

Warsaw 29-09-2025

## **ANNOUNCEMENT NO. 1/ZPBSU/2025 REGARDING THE ACQUISITION OF TECHNICAL SOLUTIONS IN THE DOMAIN OF UNMANNED AERIAL WEAPONS SYSTEMS**

Pursuant to Ministry of National Defence Decision 123/MON of 12 September 2025, the Inspectorate of Unmanned Combat Systems announces a procedure for the acceptance of applications from manufacturers of unmanned solutions on the organization and modes of testing in the Polish Armed Forces.

### **I. Subject of the announcement**

An airborne unmanned combat system. A set of FPV (First Person View) drones designed for advanced training on the tactical training strip.

### **II. INTENDED USE**

UCS is designed to carry out exercises and training tasks by soldiers, pilot candidates and UCS operators. The exercises will be carried out at designated and military-designated tactical exercise belts. The Ordering Party excludes the possibility of using the ordered equipment for OPERATIONAL purposes.

The unmanned aerial system must be able to carry out flights with the visibility of the VLOS (Visual Line Of Sight) radio horizon line, enabling the performance of an exercise consisting in carrying out a simulated attack on ground targets. The kit must be equipped with 5 FPV drones with different functional parameters specified later in the document. The system must be equipped with a daytime camera, a color camera (4 devices) with a wide viewing angle and a thermal imaging camera (1 device), video transmission system transmitting the image to the operator's goggles with low latency. The basic control system is the radio data transmission system (4 devices included). Transmission system by connection via fiber optic cable (1 device included). The system will not be integrated with any BMS system (Battle management system) for the exchange of tactical data. It is not possible to connect the systems to the Ministry of National Defence IT (MI, MZ) network. The only purpose of the above-mentioned system is advanced training of pilots and UCS operators.

### ***II. LIST OF MINIMUM TECHNICAL REQUIREMENTS.***

#### ***I. DEFINITION – FPV SYSTEM***

FPV (First Person View) training system is an unmanned combat system designed for flights in separate airspace D-DANGER in the area of closed military training grounds. The device performs tasks similar to smart loitering munitions and is capable of striking enemy manpower, infrastructure, and medium-armored vehicles. The system can be controlled by radio or via an optical cable. The system is adapted to drop training loads.

## ***II. DEFINITION – UAV DEVICE WITH ADDITIONAL EQUIPMENT***

The set includes the following elements and equipment:

- a. 2 UCSs (for day flights) containing engines, propellers, optical system with daytime camera, necessary electronics, radio transmission systems;
- b. 1 UCS (for day flights) containing engines, propellers, an optical system with a daytime camera, the necessary electronics, radio transmission systems and an implemented drop mechanism for transporting cargo. The dump mechanism must be controlled via the control controller via the appropriate GPO/AUX port. The trigger mechanism for the charge dump should be a suitable servo or stepper motor. The drop system should be adapted to transport a dummy combat load weighing up to 1 kg or 2 x 500 g (double system designed for 2 dummy combat charges);
- c. 1 UCS (for night flights) containing engines, propellers, optical system with a thermal imaging camera, the necessary electronics, radio transmission systems;
- d. 1 UCS (for day flights) containing engines, propellers, optical system with a daytime camera, necessary electronics, fiber optic transmission systems.
- e. A set of min 10 batteries for the UCS device;
- f. Two controllers containing joysticks to control the UCS together with with antennas. (One of the controllers is part of the GCS – Ground Control Station);
- g. Operator's goggles designed to receive video signals with with analogue VTX receivers;
- h. A set of chargers and power supplies with electrical wiring for UCSs, goggles and GCS;
- i. GCS station with a monitor and radio receiving system and the ability to receive the signal via optical cable;
- j. Antenna mast for GCS incl. antennas with high RF Video signal yield and telemetry;
- k. An additional power station to power the batteries in the car or for field work;
- l. 4 full sets of back-up propellers for each UCS system together with with the necessary tools to replace them;
- m. Durable protective and transportation packaging;
- n. Necessary electrical, antenna, video and USB wiring;
- o. Technical documentation in printed form in an abbreviated version and in full form saved on an electronic medium (CD or SD card) in the form of PDF files;
- p. Manufacturer's declaration of approval for sale in the EU, catalogue note photocopy of certificates of approval and technical tests, if manufactured.
- q. Min 2 SD cards of 32GB or more for FPV goggles and GCS station. To record videos to analyze the progress of pilots' teaching;

## ***III. CRITICAL REQUIREMENTS:***

- a. The manufactured device is manufactured in Poland or in the European Union or in a NATO alliance country;
- b. The equipment should meet the production requirements of ISO 9001;

- c. The device is approved in the EU and meets environmental protection requirements;
- d. The device should fly at a distance of not less than 5000 m from the pilot in the zone ensuring the visibility of the radio horizon. The device controlled by the optical cable must fly at a distance of up to 5000 m. It is not allowed to use software locks that limit the flight distance from the operator to only 5000 m;
- e. The radio-controlled device should fly above an altitude of 120m AGL. The device must be free of blockages and restrictions limiting the flight altitude to 120 m AGL;
- f. The UCS should fly on one set of charged batteries/packs with a load weighing at least 3 kg for at least 15 minutes of flight. (the UCS version with the drop system should perform a flight with a 1kg drop payload or 2 x500g in the version with a double drop mechanism. The test flight will be carried out in optimally favourable, windless weather conditions during the summer;
- g. The device should operate at an ambient temperature in the range of -5/+40 °C;
- h. UCS should fly at a speed of not less than 70 km/h for at least 5 minutes;
- i. The UCS shall fly in a wind of 14 m/s;
- j. UCS should perform a hover in the air. Altitude maintenance during hovering should be supported by a barometric altitude sensor. A height maintenance tolerance of +/- 2 m is acceptable;
- k. The device should work in light rain, allowing piloting in the event of drizzle during flight. It is recommended to have IPX1 or higher water resistance standards;
- l. The device must have a GNSS receiver receiving GPS, GALILEO, GLONASS satellite constellations, UCS position data must be displayed in the goggles and on the GCS screen. It is recommended to have an automatic return to the starting point (RTH) function;
- m. The device must be equipped with an electronic buzzer signaling a loud alarm in the event of loss of the UCS during a training flight, thus enabling the device to be found in the field;
- n. The device shall fly with and without GNSS in the event of a disturbance. Thus, it is not possible to start the device in the absence of GNSS signal;
- o. The device should stabilize horizontal flight with altitude maintenance based on the integrated IMU and barometric altimeter;
- p. The device should enable flight mode without full flight stabilization, thus enabling aerobatic mode (ACRO, MANUAL);
- q. The device signals the starting position using the GNSS indications by means of a corresponding marker. This data is displayed in the operator's goggles and on the screen of the GCS station. The direction of flight relative to the take-off position is indicated using a graphic icon. The distance of the ucs to the starting point is given;
- r. The drop system installed in the ucs (1 pcs) will be controlled by the appropriate function by means of a flight controller; (assigned function key on the control panel).

#### **IV. REQUIREMENTS OF THE UNMANNED AERIAL VEHICLE**

- a. The system should be made of durable material, plastic. The structure is a single monolith that does not require screwing or folding of components and parts by the user. The device is ready to work out of the package. It is permissible to use a frame made of material such as plastics, carbon fibers, light metal alloys such as aluminum;
- b. The size of the propellers should be in the range of 7-11 inches. The type of propellers, material, characteristics and parameters are to be selected in such a way that the device can perform the task of flying in a minimum of 15 minutes with a load in the form of a training load weighing 3 kg or more (4 systems without a drop mechanism included);
- c. Mounting of the propellers should be done with the use of tools that are included in the kit (wrench and tongs for gripping the motors);
- d. The propellers must be marked in such a way that the assembly is carried out quickly without the possibility of making a mistake (side of the propellers and direction of rotation);
- e. The weight of the UCS should not exceed 10kg. The specific weight of the device includes: the skeleton and housing of the device, the weight of the motors with propellers, electronics, antennas, optical system, battery or package, simulated training payload weighing 3 kg or more;
- f. The dimensions of the UCS frame measured diagonally across the arms should be 245 mm +/- 20 mm (without propellers);
- g. UCS must have 4 brushless motors of the OTRUNER type. The size of the motors, power, type of winding is calculated in such a way that the UCS is able to perform the assigned task, i.e. flight of not less than 15 minutes with load (training load, dummy);
- h. ESCs controlling the operation of brushless motors should be compatible with the flight controller electronics. It is permissible to use separate ESCs for each motor separately mounted on the UAV arms. The control should be carried out using the DSHOT300/600 or PWM protocol;
- i. The system (4 UCSs) should be equipped with a color camera as described later in the document;
- j. The system (1 UCS) should be equipped with a thermal night imaging camera described later in the document;
- k. A system equipped with a dump mechanism (1 UCS) should be able to tilt the camera so that the camera is looking down at the moment of the payload drop. Control via micro servo should be done from the control apparatus. A solution with two remote-switchable cameras (front-facing camera and down-firing camera) is acceptable;
- l. The device shall have an electronic gyroscopic (IMU) flight stabilization system;
- m. The equipment (systems with radio transmitters) shall have a radio transmitting and receiving system designed to control the UCS and a separate VTX system for real-time image transmission. The specification of the radio part is described later in the document;

- n. The system designed to be controlled by means of an optical cable should not cause delays in the control and reception of the video signal. The technical specification of the optical link is described later in the document;
- o. The UAV should be equipped with a GNSS receiver capable of achieving standard positioning precision without accuracy and precision for RTK systems;
- p. UCS electronics use XT60 or XT90 connectors for power supply. The kit (including chargers) includes power packs with the same types of connectors;
- q. The UCS should have a USB C socket designed to be connected to a laptop in order to introduce individual configurations related to the operation of the device. These are user-created configuration files;
- r. The manufacturer or supplier will provide an appropriate configuration program to ensure that the user settings are changed. The software must have a GUI (Graphics User Interface). The software must be running under the control of a Windows or Linux PC;
- s. The configuration software should allow you to change the OSD (On Screen Display) settings and other parameters such as PID settings.

#### **IV. OPTICAL SYSTEM, PAYLOAD, CAMERAS:**

##### **I. CMOS DAYTIME CAMERA**

- a. The device (4 UCSs for daytime flights) must have a camera or a set of cameras designed for daytime observation;
- b. A camera with an analog PAL signal of 625 lines is required. The camera is compatible with a flight controller and an analog video transmitter VTX (Video Transmitter);
- c. The camera should be able to work between 4:3 and 16:9 formats;
- d. The camera and its lens should provide a wide viewing angle of 130°, +/- 15%;
- e. The sensitivity of the CMOS sensor used in the daytime camera should be ISO 100-800 or higher with higher sensitivity;
- f. The camera should have AGC (Automatic Gain Control) mode, automatic sensitivity and gain control mode;
- g. The camera should work at a minimum speed of 25 FPS;

##### **II. NIGHT CAMERA, THERMAL IMAGING (1 UCS)**

- a. A night camera, thermal imaging camera should guarantee a clear image with a resolution of not less than 320 x 240 pixels;
- b. The thermal imaging camera should operate in the wavelength range corresponding to the LWIR (Long Wave Infra Red) classification, 8-14 µm;
- c. The camera shall generate a CVBS PAL video signal consistent with the VTX transmitter electronics installed in the UCS and in accordance with the UCS flight controller electronics;
- d. The camera should image heat signatures in "Hot is White" or "Hot is Black" mode. (user-defined, one-time).

## ***V. RADIO TRANSMISSION SYSTEM:***

- a. The UCS and the control system intended for the pilot must be compatible with each other;
- b. The device intended for video transmission (VTX) must be compatible with the VTX receivers installed in the headset and in the GCS station;
- c. It is allowed to use separate transmitters for telemetry and analog video transmission;
- d. Equipment must operate in radio frequency bands intended for use of radio equipment not requiring a radio licence '2,4 GHz' corresponding to the 2,400-2,4835 GHz frequency range or '5,8 GHz' corresponding to the 5,725-5,875 GHz frequency range;
- e. Radio equipment should be authorised for commercial circulation in the EU. The parameters of the radio path shall correspond to those required for Class 1 radio equipment not requiring a radio licence in accordance with Article 145(2)(5) of the Act of 12 July 2024. Electronic Communications Law (Journal of Laws of 9 August 2024, item 1221) or meet the conditions set out in the regulation of the minister responsible for information technology issued on the basis of Article 145(4) of the said Act;
- f. The device should have a user pairing mode between the UCS and the control controller. Telemetry transmitters must be compatible in this regard. The pairing procedure should be simple to follow and do not require specialized tools, software or an external electronic device;
- g. The kit should allow you to set VTX channels and transmitting frequencies using the control controller. To do this, the system must support the TBS Smart Audio protocol or equivalent with a similar operating principle to enable the VTX transmission channel to be set using GCS;
- h. The device must be able to fly the same devices in close proximity to each other without any negative impact on each other, thus preventing the performance of training tasks. (Explanation: 3 teams train simultaneously on the tactical exercise strip using the same drones and 3 GCS stations, there can be no mutual signal interference between paired systems);
- i. The device should prevent control from being taken over by another flight controller or other control device that is not paired with the UCS;
- j. It is recommended to transmit radio via an integrated telemetry transmitter using the AES128 or AES256 algorithm;
- k. k. It is recommended to use an FHSS radio transmitter for the telemetry and control module.

## ***VI. UCS CONTROLLER DESIGNED FOR UCS PILOTING***

- a. The controller must be compatible with the UCS telemetry receiver;
- b. The controller should have two joysticks designed to control the UCS and several keys or function switches configurable by the user according to individual needs;

- c. Configuration of flight controller functions must be done from the control controller software without the need for a PC or specialized tool;
- d. The weight of the controller should not exceed 800g;
- e. The controller should have hooks that allow it to be hung around the pilot's neck using a strap or so-called strings;
- f. The controller should be able to operate for no less than 60 minutes on battery;
- g. The controller must be able to connect to an external power source (power bank) or be able to replace the battery;
- h. The controller should have built-in radio antennas and a system for connecting external antennas via SMA or BNC connectors;
- i. The controller shall be resistant to light rain, moisture and dust at IP43 or above;
- j. The controller should have a battery charge indicator;
- k. The controller must have a screen, LCD display to configure the device. (the purpose of the display is not to display the image from the UCS camera);
- l. The controller must have a suitable socket for the external control module, a universal socket. This socket should be used for the installation of a fiber optic transmission module or for the installation of an additional amplifier, telemetry transmitter or other radio module extending the functionality of the control controller;
- m. The controller has a USB-C connector for charging and connecting to a PC using the HID (Human Interface Device) protocol for integration with a computer simulator intended for training (computer simulator software is not part of the equipment).

## ***VII. FPV GOGGLES FOR UCS PILOT***

- a. FPV piloting goggles must be compatible with the UCS transmitting system and work in the 5.8 GHz ISM band;
- b. The goggles must be able to receive the video signal generated by the UCS camera wirelessly;
- c. Goggles must have their own antennas with the possibility of connecting external antennas that are part of the whole set. SMA or BNC connectors are acceptable. The connectors intended for antenna operation must be compatible with each other;
- d. The connection cable between the goggles and the external antennas should be 10m or more.
- e. The equipment must have built-in high-resolution LCD or OLED displays capable of displaying the image generated by the UCS camera;
- f. The goggles have their own power supply and the ability to connect an external battery;
- g. The goggles allow you to connect LIPO 3s-6s power packs. Three Goggle Power Packs are included in the kit and must guarantee a total power supply of 4 hours of operation;
- h. The goggles must display telemetry data, the so-called OSD (On Screen Display) generated by UCS. The DSO must display telemetry information

such as: power status of the UCS battery, goggles, flight direction indicator based on the compass installed in the UCS, distance from the operator, UCS flight altitude, cross indicator of the conventional artificial horizon, information on the arming status of UCS engines;

- i. The goggles should have the function of recording the flight and recording in the form of an MP4 video, enabling the analysis of the learning progress. The resolution of the videos should be compatible with the format of the image generated by the cameras (PAL 625 lines). The image encoding used should be h264 or M-JPEG. Files saved in an MP4, AVI, or MOV container;
- j. The headset must have an additional HDMI or micro HDMI connector. Additional connectors for CVBS signal for connecting the module for optical transmission;
- k. It is recommended, for people with a slight visual impairment, to use a device that allows them to work with corrective glasses or change the gain setting of the inner lenses and adjust their spacing;
- l. It is recommended to replace the RF module operating in the 5.8 GHz band with a radio module operating in other bands. Such a module must be compatible in terms of connectors.

#### ***VIII. GCS AIR TRAFFIC CONTROL STATION***

- a. The GCS air traffic control station is a portable system equipped with its own power supply enabling battery life for more than 4 hours;
- b. The device is equipped with an LCD monitor with a size of more than 13 inches;
- c. a video radio transmission receiver compatible with the transmitter installed in the UCS;
- d. a set of sockets and connectors for connecting external video sources, such as an optical transmission module;
- e. The device should be capable of receiving video transmission from the UCS via radio systems and an appropriate system for transmission over optical fiber-optic cable;
- f. The device must be portable, housed in a durable enclosure made of made of impact- and moisture-resistant plastic in accordance with IP55;
- g. The weight of the entire device should not exceed 16 kg;
- h. The device should allow the power batteries to be replaced. The batteries shall be compatible with the power supplies and chargers which are the equipment of the subject of the proceedings;
- i. The device must be capable of connecting external antennas that are part of the entire system;
- j. Antennas (connectors) must be GCS compatible;
- k. Antenna cabling intended for operation (telemetry/video) should be compatible with the entire system.

#### ***IX. GCS AIR TRAFFIC CONTROL STATION***

- a. The manufacturer will provide 1 foldable antenna mast with antennas to receive telemetry and video signal;



- b. The antenna mast will be made of light metal or plastic;
- c. The height of the mast will be not less than 3m;
- d. The mast will be protected against tipping over by special counterweights or anchors with guys;
- e. Coaxial cables are included to connect the antennas with GCS or goggles and a control station. Cable terminations, connectors must be compatible with antennas and all radio equipment;
- f. The wiring should be 10 m +/- 2.5 m long.

#### ***X. FIBER OPTIC LINK WITH CABLE***

- a. The manufacturer will provide 1 UCS system adapted as part of the optical cable control kit;
- b. The system should be equipped with an optical cable tray of 5 km or more;
- c. The optical cable tray should be designed to allow permanent mounting on the UCS;
- d. The design of the optical cartridge should be made in such a way as to minimize the risk of entanglement of the optical cable in the propellers (e.g. tilting the cartridge at an appropriate angle downwards);
- e. Optical transmission should be one optical fiber at a time, singlemod transmission in both directions between UCS and GCS in the light length range of 1310 nm and 1550 nm;
- f. The termination of the optical cables should meet the standard of FC/PC connectors (screw-in terminations with threads);
- g. The same type of termination must be installed in all optical transmission components (UCSs/GCSs);
- h. The transmitting element at UCS will be integrated with UCS by company. The module should be connected to the flight controller using micro molex plugs or similar for quick replacement in the event of a failure;
- i. GCS will be integrated with the optical module in such a way that it guarantees the display of the image on the LCD monitor and provides full control through the flight controller of the pilot equipped with the GCS set.

#### ***XI. UCS BATTERY POWER PACKS***

- a. The manufacturer will provide at least 10 power packs for UCSs with compliant terminations with XT60 or XT90 plugs. (the same must be in the UCS);
- b. The power pack should contain 6 power supply sections (6S packs). The maximum discharge current should be 80-100C. The capacity of the package should be no less than 8,000 mAh;
- c. The voltage of the packs should be in the range of 22.2V-26.1V, thus leaving the possibility to choose the type of packs;
- d. The battery should provide a charge of at least 50 cycles;
- e. The bundle includes bundles for the headset and packages for GCS stations;
- f. The packs will have a balancing connector that allows you to connect a simple meter to measure the voltage of the battery section;

- g. Each packet should be equipped with a simple electronic sounder using a piezoelectric transducer to generate a loud sound when the packet is critically discharged. The device should be plugged into the balancer connector.

## ***XII. CHARGERS AND POWER SUPPLIES***

- a. The kit is supplied with an electric charger designed to charge model packs in the range of 2s-6s. The smart charger should realize the charging functions for 2 packs in parallel.
- b. The power supplies are adapted to 230V AC mains power supply, they are equipped with a short electrical cable (+/- 10 cm) with a European termination;
- c. The charger should be equipped with a safety device that prevents overcharging of the batteries;
- d. The charger should perform other functions such as discharging packets, checking capacity, carrying out packet preparation procedure for storage (Storage);
- e. The power supply should be able to operate at +5 to +35 °C;
- f. The kit should be equipped with a car charger or other alternative solution that allows you to charge the battery in the car from the cigarette lighter socket +12V DC;
- g. Two digital meters of battery capacity and DC voltage of the model packs are required in the kit;

## ***XIII. Packaging, transport***

- a. The transport packaging should be durable and sturdy. The main purpose is to provide protection against damage, the influence of moisture on transport and storage in a warehouse;
- b. Transport packaging, crates should be made of ABS with moisture seals and closures. The boxes should have grommets for the installation of security seals;
- c. The package should resemble the shape of a shipping box with carrying handles;
- d. The package should include: UCS, batteries, control controller, goggles for the remote control, wiring, power supply, quick start guide, tools for changing propellers, reserve propellers, other accessories of the set (without antenna mast);
- e. A separate box is allowed to be used to store the UCS drones themselves;
- f. The color should be subdued. Black, gray, green, olive green are allowed and sand. Bright colors that attract attention (fluo orange, fluo yellow, etc.) are excluded.

#### ***XIV. Software License and Patents***

- a. The manufacturer or importer makes a statement that the supplied devices are manufactured without infringing copyrights or patent rights that could infringe the interests of "third" parties;
- b. The software used is created by the manufacturer or in the case of using software purchased from "third parties", the manufacturer has appropriate agreements regulating the transfer of copyrights to the software, the operating system used, programming libraries, drivers, scripts included in the entire system. Transfer agreements govern licensing issues, including permits for further copying of software and redistribution;
- c. The software manufacturer agrees to the use of the software in systems intended for serial sale, commercial and military systems and this is in accordance with the software license.

#### ***XV. DOCUMENTATION***

- a. The contractor will provide documentation of the equipment, including a user manual in Polish. The manual can be delivered on an electronic medium in the form of a PDF file. The manufacturer agrees to copy the electronic documentation for the internal purposes of the ordering party and to place it in military ICT systems (milnet-I);
- b. Shortened in paper version in Polish for each piece of equipment. Summary documentation must be included in the shipping package;

#### ***XVI. MINIMUM CYBERSECURITY REQUIREMENTS***

- a. The UCS system does not require connecting additional devices, e.g. smartphone, modem, Starlink terminal to provide control functions.
- b. VTX analogue transmission is recommended for stable control in real time and with no delays;
- c. It is recommended to transmit radio via an integrated telemetry transmitter using the AES128 or AES256 encryption algorithm;
- d. The device must not save the so-called post-flight logs data on any memory located on the UCS PCB.