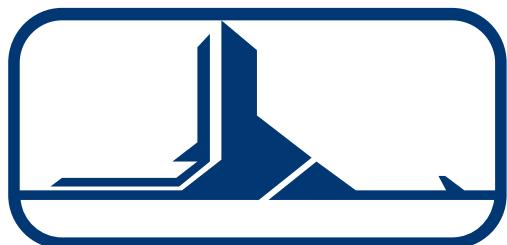




UKROBORONPROM

Ukrainian Defence Industry



State Enterprise Specialized Foreign Trade Firm

PROGRESS

30 YEARS
IN GLOBAL ARMS MARKET

CATALOGUE

**RADAR, RADIO
COMMUNICATION AND
AIR DEFENCE SYSTEMS**



State Enterprise Specialized Foreign Trade Firm

PROGRESS

State Enterprise Specialized Foreign Trade Firm "PROGRESS" (SE SFTF "PROGRESS") was established in 1990 as the first official exporter/importer of military goods and services in Ukraine and has long-term business experience on armament and military equipment markets. In accordance with the resolution of the Government of Ukraine SE SFTF "PROGRESS" is entitled with full rights to act as an exporter or importer of military and special purpose goods and services.

Nowadays, SE SFTF "PROGRESS" acts as an independent enterprise being equal member of State Concern "Ukroboronprom" — the consolidation of great number of diversified enterprises of military industry.

Ukraine has a strong industrial potential in arms and military equipment, the whole spectrum of which is offered for export by SE SFTF "PROGRESS". Having a broad geography of cooperation and trade during more than 25 years of the activity in the world armament the firm has fulfilled export and import supplies of military and special equipment, armament and services to more than 30 countries in the different regions of the world. The wide range of such sales includes a broad spectrum of military products, goods and technologies of dual use ammunition, various equipment and services.

SE SFTF "PROGRESS" deals with export of military equipment of current production (MBT, APCs, Antonov-type transport aircraft, modern navy ships, radar and communication systems), modern technologies and know-how.

SE SFTF "PROGRESS" has taken a comprehensive approach to the export of armaments and military equipment. We are pleased to offer mutually advantageous cooperation in the following areas:



State Enterprise Specialized Foreign Trade Firm
PROGRESS

- export and import of products and services of military and special purposes, including arms, ammunitions, military and special equipment, spare parts, explosives and other goods, which may be used for the creation and production of arms, military and special equipment;
- shipbuilding industry (design and construction of combat ships and civil vessels, repair and upgrade of marine equipment, component parts for shipboard systems and equipment, hydro-acoustic systems and complexes);
- aircraft engineering and maintenance (aircrafts, missiles, engines, equipment, repair services and aircraft modernization);
- modernization of armament and military equipment for foreign customers;
- rendering of services in repairing and maintenance of arms and military equipment;
- export of new technologies, project documentation and other scientific-technical products in military and civil areas;
- training of the foreign military staff in the basic training military institutions in Ukraine and in the countries of the customers;
- design of specialized factories and projects.

Our company together with Ukrainian shipbuilding centers has great experience in designing and construction of vessel of different displacement and purpose. We offer supply of coast guard boats, patrol boats, assault and Special Forces ships. Specified ships are intended for guarding and protection of water boundary and counteraction against poaching.

Ukrainian repair facilities are capable to perform complete overhaul and modernization of a series of military units and armaments of former and modern Ukrainian production.

For more than 30 years of activity on foreign markets SE SFTF "PROGRESS" has performed export deliveries of military and special equipment, armaments and services to more than 30 countries including countries of Europe, Middle East, Southeast Asia, Latin America and Africa.

Nowadays, SE SFTF "PROGRESS" is a dynamic developing enterprise which can offer a wide range of services. During the years its activity our company has built up the reputation of a reliable partner. The team of professional experts and full range of rendered services are a guaranty of effective mutually beneficial cooperation and fulfillment of our partners' requirements.

We are always open for a dialogue and mutually advantageous cooperation.

NEAR 80 000 EMPLOYEES

UKRAINIAN DEFENCE INDUSTRY MANAGEMENT HAS DEVELOPED A PROMISING MODEL OF INDUSTRY-SPECIFIC CLUSTERS WITH CLEAR SPECIALIZATION. WE ARE PROUD THAT UKRAINE IS ONE OF THE FEW COUNTRIES IN THE WORLD THAT HAS GREAT TECHNOLOGICAL KNOWLEDGE IN THE INDUSTRY AND A FULL PRODUCTION CYCLE.





ARMORED MILITARY
VEHICLES

AVIATION
INDUSTRY

SHIPBUILDING AND MARINE
EQUIPMENT INDUSTRY

RADAR, RADIO COMMUNICATION
AND AIR DEFENCE SYSTEMS

ROCKET ARTILLERY WEAPONS
AND MUNITIONS



RADAR, RADIO COMMUNICATION AND AIR DEFENCE SYSTEMS



DETECTION WHEREVER YOU ARE

Ukrainian Defence Industry specialists are engaged in development and manufacture of a wide range of modern radar systems, electronic reconnaissance equipment and electronic warfare systems.

WE DO:

- production of air defence systems
- repair and modernization of air defence equipment, communications
- design and production of radars, electronic warfare stations and optical electronic countermeasure stations

RADAR-X1-M

DOPPLER GROUND SURVEILLANCE RADAR /PERIMETER SURVEILLANCE RADAR

Application

Detection of (slow) moving ground targets in severe clutter environment detection of low altitude, low rcs air targets

Measurement of target coordinates (distance and azimuth), rcs, radial velocity, and moments of doppler spectra

Key markets

1. Defence

- Forward operating base (fob) security

- Mobile force protection

- Checkpoint security

- Forward observation

2. Critical infrastructure protection

- Airport cz/rz boundary monitoring

- Nuclear power station security

- Security of oil, gas and water pipelines

- Crisis response

3. Coastal security

- Harbour, seaport and naval base protection

- Coastal surveillance

- Offshore platform security

- Lake and inland waterway monitoring

4. National border security

- Detection of illegal immigrants and smugglers of contraband goods

- Prevention of narco-terrorism

- Monitoring of border incursions

Advantages

Capability of detection of slowly moving targets with low rcs in the strong clutter background including marine targets radar can be mounted on a mobile platform (car, truck, trailer etc.)

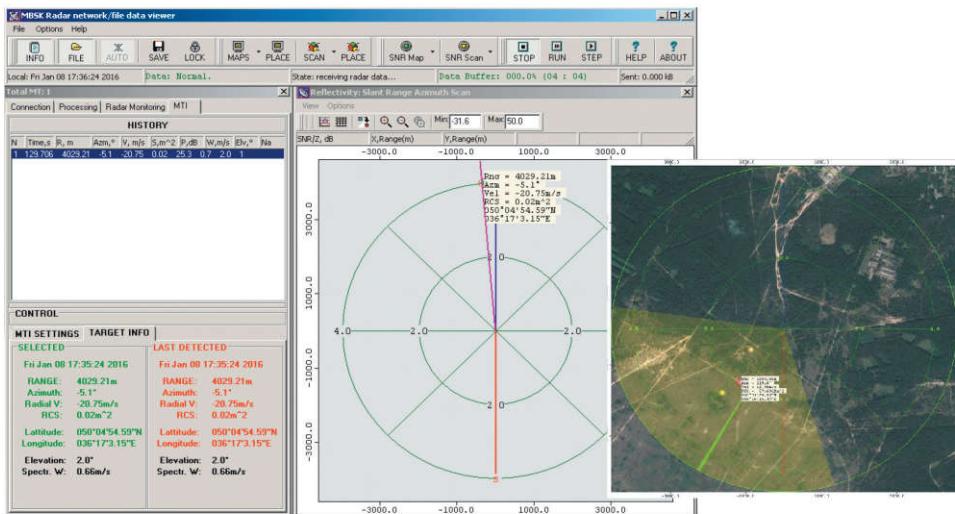
All weather operation

Integration of radar data with standard geographic information systems Industry-standard communication interface



Technical specification

Target with typical RCS, m ²	Detection range provided by SNR>15dB
UAV (UAS), 0,01	7 km
Man, 0,5	18 km
Vehicle, Airplane, Boat, 1	25 km



Typical moving target detection performance

Target with typical RCS, m ²	Detection range provided by SNR>15dB
Instrumental range	0.1...30km
Antenna type	Waveguide slotted
Peak power	30W
Elevation span	25°
Azimuth scanning	360° (continuous)
Scanning rate	90°/s (max)
Targets coordinates	Azimuth-Range
Target location accuracy	
- range	up to 5m
- azimuth	1°
Target radial velocity accuracy	0.1m/c
Min. radial velocity	0.2m/c
Coordinate system	WGS-84 and polar
Dimensions	12x0.5x0.75m ³
Weight	65kg
Input Power	300W (max)
Data and Control Interface	1000BASE-TX Ethernet



RL-08

LASER GYROS FOR NAVIGATION SYSTEMS



Purpose:
measurer of base angular rate vector projection on laser gyro sensitivity axis.

Features:
laser gyros with 3 different values of perimeter length. Monoblock structure, ring laser on a dither stand in electromagnetic screen.

Scope of application:
laser gyros are used in strapdown inertial navigation systems.

Technical characteristics:

Bias stability error, deg/hour	0.3...0.7
Angular random walk, deg/^Thour	0.03...0.08
Scale factor stability error	100 ppm
Angular rate range, deg/s	±1000
Operating temperature range, °C	-40...+65

Perimeter - 8 cm

RL-16

LASER GYROS FOR NAVIGATION SYSTEMS



Technical characteristics:

Bias stability error, deg/hour	0.01...0.03
Angular random walk, deg/^Thour	0.002...0.04
Scale factor stability error	20 ppm
Angular rate range, deg/s	±600
Operating temperature range, °C	-40...+65

Perimeter - 16 cm

Purpose:
measurer of base angular rate vector projection on laser gyro sensitivity axis.

Features:
laser gyros with 3 different values of perimeter length. Monoblock structure, ring laser on a dither stand in electromagnetic screen.

Scope of application:
laser gyros are used in strapdown inertial navigation systems.

RL-28

LASER GYROS FOR NAVIGATION SYSTEMS



Purpose:
measurer of base angular rate vector projection on laser gyro sensitivity axis.

Features:
laser gyros with 3 different values of perimeter length. Monoblock structure, ring laser on a dither stand in electromagnetic screen.

Scope of application:
laser gyros are used in strapdown inertial navigation systems.

Technical characteristics:

Bias stability error, deg/hour	0.002...0.005
Angular random walk, deg/^Thour	0.001...0.003
Scale factor stability error	10 ppm
Angular rate range, deg/s	±400
Operating temperature range, °C	-40...+65

Perimeter - 28 cm

GARANT-M

CONTROL RADIO LINK SUPPRESSION SYSTEM



Main Specifications:

Type of noise	wide-band barrage
Summary integral output power of noise	not less than 700 W
Radio suppression distance (depending on the parameters of radio lines)	not less than 50 m
Ambient temperature	from minus 40 °C to 50 °C

"Garant-M" product is designed for radio suppression of receiving sections of various radio technical facilities, radio communication channels of stationary, mobile and portable radio stations, radio telephones of cellular communication systems as well as for protection of mobile facilities (columns on the move and single combat and transport facilities) by preventing a radio-controlled explosion of explosive devices (mines, fougasses et al.).

	Frequency range of noise radiation, MHz: 20-4000
	Power consumption, kW: NOT MORE THAN 1,6
	Supply voltage, V: 24

BUREVESTNIK-1M

RADAR UNIT

Purpose: installation on the sea-, river- and high-speed vessels, including those with the dynamic suspension, on the shore-based look-out stations

	Pulse power of the transmitter: 20 KW
	Power supply, V: 170 – 265
	Power consumed, kW: 1.0



Main Specifications:

Maximum range of detection	
- average sea buoy	6 miles
- vessel of the displacement of 5000 tons	40 miles
- beacons, motor boats	4 miles
Minimal range of detection with the aerial lifted over the sea level 10 meters	0 – 36 m

GM-03AV

INERTIAL MEASUREMENT UNITS



Technical characteristics:

Gyro bias stability, °/hr	<0.015
Gyro dynamic range, °/sec	±90
Gyro random walk, °/Vhr	<0.01
Gyro SF accuracy, ppm	10
Acc bias stability, pg	<30
Linear Acc range, g	±25
Acc SF accuracy, ppm	100

IMU-08

INERTIAL MEASUREMENT UNITS

IMU-08

INERTIAL MEASUREMENT UNITS



Technical characteristics:

Gyro bias stability, °/hr	<0.5
Gyro dynamic range, °/sec	±400
Gyro random walk, °/Vhr	<0.05
Gyro SF accuracy, ppm	200
Acc bias stability, pg	<200
Linear Acc range, g	±40
Acc SF accuracy, ppm	400

IMU-16

INERTIAL MEASUREMENT UNITS



Technical characteristics:

Gyro bias stability, °/hr	<0.1
Gyro dynamic range, °/sec	±300
Gyro random walk, °/Vhr	<0.01
Gyro SF accuracy, ppm	20
Acc bias stability, pg	<60
Linear Acc range, g	±40
Acc SF accuracy, ppm	200

IMU-28

INERTIAL MEASUREMENT UNITS



Technical characteristics:

Gyro bias stability, °/hr	<0.015
Gyro dynamic range, °/sec	±90
Gyro random walk, °/Vhr	<0.01
Gyro SF accuracy, ppm	10
Acc bias stability, pg	<30
Linear Acc range, g	±25
Acc SF accuracy, ppm	100

AKS-05M

ARE PENDULUM COMPENSATION ACCELEROMETERS WITH SILICON SENSITIVE ELEMENT, CAPACITIVE SENSOR OF SENSITIVE ELEMENT POSITION, AND INTEGRATED TEMPERATURE SENSOR



Parameter::

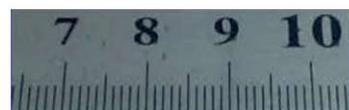
Measurement range, g	± 45
Bias stability:	
- run-to-run, g;	$\pm 3 \times 10^{-5}$
- in run (6 hours), g	$1..3 \times 10^{-5}$
Current scale factor, mA/g	$1.0 \pm 10\%$
Temperature coefficients of:	
- bias stability, g/ $^{\circ}\text{C}$	$0.5..3.0 \times 10^{-5}$
- scale factor, ppm/ $^{\circ}\text{C}$	<50
Nonlinearity	$< 5 \times 10^{-5}$
Bandwidth (-3 dB), Hz	>1200
Impact resistance (0,5 sin)	45g/6ms
Electronics unit	In-built
Weight, g	85

AKS-06M

ARE PENDULUM COMPENSATION ACCELEROMETERS WITH SILICON SENSITIVE ELEMENT, CAPACITIVE SENSOR OF SENSITIVE ELEMENT POSITION, AND INTEGRATED TEMPERATURE SENSOR

Parameter::

Measurement range, g	± 45
Bias stability:	
- run-to-run, g;	$\pm 5 \times 10^{-5}$
- in run (6 hours), g	5×10^{-5}
Current scale factor, mA/g	$1.0 \pm 10\%$
Temperature coefficients of:	
- bias stability, g/ $^{\circ}\text{C}$	5×10^{-5}
- scale factor, ppm/ $^{\circ}\text{C}$	50
Nonlinearity	-
Bandwidth (-3 dB), Hz	800
Impact resistance (0,5 sin)	45g/6ms
Electronics unit	out-built
Weight, g	55



36D6-M2

3D AIR SURVEILLANCE RADAR

The mobile 3D air space surveillance radar is intended for detection and target identification at the low and high height at the influence of active and passive jammings with the coordinate and track data output. Radar is designed to be used as a part of modern automated air defence systems and to provide target designation to air defence anti-missile systems.

Main Specifications:

Detection range for low flying targets: RCS = 1-2 m ²	
- at flight altitude 100 m	42 km
- at flight altitude 1000 m	110 -115 km
Azimuth coverage	360°
Elevation coverage	0.5°...30° in two rev.
RPM	>48 dB
Track capability	>256
Accuracy, range, m	100
Accuracy, azimuth, min	10...15
Accuracy, altitude, m	400 AT < 70 KM
MTBF	800 hours



- Operation band: **S**
- Instrumented range, km: **90, 180, 360**
- Antenna type: **DPA**
- Number of transport units: **2**
- Deployment/closing time, min: **<30**



MAIN SPECIFICATIONS:

- High probability of detection of small air targets, hovered helicopters including targets slowly moving tangentially to the radar.
- High-noise immunity.
- Capability of jammers bearings detection.
- Automatic association of echo-signals with return signals of the built-in IFF equipment.
- Capability to represent radar information and targeting over narrowband communication channels.
- High reliability.
- High mobility.
- Extreme stability of transmitter with true coherency.
- Unique doppler system of moving targets automatic detection

80K6

MOVABLE THREE-DIMENSIONAL RADAR STATION OF ALL-ROUND VIEW

Movable three-dimensional radar station of all-round view at small, medium and high altitudes with the coordinate and the trace outputs; works independently or as part of regional and national Automated Control Systems (ACS).

Main Specifications:

Limits of the station in range:

minimal	31 km
maximum	42 km
by azimuth	110–115 km
elevation	27 km
adjustment	360°

Target detection range, RCS = 3–5 m²:

at an altitude 100 m	40 km
at an altitude 1000 m	110 km
at an altitude 10 ... 30 km	300–350 km



Operating Frequency Range:

S
5 OR 10 SEC



MOBILE 3D AIR SURVEILLANCE RADAR

Mobile Radar 80K6M designed to be used as a part of radio and anti-aircraft missile troops. The radar systems provides: detection, air objects three-coordinates and Doppler velocity measurement, air objects tracking; recognition of the aircraft IFF equipment; calculation of elevation and azimuth bearing at active jamming stations; data issuing to the radar workstations and the integrated systems.

Main Specifications:

Detection range of aircraft with RCS 3-5m², km

At flight altitude 10 km	200
At flight altitude 100 km	40
Elevation coverage area, deg (In mode 1)	0...35
Elevation coverage area, deg (In mode 2)	0...35

Operation band:
S

Frequency q-ty:
6

Indicator range, km:
400

Scanning rate, sec:
5, 10

80K6K1

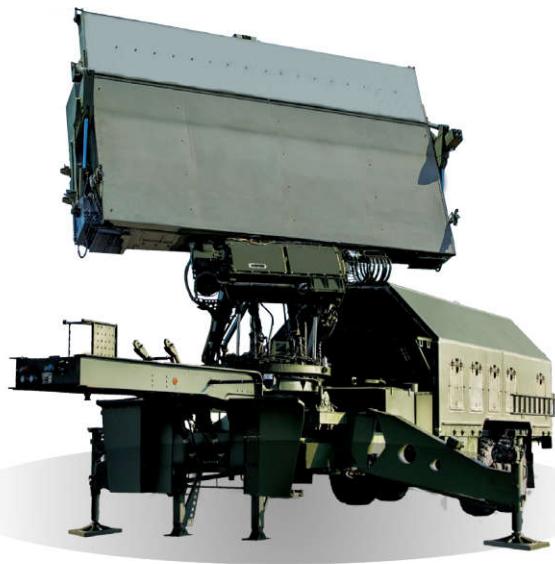
3D AIR SURVEILLANCE RADAR

The mobile 3D air surveillance radar for low, medium and high altitudes with coordinate and track outputs, operating off-line or as a part of regional and national automatic control post (ACP) is designed to be used:

- as a part of anti-aircraft missile troops to issue targeting to anti-aircraft missile complexes;
- as an information link in the air forces and air defense units for air traffic control.

Main Specifications:

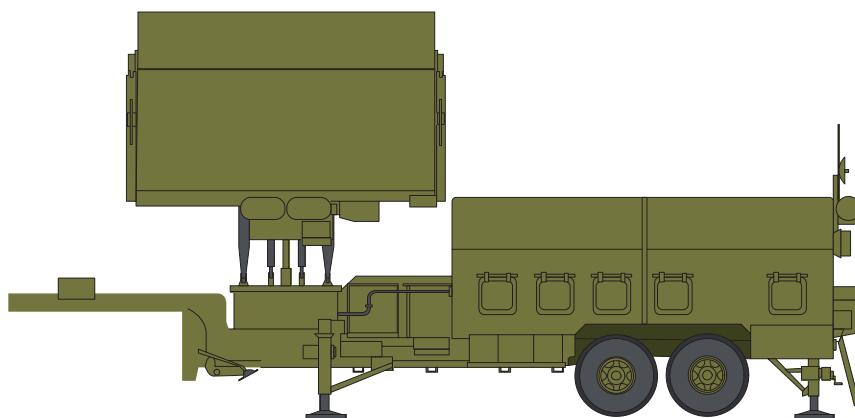
Target detection range, RCS=3 m ² (at P=0,8 F=10 ⁻⁶):	
at flight altitude 10 km	350
Maximum radar operation limits:	
in range, km	500
in azimuth, deg	360
in elevation, deg	0...70



	Operating frequency range: S
	Scanning interval, s: 5, 10
	Antenna type: DPAR
	Number of transport units: 2
	Deployment/closing time, min: 30

THE RADAR SYSTEM PROVIDES:

- detection, tracking and measurement of the airborne target coordinates and their ground speed under conditions of no interference and of natural noise and active and passive jamming as well as under their combined effect;
- recognition of the aircraft IFF-equipment, the individual and flight information gaining from friendly aircraft, data representation and issuing to users;
- jamming station direction finding in elevation and azimuth;
- data issuing to off-line display facilities and interaction with command posts of regional and higher national ACP.



90K6E

MOBILE 3D SURVEILLANCE RADAR

Mobile 3D air surveillance radar with transistorized transmitter, intended for low, medium and high flying targets detection is designed to be used:
 as a part of anti-aircraft missile troops to issue targeting to anti-aircraft missile systems;
 as an information link in the air forces and air defense units for air traffic control.
 The radar can be transported by C-130 "Hercules" aircraft.



	Frequency range: S
	Scanning interval, s: 5, 10, 20
	Antenna type: DPAR
	Deployment/closing time, min: 15, 20

Main Specifications:

Target detection range, RCS=3 m² (at P=0,8 F=10⁻⁶):

at flight altitude 10 km	350
--------------------------	-----

Maximum radar operation limits:

in range, km	500
--------------	-----

in azimuth, deg	360
-----------------	-----

in elevation, deg	0...70
-------------------	--------



1L220U, 1L220U-KS COUNTER-BATTERY RADAR

Multifunctional complex 1L220U (1L220U-KS) has a flexible hardware and algorithmic tools that can be easily adapted for various combat missions.

Main Specifications:

Range exploration VP:

artillery	30 km
-----------	-------

mortars	30 km
---------	-------

MLRS	30/40 km
------	----------

tactical missiles	55 km
-------------------	-------

Range control Accuracy:

artillery	30 km
-----------	-------

MLRS	30/40 km
------	----------

tactical missiles	80 km
-------------------	-------

Throughput goals	50 per minutes
------------------	----------------

1L220U

	Dimension: 9214x3250x3350
	Weight: 39,5 t
	Transport vehicle: ГМ 5951

1L220U-KS

	Dimension: 11500x3160x3800
	Weight: 23,5 t
	Transport vehicle: ГМ 5951

“DELTA” NAVAL 2D SURVEILLANCE SOLID-STATE RADAR

«Delta» is a modern naval/land two-dimensional pulse coherent solid-state radar for surface and air surveillance with low interception probability of its electromagnetic emission. It delivers the current coordinates of any target located within its detection range in a fully automatic way.



	Frequency: I band
	Number of targets tracked: not more than 50
	Antenna rotation period: 3, 6, 12 s
	Range scales: 12, 24, 48, 96 km
	Power supply: 220 V, 50 Hz
	Power consumption: not more than 500 W
	Equipment weight: 150 kg

Main Specifications:

Coverage:	
in range	96 km
in azimuth	0–360 °
Maximum target detection range:	
small size air type	8–20 km
ground-based (automobiles)	16–20 km
surface type	radio horizon range
Coordinates determination accuracy:	
range	20–40 m
azimuth	8–10 mrad
Communication with command post	RS-422
Deployment time with full operation mode preparation	not more than 2 min



MINERAL – ME MULTIFUNCTIONAL TARGET DESIGNATION RADAR SYSTEM

The complexes “Mineral-ME”, of marine and coastal basis, are the integrated multifunction information-and-control systems that are based on the usage of different information sensors (of active, passive, mobile surveillance posts) within one information field, provide the over-the-horizon detection of surface targets and deliver of targets designation data for full firing range of missile weapon.

Main Specifications:

Radar	Active	Passive	MEI-MOR
Frequency band	X	X, G, E/F, D	X
Scanning zone	Through azimuth	360°	360°
	Through range	up to 250 km	up to 450 km
		up to 30 km	

KASKAD

SHIP SELF-DEFENCE SYSTEM

KASKAD is a modern system which is intended to collect and process information and to ensure ship armament control. The system is based on DELTA and ROSA radars. KASKAD performs collection, fusion, and identification of information on detected (within the ship's zone of responsibility) targets. The system also ensures evaluation of the danger level degree (hazard analysis), output of the plan on formidable targets' distribution, output of the target designation to the ship fire means' control units and direct control of the ship artillery armament.

Main Specifications:

	DELTA-M radar	ROSA radar
Frequency range	X (3 cm)	S (10 cm)
Coverage zone		
- range, km	96	200
- azimuth, deg	0...360	0...360
- elevation angle, deg	from minus 10 up to plus 60	0...35
Range scale, km	12, 24, 48, 96	50, 100, 150, 200
Resolution:		
- range, m	50...60	40...60
- azimuth, deg	1,0...1,5	2,0...2,5
Maximum detection range:		
- small air targets, km	8	≥ 45
- air targets with RCS > 10m ²	20	≥ 100
- surface targets, km	radio horizon	radio horizon
Peak radiation power, W	from 8 up to 80	≥ 1500
Number of tracked targets	up to 50	up to 50



Main Specifications:

Maximum detection range (of airborne targets with the fly altitude of 1000m):	
- with RCS>10 m ²	≥100 km
- with RCS>2 m ²	>45 km
Maximum detection range of anti-crafts with RCS>0.05 m ² with the fly altitude of >5m	>12 km
Number of tracked targets	up to 50

ROSA

2D COHERENT-PULSE SOLID-STATE SURVEILLANCE RADAR

Radar "Rosa" is up-to-date marine coherent-pulse, solid-state, two coordinate all-around surveillance radar, which is intended for the surveillance after the on-land, surface and air situation in the area of responsibility. Radar construction allows to place it on board of corvette, frigate etc.

-  Frequency range: **S**
-  Range scales, km: **25, 50, 100, 200**
-  Peak-pulse power, W: **up to 1500**
-  Readiness time, m: **up to 2**

INTEGRATED DATA PROCESSING AND CONTROL SYSTEM

IDPCS is the ship/land-based automated information-and-control system for data collection and complex data processing which is used when working with multiple information sources, and ensuring interaction with users. IDPCS is formed on the base of up-to-date apparatus means, advanced computer technologies and data processing methods. Mission:
 - data collection, storage and generalization on air and surface combat/tactical situation;
 - situation assessment and prediction on decisions and plans on weapon application.

Main Specifications:

Coverage zone (limited by the parameters of the information sources)	
- at range, km	400
- at azimuth, deg.	0...360
- at elevation angle, deg.	85
- at height, km	30
Number of simultaneously processed targets	up to 400
Number of information sources	Up to 16
Number of information users	Up to 10
Cycle of exchange by data of targets designation, ms	20
Modes of targets designation:	automatic, semi-automatic
Modes of targets distribution:	centralized, autonomous
Number of operator's console	1 with 2 displays (up to 5)
To output of targets designation, s	≤0,5

TRIADA OPTOELECTRONIC FIRE CONTROL SYSTEM



"Triada" – the universal fire control system for light armored vehicles, designed for surveillance, detection, automatic tracking of surface targets (armored vehicles, personnel), control the panoramic vision system "Pannorama-2P" targeting and armored personnel carrier module weapon control (IFV): automatic 30-mm machinegun cannon ZTM-1; automatic grenade launcher AGS-17; 7.62 mm machinegun PKT type; 212 antitank missile systems; smoke screens laying means.

Main Specifications:

Detection range in the daytime	at less than 5000 m
Detection range in the night time	not less than 800 m
Power supply	27 V
Weight	up to 70 kg

MLME MOBILE LABORATORY OF MEASURING EQUIPMENT

For checking of measuring apparatus in places of its operation. Functionally it consists of two mobile complete sets YA2-4/A and YA2-4/B, developed on the basis of bodies-vans of KrAZ truck. The laboratory is equipped by life-support systems, including support of a thermal mode (air-conditioning, heating, ventilation) which allow to maintain inside of a body-van temperature (20±5)°C in a range of temperatures of outside air from minus 30°C to +40°C. The chassis of the all-wheel drive truck provides reliable moving of laboratory on roads of different categories.



BK07-9200010-00

SPECIAL BODY FOR INSTALLATION ON A VEHICLE

SPECIAL BODY FOR INSTALLATION ON A VEHICLE BK07-9200010-00 is designed for personal, laboratory, workshop, field kitchen, electronic system, medical center and other accommodation type, with for beloved truck adjustable chassis.

	Length, mm:
	4 600
	Width, mm:
	2 500
	Height, mm:
	2 300
	Weight, kg:
	4 000



Equipment:

Heating ventilation appliance

Filter ventilation appliance

Version with some sound isolation and humidity absorption level is provided at the Customer's request



Main Specifications:

Maximum radar operation limits:

- in range, km	2...360
- in azimuth, deg	360
- in altitude, km	25

TRASSA-1

STAND-ALONE MOBILE SECONDARY RADAR

The solid-state stand-alone mobile secondary radar with the phased antenna array operates under standards of both the NATO IFF system Mk XA (Mk XII), "Parol" identification system and international ATC system RBS. The radar is designed to issue radar data to units of radio-technical troops of air defense, air forces and AAMS as well as to ATC services.

	Frequency band: L
	Scanning interval, s: 6
	Consumption power, kW: 8...10
	Deployment/closing time, min: 30

“POLOZHENIYE 2” (1AR1)

SOUND RANGING SYSTEM

Automated Sound Ranging System “Polozheniye 2” (1AR1) is intended for reconnaissance of enemy's artillery guns and mortars positions and for servicing its artillery's firing.



	Fire positions reconnaissance range: 25 km
	Deployment time: 45 minutes
	Clotting time: 30 minutes
	Crew: 8

Main Specifications:

Accuracy of target location:	
by the range	0.6 - 0.8 %
by azimuth	0-03 - 0-04
Target engagement rate	30 Objective / min
Time of identification of one target's coordinates	less than 3 sec.
Number of vehicles	1 armored chassis MTLB- 1



Main Specifications:

Communication channels PCU-1 provide:	
Receiving radiolocation information from the RLS 36D6-M and P-18, control RLS 36D6-M	on wired communication channels
Transmit / receive of radar data:	
through satellite modem	
through modems «TAYNET» on commutation or dedicated telephone line	
Radar data transmission	on a radio channel to CP-12M (ZRK) in the frequency range UKV radio station (optional)
Operational-command communication through radio channels:	
with the staff management of command posts in the operating frequency range radio station Micom-2TS (1,6-30 MHz)	
the navigator with the pilots of the aircraft in the operating frequency range radio station R-862 (100-149, 975 МГц) и (220-399, 975 MHz)	
with the staff control point PU-12M (ZRK) in the the operating frequency range of VHF radio station (20-52 MHz)	

RCU-1

MOBILE RADAR COMMAND AND CONTROL UNIT

It is intended for organization of the Air Defense automated systems, aviation control, radar remote control, data recording, staff training. The main functions:

- remote command and control of RLS 36D6-M;
- collection and processing of radar data from the RLS 36D6-M and RLS P-18 as part of radio air defense units with air situation information providing to command posts over wired and satellite channels;
- collecting radar information from remote sources, the formation of a unified picture of the air situation;
- fighter aircraft pilots' control;
- target indication providing for PU-12M command and control centers and mobile Anti-Aircraft Systems (optional).

AMBER-1800

VHF-BAND RADAR

Ground-based mobile VHF-band radar AMBER-1800 provides automatic deployment on prepared sites and is designed for detection of air targets, determination of their coordinates and distribution of radar information to consumers. Transmitter and receiver of AMBER-1800 radar are solid-state.

Mobile VHF-band radar AMBER-1800 is designed on the basis of automatically deployed multi-section antenna system. The antenna itself represents a stacked array of dipole-slot antennas with linear horizontal polarization.



Performance characteristics of the stacked array antenna:

Elevation of the antenna phase center	6 meters
Operational frequency band from	140 MHz to 180 MHz
Output impedance	50 Ohm
Beamwidth	6 degrees
Level of sidelobes	minus 20 dB
Antenna rpm	3 to 6

Time of deployment (stowing down) and leveling of the antenna mast assembly after vehicle positioning on prepared site does not exceed 12 minutes.



Main Specifications:

Detection range for a target with RCS of 2.5m ² :	
Altitude (meters):	Range (km):
100	30/32
1000	70/80
3000	110/120
10000	300/360

P-18MA

GROUND-BASED LONG-RANGE VHF BAND SURVEILLANCE RADAR

Is offered as the upgraded follow-on to its prototype, the analogue P-18.

Features:

metric band for "counter-Stealth" capability;
maximum use of COTS components;
stable, fail-safe, modular solid-state transmitter and receiver; built-in test equipment;
no special adjustments required during operation;
largely simplified maintenance; engineered for minimum cost of ownership.
Upgraded P-18MA radar is adopted by MoD of Ukraine for its Armed Forces.



Range of working frequencies:
140 – 180 MHz

MR-18

HIGHLY MOBILE 3D AIR SURVEILLANCE RADAR

The mobile air surveillance radars with coordinate and track outputs, operating off-line or as a part of regional and national automatic control posts (ACP) are designed to be used: as a part of radio technical air defense units for air traffic control; as a part of antiaircraft missile troops to issue targeting to antiaircraft missile complexes; as a part of radio technical air force units for aviation training support.



	Operating frequency Range: VHF
	Consumption power, kW: 30
	Number of transport units: 1+1
	Scanning interval, s: 10 OR 20

Main Specifications:

Radar operation limits in range:	
Minimum, km	2,5
Maximum, km	400
in azimuth, deg	360
in elevation, deg	0...45
in altitude, km	40



RCP 1M

MOBILE RADAR CONTROL POST

Construction is made on the basis of the van-vehicle of high cross-country capability KrAZ 6322 AF1. The van body is divided in two compartments.

Main specifications:

Remote control for 36D6M, 80K6K1 radars
Radar data collection and processing coming from radar with digital output as a part of AD radio communication unit and issuing the air situation picture to the command posts via wire and satellite communication channels
Collecting the radar data from the remote posts and creation the integrated air situation picture
Fighters' pilot control
Providing target designation to AAMC (option)

Main Specifications:

Remote control for 36D6M, 80K6K1 radars
Radar data collection and processing coming from radar with digit output as a part of AD radio communication unit and issuing the air situation picture to the command posts via wire and satellite communication channels
Collecting the radar data from the remote posts and creation the integrated air situation picture
Fighters' pilot control
Providing target designation to AAMC (option)

MARS-L

MOBILE RADAR SYSTEM

Purpose:

- Automatic detection at low/med/high altitudes;
- Combined mobile PSR and SSR solution on one vehicle;
- Automatic tracking and data distribution.

Function:

- Aircraft automatic detection by PSR and SSR;
- Aircraft azimuth and range measurements;
- Displaying air situation at operator workstations;
- Automatic output of air situation to users via communication channels;
- Recording of air situation.

Applications of MARS-L:

- as aerodrome control radar for flight mission assurance units;
- as radar field gap filler for radar troops;
- as mobile low-altitude surveillance radar for Land Forces Air Defense;
- as mobile NATO standardized secondary radar for rapid reaction force peacekeeping operations;
- as target acquisition and designation radar for prospective anti-aircraft missile systems.



Secondary channel:

Support of RBS, MK XA and Eastern IFF transponder systems

Time of deployment (tearing down) by qualified personnel	10 min
Protocol of data acquisition and output	ASTERIX (CAT 001, 002)
Service life	10 years or 60000 h



Detection Range (target of fighter type):

Altitude (m):	Range (km):
100	40
500	80
1000	120
45000	210

PRV-16MA

MOBILE HEIGHT-FINDER

Mobile height finder PRV-16MA is intended for measurement of aircraft altitude from target designations provided by interfaced radar or automated control system and bearing of active jammers. By default PRV-16MA distributes data in ASTREIX format. Along with two-dimensional range finders (such as upgraded P-18/19 etc.) PRV-16MA forms the back-bone of 3D Radar Complex. System is offered as the upgraded follow-on to the prototype, analogue PRV-16. PRV-16MA can be easily interfaced with surveillance radars and command and control centres such as P-18MA, P-14MA, MARS-L, Module, etc.

Advanced digital technologies of radar signal processing and solid-state components have allowed to improve performance characteristics and jamming immunity, electromagnetic compatibility, decrease power consumption.

Resolution (not worse):

On the slant range	300 m
On the azimuth	3°
On the elevation	0.5°
Time of deployment	15 min

P-14MA

UPGRADE OF EARLY-WARNING VHF BAND RADAR

Offers the best (in terms of efficiency/cost ratio) alternative to restoration or repair of legacy prototypes.

Features:

- metric band for "counter-Stealth" capability;
- maximum use of COTS components;
- option of containerized solution (two 20ft ISO);
- stable, fail-safe, modular solid-state transmitter and receiver;
- built-in test equipment;
- no special adjustments required during operation;
- largely simplified maintenance; engineered for minimum cost of ownership.

Upgraded P-14MA radar is adopted by MoD of Ukraine for its Armed Forces.

Main Specifications:

Range of working frequencies, MHz	160-200
Detection range for a target with RCS of 2.5m ² :	
at altitude of H=100 m	37 km
at altitude of H=1000 m	130 km
at altitude of H=3000 m	220 km
at altitude of H=10000 m	400 km



S-125-2D (PECHORA-2D) SAM SYSTEM



Engagement envelope:

Min. altitude	20 meters
Max. altitude	21 km
Min. range	3.5 km
Max. horizontal range	27 km
Max. slant range	34 km

Engagement range (fighter):

Altitude 7 km	37 km
Altitude 350 m	27 km
Altitude 50 m	25 km

Upgraded Surface-to-Air Missile System S-125-2D is intended for protecting political and administrative centres, strategic civil and military sites, friendly forces against various means of enemy air attack.

System features:

- Service life not less than 15 years;
- High efficiency and mobility;
- High immunity to RF interference;
- Survivability;
- Exceptional performance characteristics.

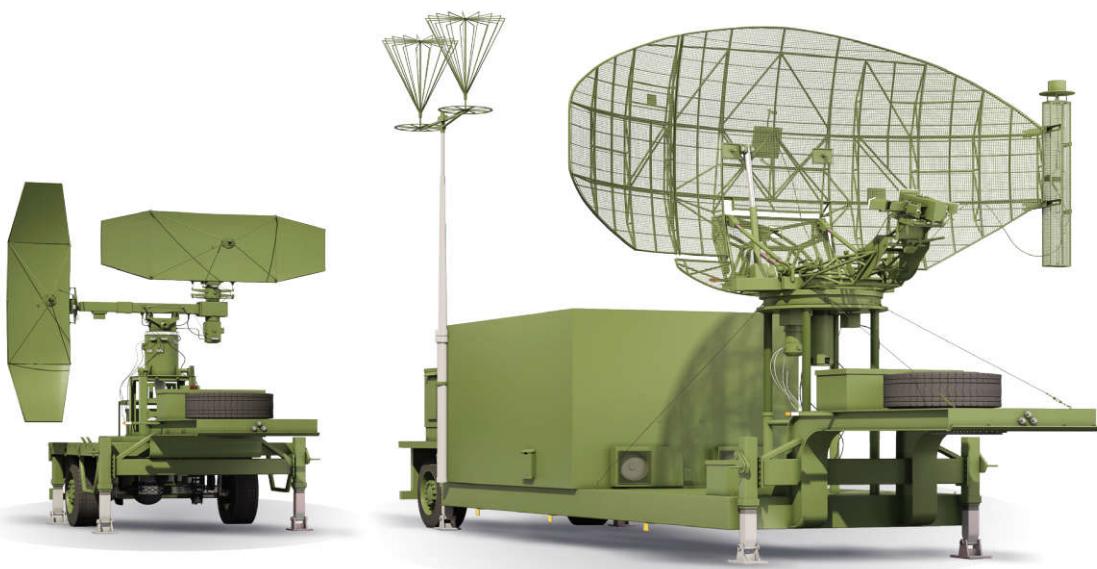
Missile guidance methods:

- 3 point
- half lead
- optimal dynamic control (new)

 MTBF:
1500 hours

RSP-10MA

UPGRADED GROUND-CONTROLLED APPROACH SYSTEM



Is intended to ensure flight safety of aircraft and helicopters within terminal airspace, obtain positional information and guide aircraft to a safe landing in normal and adverse weather conditions. RSP-10MA consists of the surveillance radar (ASR) combining primary and secondary channels and Precision Approach Radar (PAR). Ground Controlled Approach System RSP-10MA is adopted by MoD of Ukraine for its Armed Forces.

Main Specifications:

	PSR	SSR
Range of working frequencies, MHz	1250 – 1350, 250 frequencies with step 0.4 MHz	1030 – interrogation, 1090 – RBS response, 740 – Eastern IFF response
Detection range for a target with RCS of 2.5m ²		
- minimum range	1000 m	2.7 km
- maximum range	110 km	150 km

- Start-up time, min: **3**
- Power consumption, kW: **15**
- Track capacity:
not less than 100

P-190MA

GROUND-BASED MOBILE UHF LOW, MEDIUM AND HIGH ALTITUDE SURVEILLANCE RADAR

Is offered as the modernized follow-on to its prototype, the analogue P-19. P-190MA radar features: maximum use of COTS components; stable, fail-safe, modular solid-state transmitter; built-in test equipment; no special adjustments required during operation; largely simplified maintenance; engineered for minimum cost of ownership. Modernized P-190MA radar is adopted by MoD of Ukraine for its Armed Forces.

Main Specifications:

Range of working frequencies, MHz	825-890
Detection range for a target with RCS of 2.5m ² , P=0.5:	
at altitude of H=100 m	35 km
at altitude of H=1000 m	90 km
at altitude of H=3000 m	150 km
at altitude of H=10000 m	300 km



MANDAT-B1E

RADIO COMMUNICATION JAMMING COMPLEX



Main Specifications:

Name of the article	R-330RD	R-330KV1	R-330UV1	R-330UV2
Application	Automated reconnaissance station HF, UHF	Automated Jamming station HF	Automated Jamming station UHF1	Automated Jamming station UHF2
Operating frequency range, MHz	1,5 - 1000	1,5 - 30	30 - 230	225 - 1000
Coverage area (front / depth), km		up to 90 / up to 60		

Complex "Mandat-B1E" is intended for electronic environment monitoring and jamming radio communication channels within frequency range of 1,5-1000MHz. The complex "Mandat-B1E" provides for detection, determination of coordinates and setting time and frequency spot jamming against sources of emission operating either on fixed frequencies with any kind of modulation or frequency hopping (FH) with a hop rate amounting to 1000 hops per second.

INTERROGATOR 69Л02

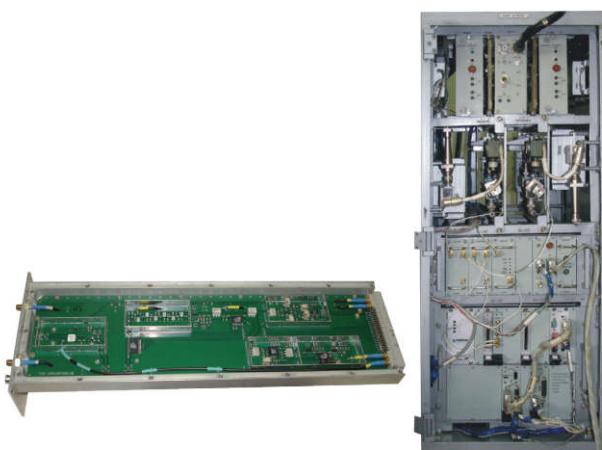
BUILT-IN RADAR INTERROGATOR OF SYSTEM MK-XA, MK-XII AND RBS

Built-in radar interrogator 69Л02 meets the requirements of NATO (STANAG 4193) and ICAO standards.

	Power consumed, W: <130
	Turn-on time, min: Less than 3
	Power-supply system: DC voltage 27V
	Weight, kg: 80

Main Specifications:

Pulse power of each transmitter is not less than 2000 W reducible by 12 dB at interval 3 dB	> 2000 W
Receivers' sensitivity is not less than	-126 dBW
Pulse amplitude difference between side-lobe suppression channel and main channel	<1 dB
Side-lobe suppression on response within dynamic range	70 dB



ЭД80 POWER STATION

The mobile body-type power station is designed to supply special-purpose products with three-phase alternating current, 400V, 50Hz, from diesel-generator set or 380 V, 50Hz, from supply mains. Power station is equipped with a master and standby diesel-generator for the radar continuous operation.

Output Parameters:

current	alternating, three-phase
rated power of master and standby diesel-generator, kW, no less	80
rated power of auxiliary diesel-generator (P13.5-4), kW, no less	10
current frequency, Hz	50
rated current, A, no more	126
power factor	0.8

	Voltage, V: 380
	Consumption current, A, no more: 165
	Power, kW, no more: 85

MODULE

AUTOMATED MOBILE COMMAND POST



Automated Mobile Command Post (AMCP) "MODULE" is the basic element in the structure of Air Defense and Air Force Command, Control Communications & Computers (C4I) defense networks.

Flexible structure and open architecture concept allow "Module" to be easily configured as Control and Reporting Post (CRP) and Control and Reporting Center (CRC) and serve as the backbone of successful C4I operations.

AMCP "Module" can be reconfigured into a Joint Operations Centre (JOC). JOC is the highest element in the structure of Air Defense and Air Force Command, Control Communications & Computers (C4I) defense networks. JOC is intended for planning, directing and executing joint operations and has tailored composition, organization and functions.

JOC coordinates with other command and control units with special attention on integration and interoperability ensuring nationwide airspace control and flight following.

Advantages:

- Module design principle;
- Unification of hardware, data processing tools and facilities;
- Flexibility of structure;
- Capability of connection and usage in automatic mode of different types of radar sensors;
- Easy upgradeability and extendibility according to Customer requirements.

Performance characteristics:

MTBF	5000 hours
Interfaced surveillance sensors	16
Message protocol	ASTERIX, LINK 1, LINK 776 etc
Display coverage area:	
■ Range	800 km
■ Altitude	60 km
■ Speed	3600 km/h

KVADRAT-2D (2K12M1-2D)

SAM SYSTEM

Advantages of upgrade:

- Capability to detect and destroy low-flying targets including targets with small RCS;
- Improved operation in jamming conditions in presence of reflections from underlying surface;
- Automation of control from Command Post; automation of detection and tracking;
- Increase of kill area and kill probability due to optimization of signal processing. Increased detection and tracking range of low-flying targets;
- Improved survivability and control capabilities.
- Full remote control of engagement radar from remote workstations
- Crew protection of engagement radar from HARM

Upgraded 2K12M1-2D SAM System "KVADRAT-2D" features improved performance and extended functional capabilities due to new algorithms of data processing and displaying

Performance characteristics:

Time to acquire target:	3-6 s
MTBF:	1500 hours
Detection of cruise missile at altitude of 0.2 km: not less than 21 km	



S-75M3A VOLGA-A

SAM SYSTEM



S-75M3A is upgraded high-altitude, command guided, surface-to-air missile system designed for point/area defence of administrative, industrial and military sites against all types of air threats at low, medium and high altitudes. S-75M3A is offered as the upgraded follow-on to S-75M3.

S-75M3A efficiently destroys strategic, tactical and army aircraft, high speed reconnaissance aircraft, drifting aerostats, helicopters and cruise missiles with radar cross-section of 0.1 m² and above.

S-75M3A "Volga-A" can receive target designations from command post of "Module" type or operate as a stand-alone system.

Advantages of upgrade:

- Capability to detect and destroy small targets including very low observable (VLO) aircraft;
- Improved operation in active and passive jamming environments due to new algorithms and technologies;
- Increased engagement envelope and kill probability in various jamming environment.

Performance characteristics:

Channel capacity target/missile:	3/3
Time to acquire target:	3-6 s
MTBF:	1500 hours
Deploy/stow time at site:	< 1 hour

TAYRA

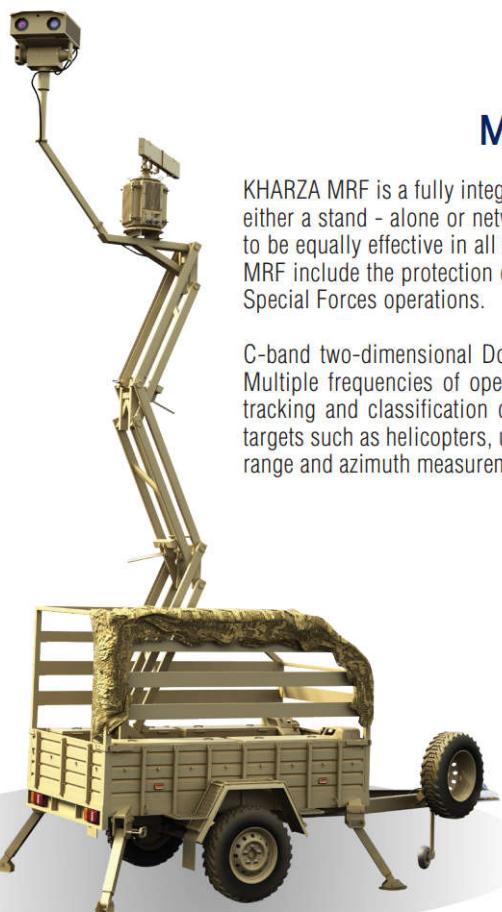
INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE VEHICLE (TAYRA ISRV)

TAYRA is a modular, mobile, day and night integrated Intelligence, Surveillance and Reconnaissance Vehicle (ISRV), capable to operate in rough terrain and to perform ISR missions in all weather conditions.

The TAYRA ISRV detects, identifies and tracks targets in areas of interest and creates a real-time situational awareness picture. The high mobility TAYRA ISRV can be rapidly deployed in any terrain and operated either independently or as a part of a central network, making it ideally suited for covert support of maneuvering forces or border protection, for military, and policing security missions.

Main Specifications:

Chassis	4x4
Top speed	120 km/h
System as intelligence equipment	ISR
Satellite-based system	CH-4215



KHARZA

MOBILE RADAR FACILITY (KHARZA MRF)

KHARZA MRF is a fully integrated and rapidly deployable surveillance system, capable of operating as either a stand - alone or networked to create virtual fence. System flexibility allows the Kharza MRF to be equally effective in all terrains and environments. Typical applications for autonomous Kharza MRF include the protection of checkpoints and critical infrastructures, convoy, escort, and support to Special Forces operations.

C-band two-dimensional Doppler radar with pulse compression and mechanical antenna scanning. Multiple frequencies of operation with the user selectable operational modes. Automatic detection, tracking and classification of different targets including people, vehicles, boats, low-altitude flying targets such as helicopters, unmanned aerial vehicles (UAVs) and aircraft. Outstanding performance in range and azimuth measurements, up to 360° situational awareness.

Main Specifications:

Doppler radar	C-band 2-D
Radar detection ranges are as follows:	
UAV (0.01m ²)	6 km
Person (0.5m ²)	18 km
Vehicle, airplane and vessels (1m ²)	more than 25 km



Wavelength band, μm :

3-5



Onboard battery, V:

24

BUKOVEL-AD

ELECTRONIC WARFARE SYSTEMS

Bukovel-AD is an effective electronic warfare system to counter a wide range of UAV types. It has real combat experience with several hundred successful results. Each technical solution of the system is the result of the accumulated experience while in warfare with a high-tech enemy. The system has high mobility, a set of tasks performed from detecting, tracking targets to suppressing satellite navigation channels and communication channels between UAV and GCS.

Main Specifications:

Detection range	320-6000 MHz
Suppression range	320-6000 MHz
Detection range	Up to 50 km
Effective suppression range	Up to 15-16 km
Suppression GNSS	yes
Suppression DataLink UAV-GS	yes
Number of simultaneously jammed channels	11
Crew	2
Transport base	4x4 truck
Weather condition	All weather
Transport-combat position transition time	2 min
UAV type	Nano, Micro, CR, SR, MR, Loitering munitions...



BUKOVEL-MINI-FX

ELECTRONIC WARFARE SYSTEMS



Cost effective anti drone system for fixed application. For defense of a small area within few square kilometers

Main Specifications:

Detection range	320-6000 MHz
Suppression range	320-6000 MHz
Detection range	3-50 km
Effective suppression range	up to 3-4 km
Suppression GNSS	yes
Suppression DataLink UAV-GS	yes
Number of simultaneously jammed channels	7
Crew	1
Transport base	no
Weather condition	All weather
Transport-combat position transition time	Fixed application
UAV type	Nano, Micro, CR

ANKLAV

PORTABLE JAMMER GPS/GLONASS

Portable jammer "ANKLAV" is intended to provide jamming navigation receivers GPS/GLONASS. It is an effective tool in combating drones and precision-guided weapons. Portable jammer "ANKLAV" is manufactured in portable and stationary version with directional antennas and omnidirectional ones.

Main Specifications:

Jamming range, km:	
- with directional antennas	40
- with omnidirectional antennas	20
Operation modes:	GPS jamming / GLONASS jamming / GPS/ GLONASS jamming



JAB

MOBILE SYSTEM OF SURFACE RECOGNITION AND ECM

Mobile System of surface recognition and ECM "JAB" is intended for detection, classification and identification of surface moving targets as well as low-speed low-flying air targets, target pointing with the aim to provide performance of tasks on security of wide areas and reconnaissance. System provides:

automatic detection (with radar) and receiving detail information (with visual channel) about surface moving targets geographically referenced and with output of the information to command center; automatic affixment of the system on the terrain with the help of satellite navigation systems; calculation and record route traffic at PC.

Main Specifications:

Radar detection range, km:	
- person	2.5
- vehicle	6.4
IR channel detection range, km:	
- person	2.4
- vehicle	6.4

CH-3003M

CH-3003M

It provides automatic continuous setting of coordinates, speed and moving direction. It displays the current coordinates in systems of coordinates WGS-84, CK-42, PZ-90.02, SK-95, MGRS i UTM, line coordinates in Gauss chart projection, in system, parameters of which are specified by the user.

	Dimensions, mm: 170x75x44
	Power supply, V: DC 10-30
	Power consumption, W: 2.5
	Weight, kg: 0.8

Main Specifications:

32 receiving channels	GPS/GLONASS/SBAS, L1-range
Algorithm of receiving channel selection	All-in-view
Positional/altitude accuracy in off-line mode (RMS)	10/15 m
Operating temperatures	from -20°C to +50°C
Operating increased humidity	100 % at 25 °C



Main Specifications:

32 receiving channels	GPS/GLONASS/SBAS, L1-range
Accuracy of coordinates determination	10 m
Operational temperature	from minus 30 to plus 50 °C
Time of autonomous operation (from the batteries)	not less than 3 hours
Interfaces	RS 232/422, USB 2.0, Wi-Fi, DigiMesh, ETHERNET

CH-4215

NAVIGATION EQUIPMENT

New equipment CH-4215 has been developed on the results of CH-3210 equipment operation for installation on ground military equipment mobile objects (having possibility of individual use) and has improved operational and physical characteristics. CH-4215 is intended to determine location coordinates, ground speed and time on radio signals of GLONASS SNS and GPS of SBAS functional addition as well as to solve control and service tasks of military units.

	Overall dimensions, mm: 218 x 191 x 57
	Power system , V: 12, 24, 27
	Embedded memory, Gb: 16
	Weight, kg: 2.5

CH-3307

EQUIPMENT OF SATELLITE NAVIGATION GLONASS AND GPS SYSTEMS USERS

SNS CH-3307 user equipment is intended for interoperability with avionics of Su and MiG aircrafts in standalone and automatic modes.



Supply voltage, V:
27

Power consumption, W:
30

Total weight, kg:
10.5

Main Specifications:

coordinates	20 m
altitude	30 m
current time	1 μ sec
ground speed vector	0.2 m/sec
UTC time mark	100 nsec

CH-4312

ON-BOARD SATELLITE NAVIGATION EQUIPMENT



Main Specifications:

Receiver	GPS / Glonass/ SBAS: 24 channels
Data updating frequency	10 Hz
Information field range of color LCD monitor	78,7x53,6 mm
User's data base	1000 WPT and 90 routes

CH-4312 equipment is intended for aircraft handling as a part of aircraft avionics system in all flightstages, including non-precision approaches.

CH-4312 provides problem solving of navigation, planning, trajectory prediction, aircraft equipment control and air navigation process control using P RNAV requirements with RNP 0.3, RNP 1, RNP 5 accuracy.

Supply voltage, V:
27

Power consumption, W:
20

CH-3101M NAVIGATION EQUIPMENT

Navigation equipment CH-3101M is designed for use on ships and riverboats for convenience determination of navigation parameters of movement by the signals of global navigation satellite systems GLONASS / GPS/SBAS in absolute mode and in differential mode.

	Dimensions, mm: 218 x 187 x 89
	Power supply, V: DC 10-30
	Onboard memory, Gb: 16
	Weight, kg: 3



Main Specifications:

quantity of receiving channels	32
positional accuracy	10 m
velocity accuracy	0.2 knot
Operating temperatures	from minus 10 °C to plus 50 °C
display, touch screen SAW	color, graphics, liquid crystal



CH-4003 AUTOMATED COMPLEX OF SECRET SERVICE

Automated complex of secret service of CH- 4003 - intended for the navigation providing and determination of coordinates of points (reference-points, targets) on terrain. A complex provides the measuring of distance to the objects (aims) and determination of directions on them.

Main Specifications:

range of measuring of distances	from 145 to 10000 m
accuracy of measuring of distances	±10 m
corner of eyeshot in the mode of exposure	from 1° to 11° (6,7°)
time of realization of calculations	real time
time of readiness to the next measuring	5 s

UM 321001

LOWNOISE TRANSISTOR AMPLIFIERS

Microwave modules UM 321001 employed with in receiver determination and accompanying channels of ZRC "OCA" instead vacuum devices YB-67,YB-75. Modules secure 30% increase in distance of finding and escorting small-dimensions targets.



	Operating frequency band, MHz: 14280-15790
	Pulse power capacity at input, W: 100
	Power voltage, V: ±12
	Weight, g: 1,0

Main Specifications:

Transmission factor, dB	33-39
Irregularity of transmission factor, dB	3,0
Noise factor, dB	3,0
Rate of adjustment of transmission factor (time-varied gain control) TVGC, dB	23
Service life, hrs	10000



Main Specifications:

Maximum Attenuation, dB	30
Start Attenuation, dB	1,0

M34702 P-I-N ATTENUATOR

P-i-n Attenuator M34702
(M34713) Coaxial waveguide controller attenuator
designated for controlling the VHF-signals within
waveguide leads in radar "Kolchuga" and air
defence missile complex "Tor".

	Operating Frequency Range: CENTIMETER
	Power Input, W, not more than: 2,5
	Control Current, mA: 100
	Weight, g: 160

UA КИУ-7

MULTIBEAM PULSED AMPLIFYING KLYSTRON

Pulse klystron UA КИУ-7 intended for receiving of powerful amplifying signal in transmitter of RLS 79K6, 80K6.

Main Specifications:

Heating Voltage, V	12,6
Cathode Voltage, kV	15-20
Voltage of Control Electrode, kV	4,0-6,0
Power Input, W	2
Cathode Current, pulse, A	30
Heating Current, A	6,0-8,0

 Dimensions, mm:
600x230-307

 Weight, kg:
50



Main Specifications:

Heater voltage, V	12 - 14,7
Pulse cathode voltage, kV, not exceeding	50 - 55
Input power at pulse, kW	5 - 50
Output power at pulse, kW	355 - 525
Heater current, A	4 - 6
Cathode pulse current, A	19 - 24

UA КИУ-5

PULSE AMPLIFIER KLYSTRON

Pulse amplifier klystron of centimeter waveband. The devices have magnet-equipped cabinets and are metal/ceramics type. The cooling type is compulsory, done by liquid.

 Dimensions, mm:
256 x 870

 Weight, kg:
35

КГ-3Р, КУ-137Р, КИУ-43Р

KLYSTRONS

Restoration repair of generator-converter amplifier chain of klystron including КГ-3Р, КУ- 137Р, КИУ-43Р for making up into S-300 PS Missile System. Klystron КИУ 43Р-pulsed amplifier device of packaged and metal-ceramics type, input and output waveguide type, compulsory cooling by liquid (resonator and collector) and air (cathode) cooling, Operated on fixed frequency. Klystron КИУ- 43Р - operated with intermediate converter-amplifier pulsed klystron KY-137Р, packaged, metal-ceramics type with compulsory cooling by liquid. Klystron КГ-3Р-generator of continuous signal, fixed frequency.



МІ-119

MAGNETRONS



Average capacity pulse magnetrons with precision tuning mechanism able to be re-tuned to any of the fixed preprogrammed cm-waveband frequencies. Employed within portable radars.

Main Specifications:

Waveband, MHz	830-882
Heater voltage, V	6-8
Heater current, A	12-16
Anode voltage, kV	23
Anode pulse current, A	22-32
Readiness time, sec	120

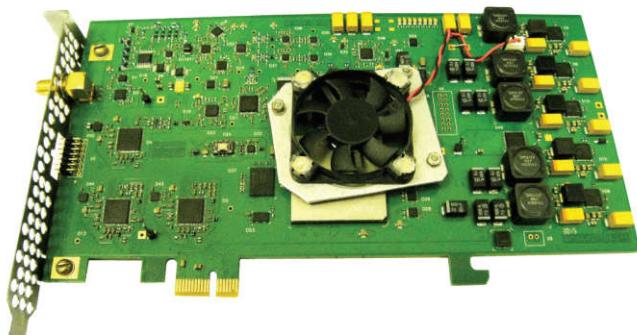
Dimensions, mm:
330 x 270 x 120

Weight, g:
7 000

DEMODULATOR

The demodulator was created and designed for functioning as a component part of a data receiving station from Earth Observation Satellites.

	Input frequency range, MHz: 270...1100
	Transmission data rate, Mbit/s: 1...500



Main Specifications:

modulation type	BPSK, QPSK, (S/O)QPSK, UQPSK, AQPSK, 8PSK
decoding type	convolutional (Viterbi algorithm), scrambling, differential
input signal frequency rate of change	up to 10 kHz/s (Doppler)
input signal level	minus 50...minus 10 dBm
data rate interface	PCI Express

DATA RECEIVING STATION OF EARTH REMOTE SENSING



The ground receiving station meets the modern requirements and provides:

- automated choice of station operating mode;
- data receiving possibility from satellites with different characteristics of the X-band downlink with the speed up to 500 Mbit/channel;
- operational retuning on different satellites;
- operational control and diagnostics of station work;
- check of received data availability and quality received data ingestion, decompression and visualization.

INFRARED EARTH IMAGER

The long-wavelength infrared (LWIR) Earth imager is designed to produce digital images of an Earth surface in long-wavelength infrared range. To provide high technical characteristics in the imager the photonic detector with cooling based on solid solutions of cadmium telluride and mercury is used (under development).

	Spectral range, μm : 7,5 – 9,0
	Power consumption, W: 30
	Weight, kg: 15



Main Specifications:

pixel projection in nadir at the orbit 690 km	96 m
frame area	61×49 km
noise equivalent temperature difference (NETD)	35 mK
cooling method	Stirling microrefrigerator

MULTIBAND EARTH IMAGER



The multiband Earth imager is designed to produce panchromatic and multispectral images of an Earth surface with resolution 2.0 m and measure of survey objects radiance. In order to improve image quality in the imager is used the photodetector array with the time delay integration mode.

	Power consumption, W: 65
	Weight, kg: 30

Main Specifications:

spectral channels range:	
- panchromatic	0,45 - 0,8 μm
- blue	0,45 - 0,51 μm
- green	0,52 - 0,59 μm
- red	0,63 - 0,69 μm
- near infrared	0,77 - 0,90 μm

RADAR, RADIO COMMUNICATION AND
AIR DEFENCE SYSTEMS

CATALOGUE
NOTEBOOK

State Enterprise Specialized Foreign Trade Firm
PROGRESS



30 YEARS
IN GLOBAL ARMS MARKET



CATALOGUE
NOTEBOOK

RADAR, RADIO COMMUNICATION AND
AIR DEFENCE SYSTEMS



State Enterprise Specialized Foreign Trade Firm

PROGRESS



30 YEARS
IN GLOBAL ARMS MARKET

