UKRINMASH

UNMANNED VEHICLES

UkrOboronProm
Ukrainian Defence Industry

CONTENT

UKRINMASH - 25 YEARS AT THE INTERNATIONAL MARKET

The State Self-Supporting Foreign Trade and Investment Firm «Ukrinmash» which is the participant of the State Concern “UkrOboronProm”, operates at the international market since 1991.
The aim of the Firm is to implement the interests of Ukraine in the field of military-technical cooperation with foreign partners. «Ukrinmash» has built reliable business connections with countries from every part of the world. The key mission is service excellence, reliability and customer satisfaction.

«UKRINMASH» OFFERS:

- Export of weapons and military products in the field of armoured military vehicles, aircraft engineering, shipbuilding industry, radar, ammunition and air defence, as well as rocket and artillery weapons.
- Transfer of technologies and know-how, including the development of military factories and MRO centers.
- Maintenance, repair / overhaul and upgrade of military equipment.
- Training of foreign military personnel.
- Import of weapons and military products to Ukrainian Army and all other military and defence structures.
- R&D, investment and other partnership opportunities.
- Disposal, demilitarization of the old military equipment and territory demining.
- Marketing, advertising and intermediary services.

For the last few years Ukrainian Defence Industry has been in the stage of transformation into a highly effective structure. This process is taking place due to new technologies, products, innovations, efficient management and top-professionals who have come into this field. Today we are offering the new armament business culture, customer oriented, flexibility and personal approach.

We represent Ukrainian Enterprises of the State Concern «Ukroboronprom» which employ more than 80 thousand people, and the products of other Ukrainian enterprises. Ukraine is a reliable partner who exports the defence products to many countries of the world. The potential for development of the Ukrainian Military Industrial Sector is a tremendous one who is only at the beginning of its realization and prospects.

We suggest the widest product range in the field of aviation, armour, radio, artillery, as well as ship building and rocket industry, etc.

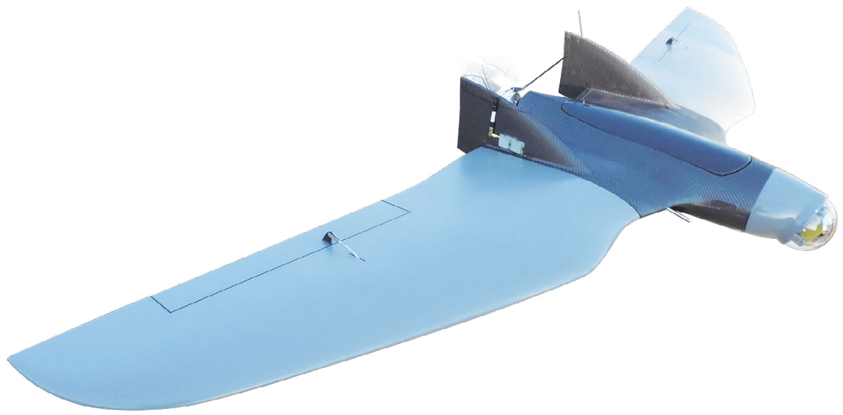
Ukraine makes part of prestigious club of the countries which has mastered the closed cycle in aircraft building, radio intelligence and radio-electronic warfare, whereas the Ukrainian export potential is among the best 10 in the world.

SE “Ukrinmash” is a unique special exporter and integrator which makes an important part of the Ukrainian Military Industrial Sector honored to be your reliable partner. We are proud that SE “Ukrinmash” is one of the most experienced and one of the biggest export-import companies of Ukraine which has been working in the armament and military hardware market for more than 25 years.

We present you our products range as well as services in repairing, upgrading, joint promotion of the products and cooperation in the military markets. SE “Ukrinmash” is not only reacting to the state of the market but initiates trends in the world market. For nowadays, SE “Ukrinmash” is making a new history of the military industry of Ukraine.

Sergii Sliusarenko
Chief Executive Officer

SE SSFTIF «Ukrinmash»



A1-S FURIA

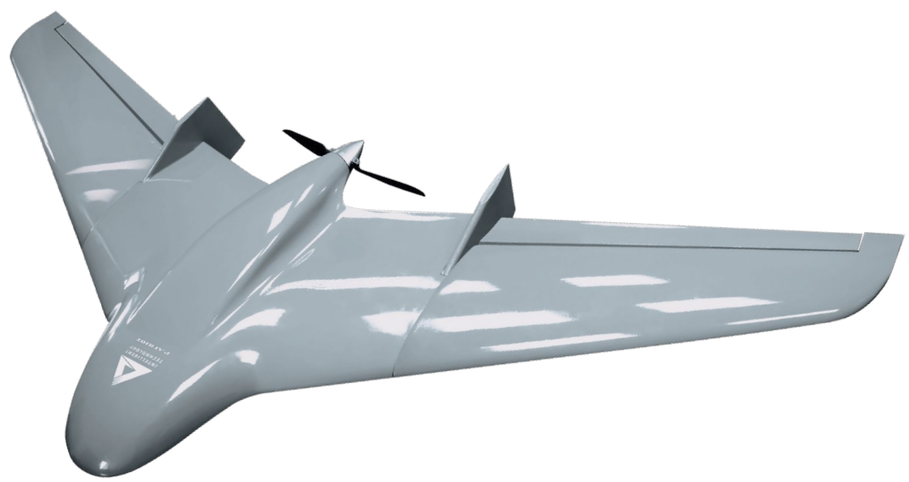
MAIN PERFORMANCE DATA

Purpose	Flash spotting and image reconnaissance day and night time in real-time mode at distance not more than 30km
Length, mm	654
Wing span, mm	1 950
Engine type	electric motor
Service ceiling, m	2500
Start	automatic from catapult
Landing	on parachute in automatic mode
Flight mode	manual, automatic with programming functions, automatic, semiautomatic with in-flight route correction
Autopilot	available
GPS-receiver	available
Daytime and night optical camera	available
Command line AES256	encrypted

COMPOSITION OF SYSTEM

UAS A1-S «Furia»	3 units
Ground control post with integrated manipulators	1unit
Optical night vision module	2 pcs.
Optical day vision module	2 pcs.
Ground antenna system	1 pc.
Catapult elastic	1 pc.
Catapult mechanic	1 pc.
Weather station (digital anemometer)	1 pc.
Repair set	1 pc.
Battery LiPo 16000 mA*h or Li-ion 21000 mA*h	8 pcs.
Case for transportation	5 pcs.
Charging battery Power Lab 8	1 pcs.
Memory card 32 GB	3 pcs.
Flight operational manual	1 pc.
Passport A1-S Furia	1 pc.

Flying range, max, km	Cruising altitude, m	Flight time, h	Speed range, km/h
120	80-2500	2	65-100



PATRIOT R2

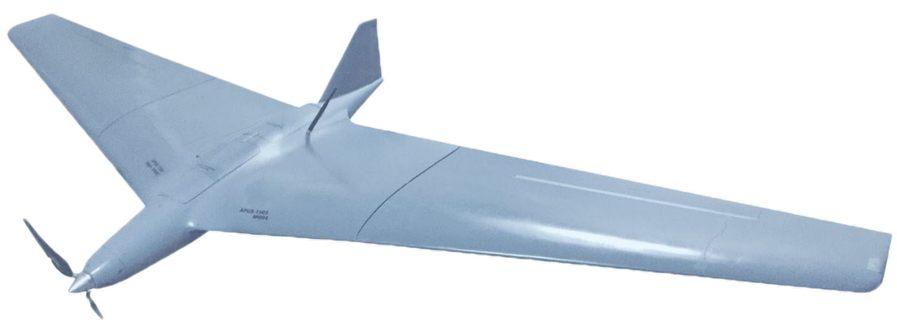
COMPOSITION OF SYSTEM

Unmanned aerial vehicle (UAV without targeted equipment , parachute and electric batteries)	3 pcs.
Ground control station	1 pcs.
Targeted equipment	3 pcs.
Antenna system	1 pcs.
Elastic catapult without rails	1 pcs.
Parachute	3 pcs.
Electric batteries for UAV and “Ground control station”	8 pcs.
Kit operational documentation	available
Power supply for «Ground control station» and batteries charge	1 pcs.
Transport packaging	4 units
Software for UAS “PATRIOT R2”	available

MAIN PERFORMANCE DATA

Getting intelligence information about the enemy and the terrain	
Searching targets and adjust artillery fire	
Improve the effectiveness and efficiency of solving the tasks of Border Service	
Monitor geographical areas (rapid detection of fires in fields and forests, etc.)	
Monitor of environmental conditions	
Length, mm	650
Wing span, mm	1 500
Engine type	electric, quiet
Service ceiling, m	2 000
Take-off position	elastic catapult without rails
Landing	parachute
Flying modes	automated, according to the given coordinates
Autopilot	available
GPS-receiver	GPS, GLONNAS, BeiDou, inertial system
Thermal imaging camera	available at night and day
Command line and telemetry channel	encrypted

Flying range, max, km	Cruising altitude, m	Flight time, h	Speed range, km/h
120	400-1000	2	25-100



APUS 1505A01

MAIN PERFORMANCE DATA

Purpose	aerial reconnaissance in real time with identification and coordinates definition of the objects under observation
Length, mm	900
Wing span, mm	3 200
Engine type	electric motor / internal combustion engine
Service ceiling, m	3 500
Take-off position	catapult with elastic elements
Landing	parachute landing; to body
Flying modes	automatic, semi-automatic, operator's PC; option for changing the mission/task during flight
Autopilot	available
GPS-receiver	available (UDC GPS)
Thermal imaging camera	available at day and night
All channels	encrypted
Maintenance documentation	available

COMPOSITION OF SYSTEM

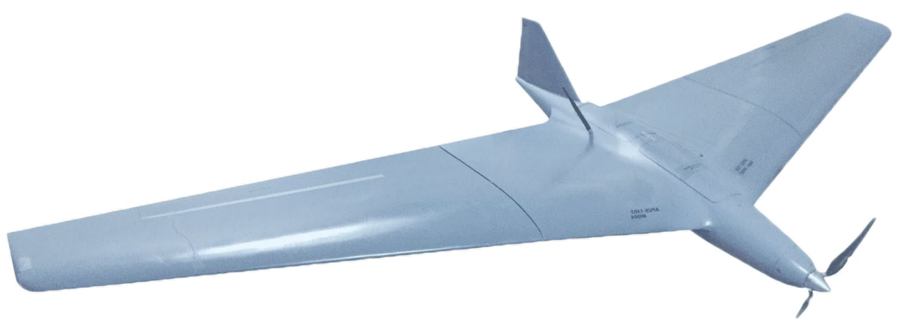
UAV	3 pcs
Ground control station	1 pcs
Catapult	1 pcs
SPTA kit	1 pcs

Flying range, max, km
140-800

Cruising altitude, m
1000

Flight time, h
3 / 6-8

Speed range, km/h
70-150



APUS 1505A04

COMPOSITION OF SYSTEM

UAV	3 pcs
ground control station	1 pcs
catapult	1 pcs
SPTA kit	1 pcs

MAIN PERFORMANCE DATA

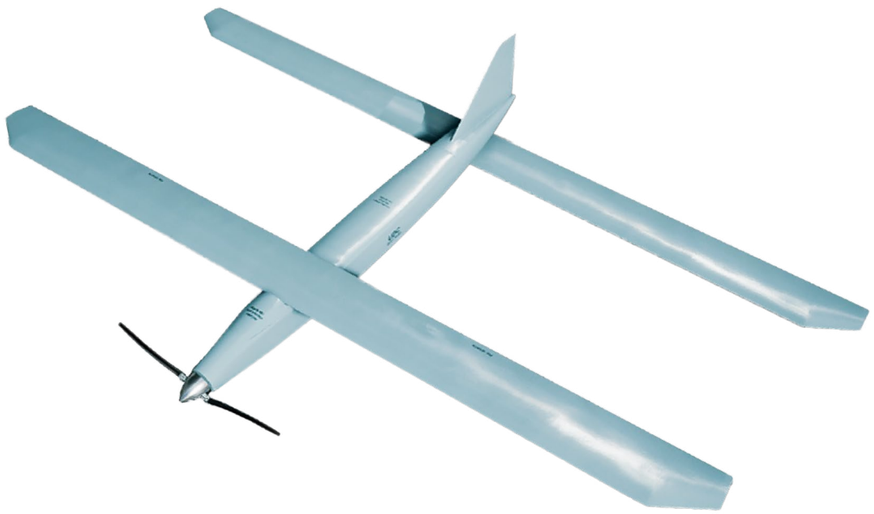
Purpose	collecting ID (IMSI / IMEI) terminals of mobile communication standard GSM (2G) and UMTS (3G) with simultaneous determination of target coordinates
Length, mm	900
Wing span, mm	3 200
Engine type	electric motor / internal combustion engine
Service ceiling, m	3 500
Take-off position	catapult with elastic elements
Landing	parachute landing; to body
Flight mode	automatic, semi-automatic, operator's PC; option for changing the mission/task during flight
Autopilot	available
GPS-receiver	available
Thermal imaging camera	available at day and night
Command line, telemetry channel	encrypted
Maintenance documentation	available

Flying range, max, km
140-600

Cruising altitude, m
1000

Flight time, h
2 / 4-6

Speed range, km/h
70-150



DRAGONFLY 1603

MAIN PERFORMANCE DATA

Purpose	aerial reconnaissance in real time with identification and coordinates definition of the objects under observation
Length, mm	1 250
Wing span, mm	1 900
Engine type	electric motor
Service ceiling, m	3 500
Cruising speed, km/h	50
Take-off position	hand launched
Landing	parachute landing / to body
Flight mode	automatic, semi-automatic, operator's PC; option for changing the mission/task during flight
Autopilot	available
GPS-receiver	available
Thermal imaging camera	available at day and night
Command line, telemetry channel	encrypted
Maintenance documentation	available

COMPOSITION OF SYSTEM

UAV	2 pcs
ground control station	1 pcs
SPTA kit	1 pcs

Flying range, max, km: 140

Cruising altitude, m: 800

Flight time, h: 2

Speed range, km/h: 50-120

OBRIY

COMPOSITION OF SYSTEM

Ground Control Station (as an option can be mounted on the chassis of the vehicle with off-road capabilities)
Set of jet propelled UAV's
Simulator

MAIN PERFORMANCE DATA

Purpose	application as a flying target and high performance training solution for a variety of gun and air defence missile systems
Length, mm	3 350
Wing span, mm	2 470
Engine type	turbojet
Service ceiling, m	5 500
Take-off position	conventional takeoff (distance): 150 m
Landing	conventional landing (distance): 200 m
Flight modes	automatic, semi-automatic
Autopilot	available
GPS-receiver	available
Command line and telemetry channel	encrypted

Flying range, max, km: 125

Cruising altitude, m: 2 000

Flight time, min: 30

Speed range, km/h: 500

SPARROW

MAIN PERFORMANCE DATA

Purpose	aerial reconnaissance and surveillance
Take off weight, kg	2
Length, mm	600
Wing span, mm	980
Engine type	electric motor
Cruising speed, km/h	80
Start	automatic from catapult
Landing	on fuselage in automatic mode. Emergency landing is available
Flight modes	automatic, semiautomatic with in-flight route correction
Autopilot	available
GPS-receiver	available
Daytime and night optical camera	available
Video and telemetry channel	encrypted

COMPOSITION OF SYSTEM

UAV	2-4 pcs.
Ground control station (ruggedized PC)	1 pc.
Antenna system	1 pc.

Flying range, max, km	Cruising altitude, m	Flight time, h	Max speed, km/h
15	2000	1	100

SPARROW LE

COMPOSITION OF SYSTEM

UAV	2-4 pcs.
Ground control station (ruggedized PC)	1 pc.
Antenna system	1 pc.

MAIN PERFORMANCE DATA

Purpose	Intended for use by patrol and reconnaissance units for observation
Length, mm	1 400
Wing span, mm	3 200
Engine type	electrical
Service ceiling, m	5 000
Cruising speed, km/h	50
Take-off position	hand launched
Landing	on wheel
Flight modes	automatic, searcher, reconnaissance
Autopilot	available (INS ACU)
GPS-receiver	available (GNSS)
Daytime and night optical camera	available
Video and telemetry channel	encrypted

Flying range, max, km	Cruising altitude, m	Flight time, h	Speed range, km/h
200	1000	2-3	60-110

ANSER

MAIN PERFORMANCE DATA

Purpose	tactical surveillance, target reconnaissance at day and night
Length, mm	2 200
Wing span, mm	3 500
Engine type	fuel
Service ceiling, m	3000
Take-off position	catapult or wheels
Landing	parachute or wheels
Flying modes	automatic, searcher, reconnaissance
Autopilot	available (INS ACU)
GPS-receiver	available (GNSS)
Daytime and night optical camera	available
Video and telemetry channel	encrypted

COMPOSITION OF SYSTEM

UAVs	2-4 pcs
GCS	1 pc
Antenna complex	1 pc (based on vehicle)
Secured channel	

Flying range, max, km
780

Cruising altitude, m
1000-1500

Flight time, h
6-12

Speed range, km/h
60-110

SPECTATOR-M

COMPOSITION OF SYSTEM

UAV	3 - 9 units
Ground control station	1 unit
Telemetric communication system	1 set
Tracking and information reception system	1 pc.
Long range radio control system	1 pc.
Control panel	1 pc.
Battery set with charging device	1 set
Portable back pack	3 set
Memory card 32 GB	4 – 11 pcs.
Battery LiPo 16000 mA*h or Li-ion 21000 mA*h	8 pcs.
Documentation	1 set

MAIN PERFORMANCE DATA

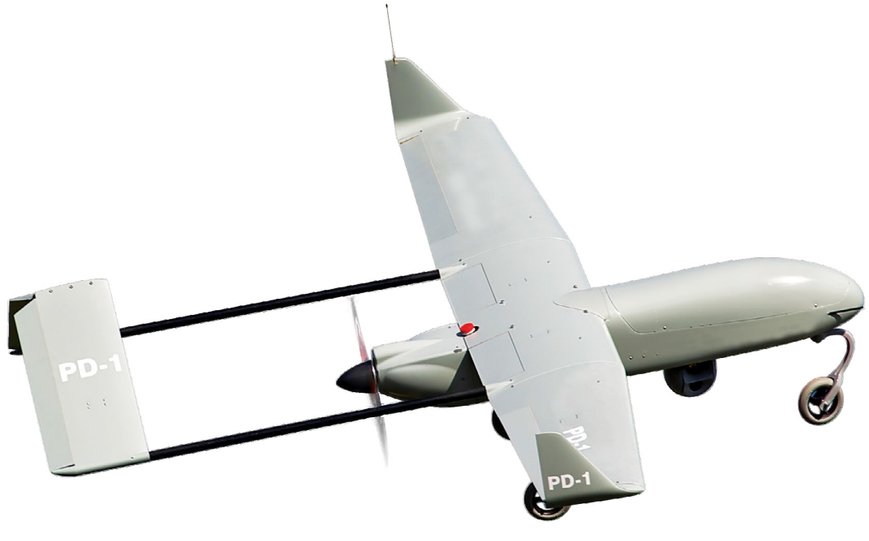
Purpose	reconnaissance in a real time mode of day and night
Length, mm	1 295
Wing span, mm	3 000
Engine type	electric motor
Service ceiling, m	3000 (max altitude above sea-level — up to 2000)
Cruising speed, km/h	70
Start	manual, semiautomatic
Landing	on parachute in automatic mode, manual
Flight modes	manual, automatic with programming functions, automatic, semiautomatic with in-flight route correction
Autopilot	available
GPS-receiver	available
Inertial systems	available
Thermal imaging camera	available

Flying range, max, km
30/50

Cruising altitude, m
80-1500

Flight time
UP TO 2 HR

Max speed, km/h
120



PEOPLE'S DRONE PD-1

MAIN PERFORMANCE DATA

Purpose	air reconnaissance and control on enemy's movement
Empty weight, kg	15-23
Payload weight, kg	8
Length, mm	2540
Wing span, mm	3190
Engine type	gasoline
Start	aircraft type
Landing	on chassis, automatic
Flight mode	automatic, semiautomatic with in-flight route correction
Autopilot	available
GPS-receiver	available
Inertial systems	available
Time of deployment	15 min.
Thermal imaging camera	available at night and day
Information channel specifications	Range of communication channel – min 100 km (digital channel, protected) directed antenna UAV can operate in conditions of enemy EW countermeasures, PD-1 can continue mission in automatic mode or return to start-point in case of external impact in connection or navigation system. The system of inertional navigation is used for the purpose.

COMPOSITION OF SYSTEM

aircraft with internal-combustion engine	1 pc.
gyrostabilized platform	1 pc.
camera and thermal imager	1 pc.
vehicle for terrain movement	1 pc.
portable aircraft control station	1 pc.

Flying range, max, km	Cruising altitude, m	Flight time, h	Speed range, km/h
100	2000	5	70 - 140

PEOPLE'S COPTER PC-1

MAIN PERFORMANCE DATA

Purpose	air observation of enemy movement, reconnaissance
Weight, kg	3,6
Dimensions of disassembled, mm	500*280*130
Dimensions of assembled, mm	530*480*130
Service ceiling, m	2 000
Take off	vertical
Landing	in automatic mode in pointed place, vertical
Inertial system	available
GPS-receiver	available
Wind speed limit during start/ landing m/sec	15
Thermal imaging camera	available at night and day
Information channel specifications	range of communication channel – min 5 km (digital channel, protected)

Flying range, max, km	Cruising altitude, m	Flight time, min	Speed range, km/h
5	5-400	30	65-110

UA BETA

MAIN PERFORMANCE DATA

Purpose	reconnaissance, patrolling, locality mapping with on-line data retransmission
Max take-off weight, kg	4,5
Payload, kg	1
Engine type	electric motor
Service ceiling, m	3 000 (max altitude above sea-level — up to 2 000)
Start	catapult
Landing	parachute
Inertial system	available
GPS-receiver	available
Information channel specification	connection channels – digital, protected
Thermal imaging camera	available at day and night
Command line	encrypted

COMPOSITION OF SYSTEM

UAV	2 pcs
Launching devise	1 pc
Container for transportation	

Flying range, max, km
20/40

Cruising altitude, m
100-1500

Flight time, h
1.5

Speed, km/h
75

UA-GAMMA

COMPOSITION OF SYSTEM

Platform with power systems	2 pcs
Launch system	1 pc
Ground control station	1 pc
Containers for transportation	

Delivery configuration can be changed upon request. Any kind of a payload can be installed according to specification.

MAIN PERFORMANCE DATA

Purpose	aerial surveillance in real time, monitoring of linear and planar objects, remote sensing for the benefit of various industries
Length, mm	1 800
Wing span, mm	2 980
Engine type	internal combustion engine
Service ceiling, m	3 000
Take-off position	mechanical catapult, automatic mode
Landing	parachute and airbag amortization
Flight modes	automatic, semi-automatic, manual modes
Autopilot	available
GPS-receiver	available
Thermal imaging camera	available at day and night
Command line	encrypted

Flying range, max,km
200

Cruising altitude, m
1000-2000

Flight time, h
6

Speed range, km/h
70-160

LELEKA-100

MAIN PERFORMANCE DATA

Purpose	air reconnaissance, patrolling, locality mapping with on-line data retransmission
Max take-off weight, kg	5,4
Length, mm	1 100
Wing span, mm	2 000
Engine type	electric motor
Service ceiling, m	1 500
Start	as aircraft
Landing	landing gear
Autopilot	available
Inertial system	available
GPS-receiver	available
Operational training	3 days
Thermal imaging camera	available at night and day

COMPOSITION OF SYSTEM

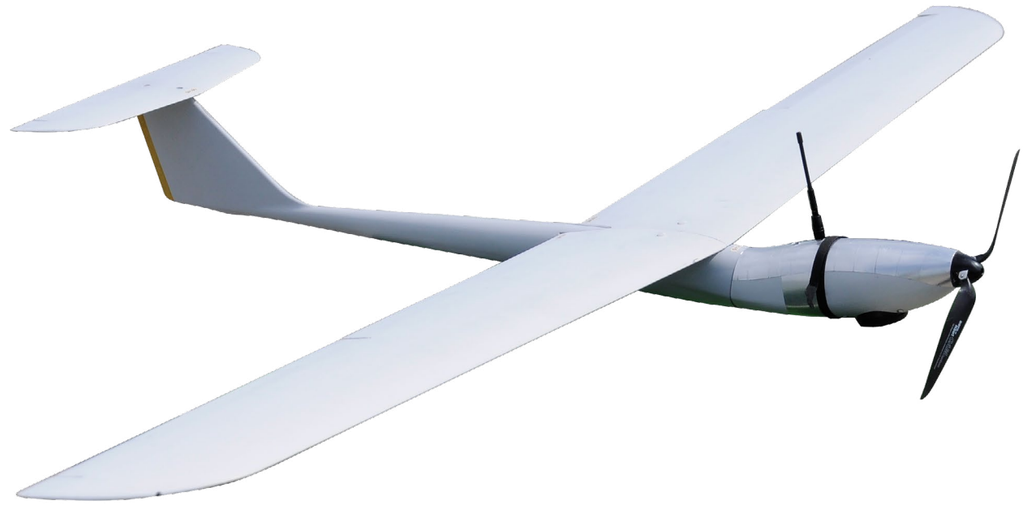
UAV	1 pc
Set of groung equipment and antennas	1 pc
Ground control station	1 pc
Battery	2 pcs
Charging unit	1 pc
Transportation container	
SPTA kit	1 pc

Flying range, max, km
180

Cruising altitude, m
50-1000

Flight time, h
2

Speed range km/h
60-80



MARA-2P

COMPOSITION OF SYSTEM

UAV	3 pcs
Ground control post	
Table-case with PC, equipped by sun visor and environment impact protected	
SPTA kit	1 set
Antenna	
Automatic watch devise	

MAIN PERFORMANCE DATA

Purpose	air reconnaissance
Wing span, mm	1 950
Take-off weight, kg	1,9 – 2,3
Engine type	electric
Operating ceiling (height), m	3 000
Start	manual
Landing	on airframe
Flight modes	automatic, semi-automatic
Autopilot	available
Inertial system	available
GPS-receiver	available
Thermal imaging camera	available at day and night
Command line	encrypted

Flying range, max, km
25

Cruising altitude, m
50-750

Flight time, min
50 - 90

Speed range, km/h
35-80

OBSERVER - SMP

MAIN PERFORMANCE DATA

Purpose	aerial reconnaissance, monitoring of environment and infrastructure facilities, search and rescue operations, protecting extended facilities etc.
Length, mm	1650
Wing span, mm	3400
Engine type	electric engine
Service ceiling, m	1500
Take-off position	hand launched
Landing	parachute landing
Autopilot	available (Pixhawk)
GPS-receiver	available (GPS/ Glonass)
Thermal imaging camera	available at day and night
All channels	encrypted

COMPOSITION OF SYSTEM

UAV	2 pcs
ground control station	1 pcs
antenna equipment	1 pcs
set of batteries for UAV	1 pcs
battery charging station	1 pcs
technological console for the pre-flight inspection	1 pcs
SPTA kit	1 pcs

Flying range, max, km
32

Cruising altitude, m
20-1000

Flight time, h
2.5

Speed range, km/h
40-100

ACS-3

COMPOSITION OF SYSTEM

UAV	2 pcs
Ground control station	1 pc
Launching devise	1 pc
Petrol power generator for control post	1 pc
SPTA kit	1 pc

MAIN PERFORMANCE DATA

Purpose	air reconnaissance
Empty UAV weight, kg	10
Max take-off weight, kg	19.5
Length, mm	1 830
Wing span, mm	3 000
Engine type	electric
Service ceiling, m	2 000
Start	starting accelerator
Landing	parachute
Flight mode	automatic
Inertial system	available
GPS-receiver	available
Thermal imaging camera	available at night and day
Information channel specifications	operational range of connection channel - 80 km

Flying range, max, km
82

Cruising altitude, m
100-300

Flight time, h
10

Speed range km/h
80-140

CHIMERA-H

MAIN PERFORMANCE DATA

Operational modes	Auto/Manual
Max. flying speed, km/h	up to 50
Endurance	2 hours (payload 5 kG)
Dimensions, mm	1540 x 1540 x 560
MTOW, kG	19
Operating Temperature	(0°C) to (+40°C)
Storage Temperature	(-20°C) to (+65°C)
Humidity	≤ 94 ± 4% relative humidity
Airframe type	Hexa
Quantity of motors, pcs	6, BLDC
Propellers	carbon fiber, 26"
Power system type	gasoline-electric hybrid power system
Output electric power	2000W
Drone on-board voltage, V	50
On-ground flight control system	autonomous, based on Tablet PC
Telemetry data link	wide band communication link

Flying range, km
150

Max. flying height, m
UP TO 1000

Flight time, h
UP TO 4

Forward speed, m/s
14

GORLYTSA

COMPOSITION OF SYSTEM

ground control station	2 pcs
ground technical service vehicles	

MAIN PERFORMANCE DATA

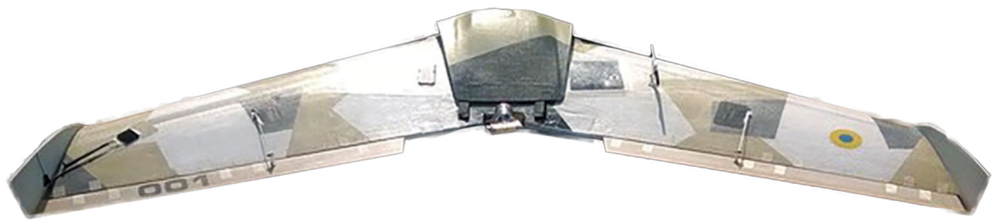
Purpose	Tactical reconnaissance
Length, mm	4 417
Wing span, mm	6 764
Engine type	PE AI-50
Service ceiling, m	5 500
Take-off position, m	200
Landing, m	200

Flying range, max, km
1050

Cruising altitude, m
1800 - 2400

Flight time, h
7

Speed range, km/h
50 - 230



VALKYRIA

MAIN PERFORMANCE DATA

Purpose	air reconnaissance in conditions of EW countermeasures
Weight, kg	3
Wing span, mm	1 600
Engine type	electric motor
Service ceiling, m	1 000
Start	manual
Landing	on airframe
Flight mode	automatic, simi-automatic
Autopilot	available
Inertial system	available
GPS-receiver	available

COMPOSITION OF SYSTEM

UAV	2 pcs
Communication unit	1 pc
Tablet	1 pc
Battery	1 pc
Charging unit	1 pc
Transportation container	1 pc
Set of reserve batteries	1 pc

Flying range, max, km
120

Cruising altitude, m
450

Flight time, h
2

Speed range, km/h
60-80

COMMANDOR

COMPOSITION OF SYSTEM

UAV “Commandor”	2 pcs
GS	1 pc

MAIN PERFORMANCE DATA

Purpose	multi-purpose flying platform
Length, mm	1500
Wing span, mm	1300
Take-off weight, kg	90
Load-lifting capacity, kg	30
Service ceiling, m	2000
Take-off position	VTOL
Landing	VTOL
Flying modes	automatic, semi-automatic, manual
Autopilot	available
GPS-receiver	available
Encrypted channels	available
Thermal imaging camera	option

Flying range, max, km
60

Cruising altitude, m
5-1500

Flight time, min
80

Speed range km/h
0-60

"SURICATTA" SET FOR RADIO-ELECTRONIC WARFARE WITH UAVS

1. "SURICATTA" set pertains to the radio-electronic-warfare equipment (hereinafter the REW set). According to the foreign classification, SURICATTA pertains to the anti-UAV defence systems (AUDS, Anti-UAV Defence System). The set is designed to prevent unmanned air vehicles (UAVs) from fulfilling various tasks by jamming (a jamming plant):

- UAV-control-monitoring channel;
- telemetry channel from UAVs;
- channel of video-information transmission from UAVs in the on-line mode;
- GPS and GLONASS channels of satellite-navigation receivers;
- generation of the GPS/GLONAS simulation signals.

2. REW set serves:

- to counteract enemy UAVs in the combat areas;
- to protect the airspace of important state facilities against UAVs;
- to disrupt smuggling activities with the use of UAVs at the state border.

3. REW set consists of the parts as follows:

- radio-signal-detection module;
- set-monitoring-and-control module;
- jamming module (Figure 1);
- control workstation (Figure 2);
- power-supply system;
- transport base, car (Figure 3).

MAIN TECHNICAL CHARACTERISTICS

Frequency range of the set operation, MHz	390 – 6150
Interference type used	Jamming and aiming by frequency
Number of simultaneous barrage jamming signals	7
Number of simultaneous jamming signals aiming by frequency	3
EIPR total radiated jamming power, kW	not less than 1500
Total power brought to the antenna system, kW	not less than 320
Antenna-power gain, dBi	not less than 7.5
Antenna-beam width of the jamming module, deg.	45 (azimuth) 50 (vert.)
Frequency range of the detection-unit operation, MHz	390 – 2700
Frequency range of the passive location module, MHz	390 – 2700
Accuracy of the direction determination, deg.	+/- 2-5
Communications channels for control of the set modules	10/100 BaseT Ethernet
Number of the control workstations (PC)	2
Power-supply voltage of the set, V/Hz	170 – 250 / 50
Electric power intake, kW	not more than 1.8
Power-supply unit, kW	gasoline invertor 2.5
Accumulator uninterruptible electronic power supply system, VA	3 000 48V x 55 ampere-hour
Weight of the jamming module, kg	110
Weight of the control module, kg	13
Weight of the detection and passive location module, kg	12
Effective range of the set jamming, km	up to 15
Effective range of the UAV detection, km	up to 25
Frequencies used	UHF1, UHF2, L2, GNSS, L3, S, C

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

* Figure 4 - External view of the antenna system
Figure 5 - Antenna system consists of an omnidirectional passive antenna and four directed passive antennas

MAIN PERFORMANCE DATA

Clearance, mm, not less than	190
Climbing angle on condition of adherence of wheels	30 °
Maximum banking angle	25 °
Maximum height of vertical obstacles, m	0.2
OVERALL DIMENSIONS	
Length, mm, up to	1500
Width, mm, up to	982
Height, mm, up to	500
ARMAMENT	
Machine gun	12.7 mm NSVT
Machine gun	7.62 mm PKT
Grenade launcher	40 mm UAG-40

PIRANHA

The system MPCRCS «Piranha» is intended to perform following tasks:

- Transportation: cargo transportation, evacuation of wounded directly from combat zones, delivery of ammunition, mines, etc., as well as the use as a mobile communication station or a brander (a propelled warhead of remote detonation), setting of false targets and jamming in order to mislead the enemy.
- Reconnaissance: protection of military

Overall weight, kg
UP TO 100

Maximum speed, km/h
25

Endurance distance, km
20

FANTOM

Tactical Unmanned Multipurpose Vehicle “Fantom” is intended to fulfill the following missions at day and night:

- Reconnaissance,
- Fire support,
- Ambulance and rescue operations,
- Maintenance and power source,
- Ammunition supply,
- Monitors and roadblocks protection

MAIN PERFORMANCE DATA	
Drive formula	full drive
Wheel arrangement	6 x 6
Suspension	independent hydraulic
Brakes	hydraulic
Depth ford, mm	500
OVERALL DIMENSIONS	
Length, mm	3000
Width, mm	1600
Height (exc combat module), mm	910
Net weight, kg	650
Payload, kg	up to 350
COMBAT MODULE	
Stabilized turntable platform enable to set different types of weapons	
Remote control system that allows to control arms system independently of driving	
Machine gun	Caliber 12.7 / 3 speed modes of fighting
SIGHTING SYSTEM	
Day and night sighting system	
Range of sight	day - 2000 m, night - 1000 m

Net weight, kg	Engine	Engine power, kw	Maximum speed, km/h	Distance range, km
650	HYBRID	30	38	UP TO 20

UNMANNED GROUND VEHICLES

MAIN PERFORMANCE DATA	
Drive formula	full drive
Wheel arrangement	8 x 8
caterpillar drive	optionally
OVERALL DIMENSIONS	
Length, mm	4200
Width, mm	2290
Height (exc combat module), mm	1200
Net weight, kg	2600
Payload, kg	up to 1350
ARMAMENT	
Machine gun – 23 mm	
RS-80 anti-tank rockets (20 clusters)	
3-D Generation ATGM (optionally)	
TACTICAL GUIDANCE	
Radio channel for guidance	up to 20 km
Optical fiber	up to 5 km
Satellite channel	unlimited

FANTOM-2

FANTOM-2 may be used as an ambulance and rescue vehicle, ammunition supply vehicle, reconnaissance vehicle, fire support vehicle. The current performance of the vehicle can execute reconnaissance activities, fire support, be a source of power.

Net weight, kg	Engine	Engine power, kw	Maximum speed, km/h	Distance range, km
2600	HYBRID	80	58	UP TO 130

UAV IN THE PROCESS OF DEVELOPMENT

IN THE PROCESS OF DEVELOPMENT

UkrOboronProm

A-5 ORLAN

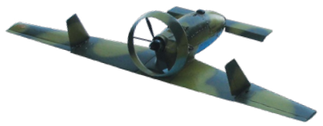
- Length, m: 1.5
- Wing span, m: 3
- Takeoff weight, kg: 28
- Speed range, km/h: 125
- Flight time, h: 6

A-2 SYNYTSA

- Length, m: 0.95
- Wing span, m: 1.8
- Takeoff weight, kg: 5
- Speed range, km/h: 80
- Flight time, h: 1

A-4K ALBATROS

- Length, m: 1.5
- Wing span, m: 2.5
- Takeoff weight, kg: 23
- Speed range, km/h: 105
- Flight time, h: 2



A-3 REMEZ

- Length, m: 0.78
- Wing span, m: 2
- Takeoff weight, kg: 10
- Speed range, km/h: 105
- Flight time, h: 2

VOROBEI-M

- Length, m: 0.6
- Wing span, m: 1.05
- Takeoff weight, kg: 2.5
- Speed range, km/h: 80
- Flight time, h: 1.5

KAZHAN

- Length, m: -
- Wing span, m: -
- Takeoff weight, kg: 20
- Speed range, km/h: 120
- Flight time, h: 3

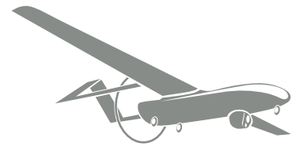
STREPET-S

- Length, m: 3.2
- Wing span, m: 4.2
- Takeoff weight, kg: 200
- Speed range, km/h: 305
- Flight time, h: 16

- Length, m: 2.7
- Wing span, m: 4.5
- Takeoff weight, kg: 60
- Speed range, km/h: 170
- Flight time, h: 11

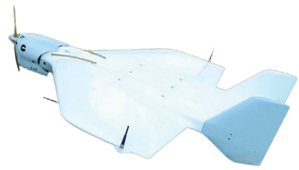
FYLYN-M

- Length, m: 1.39
- Wing span, m: 1.5
- Takeoff weight, kg: 5
- Speed range, km/h: 120
- Flight time, h: 2



SOKYL-2

- Length, m: 1.4
- Wing span, m: 1.8
- Takeoff weight, kg: 14
- Speed range, km/h: 190
- Flight time, h: 4



R-100

- Length, m: 1.8
- Wing span, m: 2.5
- Takeoff weight, kg: 35
- Speed range, km/h: 60-200
- Flight time, h: 7

R-400

- Length, m: 2.4
- Wing span, m: 3.4
- Takeoff weight, kg: 85
- Speed range, km/h: 70-200
- Flight time, h: 5

R-600

- Length, m: 1.5
- Wing span, m: 1.6
- Takeoff weight, kg: 4.5
- Speed range, km/h: 95
- Flight time, h: 1

M-6 ZHAIVYR

UNMANNED AERIAL VEHICLES THAT ARE NORMALLY CALLED «DRONES» ARE TODAY ALMOST THE MAIN FEATURE OF THE MODERN ARMY. THE QUANTITY AND QUALITY OF UAV IN MILITARY FORMATIONS CAN DETERMINE THE TECHNOLOGICAL LEVEL OF THE ARMY OF ANY COUNTRY.

THE POTENTIAL OF STATE AND PRIVATE MANUFACTURERS IN DEVELOPMENT AND SERIAL PRODUCTION OF UAS OF DIFFERENT CLASSES

More than 50 Ukrainian private and state companies shoved their interest in different time in manufacturing the UAV and presented their samples* in a period of 2008-2017. In the period of 2014-2017 a new core of Ukrainian developers and manufacturers of UAV has been formed. It should be noted that during the period of 2014-2016 certain number of volunteer teams that produced and supplied UAV to the front turned into manufactures which is now primed for manufacturing UAV professionally and oriented to supply their products to the security forces under the state orders or other procurement procedure. It is the private companies that set the pace in development of UAS in Ukraine. The leading domestic producers of UAV, that have always improved their products are: scientific and production enterprises «Atlon Avia» Kyiv; «Ukrspecsystems», Kyiv; scientific and production enterprise «Spytech», Odessa; «Carboline», Kharkiv; Aviation manufacturing company SG «Skyeton», Kyiv; Innovative production company «DeViRo», Vinnytsia.

The rate of production of the major Ukrainian producers, the example of «Atlon Avia», is in average 30 UAS per year.

Regarding real possibilities of UAS from different producers, the most effective way of check is to organize the state tests, or interagency tests, conducted under special procedure. During the tests, the systems and aircraft vehicles undergo checks on tactical and technical compliance with the requirements and demands. It includes 30 different options.

UAS USAGE IN COMBAT OPERATION IN THE EAST OF UKRAINE

The main fields of combat usage of UAS in Ukraine are reconnaissance and supplementary reconnaissance of enemy facilities, surveillance over the battle-field or over the zones of responsibility, informing, usage of combat means, target indication and correction of the artillery fire.

Ukrainian UAS are used for communication relay, participation on countermeasure, hitting the facilities by the UAS themselves.

INCREASE OF GROUND FORCES INTELLIGENCE CAPACITIES AND SPECIAL OPERATIONS

Now Ukrainians developers are trying to combine new technological possibilities, mainly domestic ones, with new trends, that form the view of efficient army.

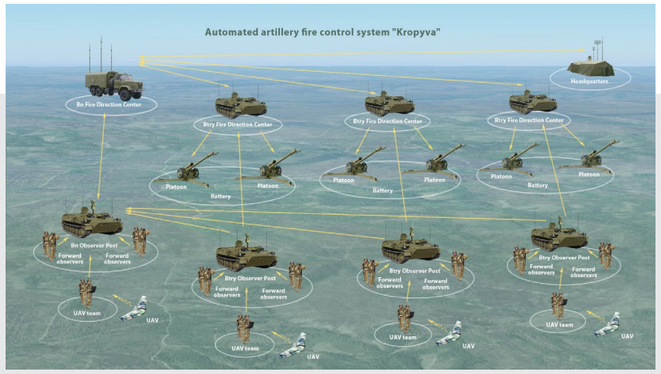
According to the estimates, on the first main customer of all technological developments in Ukraine will be the Special-operations Forces, military units and sub units of Intelligence in Ground forces, highly mobile landing troops. These kind of subunits usually perform the most difficult nontrivial missions, where the guarantee of mission accomplishment depends on membership competence as well as on technical equipment of military units, squads and individual soldiers of special forces.

The most used UAV for intelligence missions in Ukraine is PD-1. It can fly up to 5 hours and perform the reconnaissance on tactical depths of enemy position; UAS «Ieleka-100», UAS «Mara-2M», «Valkiria».

USING OF UAS IN SOLVING ARTILLERY MISSIONS

Today tactical battle field UAS are actively used in target searching, determination of their coordinates and correcting of fire in the interest of missile troops and artillery. The character of the missions has gradually singled out among general line the most suitable UAV for that kind of work. Step by step a convincing idea has appeared, that tactical battle field UAS for reconnaissance missions in the interest of infantry and UAS for artillery missions constitute systems that have different equipment, application method and functional possibilities.

For more than two years the UAS A1-S Furia has been used in antiterrorist operation zone. More than 40 UAS were delivered to the Armed Forces, National Guard, Security and volunteer organizations. General flight hours is more than 2500. With the



Tactical intelligence and strike complex «Kropyva».

«Kropyva» is assigned as an element of C4ISR system. It is designed to increase efficiency of target destruction due to automation of artillery fire control system by combining hardware and software, automation of mapping software, automated calculation, transfer of orders and targeting via digital channels of communication.

The system consists of artillery and intelligence control panel, AZK-7 automated intelligence acoustic system, AN/TPQ-48 counterbattery radars, SNAR-10 «Leopard»station of ground intelligence, ARK-1 «Rys» artillery radar intelligence system, UAS and robotic ground complex, forward air controller, different means of firing. It has been stated that this system reduces response time from 5 to 7 times on situation changes, reduces the inherent loss to 40-50%, raises the probability of hitting to 25-30%, reduces the consumption of ammunition to 30-40%.

Software and hardware geo-information system complex "Arta"

SH GSC «Arta» is designed for preliminary analysis of targets from geospatial location fixation reflected on aerial pictures, choosing the firing and command observation posts, itinerary tracing, planning of targets. 26 SH GSC «Arta» systems were delivered to the antiterroristic operation zone units.

The SH GSC «Arta» has passed tests at the base of International center of peacemaking and security of the Ground Forces Academy of Ukrainian Army (Yavoriv polygon) and in artillery units of 72 separate mechanical brigade in antiterroristic operation zone. After tests and exploitation in Missile forces and artillery SH GSC «Arta» is proposed to be supplied in artillery, tank and intelligence units in Ukrainian Armed Forces.

Artillery fire control system «SUVA»

«SUVA» system is produced by «Ukrainian Defense Corporation», (UDC, Kyiv) with application of UAS APUS-1505 manufactured on the same company. It has been stated that «SUVA» provides minimization of time needed for preparation of firing and defining settings for shooting; increase shooting accuracy due to the usage of modern mathematical methods of trajectory calculation; reduction of the consumption of ammunition due to increase of shooting accuracy; capacity of combat information exchange between intelligence and targeting; capacity to receive and proceed intelligence datum from combat counterbattery radars AN/TPQ-37 and AN/TPQ-48 automatically, from UAS and other means of intelligence; significant reduction of training terms for special artillery units.

It has been stated, that target tracking provided by UAS APUS-1505 enables to quickly identify targets from high quality pictures, transferred online during the flight. According to developers coordinates of the targets are detected automatically (10-30 seconds), with accuracy of 1-5 m without using GPS and other satellite navigation systems. Pictures with coordinates can be transferred to the post of artillery intelligence control or to artillery's computers that are included in «SUVA» system. UAS can retain the target point and refresh pictures for fire, correction and control of the target destruction.

help of «Furia», which is used on war for artillery reconnaissance, military troops have found and destroyed thousands of enemy's targets.

In 2016 new deeply upgraded version of Furia with A1-CM index was presented. It has passed defining tests and repeated checks during artillery trainings. New «Furia» of A1-CM level by its functionality is as good as foreign analogs. For example, UAS A1-CM Furia® is capable to provide automatic detection of target coordinates as well as their automatic tracking.

The ability to execute UAS missions successfully depends on operators' and commanders' skills and understanding in what situations the UAV can be useful. For example the work with Mara-2M UAS. The UAS have flown more than 35000 km, have registered more than 2500 targets while being more than 750 hours in the air.

During its usage in antiterrorist operation zone UAV «Mara-2M» have demonstrated significant record showing. Record flying range – 92,5 km, record acting radius– 37,5 km, time of flying - 2 hours, flying altitude – 2 km. Flight of two UAS at the same time was performed by one operator in condition of snowfall.

The point is to create striking and reconnaissance systems. The systems have to make Ukrainian artillery faster, more accurate and powerful due to combining UAS as a sensor component that searches targets, performs target indication and corrects fire of artillery and missile as strike component and «brains» - automated system of fire control.

These automated systems have to provide effective control of artillery troops during combat mission. These systems are created by Ukrainian national enterprises that are parts of SC «Ukroboronprom» (automated system of artillery troops control «Obolon-A», SE «Lorta», Lviv), and by private companies. These are systems like «Kropyva», «GisArta», «Suva» etc.

CREATION OF STRIKING UAV FOR EMPLOYING THEM IN THE TACTICAL UNITS

During the war against the russian-terroristic troops in the east of Ukraine, the interest of Ukrainian military and developers in the striking UAV has considerably grown. The point is the tactical use of the latters. The tactical UAV, considering their dimensions, little noticeability and absence of urge to care about safety of pilot, are able to come to the target without being noticed and to attack the enemy unexpectedly.

However the «light» ammunition – a small weight of its combat part, and, in consequence constitutes its limited capability. But reduction of the combat part has also a positive point due to and as a result reduction of collateral damage, if our subject is hitting targets within a human settlement and avoidance of hitting into your troops in case of close up combat against the enemy. In order to ensure acceptable effect of use of such guided weapon system it would be wise to increase the requirements regarding the control system. The said requirements have to ensure the direct hit or a tiny error, not exceeding 1-3 m, in order to make up for the «lack» of small capability of the combat part.

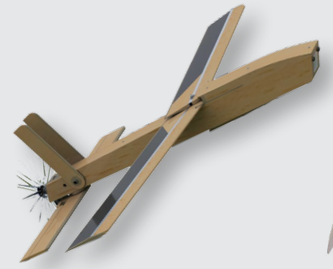
In Ukraine they have presented the air dynamic model of the AN-BK-1 «Gorlytsia» system which is being developed by the SE «Antonov» in cooperation with leading Ukrainian enterprises. It has been stated that the AN-BK-1 «Gorlytsia» system constitutes itself as a multifunctional system which is assigned for day and night reconnaissance and hitting the targets by the board weapons.

The performances of the ***AN-BK-1 «Gorlytsia»***: maximum take-off weight - 200 kg; maximum pay load - 50 kg; operational range: 80 km; reconnaissance altitude: 1800 - 2400 m.

DEVELOPMENT OF DISPOSABLE STRIKING UAV

The advantages of the «smart grenades» compared to conventional grenades, grenade launchers with guided rockets are supposedly obvious ones. The main one lies in hitting the targets out of direct visibility limits and being out reach of the enemy provided that the latter does not have analogical weapons. Meanwhile, the key parameter in assessing such guided flying grenades constitutes their ability perform their task with acceptable degree of probability.

In Ukraine the UAV systems aspiring for the «smart grenade» roles, have already been presented. Namely, it is the UAV «Yatagan-2» and multifunctional UAV «Gaidamaka» M-49. The said prototypes have not undergone any acceptance tests at the SSTC (the city of Chernihiv). Therefore, one should rely on the information provided by the developers themselves.



«Yatagan -2» UAV is a combat means capable to make targeted airstrikes. Hitting range – up to 3 km. Duration of flight 12minutes. Combat part weight - 1 kg. The principle of action of the striking «drone» - delivery of the explosive charge to the target and destruction of the latter by means of the direct attack. The guidance system is not detailed. The combat «drone» is placed in the tube, and after the start from the tube the folded wings of the UAV are unfolded. «Yatagan -2» can also be launched by hand or to be used as a striking means being placed on the armored vehicles. .

The «Gaidamaka» M-49 UAV is capable to perform not only the standard UAV functions, but a self guided shell. The UAV «Gaidamaka» M-49 is 0,48 m. long, wing span - 0,82 m; speed – up to 140 km/h. Maximum flying altitude – up to 2 km. Due to its little weight and small dimensions, the UAV can be carried in the back pack, the launch is carried out by means of a special device and manually. It has also been stated that the UAV has been adjusted to carry up to 2 kg. of explosives. The length of flight –up to 30 seconds.

CREATION OF THE ROBOTIC SEA PLATFORMS IN UKRAINE FOR COMBAT TASKS AND MISSIONS

In Ukraine several projects are implemented regarding creation of the remotely controlled sea apparatuses of different applications. Up today, unmanned under water apparatuses that are created in the interests of the Ukrainian Navy are presented by development of the KNPA-58250 system. The KNPA-58250 «surface ship – underwater apparatus» system is assigned for underwater reconnaissance; operative control concerning mines detection and destruction of the latter, survey of the underwater parts of the ships anchored in the base, combat training.

The «Sea Megic» patrol striking system is a pioneer in development of the domestic unmanned robotic, which comprises striking boats, command boats and breach boats. The concept foresees a possibility of use of the separate boats and several boats simultaneously as by swarm pattern. Such boats can be on

vigil in the given area, and then upon the order can attack solely or by swarm the target.

CREATION OF THE ROBOTIC PLATFORMS FOR PERFORMING THE COMBAT TASKS AND MISSIONS ON THE MAINLAND

Currently in Ukraine the are developing the «Piranha» Combat Remotely Controlled System). The design is a modular type. The same truck platform can be equipped with a combat support module, reconnaissance module and also to be used for cargo transportation. The combat module can be equipped with 12,7 mm machine gun UAG-40 machine gun. «Piranha» also can be used as patrol and reconnaissance vehicle. As it is it can be equipped with the reconnaissance module with the «Antisniper» unit.

An option has also been foreseen, in which the «Piranha» makes part of the «Kropyva» fire control system. The developers state that the «Piranha» system together with UAVs can be used for correcting the artillery battery fire the combat work of which can be ensured by the «Kropyva» fire control system.

In domestic line of the UCGV (Unmanned Combat Ground Vehicle) the similar Item of the «Piranha» track system is the «Fantom», multifunctional transport facility which is assigned for carrying out the combat, reconnaissance and transport missions.

According to the technical performances stated, ***«Fantom»*** can be controlled via protected radio canal at the distance of 2,5 km or by means of the cable at the distance of up to 5 km. It is equipped with the electric engine, maximum speed of 38 km / hour, endurance - 20 km. The fording ability is 500 mm. «Phantom» can carry up to 350 kg. of the pay load the platform can have as small arms as anti tank armament. In condition of night a thermal vision device has been foreseen. The vehicle is planned for operator and shooter.

Together with unique robotic and track platforms in Ukraine the attempts have been made to combine the existing technology solutions for remote control of the track or wheel platform of the serial manufacture. In 2016, in Ukraine the first national prototype of the army armored vehicle «Spartan» was presented with the Pilotdrive independent steering system. The vehicle can be controlled remotely by means of tablet, «smart glove» or an operator workstation. Communication between the operator and the vehicle is conducted by digital WiFi/Wimax data transfer channels, the range - from 10 to 50 km.

Therefore, up today the military and industrial complex of Ukraine aims at prompt development of the defense potential and particular attention is given to the remotely controlled devices. For the last few years Ukraine has already made a tremendous step in developing the UAVs. During the Anti-terroristic operation the UAVs have proved to be effective in reconnaissance missions in the interest of all armed forces. It is noteworthy, that together with the UAVs the ground and naval robotic systems have been created.

Today the State Enterprise «Ukrinmash» offers a large line of the robotic systems which meet the international standards and have competitive prices.

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