



HEAD OFFICE

9B Smolna St,
Kyiv, Ukraine, 03022



+380 50 361 17 08

uav@skyeton.com

www.skyeton.com



UNMANNED AIRCRAFT SYSTEM «RAYBIRD-3»



THE UAS «RAYBIRD-3»

cutting-edge unmanned aerial system (UAS) based on a long-range fixed-wing UAV designed to ensure non-stop air support providing unrivaled intelligence, surveillance, and reconnaissance data for both commercial and defense projects.

COMPOSITION:

- ▶ UAV «Raybird-3»
- ▶ Ground control station (GCS) with Software
- ▶ Antenna system
- ▶ Launching unit
- ▶ Payload options



TECHNICAL SPECIFICATION

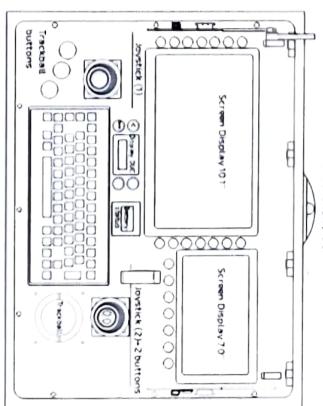
Wingspan	2,96 m
MTOW	23 kg
Speed	80/110/140 km/h
Flight time	18-28 h
Operating ceiling	up to 4500 m
Payload	up to 5 kg
Propulsion system	EFI engine
Fuel	95 Octane, oil mix
Operating temperature range	from -25 to +45 °C
Take-off technique	mechanical catapult
Recovery system	parachute landing on airbag



GROUND CONTROL STATION



Displays	3
Weight	22.9 kg
Run time	6 hours
Operating temperature	0~45 °C
Protection level of GCS when closed	IP67



KEY FEATURES

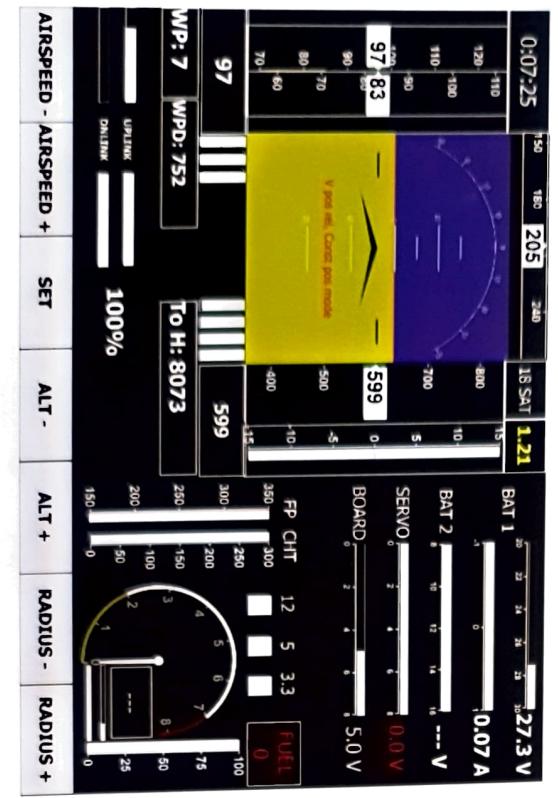
- ▶ 3 displays contain ultrabright screens with an anti-glare surface and can be switched via software
- ▶ 2 reliable 3-axis joysticks with Hall's sensors
- ▶ PC mouse is replaced by moisture-proof and compact trackball

- ▶ Full-fledged waterproof keyboard for data entry
- ▶ Multifunctional assignable buttons around the display
- ▶ Long endurance battery life
- ▶ 2 Ethernet ports 48V 100W

SKY CONTROL SOFTWARE

CHARACTERISTICS

- Client-server architecture
- Multiple numbers of users and aircraft
- Adjustable language and units
- Differentiation of access rights
- Integrated payload software
- Graphical user interface



DATA LINKS



Digital data link	up to 120 km
Telemetry and control data link	up to 120 km
Maximum total range	up to 2500 km

- Telemetry and control system of in-house development
- Encrypted DDL, telemetry and control data link
- Frequency-hopping
- Direct Sequence Spread Spectrum (DSSS)
- Noise-like signal
- MIMO Mesh networks
- Multi-frequency global navigation satellite system (Multi GNSS)
- Duplex telemetry communication link



TAKE-OFF TECHNIQUE

Mechanical catapult type launching unit designed for quick and safe application at any time of the day, regardless of the surrounding conditions.

- Take-off from unprepared surfaces

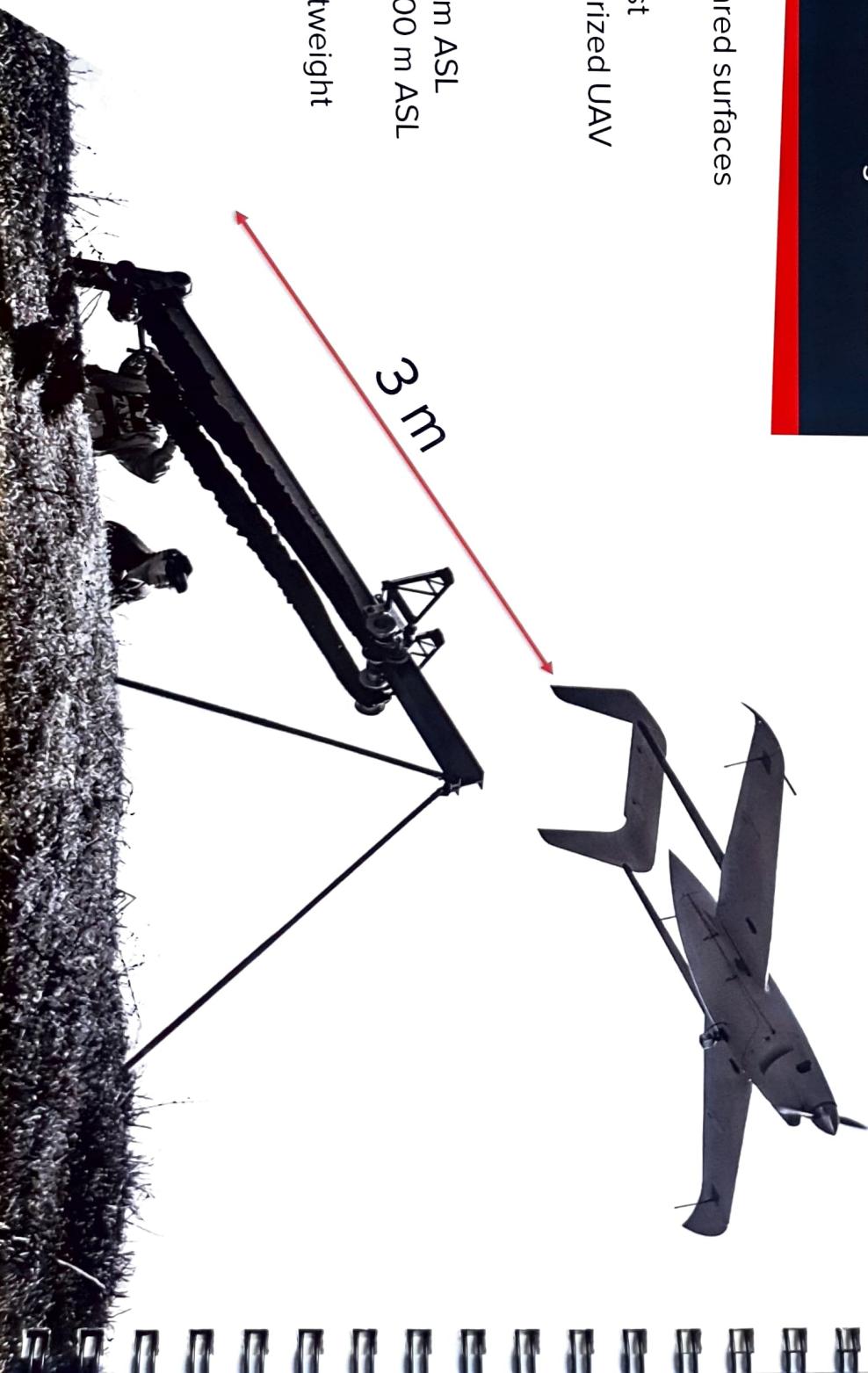
- Safety features against spontaneous/unauthorized UAV launch

- Height for takeoff

- normal – up to 1000 m ASL
- extended – up to 2500 m ASL

- Man-portable and lightweight (45 kg)

- Tool-free assembly



LANDING TECHNIQUE

- Payload and UAV integrity during landing
- Automatic parachute/airbag recovery system
- Redundancy in critical subsystems
- Reusable airbag and parachute
- Highest durability of airframe on the market

Retracting mechanism



Flipping technique



PAYLOAD TYPES



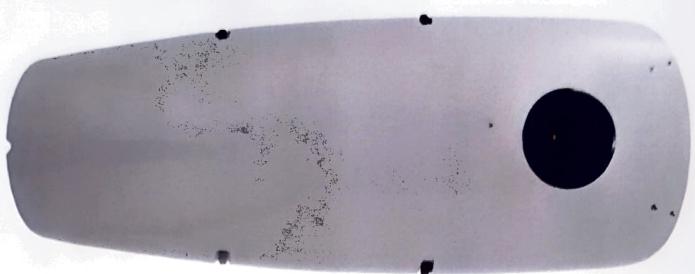
Canon EOS R

Resolution	30,3 MP
Total pixels	31,7
Viewfinder	0.5-inch OLED color EVF
Shutter	1/8000 – 30 sec
Dimensions	136 x 98 x 84 mm
Image format	JPEG, RAW

Phase One - iXM

	iXM-100	iXM-50
Resolution	11664 x 8750	8280 x 6208
Dynamic range	83	84
Pixel size (µm)	3.76	5.3
Capture rate	3 fps	2 fps
Synchronization	50 µs in an array of cameras	
speed I/O interfaces	Trigger, Mid exposure, Ready, Serial	
Dimensions (including 80 mm lens)	90 x 90 x 164 mm	
Temperature	-10°C to 40°C	
Humidity	15% – 80% (non-condensing)	

For both models



PAYOUT TYPES

Synthetic Aperture Radar (SAR)

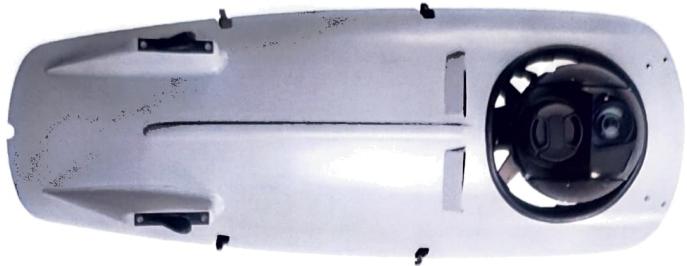


Size	W = 180 mm H = 111 mm \varnothing = 230 mm
Weight	4 kg
Frequency	X
Operating altitude	up to 5000 m
Moving target indicator	15 km
SAR imaging:		
- resolution	0,3, 0,5, 1,2, 5, 10 m
- max range	20 km



PAYLOAD TYPES

Epsilon 140



Stabilization	•	•	•	<150 µrad
Size	•	•	•	140 x 189 mm
Environmental protection	•	•	•	IP64 rated
Operating temperature	•	•	•	-25 to +45°C

Rotation limits

• • 360° continuous pan

EO SENSOR

Global shutter	•	•	•	•	•	•	Yes
Vertical FOV	•	•	•	•	•	37.9° - 13°	
Resolution	•	•	•	•	HD 720p	1280 x 720px	
Optical zoom	•	•	•	•	•	30x	

IR SENSOR

Type	•	•	LWIR uncooled	
Resolution	•	•	SD 640x512px	
IR lens	•	•	60mm	
Vertical FOV	•	•	7.7°	

LASER RANGEFINDER CLASS I (EYESAFE)*

Type	•	•	•	Diode laser
Range	•	•	up to 5000 m (static applications); up to 2500 m (dynamic applications)	
Accuracy	•	•	•	Better than 1m

*Additional options



PROCESSOR SPECIFICATIONS



Epsilon 140

FEATURES

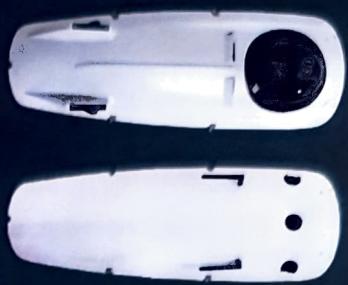
- Object tracking
- Scene steering
- Software stabilization HD
- Video output
- Onboard Video Recording
- Snapshots
- H.264 encoding
- Moving Target Indicator
- Geo-Location Feature



PREVENTING WILDFIRES



RECOMMENDED TOOLS



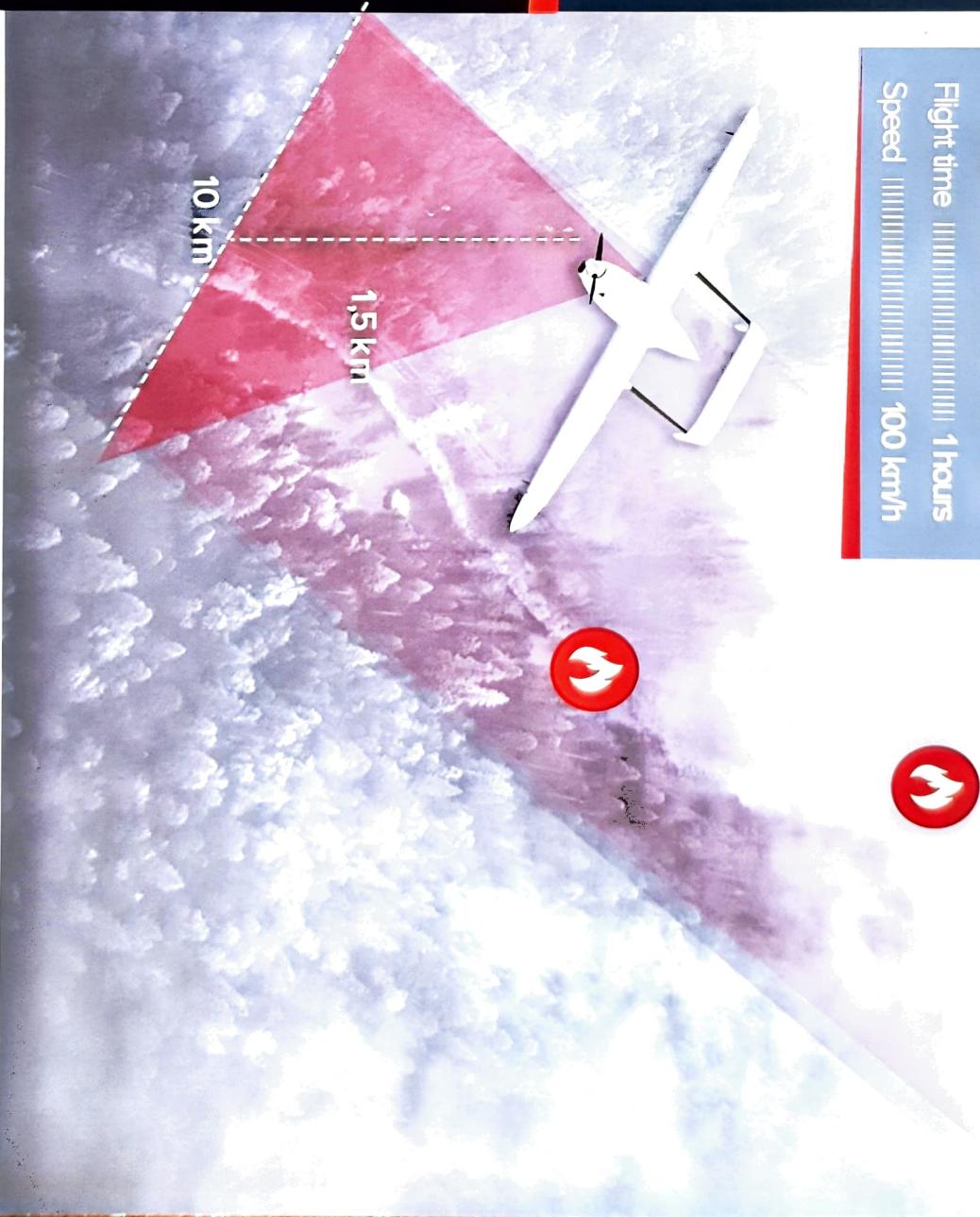
- ▶ Gyro-stabilized multi-sensor wide view gimbal
- ▶ Early fire detection sensor

USE CASE

Covered area 1000 km²

Flight time 1 hours

Speed 100 km/h

- 
- ### SOLUTION:
- ▶ Aerial reconnaissance of the fire situation in the fire season
 - ▶ Coordination of firefighting operations
 - ▶ Identification of dangerous "hot zones", "marking" of dangerous areas to help firefighters in planning and coordinating their actions
 - ▶ Survey of natural disasters areas

MARITIME SURVEILLANCE

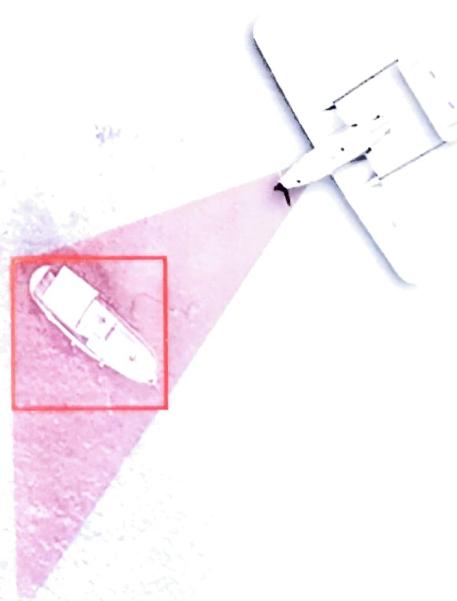


RECOMMENDED TOOLS



SOLUTION:

- ▶ 24/7 air support of maritime operations
- ▶ detection of illegal activities (drug trafficking, fishing)
- ▶ illegal pollution detection and monitoring
- ▶ moving target indicator



MAPPING AND AERIAL SURVEYING



RECOMMENDED TOOLS



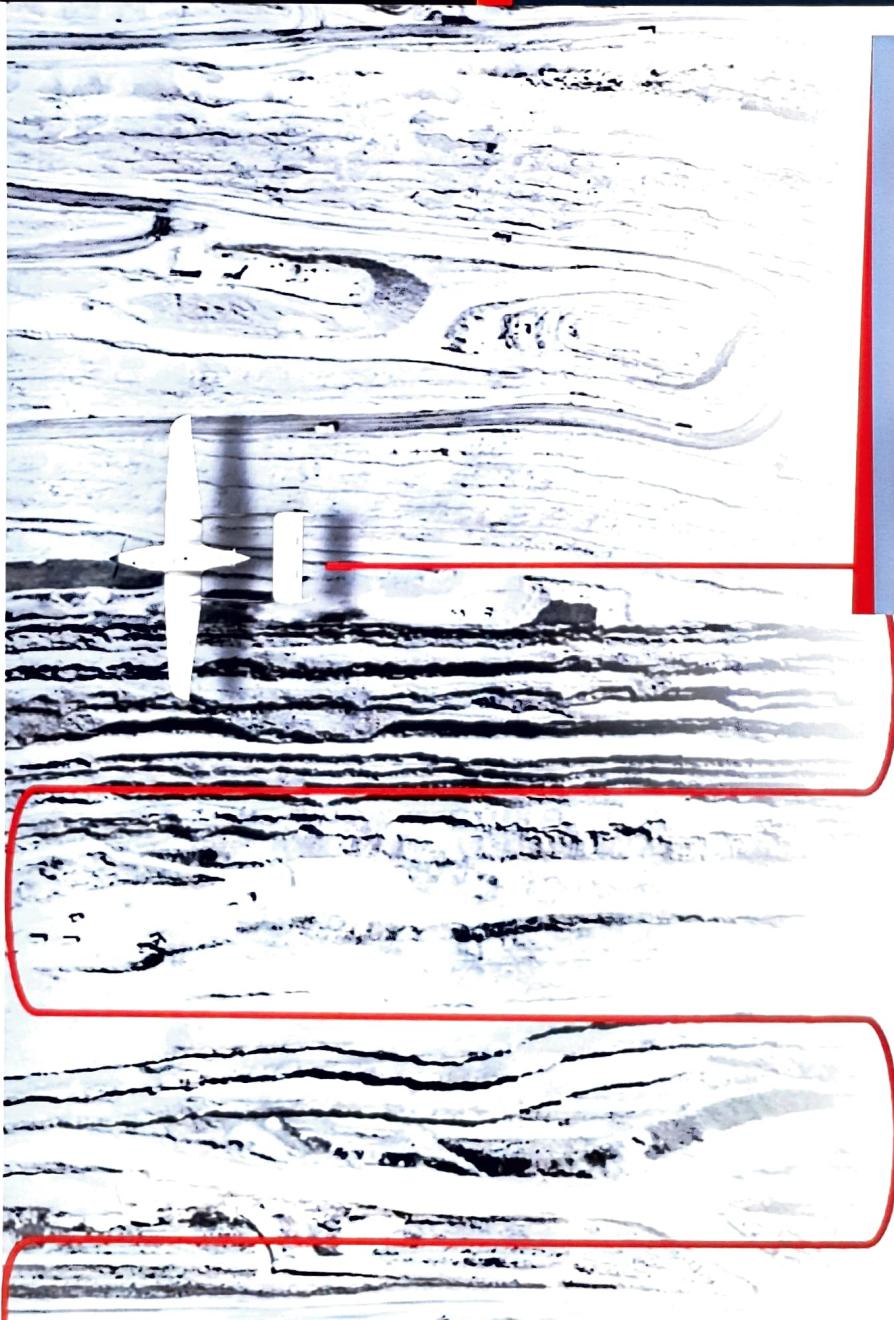
- ▶ Photo camera

SOLUTION:

- ▶ photographic insight into hard-to-reach territories
- ▶ high accuracy of aerial surveys
- ▶ high precision mappings
- ▶ reduction field time and survey costs
- ▶ fast delivery of a range of aerial survey outputs

USE CASE

Flight time		24 hours
Area		> 1000 km ²
GSD		15 cm/px



MAPPING AND AERIAL SURVEYING

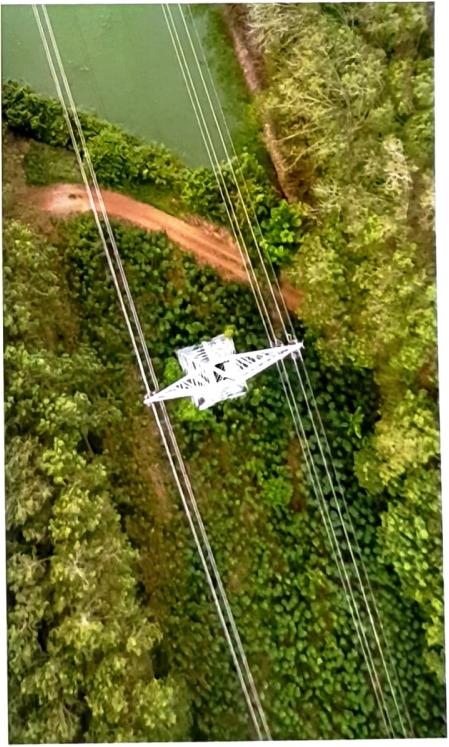


POWER LINES INSPECTION

- ▶ Execution of large-scale aerial photography of the transmission power line route (M 1: 1000 - 1: 10000)
- ▶ Definition of damage to insulators on poles
- ▶ Height Determination of wire and cable fastening on support of the transmission line
- ▶ Identification of zones of landslide and karst processes and monitoring of dynamics of their development

INSPECTION OF ROADS

- ▶ Operative diagnostics of a road surface
- ▶ Traffic flow control
- ▶ Accurate determination of the type and extent of damage to the roadway
- ▶ Monitoring of bridge crossings, dimensions and other engineering structures
- ▶ Early detection of dangerous man-made phenomena (suffusion, karst phenomena, flooding, etc.)
- ▶ Collection of operational information in emergency situations in the right-of-way



3D MODELING

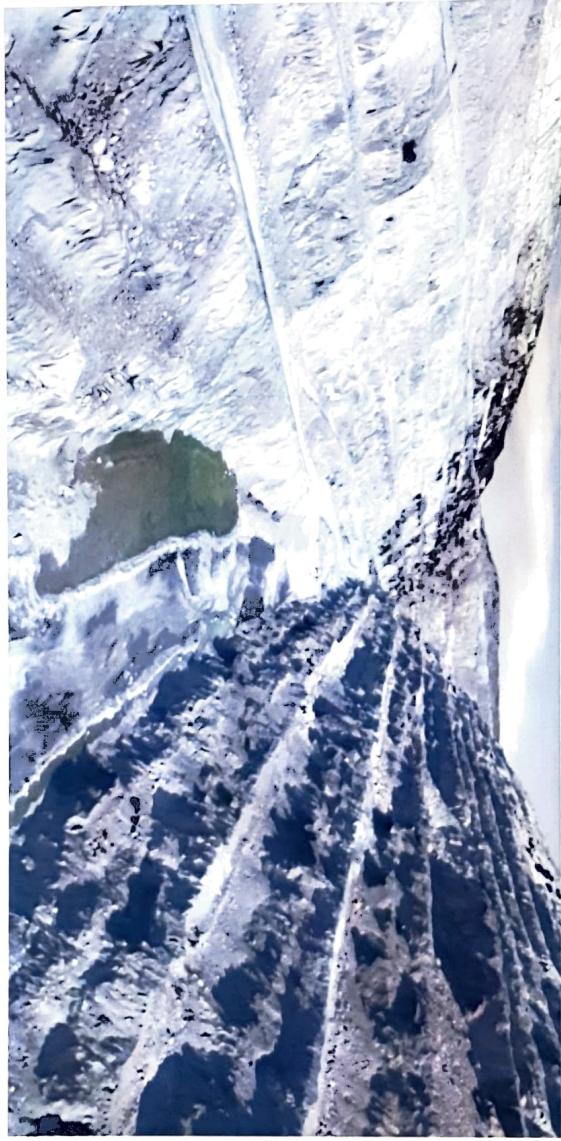
RECOMMENDED TOOLS



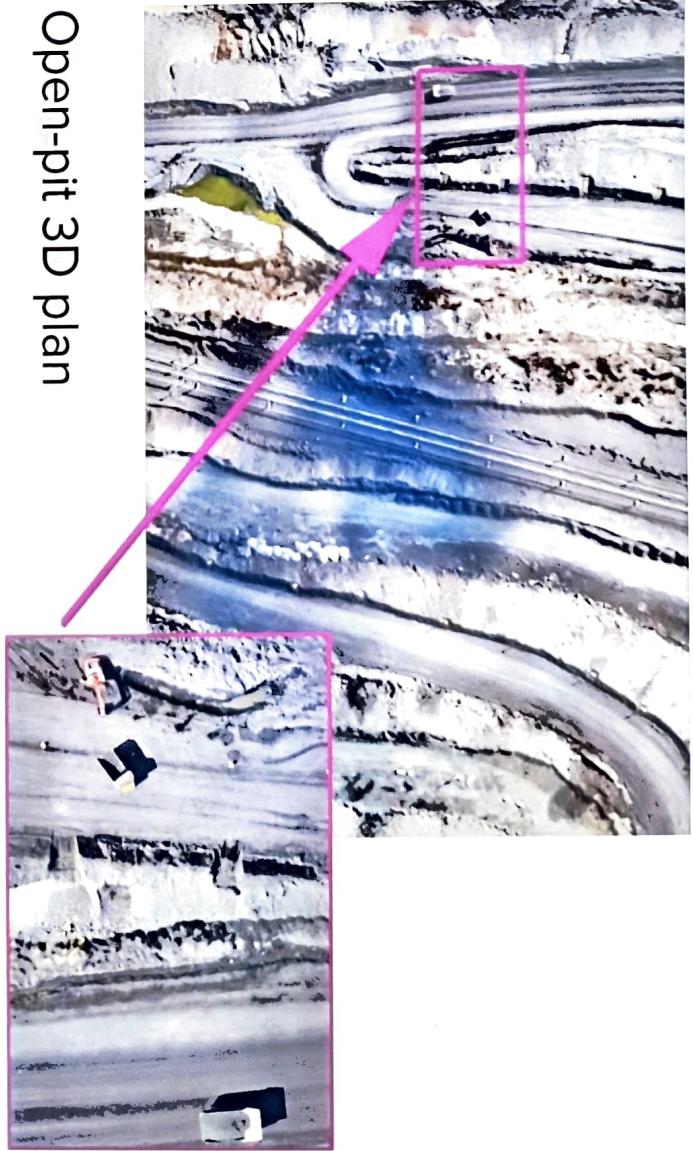
► Photo camera

STAGES OF WORK ON SITE:

- I. Pre-flight site assessment and development of a proper survey program
- II. Aerial Data Acquisition (getting a digital content for further processing);
- III. Data processing and map formation



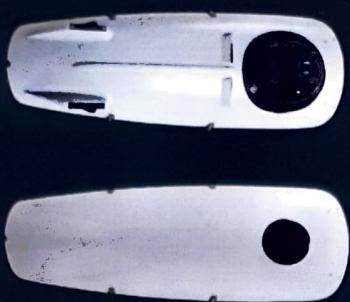
Open-pit 3D plan



PIPELINE MONITORING

AERIAL PHOTOGRAPHY AND VIDEO SURVEILLANCE

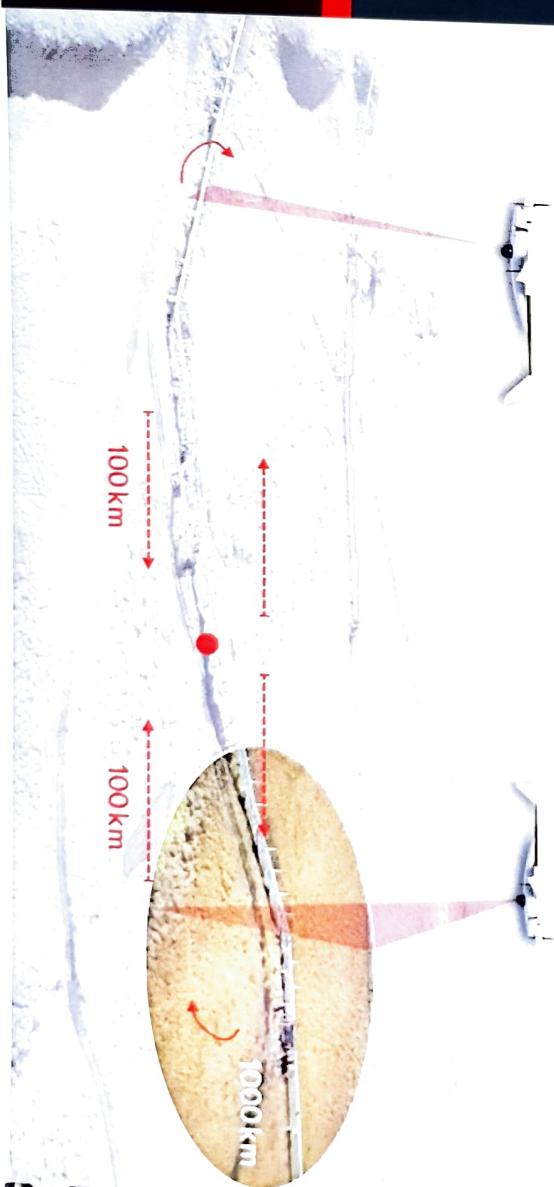
RECOMMENDED TOOLS



- ▶ Gyro-stabilised multi-sensor gimbal
- ▶ Photo camera

SOLUTION:

- ▶ continuous visual surveillance of the area around pipeline
- ▶ explicit qualitative assessment of object's condition



- ▶ high-quality snapshots of the pipeline, auxiliary equipment and surrounding infrastructure
- ▶ infrared images for detection of damages in the pipeline, where oil leakage is possible
- ▶ 2D ortho mosaics and 3D virtual models of pipeline and surrounding environment
- ▶ HD video record of pipeline which enables visual real time observation and assessment of its condition



IMPROVED BORDER SURVEILLANCE



RECOMMENDED TOOLS



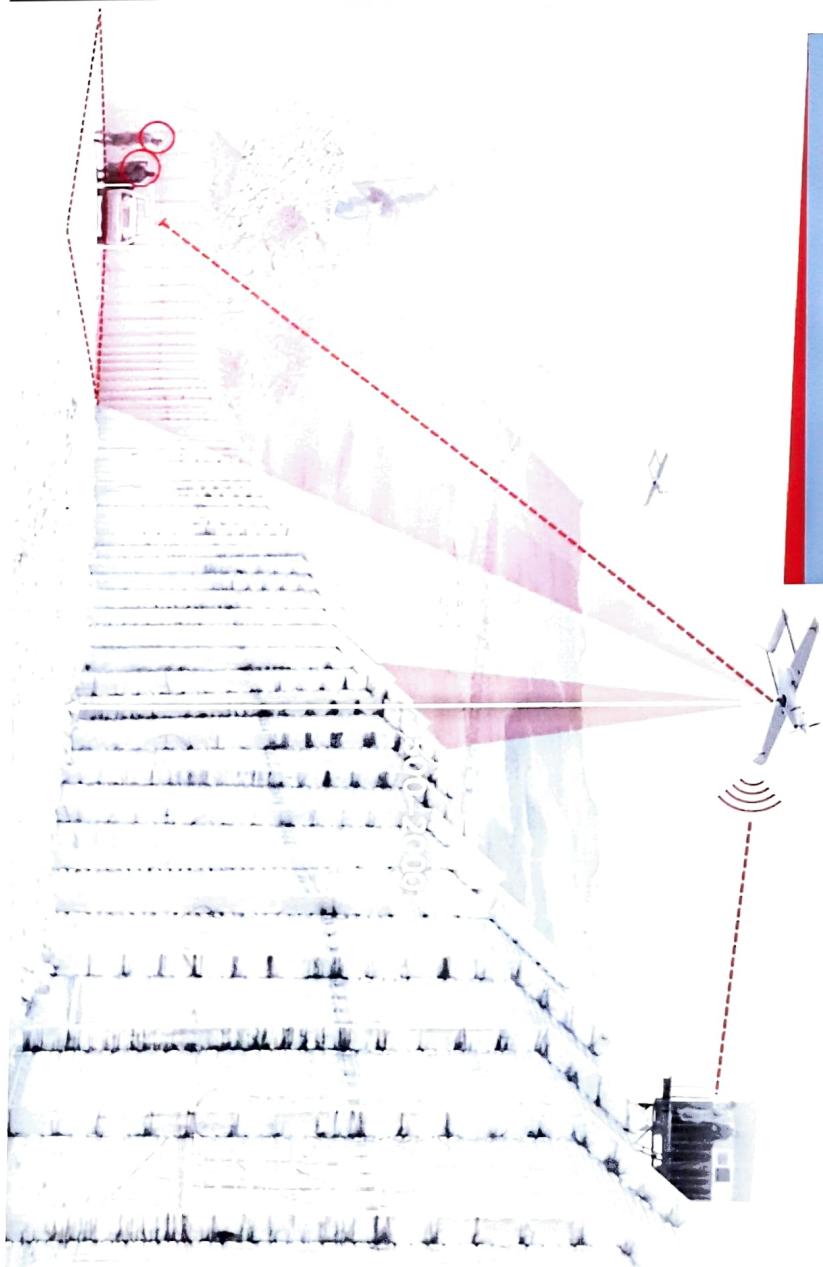
- ▶ Gyro-stabilized multi-sensor gimbal

SOLUTION:

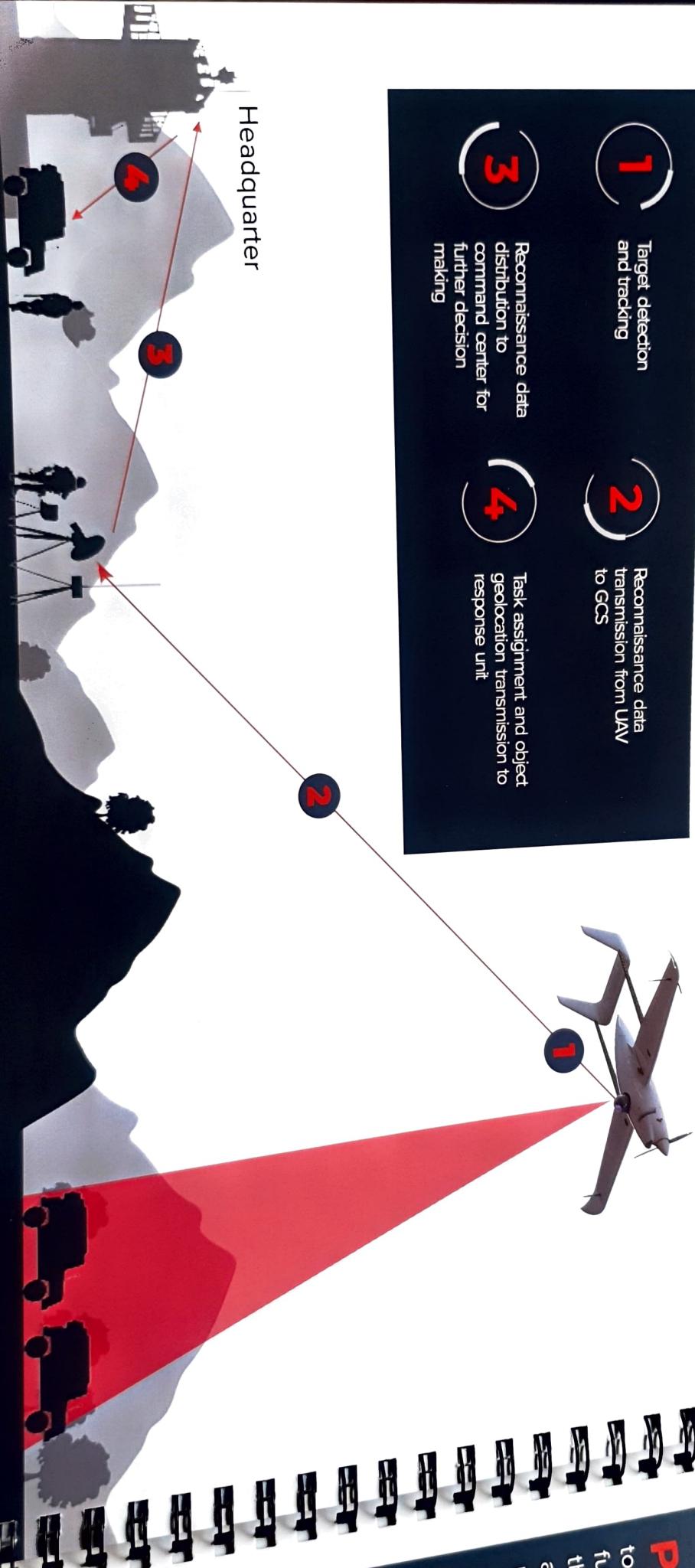
- ▶ 24/7 border patrol
- ▶ target identification and tracking

USE CASE

Border length 800 km
Patrolled route section 40 km
Speed 120 km/h
En-route data update every 20 min



RECONNAISSANCE MISSION



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TRAINING COURSE «OPERATION AND MAINTENANCE OF THE UNMANNED AIRCRAFT SYSTEM «RAYBIRD-3»



PURPOSE:

to provide a comprehensive training for future professionals. It provides both the necessary theoretical knowledge and practical skills to operate the unmanned aerial system «Raybird-3».

DURATION:

45 days (240 academic hours)

The training course consists of 2 phases: Theoretical and Practical (flight and UAS maintenance).

KEY TOPICS

- ▶ The general aeronautical knowledge
 - ▶ Application of the UAS in the context of international air law
 - ▶ Accommodating UAS operations within the current aviation infrastructure
 - ▶ General information about the service and technical characteristics of the UAV
 - ▶ The requirement for the Operator to demonstrate flight safety and how this is achieved
 - ▶ Implementation of technology to help control risks and hazards
 - ▶ Provision of an environment for safe operation
 - ▶ Typical use cases
- Upon completion of the training course, trainees should pass the qualification exam. After the exam is completed successfully, the operators receive certificates confirming the following qualifications: «UAS Operator», «Payload Operator» and «Maintenance specialist».

PLACE:

Lectures are held at Skyeton facilities, Kyiv, Ukraine

Practical classes – at Skyeton facilities, Kyiv, Ukraine; at local airfield, Ukraine



MOBILE MULTIMEDIA COMPLEX

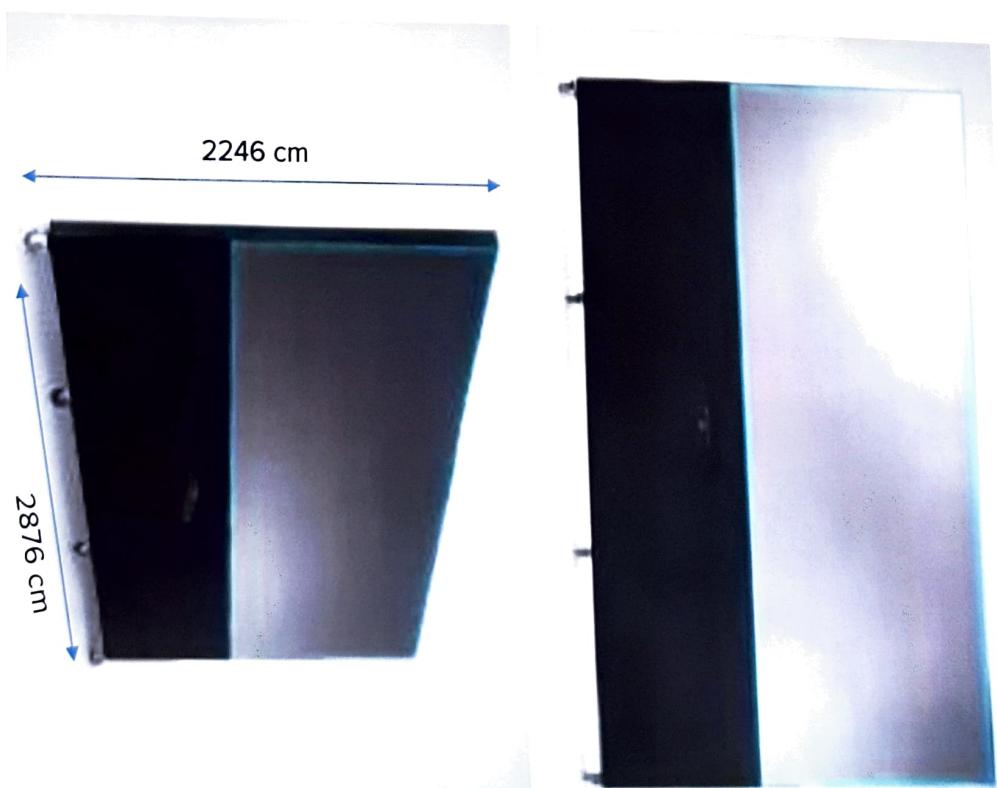


Innovative multifunctional device in the field of visualization. Projection monoblock with panoramic screen and active equipment on board.

Laser display technologies provide high definition and contrast of the content, the built-in powerful computer and stereo acoustics allow to inform and sound both small classrooms, and assembly halls and exhibition complexes.

Tasks:

- multichannel video communication;
- work on filling and use of GIS, display and analysis of data of video surveillance and facial recognition systems;
- analysis of software and hardware complexes of GPS;
- monitoring and control of moving objects, application of unmanned aerial vehicles and air reconnaissance complex for coordinating forces and supporting decision-making by law enforcement agencies for rapid analysis of the situation in case of emergencies;
- criminal and traffic accidents and directing mobile response teams.



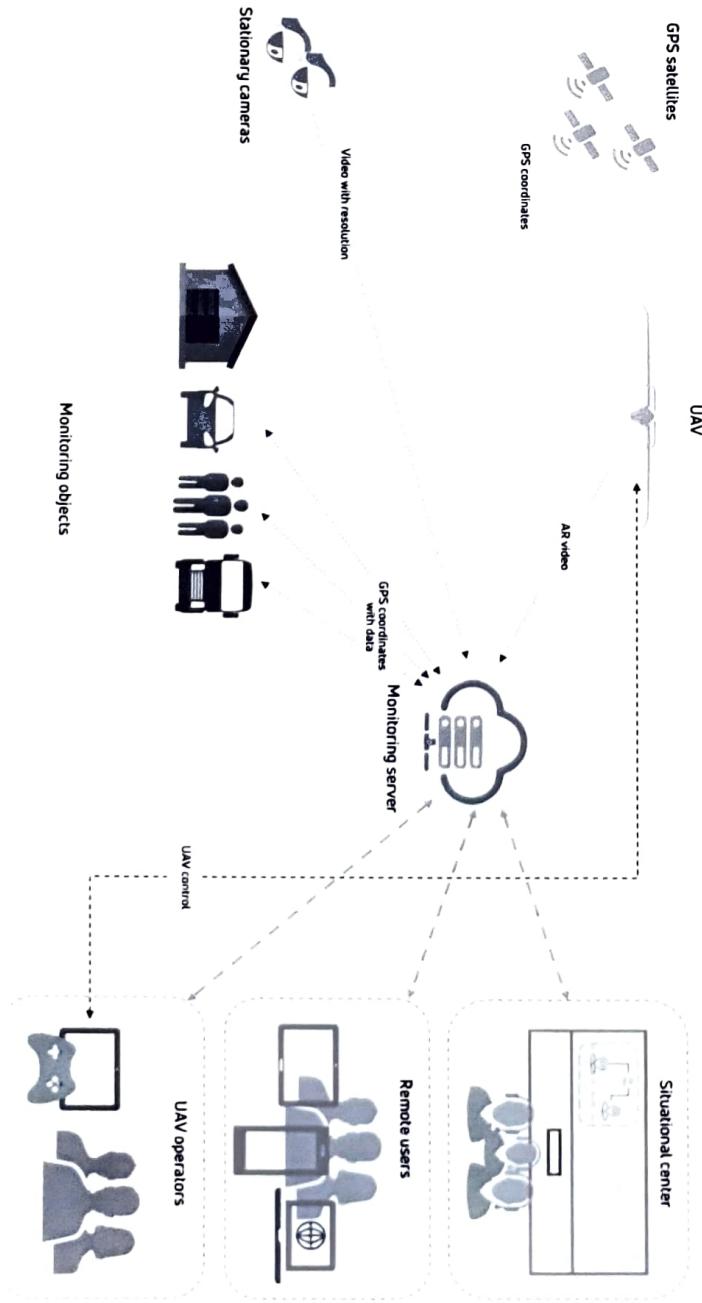
MOBILE MULTIMEDIA COMPLEX



Software and hardware complex of air reconnaissance

Displaying the data from UAV will allow to determine the coordinates of the object observed at any point in the video or photo, using telemetry data from the UAV camera in real time and in recording.

In practical use, it will allow to organize surveillance of the border area and emergency situations with the help of a series of ground surveillance cameras and patrol planes or UAVs, localization of border violations and rapid deployment of mobile interception teams.



MOBILE MULTIMEDIA COMPLEX



Technical specification

Hardware:

- Projection monoblock included: collapsible easily mounted design with panoramic seamless screen, equipped with dynamic contour illumination system, with built-in PC (server), projection module, speaker system, power supply system, set of drivers, cables for connecting additional external devices;
- Contour control panel;
- Projection module control panel;
- Gyroscopic control panel - gyro-mouse and keyboard functions;
- Multitouch set - sensor 1 pc., Styluses - 2 pcs.;
- Webcam FULL HD - Logitech Webcam HD Pro C920 - 1 pc.;
- Wireless keyboard + Logitech mouse kit - 1 set.

Software:

- Operating system Windows 10 Professional;
- Video conferencing application - Zoom Meetings & Chat;
- Applications for video capture card - RECentral 4, AmCap;
- Software for playing audio / video / PDF files;
- IWB v5.1 screen sensor adjustment software;
- Application for interactive whiteboard - OpenBoard;
- Applications for working with the Internet - Microsoft Edge, Google Chrome, GMAIL, Google Docs and others;
- Web camera applications.



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