

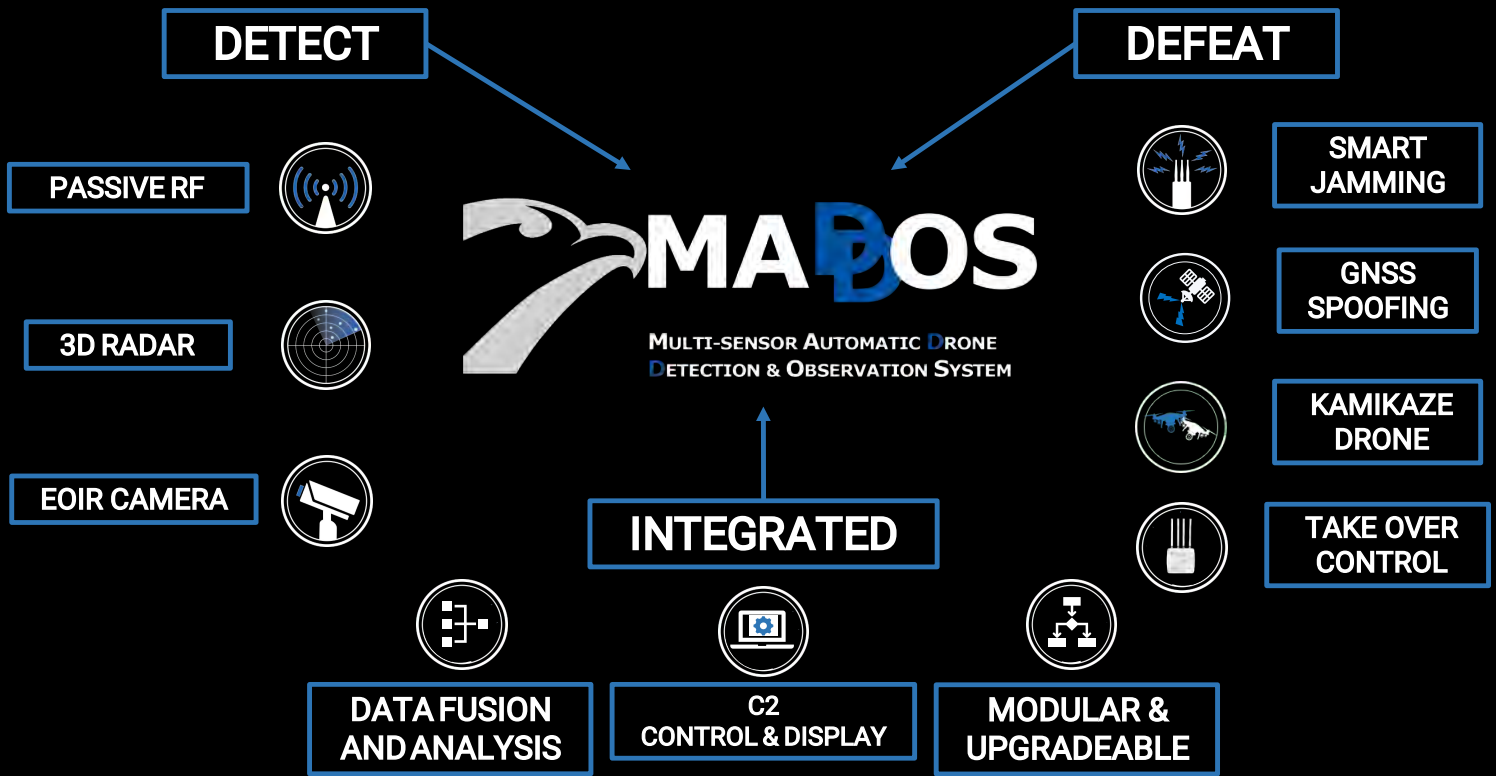
# MADOS



- ✓ **New!** C2 software based on NATO standard symbology
- ✓ **New!** Hardkill solution – Kamikaze drones
- ✓ **New!** Long range RF detection with nearly 0% false alarm rate
- ✓ Detects all kinds of UAVs – commercial, autonomous, military and DIY
- ✓ Extremely high detection range
- ✓ 360A/90E degree full dome coverage with high tracking accuracy
- ✓ Scalable for huge sites and borders
- ✓ All-in-one solution, multi-sensor support, latest AI based software
- ✓ Locates drone swarms and drone operators

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### APPLICATION



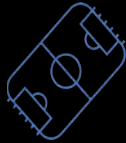
Airports



Correctional Institutes



Critical Infrastructure



Stadiums & Entertainment



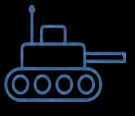
VIP protection



Smart Cities



Private Enterprise/Data



Defense & Military

### SYSTEM CONFIGURATION



#### STATIONARY

- Mounted sensors
- Installed on existing site equipment



#### PORTABLE

- Compact kit with tripod stands
- Self & fast deployment
- Flexible for ad-hoc events



#### VEHICLE

- Car mounted deployment
- Protection on the move

### OPERATION SCHEME



#### DETECT

24/7 real-time monitoring



#### IDENTIFY

Classification of the threat as a drone



#### TRACK

Displaying information and accurate position of the target



#### DEFEAT

Mitigation of the threat by multiple counter-measures

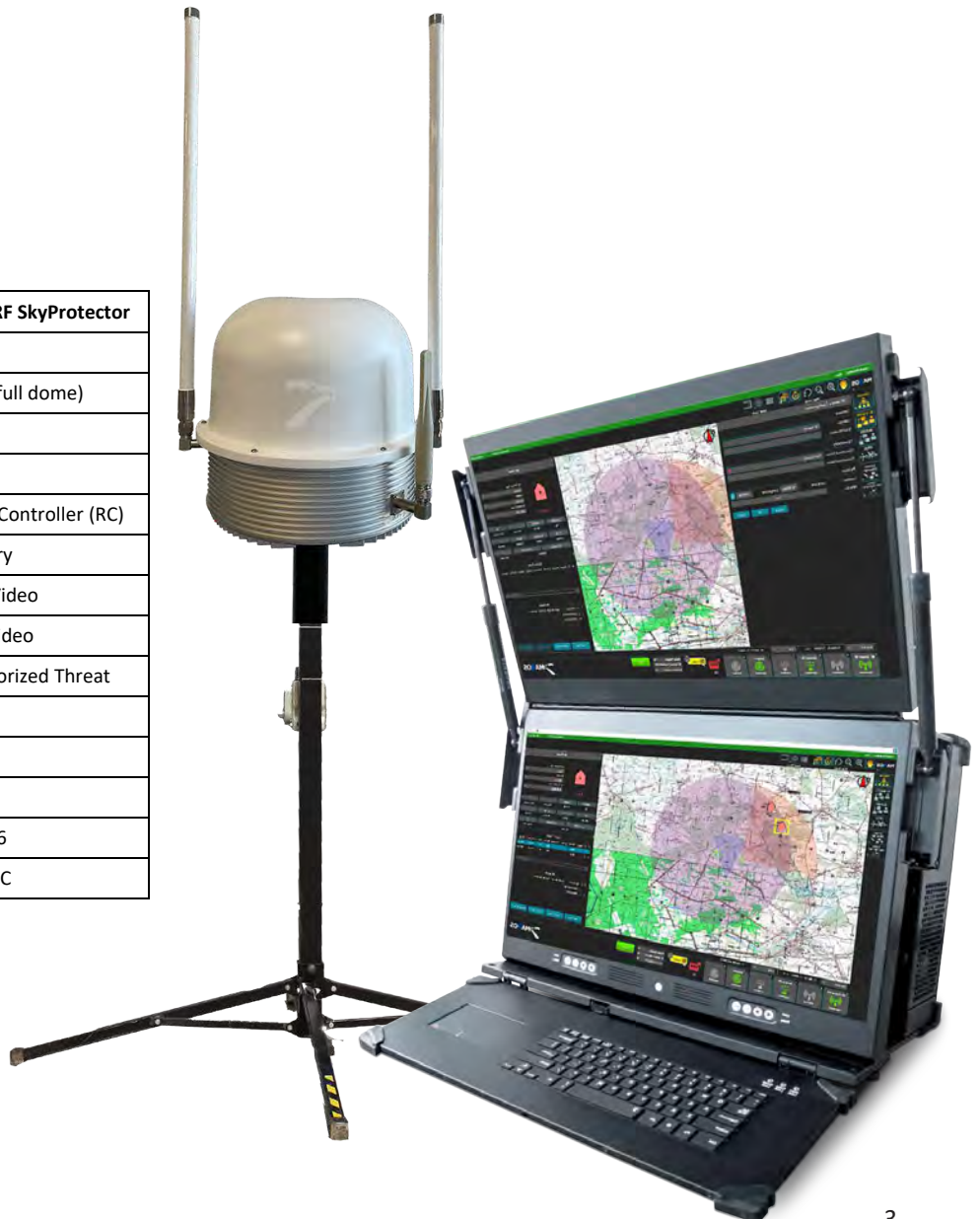
# MADDOS RF

A radio frequency (RF) detector is a device used to detect the presence of RF waves in physical transmission medium. The MADDOS RF is able to detect drone and drone pilot. Thanks to advanced AI algorithms the system identifies the type of threat by comparing different frequency patterns. The system recognizes every radio signal and can easily distinguish drones from e.g. WLAN signals by learned patterns.

## Main features

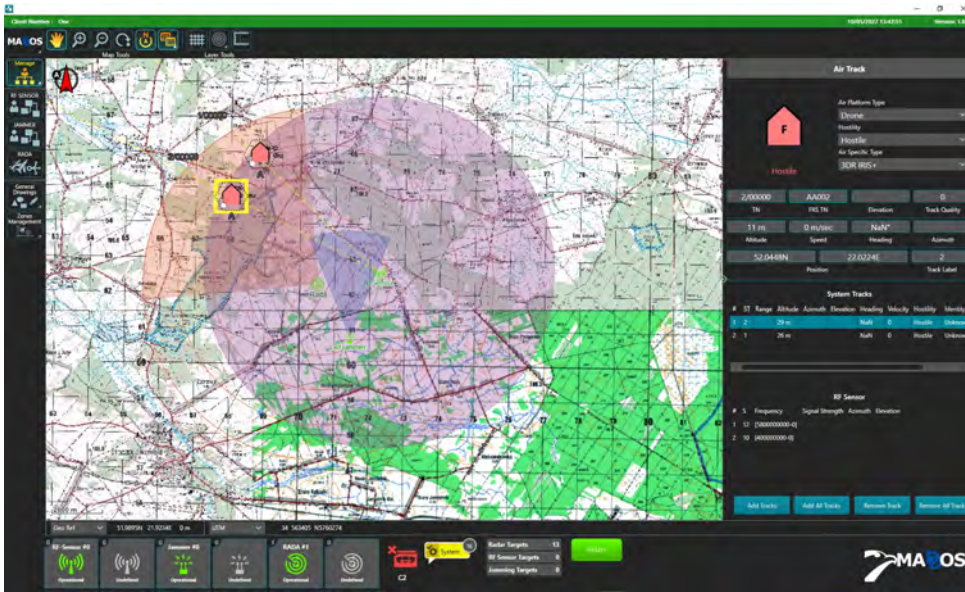
- ✓ RF frequency range covering all consumer and commercial ISM frequencies
- ✓ Multi-frequency, multi-directional swarm attack detection
- ✓ Detects the direction and location of drones
- ✓ 99,9% Identification & classification with near zero false alarms
- ✓ Drone library – more than 300 models of drone – growing continuously
- ✓ AI for detecting new and unknown drones not covered in the library
- ✓ Tracks and locates the operator(s) controlling the drone(s)
- ✓ Very long detection range up to 35KM in the rural area (up to 8km in the urban area)
- ✓ Enhanced temperature range (desert installations)
- ✓ Portable and stationary version
- ✓ Remote and Mobile access using: smartphone, tablet or computer

SPECIFICATION	MADDOS RF SkyProtector
Detection range (customizable)	1 – 10km
Coverage	360 x 90° (full dome)
Tracking accuracy	up to 5°
Classification of threat outside of library	1. Drone
	2. Remote Controller (RC)
	3. Telemetry
	4. Analog Video
	5. Digital Video
	6. Uncategorized Threat
Differentiation between Friend and Foe	Yes
Recording	Yes
Triangulation	Yes
Weight and IP	10kg & IP66
Operating temp	-25 to +55°C





# S-Band Radar



MADDOS supports powerful 3D radar integration



MHR Radar

## Key features

- Pulse-Doppler, AESA based on GAN amplifiers
- Non rotating, solid state, digital radar
- Multi Mission Radar platforms – can host varied operational missions simultaneously
- Software-Defined Radars, fully configurable for specific requirements
- Single panel coverage: 90° azimuth and 90° elevation, hemispheric coverage achieved with four panels
- Electronic counter-countermeasures (ECCM) capabilities

## Main advantages

- Combat proven
- Compact and mobile for tactical applications supports On-the-Move (OTM) Operation
- Superior Performance-to-Price Ratio, unprecedented affordability
- Extremely High Elevation Coverage, up to Hemispheric Coverage
- Multi detection range configuration – fit all scenarios



Front view

Type of Threat	Typical RCS m <sup>2</sup>	Range km
Nano UAV	0,005	5
Mini UAV	0,1	10
Medium-Size UAV	2	23
Light Transport Aircraft	20	40
Fighter – Regular	10	34
Helicopter	2	23
Direct-Attack Rocket/Missile	0,02	7
Heavy Mortar	0,01	6
Rocket	0,005	5,1

# MADDOS Camera

## Additional protection through visual detection (optional)



Ultra long range HD Thermal Camera

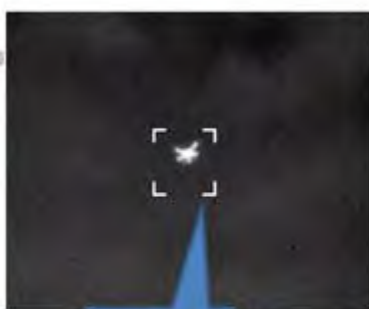
Dual sensor camera on Pan&Tilt unit is an optional detection and classification sensor in MADDOS system. Camera will automatically turn and search for the drone after receiving data from Radar/RF.

Camera enables the user to actually spot detected drones, even from a long distance, and identify potentially dangerous payloads attached to the drone, such as explosives.

Camera is a critical sensor when a hard-kill neutralization is used in configuration for double confirmation of target.

	Thermal camera	Daylight camera	Pan & Tilt unit		
Detector	Cooled MWIR	1/1.8" CMOS sensor	Load capacity: 60kg		
Resolution	640 x 512 px	1920 x 1080 px	Weight: 46kg		
Focal length	40 to 825mm	11 to 1000mm	Temp: -32°C to +55°C		
Optical zoom	20x	90x	Pan axis range: nx360°		
Digital zoom	16x	16x	Pan axis speed: 0.001°/s - 100 °/s		
IP rating	IP67, MIL-810	IP67, MIL-810	Tilt axis range: ± 90°		
Operating temp	-32°C to +55°C	-32°C to +55°C	Tilt axis speed: 0.001°/s - 100 °/s		
Weight	19 kg	18 kg	Accuracy: 0.002°		
			Communication: Ethernet		
			IP67, MIL-810		

Visual Example					
Drone // Distance	500 m	1000 m	1500 m	2000 m	2500 m
Phantom 4 (White Hot Filter)					
Phantom 4 (Black Hot Filter)					
Mavic (White Hot Filter)					
Mavic (Black Hot Filter)					



RW UAS



Fast Jet



Mini UAV

Thermal camera view

# MADDOS Jammer

The system can be extended to include an automated, integrated jammer that can effectively prevent a drone from receiving RF contact/signals, thus forcing it into failsafe mode, e.g. to land or to hover. The interference is extremely selective so that other RF channels are not impaired.

Besides being highly selective, the jammer is extremely directional and only jams in the direction of the incoming UAV.

## Mobile Handheld or Manpack-Jammer



Omni- and Directional Antenna  
Covers a total of 7 bands  
120 W output  
(up to 3 km range)

## Portable smart jammer

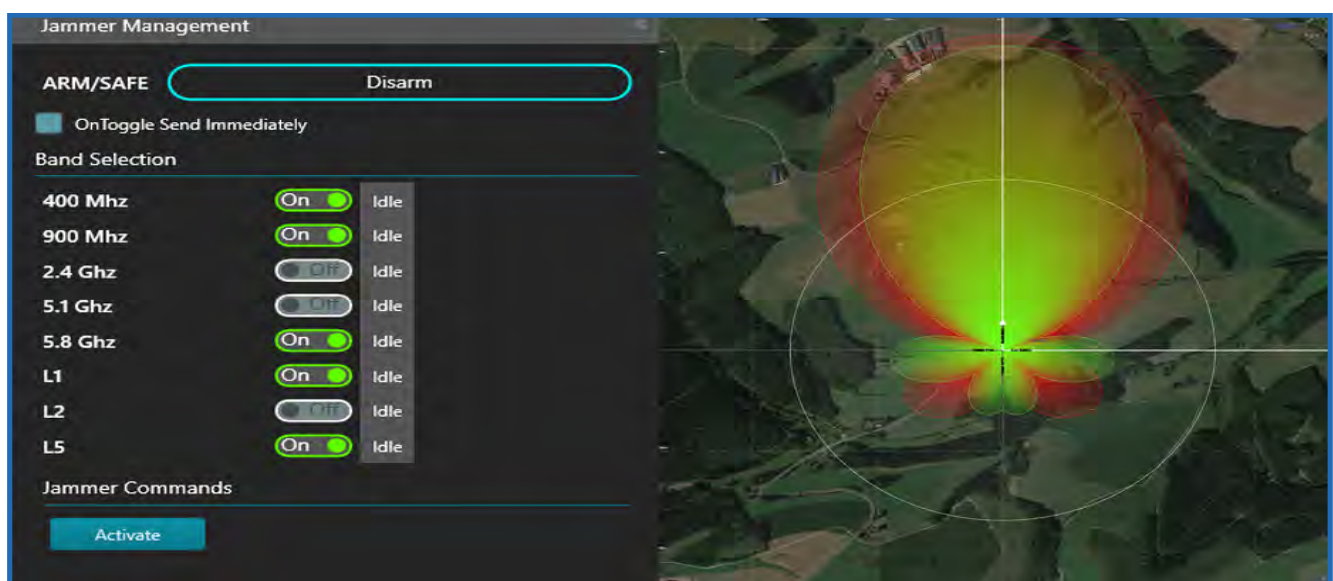


360° coverage  
Covers 5 bands  
Smart jamming of only chosen drone  
Range up to 4km

## Stationary sector and Omni-Jammer



360° coverage with 4 sectors or omni-directional antenna  
Covers in standard 9 bands  
Up to 3000W output power  
Range up to 12km



*Powerful jammer setup tool: Sectors, omni and even complex beamforming shapes can be constructed or imported. This enables the user to see the coverage of every jammer and frequency on the GIS display.*



# MADDOS ToC (TAKE OVER CONTROL)

## Preface

ToC is the premier cyber counter-drone platform designed to automatically detect, take over and safely land unauthorized commercial drones in a designated zone.

## Functionality

ToC is an autonomous end-to-end cyber solution, providing 4 layers of security:

- **Detect** - Detecting and locating drones in the vicinity of the perimeter, using a 24/7 monitoring system.
- **Identify** - Extracting rich real-time data, including the operator's last known location and flight parameters. Friendly drones can be whitelisted according to their serial (tail) number.
- **Control** - Mitigating airborne drone intrusions by automatically and actively taking over the control from the operator, navigating the drone to a predefined location, then landing it there safely. Intrusion is defined when a drone tries to enter a predefined geofenced area.
- **Prevent** - Denying drones from taking off from within a predefined geofenced area.

## Operation

ToC uses communicating sensors that are installed in several locations around the perimeter. All sensors are connected to a central server, which syncs their operation. The server also displays a Command and Control dashboard for real-time alerts, as well as for configuring the system.

## Operational Capabilities

Capability	Description
Drone detection	Detects drone activity up to a 7 km (1.24 miles) radius per sensor. According to the drone's communication signature. Can be extended if CE/FCC compliance is not required.
Drone operator detection	Extracts the operator's last known location, identify the drone model and its serial (tai) number.
Drone identification	Extracts flight parameters such as the drone's speed and altitude.
Drone flight parameter detection	Prevent stake off of unauthorized drones within a geo-fenced area.
Ground takeover, mid-air takeover	Actively takes control of an unauthorized drone that is attempting to fly into a geo-fenced area

## Technology

ToC uses Electronic RF receipt and transmission technologies for the purpose of protecting perimeters from drones, as follows:

- **Detect** - Uses passive RF scanning methods, in which the relevant spectrum bands (ISM bands) are scanned continuously for known drone communications' signatures. Once a drone is located, parsing of the telemetry channel provides information about the drone's location and altitude.
- **Control & Prevent** (deny takeoff and airborne takeover) - Uses protocol manipulation techniques - essentially to surgically redirect the control from the original drone operator into our system. Protocol manipulation is a series of messages sent to the drone that are received as legitimate commands which take over the control. The controlling channel remains - at all times - without interference and continues to function normally. The level of disruption is minimal and relates only to the drone receiving unexpected command messages.



MADDOS ToC

# GNSS SPOOFING



## Features

- Low-power radiation signals, small impact on the surroundings
- Effective defence of the intrusion of UAV fleet
- No detection system needed, quick to install
- Simple operation, one-click start/control signal
- Unattended operation, all-weather 24-hour defence

## Specification

Action distance:	
Directional distance	≥ 3 km
Active defence radius	approx. 1,5 km
Radiant power	≤ 10mW
Working frequency range	Civil UAV navigation frequency band
Size	≤ 536 mm, height ≤ 400 mm
Power Consumption	≤ 100W
Weight	≤ 20 kg
IP Rating	IP65
Power Supply	180V-240V, 50Hz
Starting time	≤ 10 min
Operating temperature	-10°C - +50°C -40°C - +60°C (wide range temperature)



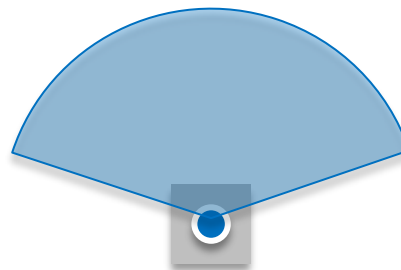
## Deployment options

### Omni



Range - 1 km

### Directional



Range - 2 km



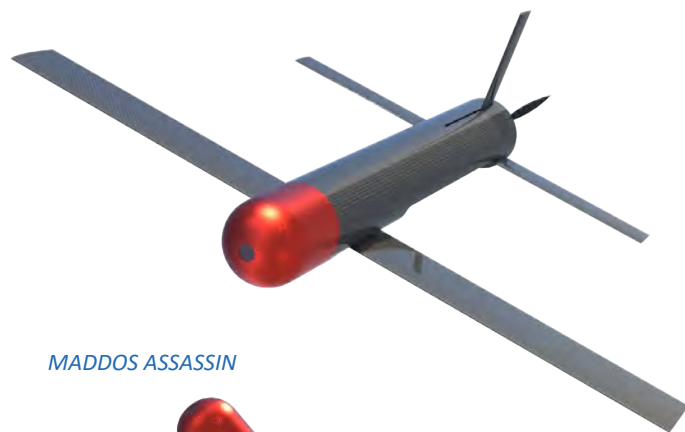
# MADDOS ASSASSIN

Hard-kill solution to defeat enemy UAV by using kinetic energy. ASSASSIN drone is able to stop Group 2 UAVs, loitering munition and armed copters.

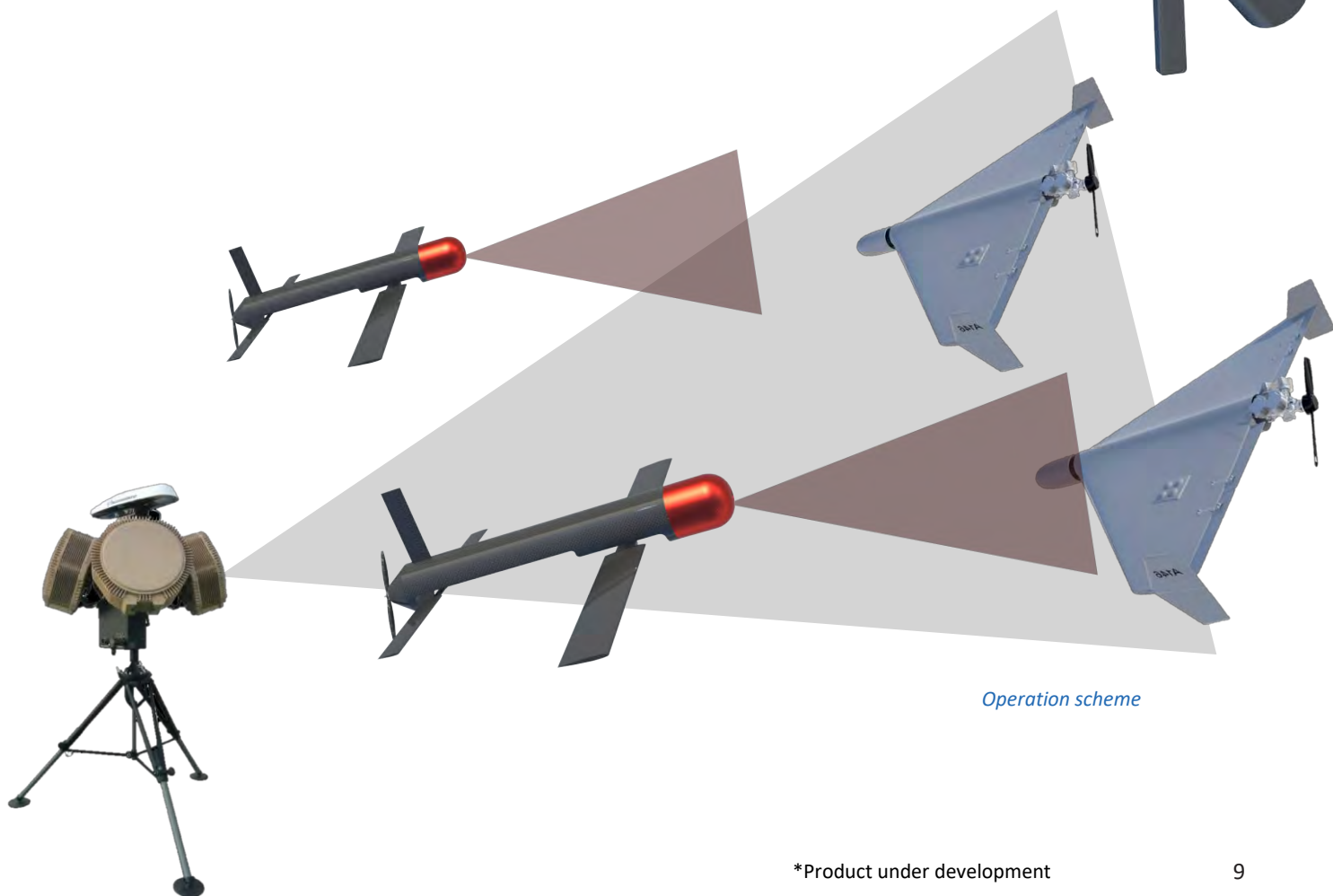
MADDOS ASSASSIN is fully autonomous fixed-wing neutralizer with high speed and explosive warhead. It can operate in swarm to neutralize multiple threats at the same time.

## Main features

- ✓ Day & night operative
- ✓ Fully autonomous
- ✓ Targeted by MADDOS Radar
- ✓ Coverage up to 5km from launcher
- ✓ Operating altitude up to 1000m AGL
- ✓ Max speed: up to 50 m/s
- ✓ Up to 0.5kg explosive warhead
- ✓ Swarming capabilities
- ✓ Low cost



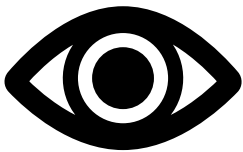
MADDOS ASSASSIN



Operation scheme

## HIGHLIGHTS

- ✓ VTOL (vertical take-off and landing) – take off and land everywhere
- ✓ Suitable for every scenario and mission
- ✓ Fully automatic missions from start to landing
- ✓ Multiple payload options
- ✓ High endurance – over 10h of flight
- ✓ High payload weight – up to 25kg
- ✓ Long communication range – up to 150km in Line of Sight (LoS) Full
- ✓ carbon fiber construction – light and durable
- ✓ Modular design – fast field assembly
- ✓ Advanced flight controller
- ✓ Inbuilt ADS-B module and LiDAR



Reconnaissance and surveillance



Intelligence gathering



Artillery fire targeting



Police and law enforcement



Search and rescue



Convoy protection

Specification	VTOL 350e	VTOL 600h
Propulsion	Electric	Electric + gasoline
Wingspan [m]	3.5	6
MTOW [kg]	22.5	110
Max. payload [kg]	3	25
Flight time [h]	2 - 3	8 – 10+
Cruise speed [m/s]	20 - 21	31 - 32
Max. speed [m/s]	31	38
Communication range	Up to 40km	Up to 150km
IP rate	IP54 – Dust and light rain protected	

# MADDOS UAVs

## Gimbal cameras

User can choose from variety of gimbal cameras, suitable for every tactical scenario with multiple capabilities:

- Daylight camera sensor
- Thermal camera sensor (uncooled or cooled)
- Laser Range Finder
- Laser illuminators
- Advanced onboard processing
  - \* Automatic object detection and tracking
  - \* Geo tagging
  - \* Object classification – human/vehicle



Gimbal cameras

## Flight Controller

- Advanced UAV control unit
- Autonomous missions planning software
- x3 redundant Flight Controller unit
- Multiple failsafe options
- IP67 and EMI protection
- Customizable functionality at customer request
- DO178C, DO254 and DO160 aviation standards



Flight Controller

## Ground Control Stations

- Sun-readable screens
- Internal battery
- Harsh environments use
- Highly portable control station
- Automatic antenna tracker



Ground Control Stations

## IMSI Catcher

- Capture and record all IMSI, IMEI, TMSI
- Coverage: 2G, 3G, 4G, 5G
- Detection range up to 25km @6000ft AGL
- Functions:
  - Directional finding & GPS location
  - Selective jamming
  - Silent/Physical call
  - SMS message



IMSI Catcher

## Anti-jamming GNSS

- Resistant against simultaneous jamming from 3 directions
- Covering GNSS L1 and L2 bands
- Low weight and small size



Anti-jamming GNSS



## CUSTOMER GROUPS

- Military & police forces (ground & air)
- Convoys
- Airports
- Power plants
- VIP security services
- Border patrols
- Government buildings (e.g. embassies, correctional facilities)
- Events
- Concerts, political events, sports etc.)
- Seaports / marinas
- Private properties

# REFERENCES