DETECT & DEFEND DRONES

We defend your airspace

GIANT

www.armour.gr

IDENTIFY & CLASSIFY

Software-centric solution recognizes and classifies malicious drones

LOCATE DRONES & PILOTS

Localization technology pinpoints drones and their pilots

NEUTRALIZE THREATS

Deploys countermeasures to protect your organization or neutralize the drone

The rapid proliferation of micro/mini UAVs is a growing potential threat to national and commercial security.

Easy to make, cheap to buy, simple to fly, and hard to detect, commercially available drones are one of the most quickly evolving technological threats to military and civilian interests.

Presently Commercial drones has raised a privacy concerns among the people since most of the drones flies equipped with high quality cameras which can invade people privacy, taking photo of people and personal property.

Also drones can be used to smuggle drugs, crash into buildings, act as peeping Toms, drop bombs, shoot guns, and gather personal data on anyone whom drone pilot want to harm.

Hence a Jammer to block drones remote control signal to protect our privacy and personal space is required.

Our Anti-Drone Solutions
Take Control Of Your Airspace Security Once And For All

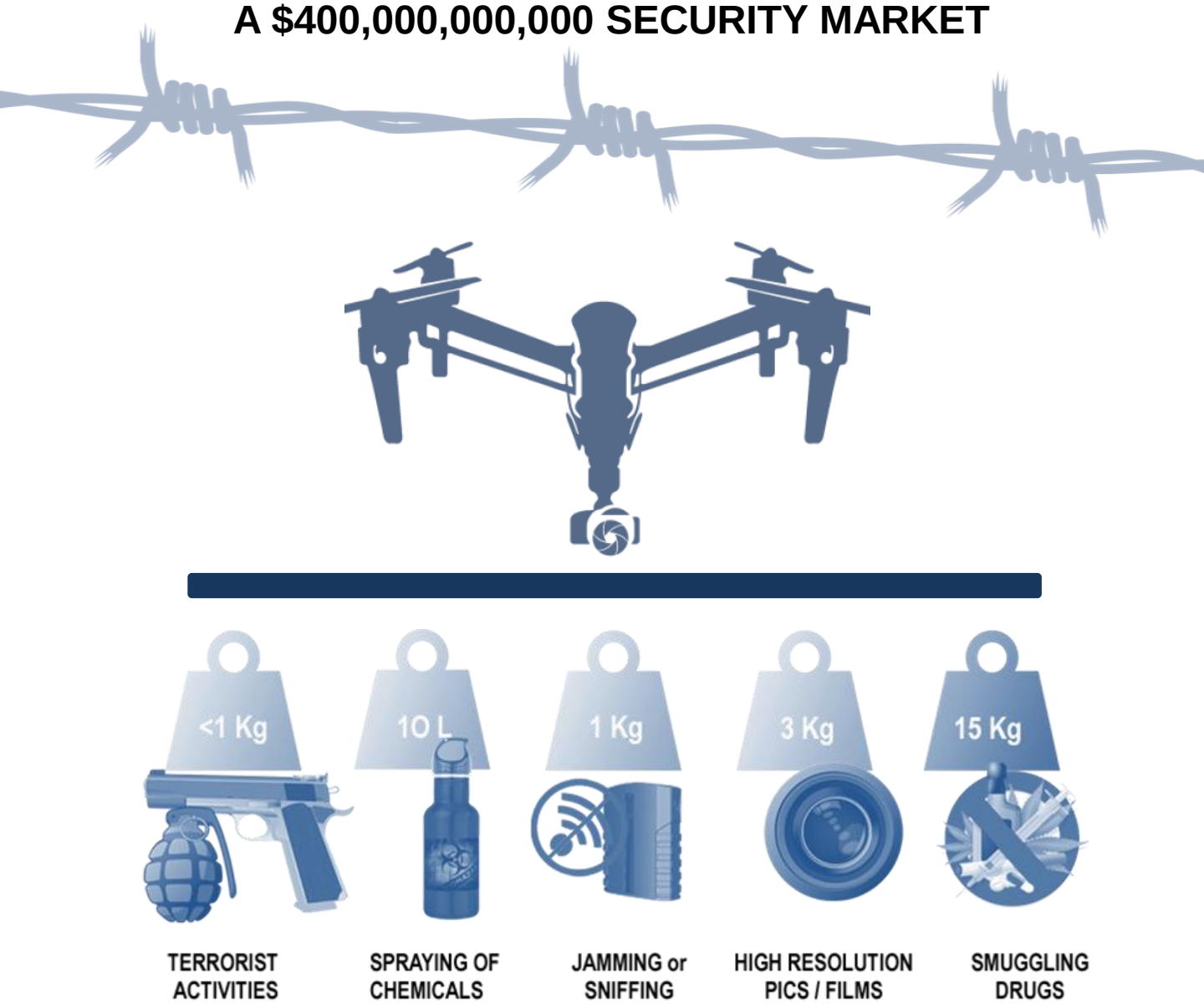
Defend your airspace

Many DEFEND DRONES manufacturer ensure us that they have the correct system that can defend a drone.

But the questions is .... how you will be able to defend a drone equipped with camera, GPS system and maybe other devices if you are not able to detect this first?

Which security guard or fence or alarm or any other technology can defend a small, micro or nano technology drone that will easily violate your area or your property from any open path with main scope to damage your reputation, your business, your LIFE?

A $500 DRONE DISRUPT
A $400,000,000,000 SECURITY MARKET



GIANT Drone Detection & Neutralization System

Multi Sensors Anti-Drone System

This multi sensors anti-drone system is a highly integrated and multiple purpose.

This system comes with RF spectrum detection; PTZ cameras(Day and Night thermal cameras) and RF Jammers.

It is a multi-sensor integrated system that uses RF spectrum detection, direction finding and visual analytic to automatically detect, classify and track commercial drones.

RF spectrum detection provides an indication of the direction of drone controllers and target drones, coupled with visual analytics for identification, classification and tracking of the target drones.

PTZ cameras is with a visualized tracking record by getting a high-quality static or mobile imaging pictures from the target zones.

The system can help track and record the videos in a wide areas. RF jammers are triggered to be activated by manual or auto mode.

1. RF Drone Detection System

Advantages and Feature of Drone detection System

Optimized configuration to allow transportable, flexible and quick deployment.

Vehicular options and roof building mounting are also available as required.

Effective drone detection using integrated multi-modal system (Spectrum detection and optical camera detection and so on as required)

A dome antennae system with ten sector antenna combines into a 360 degree seamless detection.

Scalable system to extend network coverage for a wide area and provide the estimated locations of target drones.

If more than 3 sets, it can accurately locate the target drones and remote controllers.
Automatically detect, classify and track drone targets.

Complementary RF and optical sensor configurations to provide early warning, especially suitable for drones on autonomous mode.

Multiple sensors are used to reduce false alarm rate and increase accuracy of detection.

RF spectrum detection provides an indication of the direction of drone controllers (uplink signal) and target drones(downlink signal). It also identifies the drone model based on the Drone Remote Control Libraries.

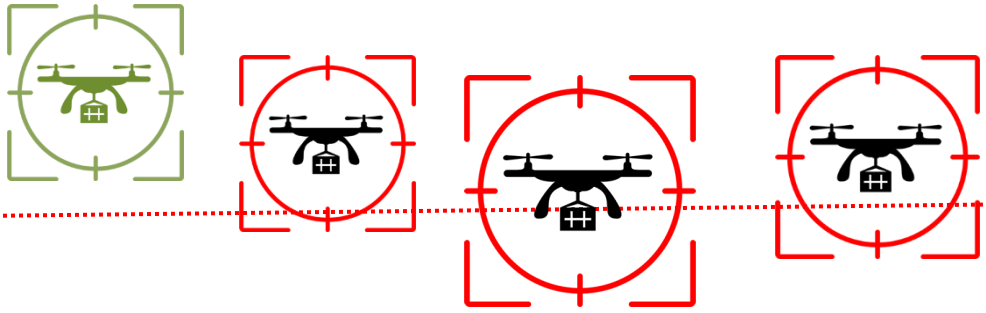
Upgradable data base.

Visual analytics provides identification, classification (i.e. to differentiate drones from birds and other small flying objects) and tracking of target drones.

It is also able to zoom in to examine the target drone.

Different from the active detection radar, this passive RF spectrum detection has no radiation, less interfered by the surrounding environment.

Its deployment will not affect the nearby sensitive areas normal communications.



RF Spectrum Detection Technical Specification

Frequency Range: 300-6000Mhz

RF Detection Signals: Drone signals, remote control signals;
WIFI IEEEE802.11a,b,n,g

Detection Radius: Not less than 5Km (LOS, transmit power:0.1W）

Detection Diameter: Not less than 8Km(LOS, transmit power:0.1W）

Detection Area: 360 degree open air

Antenna: 360 degree detection.
With 10 ports of sector antennae inside each sector antenna 36 degree, totally in 360 degree.

Geolocation sector antennae coverage: 36 degree

Geolocation angle accuracy deviation: 5 degree

Direction Finding Accuracy: more than 2 rms. Detection angle will be +/-3 degree

First drone detection: 2s

Equipment Net Weight: 14.56Kg

Equipment Size: 690mm (Diameter) x 450mm (Height)

Monitoring Computer Weight:15.4kg

Monitoring Computer Size: 460mm(L) x 230mm(W) x 350mm(H)

Power Input: 110~240VAC

Power Supply:Mobile battery supply / POE Power supply

Power Consumption: Less than 200 Watt

Operating Temperature: -35 to +85 degree

Storage Temperature: -20 to +70 degree

Humidity: Up to 85%,non-condensing

Protection Grade: IP65

Geolocation Way: Single unit for direction finding, 3units at least for location.

Drone Detection Quantity at the same time: 20 Units

2. Radar and Optical Camera Detection System

Radar, long range observation system. This anti drone system is integrated 3D radar works with the latest generation solid state technology electronic scanning 360 X 90 degrees.

It covers 360 degree horizontally and 90 degree vertically.

Due to extremely fast airspace scanning rates, the radar can detect any fast flying objects in very short time.

This enable radar to track not only the drones with the relatively low speeds, but also missiles, mortars and other small and fast objects.

When Radar detects a potential threat, the camera automatically locks on it and follow it.

Based on identification of the targets, operators can then decide whether the threat is real and disable the target with jammers.

If the system is installed in a no fly automatically when a threat is detected.

Advantages and Feature of Radar detection System

- Solid State technology
- Real 3D airspace scanning
- E-scan pulse Doppler operation mode
- Detection of very small and fast targets.

Possible Configurations

Each radar antenna covers 90x90x90 3D airspace.
Combining 4 radar antennae giving full 360 degree-scan high speed coverage.
Full coverage can also be achieved with less than 4 radar antenna (2 or 1) with placing the antennae on rotating platform sacrificing some speed.

Type of Threat	SYSTEM 1 (Km)	SYSTEM 2 (Km)
Nano UAV	3.2	6
Micro UAV	4.5	9
Mini UAV	13	28
Light transport aircraft	28	58
Heavy transport aircraft	43	85
Fighter Regular	20	45
Fighter-Low RCS	16	33
Fighter-Very Low RCS	18	16

Radar with two antennas covering 180 degrees

3. Electro Optical day/night long range Cameras System

Pan-tilt Blade

- Azimuth : Continuous
- Elevation: -45 degree to 90 degree
- Max speed: 125 degree/s

Long Range Day Night HD Camera

- Sensor: low light color CMOS

- Resolution: Full HD
- HFoV: 24.8°-0.5°
- Focus: Fast auto (hybrid-contrast based combined with radar range information),manual.

Long Range Thermal Camera

- Detector: Cooled MWIR
- Resolution: 640X512 pixel
- Wavelength: 3 to 5μm
- Zoom: Continuous optical x20.6x16 digital
- HFoV: 13.7°-0.66°

Combined system of:
- Radar with two antennas covering 180 degrees
- EO day/night long range Cameras

VIDEO TRACKER

Dedicated adaptive aerial multi tracker

Thermal Camera gives the system long detection, recognition, and identification range. Low light Day/night HD camera and advanced video tracker provides very good identification range with color picture even in very extremely low light conditions.

4. RF Jamming System

Portable Omni-Directional Jammer Solution
Portable Low Power Uni-Directional Jammer Solution
Mobile High Power Omni-Directional Jammer Vehicle Solution

Advantages and Features of RF Jammers

01. Modular construction for easy removal and plug in, maintenance, repair and upgrade.

02. Adopting digital synthesized technology, digital Software Programmed on the frequency bands and output power. More flexible for the field application.
Each unit can jam five frequency bands simultaneously each jamming band can be reprogrammed to be four channel frequency bands, totally can be up to 20 different frequency bands.

03. Each Jamming module is designed with a LCD display, indicatingt he module's working status as frequency band, output power, voltage, ampere, temperature, VSWR and status and so on.

04. Specially designed with two big ruggedized wheels on Military grade Pelican case 1560,easiertobe moved on some bumpy uneven roads. Shockproof and drop resistance.

05. High-power portable multi-band jammer. Can be carried like a trolley case.

06. Equipped with a remote control unit. The operator can ON/OFF each module through the wired remote controller.
There is an LCD display to indicate the internal battery's power level to alert you recharge the battery.

07. Delicate ventilation design and built-in heat sink on the case to ensure non stopped work in

08. Heat sink designing combing with the fans to make system in a cooling status.

09. Fully Rain-proof design available for some rainy weather. Composed of High IP grade waterproof parts to ensure high rain-proof capabilities.

10. With an internal battery, can be operated 1Hour with a LCD display on the control panel to indicate the battery level.

11.AC mains or DC power, with a direct DC input on the side of the equipment for external battery connection.

12. With an external battery pack for optional as you required. Facilitating to change the battery timely for field use and extending the equipment's lasting hours.

13.Can be portable and vehicle mounted, which it's biggest advantage in the application.

4.1. Portable Omni-Directional Jammer Solution

This multi-purpose UAV Jamming system focus on blocking the most commonly used remote control R/C communication link and GPS and 5.8G by commercial drones' manufacturer.

We can also customize the frequency for any potential DIY self-defined drones as required.

Portable omni-directional jammer integrated in the whole system and automatically activated
For the unknown drones at all frequencies from 20 - 6000Mhz. we have to put it to with the omni directional antennae, to use at least suitcases to cover all the potential threatening frequency.

Model	WF-U-K5
Frequency Bands	**5 BANDS** 5720-5850Mhz, 15W wireless data transmission） 2400-2500Mhz, 50-80W (WIFI/ Remote Control) 1570-1610Mhz, 50-80W (GPSL1/Glonass) 400-440Mhz, 50-80W (remote control) 900-930Mhz, 50 -100W (Remote Control) *Frequency bands can be customized as required.*
Module Output Power	15-100watt/band Power Adjustable by the software
Radius Range	Up to 2km in open air
Module Quantity	Five modules Still depending on the configuration
Size	56.5 x 46 x 27cm(Pelican case 1560)
Net Weight	Approx. 35kg
Antenna Type	Omni/directional antenna optional
Power Supply voltage	230VAC/110VAC, 27VDC

4.2. Portable Low Power Uni-Directional Jammer Solution

Uni-directional jammer (for known drones widespread in the market) integrated in the whole system and automatically activated.

Three (3) combo set antenna for:

- 900 Mhz

- 1.5 Ghz

- 2.4Ghz

- 5.8 Ghz

1 Km jamming effective range

Mobile

High Power Omni-Directional Jammer Vehicle Solution

4.3. Mobile High Power Omni-Directional Jammer Vehicle Solution

In terms of some special purpose vehicles are tactical and flexible, RF detection system and Jamming system are mounted on.

It can be quickly deployed in all kind of facilities, such as convoy cars, international summits, international matches and military camp and so on.

The operators inside the vehicle can have a fully control of this detection and jamming system.

Two or three detection and jamming vehicles can make a triangulation to locate the drones, make a accuracy and effective detection and jamming for the target zones.

While several drones flying from the different directions, this high power 360degree omnidirectional detection and jamming system can be quickly started to protect the target zones.

RF High Power Omni-Directional Jamming Vehicle Solution Technical Specification

Frequency Range: 20 - 6000MHz
(Including all the commercial drones and unknown intruding enemy drones)
Total RF Power: 1500 Watt
Jammer Module Number: 24 modules
Channel Number: 80Bands, Max: 96Bands
Cooling System: Systematic Smart Cooling System
System Protection: VSWR, Over-voltage, Over-current
Special Design feature: IP65 Rainproof design
Housing Design: Flexible Racking Mounts combination design.
Jamming Source: Digital Signal Source Technology
Remote Control: Full System Operation Control
Antenna Type: Omni directional Antennas
With a roof antennae platform system
All the antennae are integrated into this platform. It will have a flexible folding system, it can be mounting up or lay down via a antennae control panel, which is installed inside the driver's cabin.
Number of Antennas: 18units,
Total Power Consumption: Maximum 5500 Watt
Power Supply System: DC Power Alternator with an output of 13kw
Equipment Net Weight: Approx.180kg
Equipment Size: 70x105x58 cm
Operating Temperature Range: -35°C~+65°C
Operating Humidity: Up to 80%

Advantages & Features Of Mobile Vehicle Jamming System

- Designed with ultra broad band frequency bands, 20-6000MHz.

- 24modules plug and play design, facilitate for future power upgrading, change and maintenance. Any ruin on the modules never interfere the normal operating for other modules.

- USA Mil-spec standard case, shockproof and drop-resistance, available for the vehicle running in a worse field environment.

- Up to 24Frequency Bands. All Jamming Modules Designed by DDS technology.

- Operators are able to regulate the working frequency band and output power of each module through the software. Configuring a specific frequency band can ensure the internal communication in emergency.

- System operation can be performed in the driver's console unit. Each module can be ON/OFF. Backup battery or generator system can be optional.

- Device body is approx.180kg.

- Integrated smart active cooling system to make sure the device working continuously.

- Continuously and simultaneously interference to the common used RF signals. Each module is designed with a separate mil spec switch for ON/OFF control
- With a waterproof digital wired remote control panel housing with an aluminum case (IP 67 grade) to ON/OFF all the jamming modules separately in a remote place. With RS485 interface, adapted with a LCD display to indicate working status of all the modules.

- Integrated smart active cooling system to make sure the device working continuously.

- With 6 sets of antennae folders on the roof antennae platform for a flexible antennae folding system, mounting up and laying down can be managed by a control unit. It can ensure the system to move in any kind of low bridge and low positions as long as the car can move forward.

- With a dual 13.5Kw power alternator driven by the car engine, to ensure the vehicle Jamming system to be noiseless, no waste, taking less space from the car drunk in a continuous operation. It can also supply enough electricity to the other equipment on the Vehicle besides feeding the jammer.

- With a good anti-radiation shielding clothes suite for the operator, electronic magnetic shielding level can be more than 40db

5. Rugged Computer and Monitors – Life Time Software

The System is controlled by fully rugged Computer & Monitors

It comes along with a lifetime software support for the ultimate control of the System

COMPLETE SOLUTIONS

Defend your airspace

We, International Armour Co, a NATO registered Company and UN registered Supplier (UNGM) of Defence & Security products and a Security Services Provider, are proud to present you our Anti-Drones Technologies for the surveillance and protection of airports, borders, security sensitive infrastructure, Principals' privacy, high value premises / assets etc.:

After careful examination of:

- our Principals' needs and as regards the anti-drone protection (for anti-espionage, anti-cyber/hacking, anti-provocative and anti-terrorism reasons),
- the various existing systems in the market, integrating various technologies and
- the related prices of the same,

we decided to propose specific subsystem(s) integrations, either in a minimal, cost effective and tailored to their needs (no need for drone or controller localization, but need no drone to approach our clients' valuable premises and/or assets) system, or in a more intellectual and complete approach drone(s) detection / neutralization and drone controller localization for detention purposes and as follows:

COMPLETE SOLUTION - MILITARY
and/or
GOVERNMENTAL USE ORIENTED

We do not want the enemy or the drone operator to detect our anti-drone squad team. We want to know the exact position of the drone(s) and/or drone(s) operator and neutralize them/chase him/her respectively. We want to have the selection of directional or omnidirectional low or high power jamming depending on the operations environment. We want to defend a wide area (12 Km from A to B):

One (1) portable RF Spectrum Detection System (No 1) device for general directional passive drone detection and early warning in order other active devices (360 degrees active detection Radar (No 2) to be automatically turned on and locate the exact drone(s)' position and in case we do not want to actively/continuously transmit with the radar (i.e. economy / devices overloading avoidance purposes, undercover operations etc.)

OR

Three (3) portable devices RF Spectrum Detection Systems (No 1) for precise positional passive drone(s) detection and drone Controller detection in case we want to operate completely undercover and have the exact location of the enemy.

Combined with

One (1) portable device 360 degrees active detection radar (No 2) (in combination with device RF Spectrum Detector (No 1) for precise positional active drone detection and that will be automatically turned on and locate the drone(s) (in case we do not want to actively / continuously transmit with the radar). Additionally, the radar can detect UAVs at longer distances and especially in cases that the UAVs do not transmit any RF (flying to predefined targets position etc.)

AND

One (1) portable device of low power uni-directional RF jammer (No 4.2.) that will be automatically turned-on / aligned with the target upon drone detection within our security perimeter (in case we do not want to affect other directions and/or friendly forces to other directions around us).

AND

One (1) portable device of omni directional RF jammer (No 4.1.) that will be automatically turned- on upon drone detection within our security perimeter, in case of a multi threat scenario and with no danger of friendly forces interference nearby.

Defend your airspace

OR

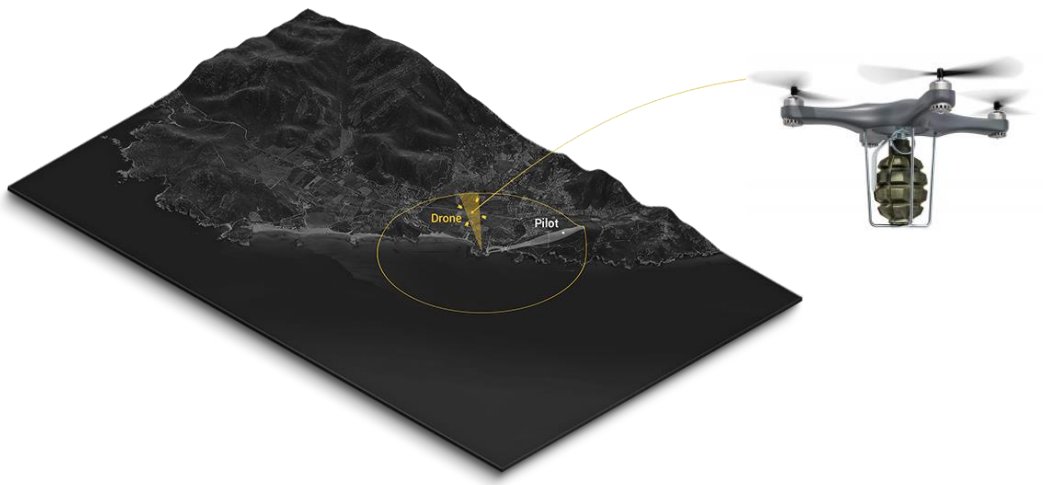
One (1) Mobile High Power omni-directional vehicle RF jammer (No 4.3.) that will be automatically turned-on upon drone detection within our security perimeter, in case of a multi threat scenario and with no danger of friendly forces nearby, or in case we need whatever be the case NOT TO ALLOW ANY DRONE TO FLIGHT WITHIN OUR PROTECTED ZONE.

AND

Rugged Computer & Monitors and life time Software support (No 5) for all devices integration
and control.

Optional

One (1) Electro Optical day/night long range Cameras System (No 3) if we want to have a visual aspect of the drones and the environment and a close cooperation with the 360 degrees active radar system for live targets monitoring and optical classification by the Controller



MINIMAL SOLUTION - PRIVATE USE ORIENTED

We do not need to know the exact position of the drone(s) and/or drone(s) operator. We want to defend a narrow area (i.e. up to 300-400m from A to B). We do not want any drone to approach our valuable premises / asset and avoid any espionage, hacking, criminal act and disturbances.

1.1. **One (1) portable RF Spectrum Detector (No 1)** device for general directional passive drone detection and early warning

Combined with

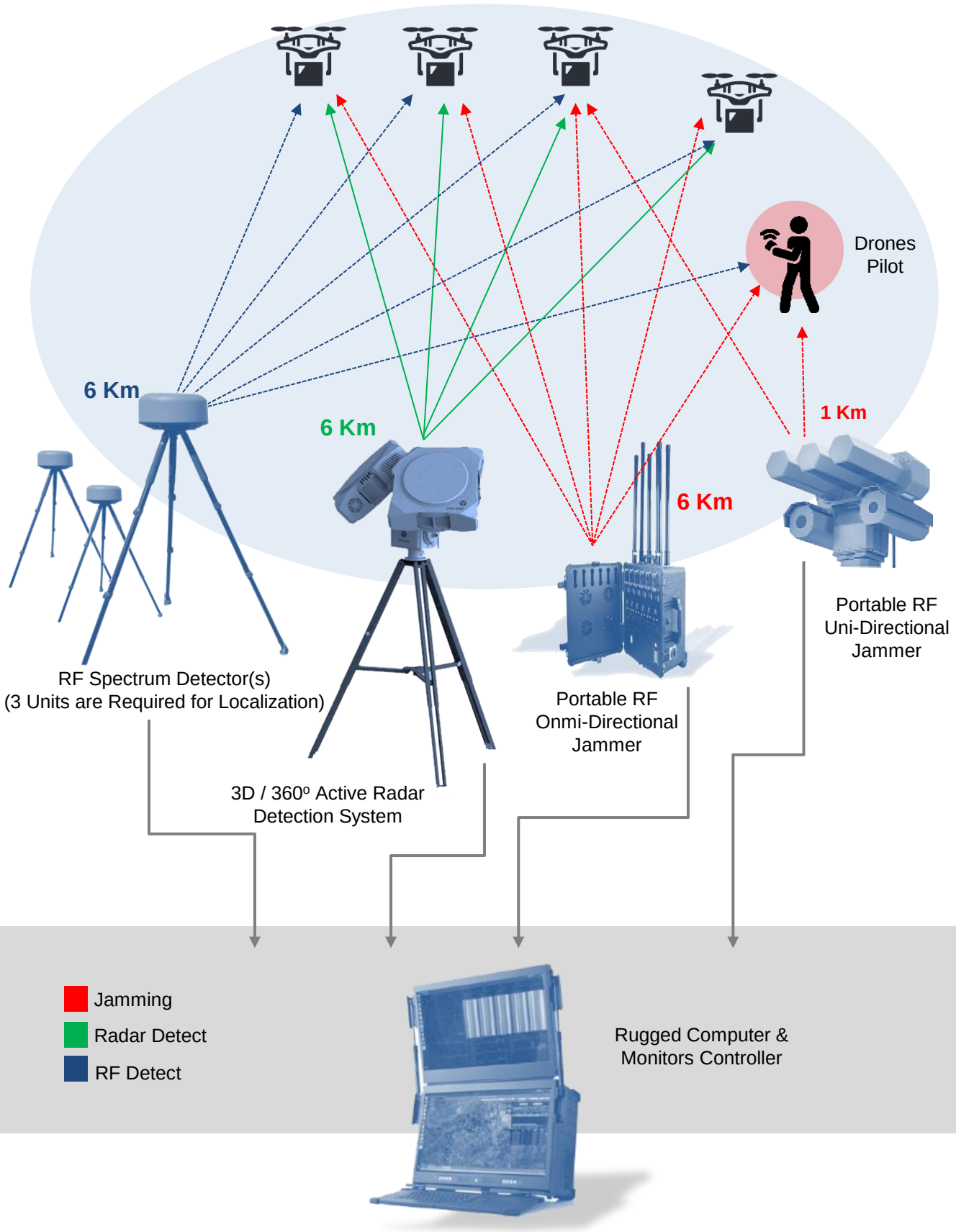
One (1) portable device of omni-directional RF jammer (No 4.1.) that will be automatically turned-on upon drone detection within our close security perimeter, in case of a multi threat scenario and with no danger of friendly forces nearby. Also, if we want to defend a narrow area (i.e. up to 300-400 m from our valuable premises / assets) at an urban and close space environment.

AND

Rugged Computer & Monitors and life time Software support (No 5) for all devices integration and control.

All the above will be covered with installation / demonstration / usage training services / integration onboard vehicles, by our side and at our clients' spot(s).

DETECT & DEFEND DRONES
MULTI DRONES DETECTION/JAMMING

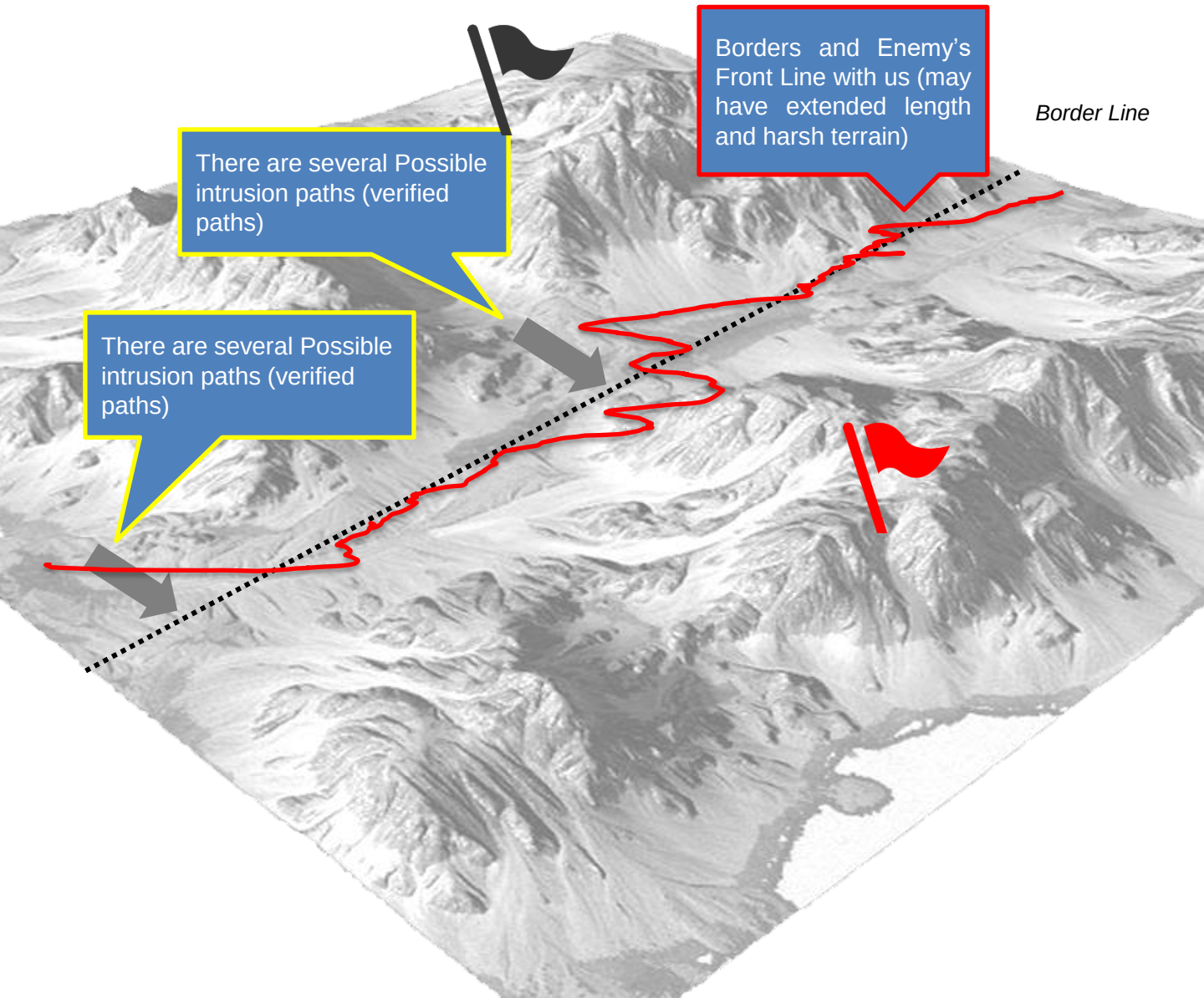


Borders / Enemies' Front Line Problem

Neighbors and / or Enemies, in the field of operations are separated from us with a Border or Front Line.

Smugglers, Terrorists, Criminals or Enemies in general intrude into our own territory by passing through specific passages and "safe" intrusion paths.

The borders or enemy's frontline have various extent and geomorphology, that sometimes are so long and complex that anti-smuggling, anti-terrorists, anti-criminals, or military operations from our own Armed and Law Enforcement Forces are very difficult and complicated.



Enemies' Proven Capabilities

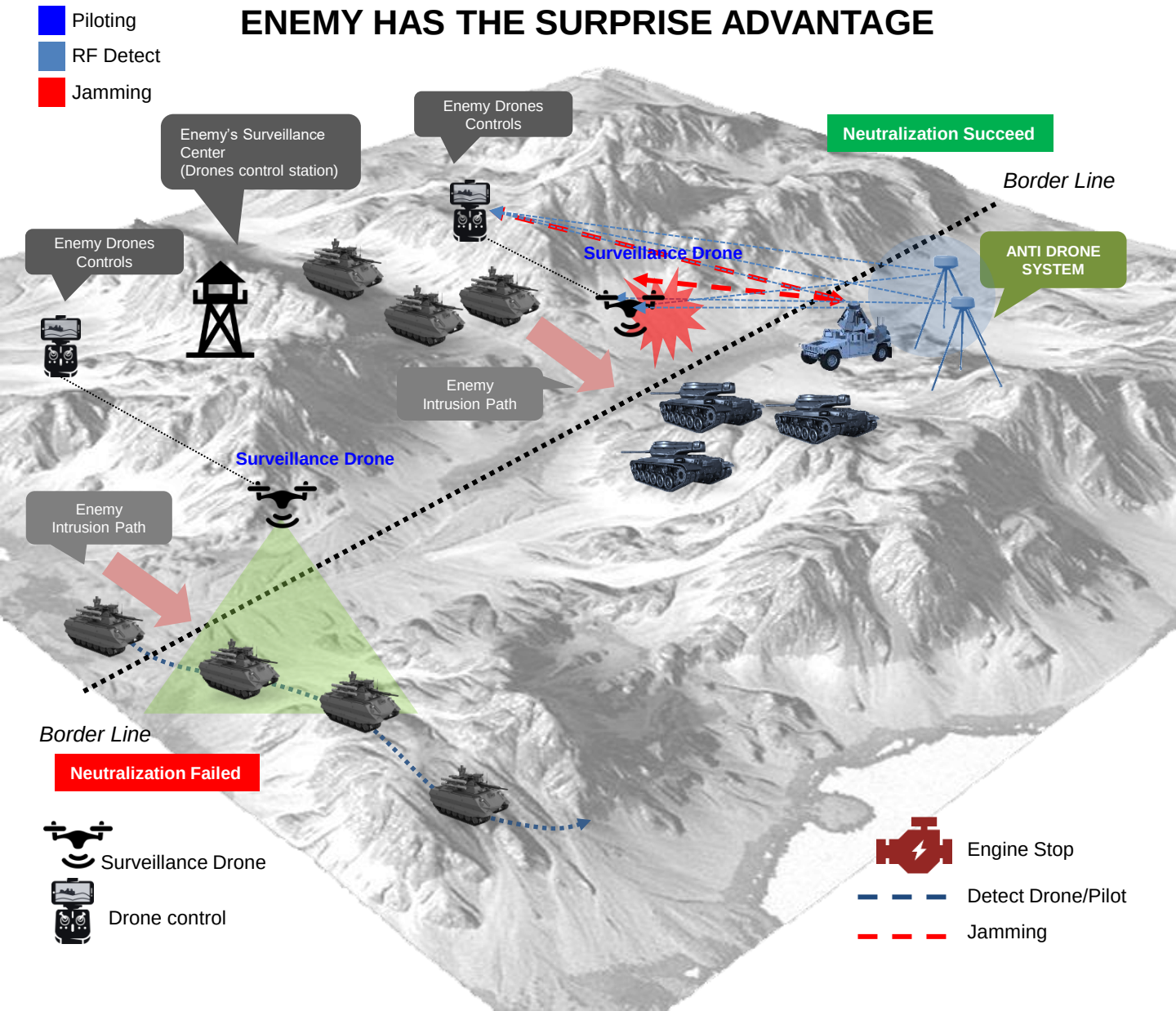
The enemies have the advantage of surprise;
They chose the time to pass into our territory and the right for them path of intrusion.
They use suitable 4-wheel drive heavy trucks or other to intrude into our territory
They utilize different means of destruction in order to fool our Armed and Law Enforcement Forces

Enemies' Possible Capabilities

Probably, they utilize cheap commercial drones that fly for a short period of time throughout the borders line, in order to find out the right safe intrusion paths that are not protected by own Armed and Law Enforcement Forces.

They have possibly established surveillance and monitoring spots throughout the borders line, in order to find out the right safe intrusion paths that are not protected by own Armed and Law Enforcement Forces.

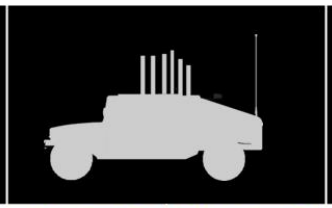
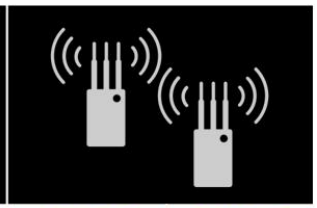
They maintain the advantage of surprise…



Border Control and Enemies' Front Line Operations Needs





UAV-A/C	Guidance Method	DETECTION RANGE ACTIVE RADAR	GIANT SYSTEM Detection Range Passive (RF/ WiFi / RC)	COMMON SYSTEM Detection Range Passive (RF, WiFi, RC)	BIG / VEHICLE Jamming / Neutralization Capability (3G, 4G included)	BIG / VEHICLE Jamming / Neutralization Range	PORTABLE Jamming / Neutralization Capability (3G, 4G is optional)	PORTABLE Jamming / Neutralization Range (3G, 4G is optional)
Nano UAV	GCS / RF, WiFi, RC, GPS	**6 Km**	**6 Km**	**3 Km**	**YES**	**6 Km**	**YES**	**3 Km**
Micro UAV	GCS / RF, WiFi, RC, GPS	**9 Km**	**6 Km**	**3 Km**	**YES**	**6 Km**	**YES**	**3 Km**
Mini UAV	GCS / RF, WiFi, RC, GPS	**28 Km**	**6 Km**	**3 Km**	**YES**	**6 Km**	**YES**	**3 Km**
UAV Regular	GCS / RF, WiFi, RC, GPS, 3G, 4G	**40 Km**	**6 Km**	**3 Km**	**YES**	**6 Km**	**YES**	**3 Km**
UAV Regular	SATELLITE (5G, LEO)	**40 Km**	N/A	N/A	**NO**	**NO**	**NO**	**NO**
UAV Regular	Dead Reckoning	**40 Km**	N/A	N/A				
Fighter Very Low RCS	LOS, Radar, GPS, Dead Reckoning	**16 Km**	N/A	N/A				
Fighter Low RCS	LOS, Radar, GPS, Dead Reckoning	**33 Km**	N/A	N/A				
Fighter Regular	LOS, Radar, GPS, Dead Reckoning	**45 Km**	N/A	N/A				
Light Transport A/C	LOS, Radar, GPS, Dead Reckoning	**58 Km**	N/A	N/A				
Heavy Transport A/C	LOS, Radar, GPS, Dead Reckoning	**85 Km**	N/A	N/A				

Hard Kill Weapons System is needed N/A = NO APPLICABLE

Border and Enemies' Front Line Surveillance and Monitoring (in terms of enemies' monitoring spots reconnaissance)

Border and Enemies' Front Line Surveillance and Monitoring (in terms of Enemies' movements detection and early warning)

Possible destruction of enemies' monitoring spots and/or the enemies themselves, depending on the operational situation

Enemies' drones detection and neutralization

Enemies' communications neutralization

Enemies' / criminals' trucks immobilization by own Armed and Law Enforcement Forces.

Enemies' / criminals' trucks inner cargo inspection for illegal drugs, weapons, explosives, human trafficking, etc.

…

UAV / DRONE
HARD KILL SYSTEM TRIO

LAYER AIR DEFENSE SYSTEM OF SAM SYSTEM "TRIO"

The air–defense missile system “TRIO” has been created to provide air defense for military and industrial facilities, land troops’ units and formations, and to strike small–size air targets, including unmanned aerial vehicles.

The TRIO’s guns supplement each other, which allows it to efficiently destroy small–size air targets of various types, including mini–drones.

The new system’s weapons are mounted on the tracked chassis, which enables it to move confidently across terrain with different types of soil.

Mobile control post with reconnaissance assets (Mobile Reconnaissance and Control Post)

Modernized fighting vehicle of short-range surface-to-air missile system 9K35 "Strela – 10"

Modernized self-propelled anti-aircraft gun ZSU-23-4 “Shilka”

Robotic fire system "BERSERK" based on the quick-firing aerial machine guns GShG-7.62

SOKOL PASSIVE OPTICAL RADAR

A new passive optical radar (electro-optical target reconnaissance system) installed on the mobile reconnaissance and control post of the surface-to-air missile system "TRIO" is capable to perform reconnaissance of enemy aircraft at a distance of up to 20 000 m in a full security mode.

As part of SAM system "TRIO", the passive optical radar automatically surveys a given sector of the space hemisphere, processes information received from television modules, recognizes and identifies detected objects, calculates and constructs air situation and subsequently transfers it to subordinate fighting vehicles and central command post

TECHNICAL SPECIFICATIONS

Angles of sight:

- Horizontal, degrees: **360**
- Vertical, degrees:**-10 to +70**
- Instantaneous field of view, degrees: **7**

Lifting height of telescoping mast with radar, m: **6**
Gradeability, degrees: **35**
Speed of movement by water, km/h: **4 - 5**
Highway cruising range, km: **500**
Crew, persons: **4**
Mounted equipment, kg: **Up to 4000**

TARGET ACQUISITION RANGE

Not less than **2000**

Up to **20 000**

STRELA–10

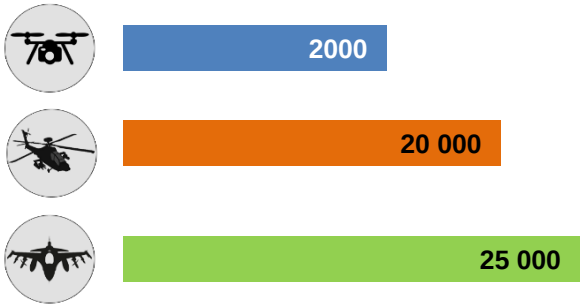
The modernization of air–defense missile system 9K35 “Strela–10” (ADMS) provides expanding the capabilities of combat use and increasing the survivability of the air–defense missile system.

To this end, the system is equipped with modern reconnaissance means – day and night passive optical–electronic station “Strizh–M3”, which is capable of detecting and tracking targets from a distance of 20 km, automatically calculating the target’s position relative to the launch zone of the air defense missile system and warning the combat vehicle about target engagement zone. In addition, a forced turn of the launcher is ensured to the point where the target appears to be able to execute firing on a follow–up course.

The combat vehicle is adapted for combating small–sized air targets, including unmanned aerial vehicles and for firing, among other things, modernized air–to–air guided missiles (with three versions of the homing heads: infrared, thermal imaging and laser) MALANKA, which are able to hit targets of 30x30 cm size.

TARGET ACQUISITION RANGE

AFTER MODERNIZATION



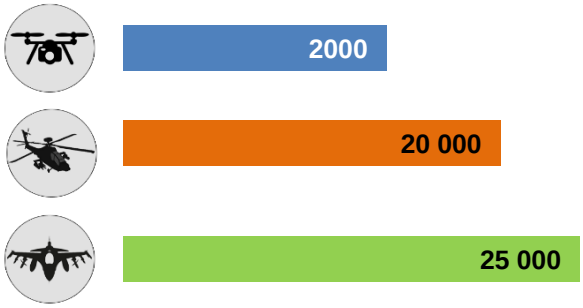
ZSU–23–4 SHILKA

ZSU–23–4 “Shilka” was modernized in order to more effectively hit small and low–altitude unmanned aerial vehicles, including prospective ones, and its outdated and unsuitable under the modern jamming countermeasures radar complex PKK–2 was replaced.

Instead of it, ZSU–23–4 “Shilka” has got a newest optical–electronic reconnaissance and targeting complex, which allows detecting an aerial target in passive mode such as a helicopter or a small plane at a distance of up to 20,000 meters and tracking it from a distance of 16,000 meters, and detecting and tracking small targets (30x30 cm) from a distance of 2000 meters.

TARGET ACQUISITION RANGE

AFTER MODERNIZATION



ROBOTIC FIRE SYSTEM "BERSERK

Robotic fire system (RFS) "Berserk" equipped with a weapon station with two GSHG-7.62 four-barreled machine guns is capable of effectively counteracting unmanned aerial vehicles of aircraft and helicopter types, as well as loitering munitions at a distance of up to 1,000 meters.

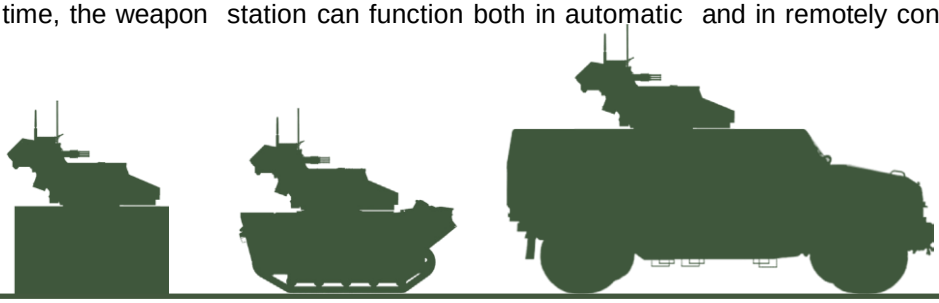
Rate of fire and volume of fire make it possible to create a reliable screen on the path of target being fired and not to let it reach the protected critical infrastructure object (power plant, oil refinery, etc.).

The turning platform of the RFS "Berserk" uses powerful electric drives that allow turning the weapon station to 360 degrees in just 6 seconds.

This speed is necessary for a promt response to rapidly changing air situation. Strength of the structural components of the turning platform helps it withstand the comparatively high recoil of the coaxial four-barreled machine guns.

The versatility of seating positions allows installing the weapon station stationary and on various types of mobile vehicles, in particular on the ASILAK lightly armored vehicle.

At the same time, the weapon station can function both in automatic and in remotely controlled modes.

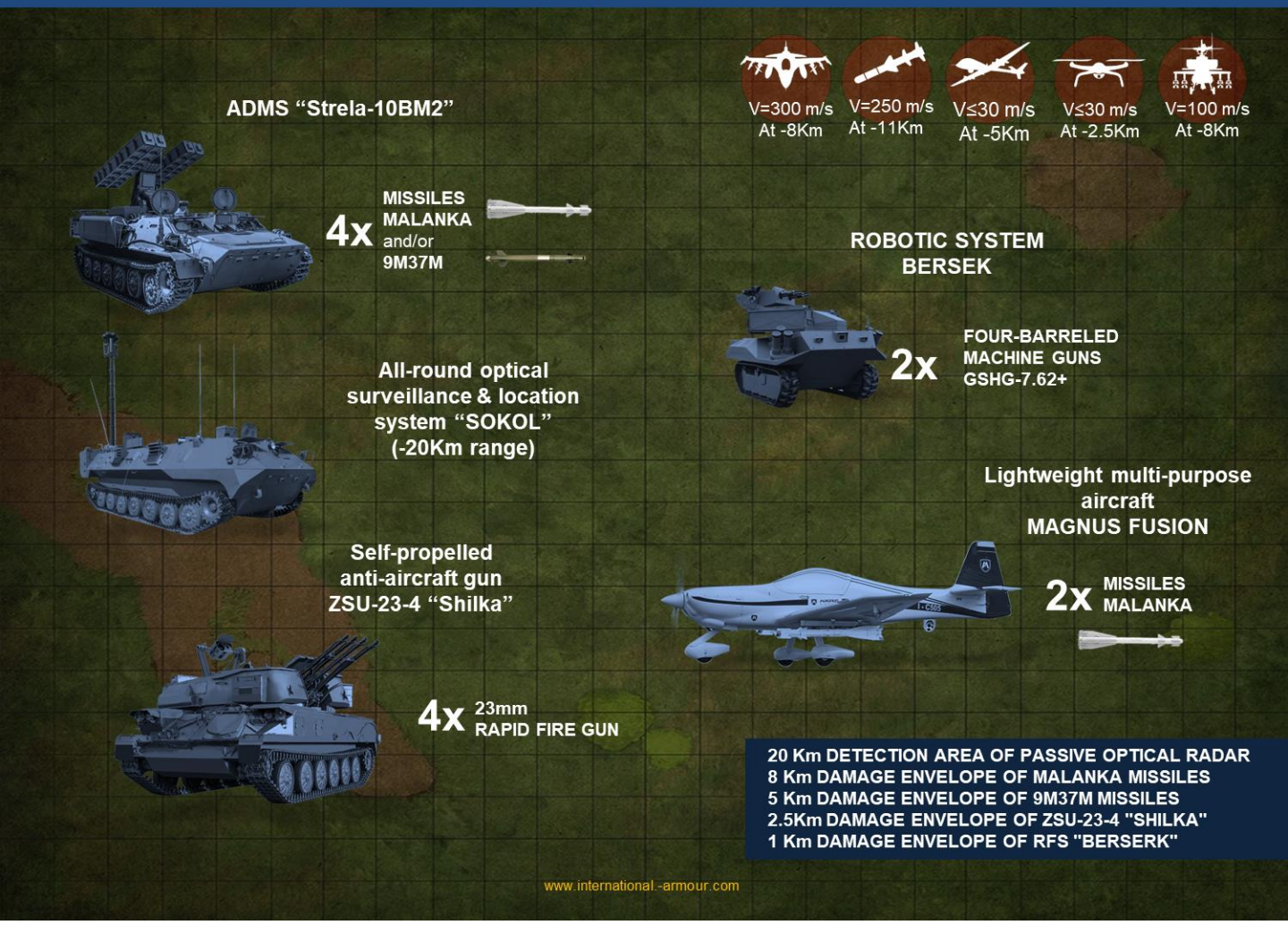


Fixed Site Target | **RFS "BERSERK"** | **Lightly Armored Vehicle (LAV) "ASILAK" ARS-6**

Electro-optical station "Chizh" installed on the weapon station can also be used for over-watch with simultaneous transmission of all intelligence information to the command post.

LAYER AIR DEFENSE SYSTEM OF SAM SYSTEM "TRIO"

Borders / Enemies Front Line Hard Kill Systems



20 km DETECTION AREA OF PASSIVE OPTICAL RADAR

8 km DAMAGE ENVELOPE OF MALANKA MISSILES

5 km DAMAGE ENVELOPE OF 9M37M MISSILES

2.5 km DAMAGE ENVELOPE OF ZSU-23-4 "SHILKA"

1 km DAMAGE ENVELOPE OF RFS "BERSERK"

Multi-purpose aircraft
MAGNUS

Lightweight multi-purpose aircraft
MAGNUS FUSION

The robotic version of the lightweight multi-purpose aircraft MAGNUS Fusion is a low-wing monoplane made of composite materials with alloy steel power elements and fixed landing gear.

The aircraft can be equipped with guided flying weapons - MALANKA missiles and is designed to counter small UAVs, as well as high-speed maneuvering targets before they enter the protected air zone. Moreover, MAGNUS Fusion weapons can be used to engage ground targets.

The iSky-30 HD three-channel high-sensitivity optical-electronic station installed on MAGNUS Fusion allows you to automatically detect, track and identify targets. In addition, the laser illumination function provides precise guidance of MALANKA missiles with a semi-active laser and passive thermal imaging homing head.

TARGETS:

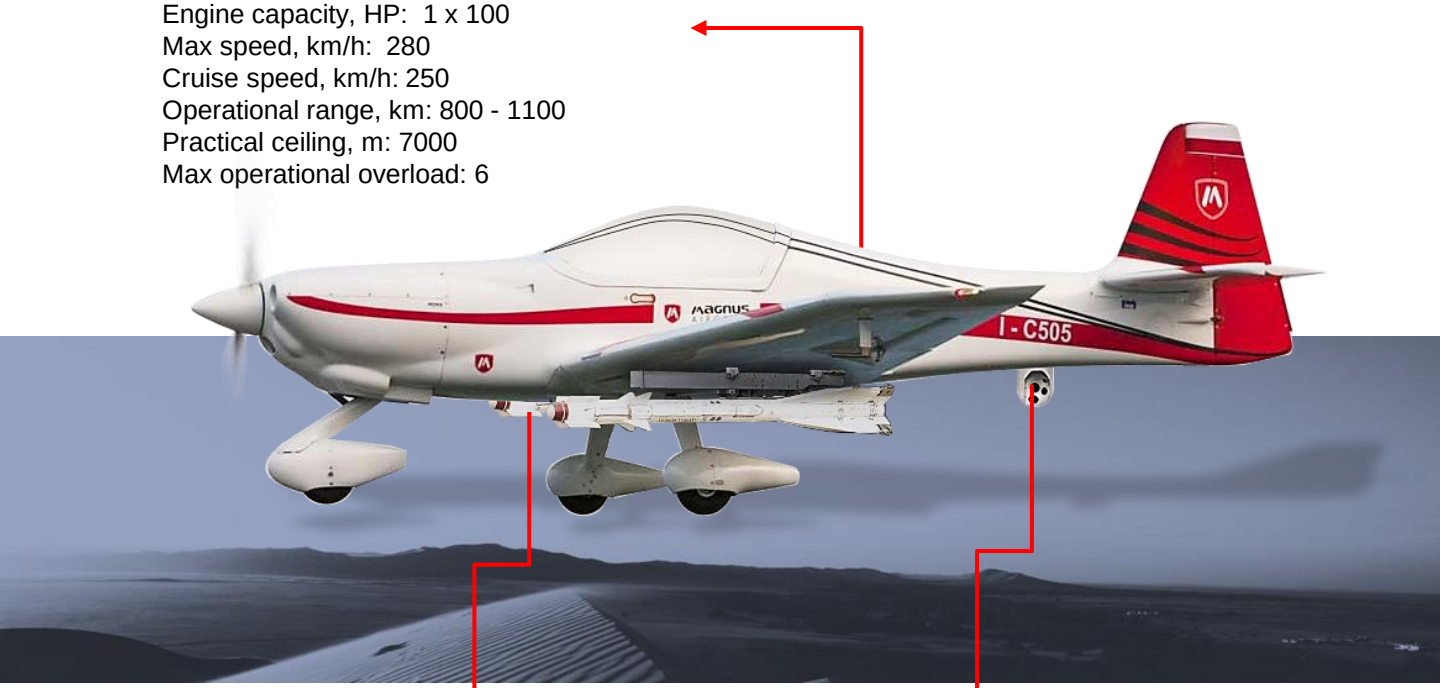
- UAVs of ALL TYPES
- helicopters
- airplanes
- cruise missiles
- military transport aircraft
- ground targets

FEATURES:

– Autonomous patrol of protected sites and territories
– Real-time video transmission
– Detection and control of small maneuvering air targets

MAGNUS FUSION

Wing span, m: 8.44
Length, m: 6.62
Height, m: 2.40
Weight: Empty: 299Kg / MTOW: 600Kg
Fuel, L: 90
Engine type: PD Rotax 912ULS
Engine capacity, HP: 1 x 100
Max speed, km/h: 280
Cruise speed, km/h: 250
Operational range, km: 800 - 1100
Practical ceiling, m: 7000
Max operational overload: 6

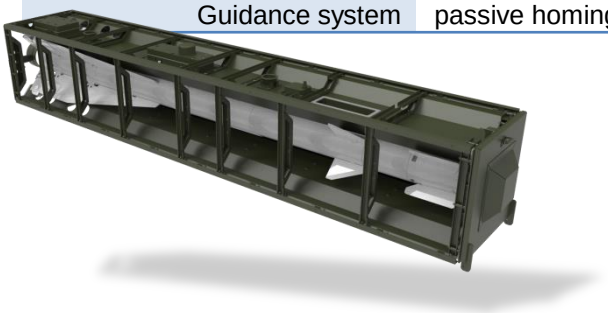


Missiles MALANKA x 2 pcs

Has two types of homing heads
- semi-active laser
- passive thermal imaging

MALANKA missile features:
It can engage not only air, but also ground targets.
There are two modes of use - air-to-air and air-to-surface

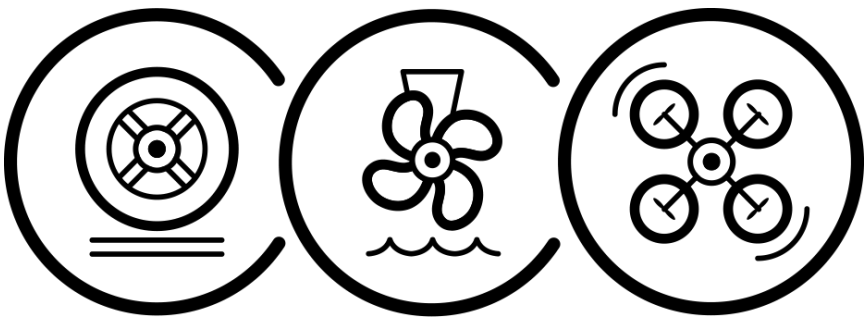
Target engagement range, km	0,3 – 8
Target engagement altitude:	0,1 – 5
Kill probability (by one missile)	0,9
Max overload, g	47
Engage target overload, g	12
Guidance system	passive homing



Optical-Electronic Station iSky-30 HD

- Thermal Imaging (TI) Camera with 250 mm focal length
- High Sensitivity Color HD Day Camera
- Optional Eye-safe Laser Range Finder
- Optional Laser Illuminator
- Optional Laser Pointer
- Weight – 21 kg
- Diameter – 305 mm
- Detection range – 18 km

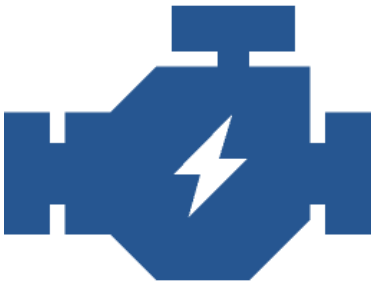
DEACTIVATE ENGINE



DEACTIVATE ENGINE
The ultimate in target deactivation technology

State-of-the-art, non-contact, non-kinetic disruption system

Minimal risk of collateral damage



Jams the engine management system of vehicles, boats and UAVs;

Safely brings vehicles/boats/UAVs to a controlled stop

Vehicle/boat/UAV is unable to restart until radio waves are turned off

Stops Unmanned Aerial Vehicles

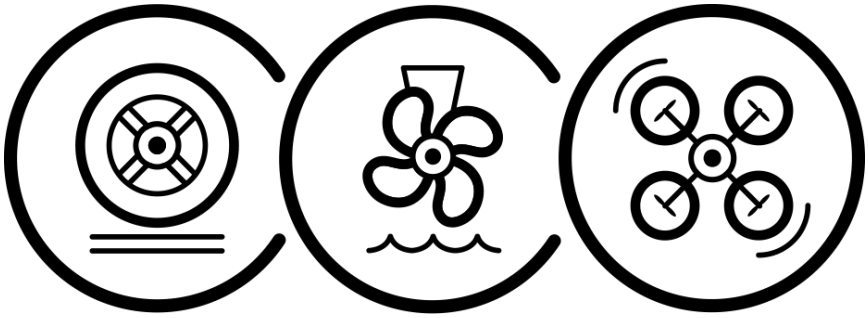
The UAVs/Drones are stopped mid-flight, and can either be brought down (Hard Kill) or if preferred in some cases landed safely on the ground

Field trials undertaken with high percentage success rate

Cars, Trucks, Motorcycles, Outboard, Inboard Engines and UAVs Driver maintains control of steering and brakes (vehicles)

Static, dynamic and pursuit scenarios have been demonstrated

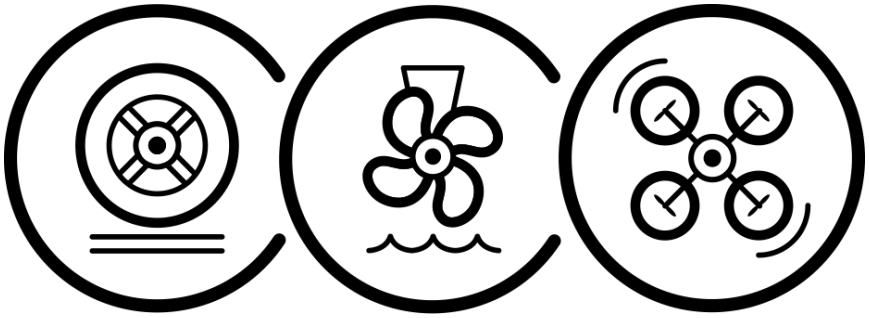
Revolutionary Life Saving System



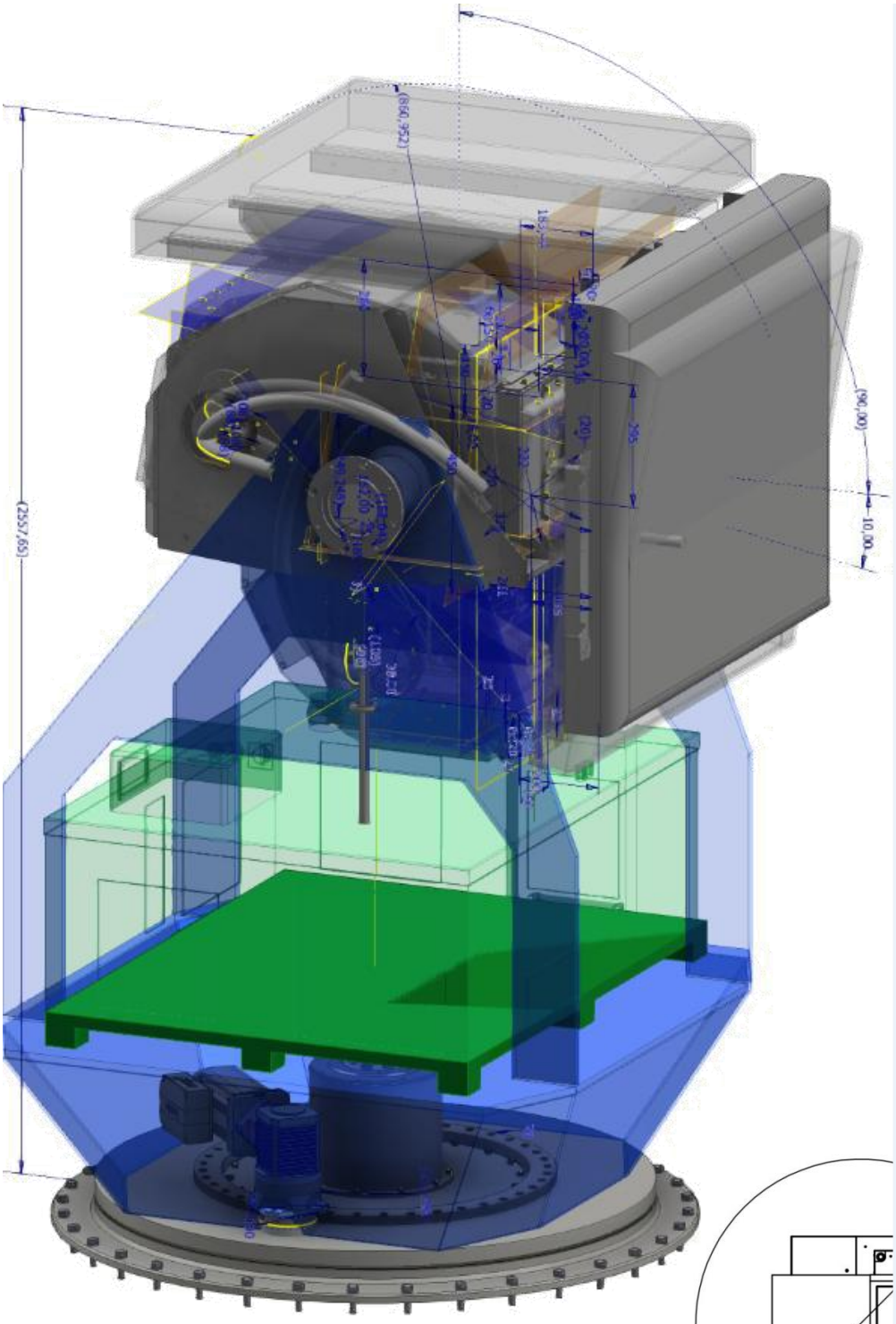
DEACTIVATE ENGINE
The ultimate in target deactivation technology

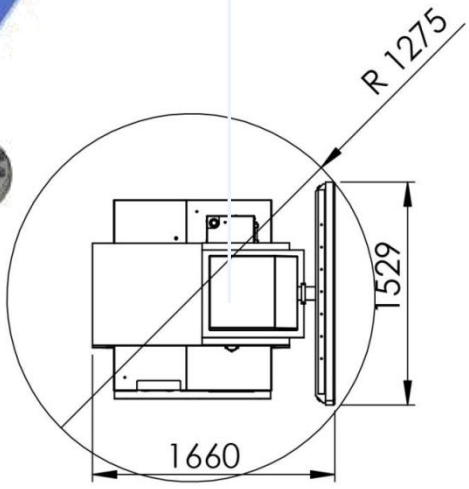
- The future of Non-lethal engine stop technology.
- One of a kind, non-contact, non-kinetic jamming system
- SAFE STOP jams the engine management system of vehicles and boats and drones

POWERFUL RF TRANSMITTER
REMOTELY JAMS THE ENGINE
MANAGEMENT SYSTEM
CAUSING THE TARGET TO STOP SAFELY



DEACTIVATE ENGINE
PAN AND TILT





APPLICATIONS

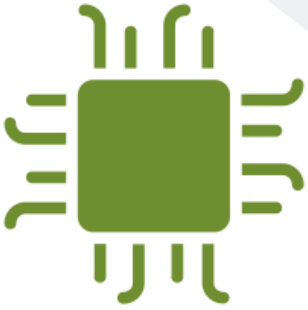
VEHICLE APPREHENSION

UAV AERIAL DENIAL

MOBILE ASSET PROTECTION

MARINE ASSET PROTECTION

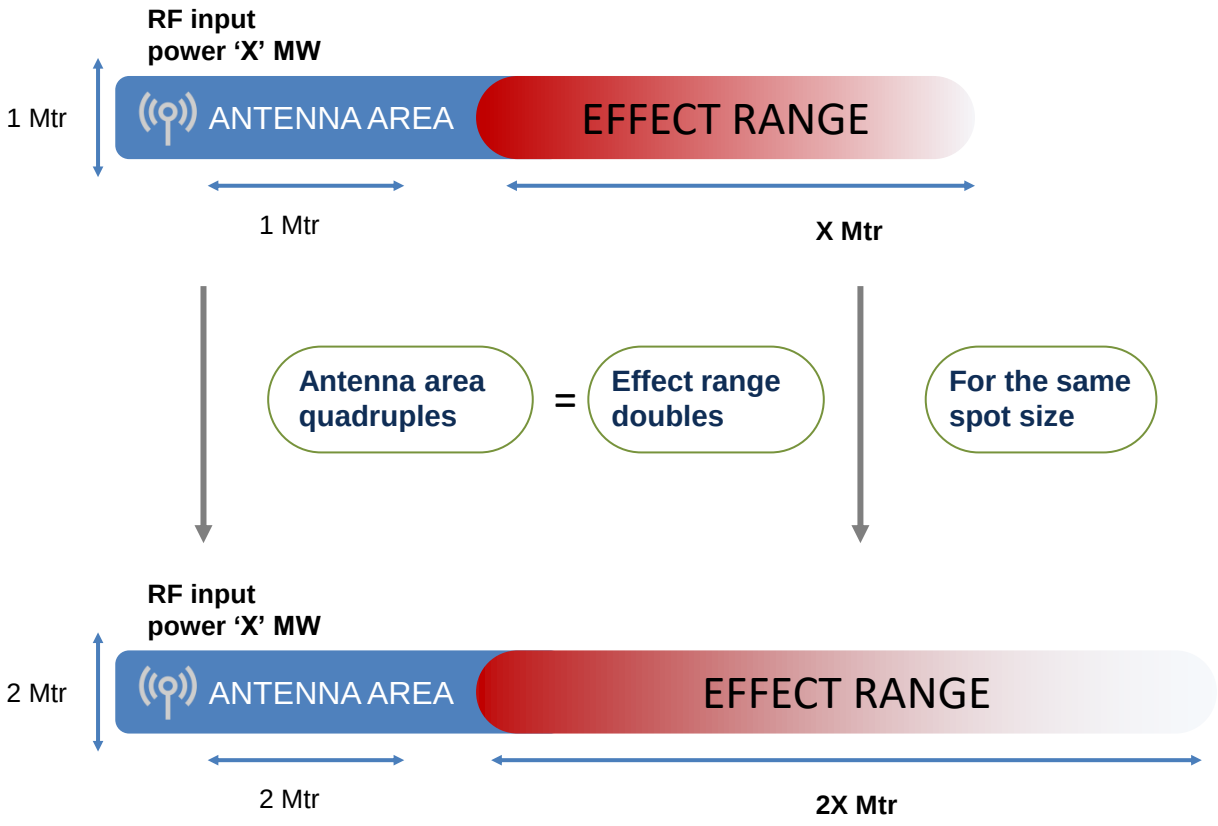
HARBOUR ACCESS CONTROL



FIXED ASSET PROTECTION

POSSIBLE RANGE

System range was successfully demonstrated at hundreds of meters



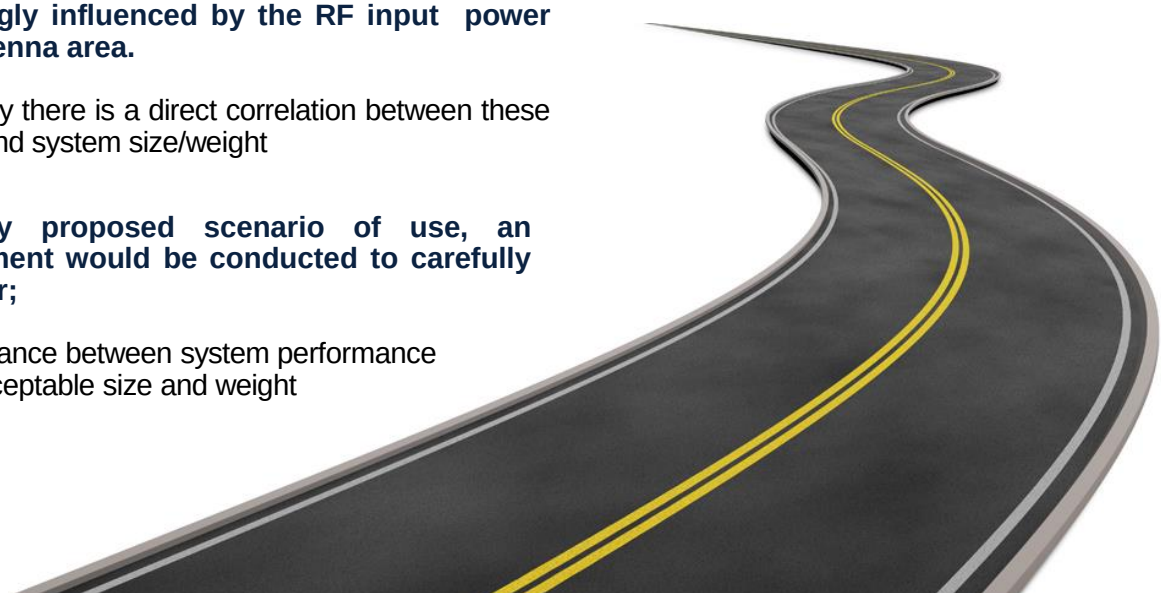
SYSTEM OPTIMISATION

The stopping range performance of Safe-Stop is strongly influenced by the RF input power and antenna area.

- Typically there is a direct correlation between these factors and system size/weight

For any proposed scenario of use, an assessment would be conducted to carefully consider;

- The balance between system performance
- The acceptable size and weight



HEALTH & SAFETY

Demonstration

All occupied testing has been carried out within the International Commission on Non-Ionising Radiation Protection (ICNIRP) guidelines 1998

Field strength measurements at 10m are better than 7 times lower than the threshold at which pacemakers may begin to be affected and >100 times lower than the threshold at which they may fail [2]

System Deployment

A full risk assessment and safety case for scenario of use needs to be carried out prior to operation

References

[1] ICNIRP 1998 & 2010

Guidelines 'For Limiting Exposure to Time - Varying Electric, Magnetic and Electromagnetic Fields

[2] HDL-TR-2197

November 1991- The Effects of Electromagnetic Pulse (EMP) on Cardiac Pacemakers

Vincent J. Ellis, U.S Army Laboratory Command, Harry Diamond Laboratories

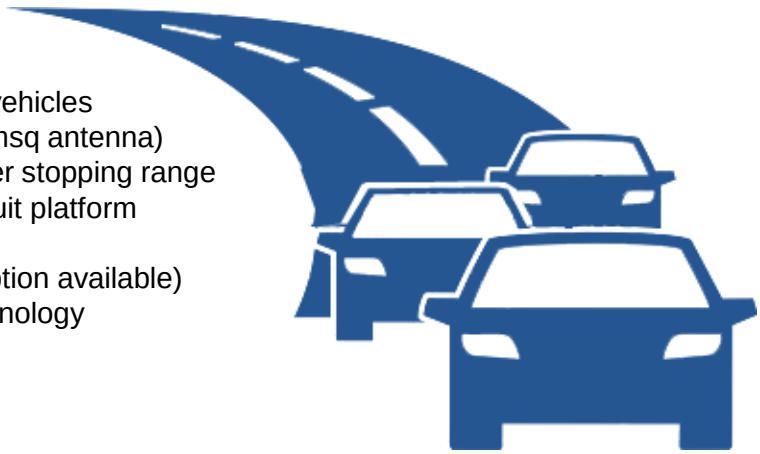
LAND USE / KEY FEATURES

Capabilities

When applied, the target vehicle retains limited controllability, resulting in steering and brakes maintaining functionality; the target will be unable to move until RF Safe-Stop™ is put back in passive mode. Vehicle occupants remain unharmed allowing greater precautionary use.

Key Features

- Compact and discreet: fits into 4x4 vehicles
- Stopping distance of up to 100m (1msq antenna)
- Larger antennas can produce greater stopping range
- Modular: allows reconfiguration to suit platform
- Silent, permits covert operation
- Energy efficient (battery-powered option available)
- Non destructive Utilises proven technology
- Easy to operate
- Output optimisation

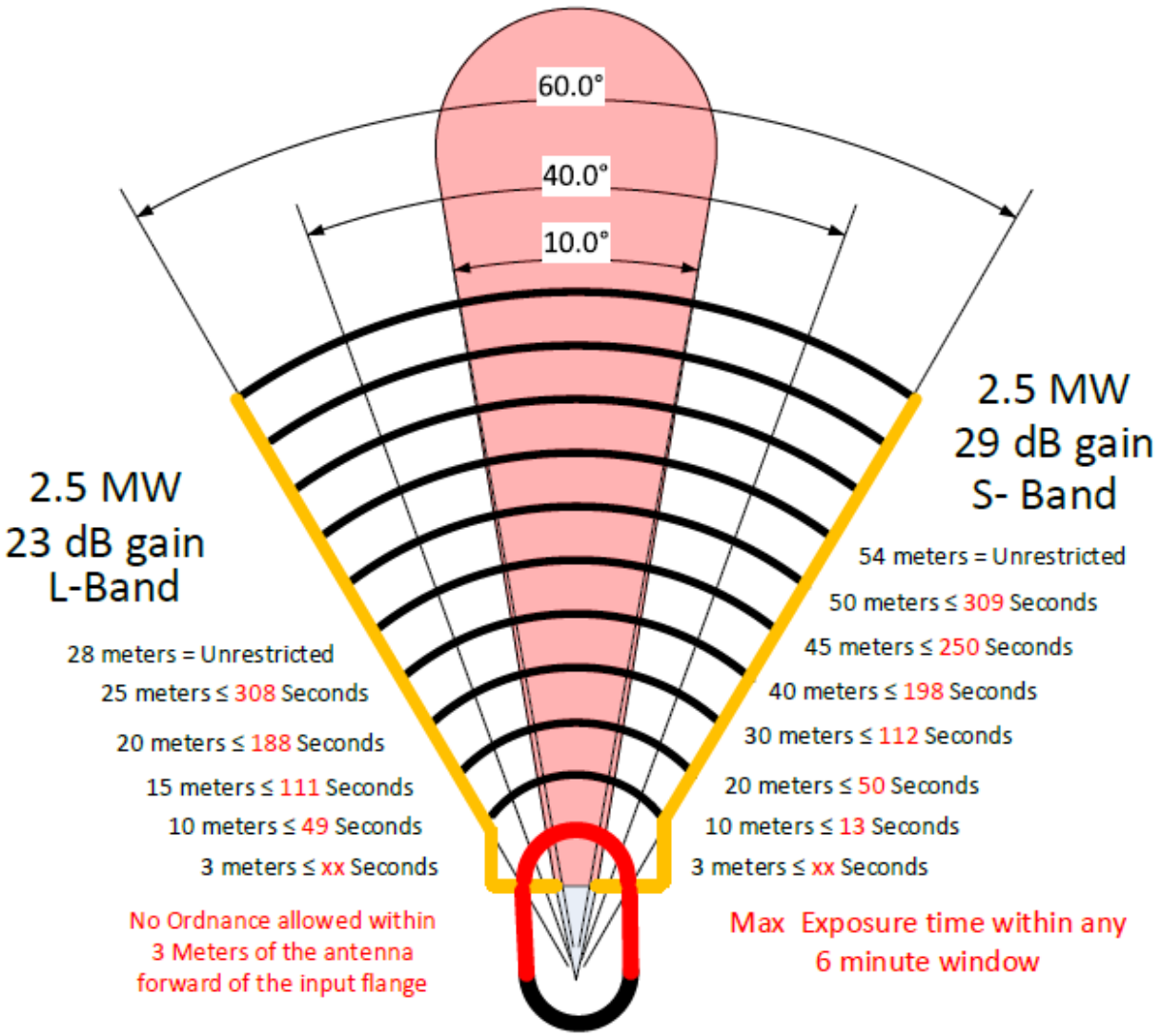


PEL

L-Band keep out zone width 28 meters in front of the antenna is+/- 3 meters (+/- 5°) from the antenna center line.

Keep out zones for the side and rear of the antenna will be based on measurements.

S-Band keep out zone width 54 meters in front of the antenna is +/-4 meters (+/- 4°) from the antenna center line.
Keep out zones for the side and rear of the antenna will be based on measurements.



NOTE: Side and rear keep out distances shall be minimized by applying mitigation efforts such as adding absorber around the perimeter of the antenna.

DEMONSTRATED VEHICLES

69 Vehicle Types /33 Different Manufacturers
54 cars, 10 motorcycles, 7 trucks

Cross Section of Vehicles tested (Cars)		
Audi A6	Citroen Xara	Mercedes E Class
Ford Mondeo 56	MG ZT V6	Mazda 6 Auto
Jaguar S Type	Renault Laguna	Volvo S40
Nissan Maxima	BMW 3	Mazda CX5
BMW 735i	Opel Omega	Citroen Berlingo
Ford Mondeo V6	Opel Astra	Nissan 100X
Volvo 940	Mazda 6 man	Seat Leon
Subaru Forrester	Peugeot 406	Hyundai Accent
Citroen Jumpy	Jaguar X type	Opel Vectra V6
MG Z	Toyota Land Cruiser	BMW 520i
Honda Accord	Volvo V70	Lexus GS300
BMW 330	Nissan Primeria	BMW 323i
BMW 730	Alfa 147	Ford Mondeo Diesel
Citron Picasso C3	Toyota Corella	Volkswagen Passat
Toyota Celica	Ford Cougar	Audi Q7
BMW X5	Citroen C5	Audi A3
VW Phaeton	Lancia Ypsilon	Honda Accord
Opel Combo Van	Mercedes E300	Nissan Pathfinder
Mitsuibishi truck	DAF Trucks	Volvo F40 Truck
Ford Transit	Kawasaki ER5	Kawasaki GPZ305
Yamaha 750	Yamaha 600	Kawasaki 600
Honda Scooter	Triumph 900	BMW 1000 Tourer
Toyota tundra	VOLVO F12 truck	

USE AT SEA / KEY FEATURES

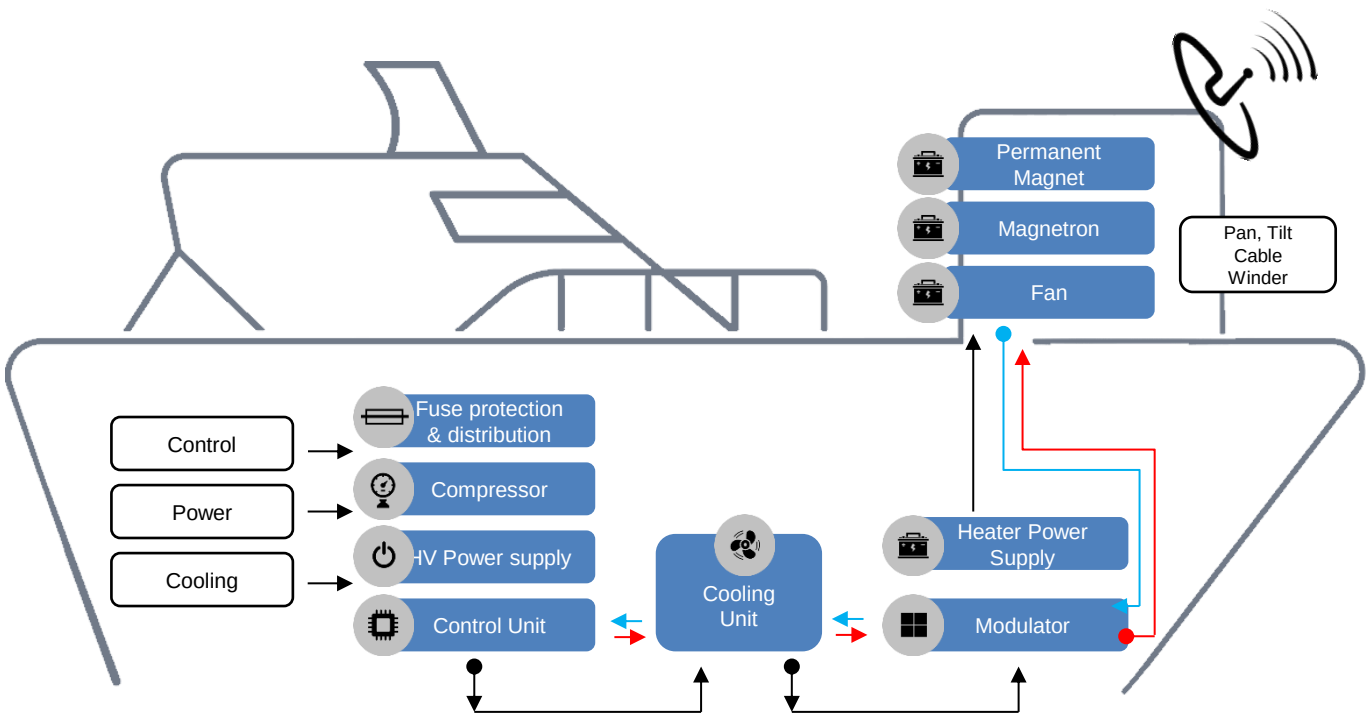
Capabilities

Typically applied for harbour entry protection, maritime policing and anti-piracy, target vessel retains limited controllability, and will be unable to move until RF Safe-Stop TM is put back in passive mode. Vessel occupants remain unharmed allowing greater precautionary use.

Key Features

- Compact and discreet Stopping distance in excess of 100m (1msq antenna)
- Larger antennas can produce greater stopping range
- Modular: allows reconfiguration to suit platform
- Silent, permits covert operation
- Energy efficient (battery-powered option available)
- Non destructive
- Utilises proven technology
- Easy to operate
- Output optimisation

BOAT STOP



DEMONSTRATED VESSELS

Brand	Type	Brand	Type
Mercury	30HP Outboard (2 Stroke)	Boomerang Inboard	Twin Rolls Royce 500HP Diesel Inboard
Mercury	115 HP Outboard	Fishing Boat	Twin 550HPOutboard
Mercury	200 HP Outboard (2 Stroke)	Suzuki	200 HP Outboard
Mercury	225 HP Outboard	Suzuki	40 HP Outboard
Mercury	300 HP Outboard	Tohatsu	25 HP Outboard
Mercury	300V HP Outboard	Tohatsu	150 HP Outboard
Yamaha	300HP Outboard	Evinrude	75 HP Outboard
Yamaha	242HP Twin Jet Boat Inboard	Evinrude	250 HP Outboard
Yamaha	115Hp Outboard	Honda	40 HP Outboard
Yamaha	225 HP Outboard	Sea Doo	C400 Jet Ski
Yamaha	250G HP Outboard		
Yamaha	250HP Jet Ski		

USE IN AIR
DEMONSTRATED UAVs/DRONES

Brand	Type
DJI	Phantom 2
DJI	Phantom 2 +
DJI	Phantom 3
DJI	Phantom 4
Yuneec	Typhoon G
Blade	350 QX3
3DR	Solo SA11A Smart UAV
Dromida	Ominus FPV
Traxxas	TRX37054
E-flite	APPRENTICE ESP 15E RTF
HobbyZone	Sport Cub S RTF
……. And many - many other!	