AERODRON ORKUS

Territorial intelligence and security system

Date: April 6, 2020

STRUCTURE OF THE ORKUS COMPLEX

UNMANNED AERIAL VEHICLE - UAV

UAV of converter plane type with four or eight-engine circuit of power plant

PAYLOAD GSP, MODEM, CARGO CONTAINER

The UAV payload includes a communication channel with telemetry, control and video signal transmission range up to 80 km, as well as an optical-electronic system - gyro stabilized suspension (GPS) to provide aerial photography or container for cargo transportation.

GROUND STATION (GS) - MODEM, MAST, REMOTE CONTROL, CENTER

Control center on cross-country chassis for 24-hour duty to mission area or portable kit for short-term operations

UAV INCLUDED IN THE ORKUS COMPLEX

1. BASIC VERSION

Designed for cargo transportation (for payload installation also) with a weight of up to 2.5kg for a distance of up to 120 km.
Number of engines: 4 pcs.

2. VERSION WITH INCREASED FUEL TANK

Designed for cargo transportation (for payload installation also) with a weight of up to 5 kg for distances of up to 200 km
Number of engines: 8 pcs.

3. VERSION WITH LIFTING UP TO 7 KG

Designed for cargo transportation (for payload installation also) with a weight of up to 7kg for a distance of up to 120 - 150km.
Number of engines: 8 pcs.

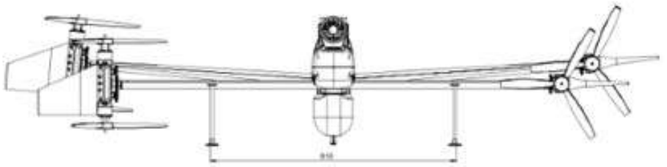
4. VERSION WITH LIFTING UP TO 12 KG

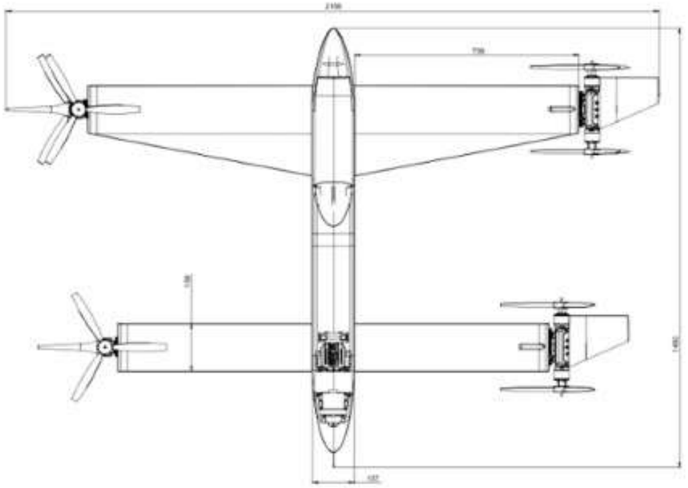
Designed for cargo transportation (for payload installation also) with a weight of up to 7kg for a distance of up to 120 - 150km.
Number of engines: 8 pcs.

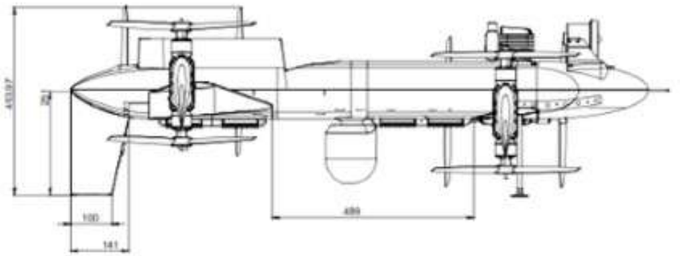
COMPARATIVE TABLE OF UAV

COMPARATIVE TABLE

Version	Basic	The increased tank	Lifting up to 7 kg	Lifting up to 12 kg
Wingspan, m	2,1	2,1	2,1	2,1
Payload, kg	2.5	5	7	12
Maximum take-off weight, kg	23	29	30	30
Power of engines, W	4 x 2000	8 x 2000	8 x 2000	8 x 2000
Generator power, W	2500	3500	3500	3500
Speed, km/h	0-120	0-120	0-120	0-120
Cruiser speed, km/h	90	105	100	95
Flight duration, h	1.5	3.5	1,5	1
Flight altitude, m	up to 2000	up to 2000	up to 2000	up to 2000
Distance, km	120	200	90	90







THE GYROSTABILIZED PLATFORM - GSP

Parameter	GSP-K921
Diameter of "sphere"	115 mm
Height	130 mm
Weight	1000 g
Camcorder	Tamron MP1110M-VC
Thermal imager	S7IR with lens Ophir 20mm
Resolution of the thermal imager	384×288 / 640x480
High resolution camera	Progressive scan, 1280x720
Resolution of the observed frame	Progressive scan, 720x576
Zoom	10x – optical, до 20x – digital
GSP management	Ethernet
Characterization of mechanical axes	2 axis of rotation - 360 degrees
Third axis	Available
Gyrostabilization accuracy	Not worse than 0.02 degrees

Parameter	GSP-160
Diameter of "sphere"	160 mm
Height	220 mm
Weight	1000 g
Camcorder	Panasonic GP-MH330 or the same
Thermal imager	S5IRC-4272
Resolution of the observed frame	Progressive scan, 720*576
High resolution camera	1280*720
Zoom	30x
Resolution of the thermal imager	640*480 Progressive scan
GSP management	Ethernet
Characterization of mechanical axes	2 axis of rotation - 360 degrees
Third axis	Available
Gyrostabilization accuracy	Not worse than 0.02 degrees

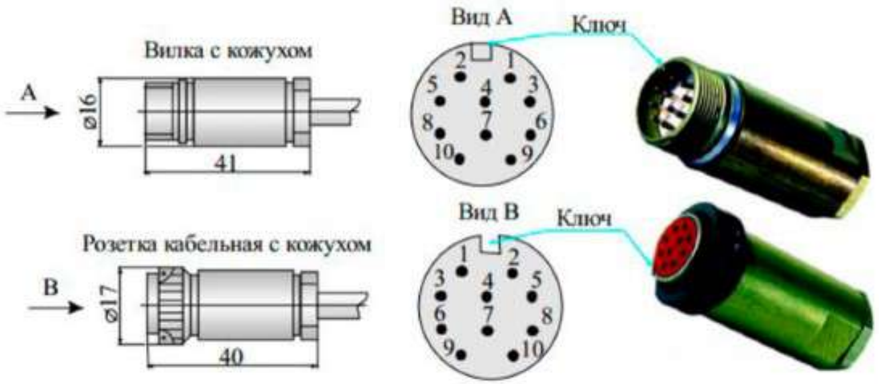
GSP-K921

GSP-160

THE GYROSTABILIZED PLATFORM - GSP

Parameter	ГСП-92
Diameter of "sphere"	110 mm
Height	127 mm
Weight	720 g
Camcorder	Tamron MP1110, MC-108
High resolution camera	Progressive scan, 1280x720
Resolution of the observed frame	Progressive scan, 720x576
Zoom	10x – optical, up to 20x – digital
GSP management	Ethernet
Characterization of mechanical axes	2 axis of rotation - 360 degrees
Gyrostabilization accuracy	Not worse than 0.02 degrees
Image stabilization	Available

GSP CONNECTOR WIRING- PC10TB



COMMUNICATION LINKS - SDR MODEM

COMMUNICATION CHANNEL FOR TELEMETRY, CONTROL AND VIDEO TRANSMISSION

The digital modem 3D Link is based on OFDM technology, capable of generating signals with high spectral efficiency and signals with spread spectrum, which provides information speed up to 64 Mbps in the video channel, as well as excellent noise immunity in the command-telemetry channel.

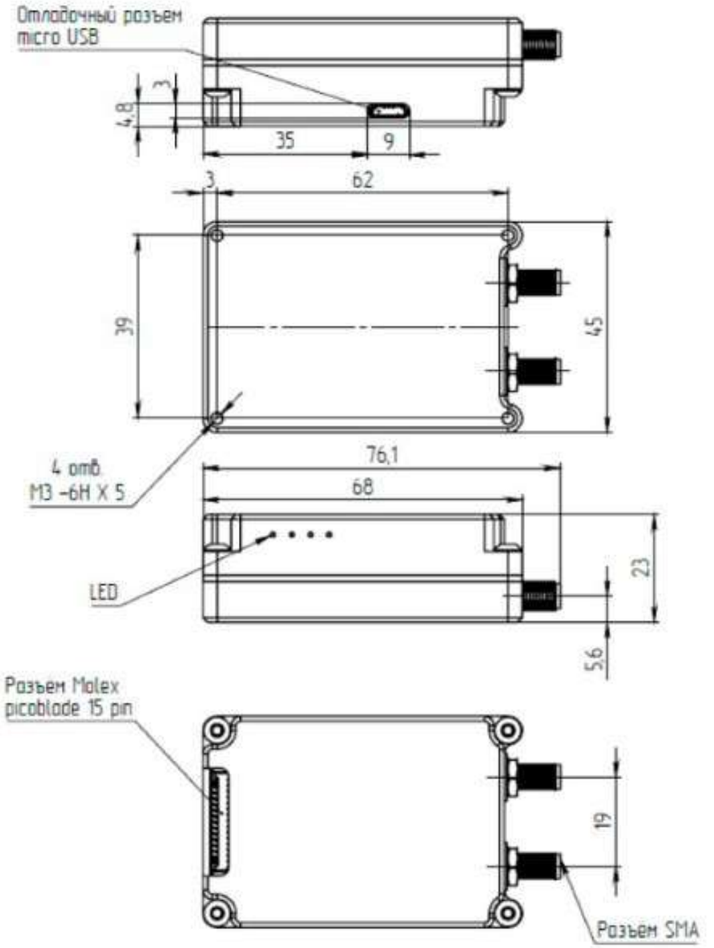
The video channel is connected via Ethernet interface, command/telemetry link via Ethernet, RS232 or CAN interfaces.

3D Link supports work in network configurations of point-to-point, point-to-many points, relaying.

Supports adaptive control of transmitter power. Special algorithms to suppress narrowband and pulse interference. Measuring the range between transmitter and receiver.

IP packet routing support. Extremely small dimensions and weight. Video 6.1 Mbps control/telemetry channel 85 kbps at drone flight altitude 50 m: up to 20-40 km in video channel and up to 33-50 km in control channel.

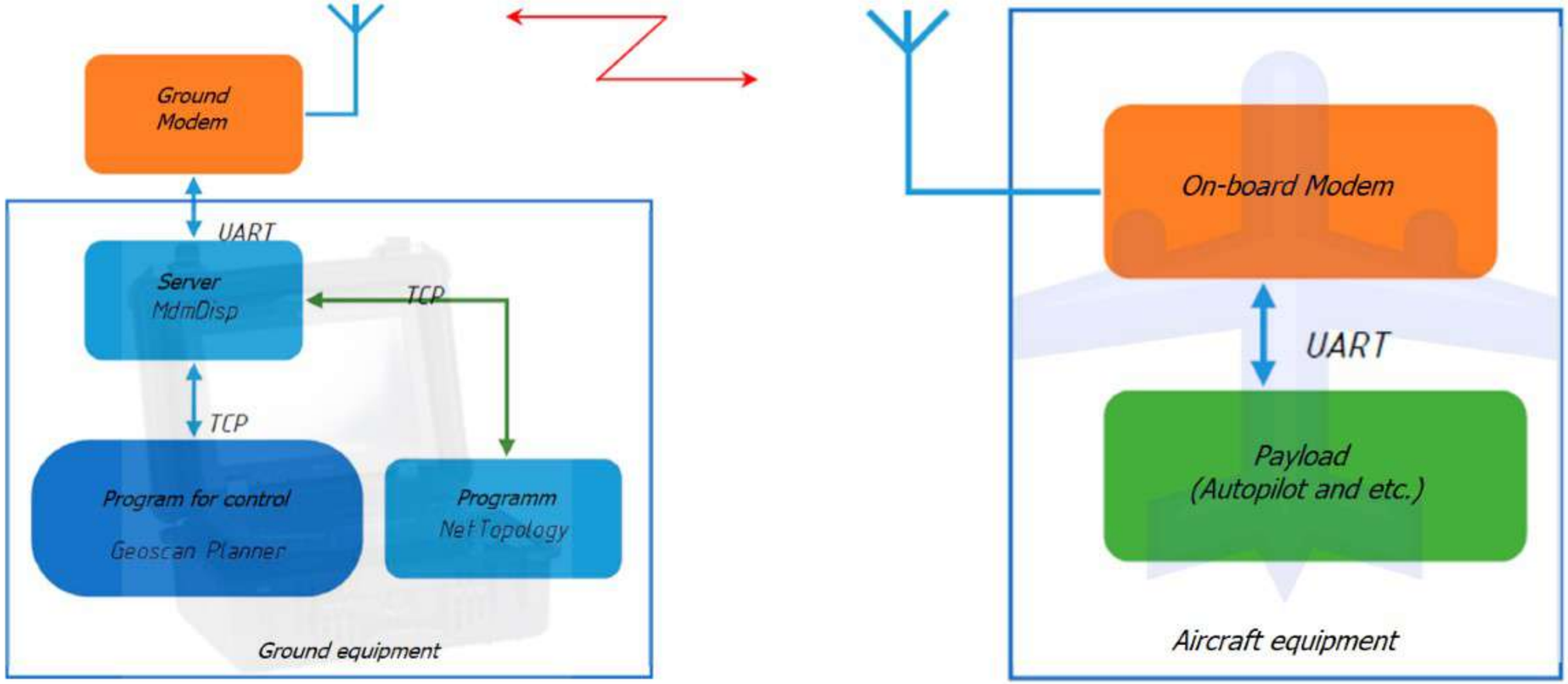
MODEM SDR



METHOD OF MODEM SDR WORK

ON-BOARD AND GROUND MODEM INTERACTION DIAGRAM

Aircraft radio modem receives data from ground radio modem and transmits it to connected payloads via UART interfaces. No more than 5 payloads can be connected to the onboard modem. Received data from payloads is transmitted by aircraft radio modem to ground radio modem. Ground radio modem receives data from on-board radio modem and transmits it to MdmDisp Server. Data received from Server MdmDisp to ground radio modem are transmitted to aircraft radio modem.



GROUND STATION - PLACEMENT VARIATIONS

STATIONARY COMPLEX

Includes control station, external set of masts and automatic charging and all-weather station of UAV, which provides 24-hour standby duty of drone without additional adjustment before take-off

MOBILE VEHICLE COMPLEX

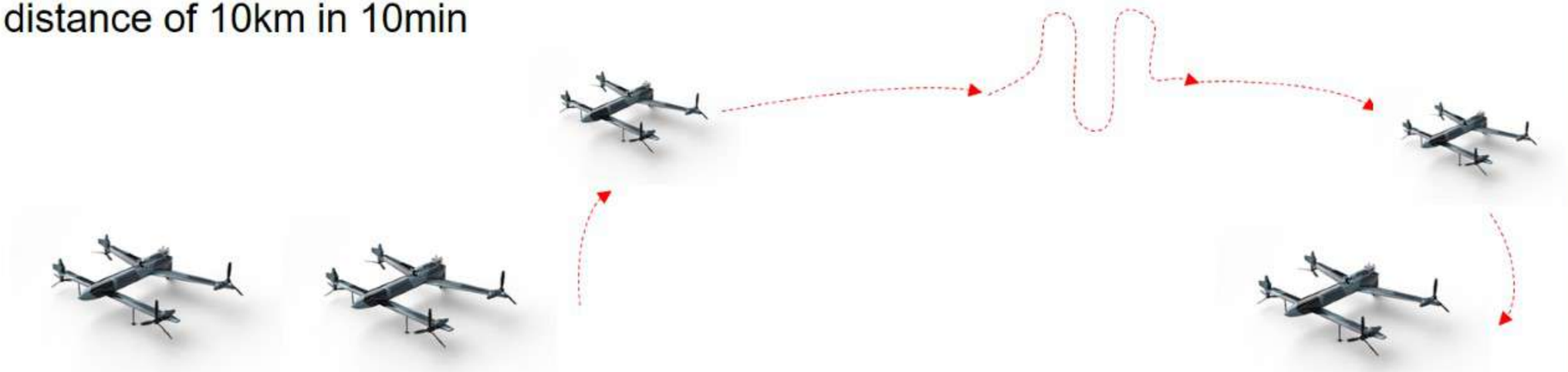
The control center is located on the landing gear, the mast is installed on special brackets, and the launch and landing of the UAV can be a retractable platform

MARCHING MOBILE COMPLEX

The control center is a protected case with a laptop or tablet, the mast is placed on tripods and, as a platform for the launch of the UAV, is portable.

WORK OF ARCUS COMPLEX

Script goal: Provide observation of the object by the specified coordinates at the distance of 10km in 10min



Preparation	**Expectation**	**Receiving**	**Vertical take-off**	**Flying into a given square**	**Target detection**	**Return to Base Landing**
Testing of the complex 15 min 1 times a day	24 hour Observation Coordinate commands	Commands of coordinates of observation Warm up 2 min Define route	Access to preliminary square route 2 min	route correction 6 min 10 km	Maneuvering escort 60 min	Landing of 15 min

After obtaining coordinates of the specified visual tracking place, within 10 minutes, deliver the controlled observation drone to the specified point at a distance of 10 km from the stationary or mobile complex.

SCOPES OF APPLICATION OF ORKUS SYSTEM

SPECIAL TASKS

INDUSTRIAL OBJECTS

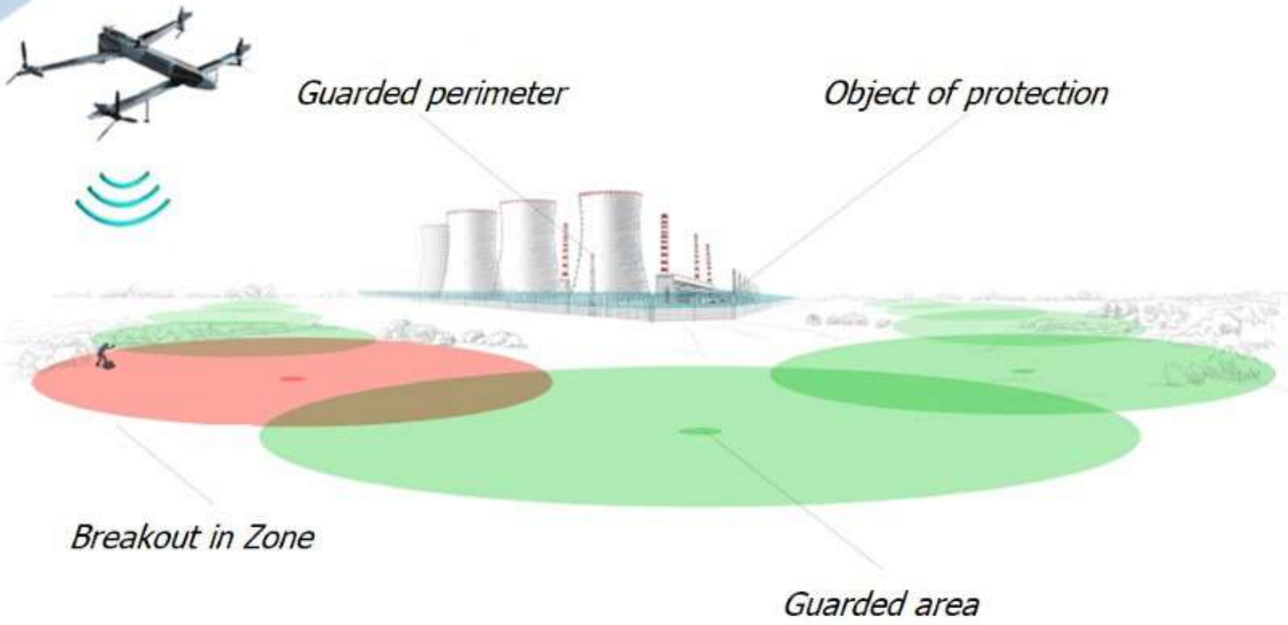
Observation of territories adjacent to particularly important industrial facilities - nuclear power plants, large chemical industries, closed administrative and territorial entities.

PRIVATE PROPERTIES

Monitoring of territories in private ownership - the territory of hunting farms, private reservoirs

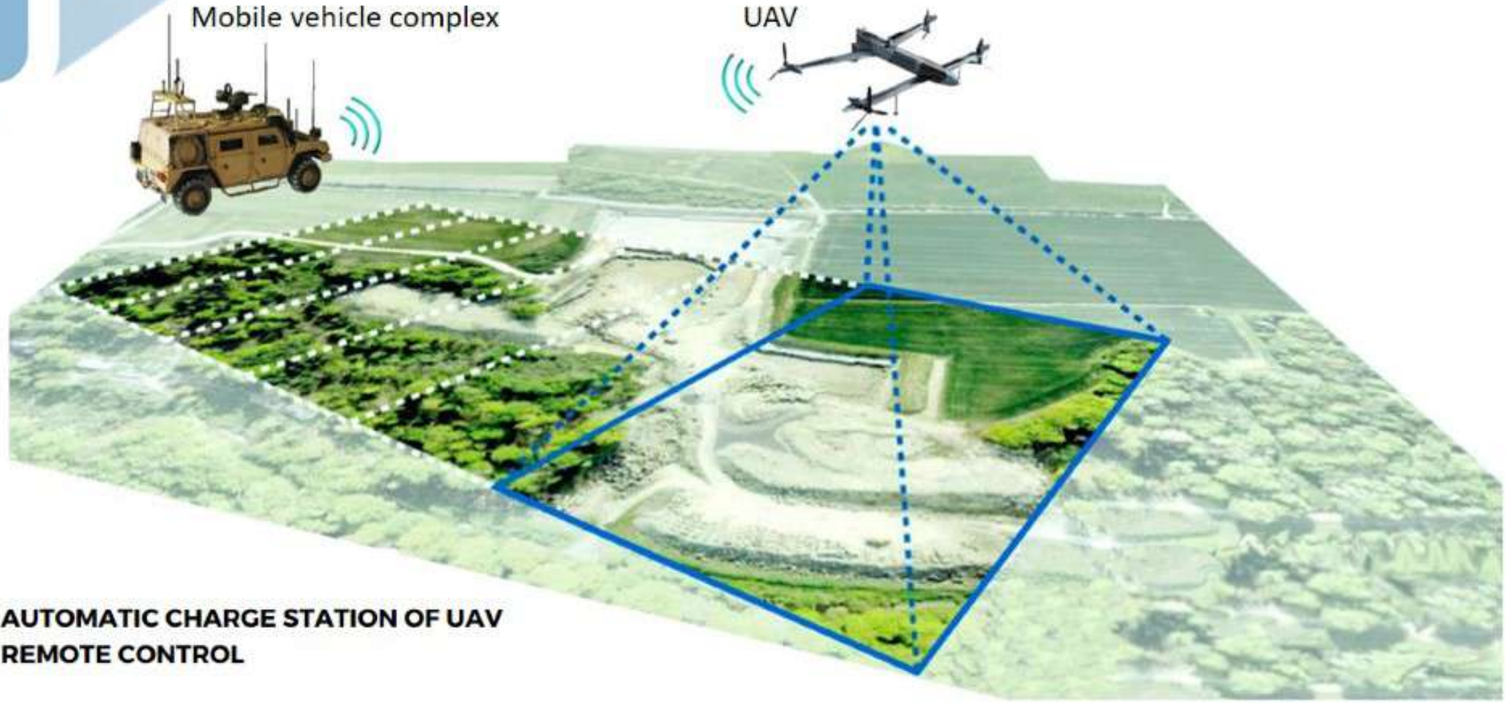
MARINE OBJECTS

Monitoring of ships on port raids to prevent smuggling.



SPECIAL TASKS

- ENEMY SEARCH AND DETECTION
- IDENTIFICATION OF THE OBJECT
- ESCORT OF THE OBJECT
- LOCAL EXPLORATION
- CARGO DELIVERY



AUTOMATIC CHARGE STATION OF UAV
REMOTE CONTROL

OIL AND GAS INDUSTRY

OBJECT MONITORING AND DAMAGE DETECTION

Regular monitoring and evaluation of the technical condition of pipelines, flare pipes, tanks and other technical devices, both in real time and with the help of aerial photographs and videos. Also, analysis near the pipe space and prompt detection of damage such as oil spills, gas leaks.

CONTROL OF WORKS ON OBJECTS AND CARGO DELIVERY

Control of works performance and delivery of cargo to remote production sites, where there is no ground communication in spring-autumn period, as well as in cases when the use of helicopter equipment is not economically feasible

EMERGENCY MONITORING

Identification of unauthorized oil production from pipelines, landfills, taps, work in protected areas, detection of unauthorized persons in protected areas.

RAILWAY TRAFFIC

RAILWAY INTEGRITY CONTROL

Integrity monitoring of railway tracks and roadside tracks

ROAD SITUATION CONTROL AND MONITORING

Roadside monitoring, accounting and monitoring of roadside infrastructure

DETECTION AND TRACKING OF INTRUDER

Detecting and fixing intruders

ENERGY AND COMMUNICATION

CONTROL OF POWER LINES

Power line monitoring

WIRELESS COVERAGE MONITORING

Wireless network coverage quality monitoring

RELAYING

Relaying radio signals of communication systems - ensuring the prompt transmission of radio signals over the radio horizon line from the source to the consumer in areas with no wire, radio relay and other types of communication.

ROAD TRAFFIC

Accident and Crash

Detection of the accident site, transmission of video information about the situations to the emergency response service.

CONTROL AND MONITORING OF ROADS AND THE ROAD SITUATION

Aerial photography of roads and roadside conditions, accounting and monitoring of roadside infrastructure

DETECTION AND TRACKING OF INTRUDER

Detection and escort of the offender to the place of forced stop and detention

SEARCH AND RESCUE WORKS

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WILDFIRES

TECHNOGENIC INCIDENTS

NATURAL CATACLYSMS

Monitoring, detection and coordination of ground groups actions in emergency case.

Search and rescue is the search for and provision of aid to people who are in distress or imminent danger. The general field of search and rescue includes many specialty sub-fields, typically determined by the type of terrain the search is conducted over.

INDUSTRIAL AND ENVIRONMENTAL MONITORING

POACHING

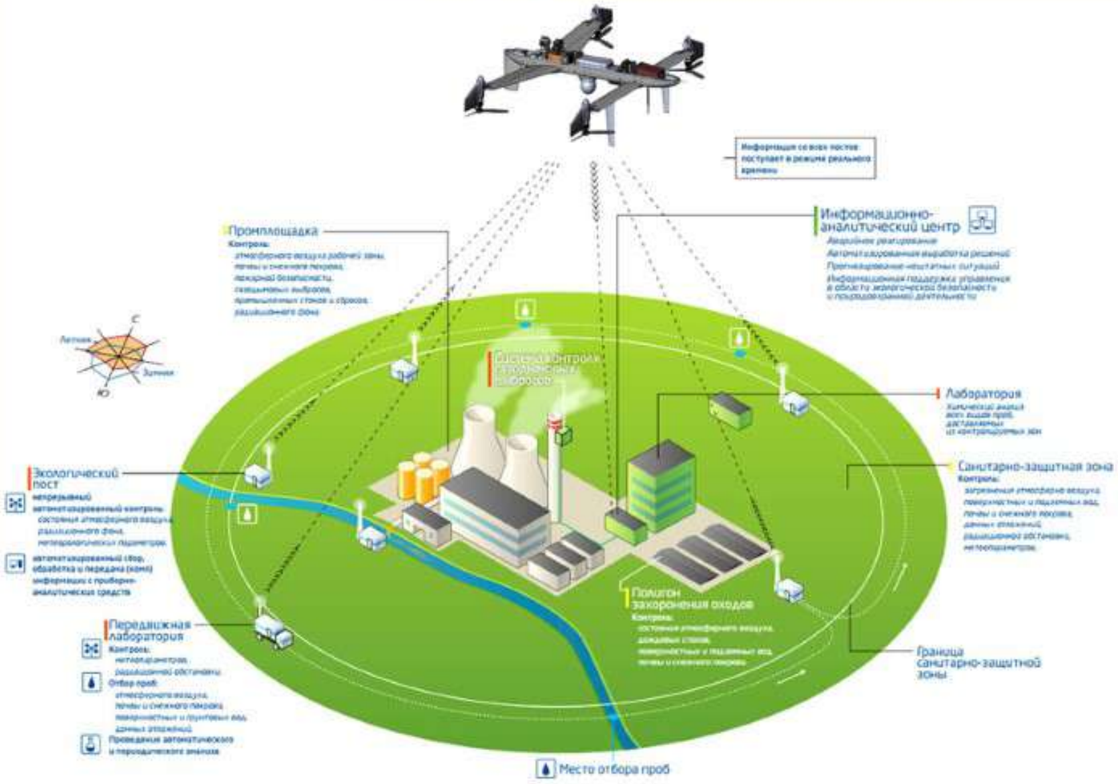
Detection and fixing of violations

MONITORING AND FIRE DETECTION

Fire spot detection and ground group coordination

DETECTION OF CONTAMINATION AND DETECTION OF VIOLATORS

Detecting and fixing intruders



MAPPING AND GEOPHYSICAL RESEARCH

ICE AREA EXPLORATION

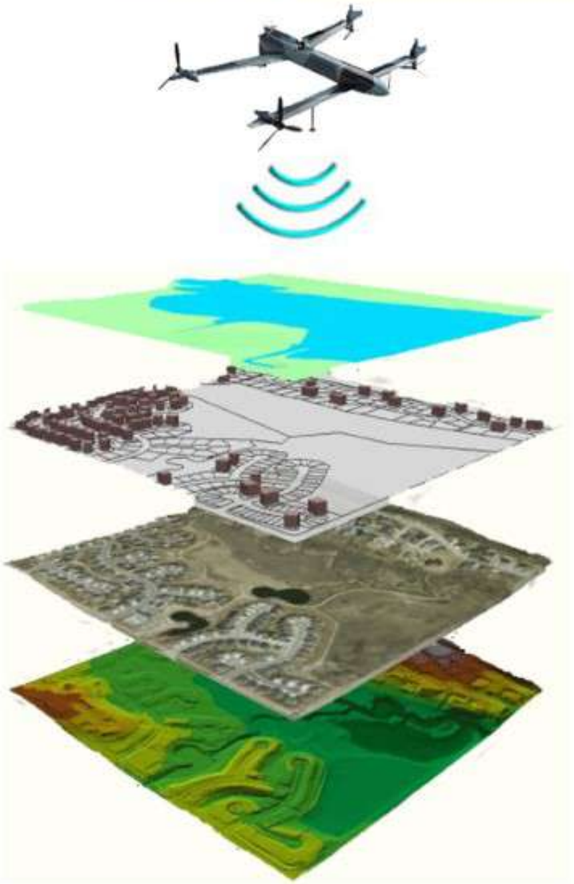
Monitoring of ice fields in water areas in order to determine the age of ice, the direction and speed of drift, the position and values of breeding and etc.

AERIAL PHOTOGRAPHY AND MAPPING OF PLACES OF USEFUL FOSSILS

Accounting and monitoring of land plots, support for land surveying tasks, determination of sizes, locations and other characteristics of land plots

SUPPORT FOR DESIGN AND EXPLORATION WORKS

Support for exploration and design work on the ground



COMPETITORS

The Kalashnikov concern (enters into Rostec) began to use UAV (ZALA AERO GROUP) for monitoring of pipeline systems according to joint projects with the largest Russian companies of the oil and gas industry.

UAV Supercam allows the aircraft to be considered a bright representative of multifunctional unmanned systems used for surveillance and reconnaissance tasks, protection of oil and gas pipelines, military bases, state border, convoys. Supercam S350 is indispensable as an UAV for emergency elimination rescue and search operations.

The unmanned aircraft Cyberhawk has quite compact dimensions and has a small mass, which allows it to be easily transported to the place of direct operation, in particular, at the valley and width of the device of 50 centimeters, the UAV has a mass of 2.5 kilograms.

ZALA AERO GROUP

unmanned
Беспилотные системы

CYBERHAWK

COMPETITIVE ADVANTAGES

Maneuverability

Due to vertical take-off and landing of UAV as part of "ORKUS" complex there is no need for runway and catapult

Time

Response time of "ORKUS" complex and speed of UAV landing to the destination is significantly less than any model of squaropter included in different systems

Multitasking

The "ORKUS" complex can be deployed on different platforms depending on the specific task, and the UAV in the complex can be equipped with different payloads and increased fuel tank, depending on the your purpose

Price

Pricing of “ORKUS” complex has a tangible advantage over competitors

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