization purpose:
Vdk-558 additional channel computer (su-22 aircraft modernization) designed for solving problems of aiming and load release at the point with known coordinates in conjunction with satellite navigation system.
Composition:
Bcvm-25a - ballistic computer;
BII - information indication unit
(Part of ground-based equipment) for setting the released load parameters before flight with checkout equipment functions.
Basic specifications:

- Altitude range 50 t 6000m
- Payload calm sweep error relative to target not more than 10 m
- Ground target mode is provided at interconnecting with satellite navigation system without target visual contact

BCVM Ballistic Computer

BII Information Indication Unit

GURT-M

UNIVERSAL COMPLEX

Complex Gurt-M is a modification of the complex Gurt
- The diagnostic capability of more than 50 various modifications of guideded air missiles and air bombs
- Missile's Final inspection at manufacturing plants
- Fault diagnostics during repair of missiles
- Forecast of missiles' technical state while prolonging their service life

GURT-M system advantages:
- overall and weight characteristics of the AKPA are reduced;
- characteristics of operational reliability are improved;
- up-to-date methods of visualization and documenting of the test results are introduced. The usage of the modern industrial computer allows to document the results in various languages and also to correct check routines while in operation;
- long-term storage of missiles testing results for the whole operation period is secured that allows to forecast their technical state while prolonging their service life;
- power supply units, created on the basis of static converters of enhanced comfort (economic, noiseless, easy to maintaine), are applied in the AKPA6.2M;
- specialized equipment, in addition to the AKPA, can also include diagnostic equipment sets (DES) which allow to localize faults in missiles for their repairing.

GURT

UNIVERSAL COMPLEX

It is designed for preparation for use and maintenance of guided weapons (missiles and bombs) on preparing positions, warehouses and bases of operating organizations.
- The diagnostic capability of more than 40 various modification of missiles
- Operating in heavy climatic conditions
- Connecting to computer of IBM-type
- Self-monitoring with the definition of a defect up to structural or functional unit
- Independent gas and energy supply
- Mobile transportation

ASP-17VPM-U

UPGRADED SIGHT FOR MI-24 HELICOPTER

Upgrading description: Replacement of analog computer with a digital one having new high-precision algorithm and keeping the same dimensions and airborne communications topology.
Modernized sight allows to:
- Solve all aircraft weaponry tasks;
- Increase aiming tasks accuracy;
- Solve the bombing task;
- Provide night aiming at ground targets in combination with adros fpm-01kv sighting mark laser system and night vision goggles.

Option: Integrated navigation system included in sn-3307-type inertial meters and satellite navigation system unit allows to solve navigation and navigational bombing tasks during active radio counter-measures and in difficult flight conditions.

PVP parameters input panel

S-17V VG-1M modernized sight head adapted for operation with night vision goggles

S-17V BP power supply unit

S-17V BDUS angular velocity sensors unit

CVU digital computing device

S-17V BUK
Amplifier and switching unit

ASP-17BC8-M1

AIMING COMPLEX

- expanding the range of applicable weaponry;
- ASP-17BC8-M1 aiming complex accuracy increase;
- navigation using satellite navigation system data;

SN-3307

SATELLITE NAVIGATION SYSTEM

- navigation bombing mode implementation;
- boundary bombing height increase from 2000 m to 6000 m.