BAYKAR


BAYKAR

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To our Esteemed Customers, Partners, and Supporters:

It is with great pleasure that I present yet again a company portfolio that is robust and growing. We have witnessed in recent past unprecedented achievements in all areas from product development to company operations to customer delivery and service.

Baykar continues to deliver on its mission to produce the most robust, high-performance unmanned systems not only in Turkey, but in the world. We have graduated from humble origins as a manufacturer of car parts in the late 1990s to now delivering industry-grade UAVs that are operational in the field of battle, with over 150,000 flight hours to boot. In addition to providing surveillance, our systems now deliver smart munitions that have made our systems a sine qua non in the theater of battle.

Our success is the product of a decade and a half of persistently applying the strongest values of industrial organization and product development. Our state-of-the-art facility in Istanbul integrates design, prototyping, and manufacturing under one roof. Our company culture, with its young engineering teams, places a high premium on combatting hierarchies of position with hierarchies of knowledge and informed judgment. And our product development integrates multidisciplinary thinking to seamlessly bridge everything from sensor development to machine learning to platform integration.

We introduce our product portfolio in this catalog for the benefit of our customers. While product improvement is a never-ending enterprise, we are proud of every system and subsystem delivered - be it large like our TB2, or small like our sensor kits.

I want to take this opportunity to thank all team members of the Baykar family who have made our extraordinary journey possible.

Sincereley,
Haluk Bayraktar
CEO, Baykar

VISION

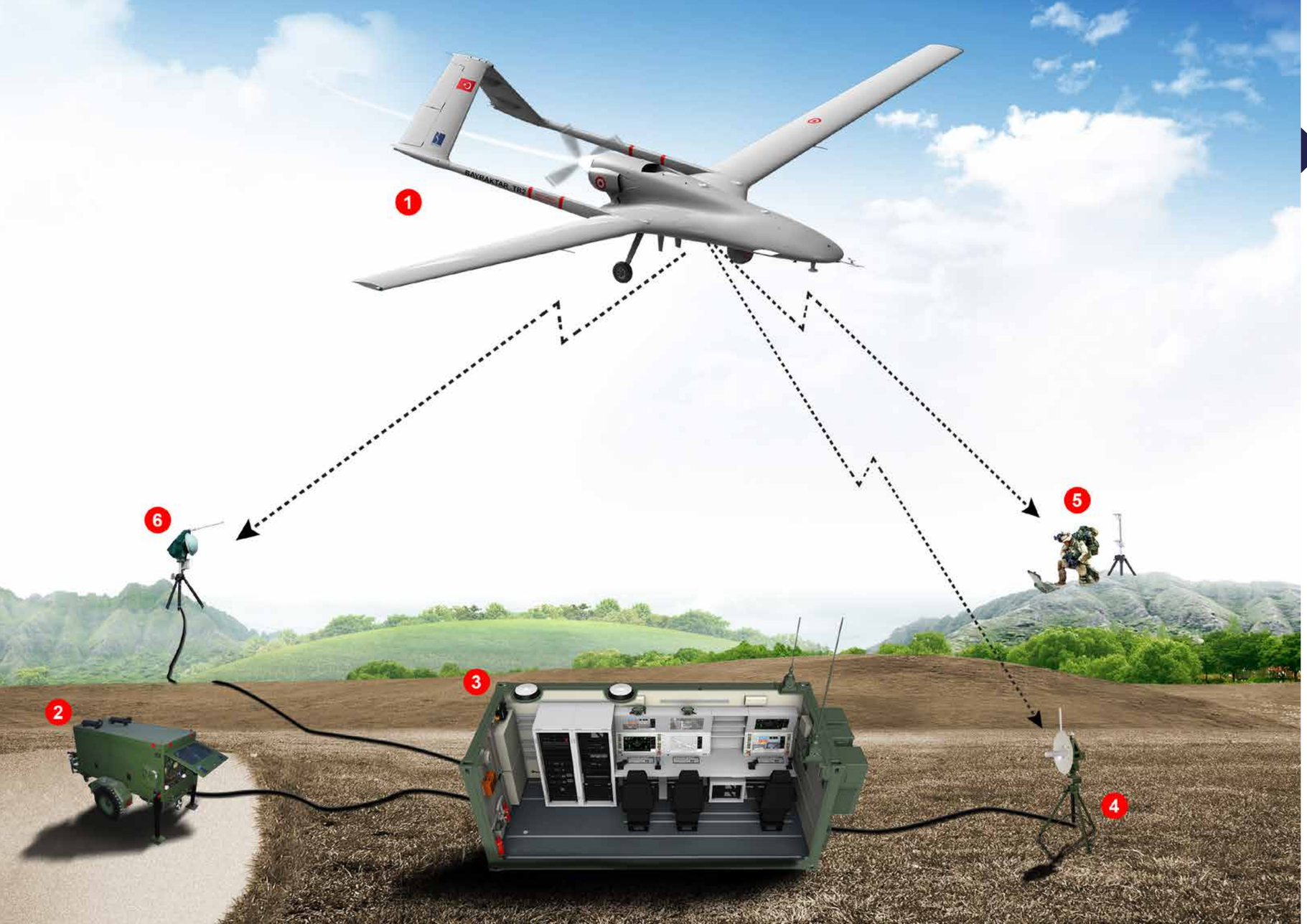
The defense industry is an essential component of the world economy and prime mover in the balance of power in today's world. Defense spending has been on the rise due to countries' attempting to counter the ascendance of other countries' weapons technology. This competition has ushered in a technology arms race that, since the termination of the Cold War, has produced a number of new defense doctrines.

One such doctrine is the importance of "network-centric", in contrast to "platform-centric" warfare, often considered the greatest military revolution of the past century. This doctrine stresses the importance of weaning defense off heavier industries in favor of complete control over information and network management. This shift has contributed to and benefitted from tidal shifts in economic, trade, and information technology development. As new information-based economies and technologies have started to supplant older, heavier industry, unmanned systems in particular started to be seen as a prime opportunity to wean countries off human-intensive operations on the battlefield. For our country in particular, the shift to unmanned aviation has provided a window of opportunity not only to bridge the gap between our capabilities and others' in the world, but also to widen that gap to our advantage.

Our company draws inspiration from the leadership of technology visionaries from our Republic's early years like Nuri Demirağ and Vecihi Hürkuş to build the most advanced technological systems on the global stage by advancing unmanned aerial systems. In line with their principles, we strive to ensure as independent, Turkey-centric a technology stack as possible. We further attempt to dovetail emerging high technology with mission-critical functions to offer our armed forces systems that are reliable, integrated, and complete.

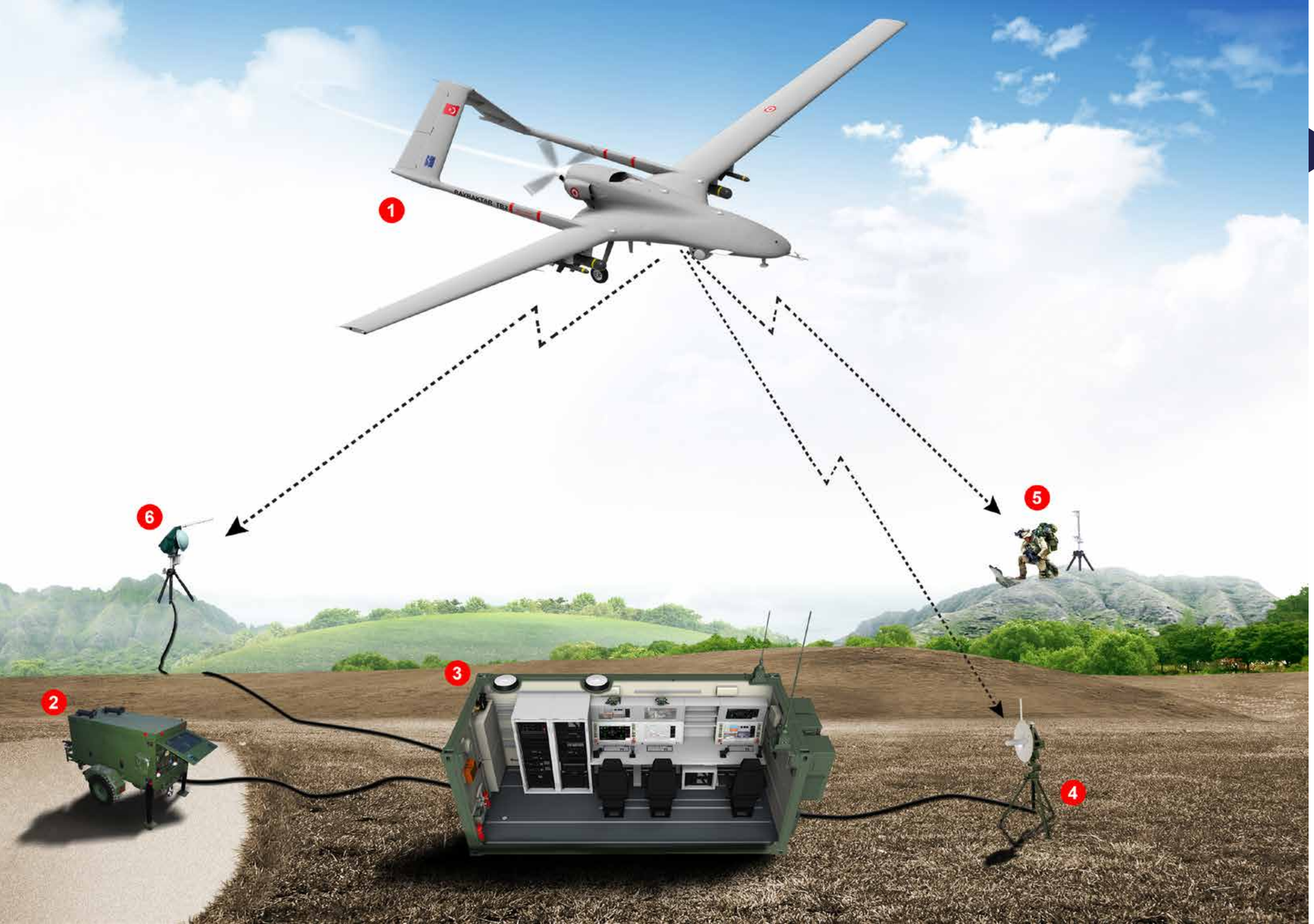
AUTONOMOUS.
HI-PERFORMANCE.
END-TO-END.

UNMANNED AERIAL SYSTEMS (UAS)



BAYRAKTAR TB2 UAS

- **1 BAYRAKTAR TB2 AIR VEHICLE PLATFORM**
- **2 GENERATOR - TRAILER**
- **3 GROUND CONTROL STATION**
- **4 GROUND DATA TERMINAL**
- **5 REMOTE VIDEO TERMINAL**
- **6 FORWARD BASE**



BAYRAKTAR TB2
ARMED UAS

- **1 BAYRAKTAR TB2 AIR VEHICLE PLATFORM**
- **2 GENERATOR - TRAILER**
- **3 GROUND CONTROL STATION**
- **4 GROUND DATA TERMINAL**
- **5 REMOTE VIDEO TERMINAL**
- **6 FORWARD BASE**

BAYRAKTAR MINI UAS

- 1 BAYRAKTAR MINI UAV
- 2 MINI UAV AUTOMATIC TRACKING ANTENNA SYSTEM
- 3 MINI GROUND CONTROL STATION
- 4 MOBILE CHARGING STATION

INTEGRATED.
RELIABLE.
COMPLETE.

AIR PLATFORM (UAV)

BAYRAKTAR TB2 TACTICAL UAV

Technical Features

Comm. Range	< 150 km
Cruise Speed	70-80 knots
Max. Speed	135 knots (110 IAS)
Operational Altitude	22.500 ft
Absolute Ceiling	25.000 ft
Endurance	< 24 hrs
Wing Span	12 m
Length	6.5 m
Takeoff / Landing	Runway (Automatic)
Max Takeoff Weight	650 kg
Payload Capacity	< 55 kg
Fuel Type	Mogas Avgas
Engine Type	100 hp Internal Combustion Engine (Injection Type, Variable Pitch Propeller)

Technical Features

- Fully Automatic Flight System
- Sensor Fusion Aided Fully Autonomous Takeoff and Landing System
- Autonomous Taxi, Parking
- Semi-autonomous
- Fault-tolerant
- Triple Redundant Flight Control System
- Onboard Storage
- Redundant Servo Actuators
- Redundant Power Architecture

Technical Features

- EO Camera Module
- IR Camera Module
- Laser Designator
- Laser Range Finder
- Laser Pointer

The Bayraktar Tactical Unmanned Aerial System is a medium-altitude, long-endurance class UAS for reconnaissance operations. With its triple-redundant avionics systems and sensor fusion architecture, it has the capability of fully autonomous taxi, take off, cruise, landing.

MORE THAN
60.000 FLIGHT HOURS
EXPERIENCE

OPERATIONAL SINCE 2014 WITHIN
THE TURKISH ARMED FORCES, GENDARMARIE AND TURKISH POLICE

NATIONAL ENDURANCE AND ALTITUDE RECORD
FOR TURKISH AVIATION

BAYRAKTAR TB2 ARMED TACTICAL UAV

Technical Features

Comm. Range	< 150 km
Cruise Speed	70 knots
Max. Speed	135 knots (110 IAS)
Operational Altitude	22.500 ft
Absolute Ceiling	25.000 ft
Endurance	< 24 hrs
Wing Span	12 m
Length	6.5 m
Takeoff / Landing	Runway (Automatic)
Max Takeoff Weight	650 kg
Payload Capacity	55 - 155 kg
Fuel Type	Mogas Avgas
Engine Type	100 hp Internal Combustion Engine (Injection Type, Variable Pitch Propeller)

Technical Features

- Fully Automatic Flight System
- Sensor Fusion Aided Fully Autonomous Takeoff and Landing System
- Autonomous Taxi, Parking
- Semi-autonomous
- Fault-tolerant
- Triple Redundant Flight Control System
- Onboard Storage
- Redundant Servo Actuators
- Redundant Power Architecture

Technical Features

- EO Camera Module
- IR Camera Module
- Laser Designator
- Laser Range Finder
- Laser Pointer

The Armed Bayraktar Tactical Unmanned Aerial System is a medium-altitude, long-endurance-class UAS purposed for reconnaissance operations. With its triple-redundant avionics systems and sensor fusion architecture, it is capable of fully autonomous taxi, take off, cruise, landing. The Armed Bayraktar is further capable of delivering up to 4 smart munitions and precise targetting is available by onboard laser designation. Bayraktar is an all-in-one solution with immediate see-and-hit capability to ensure no collateral damage.

THE ARMED BAYRAKTAR TB2 PROVIDES ARMED RECONNAISSANCE, PERSISTENT AIRBORNE SURVEILLANCE, AND TARGET ACQUISITION FOR **THE TURKISH ARMED FORCES**

THE TB2 CAN CARRY UP TO **4 SMART MUNITIONS**

BAYRAKTAR MINI UAV

Technical Features

Comm. Range	< 15 km
Cruise Speed	30 knots
Operational Altitude	2.000 ft
Absolute Ceiling	12.000 ft
Endurance	60 mins
Wing Span	2 m
Length	1.2 m
Takeoff	Hand Launch
Landing	Parachute / Belly Landing
Operational Temp Range	-20 °C.....+55 °C
Power	Battery
Motor	Electric Motor
Payload	2 Axis Day / Termal Camera
Data Links	Frequency Hopping Spread Spectrum Digital

Technical Features

- Automatic Waypoint Navigation
- Secure Digital Communication
- Home Return and Automatic Landing in Case of Lost Communication
- Smart Battery Management System
- Multi UAV Support
- Remote-Range Command / Control And Monitor
- Ground Control Switching
- Automatic Takeoff / Automatic Cruise
- Automatic Belly Landing / Parachute Deployment
- Joystick Assisted Semi-Automatic Control
- Stall Control in Case of Electric Motor Disfunction
- Spin Control in Case of Very Harsh Wind Conditions

The Bayraktar Mini Unmanned Aerial Vehicle System is an intelligent, field-proven robotic system for short-range reconnaissance applications. The system has been operational since 2007, after having first been deployed within the Turkish Armed Forces.

MORE THAN
100.000 FLIGHT HOURS
EXPERIENCE

TRAINED MORE THAN
1.000 OPERATORS

OPERATIONAL SINCE 2007 WITHIN
THE TURKISH ARMED FORCES, GENDARMARIE, SPECIAL FORCES, TURKISH POLICE AND QATAR ARMED FORCES

AWARE.
INSIGHTFUL.
DIVERSE.

PAYLOAD SENSOR SYSTEMS

WESCAM CMX 15D GIMBAL TURRET

Multi-Sensor Imaging/Lasing Payload Options

- HD thermal, HD daylight and HD low-light cameras
- Continuous wide-angle zoom
- High-magnification step-zoom spotter
- High-sensitivity color low-light imaging
- Compact, efficient, reliable laser target designator
- SWIR camera images designator spot

Sensors

IR Sensor	HD MWIR, 6 FOV
EOW Sensor	8.6-154 mm continuous zoom lens with 2nd gen HD color & VGA low light TV
EON Sensor	600/1.000/1.500 mm step zoom lens with 3rd gen HD color & (HD low light TV or VGA SWIR)
Laser Designator	100 mJ device @ 1064 nm
Image Blending	EO to IR
IR Image Processing	6th Gen + auto dead pixel removal + false color

High Performance Gimbal

- Line-of-sight Stabilization, Typically <5 μradians
- Stabilization and Steering (2) Axis Inner (pitch/yaw) (2) Axis Outer (azimuth/elevation)
- 4-axis stabilized turret with internal passive isolator for excellent stabilization performance
- Sharp optics and excellent stabilization performance results in industry leading target detection, recognition and identification range performance in the 15" class
- IMU mounted to optical bench for high target location accuracy
- INS auto-align to aircraft
- Full laser stabilization minimizes spot jitter

Advanced Image Processing

- Real-time image enhancement on all sensors
- Improved feature recognition and ID
- 2x, 4x Ezoom
- Advanced video tracker with automatic target detection
- Imaging blending
- Embedded Moving Target Indication (EMTI)

Simplified Aircraft Integration

- Electronics unit inside the turret
- Built-in vibration isolation
- Built-in GPS receiver

BSI-101 SIGNAL INTELLIGENCE SYSTEM

Technical Specifications (Elint)

Frequency Range	10 MHz to 40 GHz
IF Bandwidth	500/100/80/40/20/10/5/1 MHz
ADC Resolution	16 Bits
Frequency Resolution	1 Hz
Frequency Lock Time	50 uS
Dynamic Range	>70 dB
EMI/EMC	Designed to meet MIL-STD-461F
Temperature Range	-40 °C.....+85 °C

Technical Specifications (Comint)

Frequency Range	10 MHz to 6 GHz	Maximum Input Level	+40 dBm (10 Watt)
IF Bandwidth	200/100/80/40/20/10/5/1 MHz	Input Attenuator Range	63.5 dB in steps of 0.25 dB
ADC Resolution	16 Bits	Spectrum Sweep Rate	30 GHz/s with 12 kHz resolution bandwidth
ADC Sampling Frequency	533.333 MHz	Dynamic Range	>90 dB
Frequency Resolution	1 Hz	EMI/EMC	Designed to meet MIL-STD-461F
Phase Noise	-95dBc/Hz at 100kHz offset	Temperature Range	-40 °C.....+75 °C
RF to IF Gain	25 dB	Power Input	12 V, 4 A
AGC Range	50 dB	Weight	< 4 kg
Noise Figure	<5 dB	Monitor Outputs	Video, IF, LO1, LO2
P1dB	>0 dBm		

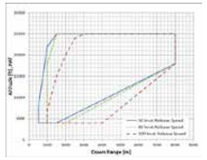
Baykar's signal intelligence system BSI-101 is a high performance radio receiver that can be used for airborne monitoring and surveillance of the RF spectrum. Based on a software-defined radio architecture, BSI-101 can be customized to specific needs of ELINT and COMINT systems.

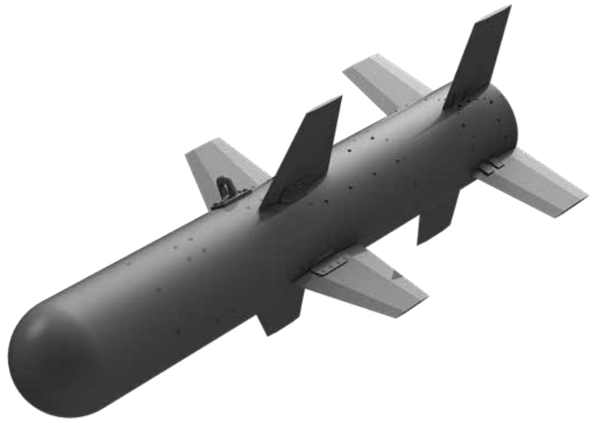
WITH ITS MINIMAL SWAP, BSI-101 IS WELL-SUITED FOR DEPLOYMENT ON UAVS AND REMOTELY CONTROLLED MOBILE GROUND VEHICLES.

IMPACTFUL.
DIRECTED.
PRECISE.

PAYLOAD SMART MUNITIONS

ROKETSAN MAM-L

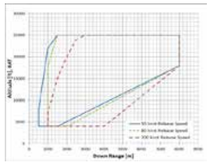


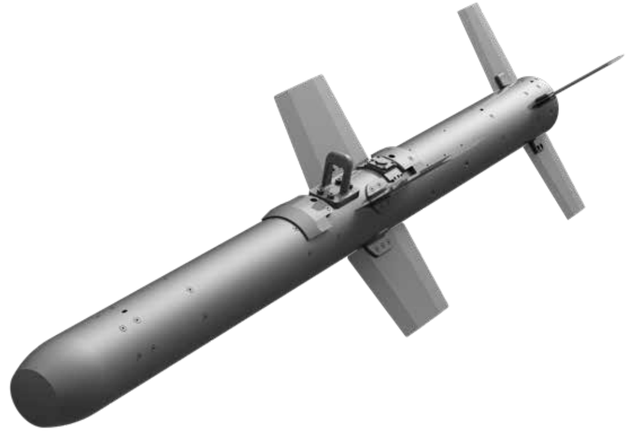


Technical Features

Max. Range (depending on launch altitude and platform velocity)	> 8 km
Min. Range (depending on launch altitude and platform velocity)	< 2 km
8 km Range Flight Time	< 80 s
Accuracy	< 3 m
Warhead Effectiveness and Targets	ANTI PERSONNEL
Type V Insensitive Munition against bullet impact and fuel fire	Effective in >20 m diameter against personnel
Type V Insensitive Munition against bullet impact and fuel fire	ANTI ARMOR Battle Tank, armored vehicles (>700 mm RHA armor penetration)
Guidance	Inertial Midcourse Navigation + Semi Active Laser (STANAG 3733)
Weight	21,5 kg
Length	1.000 mm
Diameter	160 mm

ROKETSAN MAM-C





Technical Features

Max. Range (depending on launch altitude and platform velocity)	> 8 km
Min. Range (depending on launch altitude and platform velocity)	< 2 km
8 km Range Flight Time	< 80 s
Accuracy	< 3 m
Warhead Effectiveness and Targets	ANTI PERSONNEL
Type V Insensitive Munition against bullet impact and fuel fire	Effective in >20 m diameter against personnel
Type V Insensitive Munition against bullet impact and fuel fire	MULTI PURPOSE Armored vehicles (>200 mm), Anti-personnel (>10 m)
Guidance	Inertial Midcourse Navigation + Semi Active Laser (STANAG 3733)
Weight	7 kg
Length	900 mm
Diameter	70 mm

ROBUST.
INDUSTRY-GRADE.
SAFE.

GROUND CONTROL STATIONS (GCS)

BAYRAKTAR TB2 GCS

Interfaces

- Seperate 220V AC Power Inputs for Generator and Electrical Network
- **External 220V AC Power Output for Ground Data Terminal**
- External 24V DC Power Input for Redundant Power Source for Critical Hardware
- **C4I Interface**
- Ethernet IO Ports
- **Fiber Optic IO Ports**
- Telephone Line IO Ports

Features

- Satisfies NATO "6516/SHCPE/86-88" Standards
- **ISO 1161-1976 Compatible Corners**
- STANAG 2338 Compatible Painting
- **Compatible with EMI and EMC Requirements**
- Redundant Power Architecture
- **Redundant Pilot and Payload Operator Consoles**
- Radio and Intercomm. Systems
- **Air Conditioning and NBC Protection Systems**
- Lightning Protection Systems
- **Blackout Lamps**
- Monitoring and Command Interface Modules
- **Command and Control Embedded Software**
- Command, Control and Monitoring Operator Interface Software

Baykar designs, develops, and manufactures Command and Control systems and sub-systems such as Shelters, Consoles, Rack Type Cabinets, Power Distribution Units(PDUs), Monitoring and Command Modules, Command and Control Software and User Interface Software.

THE GROUND CONTROL STATION IS USED BY THE BAYRAKTAR TB2 TACTICAL UAV SYSTEM FOR **THE TURKISH ARMED FORCES** AND TURKISH POLICE

Specifications

Type	ACE III
Operation Temperature	-40 °C.....+60 °C
Sizes	2.240 x 5.900 x 2.300 mm
Weight	2.150 kg

BAYRAKTAR TB2 MOBILE GCS

The Baykar Mobile Ground Control Station is used for operating Bayraktar TB2 platform far away from main control bases. Its powerful antennas allow Bayraktar TB2 to take off and land at its present location and increases its flight range.

The Mobile Ground Control Station consists of a Nato Ace III Shelter, a hydrolic antenna platform that can be adjusted up to 12m height, C-Band and UHF antenna systems, and a powerful truck with hydrolic landing gears that brings mobility to all of these systems.

An indigineous design of Baykar, the Mobile Ground Control Station has a safe and quick installation by virtue of its sensors and control valves.

Tower

Hydroulic Control
Adjustable tower operation speed
0-12m height
Mechanical safety system
300 kg weight carriage capacity

Vehicle

Total carriage capacity	25 tons
Range	> 1.000 km
Power	330 PS (243 kW) @ 1.900 d/d
Torque	1.300 Nm @ 1.200-1.700 d/d
Fuel Tank	350 L (Aluminum)

BAYRAKTAR MINI GCS

General Specifications

Temperature Range	-30 °C.....+55 °C
Dimensions	450 x 270 x 53 mm
Weight	3.325 g (±20 g)

Electrical Specifications

Supply Voltage Range	13.5V : 30V DC
External Power Supply	220V AC input, 20V DC output, 160W
Internal Battery Unit	4S, Li-Po, 9Ah
Power Consumption	<10 W (Nominal, only Mini GCS) <125 W (Maximum, with Mini ATAS and PC)
Connections	Mighty Mouse Series Circular Connector x4 (26 Pins x2, 10 pins x1, 6 pins x1)
Communications	Ethernet x2, RS232 x2, CAN x1

Features

Ruggedized Composite Structure
PC Locking
System and ATAS Power Switches with Individual Covers
Indicators for System, Internal, External and ATAS Power
Flat Keyboard, Capable of Commanding the UAV by the Hardware without PC
Flat Keyboard LED Indicators
Individual Current Protection for ATAS, External Supply and Battery Supply
Resettable Fuses
Cap Protection for Circular Connectors
Easy to Carry

HI-FIDELITY.
POTENT.
ON-DEMAND.

GROUND SUPPORT EQUIPMENT

GROUND SUPPORT UNIT

The Baykar Ground Support Unit (GSU) powers the Bayraktar TB2 Platform on the ground, charges smart batteries, and provides maintenance via an operator interface. The GSU can charge batteries or the UAV for four hours without needing an external power source. When plugged in, it operates on a standard 220-230V AC source and has wheels for easy mobility.

Technical Specifications

Operational Temp	-20 °C.....+50 °C
Storage Temp	-40 °C.....+60 °C

Interfaces

Uninterrupted 220V (2A) AC Socket
Electrical Network powered 220V (10A) AC Socket
Ethernet IO Port
RS232 Serial Communication Port

REFUELING STATION

The Baykar refueling station is custom-made for the Bayraktar TB2 platform and comes with an 800 litre capacity in semi-trailer form factor. The station can both refuel and defuel the aircraft.

The station is powered by a 220-230V AC standard ground voltage supplied from the grid or a generator.

Technical Specifications

Capacity	800 L
Dimensions	1.188 x 2.252 x 1.430 mm
Construction	Semi-Trailer Type
Working Temperature	-10 °C.....+55 °C
Fuel Pump Output Pressure	1,72 Bar
Refueling Flow Rate	24 L/min
Discharging Flow Rate	17 L/min
Valves	Electro-mechanic

MINI MOBILE CHARGING STATION

The Mini Mobile Charging Unit is for charging and discharging batteries which are used in the Bayraktar Mini Unmanned Aerial Vehicle System.

THIS UNIT ENABLES THE CHARGING AND DISCHARGING OF BATTERIES USED IN THE AVIONICS, GROUND CONTROL STATION AND MOTOR.

Technical Specifications

Operating Temperature	-20 °C.....+55 °C
Weight	5.130 g
Sizes	300 x 350 x 150 mm
Air Cooling	2 Internal Fan (Air Input Channel, Air Output Channel) The ability of driving automatic temperature controlled fan
External Cables	Cable that draws power from truck Cable that draws power from regular source on the grid Cable that connects the battery pack to the charging station
Error Notification	Inverse Polarity, Connection Loss, Short Circuit Error, Selection of Wrong Voltage, Low Input Voltage, High Input Voltage, Low Cell Voltage, High Cell Voltage, Cell Connection Error, High Temperature Error

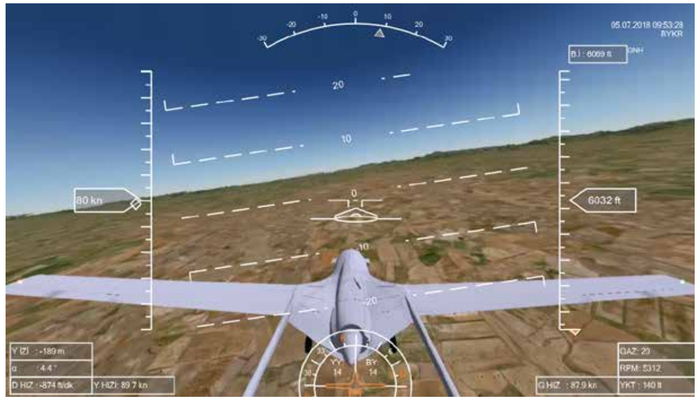
Electrical Specifications

Input Voltage	180-264V AC Mains Voltage / 12V DC Voltage
Charging current capacity	0.1 A-10 A
Discharging current capacity	0.1 A-7 A
Power Input Panel Components	Grid Power Connection Connector, Grid Power Connection Fuse, Grid / Storage Battery Power Source Picking Key, Mobile Charging Station On/Off Switch Connector That Draws Power From Truck
Charge Specifications	Charge, Discharge, Balancing
Charge Capability	Up to 6 cells
Batteries Charged	Avionic System Battery, GCS Battery, Motor Battery
Internal Balancing Specification	Balancing Mode, Cell balancing during Charge/Discharge

READINESS BEFORE READINESS.

SIMULATOR SYSTEMS

BAYRAKTAR TB2 HIL SIMULATOR



The TB2 simulation system provides a training platform for operators and operator trainees with a realistic flight, payload and ammunition launch experience.

Technical Features

- Real Time Simulation
- Realistic Flight Dynamics
- Identical Flight Control for TB2 UAV System
- Pilot Console
- Gimbal Operator Console
- Trainer Console
- Air to Surface Missile Fire Scenario Training

Technical Features

- Gimbal Scenario Training
- Emergency Scenario Training
- Meteorological Simulation
- High Resolution Virtual Reality Platform
- Easy To Setup
- Easy To Use
- Ergonomic Design

A SINGLE PANE OF GLASS

C4I SYSTEMS

OPERATOR INTERFACE

The Baykar Operator Interface (BOI) provides real time control of the UAV and has screens to monitor data coming from the aircraft. Because of its modular structure, BOI is easy to use for a wide range of operators with different training levels.

Main functions of BOI can be listed as follows

- Commands and Controls the UAV
- Monitors detailed Telemetry Data
- Provides Mission Planning and Mapping functionality
- Displays and Configures Camera views
- Provides computer-generated graphics for various gauges and displays

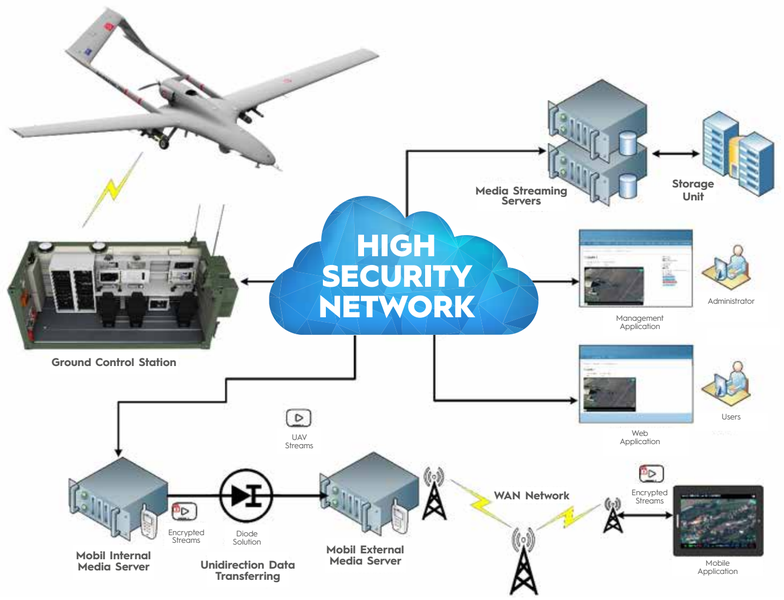
Map module of the BOI has the following features

- Operator can form flight routes and send them to Autopilot of the UAV.
- Operator can display different kinds of map information such as raster map data, shape files and elevation models.
- Operator can display ground control stations and ground data terminals on map.
- Operator can create airports and also can draw taxi routes for UAV.
- Operator can draw different kind of areas such as friendly, fly-restricted etc.
- Wide range of elements such as targets, location pins etc. can be added to map by operator.

Main functions of Camera Module are listed below

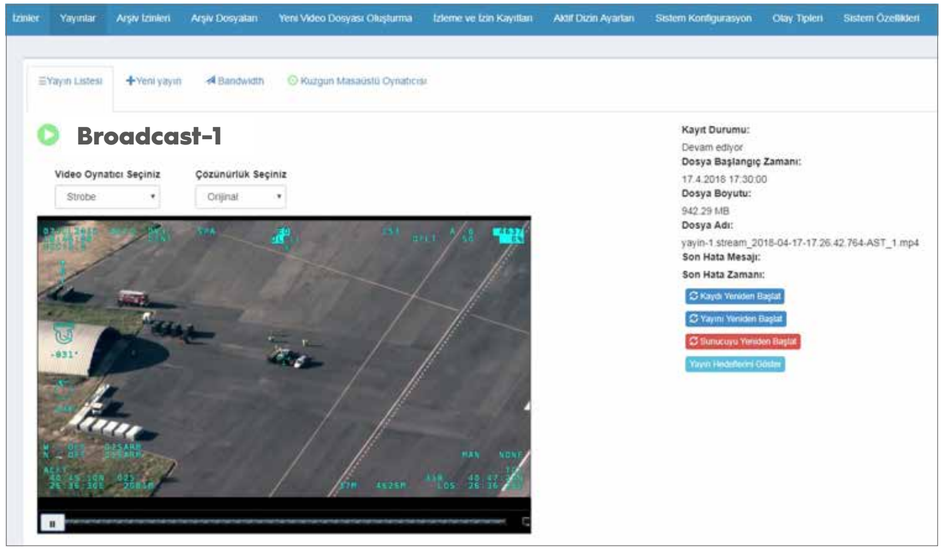
- Display of various types of videos such as Tail Camera videos or Gimbal videos at Operator Interface
- Recording of the displayed video
- Instant switch between various videos and displaying two video at the same time
- Various HUDs (Heads-Up Displays) for different type of missions

LIVE VIDEO STREAMING
AND VIDEO ARCHIVE SYSTEM



SYSTEM MAIN FEATURES

- Live Video Streaming
- Video Archiving System
- Event Management
- User Authorization and Active Directory Integration
- Security and Intrusion Prevention
- Easy and Efficient System Management



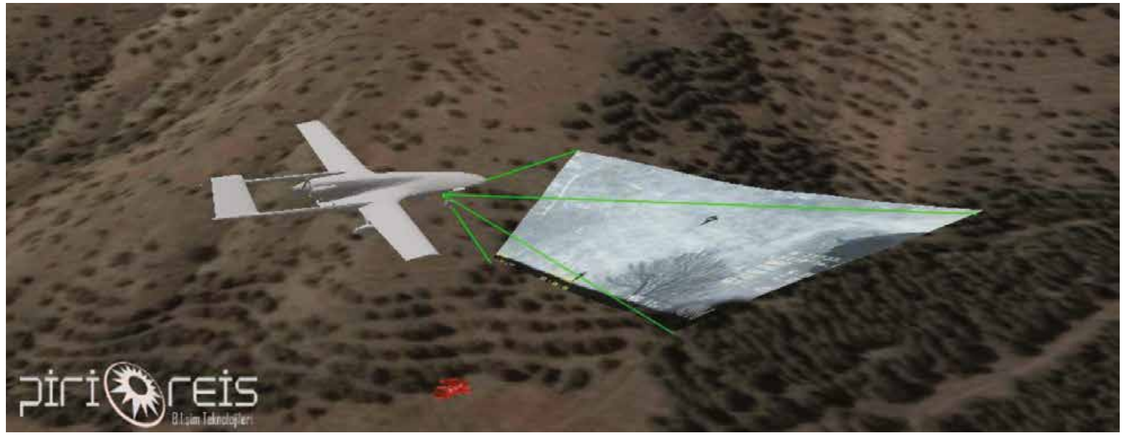
Baykar Live Video Streaming System (BLVSS) provides real-time media streaming and archive management solutions for the defense industry. BLVSS allows many authorized users watch high resolution video streaming in real time with low latency. BLVSS consists of a web-based application that allows internal network clients to watch live streams, and a mobile application that allows secure streaming of live videos to tablets using mobile networks.

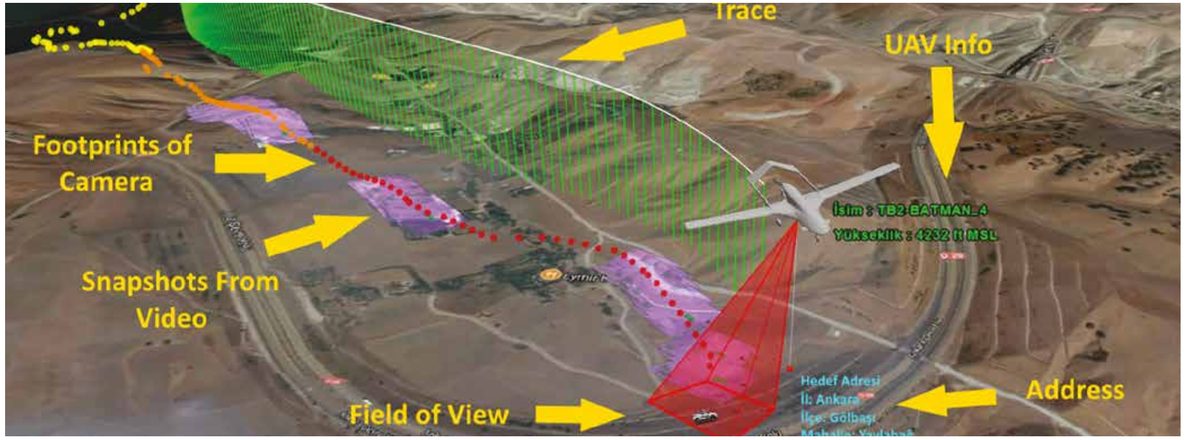
Live stream videos are recorded in 30-minute-length archive videos. The Comments feature allows users to take notes related to the video streaming. Moreover, users can add tags along with notes and therefore evaluate archived videos with details. These notes can be exported and thus tasks can be scheduled. Archive files can be searched based on date or metadata.

For security of access to live streaming and archived video, the system automatically uses temporary passwords. This makes access to the media server more secure. In addition, user name or device id is watermarked on live streaming and archived videos.

With the mobile solution that can be optionally integrated into the Live Video Streaming System, live streaming can also be watched on mobile devices with Windows platform. Live streams are securely transmitted from high-confidential networks to mobile devices using end-to-end encryption and unidirectional data transmission (a.k.a. diode).

GEOGRAPHICAL ANALYSIS SOFTWARE





Geographic Analysis System (GAS) software developed 100% nationally (fully native resources) by PiriReis Ltd. is a 3-dimensional (3D) virtual globe platform which enables displaying geospatial data compliant to international standards and analyzing them, on the intranet network of the Turkish Armed Forces.

By using the GAS-Unmanned Aerial Vehicle (UAV) Module, developed in cooperation with Baykar and PiriReis, analysis and queries related to UAVs are performed in the operation centers and ground control stations.

All operations needed to trace and manage UAVs on a 3D virtual globe and make use of the images taken from their camera are performed by using the GAS-UAV. In this way; situational awareness is increased, UAVs are used more effectively and planning and decision-making processes are supported

Main Operations Performed

Near-real-time instant tracking of multiple UAVs.

Displaying UAV's moving (instant) position and location, field-of-view, footprint, and trace in 3D environment.

Getting UAV's information (ID, title, flight altitude, angle, etc.)

Viewing UAV's trace data with its footprint.

Automatic detection and displaying of addresses (city-county-district-street or place name) of UAV's location and the target (center of camera view).

Viewing meteorological conditions while tracking UAVs.

Displaying video coming from UAV's camera in a separate window.

Taking a snapshot of a frame from the video and positioning this image on terrain to the true location.

Instantaneous data interpretation and data compiling (target acquisition, intelligence data collection, digitizing, adding notes etc.) from the images captured from video, with the support of other geospatial data loaded on the GAS.

Storing snapshot images and trace data of the UAVs in the database, then querying these data and replaying/viewing the selected one.

Setting flight route and preparing mission plan for UAVs.

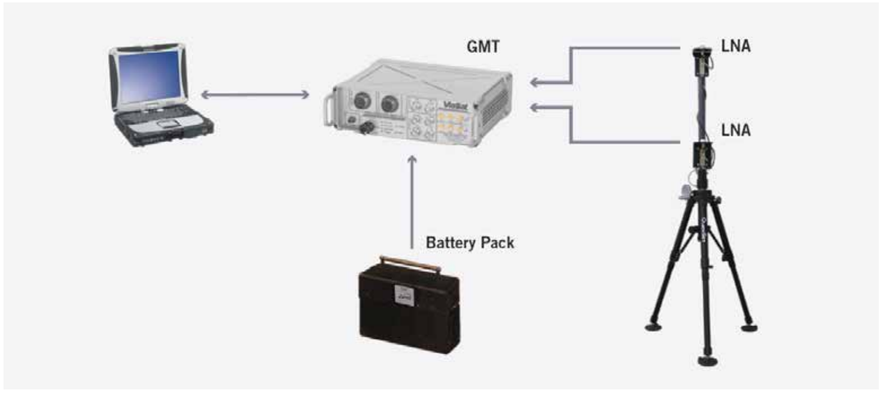
Checking overlapping routes.

Giving a warning when one UAV closes up on another one or when one UAV comes close to the terrain in a dangerous way.

MULTI UAV CONTROL & MONITORING SOFTWARE

Central UAV Monitoring System (CMS) is a web based tool that is used for displaying basic information of airborne UAVs on a single map to users. Thanks to the system, air traffic control, mission planning, antenna and frequency planning are made easily. CMS allows users to take a general look at all the flights. Location, orientation, remaining fuel, payload information, emergency situations, communication information (Ground Control Station - GCS, Ground Data Terminal - GDT) of the UAVS can be tracked. Additionally, it allows the users to help separation of the UAVS and shows altitude tables, proximity alerts, flight codes, UAV trails. Health status of the ground antennas can be tracked and line-of-sight information can be shown over the map. Permissions can be granted at different levels for users to restrict classified information. CMS is a very useful tool that reflects all the necessary information for the UAV operations with a central command.

REMOTE VIDEO TERMINAL SYSTEM



General Specifications

Temperatures	Operating : -20 °C.....+55 °C Non-operating : -40 °C.....+55 °C
Backpack Dimensions	99 x 46 x 38 cm
Antenna Tripod Dimensions	91 cm < height < 183 cm
Total Weight	20 kg

Electrical Specifications

Voltage	24V with supplied battery pack or 28V DC
Current	Up to 4.0 Amps
Power Consumption	Max 100 W
Connector	2 x 50 OHM SMA Connectors and 55-pin Primary Connector
Ethernet Interface	205 cm/81 in

Details

Rugged, portable antenna system enhances EnerLinksIII range performance.

Ideal for dismounted on-the-pause applications .

Small omni antenna design provides 3dBi of gain.

Wide beamwidth improves usability and allow ease in pointing.

Upward-looking antenna for operation at close overhead range.

Fully integrated with all TF components.

The RVT can provide up to five hours of use per mission.

The small, light patch antennas provide a wide beam width to allow easy acquisition and tracking.

The RVT system can provide up to 30 km at 6 Mbps for transmission of high-quality HD video and other sensor data.

WIDE AREA
MAPPING SERVICE

Baykar has available a rapid mapping service to provide orthorectified, color-corrected, high-resolution maps - not just photos - overnight. The service can cover hundreds to thousands of square kilometers in one day and deliver the ready-made map by the next day.

The Baykar system is built for rapid development and disassembly, with reliable camera technology. All cameras are commodity, off-the-shelf cameras and proven to sustain in excess of hundreds of thousands of shots without the need for replacement. While capture for each flight happens over several hours, the processing of images takes slightly more time and happens offline.

When cruising at TB2 speeds in excess of 200 km / h, this arrangement enables coverage of hundreds of square kilometers per hour, thus enabling entire provinces or even countries to be imaged in one day.

The system includes a web-based application that walks an operator through all phases of map generation, from the initial designation of the desired area and resolution, to finally image stitching and imagery delivery.

Example Coverage Patterns (presuming medium flight altitude of 15,000 feet)

Region	Area (km^2)	Example Coverage Time	Resolution (cm/pixel)
San Francisco	130	10 Minutes	6
Greater Istanbul	4.000	4.5 Hours	6
Adana Fertile Region (Çukurova)	10.000	11 Hours	6

ISOLATED.
INTELLIGENT.
REDUNDANT.

SUBSYSTEMS – AVIONICS –
FLIGHT CONTROL SYSTEMS

BUK-101 FLIGHT CONTROL COMPUTER

Flight control system (FCS) is the most crucial component of a UAV platform which must offer a safe degree of autonomy combining robust estimation, navigation and control capability. Above all, critical avionic systems have to be continuously monitored and possible failures must be diagnosed and isolated from the control cycle with immediacy. FCS, developed by Baykar as part of Turkey's national UAV initiative, offers a state-of-the-art system which reduces the operator burden while maximizing safety and reliability. Its triple redundant configuration is the first application on a tactical grade UAV system. The estimation software included in the flight control system that supplies state information to the control cycles depends on modern algorithms based on stochastic sensor fusion. Navigation, control and guidance algorithms are capable of fully autonomous takeoff, landing, taxiing and waypoint navigation.

EMERGENCY SITUATIONS DUE TO SUBSYSTEM MALFUNCTIONS ARE DETECTED BY A HEALTH-MONITORING SYSTEM AND **SAFE RETURN TO THE BASE IS HANDLED BY THE AUTOPILOT, RETURNING THE AIRCRAFT ON A PREDEFINED ROUTE.**

Specifications

Supply Voltage	18V – 29V DC
Power Consumption	Max. 20 W
Operating Ambient Temperature	-40 °C.....+55 °C
Weight	3.060 g

Features

- Complies with VPX Standards (ANSI/VITA 46.0, 48.0, 48.1, 48.2)
- Lightweight Aluminum Casing
- Vibration Resistant
- Conductive Cooling

Features

- Triple Redundant Main Controller Unit
- Triple Redundant System Health Monitoring and Voting Unit
- Triple Redundant Power Regulating System
- **Electrical Isolation Interface**
  15 RS232, 4 RS422/RS485 Full Duplex,
  2 RS422/RS485 Half Duplex,
  4 CANBUS Interface
- EMI Protection
- ESD Protection
- Surge Protection
- Short Circuit Protection
- Reverse Voltage Protection
- MIL-DTL-38999 Type Circular Connectors

MISSION CONTROL COMPUTER

The Auxiliary Mission Computer controls the non-critical data flow on the aircraft and transfers data that can be required by the Flight Critical Mission Computer. Multiple communication input/output lanes provide monitor and control role of connected avionics and ensures payload operation and realization of non-flight-critical functions without interfering with the main flight control system.

Specifications

Input Voltage	18 – 29V DC
Power Consumption	Max. 20 W
Operating Temperature	-40 °C.....+55 °C
Weight	1,8 kg

Features

- Handling of Auxiliary Mission Functions with Safety Microprocessor
- **Electrical Isolation Interface**
- 15 RS232, 2 RS422/RS485 Full-Duplex, 2 RS422/RS485 Half-Duplex, 4 CANBUS Interface
- High Voltage (Surge) Protection
- Short Circuit Protection
- Reverse Voltage Protection
- All Connectors Meets Requirements Specified in MIL-DTL-38999
- Complies with VPX Standards (ANSI/VITA 46.0, 48.0, 48.1, 48.2)
- Light Weight Aluminum Chassis
- Vibration Resistant Design
- Conduction Heat Transfer Structure

KM-301 MAGNETOMETER

KM-301 is a compact three-axis magnetometer and it can be used as a subsystem with heading output for navigation systems. Set-Reset capability improves accuracy by eliminating possible strong magnetic disturbances and self-thermal noise of the sensor.

Specifications

Range	-2 to +2 Gauss
Operating Temperature	-40 °C.....+60 °C
Supply Voltage	18 - 28V DC
Interface	1 x Micro-D (9 pin)
Communication	1 x RS232

Features

- 50 Hz Continuous Output.
- Hard and Soft Magnetic Calibration Adjustment.
- Mounting Adjustment using DCM.
- Diagnostic Output for Sensor and Communication Failures.

MINI AUTOPILOT UNIT

THIS COMPACT AUTOPILOT SYSTEM CONSISTS OF DEVELOPED **INERTIAL, MAGNETIC, AND PRESSURE SENSORS AS WELL AS A COMMUNICATION MODEM.**

Using an advanced microcontroller with high processor power and advanced stochastic sensor fusion and navigation algorithms, it provides full automatic departure and landing as well as navigation in autonomous and semi-autonomous modes. It provides a controlling external input sensor and useful lines with the channels of RS232 and CAN.

Specifications

Operating Temperature	-40 °C.....+55 °C
Weight	158 g
Sizes	20 × 125 × 90 mm
Voltage	Min. 9V DC Nominal 12V DC Max. 13,3V DC
Current	Min. 150 mA Max. 230 mA
Avarege Power Dissipation	2,8 W
3 Axis Angular Velocity Accelerometer	Range of measuring ± 300 °/s Resolution 0.01 °/s Noise (RMS) 0.06 °/s

Specifications

3 Axis Accelerometer	Range of measuring ± 10 g Resolution 0,313 mg Noise (RMS) 1 mg
3 Axis Magnetometer	Range of measuring ± 2 Gauss
Micro-D 1/O Connector	
External Programming Connector	
MMCX Telemetry Telecommand RF Connector	

Features

- Safety microcontroller which has high processing power.
- Real Time Operating System.
- Stochastic state estimation algorithms.
- Developed navigation algorithms.
- Full and semi-autonomous flight modes.
- Automatic route point tracking.
- Automatic circle tracking.
- Full automatic landing and departure.
- Emergency monitor, automatic home return in case of emergency.
- Automatic landing with parachute or automatic landing on the body when communication loss occurs.

BAS-201 BAYKAR IMU

BAS-201 is a military grade inertial measurement unit. BIMU - designed, developed and manufactured by Baykar is used as the primary sensor in sensor fusion and stochastic filtering applications. It is a tactical grade, high performance unit that provides accurate measurements. Its low size, weight and power consumption makes it a good choice especially for space constrained applications.

IT IS A TACTICAL GRADE, **HIGH PERFORMANCE UNIT** THAT PROVIDES **ACCURATE MEASUREMENTS**.

Specifications

Performance	
Operating Temperature	-40 °C.....+55 °C
Output Rate	200 Hz
Weight	255 g
Connector	MIL STD 38999, Series 3 connector, 22 PIN
Gyro Specifications	
Range	± 300 °/s
Random Walk	1 °/√hr
Bias Instability	5 °/√hr
Bias Over Temperature	± 1 °/s

Accelerometer Specifications	
Range	± 5 g
Noise (1σ)	2,5 mg
Bias Over Temperature	±1 mg/°C
Input Voltage / Power	
Operating Range	15-30V DC
Typical Voltage	24/28V DC
Typical Current	130 mA
Environmental Compatibility (MIL-STD-810F)	
High Temperature	Storage / Operation = Method 501.4
Low Temperature	Storage / Operation = Method 502.4
Vibration	Operation / Transportation = Method 514
Humidity	Cycle = Method 507.4
Low Pressure(Altitude)	Storage / Operation = Method 500.4

Features

- High Sensitivity Sensors
- Self-Eliminating Any Temperature and Aging Effects
- High Immunity to Shock and Vibration
- Detailed Diagnostics Data Capability for Testing and Operation
- Redundant Communication With Diverse Interfaces
- Configurable Communication Protocol for Different Hardware and Software Applications
- Wide Operating Temperature Range
- Precision CNC Machined Aerospace Grade Aluminum Casing
- Extended Error Detection & Failsafe Measures

Applications

- Unmanned Aerial Systems
- Unmanned Ground Vehicles
- Control and Stabilization
- Measurement and Testing
- Vehicle Health Monitoring
- Robotics

BAS-101 MINI IMU

BAS-101 is a military grade inertial measurement unit. Baykar MIMU - designed, developed and manufactured by Baykar is used as the primary sensor in sensor fusion and stochastic filtering applications. It is a tactical grade, high performance unit that provides accurate measurements.

ITS LOW SIZE, WEIGHT AND POWER CONSUMPTION MAKE **IT A GOOD CHOICE**

Specifications

Performance	
Operating Temperature	**-40 °C.....+55 °C**
Output Rate	100 Hz
Weight	**61 g**
Connector	Push-Pull Self-Latching Type
Gyro Specifications	
Range	**± 300 °/s**
Random Walk	1 °/√hr
Bias Instability	**5 °/hr**
Bias Over Temperature	± 1 °/s
Accelerometer Specifications	
Range	**± 5 g**
Noise (1σ)	2.5 mg
Bias Over Temperature	**±1 mg/°C**

Input Voltage / Power	
Operating Range	6.5-21V DC (Optional 28V DC)
Typical Current	**155 mA @ 12V DC**
Environmental Compatibility (MIL-STD-810F)	
High Temperature	**Storage / Operation = Method 501.4**
Low Temperature	Storage / Operation = Method 502.4
Vibration	**Operation / Transportation = Method 514**
Humidity	Cycle = Method 507.4
Low Pressure(Altitude)	**Storage / Operation = Method 500.4**
Electromagnetic Compliance (MIL-STD-461F)	
RS103	**Radiated Susceptibility / Electric Field**
RE102	Radiated Emissions / Electric Field

Features

- High Sensitivity Sensors
- **Self-Eliminating Any Temperature and Aging Effects**
- High Immunity to Shock and Vibration
- **Detailed Diagnostics Data Capability for Testing and Operation**
- Configurable Communication Protocol for Different Hardware and Software Applications
- **Wide Operating Temperature Range**
- Precision CNC Machined Aerospace Grade Aluminum Casing
- **Extended Error Detection & Failsafe Measures**

Applications

- Unmanned Aerial Systems
- **Control and Stabilization**
- Measurement and Testing
- **Vehicle Health Monitoring**
- Robotics

BDS-W-040 CONTROL SURFACE
ROTARY ACTUATOR

BDS-W-040 Control Surface Rotary Actuator System is designed and built to meet performance requirements of modern UAV Flight Control Systems. BDS-W-040 provides failsafe and jitterless performance with its robust advanced control system and redundant communication architecture.

Advanced Features

Performance	
Max. Continous Torque	10.8 Nm
Stall Torque	50.8 Nm
Nominal Speed	136 °/sec
Max Travel Angle	±120°
Operating Temperature	-40 °C.....+65 °C
No Load Backlash	<1°
Weight	730 g
Connector	MIL STD 38999 Series 3 connector, 19 PIN

Input Voltage / Power	
Operating Range	18-28V DC
Typical Voltage	24V DC
Standby Current	123 mA

Environmental Compatibility (MIL-STD-810F)	
High Temperature	Storage / Operation = Method 501.4
Low Temperature	Storage / Operation = Method 502.4
Vibration	Operation / Transportation = Method 514
Humidity	Cycle = Method 507.4

Electromagnetic Compliance (MIL-STD-461F)	
RS103	Radiated Susceptibility / Electric Field
RE102	Radiated Emissions / Electric Field

Specifications

- Dual Redundant Communication via CANbus & RS485
- Gradual Stall for Overload Protection
- Brushless Permanent Magnet DC Motor
- Robust & High Fidelity Controller Design
- Advanced Error Detection & Failsafe Measures
- High Power to Weight Performance
- Contactless Shaft Position Sensor
- Precision CNC Machined Aerospace Grade Aliminum Casing

End User Software Parameters

- Dead Band - Null Position - Current Limits
- Temperature Limits - Control Parameters
- Detailed Diagnostics Data Output

Applications

- Unmanned Aerial Systems
- Control Surfaces
- Utility Actuation
- Throttle Control
- Door
- Spoiler

BLS-B-040 BRAKE SYSTEM
LINEAR ACTUATOR

BLS-B-040 Brake System Linear Actuator System is designed and built to meet performance requirements of modern UAV Flight Control Systems. BLS-B-040 provides failsafe and jitterless performance with its robust, advanced control system and redundant communication architecture.

Advanced Features

Performance	
Power	40 W
No Load Feed Velocity	53 mm/sec
Load Feed Velocity	43 mm/sec
Max. Continuous Force	410 N
Max. Force	2,180 N
Operating Temperature	-40 °C.....+65 °C
Weight	864 g
Connector	MIL STD 38999 Series 3 connector, 19 PIN

Input Voltage / Power	
Operating Range	18-28V DC
Typical Voltage	24V DC
Standby Current	123 mA
Environmental Compatibility (MIL-STD-810F)	
High Temperature	Storage / Operation = Method 501.4
Low Temperature	Storage / Operation = Method 502.4
Vibration	Operation / Transportation = Method 514
Humidity	Cycle = Method 507.4
Electromagnetic Compliance (MIL-STD-461F)	
RS103	Radiated Susceptibility / Electric Field
RE102	Radiated Emissions / Electric Field

Specifications

- Dual Redundant Communication via CANbus & RS485
- Gradual Stall for Overload Protection
- Brushless Permanent Magnet DC Motor
- Robust & High Fidelity Controller Design
- Advanced Error Detection & Failsafe Measures
- High Power to Weight Performance
- Contactless Shaft Position Sensor
- Precision CNC Machined Aerospace Grade Aliminum Casing

End User Software Parameters

- Dead Band - Null Position - Current Limits
- Temperature Limits - Control Parameters
- Detailed Diagnostics Data Output

Applications

- Unmanned Aerial Systems
- Control Surfaces
- Utility Actuation
- Throttle Control
- Door
- Spoiler

BDS-208 DUAL REDUNDANT
SERVO ACTUATOR

BDS-208 Dual Redundant Servo Actuator System is designed and built to meet performance requirements of modern UAV Flight Control Systems. BDS-208 provides failsafe and jitterless performance with its robust advanced control system and redundant communication architecture.

Advanced Features

Performance	
Power	80 W
Nominal Speed	132 °/sec
Max. Continuous Torque	1,3 Nm
Max. Torque	3,5 Nm
Operating Temperature	-40 °C.....+65 °C
Weight	670 g
Connector	MIL STD 38999 Series 3 connector, 19 PIN

Input Voltage / Power	
Operating Range	18-28V DC
Typical Voltage	24V DC
Standby Current	70 mA
Environmental Compatibility (MIL-STD-810F)	
High Temperature	Storage / Operation = Method 501.4
Low Temperature	Storage / Operation = Method 502.4
Vibration	Operation / Transportation = Method 514
Humidity	Cycle = Method 507.4
Electromagnetic Compliance (MIL-STD-461F)	
RS103	Radiated Susceptibility / Electric Field
RE102	Radiated Emissions / Electric Field

Specifications

- Dual Redundant Communication via CANbus & RS485
- Gradual Stall for Overload Protection
- Brushless Permanent Magnet DC Motor
- Robust & High Fidelity Controller Design
- Advanced Error Detection & Failsafe Measures
- High Power to Weight Performance
- Contactless Shaft Position Sensor
- Precision CNC Machined Aerospace Grade Aliminum Casing

End User Software Parameters

- Dead Band - Null Position - Current Limits
- Temperature Limits - Control Parameters
- Detailed Diagnostics Data Output

Applications

- Unmanned Aerial Systems
- Control Surfaces
- Utility Actuation
- Throttle Control
- Door
- Spoiler

BDS-008 ROTARY
SERVO ACTUATOR

BDS-008 Rotary Servo Actuator System is designed and built to meet performance requirements of modern UAV Flight Control Systems. BDS-008 provides failsafe and jitterless performance with its robust advanced control system and redundant communication architecture.

Advanced Features

Performance	
Power	8.0 W
Nominal Speed	132 °/sec
Max. Continuous Torque	1,3 Nm
Max. Torque	3,5 Nm
Operating Temperature	-40 °C.....+65 °C
Weight	0,341 kg
Connector	MIL STD 38999 Series 3 connector, 19 PIN

Input Voltage / Power	
Operating Range	18-28V DC
Typical Voltage	24V DC
Standby Current	70 mA

Environmental Compatibility (MIL-STD-810F)	
High Temperature	Storage / Operation = Method 501.4
Low Temperature	Storage / Operation = Method 502.4
Vibration	Operation / Transportation = Method 514
Humidity	Cycle = Method 507.4

Electromagnetic Compliance (MIL-STD-461F)	
RS103	Radiated Susceptibility / Electric Field
RE102	Radiated Emissions / Electric Field

Specifications

- Dual Redundant Communication via CANbus & RS485
- Gradual Stall for Overload Protection
- Brushless Permanent Magnet DC Motor
- Robust & High Fidelity Controller Design
- Advanced Error Detection & Failsafe Measures
- High Power to Weight Performance
- Contactless Shaft Position Sensor
- Precision CNC Machined Aerospace Grade Aliminum Casing

End User Software Parameters

- Dead Band - Null Position - Current Limits
- Temperature Limits - Control Parameters
- Detailed Diagnostics Data Output

Applications

- Unmanned Aerial Systems
- Control Surfaces
- Utility Actuation
- Throttle Control
- Door
- Spoiler

BDS-G-040 LANDING GEAR
ROTARY ACTUATOR

BDS-G-040 Landing Gear Rotary Actautor System is designed and built to match performance characteristics of modern UAV Flight Control Systems. BDS-G-040 provides failsafe and jitterless performance with its robust advanced control system and redundant communication architecture.

Advanced Features

Performance	
Maximum Torque	12 Nm
Max. Continous Torque	10,8 Nm
Stall Torque	40 Nm
Nominal Speed	95 °/ sec
Max Travel Angle	±120°
Operating Temperature	-40 °C.....+65 °C
No Load Backlash	<1°
Weight	730 g
Connector	MIL STD 38999 Series 3 connector, 19 PIN

Input Voltage / Power	
Operating Range	18-28V DC
Typical Voltage	24V DC
Standby Current	70 mA

Environmental Compatibility (MIL-STD-810F)	
High Temperature	Storage / Operation = Method 501.4
Low Temperature	Storage / Operation = Method 502.4
Vibration	Operation / Transportation = Method 514
Humidity	Cycle = Method 507.4

Electromagnetic Compliance (MIL-STD-461F)	
RS103	Radiated Susceptibility / Electric Field
RE102	Radiated Emissions / Electric Field

Specifications

- Dual Redundant Communication via CANbus & RS485
- Gradual Stall for Overload Protection
- Brushless Permanent Magnet DC Motor
- Robust & High Fidelity Controller Design
- Advanced Error Detection & Failsafe Measures
- High Power to Weight Performance
- Contactless Shaft Position Sensor
- Precision CNC Machined Aerospace Grade Aliminum Casing

End User Software Parameters

- Dead Band - Null Position - Current Limits
- Temperature Limits - Control Parameters
- Detailed Diagnostics Data Output

Applications

- Unmanned Aerial Systems
- Control Surfaces
- Utility Actuation
- Throttle Control
- Door
- Spoiler

BLS-L-040 LANDING GEAR
LINEAR ACTUATOR

BLS-L-040 Landing Gear Linear Actuator System is designed and built to meet performance requirements of modern UAV Flight Control Systems. BLS-L-040 provides failsafe and jitterless performance with its robust advanced control system and redundant communication architecture.

Advanced Features

Performance	
Power	40 W
No Load Feed Velocity	22 mm/sec
Load Feed Velocity	18 mm/sec
Max. Continuous Force	461 N
Max. Force	2.463 N
Operating Temperature	-40 °C.....+65 °C
Weight	707 g
Connector	MIL STD 38999 Series 3 connector, 19 PIN

Input Voltage / Power	
Operating Range	18-28V DC
Typical Voltage	24V DC
Standby Current	123 mA
Environmental Compatibility (MIL-STD-810F)	
High Temperature	Storage / Operation = Method 501.4
Low Temperature	Storage / Operation = Method 502.4
Vibration	Operation / Transportation = Method 514
Humidity	Cycle = Method 507.4
Electromagnetic Compliance (MIL-STD-461F)	
RS103	Radiated Susceptibility / Electric Field
RE102	Radiated Emissions / Electric Field

Specifications

- Dual Redundant Communication via CANbus & RS485
- Gradual Stall for Overload Protection
- Brushless Permanent Magnet DC Motor
- Robust & High Fidelity Controller Design
- Advanced Error Detection & Failsafe Measures
- High Power to Weight Performance
- Contactless Shaft Position Sensor
- Precision CNC Machined Aerospace Grade Aliminum Casing

End User Software Parameters

- Dead Band - Null Position - Current Limits
- Temperature Limits - Control Parameters
- Detailed Diagnostics Data Output

Applications

- Unmanned Aerial Systems
- Control Surfaces
- Utility Actuation
- Throttle Control
- Door
- Spoiler

BLS-T-060 CONTROL SURFACE
LINEAR SERVO ACTUATOR

BLS-T-060 Control Surface Linear Servo Actuator System is designed and built to meet performance requirements of modern UAV Flight Control Systems. BLS-T-060 provides failsafe and jitterless performance with its robust advanced control system and redundant communication architecture.

Advanced Features

Performance	
Power	60 W
No Load Feed Velocity	84 mm/sec
Load Feed Velocity	73 mm/sec
Max. Continuous Force	523 N
Max. Force	3,293 N
Operating Temperature	-40 °C.....+65 °C
Weight	0,844 kg
Connector	MIL STD 38999
	Series 3 connector, 19 PIN

Input Voltage / Power	
Operating Range	18-28V DC
Typical Voltage	24V DC
Standby Current	191 mA

Environmental Compatibility (MIL-STD-810F)	
High Temperature	Storage / Operation = Method 501.4
Low Temperature	Storage / Operation = Method 502.4
Vibration	Operation / Transportation = Method 514
Humidity	Cycle = Method 507.4

Electromagnetic Compliance (MIL-STD-461F)	
RS103	Radiated Susceptibility / Electric Field
RE102	Radiated Emissions / Electric Field

Specifications

- Dual Redundant Communication via CANbus & RS485
- Gradual Stall for Overload Protection
- Brushless Permanent Magnet DC Motor
- Robust & High Fidelity Controller Design
- Advanced Error Detection & Failsafe Measures
- High Power to Weight Performance
- Contactless Shaft Position Sensor
- Precision CNC Machined Aerospace Grade Aliminum Casing

End User Software Parameters

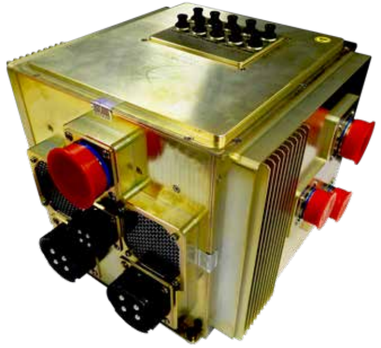
- Dead Band - Null Position - Current Limits
- Temperature Limits - Control Parameters
- Detailed Diagnostics Data Output

Applications

- Unmanned Aerial Systems
- Control Surfaces
- Utility Actuation
- Throttle Control
- Door
- Spoiler

BGKO-101
POWER DISTRIBUTION SYSTEM

BGKO-101 Power Distribution Unit is a military grade avionic - designed, developed and manufactured by Baykar that supplies power to all other avionics and checks their status, controls alternators and batteries as well. The unit has a redundant control architecture that is designed with safety microprocessors. Moreover, the system monitors the health of the power distribution, takes protective measures for faults and presents detailed diagnostic data to the flight control system.



Technical Specifications

Voltage	18-29 V DC
Protection	Over Voltage Protection (OVP)
	Over Current Protection (OCP)
	ESD, EMI, EMC Protection
Number of Power Distributed Unit	> 50
Distributed Total Power	> 2.000 W
Communication	RS232, CAN
Standarts of Switching Component	MIL-PRF-6106
	MS 27742
	MIL-R-83536
Standarts of FUSE Component	MS 3320
Connectors	MIL-DTL-38999
	MIL-C-5015
Operating Temperature	-40 °C.....+60 °C

Features

- Redundant control circuit and power distribution of flight and mission critical system
- Redundant communication system
- Original battery charging system over alternator
- Detailed power status fault log for all avionics
- Power supply to more than 50 avionics. Monitoring of voltage, current and circuit breaker status
- Power critical mode (switch off all non-flight-critical units)
- Detailed list of battery and alternator faults
- MIL-PRF-6106, MS 27742, MIL-R-83536 standart power switching components
- MIL-DTL-38999, MIL-C-5015 standart connectors
- Alternator control
- Smart battery control
- Fault control
- Voltage regulation
- Temperature control

ABLi-25
ACTIVELY BALANCED LITHIUM BATTERY SYSTEM

The actively balanced Lithium based smart battery unit is the lightest weight & highest energy level battery pack designed for Unmanned Applications. The system is built to military standards and has special protective measures to ensure reliability and performance.

Technical Specifications

Capacity	20 Ah
Voltage	Min 18V DC
	Normal 22,2V DC
	Max 25,2V DC
Current	Charge 40 A
	Discharge 100 A
	Instant Discharge 200 A (<10 s)
Nominal Current	Charge 10 A
	Discharge 10 A
Storage Temperature	-10 °C.....40 °C
	Recommended 25 °C (±3 °C)
Cell Arrangement	6S-1P
Weight	4.300 g

Features

- Carbon case and aluminum base
- Lightweight box structure
- Heat isolation layers for cells
- Evacuation hole for pressure security
- 24V DC and 12V DC Outputs
- Blade type fuse holder at external 24V and 12V output terminal
- Suitable endings for ring tongue terminals
- MIL-DTL-38999 type control connector
- Internal battery control unit
- Capability to increase capacity by heating cells in cold weathers
- Internal active balancing system
- 5 level battery indicator and error indicator on battery box
- Button activated LED indicator
- 2 open-collector pins on the circular connector for external LED indicator
- Redundant communication - Dual CAN
- Individual temperature sensors for battery cells and control circuit

AIR DATA RECORDER

Air Data Recorder is a unit that is capable of recording an analog video input and one serial port data with AES-256 encryption. The unit has a rugged frame that can operate in a broad temperature range. Small size and lightweight structure with solid state component architecture offers an excellent solution for UAV systems.

Advanced Specifications

100 Hours of Analog Video Recording
AES-256 Encrypted Logging of Serial Port Input
Replaying while Recording
Fast Forward and Rewind
Flight Metadata Recording on Video Data

Technical Specifications

Operating Temperature	-40 °C.....+55 °C
Supply Voltage	18 - 28V DC
Power Consumption	60 W max.
Interface	2xMighty Mouse Series Connector (13 and 19 pin)
	1 x Mini BNC (Analog Video)
Communication	1 x RS232 for Data Recording
	1 x RS232 for Diagnostics and Control
	1 x 10/100/1000 Mbit Ethernet

TAIL CAMERA

Tail Camera is an analog output PAL system camera with a wide angle of view for aerial applications. Heated lens allows a clear view in humid conditions.

Advanced Specifications

Mechanical Adjustment for Field of View Orientation
Heated Lens for Fog Protection

Technical Specifications

Horizontal FOV	140°
Operating Temperature	-40 °C.....+60 °C
Supply Voltage	18 - 28V DC
Interface	1 x Mini BNC (Analog Video)
	1 x Circular Power Connector

BAYKAR BOMB RACK UNIT

Baykar Bomb Rack Unit has been developed in MIL-STD-8591 and MIL-STD-1760E standards for arming the tactical UAVs. Aluminum alloys are extensively used in production. Military standard connectors are used on uniquely designed control board and store interface connectors.

Store interface connector can be mounted to two different points if needed. Different types of sway braces can be used for various munitions.

Safety and ease of use is in foreground in the design. Armament can be easily done by using arming knob on the system. On the cruise, system remains in safety lock mode both electrically and mechanically. On the ground, in case, system can be disarmed via onboard manual release mechanism.

A VERY LIGHT SOLUTION FOR THE SMART MICRO MUNITIONS!

Technical Specifications

Design Standard	MIL-STD-8591 and MIL-STD-1760E
Hook Class	100 lb
Dimensions	106 x 208 x 103 mm
Weight	~1.000 g
Construction	Aluminum
Working Temperature	-40 °C - +60 °C
Platform Interface Connectors	MIL-C-38999 Referred
Store Interface Connector	Spring Contact, EMI protected

MINI UAV
VIDEO LINK

Bayraktar Mini UAV Video Link is an analog video and audio transceiver designed for harsh environments. It is ideal for law enforcement, surveillance and other applications requiring high sensitivity video and audio transmission in a compact package.

Applications

- Real-Time Video Surveillance
- Law Enforcement
- UAVs and UGVs
- Covert wireless video and audio transmission

Advanced Features

- Complete Fm Video/Audio Transceiver System
- No Latency Reception With Excellent Sensitivity
- Transmission of Analog Audio and Video Over Distances Up To 32 Km (20 Mi)
- Operation In L, S or C Bands at Factory-Preset or User-Selectable Frequencies
- Remote Control Via Rs232
- Crystal Clear Video Output Independent of the Video Format (Ntsc, Pal or Secam)
- Stereo Audio Output
- Extremely Compact and Rugged Package (86X81,5xl7mm)
- Weight 135 g
- Proven Track Record
- Fiber Glass Radome Structure

Technical Specifications

RF Characteristics	
Frequency Bands	L, S or C Band
Frequency Selection	Full Band Channelized or Up To 16 Fixed Channels
Frequency Stability	±5 ppm
Sensitivity	-90 dBm
RF Input impedance	50 Ohm Nominal, VSWR 2:1 Maximum

Video & Audio Characteristics	
Modulation Type	Analog FM
Video Standard	NTSC, PAL or SECAM
Video Output Impedance	75 Ohm Nominal
Video Output Level	1 Vpp (typical)
Video SNR	40 dB (typical)
Audio Output Level	3 Vpp (Max)
Audio Output Impedance	10 kOhm (typical)
Audio SNR	50 dB (typical)
Audio Frequency Response	50 Hz to 15 kHz (typical)
Input Voltage	8V to 20V DC Reverse Polarity Protected
Current Draw (Typical at 12V)	200 mA (typical)

Mechanical	
Material	CNC Machined T6061-T6 Aluminum
Finish	Nickel Plated or Gold Iridite
Dimensions	86 x 81.5 x 17 mm
Weight	135 g
RF Output Connector	SMA Female

Environmental	
Operating Temperature	-40 °C.....+55 °C
Humidity	Up to 95%

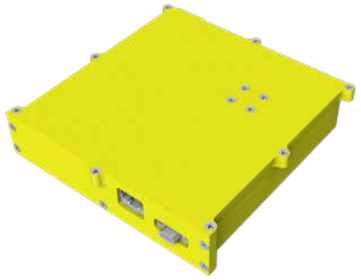
BAYRAKTAR DIGITAL VIDEO LINK

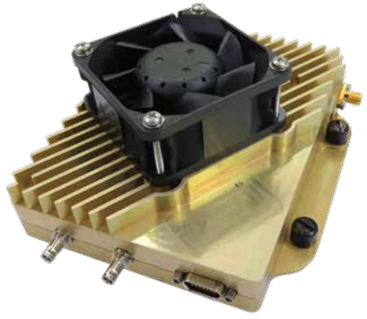
The Bayraktar digital video link is low-cost and low-swap video transmission and reception system for Intelligence, Surveillance and Reconnaissance (ISR) applications. It features dual H.264 compression engines capable of encoding HD and SD videos up to 1080p resolution. In addition to dual integrated H.264 compression, input video decoding of HD-SDI and analog video are performed on-board. As a complete end-to-end solution, Baykar's digital video link system requires no additional hardware for deployment.

Application Areas

Airborne ISR

IP video surveillance





Technical Specifications

Transmitter Unit (TX)	
Up to 150 km LOS range with Bayraktar Digital RX and PA	
Simultaneous transmission of 1 HD and 1 SD video	
Selectable modulation	QPSK, QAM16 and QAM64
L, S or C Band	
Low power consumption	
On-board HD SDI and analog decoding	
On-board dual H.264 encoders	
Size	136.6 x 118 x 52 mm
Weight	326 g
Operation temp range	-40 °C.....+65 °C

Receiver Unit (RX)	
RF to ethernet based receiver unit	
Integrated LNA (0.56dB NF)	
Various video formats	1080p30, 1080p25, 1080i60, 720p60, PAL, NTSC
Size	119 x 118 x 40 mm
Weight	320 g
Operation temp range	-40 °C.....+60 °C

POWER AMPLIFIER

Technical Specifications

Low EVM	<3 % for QAM64
Adjustable output power	+20 to +43 dBm
Good efficiency	45 W consumption @ 10 W RF output
Integrated isolator	
Compact and rugged package	
Size	124 x 131 x 75 mm
Weight	650 g
Operation temp range	-40 °C.....+55 °C

AUTOMATIC
TRACKING ANTENNA

Automatic Tracking Antenna System (ATAS) provides a complete and highly efficient ground station solution between the ground and air for the transmission of UAV video and other data. A primary objective of the antenna is to ensure transmitted data is never lost. This dual-axis auto-tracking antenna has up to 150 km signal range. Antennas can automatically locate the RF, GPS or telemetry signals and track them quickly. All major elements are housed inside the radome. Components are transported seperately into the field and the system is easily and quickly assembled.

Technical Specifications

+/- 200 degrees Azimuth Axis Rotation
+90/-10 degrees Elevation Axis Rotation
60°/sec Azimuth Angular Speed
45°/sec Elevation Axis Rotation
12.9 Nm Azimuth Torque Capacity
17.2 Nm Elevation Torque Capacity
Mechanical Limits in Azimuth and Elevation Axises
Self-Locking Gear Set in Azimuth and Elevation Mechanism
Water Proof
Weight : 32,3 kg
CNC Machined Aluminum Structure
Fiber Glass Radome Structure
-40 °C.....+55 °C Operating Temperature

Tripod Specifications

Tripod, Elevator Column	
Load Capacity	90 kg/200 lbs
Max. Height	215 cm/85 in
Min. Height	105 cm/41,5 in
Weight	19,1 kg/42 lbs
Maximum Spread Diameter	205 cm/81 in
Column Travel	45 cm/18 in
Transport dimension	17,5 x 49,5 (44 x 124)

MINI AUTOMATIC
TRACKING ANTENNA

Mini Automatic Tracking Antenna System (Mini ATAS) is a unit that provides video, telemetry and telecommunication between the UAV and the Ground Control Station by pointing the ground data terminal to the mini UAV automatically. It consists of an automatic pointing antenna system, an ATAS control unit, a tracking mechanism, a tracking antenna cable set, a telemetry and telecommunications antenna, video receiver antenna and several feet of cabling.

Interior Equipments
Operating Temperature -30 C°.....+55 C°
Physical Specifications
Sizes 741 X 1.062 X 185 mm
Total Weight 9.320 g

Technical Specifications

Power		**Input/Output**	
Voltage	12V DC Min	26 Pin Mighty Mouse Series Connector	
	16V DC Nominal	1 unit Ethernet bus	
	24V DC Max	Radio Sensitivity	-108 dBm
Current Value	1,2 A Nominal	Output Power	1 W
Power Dissipation	20 W		

Internal Sensors		**Mechanics**
GNSS Receiver		360 degree infinite tracking
GPS, GLONASS		Sewing from +90 to -10 degrees
Horizontal Position Sensitivity	2,5 m (CEP % 50, 24 hour Statik)	3-level adjustable height mounting feet
Initial resolution time	26 s	Easy installation for antenna and system connections
3 Axis Magnetometer		
Range of measuring	±2 Gauss	

BRINGING IT ALL TOGETHER.

SUPPORT AND SERVICES

STAFF TRAINING FOR UAV AND PAYLOAD OPERATIONS

Baykar provides two types of training programs for our Clients' technical staff. All training programs are provided by Baykar at its Kesan facility - having its own UAV fleet and runway. Trainings are conducted in two phases, namely theoretical/system and applied trainings. The TB2 UAS curriculum includes a one week introduction, followed by three to four weeks of theoretical and system trainings, and seven to eight weeks of flight simulations, payload operator flight trainings and applied flight trainings. The MINI UAS curriculum includes four weeks of theoretical and system trainings followed by five weeks of flight simulations and applied flight trainings. During the applied flight trainings, pilot candidates actually fly Baykar's TB2 and MINI UAVs.

UPON THE COMPLETION OF TRAINING, EVALUATION EXAMS ARE CONDUCTED FOR EACH TRAINING MODULE AND SUCCESSFUL CANDIDATES ARE AWARDED THEIR UAS TRAINING CERTIFICATES.

WARRANTY POLICY

Our Clients benefit from system-level warranty for each delivered system and is applicable.
The warranty period commences with the delivery of UAS and is valid for the following durations per each system:

- For TB2 UAS, 2 calendar years or 4000 flight hours, whichever is reached first
- For MINI UAS, 2 calendar years or 600 flight hours, whichever is reached first.

WARRANTY PACKAGE INCLUDES TECHNICAL SUPPORT DURING THE WARRANTY PERIOD AND FOR TB2 PLATFORMS, IT ADDITIONALLY COVERS MAJOR OVERHAULS AT EVERY 1000 FLIGHT HOURS.

After the system warranty period ends, maintenance and repairs are handled as per component-based warranty.

SPARE PARTS

Availability of spare parts for both scheduled and unscheduled maintenance operations critically affect operational readiness of the sytems. For successful UAV operations, Baykar deploys field depots at Client bases. Scheduled maintenance spare parts are planned and transferred to these depots. For quick fixes and unscheduled maintenance works, an inventory of critical parts are kept at these depots. Through years of operational usage experience, additional critical parts like avionics and engine components are also stored in these depots to increase part and component availability.

MAINTENANCE SERVICES

Baykar's maintenance policy is to assist and support its Clients to get the most out of their UAV systems. To keep UAVs operational most of the times, Baykar provides technical support to Client technical staff for repairs and maintenance works at line level; and carries out 1000 flight hr major overhauls with its own staff.

Baykar monitors and proactively plans major overhaul needs of its Clients in order to improve operational readiness of the systems and minimize downtime. Scheduled maintenance is planned beforehand and required parts and technical staff is deployed before the overhaul time is reached.

SOFTWARE UPDATES

Embedded system and user interfaces of the components are updated in order to meet Clients' demands and operational requirements. Critical updates are scheduled with immediate action to keep the system availability at its maximum.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