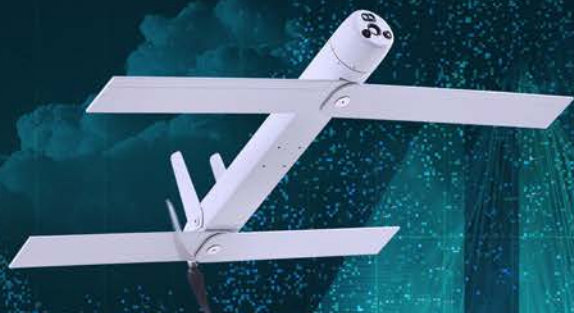
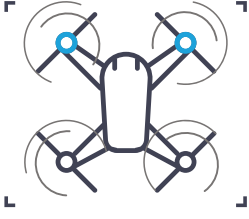


# TACTICAL MINI UAV SYSTEMS





# KARGU®

## Rotary Wing Attack Drone Loitering Munition System

**KARGU®** is a portable, rotary wing attack drone designed to provide tactical ISR and precision strike capabilities for ground troops.

**KARGU®** is capable of performing fully autonomous navigation vis STM's unique flight control system. In addition, the platform is able to perform precision strike for low signature, beyond line of sight targets.

Precision strike mission is fully performed by the operator, in line with the Man-in-the-Loop principle.

The platform is capable of detecting and striking static or mobile targets with high precision during day and night conditions.

The KARGU system is comprised of the Attack Drone Platform and the Mobile Ground Control Station.





## CAPABILITIES | COMPETENCIES

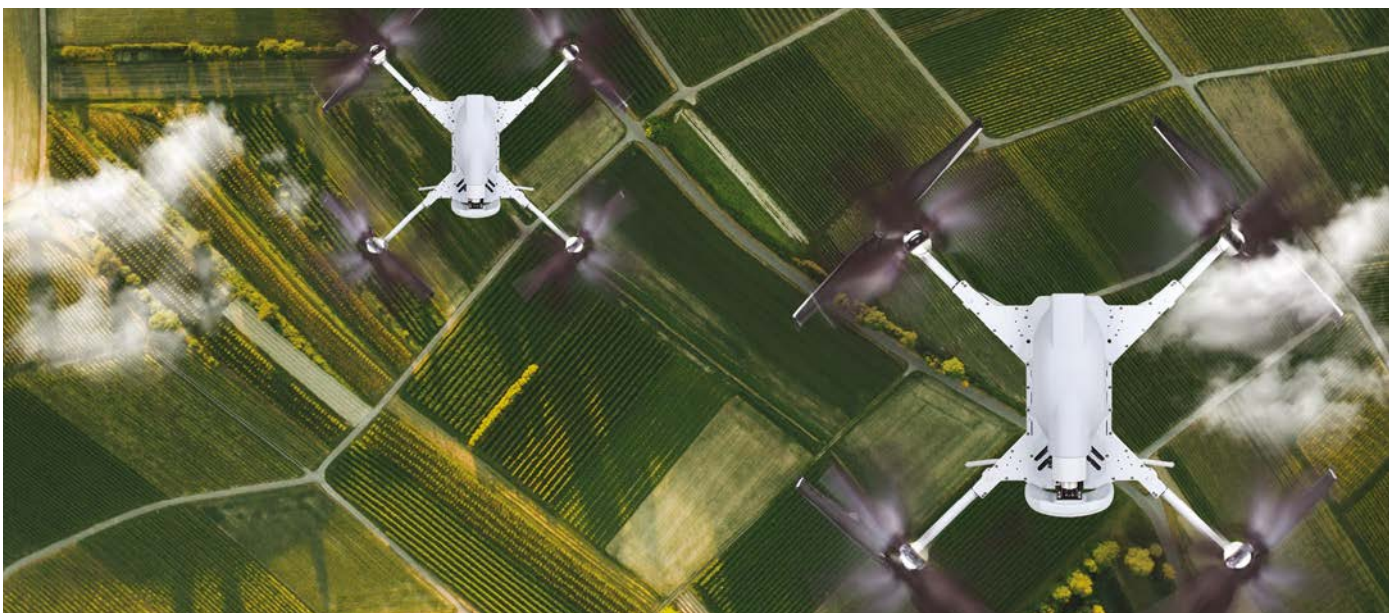
- Day & Night Mission Capability
- Precision Strike with minimum collateral damage
- Low RCS (Radar Cross Section) Platform Design
- Multiple Warhead Options
- Optical and Physical Target Tracking
- High performance, autonomous navigation and flight control system
- Operable by single personnel
- Mission abort and return home capabilities
- STM designed proximity fuse
- STM designed Automatic Target Recognition System
- Munition system integration is carried out in cooperation with MKE

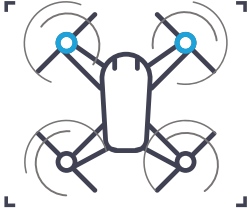
## TECHNICAL SPESIFICATIONS

Communication Range	6.5 / 10 km with external antenna
Endurance	30 minutes
Payload Capacity (Warhead)	1.3 kg
Engine	Electrical
Launch / Take off	Vertical Take Off / Landing (VTOL)



**KARGU**





# ALPAGU®

## Fixed Wing Loitering Munition System

**ALPAGU®** Fixed-Wing Attack UAV is designed for both reconnaissance and surveillance and for striking targets outside the line of sight with high accuracy.

**ALPAGU®** is a lightweight platform with its composite body and avionic design. It can be carried by a single soldier.

**ALPAGU®** is capable of performing fully autonomous navigation vis STM's unique flight control system. In addition, the platform is able to perform precision strike for low signature, beyond line of sight targets.

Precision strike mission is fully performed by the operator, in line with the Man-in-the-Loop principle.

The system is comprised of "Fixed-Wing Smart Ammunition System", Launcher" and "Ground Control Station" components.





## CAPABILITIES | COMPETENCIES

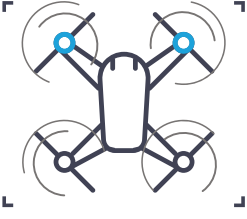
- Reliable Day and Night Operation
- Tracking Moving Targets
- High Performance Navigation, Flight Control and Guidance Algorithms
- Deployable and Operable by Single Soldier
- In-Flight Mission Abort and Emergency Self-Destruction Modes
- Advanced and Indigenous Electronic Ammunition Safety, Setup and Trigger Systems
- Indigenous National Embedded Hardware and Software
- Wide Lateral View Angle
- Image Processing-Based Control Applications
- Embedded and Real-Time Object Tracking, Detection and Classification
- Ground vehicle mountable multiple launcher option
- Munition system integration is carried out in cooperation with MKE



## TECHNICAL SPESIFICATIONS

Operational Range	< 10 km
Mission Endurance	< 15 minutes
Warhead	< 0.3 kg
Engine	Electrical
Launch Method	Pnömatik Kanister





# TOGAN®

## Autonomous Multi-Rotor Reconnaissance UAV

**TOGAN®** is a national autonomous multi-rotor reconnaissance UAS solution engineered for general-purpose reconnaissance and surveillance missions with indigenous mission planning software, autonomous intelligence, and operational capabilities. It can be controlled autonomously or via remote control, and be deployed and operated by a single personnel.

**TOGAN®** can be used effectively in tactical reconnaissance and surveillance missions, with its abilities to track fixed and moving targets and to automatically switch mission supported by indigenous and real-time image processing and deep learning algorithms.

The system is comprised of “Micro UAV Platform” and “Ground Control Station” components.





## CAPABILITIES | COMPETENCIES

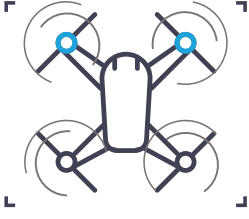
- Reliable Day and Night Operation
- Real-Time Mobile or Static Target Recognition and Tracking
- Fully Autonomous Operation Capability
- Ability to perform autonomous change of duty among two or more active platforms
- High Performance, customized flight control and mission planning software
- Deployable and Operable by Single Personnel
- 3 Axis, stabilized 30x Electro-Optical Imaging Pod
- 3 Axis Stabilised IR POD for night missions
- Integrated 3 Axis EO and IR POD (Optional)

## TECHNICAL SPESIFICATIONS

Range	5 / 10 km
Endurance	< 45 minutes
Payload	3-Axis Stabilized Gimbal
Engine	Electrical
Launch / Take off	Vertical Take Off / Landing (VTOL)







# KERKES

**KERKES** is the capability that enables rotary-wing and fixed-wing unmanned aerial vehicle platforms to perform missions in environments without GPS and RF access. With the KERKES capability, navigation is performed by estimating the location without GPS data in the operational environment. In addition, UAVs can perform missions when RF communication is not possible.

## CAPABILITIES

- Feature extraction
- Landmark recognition
- Artificial intelligence and machine learning
- Location Estimation without the support of GPS
- Mission execution without the support of GPS
- Navigation with object recognition and deep learning



# KERKES





# BUMIN

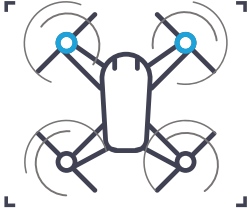
UAVs with swarm intelligence are systems that can act autonomously, learn, decide, and fulfill the mission given as a swarm within the scope of asymmetric warfare or anti-terrorism. These systems have advanced functions such as real-time object detection, identification and tracking with deep learning based computer vision techniques.

With the ability of BUMIN, rotary and fixed wing platforms, especially the unmanned aerial vehicles within our company, have that the capability of fulfill the mission as a swarm. R&D and productization activities such as testing and adapting existing products and technologies and developing new algorithms are continuing.

## CAPABILITIES

- Swarm Intelligence Algorithms
- Central/Distributed Communication Infrastructure
- UAV to UAV Communication
- Formation Capability
- Targeting and Prioritisation
- Target Sharing
- Ability to Sense and Avoid
- Rotation Capability
- Swarm Attack
- Guidance Ability





# BOYGA™

## Autonomous Multi-Rotor Combat UAS with Mortar Payload

Ammunition Drop UAV is a UAV solution that can carry 81 mm and 60 mm mortar ammunition adapted to the mechanism that releases the safety system, and can carry out the planned task and drop the useful loads on the target or coordinate it chooses.

It has an algorithm that helps target estimation of mortar ammunition.

It performs a task at the level of “Man-in-the-loop” (where the user is in the loop) by following the target selected by the user from the screen image with image processing algorithms.

Munition system integration is carried out in cooperation with MKE

### Technical Specifications 1 - Mechanical and Flight Features

Dimensions	800x800x500 mm
Diagonal Diameter	1.000 mm
Geometric Configuration	Quad coaxial (8 Motors)
Weight (No Payload)	12 kg
Maximum Payload Capacity	6 kg
Maximum Take Off Weight	18 kg
Endurance	25 min. (With 6 kg payload)
Maximum Flight Altitude	2,000 m AGL
Cruise Speed	54 km/h
Wind Resistance	15 m/s

### Technical Specifications 2 - Data Link

Frequency	S Band
Control Distance	10 km (with external antenna)
Data Rate	Up to 5 Mbps
Data Interface	Ethernet, RS 232
Security	AES-256

### Technical Specifications 3 - Imaging System

Gimbal	3 axes
Image Quality	Full HD 1080 (1920 * 1080)
Lens Optical Zoom	30x

### Technical Specifications 4 - Ground Control Unit

Tablet	10.1 inch touch screen
Joystick	Yes
Working Time With Battery	2 hours
Communication	Internal and external antenna

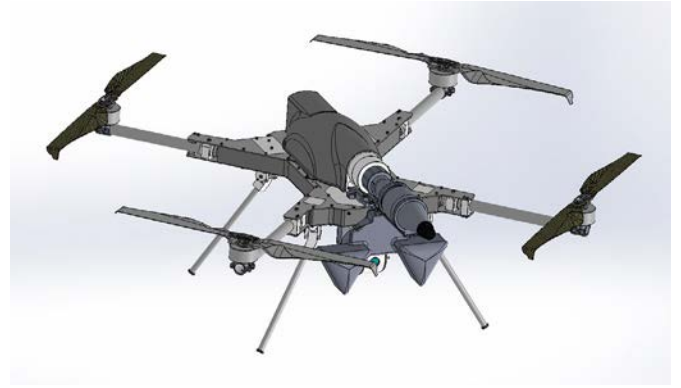
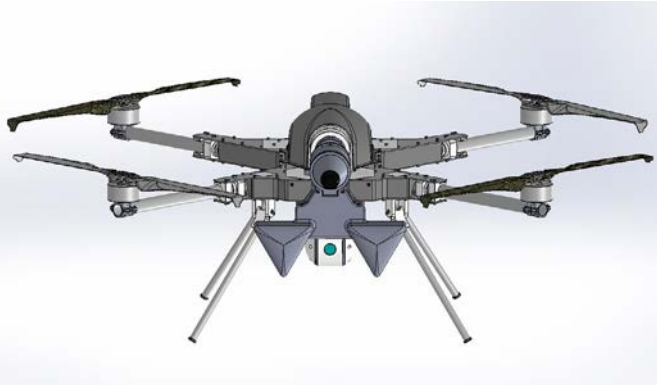




# STM RF SEEKER PAYLOAD

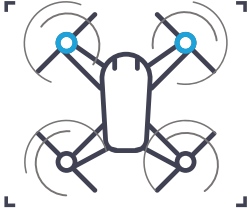
## RF Seeker Payload for Mini/Micro or Small Class UAV

**STM RF Seeker Payload**, is a passive wideband sensor that allows mini/micro or small class UAV platforms to detect and track RF transmissions belonging to friend and foe systems. **STM RF Seeker Payload** works integrated with the STM KARGU platform, which has successfully proven itself in the field in domestic and international missions.



## Specifications

- Wide Frequency Coverage
- Automatic Gain Control
- Guidance on Fixed or Moving Target
- Hom-on-Jam
- Automatic Target Selection Capability
- Lightweight Design
- Non-Moving Parts
- Low Power Consumption
- Platform Independent Integration

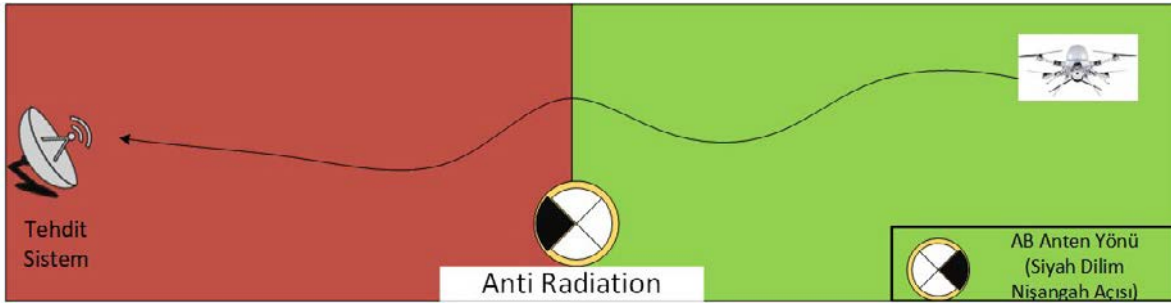


## Single Sensor Multi-Use

**STM RF Seeker Payload** provides cost-effective electronic warfare capabilities to the platforms.

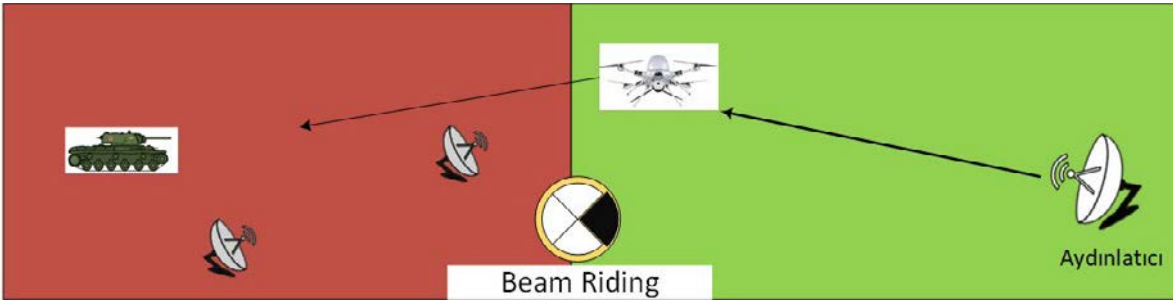
### Anti-Radiation Mode

- Detection and Tracking of enemy RF transmissions
- Guidance on Enemy RF transmission



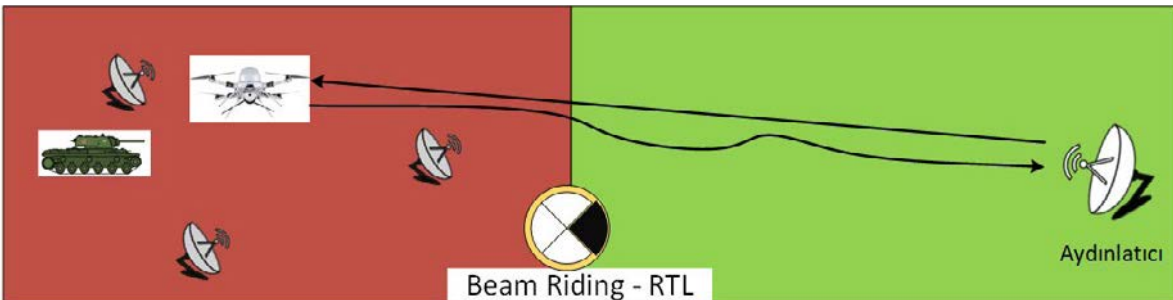
### Beam Riding Mode

- Detection and Tracking of Friendly RF transmission
- Ride on friendly beam
- Engagement Superiority against enemy jamming



### Beam Riding - Return to Land

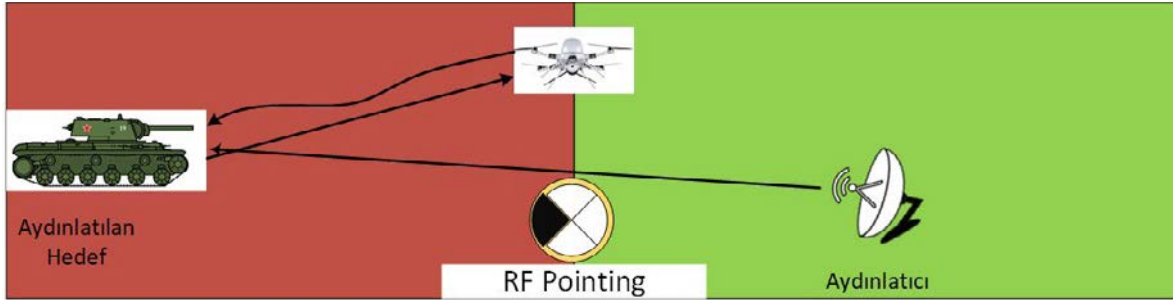
- Detection and Tracking of Friendly RF transmission
- Ride on friendly beam to safely return to land





### RF Pointing Mode

- Illumination of the enemy element
- Detection and Tracking of return echo
- Guidance on return echo



### STM RF Seeker Payload Technical Specifications

TECHNICAL SPECIFICATION	VALUE
Operating Frequency	V/UHF
Channel	4
Sensitivity	-110 dBm
Monitoring	Yes
Automatic Gain Control	Yes
SFDR	60 dB
GVD-based programming	Yes
Automatic Target Selection	Yes
User-Assisted Target Selection In The Air	Yes
Compatible with fixed or rotary wing platforms	Yes







## STM SAVUNMA TEKNOLOJİLERİ MÜHENDİSLİK VE TİCARET A.Ş.

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