WB GROUP

WARMATE

Loitering Munition System

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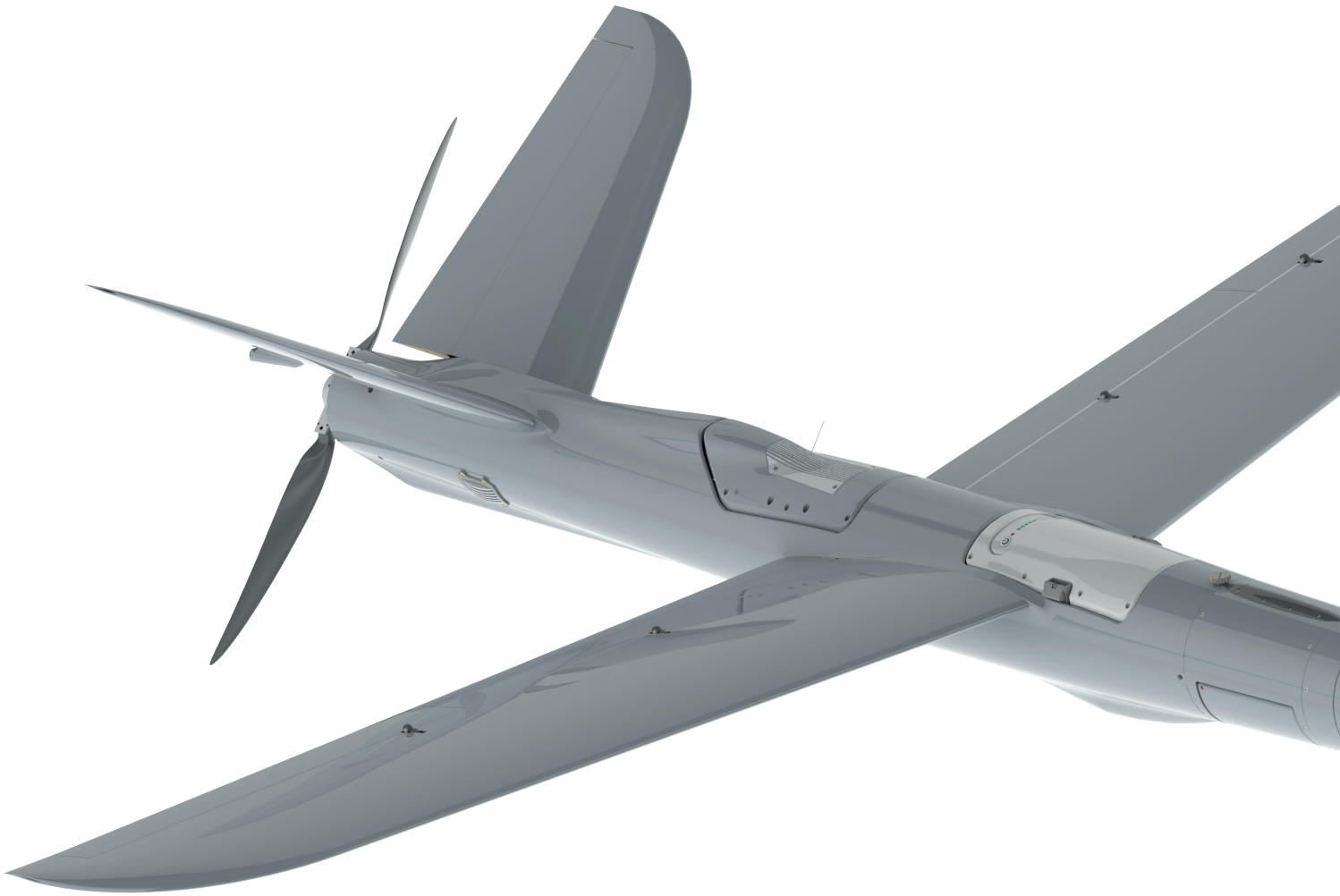
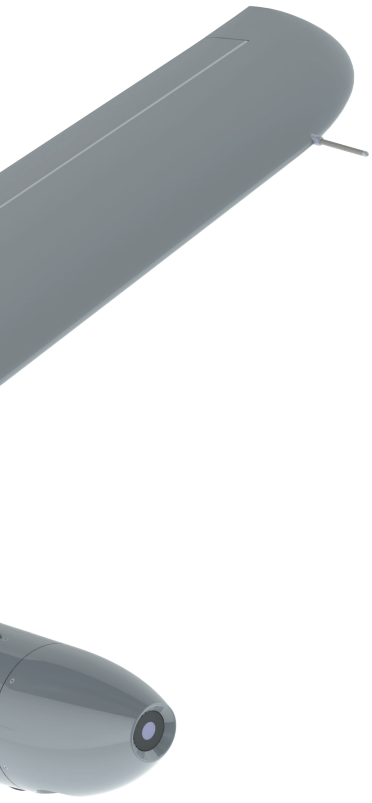
The WARMATE Loitering Munition System is a combat mini UAV that provides a highly targeted strike capability with either an anti-personal or anti-armor warhead. The addition of a daylight or thermal camera to the warhead allows for the assessment of a target before launching a strike, and a number of fail safe mechanisms means that missions can be easily aborted if intelligence is revised.



Strike



The attack mode initiates a strike on a selected target, and control of the AV is fully autonomous and based on the fire and forget system during a strike. The user is shown a video feed, at the ground control station, from the camera mounted on the front of the warhead, and this can be used to assist in directing the aircraft.

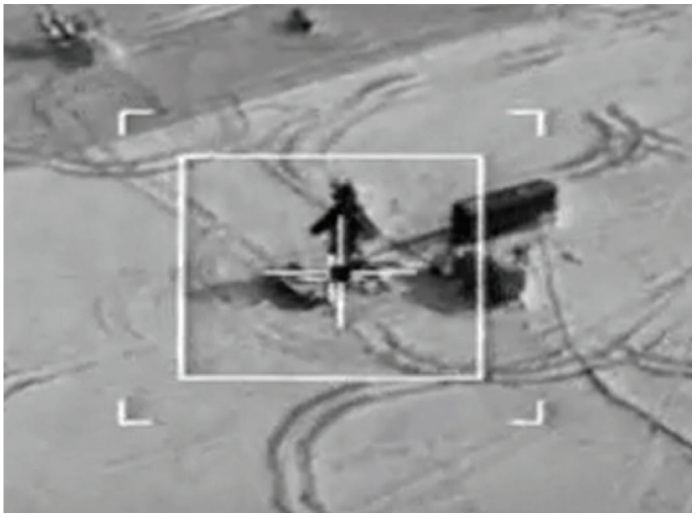
Warheads

The WARMATE airframe can incorporate various types of warheads (training, high-exposive anti-armor, anti-tank), which are interchangeable and can be changed in the field depending on the mission objectives.

Assessment

A real time video feed is provided by a daylight (EO) or thermal (IR) camera mounted on the front of the attached warhead, allowing for the observation of potential targets before initiating a strike.

The camera has an angle of incidence of 5° relative to the horizontal plane of the AV and offers a field of view of 75°. The daylight camera is capable of producing high quality images, and vehicle and human recognition is possible from a distance of 200 m.



User Friendly

The WARMATE System includes a mobile ground control station (GCS) that is easy to use and provides a real time video feed to the user. A wide range of autonomous flight modes can be managed at the GCS.

Flight Modes

Autonomous is the main flight mode that is pre-programmed by the user prior to a flight. During this mode the AV will take-off and then follow a series of waypoints according to a flight plan. However, at any point during this mode three further modes can be activated:

Loiter flight mode	The AV orbits a point over the ground.
Fly to coordinate	This flight mode is similar to the 'Loiter Flight Mode' except that the AV will fly from its current position to a new position set by the operator.
Cruise	This mode causes the AV to fly in a straight line in the direction that the camera is facing.
Attack	This mode initiates a strike. The automated videotracker allows for a precise target hit without the operator's control even after the loss of communication

Ground Control Station

The WARMATE ground control station (GCS) is lightweight and may be transported in a single backpack, allowing for easy deployment of the air vehicle (AV). The GCS comprises a ruggedized touch screen laptop being assisted by military joypad allowing the user to control the air vehicle (AV) and view visual data , and a data transceiver, which is a digital and bidirectional, tripod mounted, encrypted datalink that allows for the transmission of flight controls from the GCS to the AV.

Operators can easily set and modify flight plans using user-friendly software installed on any type of laptop chosen by the end-user. Real time data from the AV can be viewed and modified on the same screen as a map detailing the location, speed, and altitude of the AV.

Rapid Deployment

The take-off of the WARMATE is fully automated using a lightweight catapult launcher, which can be used from any surface; grass; ice; snow; or concrete. The launcher is assembled from three subcomponents and can be constructed in under ten minutes by an experienced user.

The AV is launched following a series of pre-flight tests to ensure communication between the ground control station and the AV. Take-off is fully automated.

Long Term Support

Maintenance

O-level or operational level is ongoing maintenance in the field to repair minor damage to the system. Each system has a toolkit provided and part of the training program enables the user to understand how and when to carry out minor repairs.

I-level or intermediate level is the repair and maintenance of more serious damage or faults with the system. This can be carried out by WB GROUP or be assigned to a third party, who will receive training from WB engineers, depending on the requirements of the user.

D-level or depot level is an overhaul of the system that is recommended every year, and is carried out by WB GROUP.

Training

WB GROUP provides a two week tailored program, which consists of lectures, simulation training, and live operation of the UAV. All training is computer aided and instructor led. Traineesundertake a series of exercises so as to become accustomed to multiple different flight and attack scenarios. The training program can be carried out in Poland or in a different country taking advantage of local support.

Multiple Safety Levels

The Warheads have three independent safety levels ensuring that detonation is only possible during a strike.

Level 1 A red strip needs to be removed before preparing the UAV for launch unlocking the warhead. This provides safety during the transport of the UAS.

Level 2 A second connector is attached to the launcher and removed during the launch. This provides safety during the assembly of the UAV.

Level 3 Each warhead has a unique electronic code that needs to be activated during the attack phase. Only following entry of this code by the user is detonation of the warhead possible. This ensures against incorrect detonation of the warhead during a mission.

Technical Data

Wingspan	1590 m
Length	1170 m
Maximum take-off weight	5300 g
Maximum payload weight	1400 g
Propulsion	Electric motor
Instrument airspeed	50/150 km/h
operating ceiling	100 - 500 m
Operational range	15 km
Operational speed	75 km/h
Maximum horizontal speed	120 km/h
Maximum speed during attack	150 km/h
Maximum operational ceiling	3000 m AMSL
Endurance	80 min.
Strike method	The attack mode initiates a strike on a selected target, and control of the UAV is semi-autonomous during a strike. The user os shown a video-feed, at the ground control station, from the camera mounted on the front of the warhead, and this can be used to assist in directed the aircraft.
Mission planning	yes
Flight along a flightpath	yes
Flightpath modification	yes
Manual control	Yes, assisted by an on-board computer - autopilot
Flight to a specific location	yes
Circling around a location	yes
Personnel needed for ground station operation	1 person can launch the UAV and then subsequently operate the GCS
Operational frequency	Military C-band – both uplink and downlink
Mission termination	Possible
Targeting accuracy	statistically confirmed 1.5 m CEP
Automated Target tracking	Yes, even after the loss of communication

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