



ZALA AERO GROUP
UNMANNED SYSTEMS



**KALASHNIKOV
GROUP**



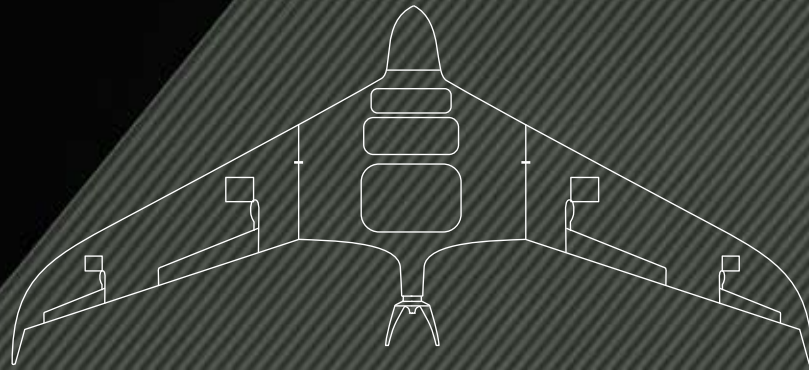


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Wingspan 5300 mm

ZALA 421-16E5

SPECIFICATIONS OF UAV, EQUIPPED WITH ELECTRIC PROPULSION

Operating range	100+km
Endurance	5-7 h
Wingspan	5300 mm
Maximum flight altitude	3600 m
Launch	Pneumatic launcher
Landing	Parachute and air damper
Engine type	Electric propulsion system
Speed	65-110 km/h
Maximum takeoff weight	29,5 kg
Payload weight	up to 5 kg
Payloads	Type 16E+ /Type 16E5
Permissible wind speed	up to 15 m/sec
Operating temperatures range	-40 C...+50 C
Navigation	inertial navigation system with SNS correction (GLONASS/GPS), radio distance finder

ZALA 421-16E5 is a flagship of ZALA AERO product range. All main systems, responsible for flight safety, are duplicated in this system.

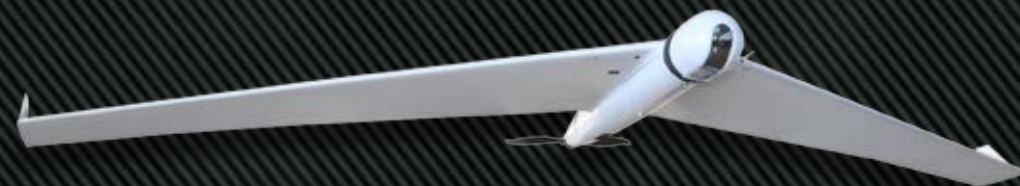
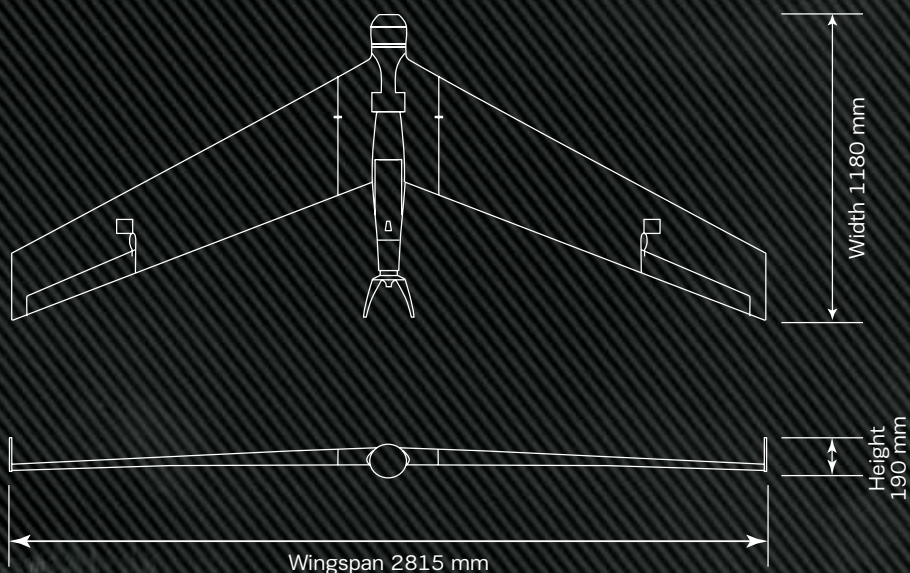
UAV dimensions and loadlifting capacity allow to install additional equipment up to 5 kg together with provided payloads. UAV is launched from unprepared pads by a launcher based on a trailer, and lands in any target point of a region using parachute and air damper.

ZALA 421-16E5 system is designed for electrooptical ground reconnaissance during daytime and at night, patrolling long spans of state borders, aerial photography of underlying surface, target detection, fire adjustment, rebroadcasting radio signals, communications surveillance, providing information to ground forces by personal devices of position control and communication.

SPECIFICATIONS OF UAV, EQUIPPED WITH COMBUSTION ENGINE

Operating range	100+km
Endurance	12-20 h
Wingspan	5300 mm
Maximum flight altitude	5000 m
Launch	Pneumatic launcher
Landing	Parachute and air damper
Engine type	Combustion engine
Speed	90-140 km/h
Maximum takeoff weight	29,5 kg
Payload weight	up to 5 kg
Payloads	Type 16E+ /Type 16E5
Permissible wind speed	up to 15 m/sec
Operating temperatures range	-52 C...+40 C
Navigation	INS with SNS correction (GLONASS/GPS), radio distance finder





ZALA 421-16E

The system is designed for electrooptical reconnaissance within 50 km from the target at any time of day or night with two live video streams. The UAV solves the tasks that require aerial reconnaissance in mountainous regions, tracking of ground forces and equipment displacement, recognition of objects on complicated areas, aerial photography, fire adjustment. Confirmation or denial of operational information, reception of certain enemy information such as: precise location, strength, routes and schedule of displacement.

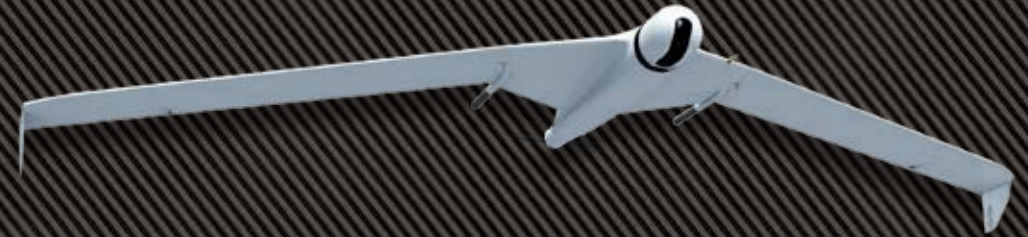
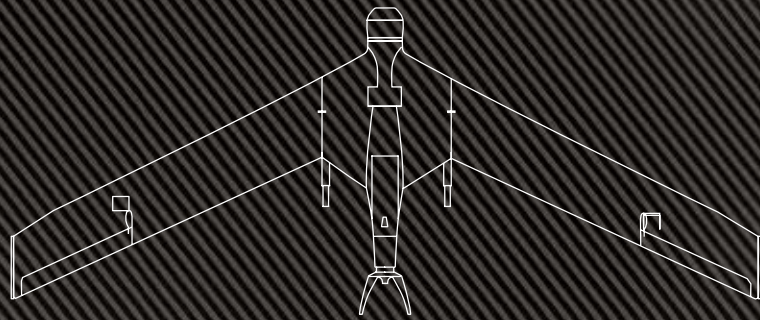
The obtained information allows to choose the proper methods to neutralize the enemy.

UAV, equipped with dual-frequency GPS receiver and camera of 16E type, provides the best positional accuracy of a ready photomap that allows to plan the special-forces raids according to up-to-date cartographic information.

SPECIFICATIONS

Operating range	50 km
Endurance	more than 4 h
Wingspan	2815 mm
Maximum flight altitude	5000 m
Launch	Pneumatic/mechanic launcher
Landing	Parachute and air damper
Engine type	Electric
Speed	65-110 km/h
Maximum takeoff weight	10 kg
Payload weight	up to 1,5 kg
Payloads	Type 16E+
Permissible wind speed	up to 15 m/sec
Operating temperatures range	-40 C...+50 C
Navigation	INS with SNS correction (GLONASS/GPS), radio distance finder





ZALA 421-16E2

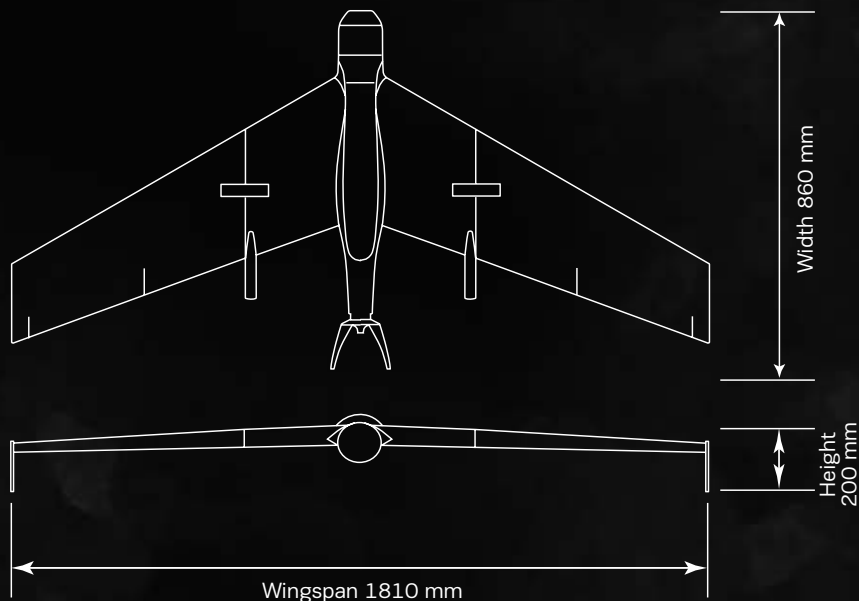
ZALA 421-16E2 is one of the recent developments in the field of unmanned aircraft equipment. The UAV allows to complete a wide range of tasks, such as: electrooptical reconnaissance during daytime and at night, aerial photography of a region, target detection, fire adjustment, rebroadcasting radio signals, providing information to ground forces by personal devices of position control and communication. A distinct feature of this unmanned aircraft vehicle is the minimal installation time and the maximal endurance in comparison with other UAVs of the same class. UAV is launched by elastic catapult. UAV lands using parachute and air damper that protects payload and fuselage from possible damages during landing.

Flight duration up to 4 hours allows to make full use of new type payloads: video camera with 60x zoom, new thermal imaging camera with 60 mm lens that captures images in infrared band. Silent mode gives a possibility to explore a region on low altitudes without risk of visual or acoustical disclosure of UAV.

SPECIFICATIONS

Operating range	30 km
Endurance	4 h
Wingspan	2800 mm
Maximum flight altitude	5000 m
Launch	Elastic catapult
Landing	Parachute and air damper
Engine type	Electric
Speed	65-110 km/h
Maximum takeoff weight	7,5 kg
Payload weight	up to 1,5 kg
Payloads	Type 16E+
Permissible wind speed	up to 15 m/sec
Operating temperatures range	-40 C...+50 C
Navigation	INS with SNS correction (GLONASS/GPS), radio distance finder





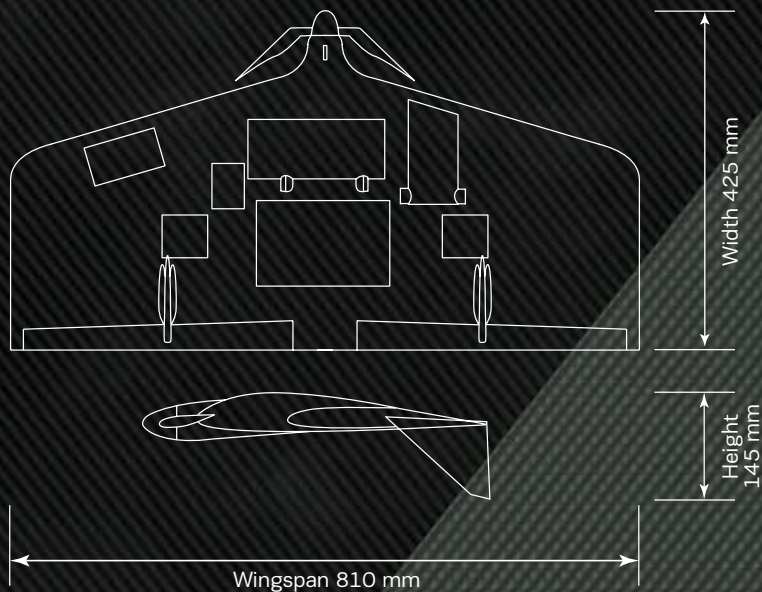
ZALA 421-16EM

The main advantage of the aircraft vehicle is a preservation of high properties at significantly reduced dimensions. Launch safety is increased by handles, which are built-in the UAV body. The UAV is designed for electrooptical reconnaissance within 25 km from the target at any time of day or night, and transmits two live video streams. The UAV solves the tasks of operational reconnaissance at a distance of few kilometers from basing site that ensures security of personnel and equipment. The UAV enables aerial photography at low altitudes. The UAV provides monitoring of the necessary area, safety of searching team during inspection of the enemy, disclosure of attempt to escape during blocking the area.

SPECIFICATIONS

Operating range	25 km
Endurance	2,5 h
Wingspan	1810 mm
Maximum flight altitude	4000 m
Launch	Elastic catapult
Landing	Parachute
Engine type	Electric
Speed	65-110 km/h
Maximum takeoff weight	6,5 kg
Payload weight	up to 1 kg
Payloads	Type 16E+
Permissible wind speed	up to 15 m/sec
Operating temperatures range	-40 C...+50 C
Navigation	INS with SNS correction (GLONASS/GPS), radio distance finder





ZALA 421-08M

The UAV provides exceptional reliability, serviceability, silent operation, invisibility and best payloads in comparison with other UAVs of the same class.

The UAV does not require any specially prepared launching and landing pads, performs aerial reconnaissance in all-weather conditions and at any time of day or night.

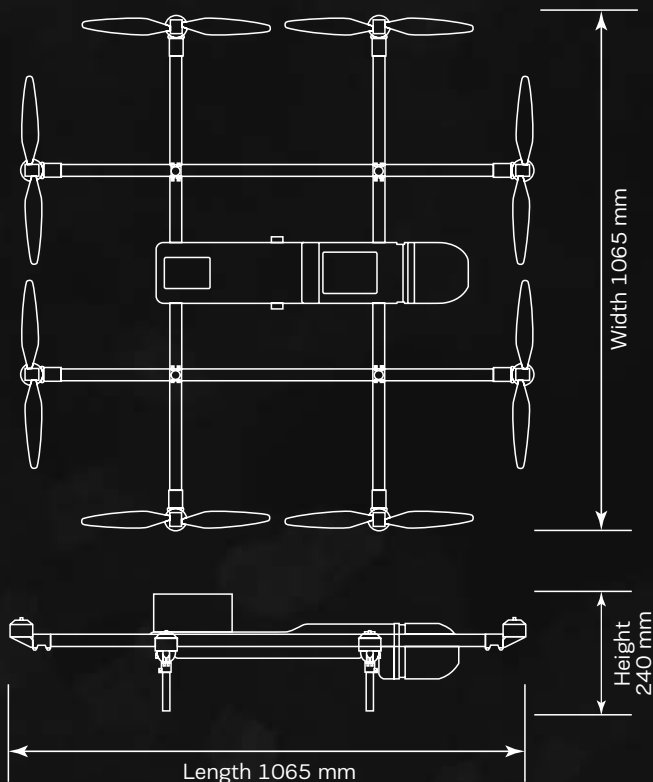
Its light weight allows to launch it from hands without using a catapult, that makes it irreplaceable for tasks that require a concealed presence.

The main tasks of this model: reconnaissance of enemy's objects, which are opened or concealed, stationary or moving, based on the ground or above water. Revision of areas, occupied by enemy. Fire adjustment, target damage definition. Specification of weather and geographical characteristics of military operations areas. Control of military forces position, condition and concealment. Execution of search and rescue activities.

SPECIFICATIONS

Operating range	15 km
Endurance	80 min
Wingspan	810 mm
Maximum flight altitude	4000 m
Launch	Elastic catapult
Landing	Parachute/into a net
Engine type	Electric
Speed	65-130 km/h
Maximum takeoff weight	2,5 kg
Payload weight	up to 300 g
Payloads	Type O8M
Permissible wind speed	up to 20 m/sec
Operating temperatures range	-52 C...+50 C
Navigation	INS with SNS correction (GLONASS/GPS), radio distance finder





ZALA 421-22

This UAV does not require any specially prepared launching and landing pads, that makes it irreplaceable for aerial reconnaissance in populated localities. UAV ZALA 421-22 is successfully operated at any time of day or night and applied for objects searching, safety control of regions within 5 km radius.

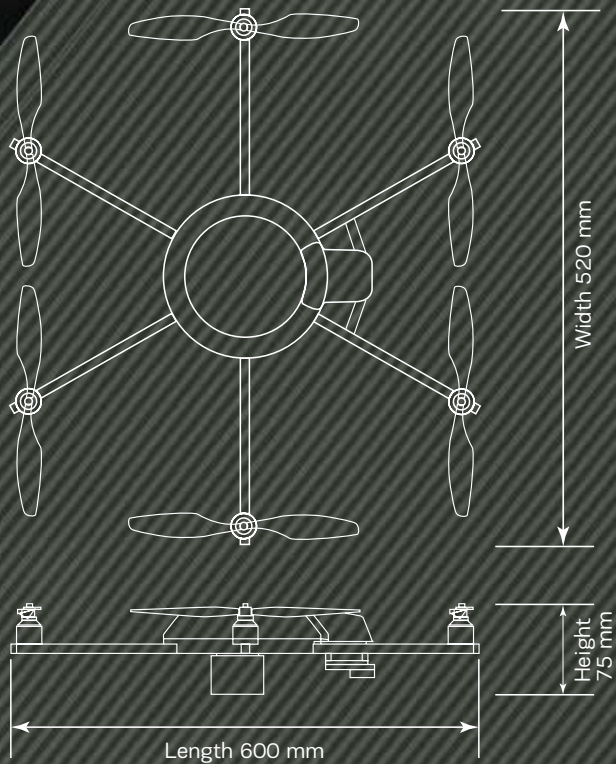
Bearing capacity of the UAV enables to deliver loads weighing up to 2 kg.

“Tethered” configuration enables to monitor the environment during 4 hours.

SPECIFICATIONS

Operating range	5 km
Endurance	35 min
Dimensions	1065x1065x240 mm
Construction	folding framework
Maximum flight altitude	1000 m
Launch	Automatic
Landing	Automatic
Engine type	Electric
Speed	up to 30 km/h
Maximum takeoff weight	8 kg
Payload weight	up to 2 kg
Payloads	Type 16E+
Permissible wind speed	up to 10 m/sec
Operating temperatures range	-40 C...+50 C
Navigation	(GLONASS/GPS), radio distance finder





ZALA 421-21

Compact, easily operated unmanned hexacopter. Vertical takeoff and landing allow to successfully apply this UAV for aerial reconnaissance in regions, where are no conditions, suitable for plane-type UAV's launch and landing. The UAV is intended to be operated in urban areas, monitor public events, detect illegal activities in the area of responsibility, provide security of perimeter within 2 km radius at any time of day or night. The system is placed in a portable container, that allows to equip dismantled groups with it.

SPECIFICATIONS

Operating range	2 km
Endurance	40 min
Dimensions	600x520x75 mm
Maximum flight altitude	1000 m
Launch	Automatic
Landing	Automatic
Engine type	Electric
Speed	up to 30 km/h
Maximum takeoff weight	1,5 kg
Payload weight	up to 300 g
Payloads	Type 21
Permissible wind speed	up to 10 m/sec
Operating temperatures range	-40 C...+50 C
Navigation	GLONASS/GPS



PAYLOADS

TYPE «16E5», «16E+»

- 1 Z-16E5BK/ИК/Л2 is a gyro-stabilized HD video camera, two thermal imaging cameras and a laser designator. The video camera is installed on a three-axis gyro-stabilized electromagnetic platform with the resolution of 720*576 pixels and 60x optical zoom or 30x optical zoom for HD and a new mode of higher sensibility (V2) for severe weather conditions or low light conditions. Two thermal imaging cameras (19mm-60mm) with the ability to transmit an image of 640x480 pixels resolution, 12x zoom combined with smooth scaling mode, isotherm, digital filters and laser designator.
- 2 Z-16BKHD-V3 is a gyro-stabilized HD video camera. The payload is compatible with UAVs of both plane and copter type with a new mode of higher sensibility. The video camera is on three-axis gyro-stabilized platform with resolution of 720*576 pixels or HD camera with 20x optical zoom and 60-x digital zoom.
- 3 Z-16ИК35/ВкЛ-V3 is a gyro-stabilized thermal imaging camera with video camera and laser designator. The payload is compatible with UAVs of both plane and copter type. The thermal imaging camera is on three-axis gyro-stabilized electromagnetic platform with the resolution of 640*512 pixels (35 mm), smooth digital zoom, isotherm mode, built-in digital filters and 8-x digital zoom, combined with video camera of 720*576 pixels resolution and laser designator (up to 1,5 km).
- 4 Z-16Ф2/Вк-V3 is a gyro-stabilized photo camera with a video camera. The payload is compatible with UAVs of both plane and copter type. The photo camera is of 42 MP resolution, central shutter and full frame sensor, combined with two video cameras of 720*576 pixels resolution.
- 5 Z-160/Вк-V2 is an alarm annunciation system with video camera. The payload is compatible with UAVs of both plane and copter type. The alarm annunciation system is remotely controlled, combined with a video camera, transmits voice messages and simultaneously observes the area, transmitting video data of 720*576 pixels resolution in a real time mode.
- 6 Z-16MC-V3 is a multispectral camera. The payload is compatible with UAVs of both plane and copter type. Thermal imaging camera is on three-axis gyro-stabilized electromagnetic platform with the resolution of 640*512 pixels (35mm), smooth digital zoom, combined with a video camera of higher sensibility of 720*576 pixels resolution. It allows to obtain a video signal with superposition of visible and infrared spectrum on one data stream.
- 7 Z-16ИК60/Вк/Л-V3 is a gyro-stabilized thermal imaging camera, video camera and laser designator. The thermal imaging camera is on a three-axis gyro-stabilized electromagnetic platform with the resolution of 640*480 pixels (60 mm), smooth 8x digital zoom combined with smooth scaling mode (V2), built-in digital filters of brightness and contrast (V2), isotherm mode (V3), combined with video camera of 720*576 pixels resolution and laser designator.
- 8 Z-16ИК35/Вк/Л-V3 is a gyro-stabilized thermal imaging camera, video camera and laser designator. The thermal imaging camera is on a three-axis gyro-stabilized electromagnetic platform with the resolution of 640*512 pixels (35 mm), smooth 8x digital zoom, built-in digital filters (V2), isotherm mode (V3), combined with video camera of 720*576 pixels resolution and laser designator.
- 9 Z-16GAMMA/Вк-V2 is a gamma-ray dosimeter with a video camera. The unit of gamma and x-ray detection is remotely controlled, combined with video camera of 720*576 pixels resolution.
- 10 Z-16GAS/Вк-V1 is a gas-analyzer with video cameras. The gas-analyzer of active chemical substances is remotely controlled and combined with video cameras of 720*576 pixels resolution.
- 11 Z-KB/Вк-V2 retranslator of short-wave band. Retranslator of a short-wave band is designed to provide a reliable connection between ground forces at a distance within 40 km and is combined with video camera of 720*576 pixels resolution.



INTERCHANGEABLE PAYLOADS

TYPE «08»

- 12 Z-08MBK/Вк-V4 is a gyro-stabilized video camera. The compact video camera is on two-axis gyro-stabilized electromagnetic platform with the resolution of 720*576 pixels and 4x optical zoom.
- 13 Z-08MIK/Вк-V4 is a gyro-stabilized thermal imaging camera with video camera. The compact thermal imaging camera is on two-axis gyro-stabilized electromagnetic platform with the resolution of 640*512 pixels, built-in digital filters (V2), isotherm mode (V3), 4x digital zoom, combined with a video camera of 720*576 pixels resolution.
- 14 Z-08MФ/Вк-V2 is a fixed photo camera with video camera. Compact photo camera with the resolution of 20 MP, combined with video camera of 720*576 pixels resolution.

TYPE «21»

- 15 Z-21BKHDS-V3 is a gyro-stabilized HD video camera. Compact video camera on a two-axis gyro-stabilized electromagnetic platform with the resolution of 720*576 pixels, saving 4K video data or photo images onboard (12 MP resolution).
- 16 Z-21IK/Вк-V3 is a gyro-stabilized thermal imaging camera with a video camera. The compact thermal imaging camera is on a gyro-stabilized electromagnetic platform with the resolution of 640*480 pixels, isotherm mode (V3), 4x digital zoom, combined with a video camera of 720*576 pixels resolution.
- 17 Z-21IK-V3 is a gyro-stabilized thermal imaging camera. The compact thermal imaging camera is on a gyro-stabilized electromagnetic platform with the resolution of 640*480 pixels, isotherm mode (V3), built-in digital filters and smooth 8x digital zoom (V2).

Compact payloads provide a high-quality video, photo and thermal-imaging data for a wide range of tasks to be solved.

Highly-precise stabilization allows to monitor areas even under severe weather conditions without loss of image quality.

AT MODULE

A distinctive feature of the module is an analysis of live video stream (on UAV) to define an object position within the camera sight. This approach allows to hold and track the target with digital stabilization of the image, minimize the error of coordinates calculation and altitude detection during surveillance.

AUTOPILOT

ACS software is developed to control UAV operation including launch and landing. Also for combining SNS and INS data, coordinates calculation, generation of commands to control payload and actuating devices, saving telemetry.



TRANSCIEVER

Duplex communication. Pseudorandom operational frequency readjustment mode provides a high resistance to interference. A wide range of hardware interfaces: Ethernet, CAN, RS-232, video in/out, audio in/out. There is a capability to connect a magnifier. Compact dimensions and light weight.

NAVIGATION

INS is corrected by SNS (GPS/GLONASS), radio distance finder. Optionally you may install a high accuracy INS with a geodesic signal receiver from global navigational satellite systems, that provide a standard deviation of 0,02 m.



AIRBORNE RELIEF AND COORDINATES COMPUTER

ARCC calculates visual direction and distance from an object with specified coordinates, that allows to correct targeting. ARCC can define speed, direction and trajectory of a moving target.

SELF-DIAGNOSIS MODULE

Combination of monitor sensors in real time mode accumulates data from UAV units and transmits it to ground control station: speed and direction of wind, altitude, flight course, humidity and air temperature, battery level, condition of UAV units and components.



MOBILE CONTROL STATION

Most of operational tasks require an autonomous functioning of UAV exploitation team during a long time, and that is why it is necessary to provide an automated work place for operator, rest area, dining area and a work place for preflight check. Long-term experience of operating UAVs in conditions of full separateness resulted in creation of several configurations for mobile control stations, based on different transport facilities.

Configuration of every definite MCS depends on many factors, such as: the crew size, UAV types, duration of autonomous operation, communication equipment and so on.

Every MCS consists of:

- In-vehicle network of 220 V and 12 V;
- Heaters and conditioners of storage area and operation compartment, that provide comfortable conditions both for operating and resting shift.
- Telescopic mast of 6 meters height;
- Ladder, attached to the door of storage compartment with additional luggage platform on the MCS roof;
- Automated work place for three or four persons of operation team;
- Equipment for visual data display;
- Blackout of compartments interior;
- External LED-based lighting.

MCS, based on a truck, provides a complete independence of the storage compartment for staff to operate and live in.

ZART AEROSTATS



Modern aerostats enable to control the necessary area in a visible or infrared spectrum during 24 hours a day in a real time mode. Aerostat provides continuous video monitoring during 72 hours at the altitude up to 300 meters, wind speed up to 15m/sec and 360 coverage within the distance of 8 km. ZART system has an advantage of mobility, high reliability, ease of use, quick installation and fast subsequent start. Aerostat has a high level of autonomous operation, the power is supplied from internal battery or generator. ZART aerostat may be successfully applied for continuous monitoring of crowded or emergency areas. It allows to coordinate actions of ground search-and-rescue groups, protect closed areas or prevent illegal entry by unauthorized persons. May be applied for protection of state borders.

SPECIFICATIONS

Maximum altitude	300 m
Diameter	6m, 6,4 m, 7,7 m
Wind speed at launch	10 m/sec
Wind speed at operation	15 m/sec
Installation	30 min
Maintenance	20 min
First maintenance	after 72 hours
Loading capacity	7 kg/20kg/35kg
Working temperatures range	-45C ... +60C

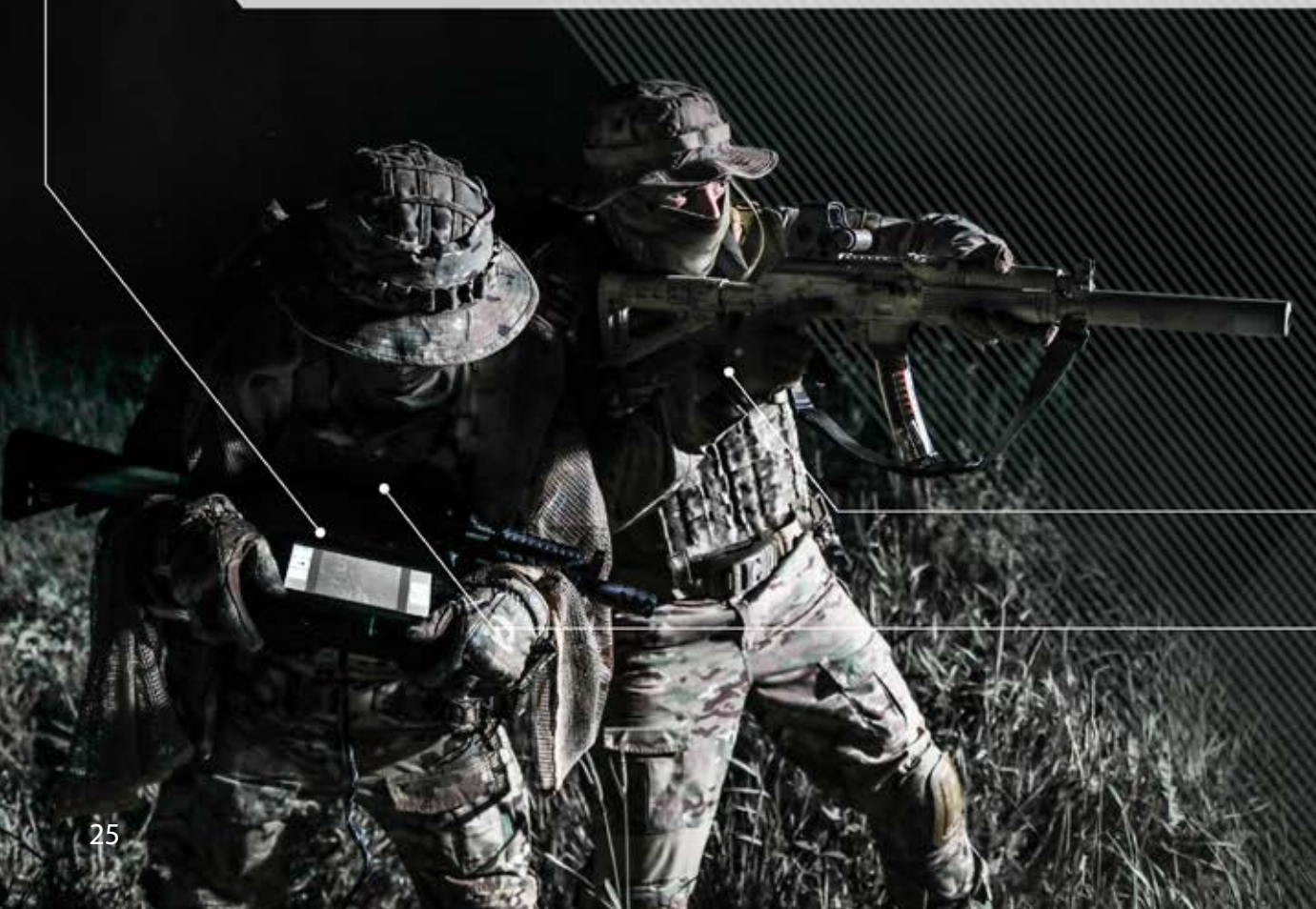
RTC-7



COMPACT CONTROL STATION.

The main characteristics of RTC-7

- Telemetry display, received from UAV, including display of UAV position on electronic ground map;
- Video recording, received from UAV, to an external drive in automatic mode;
- Telemetry, UAV commands recording to a flight file, saving it on an external drive;
- Creation of report electronic maps and saving them to external drive;
- Execution of UAV preflight check;
- UAV launch and landing;
- UAV operation during flight;
- Control of antenna unit in automatic mode;
- Armoured design of IP class;
- Special algorithm to protect from critical operator's errors.
- Integrated basemap of Digital Terrain Model.



ZALA radio station

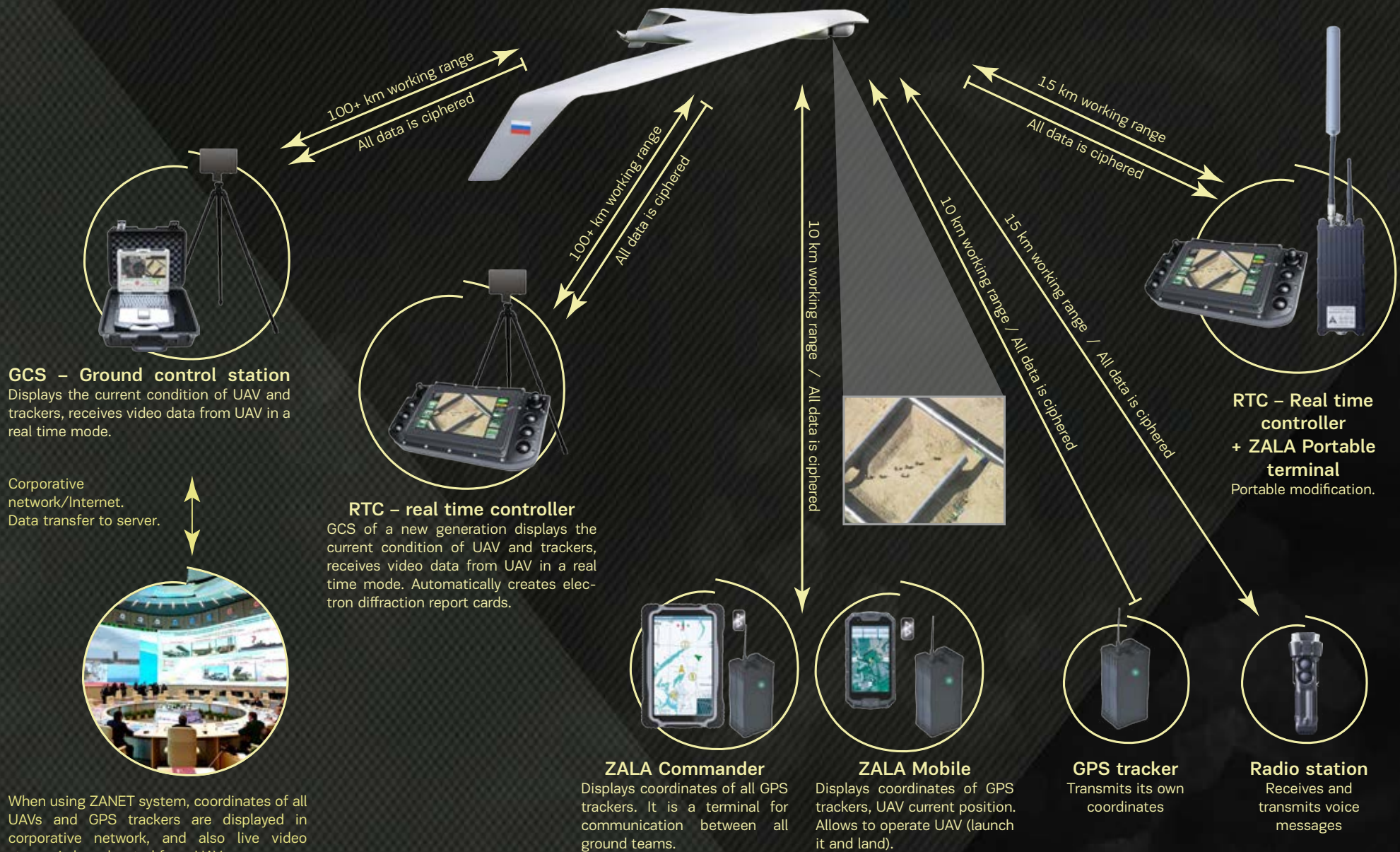
- Digital format of speech;
- Defines and transmits GPS/GLONASS coordinates;
 - Also may operate through cascade retransmission stations;
 - Pseudorandom operational frequency readjustment communication;
 - Is able to transfer text messages (from interface) with the help of Android-based device;
 - On-line retransmitting, compatible with any ZALA UAV;
 - 48 hours of autonomous operation.
 - Simplex communication;



PORTABLE TERMINAL

- The device is a version of antenna feeder system for ground forces. Includes all basic functions of a stationary AFS and enables to control UAV at a distance up to 15 km. Main functions:
- Receive and transmit video signal from UAV;
 - Pseudorandom operational frequency readjustment communication.

ZALA UAVs retransmit signals after the connection of ground forces and control stations



GROUND CONTROL STATION

UAV is easily operated because of intuitive software interface.

Software allows to:

- Perform preflight check of UAV;
- Read and record UAV flight tasks;
- Adjust the fire;
- Operate UAV during flight in automatic and semiautomatic modes;
- Control UAV payloads during flight;
- Receive and display information from UAV on electron diffraction report card;
- Built-in heightmap allows to safely operate in a mountainous regions and select the best position to install the system;
- Built-in simulator allows to practice in UAV operation, create flight tasks and simulate emergency situations (icing, flights in low clouds and so on).



ZALA UAVs SPECIFICATIONS

	ZALA 421-16E5/ICE	ZALA 421-16E	ZALA 421-16E2	ZALA 421-16EM	ZALA 421-08M	ZALA 421-22	ZALA 421-21	
Working range	100+ km	50 km	30 km	25 km	15 km	5 km	2 km	
Endurance	6+h/12-20h	4 h	4 h	2,5 h	100 min	35 min	35 min	
Wingspan/dimensions	5300 mm	2815 mm	2800 mm	1810 mm	810 mm	1065*1065*240 mm	600*520*75 mm	
Maximum altitude	5000 m			4000 m		1000 m		
Launch	Pneumatic launcher	Pneumatic/mechanic launcher	Elastic catapult		Elastic catapult/ from hands	Automatic		
Landing	Parachute and air damper			Parachute		Automatic		
Engine type	Electric/ICE		Electric					
Speed	65-110 km/h				65-130 km/h	up to 30 km/h		
Maximum takeoff weight	29,5 kg	10 kg	7,5 kg	6,5 kg	2,5 kg	8 kg	1,5 kg	
Payload weight	up to 5 kg	up to 1,5 kg	up to 1,5 kg	up to 1 kg	up to 300 g	up to 2 kg	up to 300 g	
Payloads	Type «16E5» / Type «16+»			Type «16+»		Type «08»	Type «16+»	Type «21»
Plane/Construction	Two removable consoles and fuselage				One-piece body	Folding framework	Non separabel	
Permissible wind speed	Up to 15 m/sec				Up to 20 m/sec	Up to 10 m/sec		
Operating temperatures range	- 40° C ... + 50° C							
Navigation	INS with SNS correction (GLONASS/GPS), radio distance finder					(GLONASS/GPS), radio distance finder	GLONASS/GPS	