AUGUST 2019

DEFTECH GLOBAL

AEROSPACE PRODUCTS & SOLUTIONS

DEFTECH GLOBAL

SAFETY. PROTECTION. RELIABILITY.

INTRODUCTION

Established in 2012, Deftech Global Ltd. has evolved into a renowned world-wide provider of a broad range of special purpose goods and equipment. Our company offers qualified services on repair, modernization and life extension of the relevant products. Deftech is closely connected with leading OEMs in Ukraine, post-Soviet and East European countries.

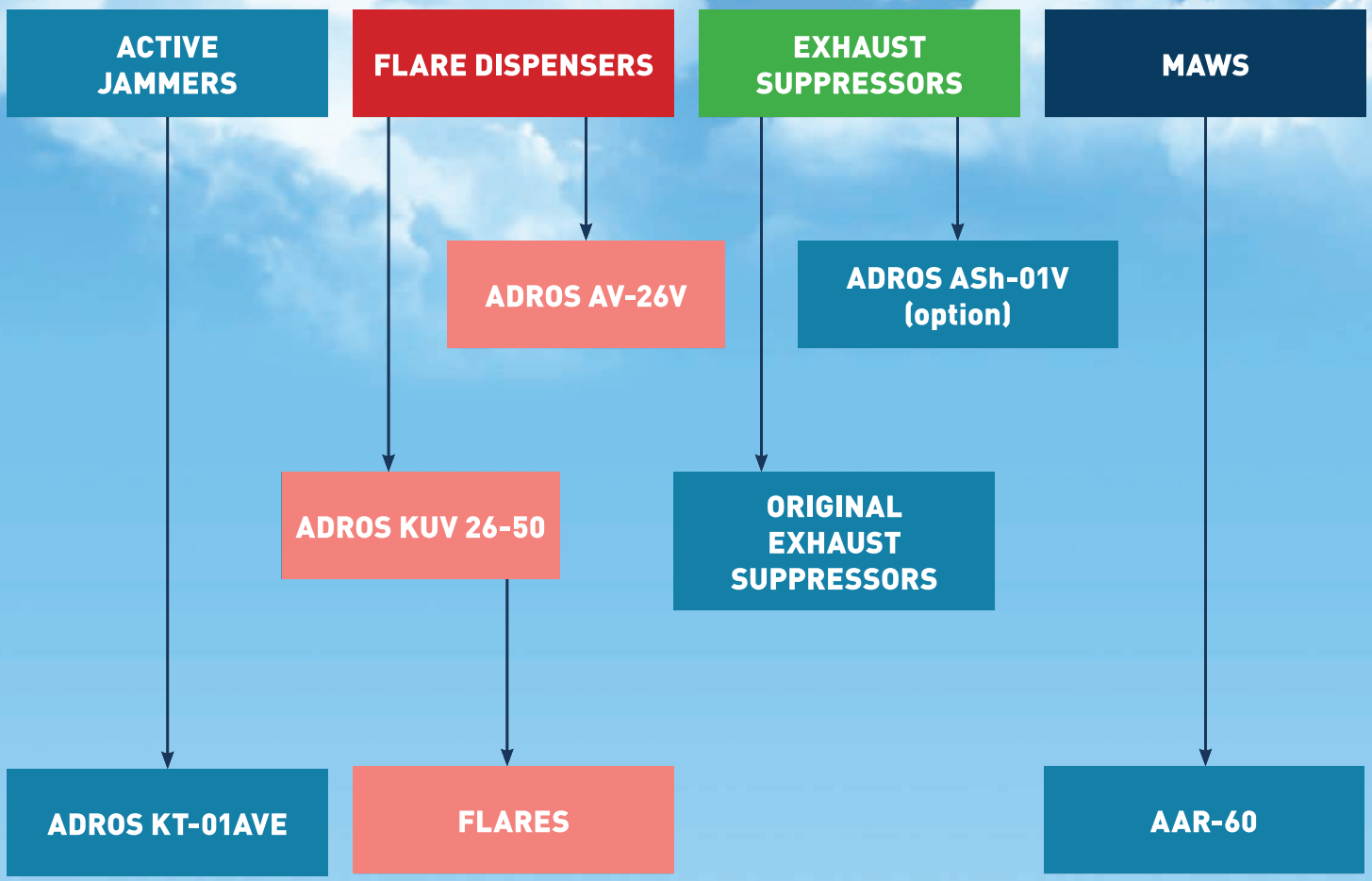
Deftech's unique experience is based on its long-existing multinational ties and numerous clients all-around the world in both governmental and private sectors. We are a customer-oriented company striving to build and maintain close companion relationships. As a reliable partner, we focus on delivering high-quality products and services at competitive prices within shortest periods.

The presented Catalogue embraces our capabilities in the sphere of aerospace products and solutions, suggesting up-to-date equipments and technologies. Additionally, in case you are interested in a full list of the production offered by our company, we kindly suggest to pay your attention to Air Defence and Electronic Warfare, Navy, Land Forces and Law Enforcement catalogues as well.

CONTENT

AIRCRAFT PROTECTION EQUIPMENT

SYSTEMS FOR PROTECTION OF HELICOPTERS AGAINST MISSILES WITH IR SEEKER



SYSTEM GENERAL DESCRIPTION

This system combines separate components of a complex, which performs helicopter protection probability up to 95% from IR missiles hitting .

Active jammer Adros KT-01AVE is the main component, which radiates specially organized disturbance IR signal to interfere IR homing heads operation.

Another important component of the system is KUV 26-50 (or AV-26V) flare dispenser. Specially organized flares deceive any IR homing head (including two-color and pulse-length modulated).

Exhaust suppressors decrease helicopter IR visibility and accordingly decrease IR missile allowed launch range.

MAWS allows to detect the threats and to save flare ammunition.

Systems includes:

ADROS KUV 26-50 MULTICALIBRE FLARE DISPENSER

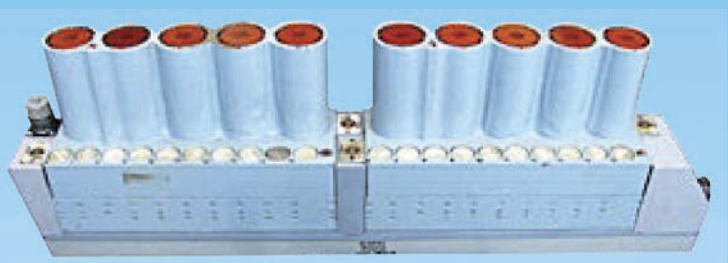
Jamming dispenser «Adros» KUV 26-50 is designed to store and throw-out false thermal targets (FTT) and passive radar clutters / flares of 26 mm and 50 mm calibre. Dispensing is performed ac-cording to special pro-grams including system of FTT selection which create a complex jamming environment for infrared seekers / homing heads of all type missiles. «Adros» KUV 26-50 can be installed on helicopters, military transport and attack aircrafts.

Design features:

- Flares of two calibre: 26 mm and 50 mm in one holder.
- Digital control system.
- Built-in-test.
- Reprogramming function.
- Ready to work under the control of MAWS sensors.
- Simple and reliable design.
- Does not need specially qualified specialists.

SPECIFICATIONS:	
Flare type	PPI-26, PRP-26, PPI-50, PRL-50, etc
Number of flares in one holder	10 pcs of 50 mm and 20 pcs of 26 mm
Number of controlled holders	from 2 to 20
Protection zone	circled
Modes	automatic (under MAWS control); manual; emergency; built-in-test
Shooting flares	from one (right or left board) side or from both
Continuous working time	not less then 4 hours
Readiness time	up to 5 s
Power supply	27V DC
Power consumption	up to 250 Wt
Weight:	
- control unit	up to 0.5 kg
- empty holder	up to 15 kg

PERFORMANCE:	
Specified life	2000 hours
First overhaul service life	1000 h in 15 years
Overhaul life	500 hours in 7.5 years
Useful life	up to 30 years
Guarantee	under the contract



Cartridges / flares

KUV 26-50 on tail boom

AV-26V on the left board

PIK-01V ENGINE EXHAUST SHIELD SYSTEM

The purpose of the system is to suppress an engine IR signature. This additional element is supposed to increase the efficiency of "Adros" KT-01AVE IRDM station. PIK- 01V variant is designed for Mil design bureau helicop-ters, such as Mi-8, Mi-17, Mi-25, Mi-35 etc., as well as Kamov design bureau helicopters such as Ka-27, Ka-31, etc., and provides decrease of its visibility in infrared band of waves in all operational modes.

Original design solutions allow to decrease temperature of exhaust gases and temperature of design elements through increasing of heat exchange area, special screens and air ejector systems.

SPECIFICATIONS:	
Temperature of exhaust gases and design elements – not more than	200°C
Power loss on free power turbine shaft - not more than	1.5 % on peak mode
Degradation factor of IR radiation power in 3-5μm – not less than	3.5 – 4
Weight of two shields (in set) - not more than	40 kgs

ADROS KT-03UE STATION FOR OPTICAL-ELECTRONIC SUPPRESSION

The station may be installed on helicopters and aircrafts, which are equipped with two turboprop engines. The station does not need any information regarding the type of suppressed missiles. It successfully functions without any launch detection system. In order to provide the most effective protection of aircraft the system must be used in combination with exhaust shields and / or flare dispensers.

SPECIFICATIONS:

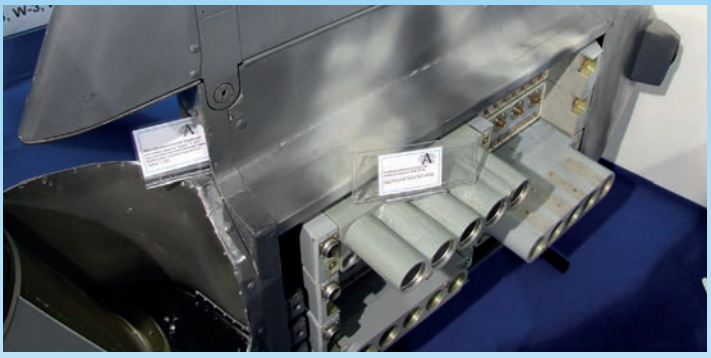
Power supply:	
– DC	27 V
– single-phase voltage	115 V, 400 Hz
– two-phase voltage	208 V, 400 Hz
Power consumption:	
– 208 V, 400 Hz, not more than	5000 VA
– 115 V, 400 Hz, not more than	500 VA
– 27 V, not more than	500 W
System weight, not more than	40 kgs

Operating conditions:
– normal environment temperature from +20°C to –15°C;
– elevated environment temperature: operating +60°C, short-term operating +70°C;
– lower environment temperature -50°C;
– elevated relative air humidity 98% (temperature +35°C).
The system consists of radiation unit and control unit.
Protection zone: by azimuth – 330°, by elevation – from –20° to +30°.

Start-up time – not more than 5 minutes.
SOES «Adros» KT-03UE ensures protection (missile attack failure):
- of helicopter – with probability 0,85;
- of aircraft – with probability 0,75.

Among additional features there are: built-in automatic test, re-programmability, unification (interchangeability of units), automated unified working mode.

ADROS T-32C MULTIFUNCTIONAL IRCM POD



T-32C IRCM pod provides effective protection of cargo planes such as Antonov An-26, An-32, An-140, An-70 and the same class aircraft against guided missiles equipped with IR homing heads of different target signal modulation type and jamming function.

Specifications:

- Can be installed on original attachment points of Antonov An-26 and An-32, modernized for 26IKO pod installation.
- Three main variants:
  - T-32C mk.1 – multicalibre flare dispensers KUV 26-50;
  - T-32C mk.2 – multicalibre flare dispensers KUV 26-50 + missile approach warning system;
  - T-32C mk.3 – multicalibre flare dispensers KUV 26-50 + missile approach warning system + "Adros" KT-02AS active jammer.
- Does not need specially qualified personnel.

Flare quantity:

- 50 mm – up to 40 pcs in one pod
- 26 mm – up to 80 pcs in one pod

Dimensions:

- length - 2.6 m;
- width – 0.4 m;
- height – 0.8 m.

Empty weight – 190 kg.
Full loading weight – 250 kg.

OMUT-KM
ELECTRONIC WARFARE SUIT FOR INDIVIDUAL PROTECTION OF MIG-29, SU-27 AND SU-30 AIRCRAFT

Omut-KM is a high-performance airborne countermeasures system, designed for individual protection of an aircraft and small task aircraft cells against all kinds of radar weapons.

Omut-KM system generates different types of active jamming, which effect radar measuring channels (range, rate and angle) of the airborne mis site intercept systems, air defense missile systems and active (semi-active) missile homing heads.

Omut-KM provides a full aircraft protection (in front and rear semisphere) and increases individual survival ability.

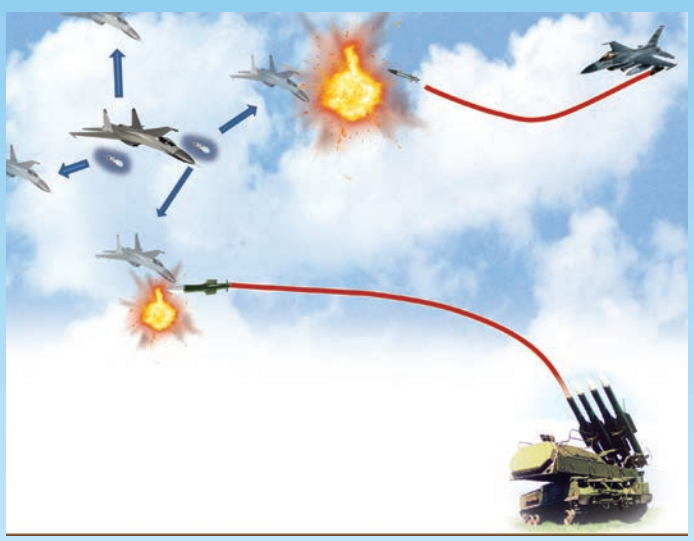
Equipment configuration

Omut-KM consists of two pods with equipment, which attached to a station under an aircraft wing, as well as control and multifunctional display panels installed in a cabin:

Control and display panel 1pc.
Pod 2 pcs.

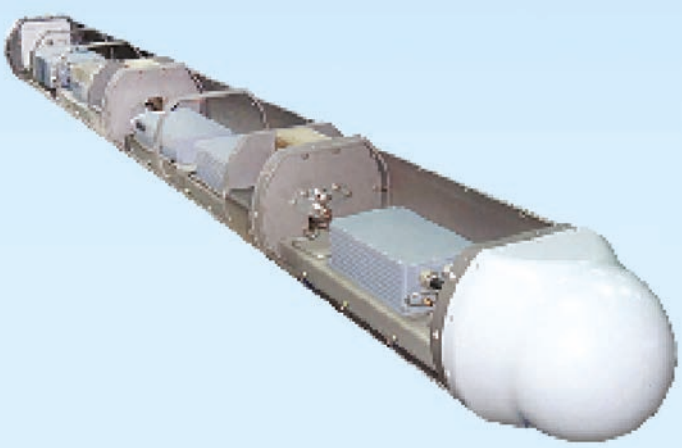
Each pod is designed as a sub launcher that provides an option to attach a weapon under it. Both pods include the same unit sets, which allow Omut-KM system to provide electronic security for front and rear semisphere.

Omut-KM countermeasures system consists of:



The Omut-KM self-defense system consists of:

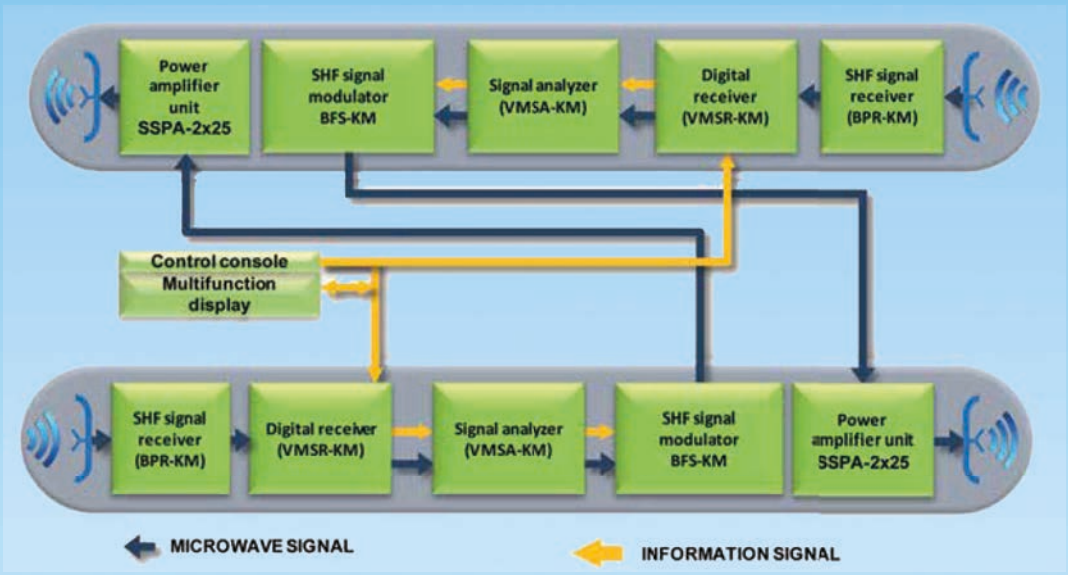
Receiving cross-polarized antenna	1 pc.
Transmitting cross-polarized antenna	1 pc.
SHF signal receiving unit	1 pc.
Multichannel digital receiver unit	1 pc.
Multichannel digital signal analysis unit	1 pc.
Multichannel SHF signal modulator unit	1 pc.
Power amplifier unit	1 pc.



SPECIFICATIONS:	
Screen size, inches (mm)	5x4 (132.5x99.4)
Unit size, mm	197x164x188
Resolution ability, color pixels	640x480
Mass, kg	4
Consumption, A: 27V chain electronics	1,5
115V chain heating at = - 40 C	1
Brightness, cd/m2	1200
Contrast	>200:1

2 analog video inputs Composite (PAL, SECAM, NTSC)
2 video input channel Fiber Channel color/monochrome (option)
Video output to recording system: 1 chan nel Fiber Channel
2 interface channels as per MIL STD 1553B standard
6 input/ 2 output lines ARINC - 429
Control interfaces: USB - 3 pcs., Ethernet -1 pc., RS232 - 2 pcs.

PRINCIPLES OF OPERATION



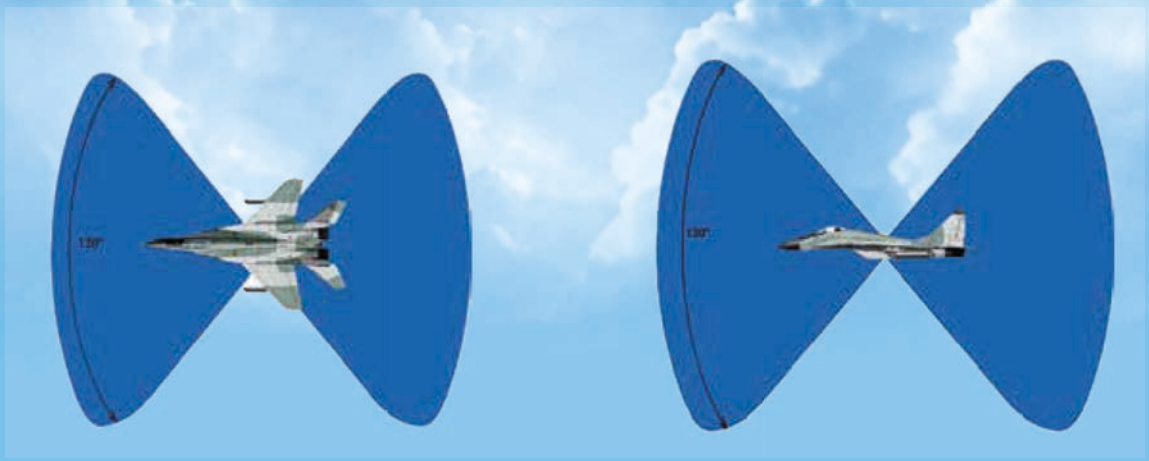
Omut-KM main operational principle is continuous interaction between the multichannel digital reception units, analysis units and radio signal modulating units.

Frequency range continuous scanning, with instantaneous analysis of 1 GHz frequency band, is performed by means of the multichannel digital receiver unit and signal analysis unit.

Frequency range continuous scanning, with instantaneous analysis of 1 GHz frequency band, is performed by means of the multichannel digital receiver unit and signal analysis unit.

In the phase of analyzing, the instantaneous frequency bandwidth is passed through multichannel speed digitalizing, spectral analysis for potential threat searching, electronic environment changes measuring as well as determined threat prioritization. The modulator control commands for each target individual jamming are generated according to gathered information.

SPATIAL AND SPECTRAL PROCESSING AREAS



COMPARATIVE SPECIFICATIONS:

Parameter name	GARDENIA (L-203B and L-1031)	TALISMAN	SATELLITE	OMUT-KM
Frequency band	7.5-10 GHz	8-12 GHz	8-11.5 GHz	5-12 GHz; optionally: 2-5; 5-18 GHz
Output power, W	100W	10W	10W	50W (adaptive)
Jamming type	Noise jamming, rate pull-off jamming, range pull-off jamming, blinking. Jamming brings on the enemy to counteractions.	Rate pull-off jamming, range pull-off jamming. Jamming brings on the enemy to counteractions.	Rate pull-off jamming, elevation pull-off jamming. Jamming brings on the enemy to counteractions	Wide range of imitating and masking jamming. Generation of optimal jamming while in flight. DRFM technology application. Jamming brings on the enemy to counteractions.
System expansion	Not available	Available. Frequency extension is available.	Not available	Available. Frequency extension is available. Enhancement is available (electronic support measurement, radar warning receiver).
Media type	9-13, T-10K, T-10UBK	All types	All types	All types
Jamming sectors in front and rear hemispheres.	±30'	±45'	±45'	±60'
Jamming reprogramming script	Absent	Absent	Absent	Reprogrammable
Hook station usage	Inside of fuselage or containers on thewingtips.	Hook station is not occupied	Hook station is not occupied	Hook station is not occupied. Hook station is available for standard weapon.
Polarization control	Absent	Absent	Mechanical, slow polarization changes control	Electronic system. Rapid polarization changes control.
Data acquisition about radio aids while inflight	Not provided	Not provided	Not provided	Provided
AWG technology application	Absent	Absent	Absent	Noise generation available, based on preprogrammed signal formats as per AWG technology
Jamming objects	Outdated kinds of air defense missile system	Some kinds of current air defense missile system	Some kinds of current onboard missile systems and air defense missile system	All kinds of onboard missile systems and air defense missile system, active (semi-active) missile homing head
Electromagnetic compatibility	Not provided	Provided	Provided	Provided
Stationery check analysis	Provided. Displaying the system failure	Not provided	Provided. Displaying the system failure	Provided. Indication of system failure as well as failed unit
Efficiency	Low	Average	Average	High
Container weight, kg	100	78	65	82
Power consumption	27V, 115V, 2000W	27 V, 1200W	27V, 600W	27V, 650W

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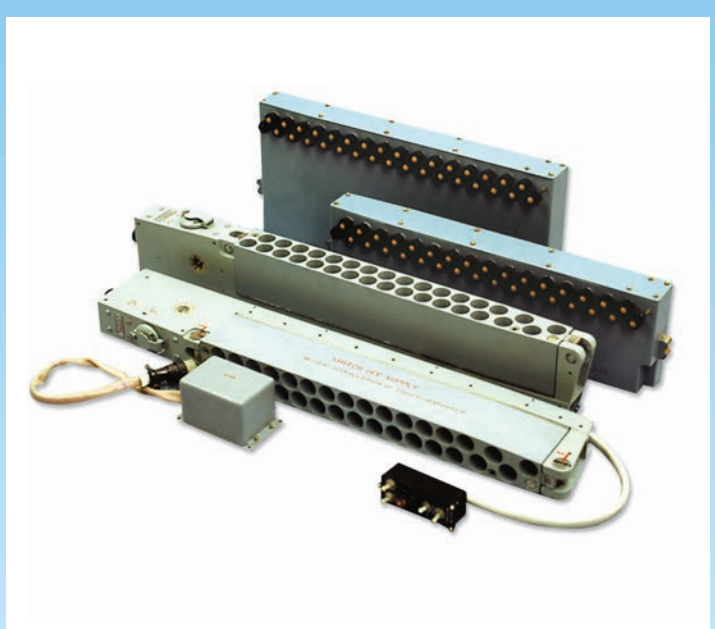
ASO-2V / ASO-2VM / ASO-2E / ASO-2E-E7R AUTOMATIC RADAR AND INFRARED JAMMING DEVICES



Jamming is performed by series of 4 and 16 charges with intervals of 2 - 4 sec / 2 - 6 sec (for ASO-2V) and 1 - 0,3 sec (ASO-2E)

Besides, ASO-2VM.0000-0-02 produces jamming with volley of 2, 4 and 8 shells.

ASO-2V.0000-0-01 and ASO-2VM can shoot when barrel is directed upwards or downwards, and others just with barrel directed downwards.

SPECIFICATIONS:	
Operating voltage, V	27(±10%)
Overall dimensions of the girder without connectors, mm	768,5x1255x60,5
Weight , kg	
ASO-2V 0000-0	12,7
ASO-2V 0000-0-01	11,28
ASO-2V 0000-0-02	37,8
ASO-2V 0000-0-04	12,7
ASO-2VM 0000-0-02	12,7

L006LM (SPO-15) ILLUMINATION WARNING STATION

L-006LM (SPO-15) airborne radar warning system is designed to alert the crew about their aircraft/ helicopter is being illuminated by enemy radars of air defence missile/artillery systems, in order appropriate protective measures can be undertaken: evasion of threats' positions or, depending on the task assigned, approaching them.

The system ensures:

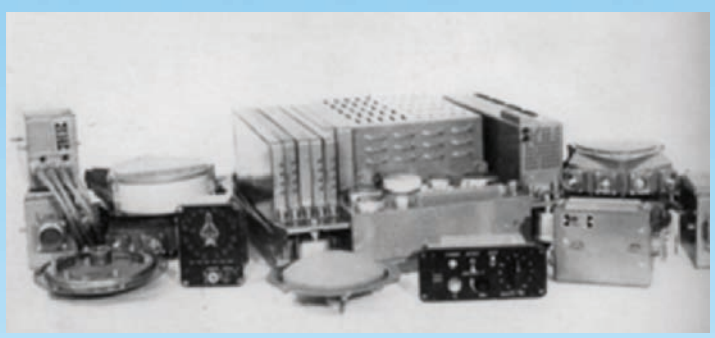
- detection and direction-finding of enemy ground, surface and airborne radars illuminating the aircraft;
- determination of illuminating radar types and operating modes;
- measurement of illuminating radars signal power and rough assessment of range closing rate, as well as determination of approach time to engagement zones of enemy air defence missile and artillery systems or interceptor aircraft;
- identification of the highest priority threat to the aircraft, if illuminated by several radars simultaneously.

L-006LM (SPO-15) airborne radar warning system is installed on various Su/MiG/Tu/Yak/Mi-type aircraft and helicopters, as well as on sea vessels (missile boats, and the like).

Comprises following components:

- forward azimuth antennae
- control centre
- cockpit indicator station
- HF converters
- receiver
- computer
- elevation angle antennae
- Power supply
- long range antennae

SPECIFICATIONS:	
Surveillance zone, angle degree:	
- in azimuth	360
- in elevation	±30
Operating frequency band, GHz	4.4-10,3
Weight, kg	20



SPO-15 cockpit display from a MiG-29

ORT
SOLID-STATE RECORDER OF AUDIO INFORMATION

Solid State Recorder of audio information is a new generation of on-board recorders. Designed on the basis of memory chips and modern element base with the use of signal processors and cutting edge information technologies.

Provides recording and preservation of information (voice data from the crewmembers and acoustic environment in the cockpit as well as information from the data communications equipment (DCE), and timestamps) after emergencies with aircraft.

Features of the product are:

- presence of a solid-state non-volatile memory (chipset), placed in a special box that protects the information, recorded inside, from the damaging effects in emergency situations;
- possibility of reading and reproducing the recorded information with the help of data retrieval equipment (DRE) immediately on-board the aircraft from mono-block after a flight;
- ability to recover data in case of destruction of monoblock;
- presence of a removable storage device, which allows quickly analyse the recorded information.

ORT operates in "RECORD", "ERASE", "CONTROL", "INFORMATION RETRIEVAL" modes and records audio and digital information through six channels:

- Channels 1, 2, 4 - voice information from the A/C crew headsets;
- Channel 3 - mixed signal of acoustic environment in the cockpit from the omni-directional microphones (up to 3 microphones synchronous);
- Channel 5 - timestamp (recorded simultaneously with sound and digital information at channels 1 - 4 and 6);
- Channel 6 - information from data transmission hardware of the Air traffic control.

ORT:

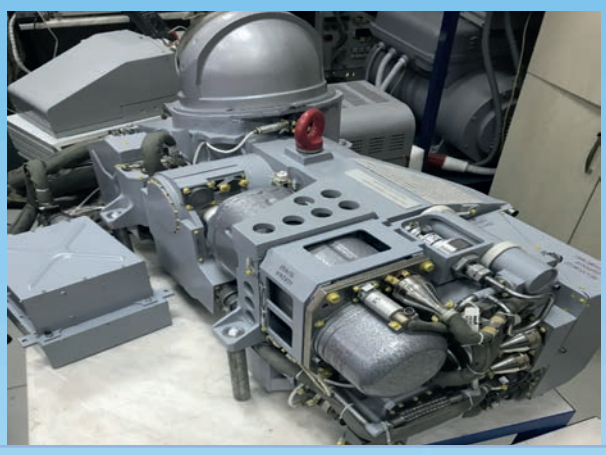
- provides continuous recording for at least sixteen hours for each of the recording channels.
- operates when powered by an A/C on-board network within range from 18 to 33 V.
- maintains continuous operation for duration up to 200 msec in case of primary power failure of on-board 27 V network.
- ready to operate within 5 seconds after power is on.
- provides non-stop continuous operation for at least 24 hours.
- provides at least 30 000 hours meantime before failure (MTBF).
- provides protection against unauthorized access to recorded information.
- has a built-in automatic control.
- provides start-up and flow control test when turned on. The test is started from ORT control panel.
- receives timestamps from the A/C's single-time system in one of the following formats:
  - according to GOST 18977-79 and RTM 1495 rev.3 at clock frequency of 48 kHz of on-board registration device BUR-92 (BUR-92A);
  - through specialised individual interface between ORT and "Tester-N" ("Tester-U3-KI") equipment.
  - according to ARINC429 in GMT (Greenwich Mean Time) format at frequency of 12,5 kHz.

AIRBORNE RADARS OPTICAL LOCATION AND TARGETING SYSTEMS

SUPPLY AND MODERNIZATION OF 13SM / 13SR OPTICAL LOCATION STATION OF MIG-29 AND MIG-29K/KUB AIRCRAFT

13SM optical location station and its improved version 13SR station are applied for:

- search, acquisition and tracking of targets emitting heat;
- locking and auto tracking of air targets at angular coordinates and measurement of range to them;
- transmission of angular coordinates of the air targets and range values for shaping of target designation for missiles seeker heads and provisioning of non-synchronous shooting mode of autocannons;
- measurement of range to the ground surface in the direction set by the aiming angle.



SUPPLY AND MODERNIZATION OF OEPS-30I / OLS-30 (36SH-01) OPTICAL LOCATION AND SIGHTING SYSTEM FOR SU-30 / SU-30MK(I) TYPE AIRCRAFT

OEPS-30I / OLS-30 (36Sh-01) optical location system and its improved version OEPS-30R station are applied for:

- search, acquisition and tracking of targets emitting heat from any target aspect angle on the background of earth, clouds and water surface both in the day time and at night, in the presence of organized jamming;
- measurement of range to air or ground targets by means of laser range finder;
- illumination of ground targets for laser guided munition;
- the station is equipped with helmet mounted sighting system SURA-I(M).

MODERNIZATION OF THE H001, H019 AIRBORNE RADARS

HIGH FREQUENCY RADAR RECEIVER MODULE

Designed for the modern interceptor airborne radars (enhanced H001, H019 versions).

- high frequency low level, radar signal receiving and signal transformation in narrowband and wideband modes of operation;
- wide range input attenuator to control input signal level and to prevent transmitter pulses to affect low noise receiver, with the small recovery time;
- wide range digital gain control in wideband mode;
- excellent radio emissions protection by HF modules careful shielding and isolating.

AAED. 434854.001

SPECIFICATIONS:	
frequency band	X
gain (adjustable), dB	46
noise factor, dB	3,5
maximum input signal level, dB	-35
VSWR	1,6
image rejection, dB	40
output bandwidth in narrowband mode, MHz	5
output bandwidth in wideband mode, MHz	30
gain control range, dB	25

AAED. 434854.002

SPECIFICATIONS:	
frequency band	X
noise factor, dB	3,5
maximum input signal level P_{-i}, dBm	-35
VSWR, dB, max	2,5
image rejection, dB	40
output bandwidth in narrowband mode, MHz	5
output bandwidth in wideband mode, MHz	30
digital gain control range in wideband mode, dB	15
multi channel phase differences	90 ± 5
maximum output voltage, V	±1

AAED. 434854.003

SPECIFICATIONS:	
frequency band	X
gain (adjustable), dB	46
noise factor, dB	3,5
maximum input signal level, dB	-35
VSWR	1,6
image rejection, dB	40
output bandwidth, MHz	5
gain control range, dB	25

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MODERNIZATION OF THE H001, H019 AIRBORNE RADARS

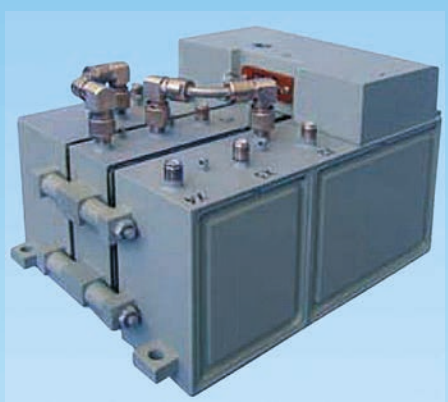
LOW NOISE WIDEBAND FREQUENCY SYNTHESIZER UU52155A(B,G), UU52172A(B), UU52158

Upgraded analog of U52155A, U52155B, U52155G, U52172A, U52172B, U52158.

- generating stable fast-switched frequency in 3,5MHz advance according to the information of the airborne computer through trunk parallel interface lines;
- 3 frequency channels;
- digital control;
- built-in diagnostics and alarm reporting;
- wide operating temperature range -50°C to +70°C;
- low energy consumption.

SPECIFICATIONS:	
frequency spots number	52
output power, mW	3-20
amplitude noise at carrier offset -170 kHz, dB/Hz	120
phase noise at the carrier offset:	
- 2 kHz, dB/Hz	-112
- 5 kHz, dB/Hz	-117
- 50 kHz, dB/Hz	-122
- 170 kHz, dB/Hz	-128
switching time, ms, less than	300
channel isolation, dB, min	30
spectrum spurious components level, dB	-90

L-BAND MULTIMODE LOW PHASE NOISE TWO-CHANNEL FREQUENCY CONVERTER UM45210, UM45212



Enhanced analog of M45210, M45212 units.

- state-of-the-art technology and new components;
- built-in diagnostics and alarm reporting;
- high frequency stability and spectral purity;
- wide operating temperature range;
- low power consumption;
- high radio impermeability.

SPECIFICATIONS:	
LO channel output power, not less than, mW	250
LO channel maximum spurious components level, dB	-80
IF channel output power, not less than, mW	250
IF channel maximum spurious components level, dB	-70
phase noise level at the carrier offset of:	
-2 kHz, dBc	-110
-5 kHz, dBc	-115
-10 kHz, dBc	-120
-170 kHz, dBc	-125
radio impermeability, dB, min	-80

C-BAND LOW NOISE HETERODYNE UM45211(UM45213)

SPECIFICATIONS:	
output power, mW	60-250
gain flatness, dB, min	3
phase noise at the carrier offset:	
- 2 kHz, dB/Hz	-107
- 5 kHz, dB/Hz	-110
- 10 kHz, dB/Hz	-115
- 170 kHz, dB/Hz	-117
operating temperature, °C	from -50 to +70
energy consumption, W, max	7

Upgraded analog of M45211-1(2), M45213-1(2) units:

- modern components;
- built-in diagnostics and alarm reporting;
- high frequency stability and spectral purity;
- low energy consumption;
- high radio impermeability.

ADROS FPM-01KV SIGHT MARK FORMING LASER SYSTEM

Provides to helicopter the capability of unguided munitions operative deployment (rockets, artillery, bombs, etc.) in the dark weather conditions, pointing a sight mark directly on the ground target through the night goggles.

Design features:

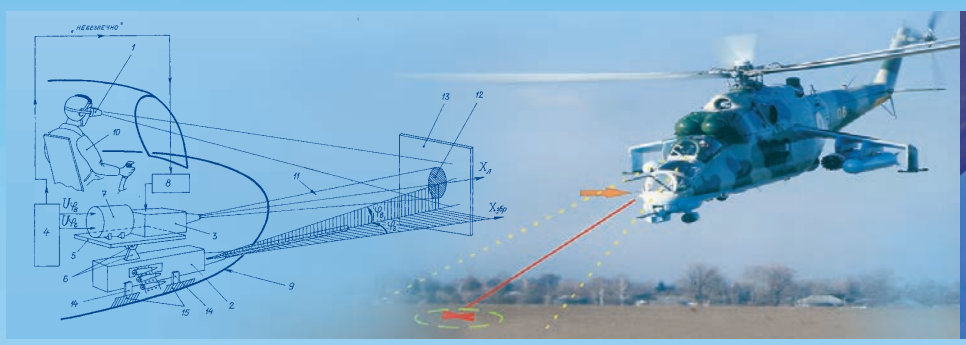
- Can be used autonomously as well as reserve aiming device for thermo vision (FLIR type) sights
- Can be connected to any aiming devices and systems
- Can be used on various helicopters
- Does not limit piloting activity
- Forms sight mark directly on the ground target
- Light weight and small dimensions
- Easy service

Specifications:

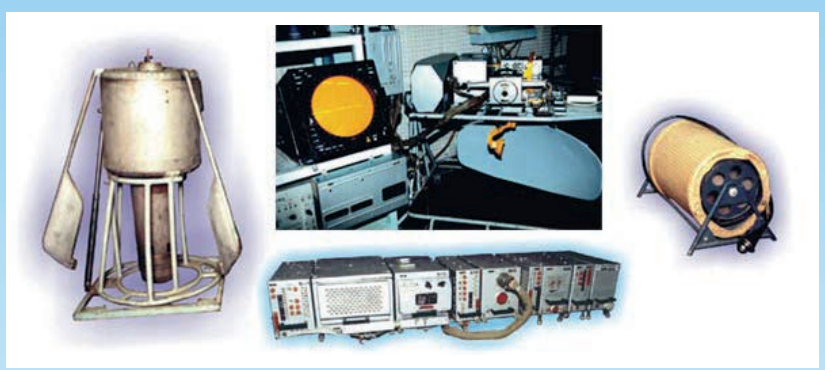
- Sight mark observation distance (for night goggles sensitivity of 5•10-4 i) is at least 1.5 km
- Laser beam wavelength, according to the night goggles waveband.
- Laser beam deviation angles:
  • ±12° in azimuth;
  • from -30° to +6° in elevation
- Laser beam angle rate is at least 20°/s
- Beam positioning accuracy is better then 1.5 mrad
- Readiness time is less then 3 min
- Power supply:
  • +27V DC, 40 Wt;
  • 36V AC x 400 Hz, 70 V•A;
  • Weight – less then 5 kg.

Performance:

- Specified life amounts to 4000 flying hours.
- First overhaul service life equals to 1000 h in 7 years.
- Overhaul life is about 1000 hours in 6 years.
- Useful life is up to 25 years.
- Guarantee is under the contract.



OSMINOG PS AND OSMINOG PS-32 RADAR STATIONS



OSMINOG PS radar station is installed in KA-27 helicopter and designed for search, rescue and navigation purposes. OSMINOG PS-32 radar station is also installed in KA-32S helicopter. It is designed for the panoramic observation of water and terrestrial surfaces in order to search, detect and determinate the coordinates of surface objects, estimate the general ice conditions, navigate and detect deep cumulus cloudiness conditions.

SPECIFICATIONS:

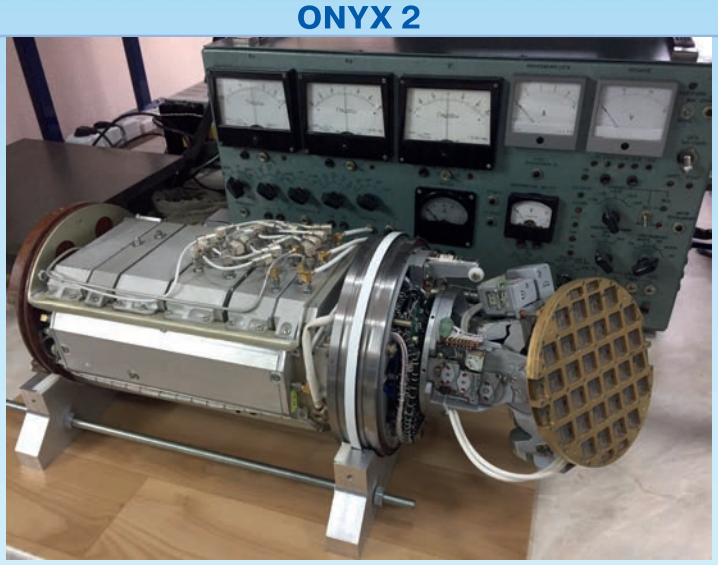
Detection range of surface objects from 100-500 m flight altitude with sea state up to 3:	
• with average ERA 250 m^2	not less than 25 km
• equipped with transponder-beacons	from 20 to 100 km (subject to beacon type, for «OSMINOG PS») 10 W from the airborne circuit = 27 V
• in cumulonimbus cloudiness	not less than 30 km (for «OSMINOG PS-32» station)
Object coordinates determination error, not more than:	
• for range	50 m
• for relative bearing	1,5°
Weight of equipment:	
• «OSMINOG PS»	not more than 120 kg
• «OSMINOG PS-32»	not more than 150 kg

MISSILE SEEKER HEADS

KA-BAND (36-37 GHZ) SEEKER HEAD
ONYX 1

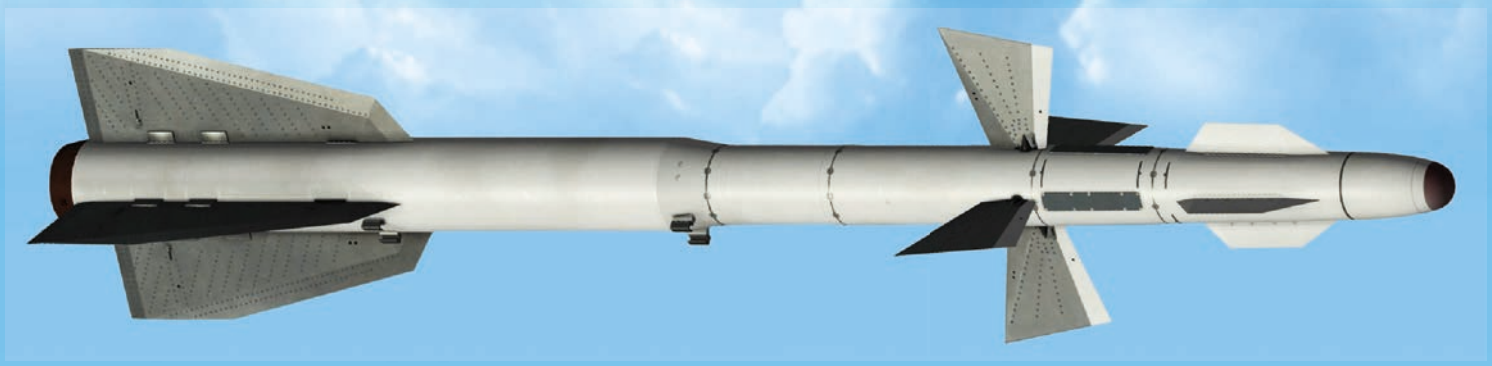
Seeker head is developed for modernization of РВВ-АЭ missiles by replacement of standard 9Б1348 seeker (operated in K band – 16-18GHz) and development of new generation Air-to-Air missile. It is also marketed for installation on missiles of BUK-M1 and BUK-M2 air defence systems. Modernization allows to dramatically improve missile protection from hostile jammers as there are no available jammers in KA-band already in operation.

X-BAND (8-12 GHZ) SEEKER HEADS
ONYX 2



Seeker head was developed for multiple customers as universal seeker head that could be used for both "air-to-air" and "ground-to-air" air defence missiles (in combination with KOLCHUGA passive radar system). For customers it has been marketed for modernization of R-27 missile and S-125 (Pechora) missile 5V27D type.

OPTICAL SEEKER A3-10 FOR MISSILE



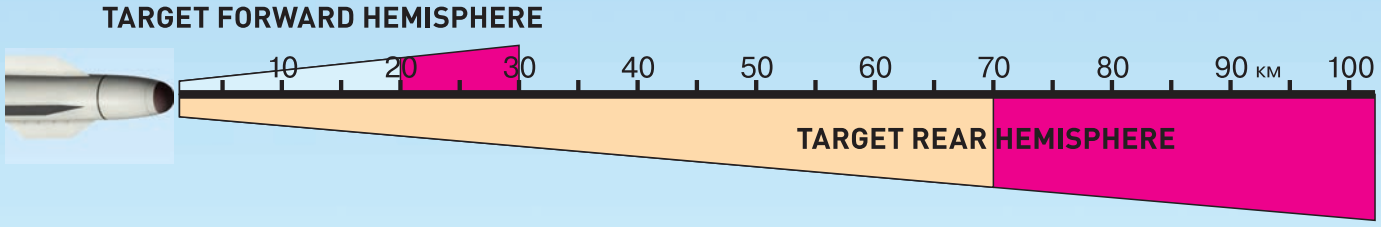
NEW POSSIBILITIES FOR MISSILE R-27T

IR OS A3-10 feature:

- phase-pulse modulation method
- two-spectral multielement photodetector device
- digital method of data processing with the aid of microprocessor units
- reprogramming possiblity of noise immunity algorithms

SPECIFICATIONS:

The IR OS features	OS 9Б-1032	OS A3-10
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
Tracking velocity, °/s	15	40
Lock-on zone, deg	±1	3,5 x 3.6
Tracking angle, deg	±60	±60
Target designation angles, deg	±45	±50
Continuous operation time, (ballon V=7.3 L(8)) hr.	3	5
Readiness time, min	≤ 10	≤ 2
Jamming protection probably, P.	0.7	0.8
Mass, kg	24.5	≤ 10 (without housing)



NAVIGATION EQUIPMENT

SRPPZ-2000 EARLY TERRAIN AWARENESS AND WARNING SYSTEM

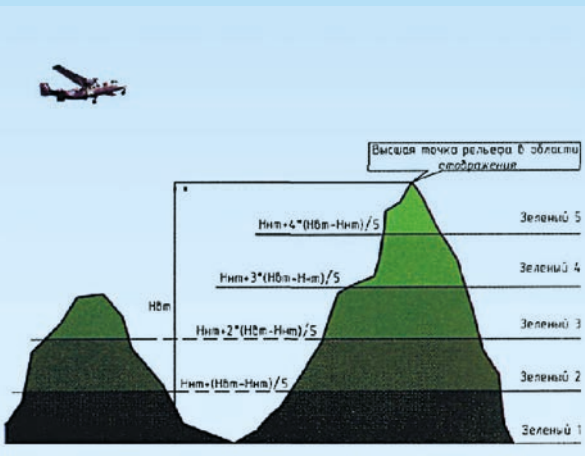
The SRPPZ-2000 system is intended for the aircraft crew for the precautionary voice and visual signal information about approaching terrain or water surface, as well as for increasing crew awareness about elements of terrestrial surface and/or artificial obstacles available in the system's database and representing potential danger.

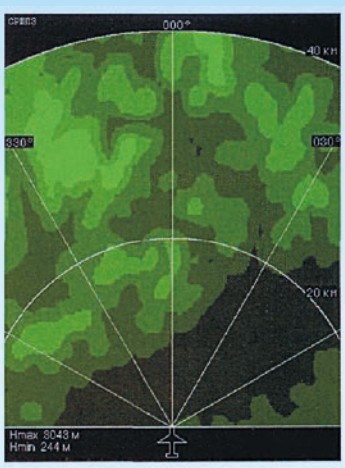
Besides, the system indicates and signals about passing predetermined fixed heights, exceeding admissible roll angle value, premature decrease at land ing approach.

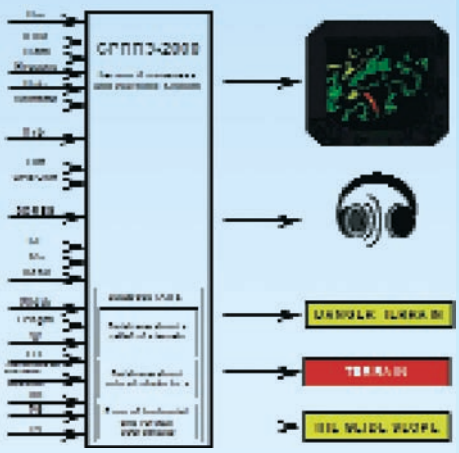
The functioning algorithm of the system contains criteria of danger and considers the set configuration.

Signal information is formed in advance to provide the crew with sufficient time for appropriate action.

The system continuously analyzes flying conditionsand alarms in potentially dangerous situation on the basis of current parameters of the flight, position of landing gears and flaps, surface relief and artificial obstacles.







SPECIFICATIONS:	
System readiness time, not more than	10 sec
Time of continuous work, not less than	24 h
Time between failures	10 000 h
Weight of system, not more than, including: - СРПП3-2000, not more than - FRAME of СРПП3-2000, not more than	2,4 kg 1,6 kg 0,8 kg
Overall dimensions: - width - depth - height	 33 mm 435 mm 222 mm
OPERATING RANGES:	
Sinusoidal vibrations	range of frequencies from 5 - 2000Hz, amplitude of vibroacceleration up to 5 g, amplitude of vibrodisplacement 2,5 mm;
Shock loading	up to 6,0 g;
Linear acceleration	up to 5,0 g;
Atmospheric pressure	from 12 up to 170 kPa (from 90 up to 1270 mm.merc.col.);
Operating temperatures	+ 55°C / - 55°C
The short-term working temperature	+ 70°C
Limited temperatures	+ 85°C / - 60°C
Relative humidity	not more than 96 % at up to 40°C
Lightning resistance and HIRF	Connection cables should be placed in shielding braid, connected to both ends with case AV

MMW COLLISION AVOIDANCE RADAR (CAR)

The CAR is intended for operation as a component of the helicopter radar for all-day and all-weather collision avoidance of a helicopter with stationary obstacles such as supports and high-voltage power lines, towers, high buildings, etc.

The CAR can be used for a short-range navigation of ships in severe weather conditions, as well as for anti-mine and anti-sabotage protection.

Basic performance data:

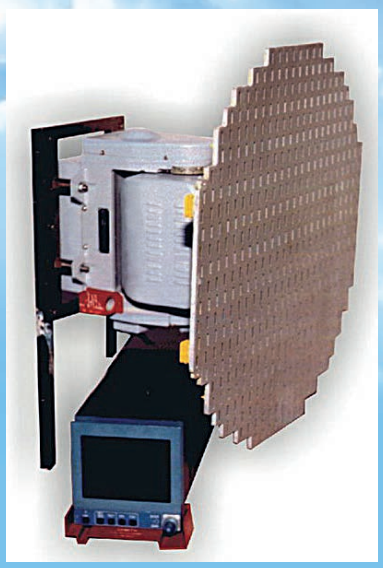
Operating frequency band millimeter

Working measuring zone:

- in distance	45 - 2200 m
- in azimuth	± 60 degrees
- in elevation	± 15 degrees

Resolution:

- in distance	7.5 . . . 10 m
- in angular coordinates	1° ± 0.1°
Mean-square error in angular coordinate measurement	0.5 degree
Operating temperature range	-50°C...+55°C;
Weight	20 kg



BURAN A-140, BURAN-A AIRBORNE METEO-NAVIGATION RADAR STATION

Airborne meteo-navigation radar station «BURAN A-140» is installed on AN-140 aircraft, and «BURAN-A» in various modifications, on AN-148, AN-38, AN-74TK-300, IL-114 aircraft as well as on BE-200 seaplane.

Advantages:

- absence of waveguide channel eases installation and maintenance of the aircraft;
- possibility of interfacing with the TCAS system and satellite navigation system allows minimizing the equipment composition;
- dialogue mode of control and automated adjustment eases pilot's work;
- automatic processing and tuning of the «image»;
- electronic sight for measurement of the meteorological object and radiolocation reference points coordinates;
- detection of turbulence zones;
- compensation of the radio-waves attenuation in meteorological formations;
- reflection and analysis of the vertical profile of the meteorological object;
- location of the oncoming aircraft;
- navigation in-flight view of the underlying surface.

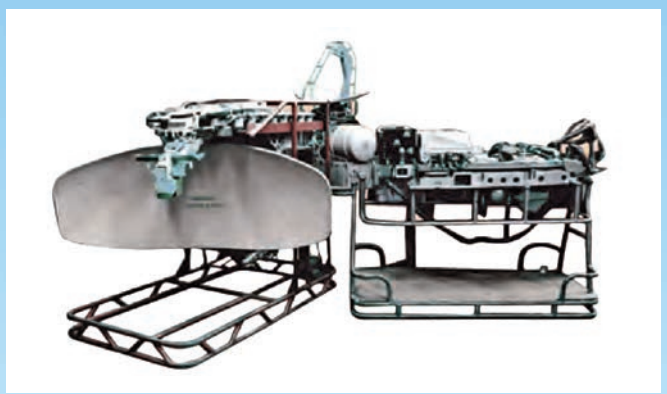
SPECIFICATIONS:

Structure	Weight, kg	Overall dimensions, mm
Antenna transmit-receive unit (ATR) BR702 BR701	12,7 11,7	304 x 250x 130 224 x 250 x 13 VSAR 377x244
Control unit BR483	1.5	80 x 120 x 200
Multifunctional indicator BR457 BR454	6,9 6,9	71 x 158 x 160 71 x 158 x 160
Carrier frequency, MHz		9345
Pulse power, kW		5
Beam width, degree		4x4/6x10
Antenna gain, decibel, dB		33/27
Power supply: - over circuit 27 V - over circuit 115V, 400 Hz		 70 W; 1,5 A 80 VA; 0,7 A

MILLIMETER RANGE RADAR

It is designed for day and night and all-weather operation as a part of helicopter-based radar system for warning of helicopter collision with stationary obstacles such as pylons and power lines, towers, tall buildings, etc.

PNS-24M SIGHTING-NAVIGATION SYSTEM



Sighting-navigation system PNS-24M is installed on Su-24M aircraft and provides solution of following complex tasks at any time of day and night in simple and difficult meteorological conditions:

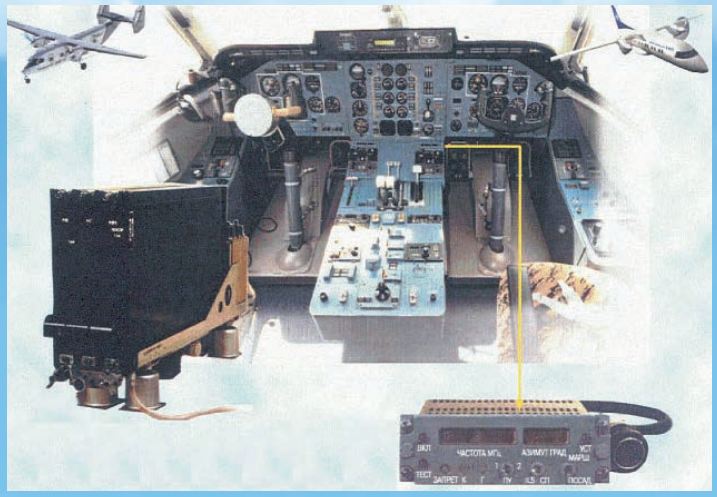
- automatic flight as per set programmed and strategic itinerary points with correction of current position;
- detection of objects and aimed pointing of all kinds of aviation armament on terrestrial (hidden and open), airborne and above-water targets;
- safe fly-around at the altitudes from 50 to 600 m in automatic and semi-automatic modes.

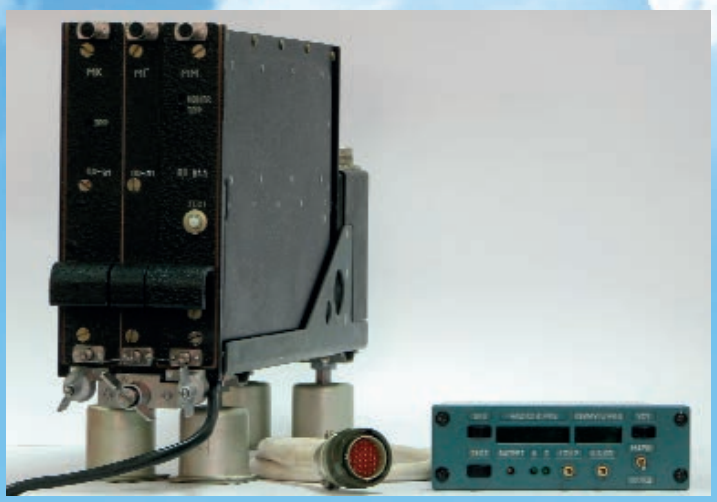
Composition of the system comprises 16 separate functional units.

SPECIFICATIONS:

Supply voltage:	
- three-phase, V, Hz	200, 400;
- DC, V	27;
Power consumption, VA, not more than:	
- over circuits 200 V, 400 Hz	7800;
- over circuit 27V	3100 W;
Weight, kg, not more than	837

KURS-93M AIRBORNE INTEGRATED NAVIGATION-LANDING SYSTEM





«KURS-93M» is a new generation of navigation-landing equipment, developed on the basis of single-chip microcomputers.

By its technical and operational characteristics «KURS-93M» fully corresponds to the ICAO requirements. This equipment can be used on any type of aircraft and helicopters without any restrictions. Currently it is installed on AN-140, AN-38, MiG-29 aircraft, Mi-8 helicopters as well as on other aircraft.

The system provides for navigation of the aircraft flights by radio beacons of VOR system, pre-landing maneuvers and approach landing by ILS and SP-50 radio beacons, as well as marker radio beacons flyby signaling.

The system comprises radio receiving block on damper frame and control panel.

SPECIFICATIONS:

Radio receiving block (RRB)	
Overall dimensions of the RRB -200 x 94,5 x 368 mm (1,5 K) (without frame)	
• Weight of the RRB	4,7 kg (without frame)
• Weight with the frame	6,3 kg
• RRB power consumption	30 W from the airborne circuit =27 V
• Ventilator feed from the airborne circuit	115V, 400 Hz
Code of external influences of the RRB mounted on the frame – BVI/V, zone B, ground-U1-UL-DIII-TII*-VLI-TMI-RO-PPI-PSKh-PG-VDKh-AShII.	
*RRB operating temperature range for:	
Weight of equipment:	
• performance I	from minus 55° C up to plus 55°
• performance II	from minus 40° C up to plus 55°
Control panel (CP):	1450
• CP overall dimensions	155x48x145 mm
• CP weight	1 kg
• CP power consumption	10 W from the airborne circuit = 27 V
Code of external influences of the CP – BIV, zone A1, ground U1-UL-DRIII-TII*-VLI-TMI-ROX-PPI-RS-PG-VDKh-AShII	
Operating temperature range	from minus 55° C up to plus 60°

AGGREGATES, SYSTEMS, SPARES

ИМ-3А (IM-3A) ACTUATING UNIT

Designed to cut off the turboshaft engine fuel supply system by the electric signal in case of free turbine RPM increase.

ГПОАЗ (GPOAZ) HYDRAULIC ACTUATOR

Hydraulic actuator is designed for lifting up and putting down of the attached load.

ЕНА15 (ENA15) INDEPENDENT FLIGHT CONTROL ACTUATOR

Used for civil aircraft rudder actuation by input control signal from the flight control system.

ЕМА-750, 100 ELECTROMECHANICAL ACTUATORS

Designed for linear movement of executive elements of mechanisms. Electromechanical actuator consists of valve electro-motor and gearbox.

ЕМП3 (EMP3) ELECTROMECHANICAL ACTUATOR

Designed for linear movement of executive elements of mechanisms. Electromechanical actuator consists of valve electro-motor and gearbox.

2ПБД-60, ПБД-59В, ПБД-59МВ, ПБД-59ИВ (2PBD-60, PBD-59V, PBD-59MV, PBD-59IV) ELECTROMECHANICAL DRIVES AND ACTUATORS

Mounted on cluster holders and dispensers of Tu-series aircrafts and are designed for opening of load-carrying shackles and drop blocking.

АРП-20, 20Н, 21 (ARP-20, 20N, 21) AUTONOMOUS ELECTROHYDRAULIC CONTROL ACTUATOR

Designed to deflect the rudder according to the input mechanical signal in reversion mode of the aircraft wheel steering system. Application: An-148.

НД-450 (ND-450) DOSING PUMP

Designed for automatic control of fuel supply in the engine AI-450 on two main channels of electronic control system, and also dosage of fuel in the engine is proportional to a position of the engine control lever in a mode of standby hydromechanical control.

НП-114 (NP114) PLUNGER PUMP

Designed to supply working fluid delivery to object's hydraulic system under high pressure.

НП40, НП40А (NP40, NP40A) PLUNGER PUMP

Pumps feed high-pressure hydraulic systems with working fluid. Application: Ka-60, Ka-62.

148Н (148N), 139, 138, 134, 130-2К, 130-2, 130-2А, 117 PLUNGER PUMP

Source of high pressure working fluid in hydraulic systems of hoisting-andconveying machines and press-and-forging plants, in processing lines of foundry and stamping, machinetool building, massive transmission and other fields of industry.

ГНП135 (GNP135) HYDRAULIC PLUNGER PUMP

Feeds high-pressure hydraulic systems with working fluid.

HC15E, HC15A, HC15H (NS15E, NS 15A, NS15N) ELECTRICALLY DRIVEN PUMPING STATIONS

Supply of working fluid into the object's hydraulic system, keeping pressure in the hydraulic system in assigned range. Application: aircraft hydraulic system.

HC 29 (NS 29), 30, 15R, 5NR, 103, 140-5R, 140-3, 140-4, 10-2, 140-2N, 140-1, 140-7, 140-7N, 140-5, 140-6, 140-10, 226 ELECTRICALLY DRIVEN PUMPING STATIONS

Supply of working fluid into the object's hydraulic system, keeping pressure in the hydraulic system in assigned range. Application: aircraft hydraulic system.

HC-68 (NS-68), 68-1, 62, 60, 40A, 69, 73M, 75-1, 148-1, 148, 148N, 148P, 148PN PUMP STATION

Source of high pressure working fluid in hydraulic systems of hoisting-and-conveying machines and pressand-forging plants, in processing lines of foundry and stamping, machine-tool building, massive transmission and other fields of industry. It is a pressure source in aircraft's hydraulic systems.

HC 46-2 (3), (6) (NS 46-2 (3), (6)) PUMP STATIONS

Pump stations are designed to supply hydraulic fluid booster system object in the case of failure of the primary hydraulic system. Ka-32 application.

HCPT (NSRT) MOTOR DRIVEN PUMPING STATION

Designed to feed working fluid into the object's hydraulic system and to keep pressure in the hydraulic system in specified range.

ДЦН42 (DTsN42) ENGINE DRIVEN CENTRIFUGAL PUMP

It is a fuel system booster pump. The engine driven centrifugal pump consists of the screw pump, impeller pump, shaft seal unit.

HP9B-3Б, HP9B, HP9B1 REGULATOR PUMPS

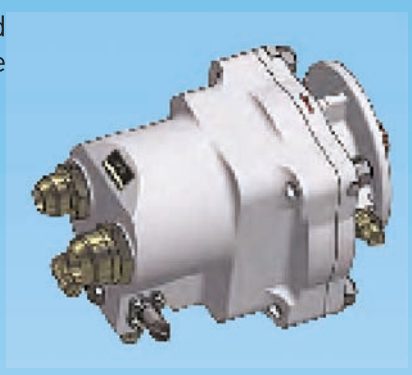
Fuel supply to the AI9V 3B engine main jets by input command from the engine control system, engine speed control.

HC58, 53, 204H (NS58, 53, 204N) HYDRAULIC PUMPING UNIT

Transforms fluid power from one object's self-contained hydraulic system to another without working fluid exchange between systems. Application: MiG-29, An-124, An-225 aircrafts emergency system.

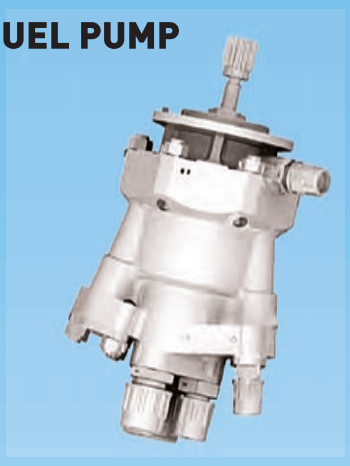
HP180 (NR180) FUEL PUMP

Designed to feed fuel to the gas turbine engine's fuel system.



HT4 (NT4) FUEL PUMP

Fuel supply to the adjustable jet nozzle control loop of AI-222K-25F gas turbine engine



HT40 (NT40) FUEL PUMP

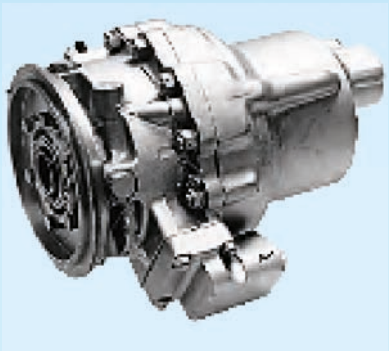
Fuel supply into the AI-222K-25F turbine engine afterburner dispenser.

P-02 (R-02) FLOWMETER

Measurement of working fluid flow. The piston type flowmeter with transducer produces impulses per unit time in proportion to consumption of fuel flowing through the flowmeter.

НП107А (NP107A) PUMP-MOTOR

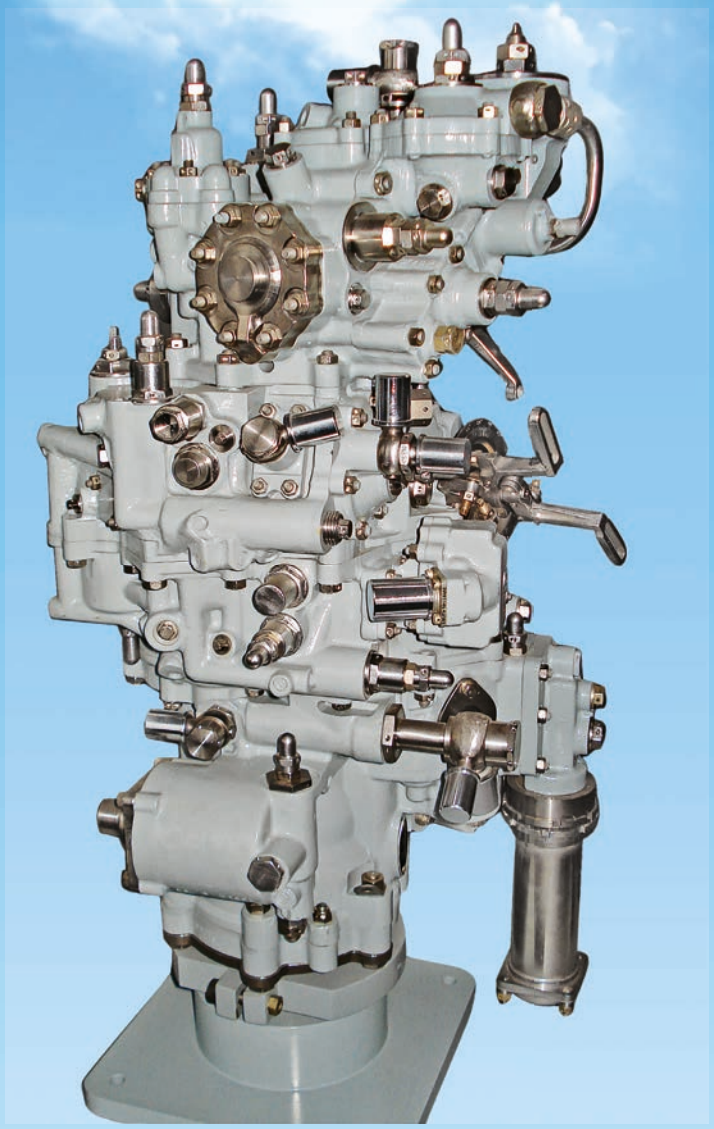
Main drive in the hydraulic actuation system of the cable-lain rope on Tu-142 aircraft.



HP-9E (NR-9E) MOTOR DRIVEN PUMP-REGULATOR

Fuel supply to starting and main jets of the small gas turbine engine by input commands from the engine control system.

НР-3ВМ-Т (ВМА-Т.ВН) (NR-3VM-T (VMA-T.VN)) FUEL CONTROL UNIT



Intended for fuel supply and automatic control of the engine TV3-117 (Ka-32, Mi-8, Mi-17 helicopters).

ЕПК-35-Н, ЕПК-35-1, ЕПК-20, ЕПК-35 (EPK-35-N, EPK-35-1, EPK-20, EPK-35) ELECTRIC DRIVEN FAUCET

The faucets are designed to be used in aircraft fueling lines.

КП-38, КП-38А (КР-38, КР-38А) ROTARY FAUCET

Designed to control the flow of hydraulic fluid to the actuator by rotation of the control spool and the feedback spool, which is mechanically connected to the actuator's user.

КВ-38Н, КВ-38Н-1 (KV-38N, KV-38N-1) SWITCHING FAUCET

Designed for switching the object's front wheel from the controlled position to the self-castoring and back and forth, as well as to feed the cavities of wheel's hydraulic drive from the drain line. Application: An-148

Д1В-03 (D1V-03) HYDRO-MOTOR

The hydraulic motor is used as a source of mechanical energy. It is the hydraulic motor of axial type with unregulated capacity and with high specific parameters. Application: Tu-160

ГМ56А, ГМ56Н, ГМ56, ГМ56-1 (GM56A, GM56H, GM56, GM56-1) HYDRO-MOTOR

Used as a source of mechanical power for hoisting-and-conveying equipment and press-and-forging plants in processing lines of foundry and stamping, machine-tool building, road-transporting and other fields of industry. Application: An-124, An-148.

ГМТ, ГМТ-1 (GMT, GMT-1) HYDRO-MOTOR

Source of mechanical power for hoisting-and-conveying equipment and press-and-forging plants in processing lines of foundry and stamping, machine-tool building, roadtransporting and other branches of industry.

ПГЛ-40 (PGL-40) HYDROVANE DRIVE

The drive is a primary electric power supply source of aircraft electrical system.

ГОП (GOP) HYDROSTATIC DRIVE

Designed for transmission of mechanical energy from the engine to the chassis with stepless speed regulation and traction of the vehicle.

ГГА-800Н (GGA-800N) HYDRAULIC ACCUMULATOR

Used as emergency hydraulic power source in aircraft hydraulic system. Piston type accumulator with gas and hydraulic fluid cavities

КВ-38 (KV-38) CAT-IN VALVE

Designed to control the working fluid flow to the actuator by pressure connection under the edge of the pilot distribution spool. Application: AN-38, AN-140

КПБ (KPB) COMPENSATION-PRESSURIZATION TANK

Used in closed hydraulic systems of machine or handling equipment to provide the reserve of working fluid and its pressurization at the pump inlet, as well ascompensation of thermal expansion of working fluid.

КГ42 (KG42) BYPASS VALVE

Designed to provide stable operation of the torque converter NS-53 at low pump flow through the bypass of the working fluid from the pump outlet line to drain.

МПК-14У (MPK-14U) FAUCET'S DRIVE MECHANISM

Designed to drive the faucets or valves gates/shatters in different engine systems and aircrafts.

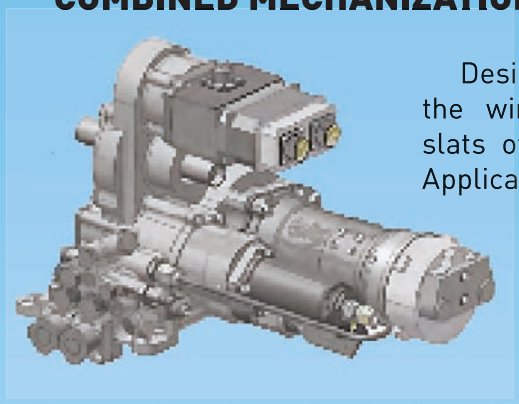
НР30, НР32 (NR30, NR32) COMBINED MECHANIZATION DRIVE

Feeds high-pressure fuel systems with working fluid. Variable capacity axial-plunger pump consists of pumping unit, pump capacity controller and pressure regulator.

ЭМП-25 (EMP-25) ELECTRO-MECHANICAL DRIVE

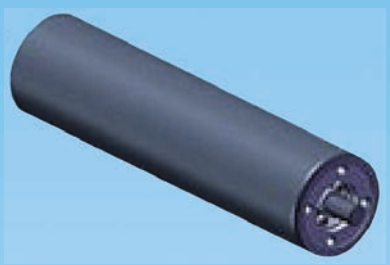
Designed for use in the propeller parking brake mechanism and other aircrafts' systems.

КПМ-148Н (KPM-148N) COMBINED MECHANIZATION DRIVE



Designed to move the wing flaps and slats of the aircraft. Application: An-148.

РЕМА-6 (REMA-6) ELECTRO-MECHANICAL DRIVE



Drive is designed to provide rotary movement of executive elements. Electromechanical drive consists of electronic motor and reducing gear.

ЕМА-2000 ELECTRO-MECHANICAL DRIVE

Drive is designed for linear movement of executive elements of the aircraft's machinery.

АОД42 (AOD42) AGGREGATE OF HOT STREAK

Designed for maintenance of submission of fuel to fuel injection nozzle «hot streak» on commands from the electronic block.

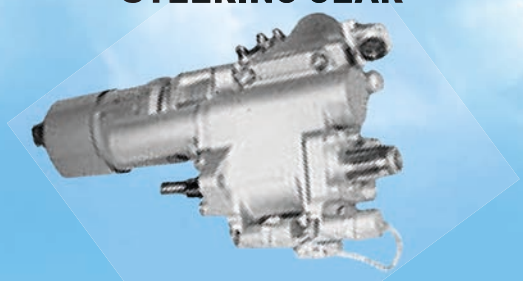
ГАЗ 213, 215 (GA213, 215) PRESSURE REGULATORS (REDUCING GEAR)

Designed for systems operating at reduced pressure from system with a high-pressure; protects hydraulic system from the pressure increased over permissible level.

АРП-1,2,3 (ARP-1,2,3) AUTONOMOUS ELECTRO-HYDRAULIC STEERING GEAR

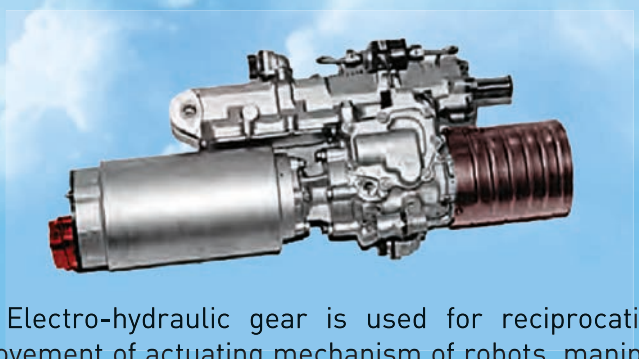
Gear provides reciprocating movement of operating and power elements of robots, manipulators, simulators, elevators, machine tools, injection molding machines, aircrafts and other devices by control commands of remote control systems.

87П6, 86П6, 9Б893, 84П6Т (87Р6, 86Р6, 9В893, 84Р6Т) AUTONOMOUS ELECTRO-HYDRAULIC STEERING GEAR



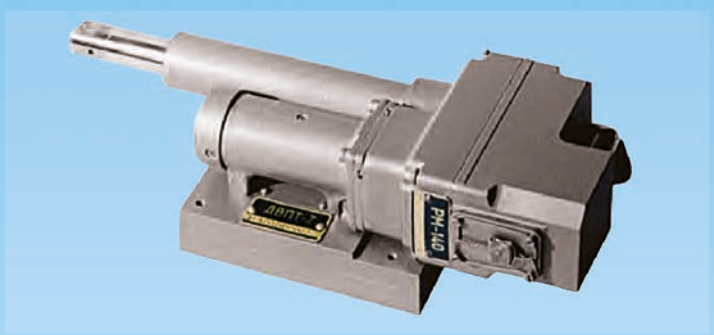
The electro hydraulic gear provides reciprocating movement of operating elements of robots, manipulators, simulators, elevators, machine tools, injection molding machines, aircrafts and other devices by control commands of remote control systems.

РПО (RPO) AUTONOMOUS ELECTRO-HYDRAULIC STEERING GEAR



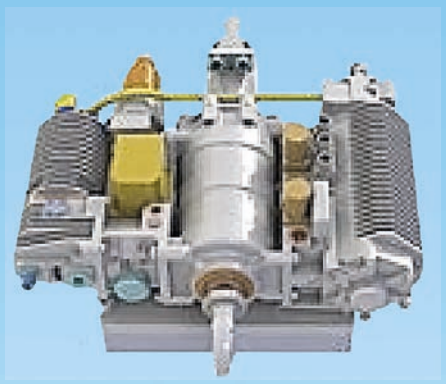
Electro-hydraulic gear is used for reciprocating movement of actuating mechanism of robots, manipulators, simulators, elevators, machine tools, injection molding machines, aircrafts and other devices by control commands of remote control system.

РМ-140, РМ-140А (RM-140, RM-140A) STEERING GEAR



Movement of object's executive units. Application: An-140, An-148

АРМ-150 (ARM-150) INTEGRATE STEERING GEAR



ARM150 is designed to deflect the rudder of civil aircraft by an external control signal from the flight control system.

АУР-22Н, 18 (AUR-22N, 18) THRUST REVERSAL CONTROL UNIT

AUR-22H is used for distribution of working fluid to actuating devices of reversal mechanism by electric command. Application: engine D-436-148 (An-148), engine D-18T (An-124-100).

БПЕ-1 (BPE-1) ELECTRICALLY OPERATED SUPPLY UNIT

Designed to supply working fluid into hydraulic system of object and to keep pressure in specified range. Application: An-28

БПРП-1 (BPRP-1) HAND-OPERATED SUPPLY UNIT

Used for supplying of working fluid to hydraulic system of an object in emergency conditions and ground-based checking-up. Application: An-72, An-72P, An-74.

ДА-0.25, 0.5, 0.5Н (DA-0.25, 0.5, 0.5N) THREE-PHASE INDUCTION MOTOR

Designed for driving of actuating elements.

ДА-8, 7, 5.5, 3-2, 3, 1.5, 0.55Т (DA-8, 7, 5.5, 3-2, 3, 1.5, 0.55T) THREE-PHASE INDUCTION MOTORS

Designed for pump station driving. Electromotor with short-circuited rotor, general climatic construction, protected, vibration-proof. Cooling – self-ventilation. Working mode – repeatedly – short-timed.

МТЖ-15Н (MTZh-15N) THREE-PHASE INDUCTION MOTOR

Electro-motor with short-circuited rotor, general climatic construction, protected, vibrationproof. Cooling – by working fluid. Designed for pump station driving.

ДВ-2000, 800, 40, 15, 15-1 (DV-2000, 800, 40, 15, 15-1) NON-CONTACT DC ELECTRO-MOTORS

Designed to drive aircraft actuator mechanisms, pump-stations, different air gears of direct and reverse action, etc.

ДВ-6000, 12000, 3000, 3000-3 (DV-6000, 12000, 3000, 3000-3) NON-CONTACT DC ELECTRO-MOTORS

Designed for pump-stations driving. Electromotor consists of electromechanic unit and control block.

ДВПТ-7 (DVPT-7) NON-CONTACT DC MOTOR

DC motor is used to drive different aircraft linear and rotary mechanisms.

Д-12Т-В(D-12T-V), D-25F, D-38T, D-90, D-90-140, D-100L, D-10F, DK-120 AVIATION ELECTRIC MOTOR

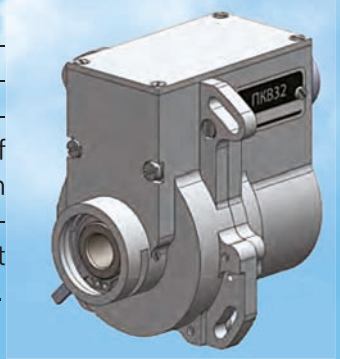
The DC electric motor with current voltage 27 V, wattage from 10 to 140W.

МПР148 (MPR148) ELECTROMECHANISM

Designed for conversion of the control signal from monitor and control unit into angular displacement position of the engine control lever.

ПКВ32 (PKV32) ELECTROMECHANISM

Designed to provide angular displacement of executive organs. Electromechanical device consists of AC electronic motor with control unit, multiple-reduction gear unit, non-contact sensor of extreme positions.



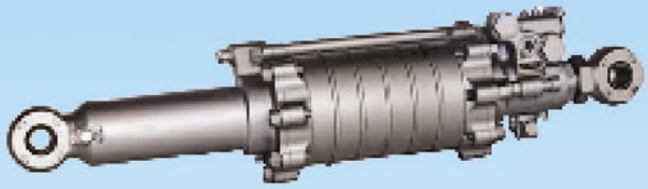
ГП-21, 23 (GP-21, 23) DRIVE GENERATORS

Designed for electric power supply for the main unit electrical system. Application: Tu-22M3, An-124.

ПЕМ-2 (PEM-2) ELECTROMAGNETIC TRANSFORMER

Designed to rotate the dispensing element of the dosepump. Two-channel transmitter of control signals from an external electronic controller into the angular mechanical movement of the shaft (flat/slide valve); all weather climatic construction, leak-proof, vibration-proof.

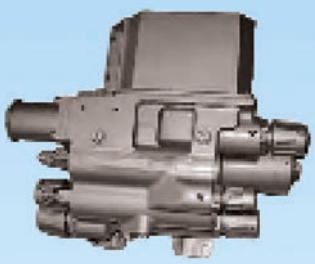
Ц-01, 02 (Ts-01, 02) POWER CYLINDERS



Designed for moving of lever mechanisms of machine. The piston type cylinder is swinging, with brake zones at the end of piston stroke at its extraction and retraction.

РС42 (RS42) NOZZLE CONTROL UNIT

Control of fuel supply to the nozzle flaps displacement cylinders of the AI-222K-25F engine by input command from the engine control system.

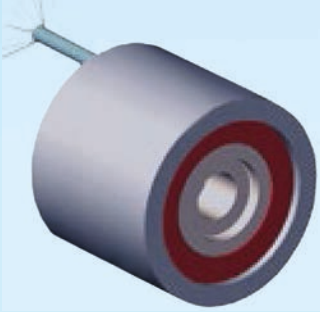


ПУС-36ДМ, ПУС-36-68, ПУС-36-71 (PUS-36DM, PUS-36-68, PUS-36-71) CONTROL DEVICES

The devices are mounted on the MiG, Su and An series aircraft and are designed for serial processing of 36 electric impulses in multichannel system and their distribution in user circuits in definite order.

ВТ32-8 (VT32-8) DUAL-CHANNEL INDUCTIVE ROTATORY SENSOR

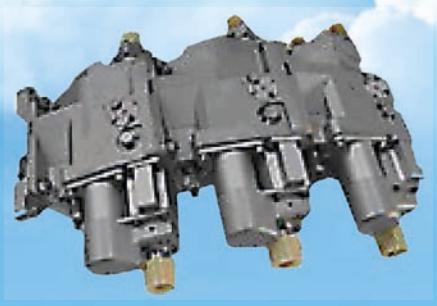
Designed for measurement of executive element angular position, as well as for use in feedback circuits of servo systems.



ДИ4, ДИЛ55, ДИ2 (DI4, DIL55, DI2) LINEAR DISPLACEMENT SENSORS

ДФ-42 (DF-42) AFTERBURNER FUEL METERING DEVICE

Designed for fuel dispensing into afterburner ducts of AI-222K-25F turbojet engine by input commands from engine control system.



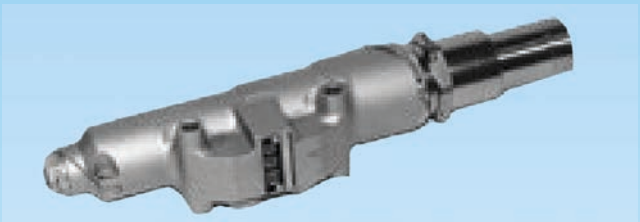
УСБ-1 (USB-1) UNIVERSAL ROUNDS COUNTER

Designed to quantify remaining rounds, as well as to indicate the weapons ready-to-fire status. It is installed on Mi-series helicopters.

АУЗ-02А (AUZ-02A) FLAPS CONTROL UNIT

Designed for fixing aircraft flaps in any extended position, stabilizing their operating speed. Application: An-28, An-38.

АТК-02-01, АТК-02-01Н, АТК-02 WHEELS BRAKE / ANTI-SKID UNIT



Designed for aircraft wheels anti-skid control by controlling the pressure in the brake lines. Application: An-140, An-148, An-28, An-38, An-140

КР-158Н (KR158N) ELECTRO-HYDRAULIC CRANE

Designed to provide pressure relief in the hydraulic wheel brake system of AN-148, AN-158, AN-140 aircrafts and their modifications, when crane's electromagnet responds to electrical signal.

ЭПЛ-1 (EPL -1) ELECTROMOTOR OF BLADE FEATHERING SYSTEM

Designed to drive the blade feathering system of the wind turbine-generator.

ВН-400 (VN-400) AIR-HEATER

Designed for air heating in the aircraft's air-conditioning system. Air heater consists of the heating element, thermo-switches, case and an electric socket.

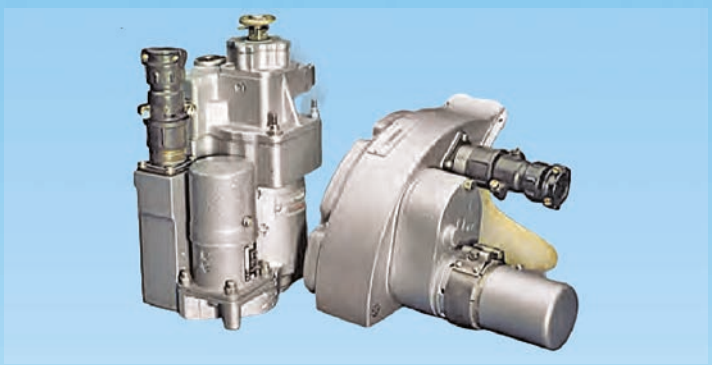
МПФ-2В, МПФ-6В (MPF-2V, MPF-6V) MOTOR-OPERATED MECHANISMS

Designed for landing lamp control, used on aircrafts.

МВР-2Б сер. 2, МВР-2П, МВР-2А, МВР-2М (MVR-2B ser. 2, MVR-2P, MVR-2A, MVR-2M) MOTOR-OPERATED MECHANISMS

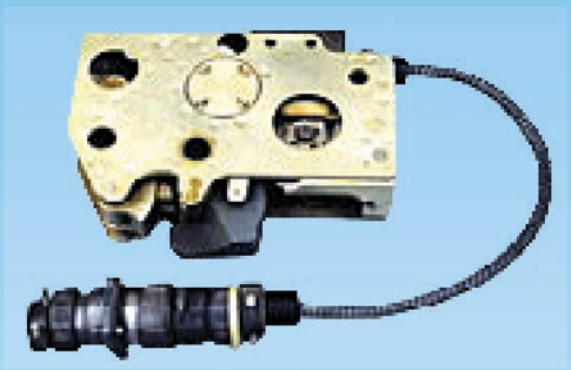
Designed for control of aero-engine oil radiator shutter, used on aircrafts.

УТ-11М, УТ-15, УТ-10В, УТ-6Д (UT-11M, UT-15, UT-10V, UT-6D) MOTOR-OPERATED MECHANISMS



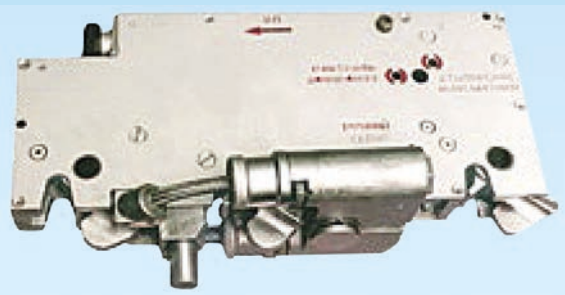
Designed for altitude relay aileron control, used on aircrafts.

БДЗ-56ЕМ (BDZ -56EM) EJECTOR RACK



Ejector Rack is used on MiG type aircraft and designed for suspension and dropping of fuel tanks weighting 400, 500 and 800 kg.

ДЗ-УМ (D3-UM) LOCK



Designed for suspension, delivery and dropping of cargo weighting 50 ... 500 kg. Designed for standard loads, having one or two rhymes with spacing of 250 mm.

ЗТП-Д-1, ЗТП-Д-2 (ZTP-D-1, ZTP-D-2) BRAKE PARACHUTE KEYLOCKS

They are installed on Su-series aircrafts and designed for the aircraft brake parachute locking and it release after landing and aircraft speed reducing.

ЗКТП-4900-0 -(01) (ZKTP-4900-0 -(01)) BRAKING PARACHUTE CONTAINER KEYLOCK

It is used on the Su series aircrafts for keeping of braking parachute container doors closed during the flight and for unlocking them for braking parachute release during the aircraft landing.

9C475, 9C475-1, 9C475-2, 9C475-3 (9S475, 9S475-1, 9S475-2, 9S475-3) CONTROL EQUIPMENT

Designed for targets search, detection and recognition, launcher selection, launching and semi-automatic guidance of "SHTURM" jet projectile at ground targets.

9M120 CONTROL CHANNEL EQUIPMENT

Designed to ensure the operation of 9K113K-8 helicopter guided weapon system – a component of OPS-24N target sight system.

КПА 9C475 (KPA 9S475) TEST AND CONTROL EQUIPMENT

Test equipment is used for checking the 9S475 products on Mi-24, Mi-8AMTSh or KA-252TB helicopters and on "14310 project" patrol boats (Mirage).

GROUND SUPPORT EQUIPMENT

Aircraft technical maintenance at stationary airfields.

ТСД-10, ТСД-11 AND ТСД-5М (TSD-10, TSD-11 & TSD-5M) BOARD LIGHT-SIGNAL DIODES

Board light-signal diodes TSD-10, TSD-11 and TSD-5M (red, yellow, green, white, blue colour of a luminescence) are intended for the emergency, warning and notifying alarm system onboard maintenance.

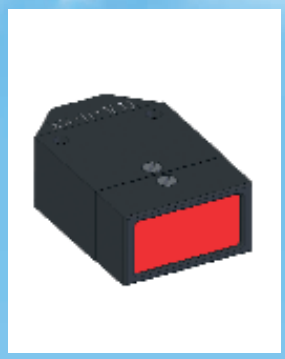
TSD-10, TSD-11 and TSD-5M inscriptions, signs, images are shone in certain colours on indicator fields according to established on-board a cliché. The size of TSD-10 indicator field allows to deduce the information in one line, for TSD-11 and TSD-5M – in one or two lines.

The design of TSD-10, TSD-11 and TSD-5M boards provides information reading at external light exposure 61000 lux.

Executions of products TSD-10, TSD-11 and TSD-5M have various kinds of connection of current-carrying wires – under the screw, under the soldering, under the screw inclined under 45˚.

TSD-10, TSD-11 and TSD-5M board is completely interchangeable with TS-10, TS-11 and TS-5M board on incandescent lamps.

TSD-10



TSD-11

TSD-5M

SPECIFICATIONS:

	TSD-10	TSD-11	TSD-5M
Supply voltage, DC or AC, V		27	
Consumption current, мА, no more than		40	
Brightness of light signals, kd/m^2		600-1800	
Uniformity of brightness of light signals, not less than		1:3	
Colours of a light signal		red, yellow, green, white, blue	
The sizes of an indicator field, mm	47 x 5,5	24 x 12	24 x 12
Weight, kg, no more than	0,028	0,024	0,028
Resource without replacement of light sources, hours, not less than		10 000	
Range of working temperatures, ˚C		from -60 up to +60	

Installation of TSD-10, TSD-11 and TSD-5M aboard air craft provides:
- Decreased energy consumption of the equipment;
- Increased resource of products;
- Increased reliability of products.

РНЦ-1 (RNTs-1) DIGITAL VOLTAGE CONTROLLER

The device is used for primary transformation of DC voltage 27 V to secondary DC voltage from 0 to 6V and delivering it simultaneously on two independent channels.

Operation conditions:

- vibration at frequencies from 5 to 2000 Hz with acceleration to 49 m/s^2 (5g) and displacement amplitude not more than 2,5 mm;
- impacts with acceleration to 58,8 m/s^2 (6 g);
- linear acceleration to 5 g. For the mounting points to 10 g;
- decreased air pressure to 2,3 kPa (17 mm mercury column);
- highest operating ambient temperature: 60°C;
- lowest operating ambient temperature: minus 60°C
- relative humidity: not more than 98% at temperature 35°C.

SPECIFICATIONS:	
Supply voltage	from 18 to 33 VDC in accordance to p.8.1.5 ЕНЛГ-С and ГОСТ 19705-89
Number of independent output channels	2
Output voltage of each channel	from 0 to 6 V, changes in a range from (1,2±0,1) V to (6,0±0,1) V simultaneously on two channels by one handle of the device
Input supply current at nominal supply voltage 27 V at maximum load, not more than	2.0 A per each channel
Output (load) current of each channel, not more than	6 A
Power consumption from the 27 V line, not more than	1,5 W (without load power)
Dimensions, not more than	48x48x130 mm
Weight, no more than	0,4 kg

AIRCRAFT AND HELICOPTER GLAZING

We can offer for supply wide range of high quality aircraft and helicopter glazing from the certified glass manufacturers.

FIGHTER FLEET

	MiG-21	MiG-23/23Б/УБ	MiG-25	MiG-27/27М	MiG-29/29UB
Fuel system (centrifugal pumps, supporting and safety valves)	495Ф ДЦН-44С-ДТ1 ДЦН-64	1029 ГТН-7-3 ДЦН-76М/А РД-20А РД-20А-2 РД-22 ЭЦН-14БМ	ГТН-7-3 ДЦН-44С-ДТ1 РД-20А РД-39 РД-41 ЭЦН-14БМ ЭЦН-105	ДЦН-64 ДЦН-76А ДЦН-64А РД-20А ЭЦН-14БМ 4030(А)	ГТН-7-3 ДЦН-78 ДЦН-80 РД-39 РД-41 ЭЦН-14БМ 4030(А)
Hydraulic system (axial and plunger pumps, hydro drives)	495Б ДЦН-58А НП-70АМ-3 НП-27ТМ	495Б ДЦН-58А НП-96АМ-2 НП-70АМ-3 Д1А-1	422А ДЦН-58А НП-96АМ-2 НП-70АМ-3	НП-96АМ НП-70АМ-3 Д1А-1	НП-103А НП-96М НС-58
Power-supply system (drive generators, batteries)	Д880Т МГП-700А МГП-700Б МГП-700Б-2С	МГП-180-2С МГП-200 МГП-700А МГП-700Б МГП-900	МГП-180-2С МГП-700С-2С	Д880Т МГП-180В	ПГЛ 40-2(3) 15СЦС-45Б
Glazing products (different types of glass)	Е-6а	ТСК-061 (ТСК 061.00.000 ТУ) Е-9		ТСК 061.00.000 ТУ	
Racks, launchers, locks etc.	Д3-57Д Д3-57ДА	МБД3-У2Т-1/1М Д3У-1, Д3У-1М		МБД3-У2Т-1/1М БД3-УМК2-Б Д3-УМ	АПУ-470 МБД3-У2Т-1/1М БД3-УМК2-Б Д3У-1 Д3У-1М
Air system	АД-5А				АД-5А
Control system					ТДК ГП21-3

FIGHTER FLEET

	Su-24/24M	Su-25/25T	Su-27	Su-30/30MK/MKI
Fuel system (centrifugal pumps, supporting and safety valves)	ГТН-7-3 ДЦН-64 ДЦН-72 ЭЦН-14БМ ЭЦН-154А ЭЦН-335М ЭЦНГ-10С-76 ЭЦНГ-40 ЭЦН-45Б	1029 ДЦН44С-ДТ1 ЭЦН-325 ЭЦН-75Б ЭЦН-91Б ЭЦН-91С ЭЦНГ-20С-62 ЭЦНГ-5	ГТН-7-3 ДЦН-80 ДЦН-80Т ДЦН-82 ЭЦН-14БМ ЭЦН-45Б ЭЦН-45С ЭЦН-91Б ЭЦН-91С ЭЦНГ-10 ЭЦНГР-20 ЭЦНГ-5	ГТН-7-3 ДЦН-80 ДЦН-80Т ДЦН-82 НП-128 НП-160Д ЭЦН-45С ЭЦНГ-10 ЭЦНГ-40 4030(А)
Hydraulic system	 НП-96АМ-2 НП-96М НС-3 ГА213 ГМ40 Д1А-1	ДЦН-96	ГТН-6 НП-96М Д1А-1	 НП-96М
Power-supply system (generators, electro motors etc)	МГТ-750К2 ММТ-0,4АМ ММТ-1,5С/ ММТ-1,5С-ОМ МГП-180-2С МГП-180И2	ММТ-0,4А-2С ММТ-900 МГП-900 МП-100С-2С МП-100С-3С МП-50Б	МГП-180В МП-100С-2С МП-100С-3С МП-50Б	ГП25 ММТ-1,5С/ ММТ-1,5С-ОМ
Glazing products		ТСК 143.05.000 ТСК-137 (ТСК 137.03.000 ТУ)		
Bomb racks, launchers, locks etc.	МБД3-У6-68 Д3-57ДА БД4-УСКБ БД4-УСКМ-Б БД3-УСК	МБД3-У2Т-1/1М Д3-УМ	МБД3-У6-68 БД4-УСКБ БД4-УСКМ-Б БД3-УСК	МБД3-У2Т-1/1М МБД3-У6-68 БД4-УСКБ БД4-УСКМ-Б БД3-УСК
Air system		АД-5А automatic pressure device	АД-5 automatic pressure device	АД-5 automatic pressure device
Control system	НР01/1		ГП23-5 НР01/1 ТДК	 НР01/1 ТДК ТДК-М

TRANSPORT AIRCRAFT

	An-26	An-32	An-140	An-74/An-74-TK200(300)	An-124-100
Fuel system	4673 463Б 463М ЭЦН-14А ЭЦН-104В ЭЦН-11-А2 ДЦН-70А	4673 463Б ЭЦН-11-А2 ЭЦН-14БМ ДЦН-70А РД-20-2			
Hydraulic system	ЭМКО-М ГА230-(2,-4) ГА192/192Т	НП-96АМ-2 ГА230-(2,-4) ГА213 (Т, Н,-1-2-3-4) НР32	 ГА230-(2,-4) КВ 38 (А) КП-38А НП-140 НС-140-2 НПТ-9	ГМ40 ГА230-(2,-4) ГА213 (Т, Н,-1-2-3-4) БПРП-1 НС46(-2,3,5,6) НП-134 НС-73 НС-69 НС-148-1	НС55А-5 НС62 НС63 НС53 ГА230-(2,-4) ГА213 (Т, Н,-1-2-3-4) НП107 КГ 42 ГМ 56
Power–supply system - batteries: - DC electro motors:	20НКБН-25(Д, Т, ТД, ТД-1)-У3 Ni-Cd battery ВС-1А Starter switch МВ-1000Б3 МВ-280 МВ-280-2С МВ-280Б РБН2	20НКБН-25(Д, Т, ТД, ТД-1)-У3 Ni-Cd battery МВ-1000Б3 МВ-280 МВ-280-2С МВ-280Б МГП-180-2С МГП-180В РБН2	20НКБН-25(Д, Т, ТД, ТД-1)-У3 Ni-Cd battery МТ-50 МП-50Б ТПП76-115-400 ТПП124-115-400В ТПП55-115-400В 2Д-104А 2Д202Р 2Д203А Diod РБН2 РЭС34 РЭС52	20НКБН-25(Д, Т, ТД, ТД-1)-У3 Ni-Cd battery МТ-50 МП-50Б ТПП206-115-400 2Д202Р 2Д203А Diod РБН2 РПС32Б-Т, РЭС34 РЭС47 РЭС49 РЭС52	20НКБН-25(Д, Т, ТД, ТД-1)-У3 Ni-Cd battery ГП 23 МГП-0,12А РБН2
Glazing products	ТСБП-28 А-10	ТСК-009 (ТСК 009.04.000 ТУ)	ТСК- 008 (ТСК 008.00.000 ТУ)	ТСК- 008 (ТСК 008.00.000 ТУ)	ТСК-006 (ТСК 006.01.000 ТУ)
Aircraft and power pack control system			НР9-3Б/В1		НР01/1 АУР-18

	IL-76	IL-78
Fuel system	ЭЦН-14М ЭЦН-11А2Ж НС-51А АДТ-21МС ДЦН-44СП3 ДЦН-44СП3Т	ДЦН-44СП3 ДЦН-44СП3Т
Hydraulic system	РД-20А-2 НС51А ГА213 (Т, Н,-1-2-3-4) Д1А-1 ГА230-(2,-4)	ГА213
Power–supply system	20НКБН-25(Д,Т,ТД,ТД-1)-У3 МТ-3000-2С ММТ-0,4АМ МТ-25 МТ-100 МГП-180-2С МГП-180В Д1-0,08-0,32 Д8-0,08-0,56	ММТ-0,4АМ
Glazing products	ТСК 079М.01 ТСК 079М.02 ТСК 079М.05 ТСК 077М.03	
Aircraft and power pack control system	НР01/1	

HELICOPTER

	Ка-25	Ка-27/28	Ка-29	Ка-31	Ка-32
Fuel system	ДЦН-70А ЭЦН-75Б ЭЦН-104В РД-22	ДЦН-70А ЭЦН-75Б РД-22	ДЦН-70А ЭЦН-75Б РД-22	ДЦН-70 ДЦН-70А ЭЦН-75Б РД-22	463М ДЦН-70А ЭЦН-75Б РД-22
Hydraulic system	ГА215	ГА215 НС46(-2,3,5,6)	ГА215 НС46(-2,3,5,6)	ГА215 НС46(-2,3,5,6)	ГА215 НС46(-2,3,5,6)
Power–supply system	МП-50Б Д-100С-3	МП-50Б	МП-50Б	МП-50Б	РБН2 РПС1
Glazing products					
Aircraft and power pack control system		НР-9В НР-3А (АК, АМ) ИМ-3А	НР-3А (АК, АМ)	НР-3А (АК, АМ) ИМ-3А	НР-9В

	Mi-8 (АПС, МТ, МТВ-1	Mi-17/171	Mi-24	Mi-25/35	Mi-26
Fuel system	АТП-8(А) НП-9 ЭЦН-40 ЭЦН-75Б ЭЦН-104В ЭЦН-89 ЭЦН-107СХ ЭЦН-91Б/С ДЦН-70 ДЦН-70А ПЦР-1Ш	ПЦР-1Ш ЭЦН-40 ЭЦН-75Б ЭЦН-91Б/С ДЦН-70 ДЦН-70А РД-22	ПЦР-1Ш ЭЦН-40 ЭЦН-75Б ЭЦН-91Б/С ДЦН-70 ДЦН-70А ЭЦНР-1А	4673 ПЦР-1Ш ЭЦН-40 ЭЦН-75Б ЭЦН-91Б/С ЭЦН-89М ДЦН-70 ДЦН-70А ЭЦНР-1А	
Hydraulic system	НС74-2 ПНВ-2Б ГА230-(2,-4) ГА192/2Т ГА213 (Т, Н,-1-2-3-4) ГА215	НП27ТМ ПНВ-2Б ГА230-(2,-4) ГА192/2Т ГА213 (Т, Н,-1-2-3-4) ГА215 ЭМКО-М	ЭМКО-К	ЭМКО-К	ГА215 ГА230-(2,-4) НС46(-2,3,5,6) ГА213 (Т,Н,-1-2-3-4)
Power-supply system	20НКБН-25(Д, Т, ТД, ТД-1)-УЗ Ni-Cd battery Д-20-2 МТ-3000-2С МТ-50 МГП-180А МГП-180Б МГП-350Б-2С МП-100Б1-2С МП-100С МП-100С-2С МП-100С-3С МП-50Б Д-100С-3 РПС1 РБН2	20НКБН-25(Д, Т, ТД, ТД-1)-УЗ Ni-Cd battery Д-20-2 МГП-180Б МГП-350Б-2С МП-100Б1-2С МП-100С-2С МП-100С-3С МП-50Б Д-100С-3 РПС1 РБН2	 МГП-0,12А МП-100Б1-2С МП-100С-2С МП-100С-3С МП-50Б	 МГП-350Б-2С МП-100С-2С МП-100С-3С МП-50Б	Д-100С-3 РПС1 РБН2
Glazing products	В8БП		ТСБН-32 ТСК 030 ПС-5		
Aircraft and power pack control system	НР9В НР-3А НР01/1 ИМ-3А	НР-3А НР01/1 ИМ-3А	НР-3А ИМ-3А		

GROUND TESTING EQUIPMENT & SERVICES

GURT-M UNIVERSAL COMPLEX

Designed for preparation and maintenance of aircraft controlled weapons (all types of missiles and bombs).

"GURT-M" SYSTEM

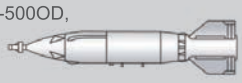
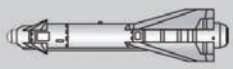
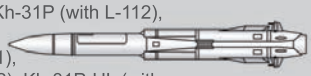
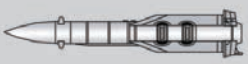
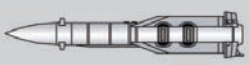
MEANS OF AUTOMATIC CONTROL (MAC)

GENERAL-PURPOSE EQUIPMENT

AKPA6.1M-05

AKPA6.2M (AKPA6.2)

SPECIAL-PURPOSE EQUIPMENT

AKPA2.9M	Kh-59, Kh-59M, Kh-59ME	
AKPA2.13M (KDO)	R-73K, U-73, R-73L	
AKPA2.20M (KDO)	KAB-500L, KAB-500L-K, KAB-500OD, KAB-500Kr, KAB-500Kr-U, KAB-1500L-F, KAB-1500L-Pr, KAB-1500Kr	
AKPA2.21M (KDO)	R-27R1, R-27ER1, R-27T1, R-27ET1, R-27P, R-27EP, 470UT-RT, 470UT-ERT	
AKPA6.4M (KDO)	Kh-29T, IKh-29T, Kh-29TD, IKh-29TD, Kh-29L, IKh-29L, S-25L, S-25LD	
AKPA6.7 (KDO)	Kh-31A, Kh-31A-UD	
AKPA6.11M (KDO)	R-60M, R-60MK	
AKPA6.17	Kh-31P (with L-111), Kh-31P (with L-112), Kh-31P (with L-113), Kh-31P-UL (with L-111), Kh-31P-UL (with L-112), Kh-31P-UL (with	
AKPA6.18 (KDO)	Kh-25MP (with LO77M), Kh-25MP (with LO15M1), Kh-25ML (with 24N1), Kh-25MR (with V500), Kh-25MU (with LO77M), Kh-25MU (with LO15M1), Kh-25MU (with 24N1)	
AKPA6.30	R-40T, UR-40T	
AKPA6.31	R-40TD, R-40RD, R-40TD1, UR-40TD, UR-40RD	
AKPA6.32	R-33	
AKPA6.33	R-33S	

MAINTENANCE FACILITIES

MANUFACTURING EQUIPMENT (ME)

Manufacturing equipment set №1 MS-14610G

Multipurpose manufacturing equipment set MS-14603G

Special-purpose sets for particular type of AKPA

TRUCK TRACTOR

DUAL - PURPOSE VEHICLE

TRUCK CRANE

GAS-FILLING STATION

TRAILER

COMPRESSOR PLANT

ELECTRIC POWER STATION

The "GURT-M" system is supplied nowadays instead of the "GURT" system which has been manufactured since 1984 and delivered to more than 40 countries all over the world.

Modernized "GURT-M" system provides:

- check and preparation for application of more than 50 various modifications of air missiles and air bombs;
- missile outgoing inspection on manufacturing plants;
- failure diagnostics during repairing of missiles;
- missiles technical condition forecast during extention of their service life.

Advantages of "GURT-M" system:

- overall performance of AKPA is improved, weight is reduced;
- characteristics of operational reliability are improved, the mean time between failures is increased twice;
- up-to-date methods of visualization and documenting of the test results are introduced. The usage of the modem industrial computer allows documenting of the results in different languages, and also correcting of the check routines while operating;

- long-term storage of results of missiles testing for all the operation period is assured that allows technical condition forecast during the extention of their service life;
- in AKPA6.2M the power supply systems created on the basis of static transducers of improved comfort (efficient, noiseless operation, convenient in maintenance) are applied;
- specialized equipment, in addition to AKPA, can also include diagnostic equipment sets (KDO) which allow failure pinpointing in the missiles for their repairing. The missiles that KDO are designed for are marked with red colour.

The list of services carried out:

- delivery of the "GURT-M" system in any kitting-up;
- modernization of the running "GURT" system up to the "GURT-M" system. Modernization of AKPA6.1 M is carried out by means of an extra equipment set delivery;
- extension of the assigned service life;
- repair and delivery of the spare parts.

MULTIPURPOSE AUTOMATIC CONTROL PANEL OF AIRCRAFT SWITCHING MECHANISMS AND COCKPIT PANELS

Control panel and a set of multipurpose adaptor wires provide control of the relay-switching boxes, on-board electro panels, panel boards, power distribution panels, cockpit panels etc, that require airborne voltage = 28 volt, ~115 volt 400 Hz, three-phase power line 36 volt 400 Hz, three-phase power line 200 volt 400 Hz for MiG, Su, Yak, Il, Tu, An, Be types of aircraft and Mi and Ka types of helicopters.

MULTIPURPOSE AUTOMATIC CONTROL PANEL OF AIRCRAFT ENGINE ELECTRIC EQUIPMENT

Control panel and adaptor wires for connection to exit interface connectors of AI-20, AI-25, AI-9B, TB2-117, TB3-117, AL-31F, RD-33, R-27F-300, R29-300, R13-300, R25-300, R-95Sh, R29, D-20KP, GTD-350 and other aircraft engines allow to control aircraft electric wiring harness of all types of aircraft, helicopters, missiles and other objects during production, operation and maintenance.

Control panel is designed for controlling wiring harness with quantity of termination lugs up to 600, 1200, 1800, 2400, 3000 and 3600, depending on quantity of switching units.

THE MULTIPURPOSE AUTOMATIC TESTER FOR TEST OF ONBOARD RELAY-CONTACT ASSEMBLIES, ELECTRICAL BOARDS AND INSTRUMENT PANELS

It is intended for automatic test of operability and automatic no separable fault detection of aircraft relay-contact assemblies, electrical boards and instrument panels (referred to as Devices) of aircrafts and helicopters of domestic and foreign production.

The Tester makes it possible to perform tests directly onboard of aircraft (helicopter) as well as to test a dismounted device.

Devices operability tests

The Tester checks:

- conformity of the checked device to electrical scheme;
- absence of breakages, short circuits;
- resistance of insulation.

Devices operability tests

The Tester checks:

- voltage of relay actuation-release;
- voltage drop in contact circuits at set current (1-5) A;
- resistance in contact circuits at a "small" current
- (1 ± 0.1) мА;
- temporary parameters of relay;
- resistance of resistors;
- reliability of contacting variable resistors and rheostats;
- DC & AC voltages;
- serviceability of diodes.

Connection of checked devices to the Tester is performed by means of "multipurpose" transient harnesses. The "multifunctionality" of these harnesses is that they can be used for connection of various devices. The software allows to optimize connection of the checked devices by means of available transient harnesses.

The Tester is completed with harnesses-extenders (their length is agreed with order) that allows to bring closer Tester's output connectors directly to the checked devices onboard i.e. to perform tests without dismounting Devices from board.

Development of operating test programs is composed by means of easily understood "technological" commands such as «To give voltage +28 on con. 3P pin 18» and so on.

Note: With order for training of specialists Producer develops operating test programs of some complicated Devices of Customer.

On completion of tests the Test report with computed output of all recorded deviations is automatically formed.

SPECIFICATIONS:	
Quantity of commutation devices	from 1 to 4
Number of connection terminals of commutation device (4 connectors 2РМД42БПН50Г8В1)	200
Control unit and commutation devices are placed in the same frame	0 ... -123.5
Voltages supplied to controllable devices:	
DC + 28 V, - 28 V	Imax = 5 A
AC 115 V 400 Hz single-phase	Imax = 2 A
AC 36 V 400 Hz three-phase “a”, “b”, “c”	Imax = 2 A
Voltage supplied to device at check of relay actuation-release (0.1-24) V	Imax = 2 A
Stabilized value of a current at check of voltage drop in contact circuits - (1-5) A	Rн max = 3 Ohm
Stabilized value of a current at check of contacts by "small" current - (1±0.1) мА	Rн max = 5 Ohm
Voltage supplied to device at measurement of resistances	U´ = (5±0.2) V
Voltage supplied to device at check of variable resistors	U´ = (28 ± 0.5) V
Voltage supplied to device at check of insulation resistance	U´ = 100 V
Voltage for the circuits containing semiconductors to check absence of short circuit	U´ = 5 V
Accuracy of measurement of DC voltage	not less cl. acc. 1
Accuracy of measurement of AC voltage	not less cl. acc. 2.5
Accuracy of measurement of resistance:	
from 0 up to 4 Ohm	not less ± 0.1 Ohm
from 4 up to 1 MOhm	not less cl. acc. 2.5
Accuracy of voltage measurement of relay actuation-release	not less ± 0.1 V
Accuracy of voltage measurement of relay actuation-release	19 ± 1 MOhm

The given Tester is very simple in operation, allows to use different test programs (based on serial differences and modifications of helicopter / aircraft operated by a Customer), and allows to solve a complex task of automatic test of onboard commutation devices (without their disassembly).

MULTIPURPOSE AUTOMATIC TESTER

It is intended for automatic test of devices, units, systems of electrical instrument equipment, avionics and armament of aircrafts and helicopters.

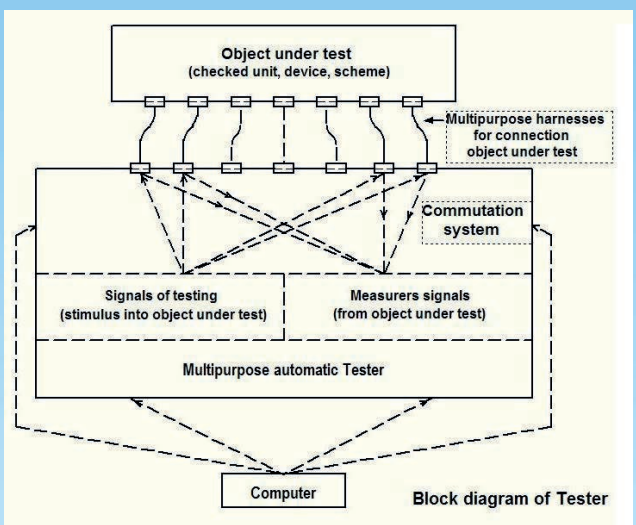
Range of application
- aircraft manufacturing plants (incoming control of devices, units, systems);
- aircraft overhaul enterprises;
- operating organizations (check of the devices dismounted from board for conformity to specifications).

The checked device is connected to the Tester's connectors by means of multipurpose transient harnesses, i.e. the harnesses used for connection and other devices.

It is advantageously distinguished the given Tester from foreign analogues which are required manufacturing the transient unit (adapter) for connection of any checked device.

In the process of testing the Tester sends various stimulus signals to the checked device: these are the supplying voltage, control signals, parametrical signals, code ringing, signals of angles imitation etc. If required, the signals from special signal sources which are absent in the Tester scheme can also be sent through the Tester system.

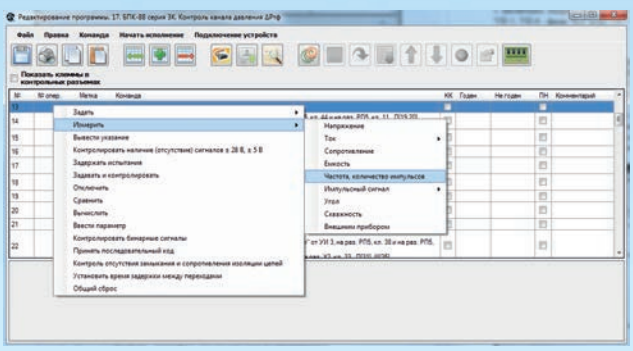
The output (response) signals from the checked device are sent to inputs of various measuring circuits of the Tester where voltage, currents, resistive signals, pulses, angular, temporary, code and other signals are measured. Also, if required, the devices for measurement of parameters, which meters are deficient in the Tester, can be connected through the Tester system.



Block diagram of Tester

The high-class multipurpose device UTM1805A integrated into the complete set of the Tester is used for performing high-precision measurements.

The switching system developed for the Tester and corresponding software allow transmitting any generator (of stimuli) from the Tester system to each of 360 terminals of output connectors of the Tester, including the external, and making measurements by measuring devices of the Tester and by external meters using any terminals.



The operating programs for test represent the sets of commands, similar used in ordinary technological documents ("Apply voltage +5V to con. 2C term. 7"), etc. It allows amending programs by Customer's specialists for considering serial differences of the tested devices.

Foreign analogues of the Tester in such cases require amendments of adapters and programs (which developers are the producers of adapters), that can cause Customer certain difficulties.

Upon completion of testing the Test report with recording all registered deviations is automatically issued.

At present the Tester is applied for checking control units and monitoring engine systems (including automatic time switches), units of autopilots and systems of automatic control.

Application of the Tester improves the quality and reliability of tests, reduces expenses for purchase of a large quantity of deficient Testers.

MULTIPURPOSE AUTOMATIC TESTER FOR THE ONBOARD ELECTRICAL HARNESSES TESTING

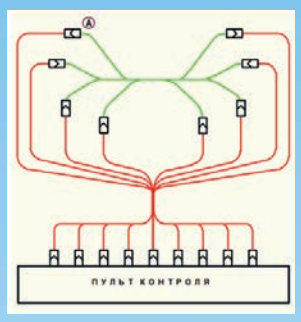
When operating this Tester, the following is not required:

- Test program for tested harnesses;
- Schemes of the tested electric cables, since the Tester itself creates them during the testing process;
- And the most important: It does not require a large number of expensive transient harnesses.

The checked device is connected to the Tester's connectors by means of multipurpose transient harnesses, i.e. the harnesses used for connection and other devices.

It is advantageously distinguished the given Tester from foreign analogues which are required manufacturing the transient unit (adapter) for connection of any checked device.

Currently, the harnesses are tested as follows:



The harness to be tested (shown in green) is connected to the Tester using the transient harness (red).

Note, that the transient harness has twice more circuits than the one being tested (each circuit has the beginning and the end).

Pay attention to connector A (or any other), which on the next same harness due to serial differences may be, for example, not a 24-terminal, but a 32-terminal connector and have some additional circuits respectively.

How do you act? Will you make a new transient harness? Any other connector may be changed tomorrow.

The proposed Tester solves this problem

Suppose you start organizing the harnesses testing beginning with the harness No. 1. You record the connectors (design and circuit designation) of this harness into the computer, which determines how and which (small, mostly up to 100 circuits) transient harnesses it should be connected with. You make them and check harness No.1.

To test the next harness - harness No.2, these transient harnesses, most likely, will not be enough, but the computer will tell you which harnesses need to be made additionally. They will be made and will replenish a set of transient harnesses; and so on.

After organizing the tests of 9, 10 "large" harnesses, you will accumulate transient harnesses to check practically any harnesses.

The Tester consists of a control unit and (from one to eight) mobile switching units.

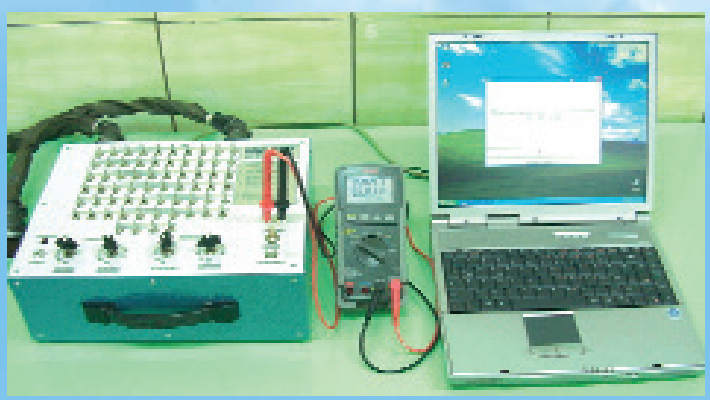
The switching unit has twelve 50-terminal connectors, which the test harness is connected to via transient harnesses.

When checking the harnesses on the plane, the switching units are located near the concentration points of the connectors of the harness being tested. Also the Tester is additionally equipped with extension harnesses that bring the switching unit connectors closer to the connectors of the harness being tested (in compartments), which makes possible to manufacture transient harnesses of the minimum length.

The Tester operation modes:

- Self-control;
- Continuity check and comparison with the "reference" (the harness circuit is determined, defects and differences are identified);
- Measurement of resistances (identification of circuits differing in resistance from the reference harness with specified deviation value);
- Insulation resistance monitoring (detection of circuits, where insulation resistance between them is lower than the specified value);
- Automatic issue of the test report.

TESTER PANEL FOR TROUBLESHOOTING DIAGNOSTICS IN ON-BOARD SYSTEMS OF ELECTRIC APPLIANCES AND AVIONICS EQUIPMENT OF AIRCRAFT AND HELICOPTERS



Tester panel significantly simplifies the process of complex defects search in on-board systems of aircraft.

MODERNIZATION OF PORTABLE UNIT 9.12 (MK9.12) FOR AUTOMATIC DIAGNOSTICS OF MiG-29 AIRCRAFT ON-BOARD SYSTEMS

MK 9.12 is designed for conduct of automatic diagnostics of aircraft and engine systems, avionics and radio-communication equipment and armament systems of MiG-29 aircraft, to detect faults up to construction plug-in, and to adjust after the replacement of plug-in.

Outdated and unreliable management system of MK 9.12 is based on micro computer "Electronika C5-22". Testing program input executed by perforated tape: information for the operator appears on photographic paper, outgoing information is reflected on punch card. This causes great problems in case of necessity to amend working testing programs (in case of production differences, or while introducing improvements, etc.) Due to this reasons there are long gaps in operation (out-of-service time) of MK 9.12.

Modernization of unit includes:

- replacement of outdated and unreliable management system by new one, based on state-of-the-art industry computer, IBM PC-compatible;
- use of standard signal selectors and measuring devices, improvement of their performance by software means;
- saving the complex of testing operations, conducted by the unit, in full;
- simplicity of making amendments and additions to the testing programs based on conceptually new software;
- availability of working testing programs, instructions and operators' guidelines in language of Customer.

RADAR SIGNAL SIMULATOR PS7-077

Designed for the X band airborne radars check and alignment, for instance the N019, N001 weapon control system radars of MiG-29 and Su-27 aircraft respectively.

PS7-077 is the enhanced analogue of PS7-061, PS7-067, PS7-019 and PS7-017 devices.

PS7-077 provides:

- setting the programmable frequency shift of the input microwave signal to the values, equal to the possible Doppler frequencies in the reflected signals of areal targets;
- setting the programmable delay to the input pulsed synchronization signals according to the chosen target range;
- customized software allows to apply different types of modulation to the input microwave signal such as: AM, FM, PM or a combination of them in order to both analyse immunity of complicated targets to ECM radars imitated jamming signals and to simulate reflected signals;
- built-in digital attenuator allows to calibrate accurately the output microwave signal level.

The PS7-077 consists of:

- high-quality industrial personal computer with LCD display;
- microwave signal modulators block;
- power supplies;
- cable system with antenna assembly.

SPECIFICATIONS:	
frequency band	X
frequency shifts value, kHz	up to ±70
digital attenuator range, dB	0 ... -123.5
attenuation step value , dB	0.5
delay ranges, μs	2 ... 1500
processor type	Intel Atom N270 1.6GHz
system frequency ,MHz	533
LCD display size, inches	12.1
pixel width, mm	0.24
operating temperature ,°C	-40 ... +70

OVERHAUL, MODERNIZATION, LIFE EXTENSION

Additionally, we kindly offer to our clients such services as repair, overhaul, modernization and life extension works togeher with the maintenance of customer's facilities practically of all types of aircraft and helicopters of ex-USSR production (Mil and Kamov families helicopters, MiG and Sukhoi families fighter aircraft, Antonov and Ilyushin families transport aircraft) as well of their components: engines, APUs, landing gears, avionics, fuselage parts etc.

All respective works shall be fulfilled in certified repair plants.

ANTONOV FAMILY AIRCRAFT

An-32 Aircraft Service Life Extension program includes:

1. Modification of wing for strengthening of lower panels of wing centre section, examination and repair of hard-to-reach areas of structural elements.
2. Carrying out scheduled overhaul with periodicity of assigned TBO.
3. Carrying out individual Ageing Control Programs along with each overhaul and treatment of corroded areas using corrosion prevention material.

Modernization of An-32 Aircraft as per Customer's requirements provides installation of new state-of-the-art equipment such as:

- Traffic Collision Avoidance System (equipped with RBS-type and "Mode S" transponders);
- modern VOR / ILS system;
- GPS/GLONASS system with independent navigation console (with display), having facility for updating data and display the data to the repeater;
- Enhanced Ground Proximity Warning System. Additionally following devices are installed for improving operation features of the system:
  - Outside Air Temp Indicator P-104;
  - Altitude indicator UVK-1F along with MVP-1-1 air flow parameter module;
- Distance Measuring Equipment with three indicators at Pilot, Co-pilot and Navigator's working places;
- Two modern VHF/UHF radio stations are installed with possibility to tune to maritime frequency (156,8 MHz), having channel spacing of 8,33KHz;
- Weather radar system with two Multi-Function Indicators having facility to display information from TCAS, GPS/GLONASS system and EGPWS;
- HF Communication Set;
- Fire Warning System to improve reliability of performance and reduce spurious warnings;
- Headsets with Mike (with noise-cancellation circuit);
- Emergency Locator Transmitters.

Additionally, following modifications are accomplished:

- Fuselage modification for noise/vibrations decrease inside cockpit.
- Hydraulic system modification including filter in hydraulic drainage line and replacement of hydraulic pumps.

- Implementation of possibility for emergency MLG bay Door lock opening in event of breaking of cable.

Following works and services are provided in respect of all AN family aircraft:

- overhaul;
- maintenance according to maintenance schedule, including diagnostic and reconditioning works;
- overhaul of aircraft engines in particular AI-20D 5 ser.

Installation of additional equipment:

- KURS-MP-2 (KURS-MP-70), SD-67 (SD-75), VEM-72FG, VMF-50;
- system of ground proximity notification with early warning function EGPWS;
- global positioning system (GPS) for performing flights within European area navigation system (BRNAV);
- cabin smoke warning systems SPS-BGO;
- insecure altitude change warning systems;
- emergency location transmitters of ARM-406AS, ARM-406P type;
- traffic alert and collision systems (TCAS-II of TCAS-94, CAS-67, TCAS-2000, SPS-2000 type);
- additional soft fuel tanks for An-24B and An-24RB.

Su FAMILY AIRCRAFT

Mid-life repair and repair as per technical state of MiG and Su aircraft, their aggregates and systems.

Repair of airframe with replacement of the elements of power units, accessories of airframe, fuel, hydraulic systems, air-conditioning system, pneumatic system, fuel tanks, aircraft armament, radio-communication equipment, avionics, electronic automatic systems, performance control devices and systems.

Warranty and after-warranty maintenance of repaired aircraft equipment, technical help and support. Theoretical and practical training of specialists in the field of overhaul of aircraft engines and all component aggregates including at Customer's site.

SU-27/30 AIRCRAFT AIRBORNE RADAR MODERNIZATION

INTRODUCTION

Su-27/30 belongs to the most advanced air superiority fighters of fourth generation. Main characteristics of Su-27/30 fairly exceed the parameters of other air superiority fighters.

The radar sighting system (RLPK-27) of Su-27/30 is the most significant mean of detecting the air targets.

The weapon control system of the Su-27/30 air craft consists of:

- airborne radar H001;
- optical-electronic aiming system;
- display information system;
- weapon control units;
- target identification system.

The pulse-doppler radar H001 is the main information system, which defines the primary characteristics of the weapon control system.

H001 RADAR INFORMATION

Design

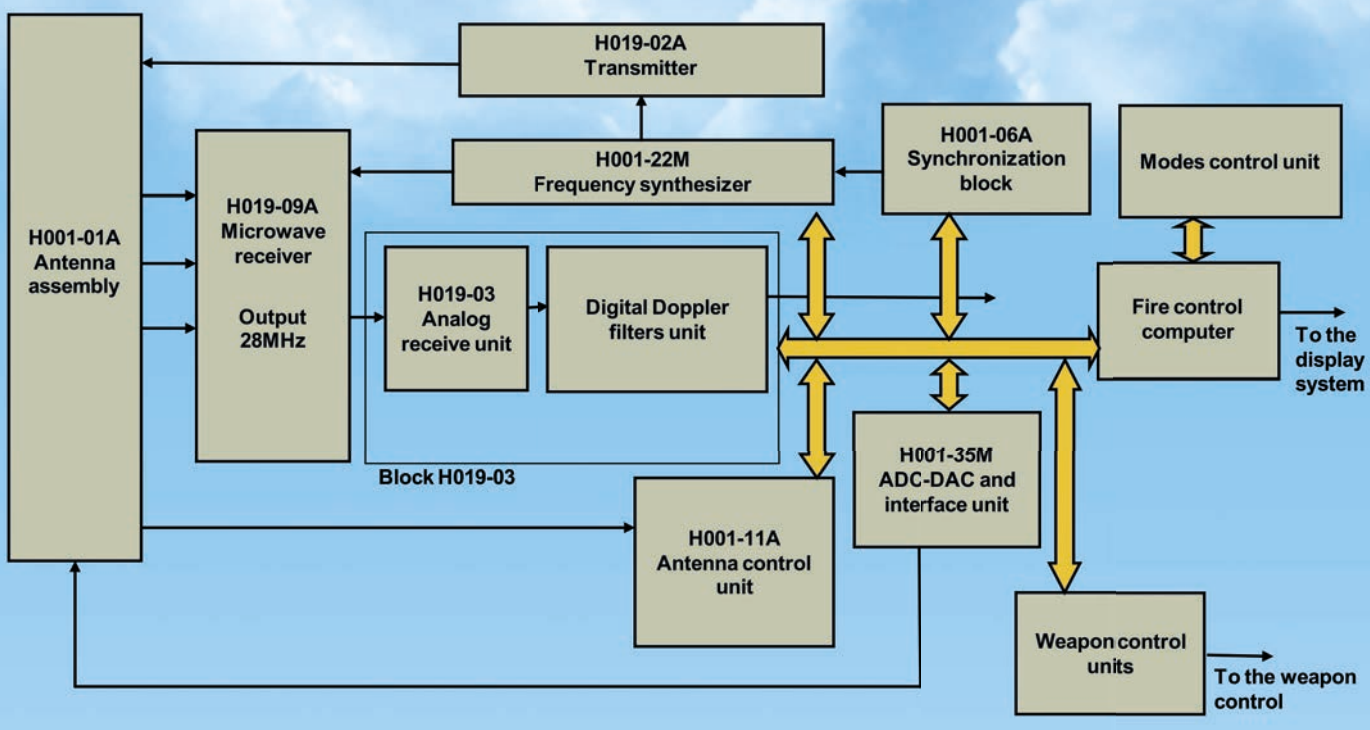
Pulse-Doppler radar H019 is designed for:

- targets acquisition at short and medium ranges with different speed and altitude;
- target tracking and corresponding information sending for the air-to-air missiles;
- air-to-air missiles launch zone computation and sending this information to the display system;
- target illumination after the missiles has been launched.
- antenna assembly;
- transmitting channel;
- receiving channel;

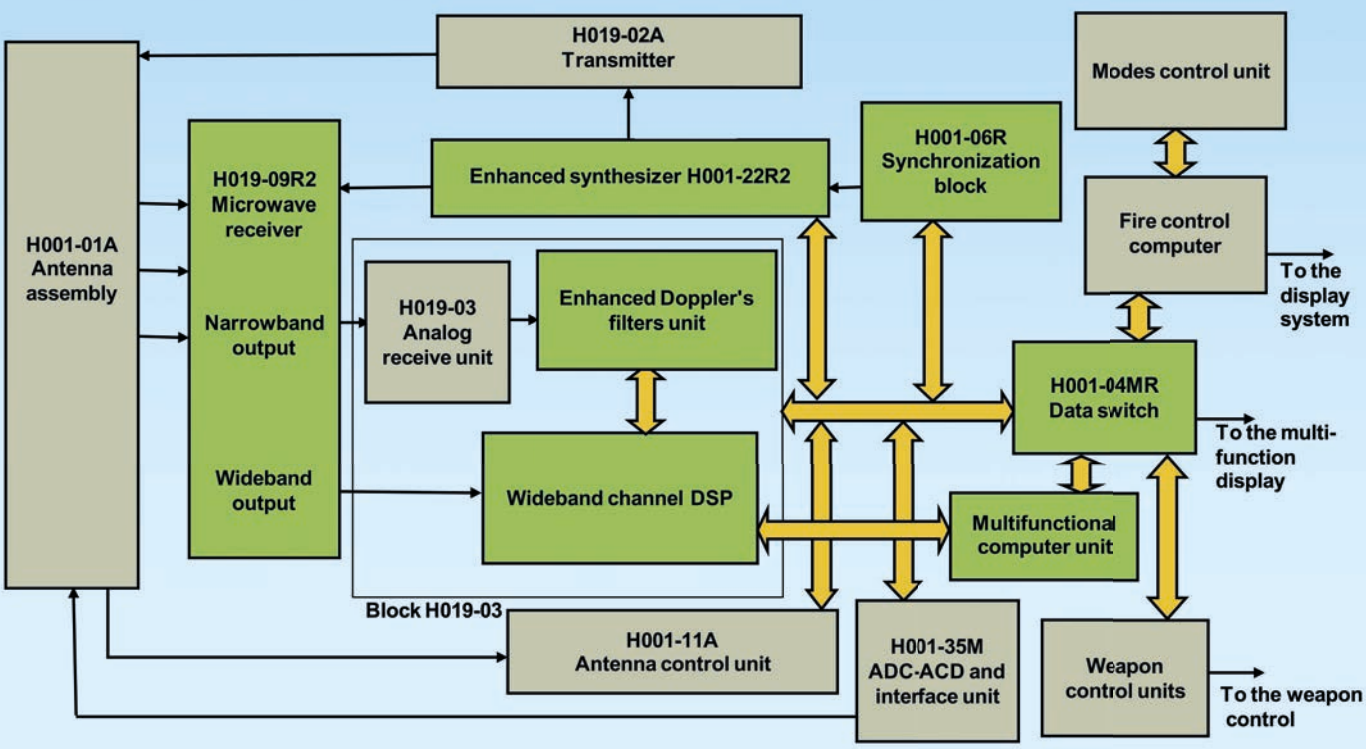
H019 consist of:

- antenna assembly;
- transmitting channel;
- receiving channel;
- synchronization system;
- fire control computer;
- weapon control units.

THE H001 RADAR SCHEME



THE H001 UPGRADED RADAR SCHEME



H001 MODERNIZATION DESCRIPTION

The upgrade version of H019 Airborne Radar will sufficiently improve the technical characteristics of the aircraft. Replacement and modernization of the main functional units will allow addition of the new radar modes (such as an air-to-surface mode). Considerable reliability enhancement of the radar system parts and its improved characteristics will increase H019 radars' life time up to 10 years. Owing to such alteration, additional prospects to further modernization are possible.

The first stage enhancement includes:

- High frequency receiver replacement with the upgraded version H019-09R1;
- Frequency synthesizer replacement with the H001-22R;
- Doppler filters and air target detection units replacement with «MCPP».

New high frequency receiver modules and synthesizer installations will increase detection range (for about 25-30%) of air targets.

At this stage, it is also possible to apply phase-manipulated signals, which can be used in air-to-surface radar operation modes.

The change of Doppler filters and air target detection units delivers new qualities to the narrowband Doppler signal and measurement system. This replacement will advance not just target detection, but also a selection of reflected target signals from noise, clutter and jamming alarms.

Thus, while operating with both high and medium pulse repetition frequencies, certain enhancement might be achieved for standard H019 radar air-to-air modes.

In general, the first step of modernization is supposed to improve:

- target acquisition characteristics;
- electronic counter-countermeasures;
- reliability indicators.

The second stage of upgrade offers completely new digital signal processing system, which would operate separately and include multi channel wideband digital signal processor (WD- SPU) and multifunction control processor (MCPU).

The complement of second stage radar system:

- high speed data switch (DS);
- multichannel wideband digital signal processor unit (contains the air target parameters estimation module and digital control synthesis aperture module);
- multifunctional control processor unit;
- multifunctional display unit (designed for the indication of all existing new radar modes and consist of TFT panel, video processor and the interface card).

In addition to above said, modernization of synchronization unit and antenna assembly of H019 radar is offered.

Such would enhance radar qualities in air-to-air modes and provide option to add air-to-ground modes.

The immediate result of the second stage modernization will contain:

- real time ground mapping mode;
- the synthesis aperture mode;
- guidance to several air-to-air missiles with different targets simultaneously;
- the possibility of addition to the MiG-29 weapon control system modern air-to-air and air-to-ground guided missiles: X-31A and P-77;
- further improvement of the tactical characteristics;
- acquisition range (64 = 3 M2) up to 90 km and 50 km (rear semi-sphere);
- radar reliability enhancement - up to 40-50%.

MIG FAMILY MODERNIZATION

Modernization of MiG-29 aircraft, in particular:

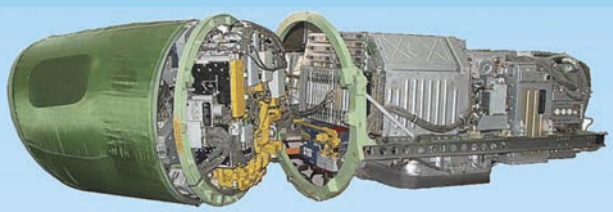
- weaponry control system;
- navigation system;
- indication system;
- optical electronic sighting system

are modernized.

Modernization:

- increases combat capabilities of an aircraft in missions against ground and above-water targets by equipping an aircraft with guided aviation means of destruction of "air-surface" type with TV heads of homing guidance (X-29T, KAB-500 KR);
- improves overall performance characteristics by incorporating satellite navigation system and upgrading of optical-electronic system;
- increases efficiency of the pilots` actions introducing navigation mode displaying terrain digital maps and sighting information on multifunctional indicator.

MIG-29 AIRCRAFT AIRBORNE RADAR MODERNIZATION



INTRODUCTION

MiG-29 Aircraft was designed in early 80s as an air superiority fighter and fighter-interceptor. Since that time it has become one of the best medium range and short range fighters. MiG- 29 is actively used in Air Forces of numerous countries all over the world.

MiG-29 weapon control system consists of:

- airborne radar N019;
- optical-electronic aiming system;
- display information system;
- weapon control units;
- target identification system.

It must be emphasized that the main information system of the aircraft is the pulse-Doppler radar N019, which defines the primary characteristics of the whole weapon control system.

H019 RADAR INFORMATION

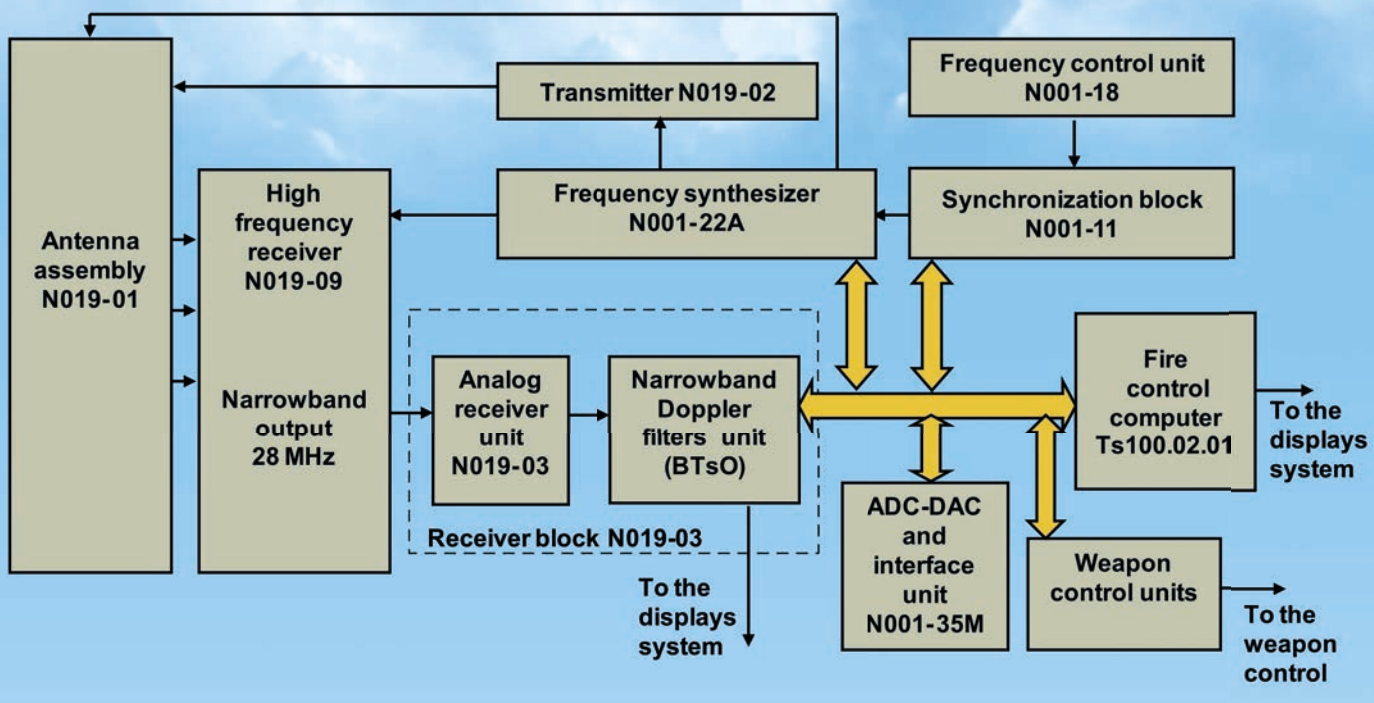
Pulse-Doppler radar N019 is designed for:

- targets acquisition at short and medium ranges at different speeds and altitudes;
- target tracking and sending corresponding in formation to the air-to-air missiles;
- computation of the air-to-air missiles launch zone and sending the information to the display system;
- target illumination after the launching of missiles.

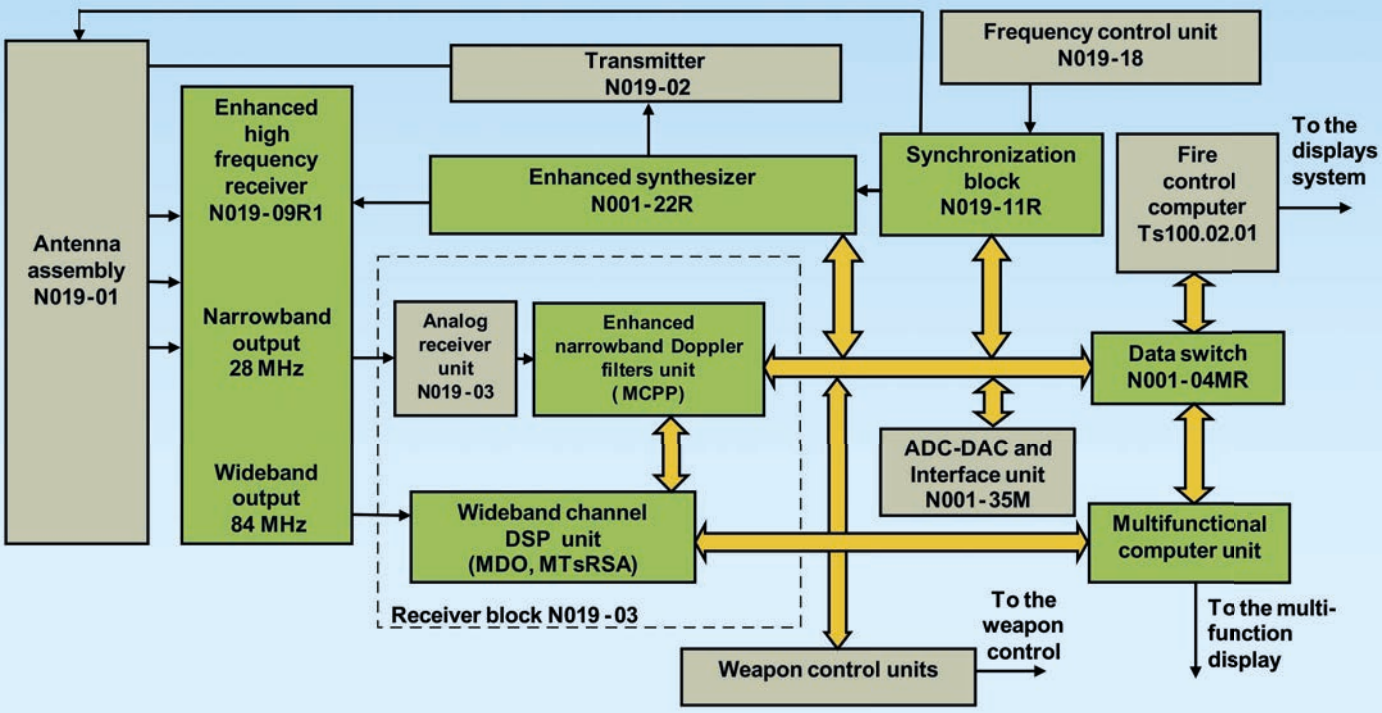
N019 radar consist of:

- antenna assembly;
- transmitting channel;
- receiving channel;
- synchronization system;
- fire control computer;
- units of weapon control.

N019 RADAR SCHEME



THE N019 UPGRADED RADAR SCHEME



H019 MODERNAZATION DESCRIPTION

The upgrade version of N019 Airborne Radar will sufficiently improve the technical characteristics of the aircraft. By the replacement and modernization of the main functional units, an addition of the new radar modes (such as an air-to-surface mode) would be easily achieved. Considerable reliability enhancement of the radar system parts and its improved characteristics will increase N019 radars life time by 10 years. After completion of current modernization program, additional prospects to further improvements are possible.

The first stage of the mentioned boost includes:

- High frequency receiver replacement with the upgraded version N019-09R1;
- Frequency synthesizer replacement with the upgraded version N001-22R;
- Doppler filters and air target detection unitsreplacement with the upgraded version BTsO-R with the module of standard radar modes (MSRM).

The new high frequency receiver modules and synthesizer installations will increase detection range (by 25-30%) of air targets. At this stage, it is also possible to apply for the transmission of phase-manipulated signals, which can be used in air-to-surface radar operation modes.

Additionally, BTsO-R unit with MSRM is installed that applies optimized algorithms of narrow band Doppler filtering. This allows to improve significantly selection of signals reflected from moving targets against the background of underlaying surface and organized radio electronic countermeasures in basic modes of radar designation and close combat with medium and high pulse repetition rate.

Generally, the first step of modernization allows to improve:

- target acquisition characteristics;
- electronic counter-countermeasures features;
- reliability indicators.

At the second stage of the upgradation, it is offered to develop a completely new digital signal processing system, which would operate separately and include multi-channel wideband digital signal processor (WDSPU) and multifunction control processor (MCPU).

New design equipment introduced at second stage of upgradation:

- high speed data switch (DS) N001-04MR;
- multi-channel wideband digital signal processor unit (contains the air target arameters estimation module and digital control synthesis aperture module) MTsRSA;
- multifunctional control processor unit MVK;
- multifunctional display unit MFI-29 (designed for the indication of all existing and prospective modes of operation of fire control system).

Standard design equipment that undergoes further modernization at this stage:

- synchronization unit N019-11;
- antenna assembly N019-01.

Above installations and modernizations allow to significantly increase aircraft performance against air target and introduce new features related to fighting ground targets.

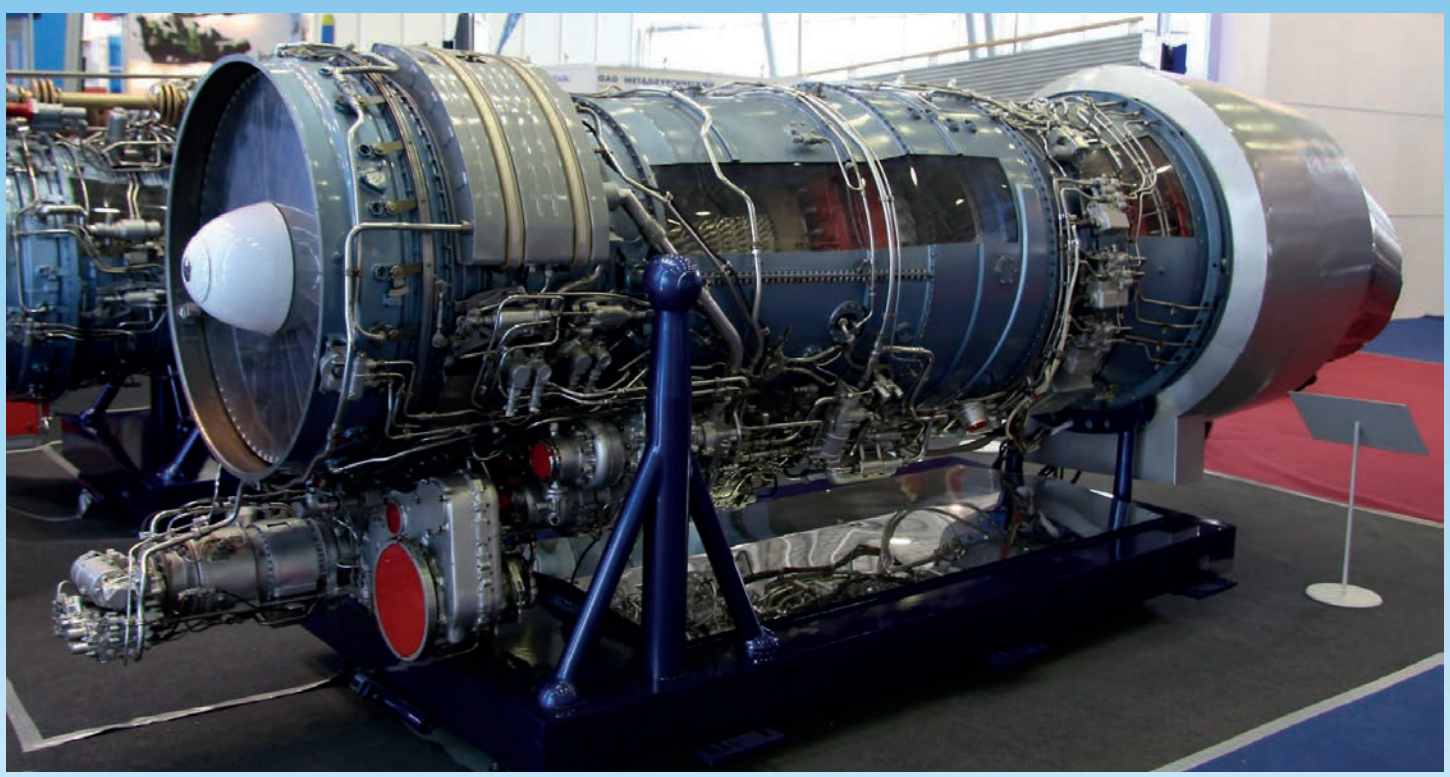
The immediate result of the second stage modernization will contain:

- real time ground mapping mode;
- the synthesis aperture mapping mode;
- "freezing" ground surface image;
- guidance to several air-to-air missiles with different targets simultaneously;
- the possibility of addition to the MiG-29 fire control system modern air-to-air and air-to- ground guided missiles: X-31A and P-77;
- further improvement of the tactical characteristics;
- acquisition range (54 = 3 M2) up to 90 km and 50 km (rear semi-sphere);
- radar reliability enhancement - by 40-50%.

IL FAMILY AIRCRAFT

Repair and scheduled maintenance of IL-76, IL-76TD, IL-76MD, IL-78 aircraft, as well as overhaul and repair of equipment and components of IL-76TD, IL-76MD, IL-78, IL-38, IL-62 , Yak-40, Yak-42 aircraft.

ENGINES AND AGGREGATES



Overhaul of AL-21F-3 aircraft engines and its aggregates. The main are: NR-53D, RSF-53B, NP-96M, DTsN-72, FN-53, PGL-30ML, SK-224-1, RT-12-3, TS-21B, 4700T, aggregate 924

Overhaul of AL-31F aircraft engines, remote aggregates boxes and all component parts. The main are: NR-31V, RSF-31V/B, RT-31V, RTF-31A, FN-31A, NP-96M, DTsN-82, KRD-99, SK-224-6 series 1, TDK, 6139T, aggregate 4030.

Overhaul of RD-33 2S aircraft engines and its aggregates. The main are: NR-59A, RSF-59A, NP-96M, DTsN-78, FN-59A, KSO-59A, RT-59E, RTF-59B, TDK, 4700-T, 4033, FG-11SN-T, BPR-88, SK-224-6 series 2.

Overhaul of R-29-300 (R-29B-300) aircraft engines of series 1, 2, 3, 4, and R-35-300 (0A, 0A-2).

Overhaul of R11, R13, R25, R-95SH, AI-25TL, M-14, GTDE-117 aircraft engines, auxiliary power units «Saphir-5» and aircraft gear boxes KSA-2 (3).

Overhaul and repair of equipment and components of Su-24 (all modifications).

Overhaul of D-36 aircraft engines (range 1, 1A, 2A).

Overhaul of propellers AB-72 range 02A, AB-72T range 02A, AB-68DM.

REFURBISHMENT / RESTORATION OF AEROENGINE BLADES

Overhaul, refurbishment /restoration of aeroengine components (including the HPTR and LPTR Blades and Vanes) can be performed through implementation of standard (welding, brazing, micro plasma) and advanced (EB-PVD) repair technologies.

Available technology and expertise allows to eliminate the most of typical defects like burnouts, fatigue cracks, corrosion-erosion damages, mechanical damages and subsequently to ensure reliability of aeroengine components.

Repair Development
PTT checks repairability and develops specific part repair scheme

Batch repairs in line
PTT performs batch repairs originally developed and implemented in line

Customized repair processes
PTT develops repair operations and processes to remove unique and non-specific defects of hot gas path components

Service life assessment
PTT fulfills repaired parts reliability and service life assessment as an optional services to customer

REPAIR






Methods

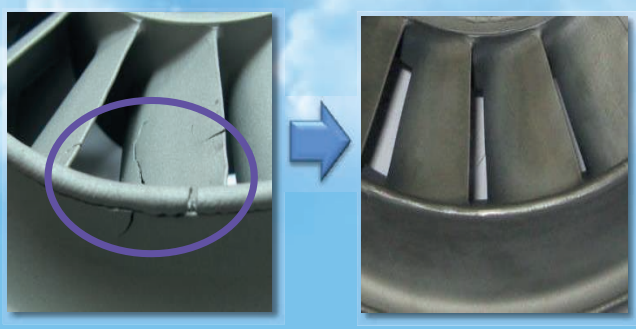
- Vacuum Heat Treatment
- Air or Inert Gas Heat Treatment
- High Temp Vacuum Brazing
- EDM Precise Machining
- Surface Polishing
- Non-Destructive Testing
- Grit Blasting
- Washing
- Shot Peening
- TIG , MIG/MAG Welding
- Machining
- Metallographic Analysis
- EB PVD Repair Processes

REFURBISHMENT / RESTORATION OF AEROENGINE BLADES

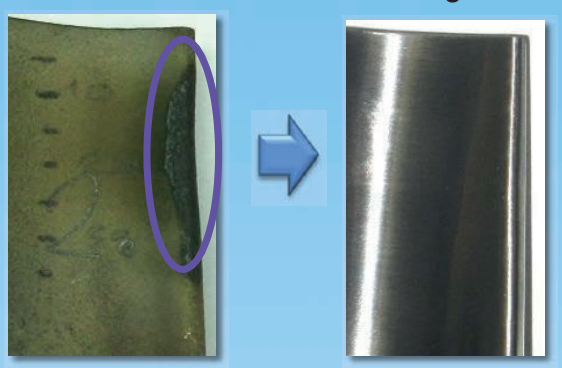
Typical repairable defects

Burnouts

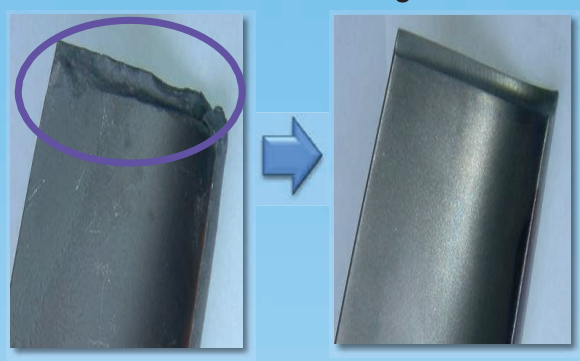
Cracks



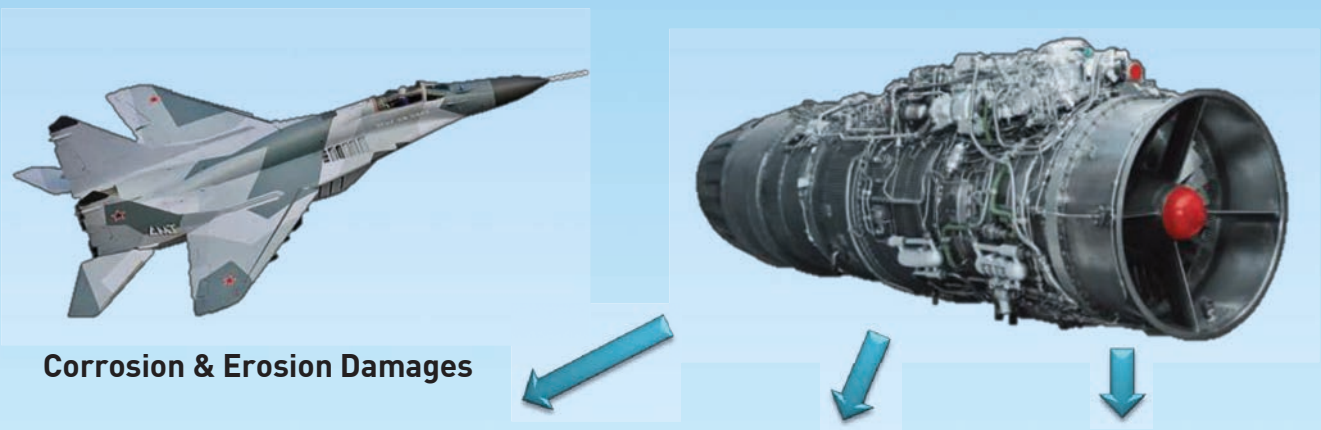
Corrosion & Erosion Damages



Mechanical Damages



REPAIR



MODERNIZATION OF HELICOPTERS

We provide:

- overhaul and refurbishment, re-equipment and upgrade of Mi-8/Mi-17, Mi-24, Mi-25/35, Mi-26, Mi-2 helicopters of all series and modifications, their aggregates and systems;
- overhaul, re-equipment, maintenance of Ka-25, Ka-27, Ka-28, Ka-29, Ka-32 helicopters of all series and modifications, their aggregates and systems;
- scrutiny of helicopters' technical state at their operation sites;
- extension of TBO up to 200-500 flight hours and TBO lifetime up to 2-5 years;
- warranty and post-warranty servicing of helicopters at their operation sites;
- delivery of rubber items for overhaul of helicopter units;
- repair of HK-12CT gas-turbine engines for gas-pumping stations;
- repair of helicopter reducers;
- demilitarization and conversion of combat Mi-8 (Mi-9), Mi-8MT (MTV), Mi-17, Mi-14, Ka-27 (Ka-28) helicopters into civil modifications (cargo-passenger, passenger, VIP cabin, search and rescue, ambulance, fire-fighting);
- Mi-8 helicopters re-equipment by replacing TV2-117 A(G) engines by TV3-117 (VM, VMA, VMS) with upgrade of airframe construction elements and systems;
- Mi-8MT (Mi-17) helicopter re-equipment into Mi-8 MTV1 (Mi-171V) modification;
- modernization of helicopters and installation of additional equipment;
- helicopter repair at Customer's site;
- technical support of helicopter operation; delivery of equipment, aggregates, spare parts and materials to Customer.

Three independent lines for overhaul of «Mi» - series helicopters:

- Line 1 - overhaul of heavy helicopters Mi-6, Mi-26 and their modifications.
- Line 2 - overhaul of middle-weight helicopters Mi-8, Mi-17, Mi-24, Mi-35 and their modifications.
- Line 3 - overhaul of light-weight helicopters Mi-2 and their modifications.

Each line is supplied with ground maintenance devices, testing and diagnostic facilities, test bench equipment, tools and devices specifically per each helicopter type. The separate lines for helicopter overhaul allow adjusting the production facilities within a short period of time, meeting the customer's requirements and reducing the overhaul time.

Among other options we offer installation of armour plates on Mi-8 / Mi-17 helicopter:

GENERAL CHARACTERISTICS

Armour protects cockpit, places of guns installation, windows of the pilot and co-pilot, and the outer part of the cockpit.

The scheme of armouring, in general, does not entail any structural or aerodynamic changes of helicopter.

Armour plates can be quickly installed as well as dismantled by technical staff.

Whole armouring equipment is made of lightweight components (not exceeding 176 kg weight), and does not significantly change the centre of gravity of helicopter.

The warranty on armour plates: 2 years for factory defect and 5 years for ballistic integrity, under proper conditions of use.

The manufacturer provides technical guidance, installation and dismantling manual, and other information on how to properly use the said equipment.

PROTECTION LEVEL

Armour is designed against 7.62 x 54R ammunition (the core of mild steel), shot from a distance of 50 meters (minimum).

INTERNAL ARMOURING

The panels of internal armouring correspond to the following mandatory conditions:

Ballistic panels (without external cladding) can withstand direct shots of 7.62 x 54R ammunition (with the core of mild steel). The certificate, certified by the manufacturer or the laboratory is attached.

Armour plates will be made only of high quality certified materials.

Armoured plates have anti-vibration properties.

Plates can be easily installed inside the helicopter, with the fastening system that does not require perforation of the helicopter frame / structure.

Each plate is labelled with respective number.

ARMOUR PLATES
DESIGNATED FOR INSTALLATION ON MI-8 (MI-17) HELICOPTER

Sl. No.	Allocation
1	on the floor (left pilot), front
2	on the floor (right pilot), front
3	on the floor (left pilot), left
4	on the floor (left pilot), right
5	on the floor (right pilot), right
6	on the floor (right pilot), left
7	left blister, upper
8	left blister, lower
9	on the seat of left pilot
10	on the seat of left pilot
11	on the seat of left pilot
12	on the seat of right pilot
13	on the seat of right pilot
14	on the seat of right pilot
15	right blister, lower
16	right blister, upper

Sl. No.	Allocation
17	left side, left pilot
18	back of the seat of left pilot
19	back of the seat of right pilot
20	back side, right pilot
21	floor, flight engineer place (seat)
22	crew cockpit entrance door
23	outer, front, on the left side of crew cockpit
24	outer, middle, on the left side of crew cockpit
25	outer, rear, on the left side of crew cockpit
26	outer, front, on the left side of crew cockpit
27	outer, middle, on the left side of crew cockpit
28	outer, rear, on the left side of crew cockpit
29	right flap, under rear / back gunner
30	right flap, under rear / back gunner
31	right flap, under rear / back gunner

LIGHT AIRCRAFT AND UNMANNED AERIAL VEHICLES

HAWK

SPECIFICATIONS	
Total weight of the system	44kg (incl. 2 UAV's, 2 Gimbals, GCS, Datalink and peripherals.)
MTOW of UAV	5,5kg
Wingspan	2m
Fuselage length	0,8m
Payload weight	1kg
Navigation systems	GPS, INS
STANDARD SYSTEM CONFIGURATION	
UAV x2	Quick Reference Handbook
Payload D/IR x2	Antenna complex
Set of spare parts	Take-off accelerator (bungee string)
GCS with pre - installed software	Transportation rucksack

PERFORMANCE	
UAV	2.5 to 3hr (weather dependet)
Effective Range	→25km
Wingspan	2m
Maximum Altitude	1200m AGL
Max Take off Altitude	4000m AGL
Time to deploy	10 min
Data link encryption	AES-128 w/256 option
Recovery	Parachute landing on any surface touch down accuraccy 20m CEP
Wind	15ms
Rain	←20mm/hr
Noise signature	Undetectable from 100m distance

HAWK

EO/IR STABILIZED GIMBAL
WITH A TOTAL WEIGHT OF JUST 250 GRAMS
Smallest 3 sensor IR gimbal
with long range continuous
zoom capability

Visible Camera	400-700nm
Resolution	1280x720
Zoom	x20 x2 digital (totalx40)
HFOV	60° WFOV - 3° NFOV - 1.5° DFOV
Delay	← 40 msec

Thermal Camera	
LWIR uncooled	(8-12m)
Resolution	640x480
Zoom	x4 digital continuous zoom
HFOV	18°W.FOV - 4.5°D.FOV

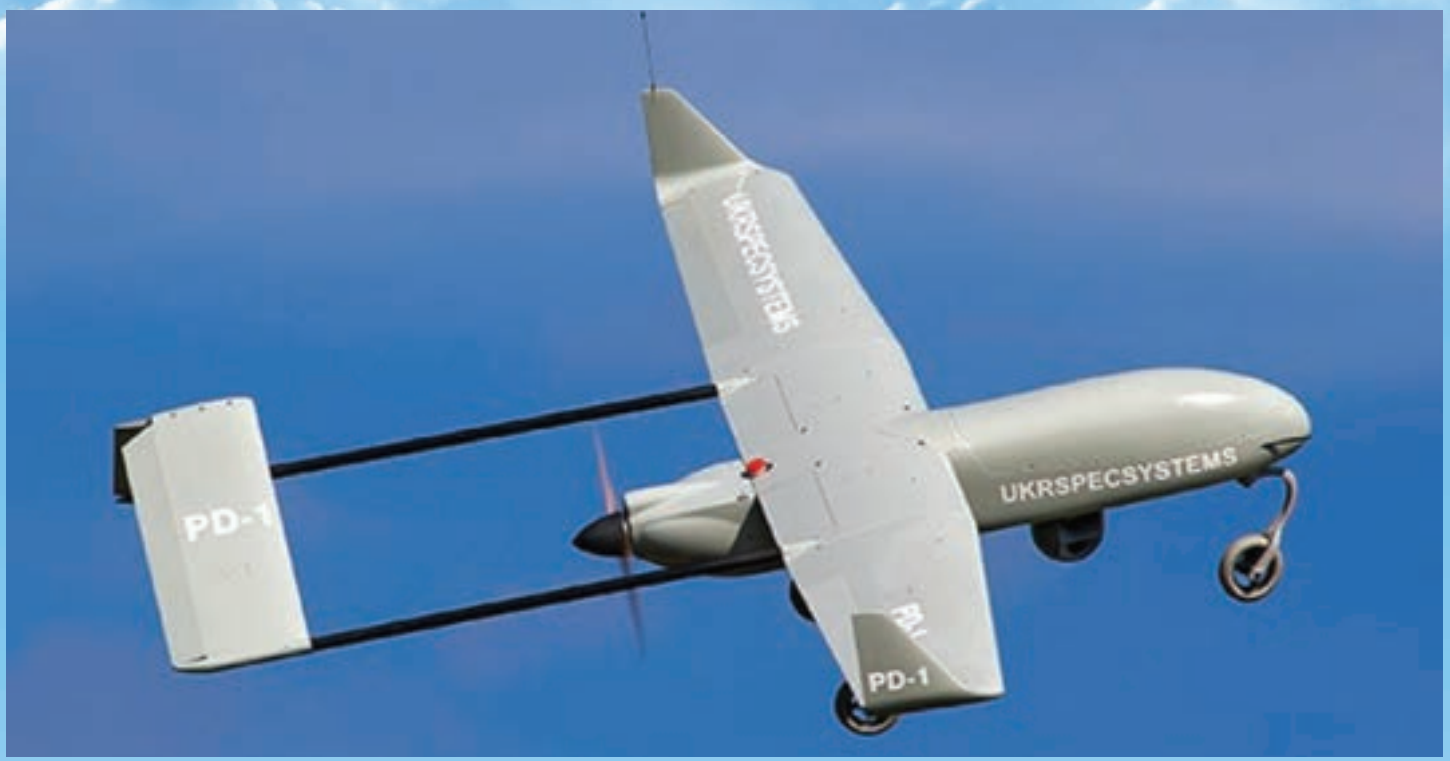
Field of regard	
Pan	360° (non continuous)
Tilt	-45° to 0°
Control Interface	RS -232
Video Interface	Micro-HDM
Stabilization	← 70 rad

Dimensions	
Diameter	63mm
Height	3mm
Weight	255 grams
Temperature	-30° to 55°

Special Features:

- Operating two UAVs from one ground station;
- Operating in GPS jammed areas, operating on no comm areas;
- AES-256 encryption;
- Using multiplepositioning systems like GLONASS, Beidu, GPS, Galileo;
- Proven track record of operatingin extreme temperature's from -30C to +50C;
- A perfect tool for close combat intelligence gathering:
  low radar noise
  low noise profile

PD-1



DESCRIPTION

PD-1 unmanned aerial system designed for intelligence, surveillance and reconnaissance (ISTAR) operations. PD-1 UAS consists of: two PD-1 unmanned aerial vehicles (UAV) with 50 cc gas engine, gyro-stabilized gimbal USG-212 equipped with EO zoom and IR cameras, planar high resolution 35 MP or 50 MP digital camera, rugged case ground control station, communication link, video transmission link, antennas with masts, carry cases, necessary instruments, spare parts and accessories.

PD-1 UAS provides day and night search and rescue operations with EO/IR gimbaled payload and daylight high resolution aerial imaging from working height 1000-1500 m. PD-1 UAV can be operated in simple meteorological conditions with light precipitation at temperatures -20°.. +45° and wind up to 20 m/s with gusts up to 25 m/s.

PD-1 UAV has telemetry link up to 100 km distance and real-time wireless video link up to 50 km. Total flight distance of PD-1 UAV is over 400 km. Effective range for PD-1 UAV in reconnaissance and aerial imaging operations is up to 100 km and in surveillance and SAR operations up to 50 km. Both telemetry and video links encrypted with AES256 and AES128 respectively. Telemetry link uses FHSS technology to PD-1 UAV have primary GNSS navigation and read-reckoning navigation in GNSS restricted or jammed areas.

Ground control station (GCS) provides command and control for both PD-1 UAV simultaneously. GCS is used for UAV maintenance and provisioning. GCS have built in sunlight readable Full HD display for real-time video monitoring and recorded video playback. Export of video to external storage supported. Notebook PC provide flight display, UAV status and map view during the flight. External pilot have full control over UAV using GCS.

GCS is made in rugged case and have battery and mains power supply. GCS has internal compartment for accessories and remote control for takeoff and landing support operations. Battery charging station provided with GCS.

PD-1 UAV utilizes horizontal take-off and landing from paved and unpaved smooth runways not less 200 m long. PD-1 performs automatic take-off and landing using laser rangefinder for precious altitude control.

PD-1 TECHNICAL DATA

Full length	2540 mm
Height	990 mm
Chassis track	670 mm
Cassis wheelbase	880 mm
Main wheel size	150x31 mm
Nose wheel size	127x31 mm
Wing area	1/17 m^2
Wing span	3190 mm
Mean wing chord	392 mm
Tip wing chord	300 mm
Root wing chord	420 mm
Wing mount angle	1°
Wing consoles dihedral	1°
Wing sweep leading edge trailing edge	 5.1° 1.7°
Wing twist at tips	-1°
Fuselage length (from nose to trail rib)	1224
Fuselage length (from nose to prop shaft end)	1535
Fuselage max width	266
Fuselage max height	284

PD-1 FLIGHT PERFORMANCE

Maximum takeoff weight	33 kg
Empty weight	20 kg
Payload weight	8 kg
Maximum flight time	5+ hours
Practical range	100 km
Practical ceiling	2000 m
Speed range	70-140 km/h
Cruise speed	95 km/h
Stall speed	50 km/h
Fuel	A-95 gasoline mixed with oil
Deployment time	15 min
Launch	Runway launch, catapult launch
Recovery	Runway landing, parachute recovery

POWER SUPPLY

Voltage	12V DC
Max current	4 A
Operating temperature	-5°..+45°
Sensor type	EO zoom camera and LWIR thermal camera

PD-1 ENGINE DATA

Engine model	MVVS 50IRS
Power	5 hp
Displacement	48 cc
Engine type	two stroke
Mixture inlet	Walbro carburetor
Fuel	95 octane gas with two stroke synthetic oil in 40:1
Ignition	electronic battery powered
RPM range	1000-7500
Fuel consumption at cruise speed	
- with gimbal - without gimbal	1200 gr/hour 800 gr/hour
Engine weight (w/ carburetor, w/o ignition)	1560 gr

USG-212 GIMBAL SPECIFICATIONS

Type	2-axis stabilized brushless gimbal
Mount	custom mount plate with dampening
Size	
Length	160 mm
Width	160 mm
Height	220 mm
Weight	1,65 kg

CONTROL

Interface	PPM, SBUS
Interface options	PWM, RS232, RS485 via external adapter
Control axis	Pan, Tilt, Zoom
Optional control	Focus
Control loop bandwidth	50 Hz
Pan range	360° continuous
Tilt range	+60°..-90°
Positioning accuracy	2.5°
Control modes	stabilize, follow on selected axis
Focus control	auto

GROUND CONTROL STATION SPECIFICATIONS

Size	
Length	1200 mm
Height closed	180 mm
Height opened	520 mm
Depth	420 mm
Weight	24.5 kg
Main display	
Diagonal size	21.5"
Resolution	Full HD 1920 x 1080
Interfaces	DVI, VGA
Luminosity	1000 cd/m^2
Digital Video Recorder	
Channels number	up to 4
Input interface	HD-SDI 75 Ohm BNC
Video format	1080p, 720p
Internal storage	128 GB SSD
Compression	H.264
External storage	USB 2.0
Notebook PC (Panasonic Toughbook CF31 optionally)	
Display	Full HD 1920x1080
CPU	Intel Core i5
RAM	4GB
Storage	500GB HDD or 128GB SSD
Video	Intel HD
USB 2.0	2
USB 3.0	1
Video output	HDMI or Display Port
OS	Windows 8.1 Pro or Ubuntu Linux 16.04 LTS
Payload control device	Logitech gamepad
UAV remote RC	Futaba 14GS 2,4GHz
AC Power	C13
DC Power	XT-60
Antenna inputs	N-type
Telemetry link specifications	
Frequency band	900 ISM or UHF Licensed band
Modulation	GFSK
Spread Spectrum	FHSS
Duplex	TDD
Output power	
Without PA	30 dBm
With PA	up to 40 dBm
Data rate	up to 230 kbit/s
Data interfaces	RS-232/RS-485/Ethernet
Encryption	AES256
Network topology	point-point, point-multipoint, peer-to-peer, mesh

Onboard antenna	
Type	Omnidirectional dipole
Gain	2 dBi
Ground antenna	
Type	Directed Yagi antenna
Gain	8 dBi
Video link specification	
Transmitter	
Frequency range	300-860 MHz
Spread spectrum	COFDM
Modulation	16QAM/64QAM
Video compression	H.264
Input interfaces	HD-SDI, CVBS
Video format: SD HD/Full HD	 576x50p, 480x60p 720x60p, 1080x60p
Encryption	AES128
Output power	0..-16 dBm
Power	12V DC
Amplifier	
Frequency range	575±15 MHz (center frequency noted in order)
Input level	0..+20dBm
Gain	43 dB
Output power (P1dB)	+33dBm
Power	12V DC
Receiver	
Frequency range	300-860 MHz
Spread spectrum	COFDM
Modulation	16QAM/64QAM
Video compression	H.264
Output interface	HDMI, CVBS
Video format: SD HD/Full HD	 576x50p,480x60p 720x60p,1080x30p
Encryption	AES128
Sensitivity	-95dBm
Power	12V DC
Operation data	
Crew	3 person
Operator training	
Technical training	3 days
Maintenance training	3 days
Flight training	depend on entry level
Deployment time	20 min
Transportation	minivan or similar vehicle
UAV transportation case size	1700x550x500 mm
Weight with UAV	45 kg

INSTRUMENTS, ACCESSORIES AND SPARE PARTS (INCLUDED IN SCOPE OF SUPPLY)

- UAV carry cases with inserts
- Additional UAV and GCS battery
- DC engine starter
- Electric gas pump
- DC battery charger with AC power supply unit
- Foldable antenna masts 3 m height
- Spare propellers
- Spare nose and main gear
- Spare bolts and nuts set
- Glue, epoxy and thread lock set
- Hand instrument kit
- Foldable table and chairs

MARA 2M

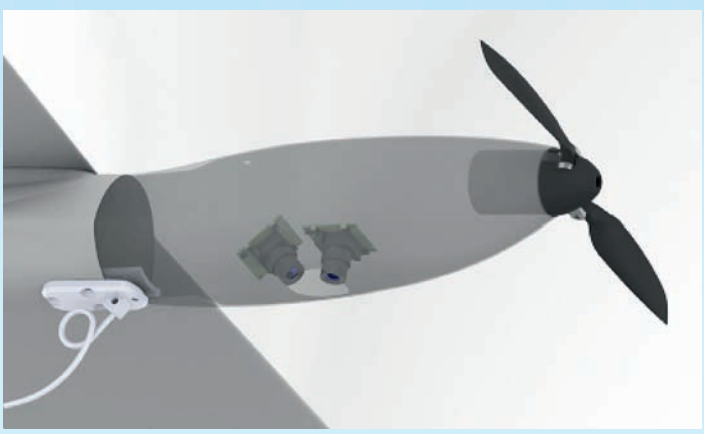
«Mara 2M» is the system on the basis of UAV, which designed for protection, monitoring and objects searching on the distance up to 25 km.

Payload of UAV «Mara 2M» allows to surveil in the visible or infrared spectrum with a resolution of 5 cm per point.

Software package allows to make a quick plan of a mission, to change it during the flight, to execute efficient binding of the objects to the maps and get its coordinates in geographical and rectangular coordinate systems.

SPECIFICATIONS	
Operating range	up to 25 km
Flight duration	50-90 minutes
Range	up to 75 km
Adjustable flight speed	from 30 to 100 km/h
Operating altitude	50-750 m
Practical ceiling	2000 m
Electric power plant	
Battery of LiPo or LiFePO4 type with capacity up to 6.5 Ah	
Payload Weight	up to 0.4 kg
Allowable wind speed	up to 14 m/s

PAYLOAD OPTIONS



BASIC PLATFROM CAMERAS

- Amortized platform stabilized by bank angle
- Course camera installed at angel of 45 (укажите значок 45 градусов) to the UAV axis with a 1.3 megapixel sensor and sensitivity from 0,02 candle-meter
- Survey camera directed vertically downwards, able to record high quality video (FullHD 1080p)
- Possibility to switch between cameras in flight
- Transfer of analog video signal to the ground control station
- Ability to work in close infrared range (CIR)

MARA 2M

RECONNAISSANCE CAMERA

- Onboard photographic surveying at resolution of 5cm per point
- The size of a picture is 3680x2760 pixels
- Transfer of analog video to the ground control station
- Dimensioning of pictures to the ground map
- Prompt coloured glass replacement
- Real time coordinates calculation

NIGHT-TIME PLATFORM

- Thermal camera (resolution 640x480 pixels, frame rate of 50 Hz and sensitivity 8-16 mkm) with a constant focal length
- High sensitivity night camera of the visible spectrum
- The ability to switch between images from the cameras in flight
- Transfer of analog video to the ground control station
- Ability of real time calculation of objects coordinates

SOFTWARE PACKAGE CAPABILITIES

- Software package of «Mara 2M» ground control station allows to control UAV flight and process the information received from payload in real time.
- Software package of pilot-operator workplace allows to control the main parameters of UAV flight, to create and update flight program. Pilot-operator may also analyze video and photographic materials.
- Software package of payload operator allows to process streaming video, to perform target detection, to set object's coordinates and display them on the map.

ADDITIONAL EQUIPMENT OF «MARA 2M» SYSTEM

- Emergency Search System (GSM-tracker)
- Flying over three-dimensional area map
- Automatic landing system
- Digital communication channel and data transmission based on COFDM technology
- Ability of remote control and data processing by satellite communication channel
- Automated tracking antenna
- Telescopic antenna mast
- Ability to work with mapping information in ArcGIS system
- GCS can be made with IP67 protection standard and consist of one unified working place aimed for UAV control and data processing on the basis of its own software (under testing)

SYSTEM KEY BENEFITS

- Interface and software ideology meet STAN AG4586 standard
- Cecured and encrypted communication channel
- Compact and light weight of the complex allows to carry it over and operate autonomously by two man fire crew
- Fully automated flight with ability to change the mission in progress
- Ability for accurate landing in semiautomatic mode in limited areas due to wing-flap system
- Preparation for launch and deployment time not more than 10 minutes
- Ability to use different payload options
- Availability of sidelights which allows landing at darkness hours
- Low noise level due to good aerodynamics and the use of electric power plant
- High positional accuracy of exploration target
- Modern software with "friendly" interface
- Ease of assembly, modular construction and ability to interchange parts and assemblies
- High strength, stiffness and survivability of UAV Kevlar construction
- Good in-field maintainability of UAV

MARA 2M

SYSTEM COMPOSITION

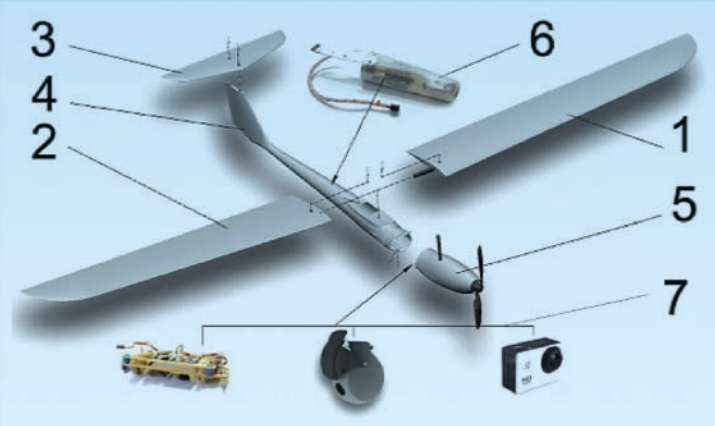
UAV MARA 2M - 3pcs (possibility to use UAV with different payload in a single complex)

- Ground Control Station (GCS):
  - Automated workstation of pilot-operator;
  - Automated workstation of payload operator;
  - Terminal of receive-transmit data line (TRTDL);
  - Remote control
- Table-case with PC equipped with sun and weathering protection visor
- Spare tools and accessories kit

Additionally, the complex can be equipped with:

- Telescopic antenna mast with height up to 6m;
- Automated TRTDL follow-up device;
- System of wireless data transmission between and TRTDL GCS

COMPOSITE MODULUS OF UAV MARA 2M



1 - left wing console;
2 - right wing console;
3 - horizontal tail;
4 - aft fuselage with the control unit;
5 - nose fuselage with electric power plant and payload;
6 - control unit;
7 - payload options:
- Basic platform of cameras
- Low platform
- Reconnaissance camera

ANSER

OVERVIEW

Tactical UAC "ANSER" series are designed for close-range tactical reconnaissance and long duration of the flight, with wingspan of 3500 mm with weight about 23 kg. A distinctive feature is the speed of deployment, reliability and resistance to mechanical and thermal effects. Also UAV has a moisture protection. It has low visibility both visually and radar. UAC ANSER meets the Ministry of Defense of Ukraine requirements for unmanned aerial complexes. UAC has the opportunity to be integrated into the overall UAV control system at general headquarters of Ministry of Defence.

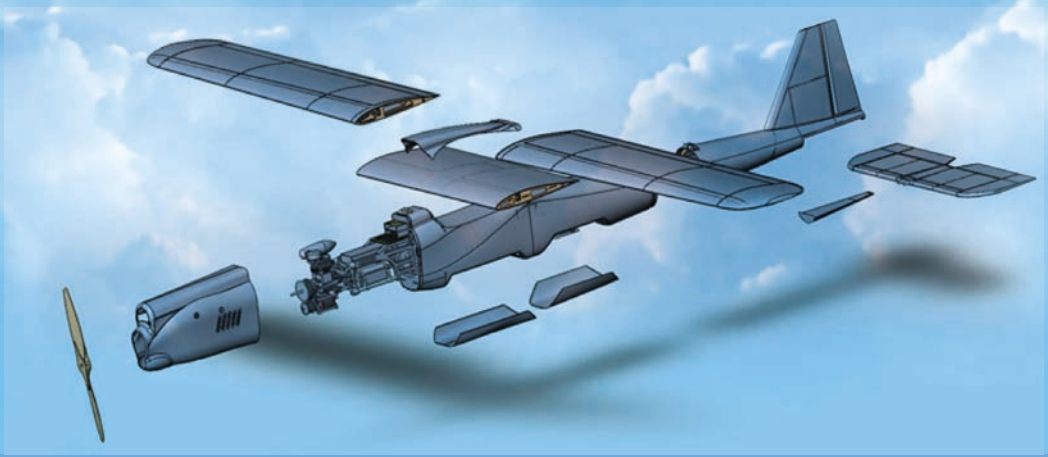
Hand launched UAC "ANSER" is intended for surveillance and reconnaissance intelligence (Type and class – Tactical Unmanned Air Vehicle – CR).
The main advantages of UAC "ANSER" are:

- high resolution camera;
- thermal imager;
- up to 5 kg of payload;
- stabilized platform of optoelectronic system;
- on-line telemetry;
- automatic flight with reference to electronic map;
- flight adjustment;
- wide range of application;
-alternative to small aircrafts;
- ease and usability of operation.

Easy preparation for launch, control, rapid activation, large range of operating conditions make complexes indispensable in meeting the challenges of air monitoring and protection. Thermal sensor allows using the complex at night.

GENERAL INFORMATION

- UAV: to increase the weight and dimensions of the payload, flight duration, convenience of transformation into the transportation condition, the scheme of classical plane is applied with a pusher 4-stroke petrol engine. The body is made of high-quality composite materials with wide application of carbon fiber.
- Ground control station: protective transport container with a special software, auto-tracking antenna system, automatic battery charger, assembly tools, spare parts, tools and equipment.
- Wing-mounted gyro-stabilized electro-optical platform with video sensor, thermal sensor and heading digital camera.
- Video system allows on-line transmission of high-quality HD video, as well as signal in the thermal range to the Ground Control Station (GCS) and/or remote screen.
- Semi-/full automatic control system, with online telemetry, reference to electronic charts, emergency re-start mode, emergency activation of the parachute landing system, adjustment of route during the flight.
- Automatic flight with reference to electronic map.



SPECIFICATION	
Launch	Catapult / or runaway, automatic take-off
Landing	Unhooking parachute system and cushion airbag
Flight duration	10 hours
Wingspan	3500 mm
Length	2000 mm
Take-off weight	Not more than 24 kg
Controlled Flight range (distance from GCS) with on-line video	Up to 70 km without satellite and 3g link, secured data link, encrypted video channel.
Operating ceiling	Up to 3500 m
Operational speed	60-120 km/hour
Wind conditions	5-12 meters/second
Recovery system	Radio beacon
Power plant	4-stroke petrol engine. Electronic stroke adjuster. On-board starter. On-board generator. Backup Li-Po battery. Automatic engine start. In-flight restart system.
Airframe	Composite, easy assembly, high reliability. Dividing fire-protective partition. Service life –at least 5 years
Control system	Hybrid (manual/semi/full auto) with autopilot navigation based on LINUX-operated on-board PC, GNSS with CEP drift. UAV tracking with reference to electronic maps, automatic (emergency) return to launching point. Unlimited number of waypoints. In-flight update mission. UAV data information – more than 100 parameters. Standard interfaces. Payload control through std joystick. Based on vechicle

DRONE BASED ON OCTOCOPTER PLATFORM

Drone – octocopter with 8 twined props - quadrocopter scheme.

Designed for search, detection and identification of objects in a given area or under the route with determined coordinates, as well as for airborne operations with payload. The complex allows to transmit real-time video and other useful information directly to the ground control station.

It may perform autonomous flight on a programmed route, which consists of a coordinates array in the fully automatic mode (operator free).

Under condition of absence of radio communication between UAV and ground control station (GCS) telemetry and photographically-acquired information is being recorded by on-board solid-state drive.

Can perform take-off and landing in fully automated mode from defined coordinates after the certain pre-flight preparations.

SPECIFICATIONS

Base length	0,56 m
The diameter of the UAV in between of the motor axes	1,2 m
Height	0,54 m
The diameter of the UAV including the span of rotor blades	1,42 m
The angle of steady deflection	± 300
Ability to perform a mission in fully automated mode	Yes
Flying range (manual and automated mode)	15 km
Maximum flying height	500 m
Maximum flying speed	50 km/h
Runtime of flight assignment (including hovering mode)	60 min.
Availability of a ground station	Yes
Maximum take-off weight (using LiPol)	16,5 kg
Payload weight	3 kg
The allowable range of operating load	+45 %
Weight in transportable condition (without batteries and camera)	7,6 kg
Weight of hard case with ground station and necessary equipment	20 kg
The operating frequency of the airborne control commands receiver	433 Mhz
The operating frequency of video channels "UAV-to-ground» (HD, SD)	1,1...1,3 GHz
The operating frequency of telemetry transmitter	915 Mhz
Method of space coordination	GPS
Control and surveillance camera (with a thermal imager), (homing camera)	FullHD (1920x1080), ZOOM 30 kt function; 640x480 pixels, a lens with a focal length of 40 (possibly 60) mm
Engines power	220W each
Battery capacity: - Basic (onboard) (8 pcs.) - Earthbased for vision system	12A-hour (22V) 5A-hour (11,1V)
Stable performance of main batteries in flight (subject to a hovering condition)	60 min.
Vision system "UAV- to-ground"	PC monitor
Critical side winds	10 m/s
Availability of gyrostabilizer	Yes
Availability of autopilot and the flight stabilization system	Yes
Availability of obstacles recognition system	Yes
Availability of objects recognition and identification system (possible to determine a person or a car on a background of buildings, roads, afforestation, snow cover etc.)	Yes

AIRCRAFT Y1 "DELFIN"

SPECIFICATIONS:

THE USAGE OF EMERGENCY SYSTEMS		
Aircraft systems	**T**he main system	**E**mergency system
Engine control	Electronic	Mechanic
Landing gear retraction and extension system	Electrical drive	Mechanical drive
Electric system	Generator Emergency accumulator	Main accumulator

THE USAGE OF DOUBLING SYSTEMS	
Aircraft systems	**B**ack-up system
Fuel consumption measurement	Two independed systems: - fuel measuring system; - fuel consumption measurement
Radio, flight-control and navigation equipment	The doubling of: - altimeter; - speed indicator; - gyrohorizon; - course system; - radio set

AIRFRAME	
Lenght, m	8.000
Height in the parking area, m	3.005
Wing span, m	9.976
LANDING GEAR	
Parking track, m	2.864
Parking base, m	1.884
WING	
Area, m^2	13.3
CABIN	
Lenght, m	2.366
Width, m	1.12
Height, m	1.16
WEIGHT DATA	
Maximum takeoff weight, kg	1.400
Maximum usable fuel capacity, L	170
Maximum payLoad weight, kg	440
FLIGHT CHARACTERISTICS	
Maximum allowable speed, km/h	350
Maximum horizontal flight speed, km/h	310
Cruising speed, km/h	280
Maximum flight altitude, m (according to the cabin un-pressuriza - tion conditions and absence of oxygen equipment)	3.000
Flight range with fuel reserve for 30 minutes of flight with takeoff weight 1300 kg, km	1.650

AIRCRAFT V-24-I

SPECIFICATIONS	
Type	MEP
Number of seats	4
POWERPLANT	
Type	2xRotax 912 S2
Engine Power	2x100 hp 75 kW
Avionics	System 2xGarmin GTN 650 + Dynon SkyView 1000
MASS	
Empty weight	810 kg
Maximum takeoff weght	1300 kg
PERFOMANCE	
Max Cruise speed	250 km/h
Stall speed	100 km/h
Service ceiling	3000 m
Maximum range	1500 km
Take-off run	390 m

PARACHUTE SYSTEMS

DPS-SN [PSSN] (ДПС-СН [ПССН]) SPECIAL PURPOSE AERIAL DELIVERY PARACHUTE SYSTEM (ADPS SP)

General view of DPS-SN [PSSN] (ДПС-СН [ПССН]) parachute system with special freight container

The Aerial delivery parachute system of a special purpose is intended for airlift delivery of parachutist-rescuers with the regular freight placed in the cargo container for search and rescue missions in hard-to-reach areas.

The Aerial delivery parachute system of a special purpose provides troop paradropping from the aircraft equipped with a cable for compulsory enactment of parachute system.

SPECIFICATIONS:	
Flight weight of the parachutist	up to 180 kg
Indicated airspeed of an aircraft at dropping	140-350 km/h
The maximum altitude at dropping	4500 m
The minimum dropping altitude: - at immediate enactment of the principal parachute - with stabilization of decrease	 250 m 400 m
Aerodynamic quality - principal parachute - spare parachute	 not less than 3,5 not less than 2,4
Vertical velocity near ground, not more than	4 km/s
Maximum overloads, not more than	10 units
Turn on 360 degrees (time) not more than	6 seconds
Overall sizes of parapack with packed parachute system, not more than: - Length - Width - Height	 620 mm 470 mm 210 mm
Parachute system weight, not more than	21,1 kg
Service time, including shelf-life	10 years
Resource of the parachute system	200 applications

AIRBORNE PARACHUTE SYSTEM DPS-M (ДПС-М)

DPS-M (ДПС-М) airborne parachute system is intended for training and performing of operational parachute jumps from troop-carrier aircraft An-12, An-22, An-26, An-32, An-72, Il-76, as well as from An-2 aircraft and from helicopters Mi-6, Mi-8, Mi-17 carried out by separate paratroopers or paratrooper groups with full standard arms and equipment or without it. This system is intended for paratroopers of all specialities at indicated airspeed of plane flight from 140 kph (38.9 mps) up to 400 kph (111.1 mps) and at altitudes from 200 m up to 8000 m with stabilization during 3 s and more with total airborne weight of a paratrooper being 140 kg.

DELIVERY SET:

Stabilization parachute	- 1 piece;
Parachute 83 m2	- 1 piece;
Harness	- 1 piece;
Container	- 1 piece;
Bag	- 2 pieces;
Semi-automatic unified combined safety device	- 1 set;
Operational documentation.	

SPECIFICATIONS:	
Length, not more than, m	0.57
Width, m	0.285
Height, m	0.21 (packed)
Weight, not more than, kg	11.5
Paratrooper weight, kg	up to 120
Dropping out (aircraft) speed, km/h	140–400
Dropping out altitude, m	200–8000
Vertical speed, m/sec	5
Average level speed, m/sec	2

BRAKE PARACHUTE PTK-6M (ПТК-6М) FOR TYPE Su-24 AIRCRAFT

The parachute system is introduced by the pilot after touching the runway with the main wheels of the aircraft. The spring of the exhaust parachute is pushed out and put into operation, when opening the lid of the parachute container of an airplane. Exhaust parachute, filling up, extracts basic parachutes (2 units). Filled main parachutes resist aircraft movement and reduce the length of its run along the runway.

The system provides braking of an aircraft during landing at speeds of its commissioning at least 180 km/h to no more 300 km/h.

SPECIFICATIONS	
The maximum operating load does not exceed	Rmax 203000 H (20715 Krc)
Overall dimensions of the parachute system in the folded state:	
-Diameter	0,41 m2
-Height	0,93 m
Parachute system weight, not more than	40 kg
Service time, including shelf-life	12 years
Resource of the parachute system	60 applications
Time of laying the parachute system:	810 kg
-with the press for more than	10 minutes
-manually no more than	20 minutes

BRAKE PARACHUTE PTK-10SK (ПТК-10СК) FOR TYPE Su-30 AIRCRAFT

The parachute system is deployed by the pilot after touching the runway by the main wheels of the aircraft. At the moment the cap is released of releasing the cap from the parachute container of the aircraft, the cone spring of the exhaust parachute straightens and enables the second exhaust parachute, which extracts the main parachute of its camera. Inflated main parachute resists aircraft movement and reduces the length of its run along the runway.

The system provides inhibition of an aircraft during landing at speeds of its commissioning at least 180 km/h and no more than 300 km/h.

SPECIFICATIONS	
The maximum operating load does not exceed	Rmax 193500 H (19700 Krc)
Parachute system weight, not more than	24 kg
Parachute system volume, not more than	58 dm^3
Service time, including shelf-life	5 years
Resource of the parachute system	50 applications
Time of laying the parachute system:	12 years
-with the press for more than	10 minutes
-manually no more than	20 minutes

BRAKE PARACHUTE PTK-10240-65 (ПТК-10240-65) FOR TYPE MiG-25 AIRCRAFT

The parachute system is introduced by the pilot after touching the runway with the main wheels of the aircraft. The spring of the exhaust parachute is pushed out and put into operation, when opening the lid of the parachute container of an airplane. Exhaust parachute, filling up, extracts basic parachutes (2 units). Filled main parachutes resist aircraft movement and reduce the length of its run along the runway.

The system provides inhibition of an aircraft during landing at speeds of its commissioning at least 200 km/h and no more than 330 km/h.

SPECIFICATIONS	
The maximum operating load does not exceed	Rmax 225553 H (23000 Krc)
Overall dimensions of the parachute system in the folded state:	
-Diameter	0,31 m^2
-Height	1,3 m
Parachute system weight, not more than	52 kg
Service time, including shelf-life	12 years
Resource of the parachute system	30 applications
Time of laying the parachute system:	810 kg
-with the press for more than	10 minutes
-manually no more than	20 minutes

BRAKE PARACHUTE PTK-29 (ПТК-29) FOR TYPE MiG-29 AIRCRAFT

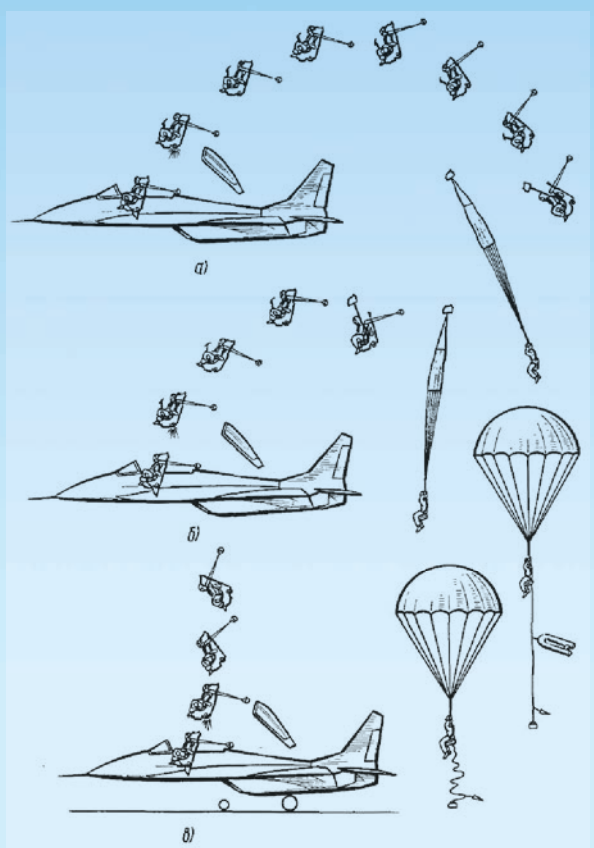
The parachute system is deployed by the pilot after touching the runway by the main wheels of the aircraft. At the moment the cap is released of releasing the cap from the parachute container of the aircraft, the cone spring of the exhaust parachute straightens and enables the second exhaust parachute, which extracts the main parachute of its camera. Inflated main parachute resists aircraft movement and reduces the length of its run along the runway.

The system provides speed suppression of an aircraft during landing and is deployed at velocity not less than 180 km/h and up to 300 km/h.

SPECIFICATIONS	
The maximum operating load does not exceed	Rmax 61656 H (6285 Krc)
Overall dimensions of the parachute system in the folded state:	
-Diameter	0,17 m^2
-Height	0,7 m
Parachute system weight, not more than	8 kg
Service time, including shelf-life	8 years
Resource of the parachute system	40 applications
Time of laying the parachute system:	
-with the press for more than	10 minutes
-manually no more than	20 minutes

PARACHUTE SAFETY SYSTEM PSU-36 SER. 2 (ПСУ-36 СЕР. 2)

PARACHUTE SAFETY SYSTEM PSU-36 SER. 4-3 (ПСУ-36 СЕР. 4-3)



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