







# ZALA 421-16E5G HD

The unique airdrome-free unmanned aerial vehicle ZALA 421-16E5G HD is equipped with a hybrid propulsion system, which provides a guaranteed flight time of more than 12 hours.

Operation up to 1000 km from the starting point with unique additional payloads.

Broadcasting a video stream in HD format provides the ground station operator with a detailed video image in real time.

#### Key benefits

- High-performance on-board computer
- Unique HD payloads
- Hybrid propulsion system
- 12+ hours flight time
- Communication range of 150+km
- Option to install additional equipment
- Accurate positioning (RTK Ready)
- · Signal retransmission
- Radio Interference Resistance

#### Specifications

Takeoff weight

Maximum payload weight

Wingspan Engine type Endurance Range (video)

Best operational altitude

Ceiling Speed range Launch Landing

Operating temperature range

Maximum wind speed

Navigation

49,5 kg 3,5+ kg 4640 mm Hybrid 12+ hr 150+ km 500-3600 m 3600 m

80-125 km/hr

Trailer-based pneumatic catapult

Parachute, airbag -40°C ... +50°C

15 m/s

INS with SNS correction, double-range finder,

ZALA alternative navigation field, video navigation (VNS)





# ZALA 421-16E5 HD

ZALA 421-16E5 HD is an airdrome-free unmanned aerial system, equipped with an electric propulsion system that provides a guaranteed flight time of more than 6 hours.

The internal bays of the UAV enable installation of additional equipment together with the main payload.

Broadcasting a video stream in HD format provides the ground station operator with a detailed video image in real time.

#### Key benefits

- High-performance on-board computer
- Unique HD payload
- Load capacity of 5+ kg.
- Communication range of 150+ km
- Option to install additional equipment
- Accurate positioning (RTK Ready)
- Signal retransmission
- Radio Interference Resistance

#### Specifications

Takeoff weight

Maximum payload weight

Wingspan Engine type Endurance Range (video)

Best operational altitude

Ceiling Speed range Launch Landing

Operating temperature range Maximum wind speed

Navigation

29,5 kg 5+ kg 5300 mm Electric 6+ hr 150+ km 500-5000 m 5000 m 65-110 km/hr

Trailer-based pneumatic catapult

Parachute, airbag -40°C ... +50°C

15 m/s

INS with SNS correction, double-range finder,

ZALA alternative navigation field, video navigation (VNS)





# 2ALA 421-16E HD



Time-proven, the most popular type of UAV in the ZALA product line. Launches from a pneumatic catapult.

The increased lifting capacity of the aircraft enables additional equipment to be installed on board for comprehensive analysis of the underlying surface characteristics.

Broadcasting a video stream in HD format provides the ground station operator with a detailed video image in real time.

#### Key benefits

- High-performance on-board computer
- Communication range of 75+ km
- Option to install additional equipment
- Underwing 24 MP camera
- Accurate positioning (RTK Ready)
- Signal retransmission
- Radio Interference Resistance

#### Specifications

Takeoff weight 10,5 kg Maximum payload weight 1,8 kg Wingspan 2815 mm Engine type Electric Endurance 4+ hr 75+ km Range (video) Best operational altitude 100-5000 m 5000 m Ceiling

Speed range Launch Landing Operating temperature range Maximum wind speed Navigation 65-110 km/hr Pneumatic catapult Parachute, airbag -40°C ... +50°C 15 m/s

INS with SNS correction, double-range finder, ZALA alternative navigation field, video navigation (VNS)

# ZALA 421-16EV HD



Combines the best technical characteristics of fixed-wing and rotary-wing types of UAVs, has a unique adaptive system of using the aerodynamic properties of the UAV in all flight modes.

Takeoff and landing are carried out in vertical mode, which provides additional advantages for monitoring and aerial photography of hard-to-reach places and areas.

Broadcasting a video stream in HD format provides the ground station operator with a detailed video image in real time

#### Key benefits

- High-performance on-board computer
- · Launch from unprepared sites
- Communication range of 50+ km
- Option to install additional equipment
- Accurate positioning (RTK Ready)
- Signal retransmission
- Radio Interference Resistance

#### Specifications

Takeoff weight
Maximum payload weight
Wingspan
Engine type
Endurance
Range (video)
Best operational altitude
Ceiling

10,5 kg 1,5 kg 2815 mm Electric 1,5+ hr 50+ km 100-2000 m

Speed range Launch Landing Operating temperature range Maximum wind speed Navigation O-110 km/hr Automatic Automatic -40°C ... +50°C 15 m/s

INS with SNS correction, double-range finder, ZALA alternative navigation field, video navigation (VNS)



# ZALA 421-16E2



optimized power consumption make this model flexible and multifunctional.

- · Compact system
- · Quick launch with elastic catapult
- Ability to launch with pneumatic catapult
- · Signal retransmission

#### Specifications

Takeoff weight 7,5 kg Maximum payload weight 1,5 kg Wingspan 2800 mm Engine type Electric Endurance 4+ hr Range (video) 30+ km Best operational altitude 200-5000 m Ceiling 5000 m

Speed range Launch Landing Operating temperature range Maximum wind speed Navigation

75-125 km/hr Elastic / pneumatic catapult Parachute, airbag -40°C ... +50°C 15 m/s INS with SNS correction, double-range finder, ZALA alternative navigation field

# ZALA 421-22



Rotary-wing UAV is designed for aerial survey, laser scanning and cargo delivery.

Easy to launch and land, doesn't require a prepared takeoff and landing site. It is characterized by resistance to low temperatures and fault tolerance.

Design allows combining up to three payloads at once. Payloads are compatible with aircraft type ZALA UAV.

#### Key benefits

- Fault tolerance: flight with 7 out of 8 engines
- Resistance to low temperatures
- Application of "Type 16E" payloads
- Carries up to 3 payloads at the same time
- Signal retransmission

#### Specifications

Ceiling

Takeoff weight
Maximum payload weight
Dimensions
Engine type
Endurance
Range (video)
Best operational altitude

8 kg 2 kg 1065x1065x240 mm Electric 35 min 5+ km 30-1000 m 1000 m Speed range Launch Landing Operating temperature range Maximum wind speed Navigation O-30 km/hr
Automatic
Automatic
-40°C ... +50°C
10 m/s
INS with SNS correction, double-range finder,
ZALA alternative navigation field



# ZALA 421-08M



launched from hand. This model is distinguished by intelligent control system and capability of use in difficult weather conditions.

This model has a successful experience of operation in the Arctic and Antarctic.

- All-weather capability
- Light weight
- · Compact size
- Quick launch
- Ease of use
- · Signal retransmission

#### **Specifications**

Takeoff weight 2,5 kg Maximum payload weight 300 g Wingspan 810 mm Engine type Electric Endurance 1,5+ hr 15/30+ km Range (video) Best operational altitude 100-2000 m Ceiling 5000 m

Speed range Launch Landing Operating temperature range: Maximum wind speed Navigation

65-125 km/hr Hand-launched/elastic catapult Parachute -40°C ... +50°C 20 m/s INS with SNS correction, double-range finder, ZALA alternative navigation field

# ZALA 421-24



The new ZALA 421-24 quadcopter-type UAV has a compact folding design and can stay invisible in the air due to low acoustic and visual signature.

It is controlled by a handheld controller (RTC-Real time controller) and allows operation from a moving vehicle.

#### Key benefits

- The system is stored in a single protected case
- · Autonomous operation
- Quick start no more than 120 sec.
- · Operation from a moving vehicle

- Application in a wide range of weather conditions
- Target tracking and holding
- Anti-interference duplicated data channel
- Capable of working with individual positioning devices (ZALA beacon)

#### Specifications

Takeoff weight
Maximum payload weight
Dimensions
Engine type
Endurance
Range (video)
Best operational altitude
Ceiling

3,6 kg 400 g 540x540x190 mm Electric 30+ min 3,5+ km 0-500 m 1500 m Speed range Launch Landing Operating temperature range: Maximum wind speed Navigation

Automatic Automatic -30°C ... +40°C 10 m/s INS with SNS correction, range finder

0-30 km/hr







The new KYB-UAV strike system is designed to defeat remote ground targets.

The KYB-UAV delivers a special payload based on target coordinates, which are set manually or based on an image from a target guidance payload.

#### Specifications

Flight speed Endurance Maximum payload weight Dimensions 80-130 km/hr 30 min 3 kg 1210x950x165 mm

- High precisionHidden launch
- Silent operation
- Ease of use

# ZALA LANCET



A new intelligent multipurpose weapon capable of autonomously locating and striking a given target. The system consists of a high-precision strike element, reconnaissance, navigation and communication modules. ZALA Lancet forms its own navigation field and does not require any ground or marine infrastructure.

ZALA Lancet has several types of guidance systems: coordinate, opto-electronic and combined. In addition, the UAV is equipped with a telecommunication channel, which transmits an image of the target, enabling confirmation of the hit effectiveness. The type of fuze is non-contact/contact.

#### Smart loitering munition ZALA LANCET-1

Speed range	80-110 km/hr
Endurance	30 min
Warhead weight	1 kg
Takeoff weight	5 kg

#### Smart loitering munition ZALA LANCET-3

Speed range	80-110 km/hı
Endurance	40 min
Warhead weight	3 kg
Takeoff weight	12 kg

- High precision
- Unreadable ballistics
- Autonomous
- Eco-friendly



## Z-16E5VHD60-IRA2/IRQ

HD video camera, with two thermal imaging cameras

Video stream resolution of 1280x720 (HD) Three-axis stabilization 50  $\mu$ rad

#### EΟ

- Optical zoom 30x (Full HD), 60x (HD)
- Hypersensitivity mode
- On-board video recording 1920x1080 (Full HD)

#### ID

- Optical zoom 8x
- Digital filters
- Highlight mode
- Temperature detection
- On-board video recording 640x512/1280x720 (HD)

Two video streams simultaneously (PIP) Laser marker range — 1500 m

# Payloads

# 16E5, 16E+ type



# Next-gen HD





HD video camera

Video stream resolution of 1280x720 (HD) Three-axis stabilization 150 µrad

#### ΕO

- Optical zoom 30x (Full HD), 60x (HD)
- Hypersensitivity mode
- On-board video recording 1920x1080 (Full HD)



## Z-16VHD2O-IRA

HD video camera with thermal imaging camera

Video stream resolution of 1280x720 (HD) Three-axis stabilization 150  $\mu$ rad

#### EC

- Optical zoom 10x (Full HD), 20x (HD)
- Hypersensitivity mode
- On-board video recording 1920x1080 (Full HD)

#### IR

- Digital zoom 8x
- Digital filters
- · Highlight mode
- Temperature detection
- On-board video recording 640x512

Two video streams simultaneously (PIP)



## Z-16IRQ-V/L

Thermal imaging camera with video camera and laser marker

Video stream resolution of 1280x720 (HD) Three-axis stabilization 150  $\mu$ rad

#### IR

- Digital zoom 8x
- · Digital filters
- · Highlight mode
- Temperature detection
- On-board video recording 1280x720 (HD)

#### EΟ

• On-board video recording 1920x1080 (Full HD)

Two video streams simultaneously (PIP) Laser marker with 1500 m range



## Z-16GAS-M-VR

#### Gas detector with video cameras

#### Laser methane detector

- Displaying data on the GCS in real time online
- Operating altitude 20-110 m
- Measuring range 0 ~ 99999 ppm•m
- Sensitivity 0~50000 ppm\*m

#### Two video cameras (general and heading view)

- Video stream resolution of 1280x720 (HD)
- On-board video recording on SD 1920x1080 (Full HD)

Two video streams simultaneously (PIP)





## Z-16GAMMA-VR

#### Dosimeter with video cameras

#### Dosimeter

- Displaying data on the GCS in real time online
- Detection of X-rays and gamma rays
- Data indication on video stream

#### Two video cameras (general and heading view)

- Video stream 1280x720 (HD) resolution
- On-board video recording on SD 1920x1080 (Full HD)

Two video streams simultaneously (PIP)



## Z-16F7R-VR / 16F7R2-VR / 16F7R4-VR

#### Photo camera with video camera

#### Photo camera

- Resolution 24/42/60 Mp
- Full frame sensor
- Lens 20/35/50/85 mm

#### General view video camera

- Video stream resolution of 1280x720 (HD)
- On-board video recording on SD 1920x1080 (Full HD)





## Z-16F8R-VR / Z-16F8R2-VR

Two photo cameras on a rotary frame with adjustable angle between them for fixed wing and multi-rotor UAV.

#### Photo camera

- Resolution 2x24/2x42 Mp
- APS-C sensor / full frame sensor
- Lens 20/35 mm

#### Heading view video camera

- Video stream resolution of 1280x720 (HD)
- On-board video recording on SD 1920x1080 (Full HD)

### Z-16AGR01-F1

#### Photo camera and multispectral camera

#### Multispectral camera

- GSD 8 m per pixel at 120 m AGL
- · Light sensor
- Spectral bands: blue, green, red, red edge, near IR
- RGB 3.4 Mp
- Image format 12-bit RAW

#### Photo camera

- Resolution 24 Mp
- · APS-C sensor
- · Lens 20 mm

Optional: Heading view video camera with video stream 1280x720 (HD) and on-board video recording on SD 1920 x 1080 (Full HD)

## Z-16SOS-VR

Alarm system with heading view video camera

#### Heading video camera

- Video stream resolution of 1280x720 (HD)
- On-board video recording on SD 1920x1080 (Full HD)

#### Optional:

- General view video camera
- Two video streams simultaneously (PIP)







# REAL-TIME CONTROLLER

The real-time controller is a portable ground station for full control of the UAV from launch to landing, reception, and display of telemetry, creating an electronic graphic report card, recording video from the UAV on a removable storage device.

Absence of operating systems provides a high level of data protection. Mobility of the device, autonomous operation, and protected performance expand possibilities and scenarios of UAV applications.

- Mobility
- Cryptographic security
- Ergonomics





# GCS

# GROUND CONTROL STATION

Ground Control Station (GCS) is designed for complete flight control: preflight checks, the launch of the UAV, creation of a flight task, control of the UAV during the flight, control of payloads, data reception, and processing, the landing of the UAV.

GCS includes an armored laptop, antenna system, switching unit, manipulator (joystick), and a power cable.

GCS connects to the vehicle's onboard electric mains (12/24 V), car's cigarette lighter socket, 220 VDC via power supply unit, or regular battery.

- Intuitive interface
- Intelligent software
- Ease of transportation
- · Secure communication channels
- Self-check system





# MCS VEHICLE-BASED

Mobile control stations are designed for autonomous operation and accommodation of the unmanned system operation team.

The vehicles of different classes (Ford Transit 4x4, Mercedes Sprinter 4x4, KAMAZ 6x6) are equipped with workplaces for operators and technicians, recreation areas for the team and transportation of the unmanned system.

#### Mobile station is consist of:

- Onboard 220 V and 12 V mains and equipment for ensuring the mains functioning
- Split air conditioning systems of the cargo and operation compartment ensure comfortable working conditions.
- 6-meter high telescopic mast
- · Ladder fixed to the cargo compartment door
- External luggage platform on the MCS roof

- Automated workstation for 3 or 4 team specialists
- · Video output equipment
- Dim-out inner compartments
- Outdoor LED lighting

- Full autonomy
- Quick deployment
- Mobility
- Operation under hard weather conditions





# **BEACON**

Portable positioning device for ground groups with builtin modem and SNS receiver. Designed to determine coordinates, transmit data to the GCS, and may serve as a communication repeater between the GCS and the mobile control device.

The beacon is equipped with a Bluetooth module and connects to an Android mobile device. Each beacon has

its unique number and its location is displayed on the GCS. Thus, the unit command sees the position of all beacons and can set targets for all ground groups as well as for each group.

Each user sees the position of his target on the mobile device and the distance to it. All transmitted data is protected by encryption and FHSS mode.





# VIDEO RECEIVING STATION

ZALA AERO GROUP

UNMANNED SYSTEMS

A small-sized receiving station provides video images from the UAV for operational control of the situation at the place of the action at a distance of 10 km without any additional antenna devices.

Built-in wired communication module allows organizing digital voice communication between the receiving stations at a distance of up to 1 km. The autonomous operation time is 12 hours. All transmitted data is protected by encryption and FHSS mode.

Delivered in a secure case.

## RADIO STATION

RS-17 is a digital voice radio station with a built-in modem.

The built-in GPS module provides accurate positioning of the radio station. Optionally equipped with 6 types of headsets

#### **Functions**

- · Voice data reception and transmission
- Transfer its own coordinates to GCS
- Communication through UAV (cascaded relay)

#### Технические характеристики

Range 20 km with UAV 5 km with ground-based radio stat Encryption, FHSS

Power Output 2 W
Operating time 24 h
Weight without antenna 480 g

Temperature range:

Standard -40°C ... +55°C Extended -55°C ... +65°C





## SPECIALIZED AI

Software solutions are designed for searching, identification, and classification of various objects and events of interest on aerial images and orthophotomaps, detection, and classification of changes that have occurred in the area of interest over different periods of time, as well as automatic generation of reports based on the processing of received materials.

The solutions are based on algorithms of artificial intelligence and computer vision, which allows you to quickly and efficiently analyze the data, find objects of interest and changes in the images, get information about their exact location and state, to convey this information to interested parties in a convenient and understandable form.

By using specialized software, ZALA systems provide a new level of quality in processing data obtained during aerial monitoring and provide the information needed for timely decision-making.

Through the use of various processing algorithms and the continuous training of neural networks on new data, the software achieves exceptionally high accuracy in a short time, processing up to 5,000 images per hour. Adding new classes of interest allows the system to be adapted to the needs of specific customer needs.

The system automatically generates a structured archive for searching and classifying objects, which provides quick access to the necessary information. The binding of information is made by different parameters: project or object, date and time, coordinates.

All uploaded data is processed and stored on the local computer without using cloud solutions. The system works on different platforms: servers, desktop computers, laptops, cell phones. The cross-platform nature of the application provides the user with instant access to the data, the results of their analysis, and automatically generated reports.

#### Main system features

- Stream loading and storing of geo-referenced images
- · Generation of a structured data archive
- Search and classification of objects in images using neural networks
- Search and classification of objects only in the area of interest
- Flexible customization of the list of objects of interest
- Automatic reporting about found objects, their location, and status
- Dispatch of information about found objects to interested parties by e-mail or via a mobile application
- Providing them with information length of performed flights
- Displaying data on a cartographic basis, possibility to use various maps in multiple coordinate systems

- · Visual comparison of images of the same area
- Measurement of linear and spatial objects

A solution for detecting changes does not require data with high accuracy of georeferencing, which greatly simplifies the work of their collection and preparation. It independently analyzes and compares orthophotomaps of the same area but from different times; it finds, labels and classifies the changes, and provides information about their properties. The application works autonomously, data processing is performed regardless of Internet connection or local network.

#### Key features of the application

- Comparison of terrain images acquired at different times
- Change and object search and classification
- · Overlaying of images on a terrain map
- Change detection in the area of interest
- Mapping, segmentation, and vectorization of images
- measurement of areas and distances on the orthophotomap
- Correction of georeferencing orthophotomap directly in the system
- Image processing at different sizes (from several megabytes to hundreds of gigabytes)
- Automatic reporting of detected changes

## **APPLICATION**

#### Oil and Gas Sector

Monitoring of oil and gas infrastructure, main pipelines, and fields. Detection of irregularities within the restricted area, locations of oil pipeline damage, and oil product leaks.

#### Security

Inspection of closed facilities and territories, Detection of the illegal presence of equipment, materials, and people. Identification of mass gathering of people and equipment.

#### Forestry

Detection of illegal logging sites and forest fires.

#### Water Management

Monitoring of hydraulic structures. Detection of pollution and illegal activities on water bodies.

#### Energy

Monitoring of power lines and power supply facilities.

#### Construction and road facilities

Control of equipment and materials relocation, monitoring of construction, and maintenance operations.



Hardware-software complex, opening up new opportunities for training specialists in the basics of flight and practicing methods of using different types of UAVs, preparation, and maintenance of the aircraft in the virtual reality environment. The simulator combines high-performance hardware and software and virtual reality.

The software package consists of two parts, one of which is designed to train operators on flying skills and control of UAVs in the air; the second part is designed to train technicians to prepare and maintain UAVs on the ground. Modern graphics and animation, realistic flight

aerodynamics and environmental factors, the use of artificial intelligence, and the use of real geospatial data allow not only to teach and consolidate the basic skills of piloting the aircraft but also to simulate the flight of any complexity in various geographical, weather and climatic conditions, as well as in the presence of radio interference or lack of communication.

Training, as well as monitoring and testing of knowledge, is carried out according to previously created missions. The system is designed for a different degree of personnel qualification - from a junior to a senior professional. Multi-

-player missions are aimed at practicing team interactions and proper coordination of actions with regard to the changing external environment. At the same time, the simulator independently conducts objective control and evaluates the results of all practiced operations and actions.

#### Key features of the flight training module

- Aerodynamics and physics of real types of UAVs
- Support of all UAV control functions
- Integration of all available payload types
- Multiple missions with different types of UAVs and pavloads
- Integration with the regular ground control station
- Existence of ready-made missions and ability to create new scenarios by the instructor
- Practicing operator actions in emergency situations, including electronic warfare

## Change of flight conditions and environment in real time

 Influence of air masses, temperature, humidity, rainfall, terrain on flight physics

- Weather conditions control (snow, rain, fog, humidity, temperature)
- Control of wind streams, direction and power (wind directions, turbulence at different altitudes)
- Realistic day and night (sun and moon movements according to geographical coordinates)
- Changing terrain features vegetation, roads, rivers and reservoirs based on real data

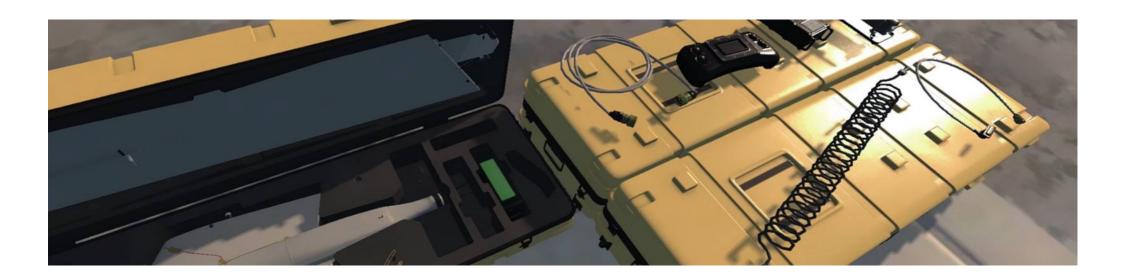
Module for training a specialist in the role of "Technician" allows going through the full cycle of work with the UAV system from deployment to landing in virtual reality mode without leaving a special site. Virtual reality simulates both human impacts on various objects and parts of the UAV system, as well as reactions to the impact. All objects in virtual reality behave identically to objects in real life. The user is able to influence these objects in accordance with the real laws of physics, which maximizes the effectiveness of training.

#### VR Mode

- · UAV assembly
- Operation with all components, included in the system
- Preflight checks

- · Launch of the UAV in various weather conditions
- Landing the UAV in manual mode with an ability to change the wind force and direction
- Interaction between operator and technician

The VR mode turns the software and hardware module into a full-flight simulator, which allows to regularly maintain the qualifications of operators at a high level and teach additional UAV control skills in a professional class.





The means of electronic warfare suppresses the control channels between the operator and the drone, as well as the drone's satellite navigation.







#### Specifications

Weight Dimension Continuous operation time	3,8 kg 530x90x280 mm 2 hr
Suppression radius of communication signals, control and data transmission	(30°) <b>0,5</b> km
Signal suppression radius of satellite navigation systems: NAVSTAR (GPS), GLONASS, GALILEO, BeiDou (360°)	2 km
Operating temperature range	-40°C +50°C

#### Key benefits

- The lightest and most compact suppression system in its class
- Activated by the push of a button
- Modular design of the complex allows the addition and replacement of suppression modules
- Ergonomic design and three-point harness for maximum ease of use
- Safe for human health
- Robust and durable with the aluminum housing
- Option to install additional suppression modules upon request

#### Structure

- Case with built-in microprocessor, charge indication, toggle switches and battery
- Suppression Module 2.4 GHz
- Suppression module 5.8 GHz
- Module of SNA suppression (GPS, GLONASS, GALILEO, BeiDou)
- External power supply module
- Tactical carrying strap
- Charging device
- Carrying case



ZALA VR

