Paras Anti Drone

Premier RF and Microwave Products Company
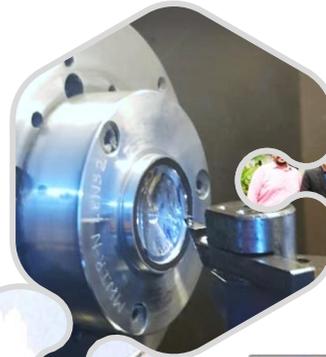
Let's Safeguard our Skies !!

Who Are We?

Paras Anti-Drone Technologies Pvt Ltd is subsidiary of Paras Defence and Space Technologies Ltd

State-Of-the-Art Manufacturing, Testing and Integration Facilities

Expert & Enthusiastic Team of 80+ People(Group : 600+)

Development of Strategic IPR in Technology Domains

True IDDM Company with Focus on R&D

Focused on Defence & Strategic Application

High-end RF Technology Made In India

Core Team

Ashutosh Baheti
CEO
MSc, Technical University
of Darmstadt, Germany
Ex-Infineon | Ex-Huawei
40+ Patents, 6+
Publications
Linkedin Profile

Amit Mahajan
Director, R&D
B-Tech Instr., 24+ years of
experience in core development of
Defence Technologies
Linkedin Profile

Nanda Kumar
Vice President
Btech ECE, JNTU, Hyd
Ex-CRL, BEL | Ex-CTO, BEL
2+ Patents

Dr. Vinay B. Narayane
RF-Systems Head
PhD, IIT-Bombay
Ex-Cisco| Ex-COEP
8+ Publications
Linkedin Profile

Dr. Abhishek Awasthi
System Engineering Head
PhD, IIT Kanpur
Post Doctorate,
University of Alabama, USA
25+ Publications
Linkedin Profile

MAKE IN INDIA

- Total team of 80+ People (incl. 8+ PhDs)
- Right from Antenna to bits and Beyond
- Technology Innovation Mandate

Future of Digital Warfare

Connectivity

Sensing

Neutralization

Command & Control
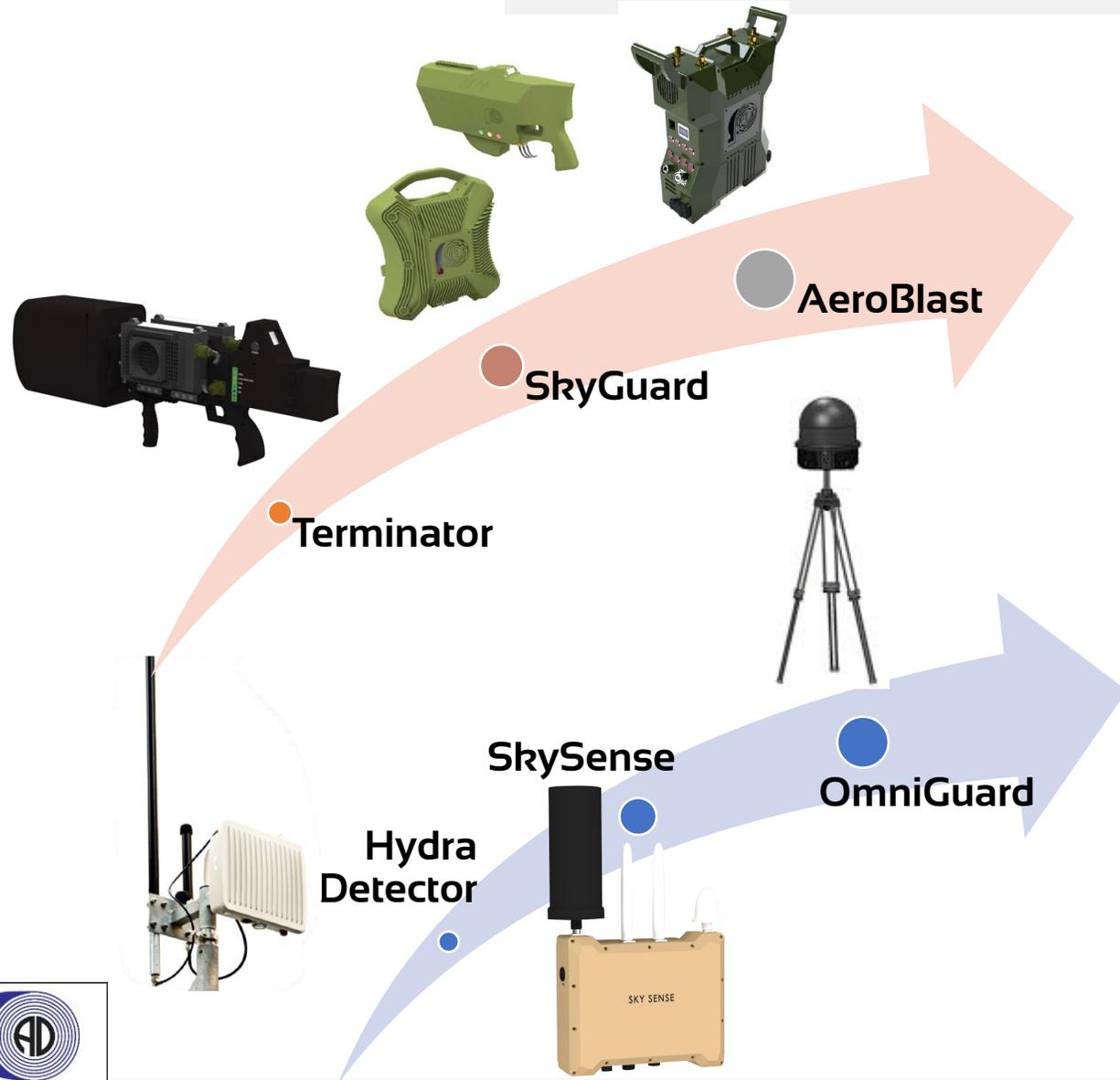
Product Solutions

- ❖ Drone Detection & Jamming Systems
  - ▪ First Line of Defence
  - ▪ Second Line of Defence
- ❖ Software Defined Radios
- ❖ ELINT/SIGINT Systems
- ❖ R&D Projects Under iDEX Scheme

Product Overview

Counter Drone : First Line of Defence

AeroBlast

SkyGuard

Terminator

Dexter 20

SkySense

OmniGuard

Hydra Detector

Jammer Product Line

Terminator : Drone Jammer Gun

Terminator Version - 1

Modular Packaging

Key Features

- Directional 3 Km Range
- Fully Portable and Modular
- 400 W EIRP
- Compact Form Factor Design
- Weight < 6.5 Kg
- Multi Frequency ISM Bands
- Full GPS Jamming L1/L2/L5

Terminator Version - 2

Terminator Version - 3

Used in Recent Conflict (Battlefield Proven)

SkyGuard : Manportable Drone Jammer Gun

Key Features

- Directional 3-3.5 Km Range
- Fully Portable and Modular
- 600 W EIRP
- Compact Form Factor Design
- Weight < 10 Kg
- Multi Frequency ISM Bands
- Full GPS Jamming L1/L2/L5

✓ **Lightweight, rugged backpack mount**
✓ **Multi-band ISM drone neutralization**
✓ **Range extension with active antennas**
✓ **Voice Guidance for Command with Mute Option**
✓ **Long battery life**
✓ **Antenna system compatibility**
✓ **Durable, compact, cost-effective**

Aeroblast : State of Art Jammer Module

- ✓ **Integration of more frequencies**
- ✓ **Portability aspect Operation time**
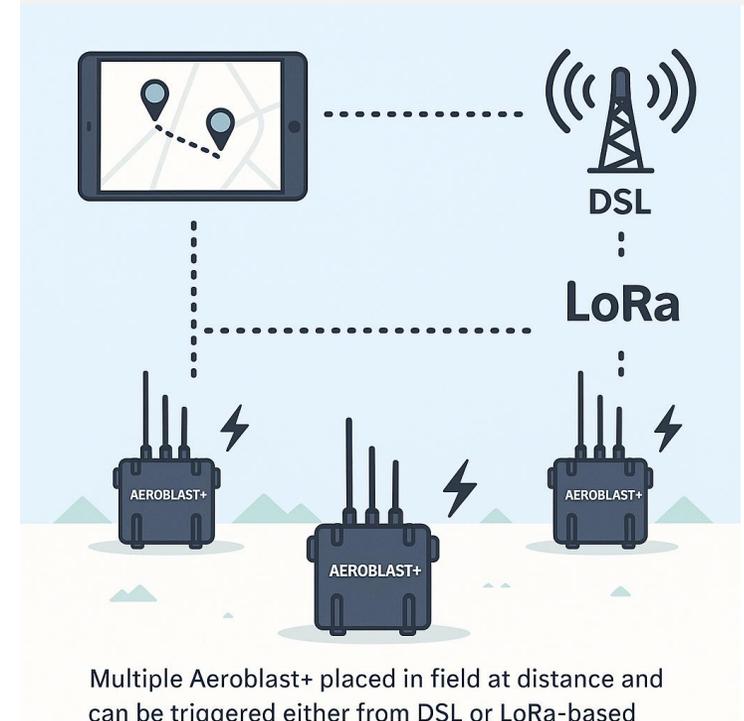- ✓ **Huge Coverage 360°**
- ✓ **Remote Configurable**

Key Features

- Omnidirectional 3 Km Range
- Man Portable
- 1200 W EIRP
- Compact Form Factor Design
- Weight < 15 Kg
- Multi Frequency ISM Bands
- Full GPS Jamming L1/L2/L5

Version- 2

Aeroblast+ : Distributed Jammer System

- ✓ **Integration of more frequencies**
- ✓ **Portability aspect Operation time**
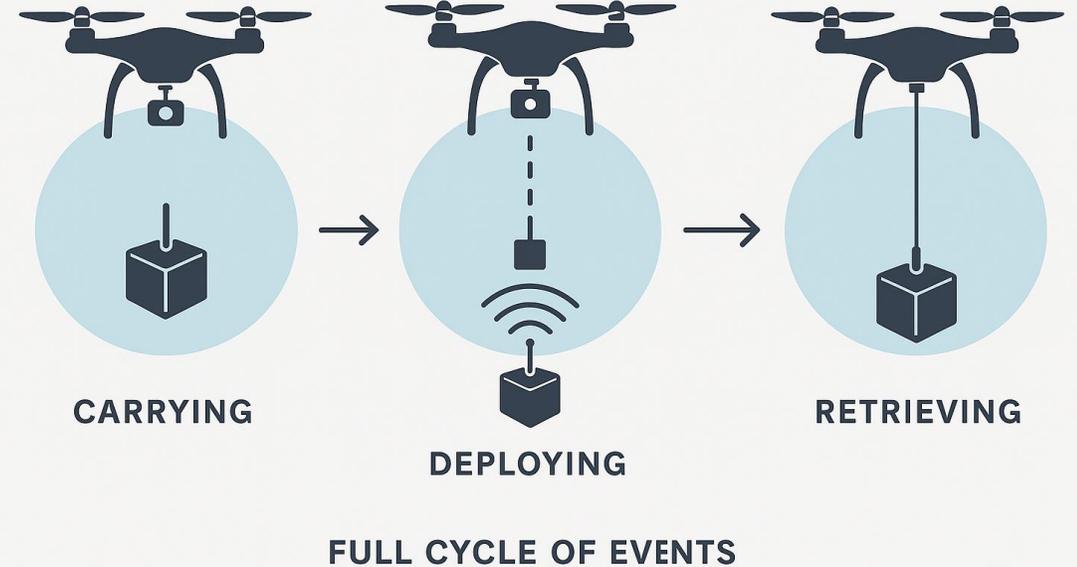- ✓ **Huge Coverage 360°**
- ✓ **Remote Configurable**

Key Features

- Agile Configurable Jammer System
- Omnidirectional 3 Km Range
- Man Portable
- Compact Form Factor Design
- Weight < 15 Kg
- 400 MHz to 6 GHz
- 4 Antenna Configuration
- 60-80 W Jammer Modules

Multiple Aeroblast+ placed in field at distance and can be triggered either from DSL or LoRa-based

Deployable Jammer Pods : GPS Jamming
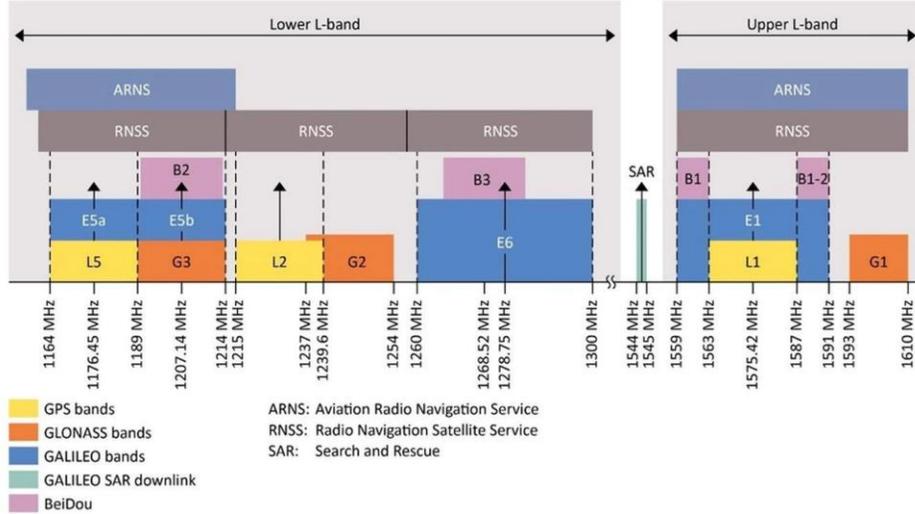
✓ **Integration of more frequencies possible**
✓ **Portability aspect**
✓ **Operation time**
✓ **Hemispherical Coverage**
✓ **Remote Configurable**

Key Features

- Drone Deployable Pods
- Hemispherical Radiation pattern
- GPS/GLONASS/BEIDOU/IRNSS
- L1/L2/L5 and other bands
- 4-5 hours of continuous operation
- Range 1 km Hemisphere

CARRYING → **DEPLOYING** → **RETRIEVING**

FULL CYCLE OF EVENTS
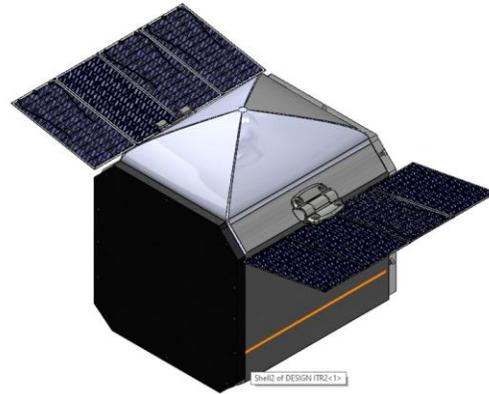
Dexter J50

Key Features

- Agile Configurable Jammer System
- Omnidirectional 3 Km Range
- Man Portable
- Compact Form Factor Design
- Weight < 15 Kg
- 400 MHz to 6 GHz
- 4 Antenna Configuration
- 60-80 W Jammer Modules

- ✓ **Integration of more frequencies**
- ✓ **Portability aspect Operation time**
- ✓ **Huge Coverage 360°**
- ✓ **Remote Configurable**
- ✓ **Fully Agile Waveform Jamming Methodology**

Vehicle Mounted RCIED Jammer System (Under development)

Direction Antennas
for some bands

- ✓ **Vehicle Mounted Jamming system**
- ✓ **Directional and Omni bands**
- ✓ **Agile waveform driven**
- ✓ **Most efficient patented waveform technology**

Key Features

- 20 MHz to 8 GHz
- 100 W Power Amplifier Modules
- PLL based Frequency sweeping
- Harmonic suppression 40 dBc
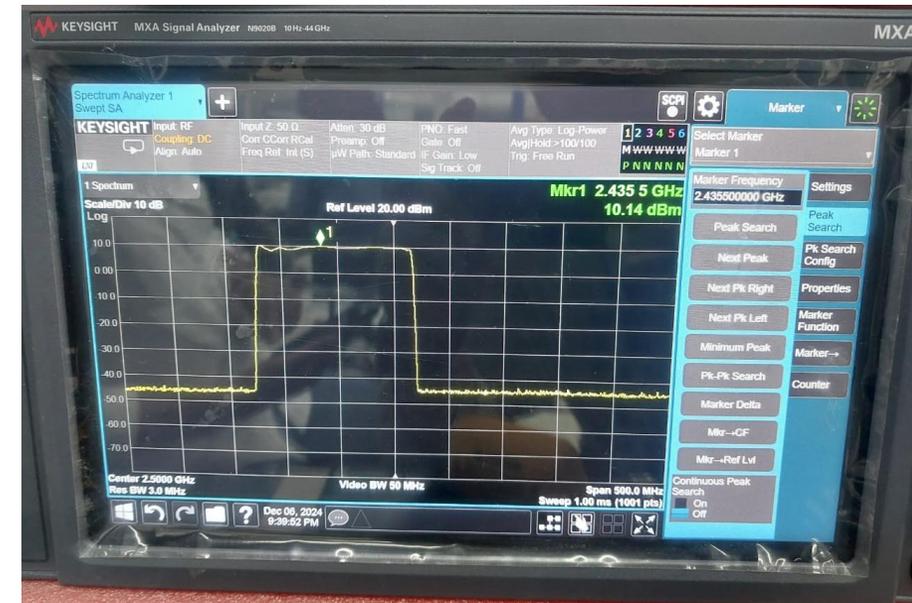- Directional and Omni
- 2-5 Km (Depending on drone type)

Scalable Jammer Modules

- Scalable and Tunable Jammer Modules design

- Fully designed inhouse

- Adjustable output power 20/50/100 W

- Compact Form Factor Design

- Covering complete frequency band from 400 MHz to 6 GHz

Detection Systems Product Line

Hydra : Omni Drone Detector

Key Features

- Detection Range upto 3 Km
- Direction estimation with 3 Units using TDOA
- ISM Drones
- 400 MHz to 6 GHz
- Deploy in 10 mins
- AI/ML drone Library

✓ **360° Drone Detection**
✓ **Signals Fingerprinting**
✓ **AI/ML Library on Controllers Database**
✓ **Drone ID Integration**
✓ **Receiver Sniffing Protocols**

SkySense

SkySense-H

SkySense-M

SkySense-Lite

Key Features

- Detection Range upto 5 Km
- DOA Accuracy ± 10°
- 400 MHz to 6 GHz
- Deploy in 10 mins
- AI/ML drone Library

✓ **360° Drone Detection**
✓ **Signals Fingerprinting**
✓ **AI/ML Library on Controllers Database**
✓ **Patented DoA Estimation Technique**

OmniGuard : Smart & Autonomous Next-Generation Counter Drone Technology

Key Features

- Passive detection of radio-frequency (RF) signals

- Full 360° (all-airspace)

- 70 MHz to 6 GHz

- SDR Driven Sensing Approach with GPU processing

- Direction finding (DF) accuracy: 7.5° RMS (Beyond 1 GHz)

- Extensive library coverage, which includes more than 220 different drones/UAVs, remote controllers, drone-telemetry and FPV models

- Stationary / Vehicle mounted System

- ✓ **Up to 10 Km Detection**
- ✓ **Low false alarm rate**
- ✓ **Identification Friend or Foe**
- ✓ **Easy Installation and Operation**
- ✓ **Direction Finding (1-6 GHz)**
- ✓ **AI/ML Library on Controllers**

Dexter 20 : Detection and Jamming

World's most advanced Agile Detection and agile Jamming System

Key Features

- Integrated Detection and Jamming
- Full band coverage 400 MHz to 6 GHz
- High Dynamic Range of 60 dB
- Agile Modulated Jamming
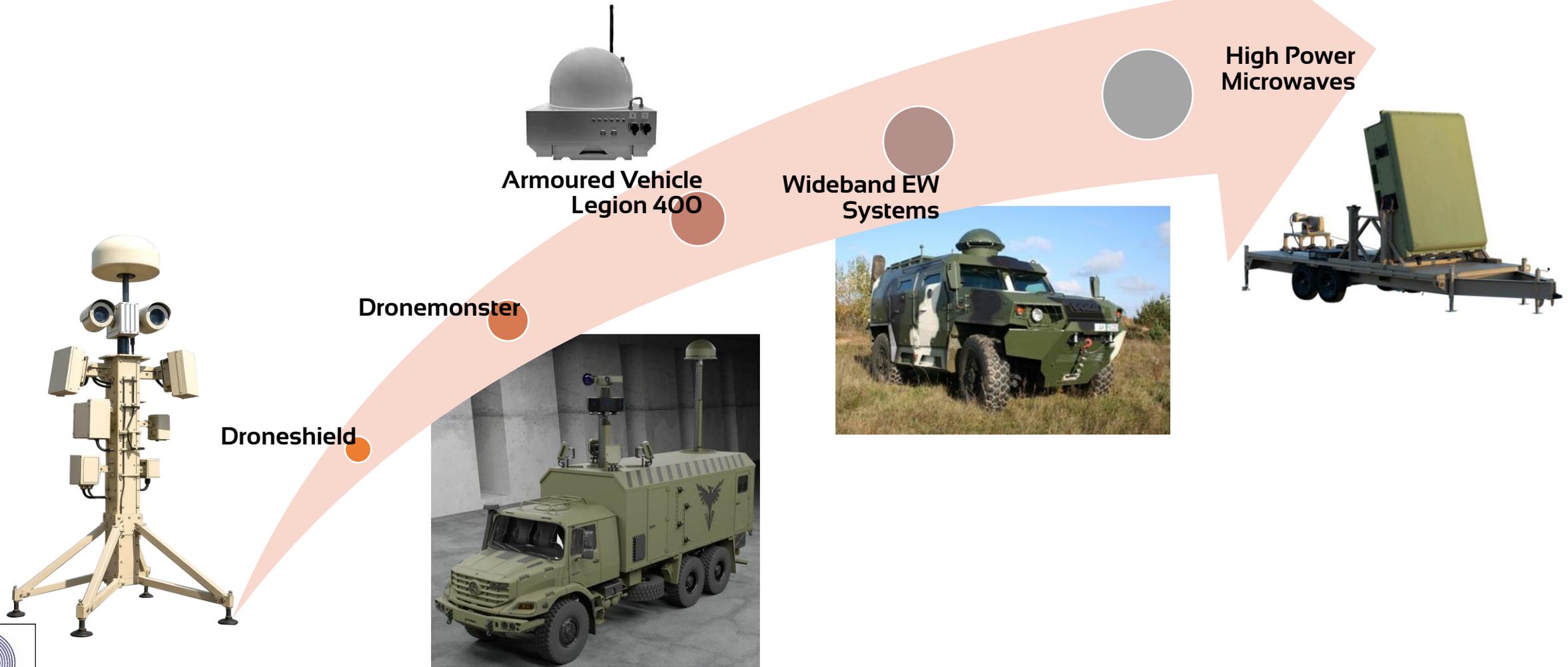- Portable System
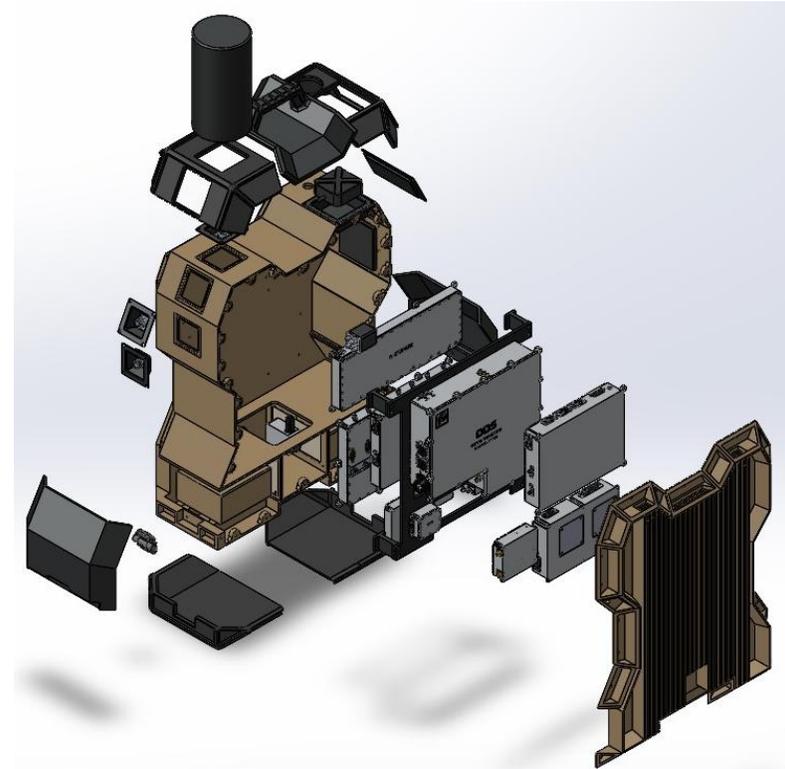
Perfect Companion for Troops and Soldiers

Field Trials
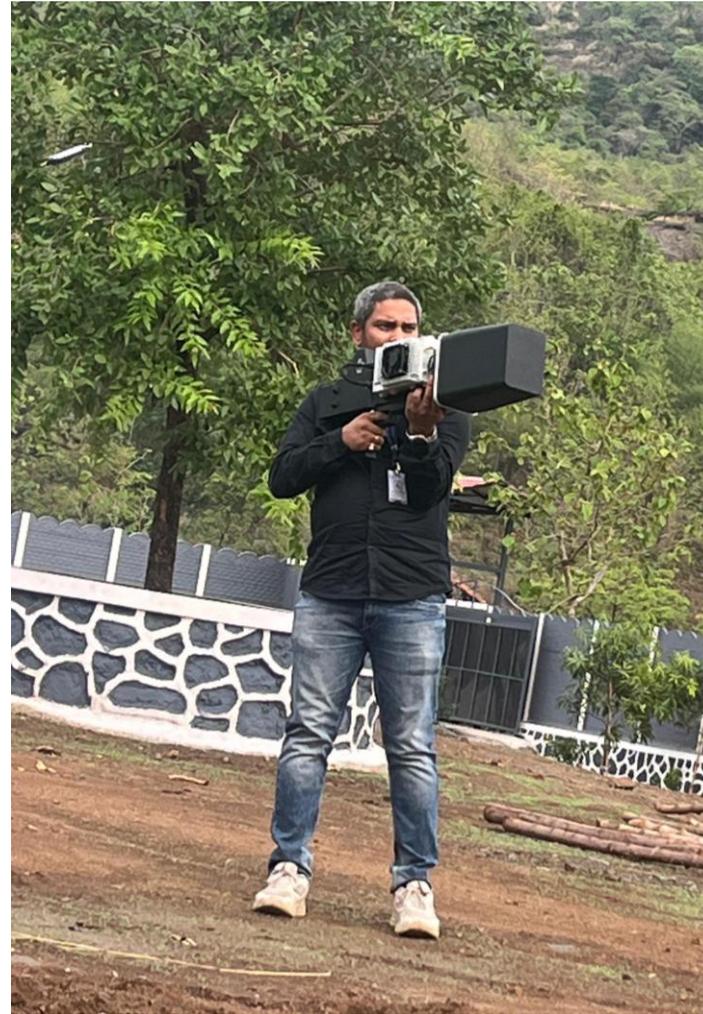
Field Trials

Second Line of Defence : Under Development

High Power Microwaves

Armoured Vehicle Legion 400

Wideband EW Systems

Dronemonster

Droneshield

Software Defined Radios

Connectivity : Software Defined Radios

Future connectivity is all about Agile and Configurable Radios

- Scalable and Agile Radio Platforms
- Scalable to EW and Radar Applications
- Vertical and Horizontal Application Integration

SDR-40 → **SDR-200** → **SDR-DRF**

Project
- **Digital Mobile Radio Ecosystem**
- **Combat-Net Radio**

Interoperable Radio Family

Radars (Under Development)

Radar: TR Module Phased Array
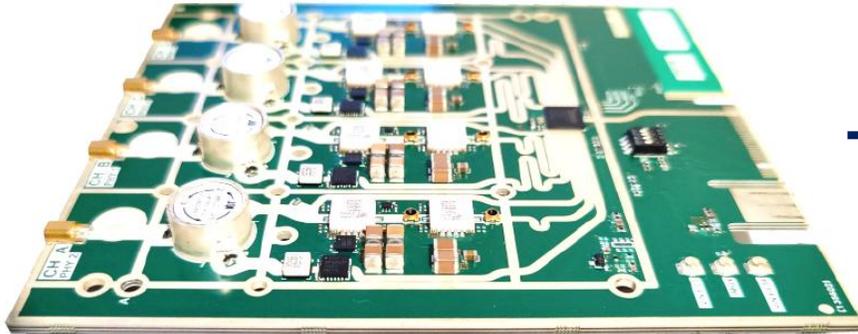
TR Modules with Advance semiconductor technologies

(Integrated Transceivers, GaN Signal chains, TTD Phase shifters)
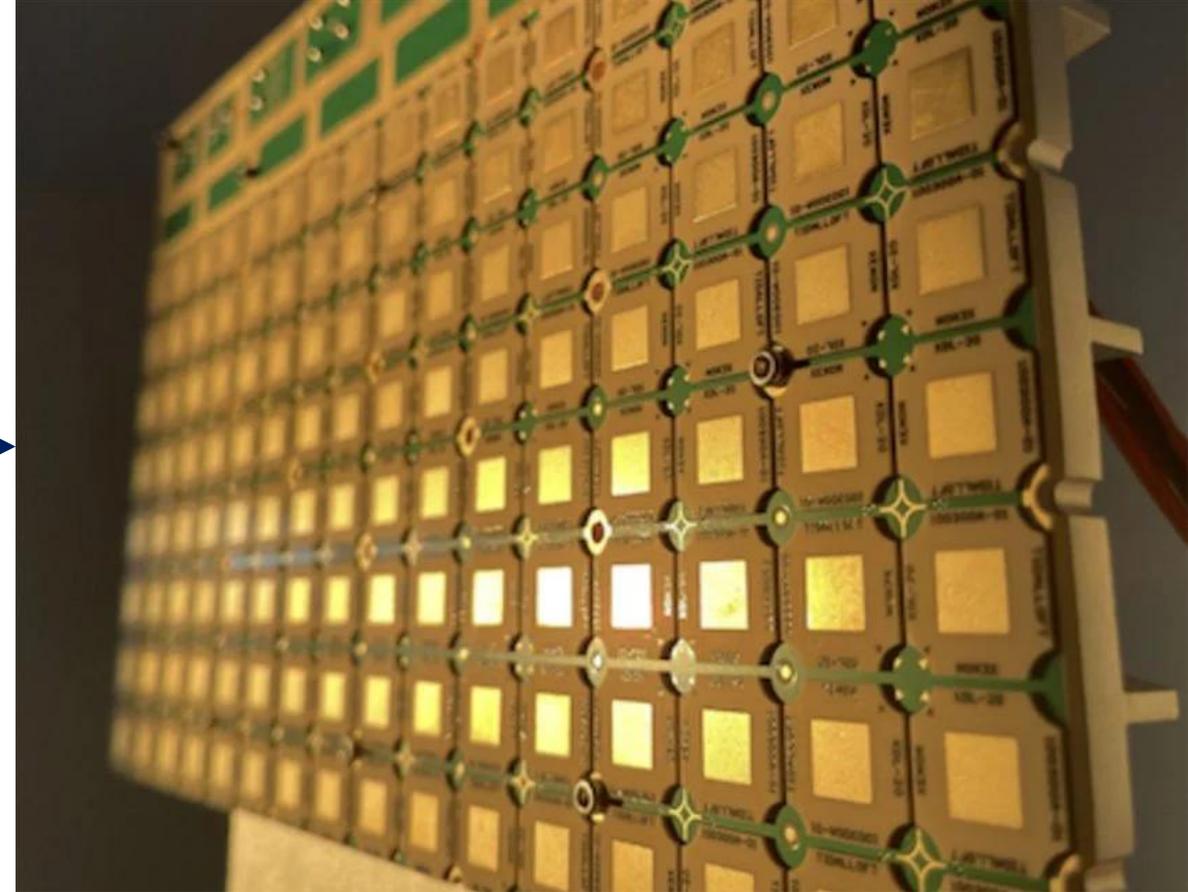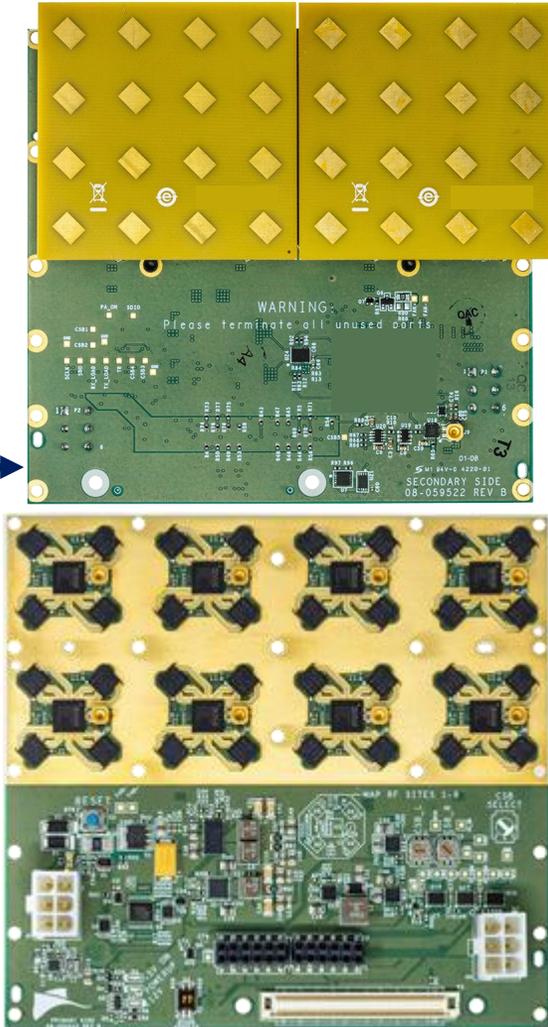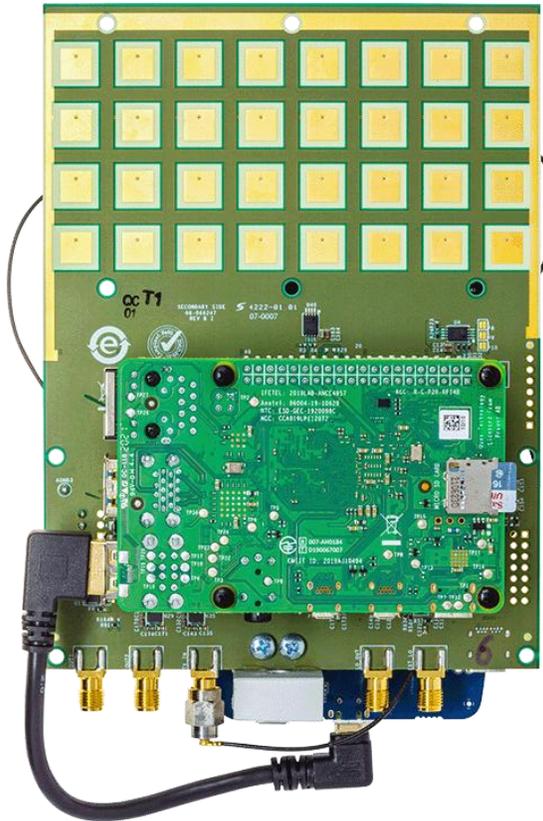
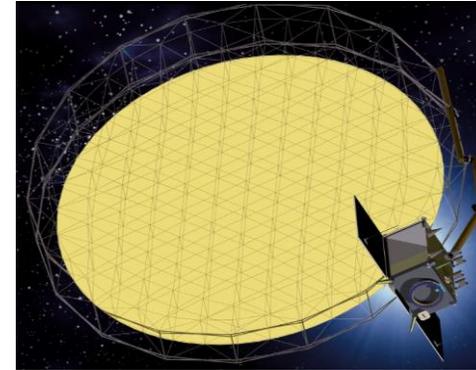**X band/Ku-Band/Ka Band**
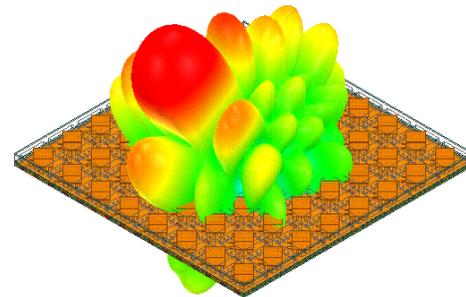
Phased Array AESA Antenna
X band/Ku-Band/Ka Band
< 6 Kg, Wdeband Performance
Robust casing with heat dissipation
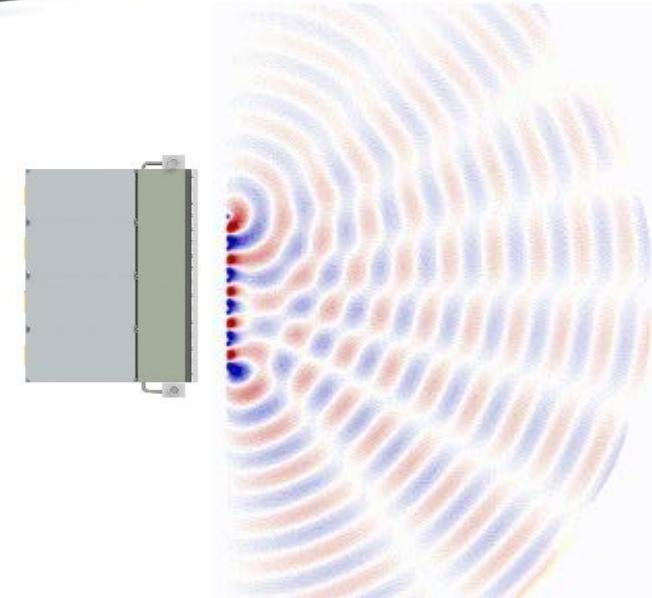
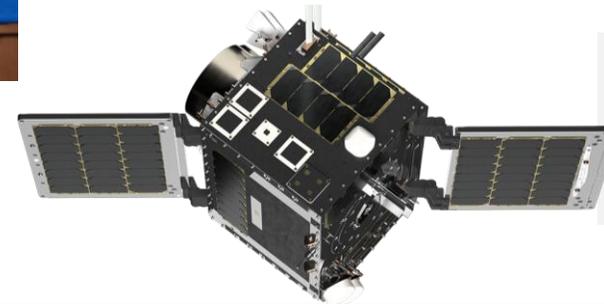## Drone Detection : X band Tile/Panel based AESA Array

Innovations for Defence Excellence
Ministry of Defence Funded Programs

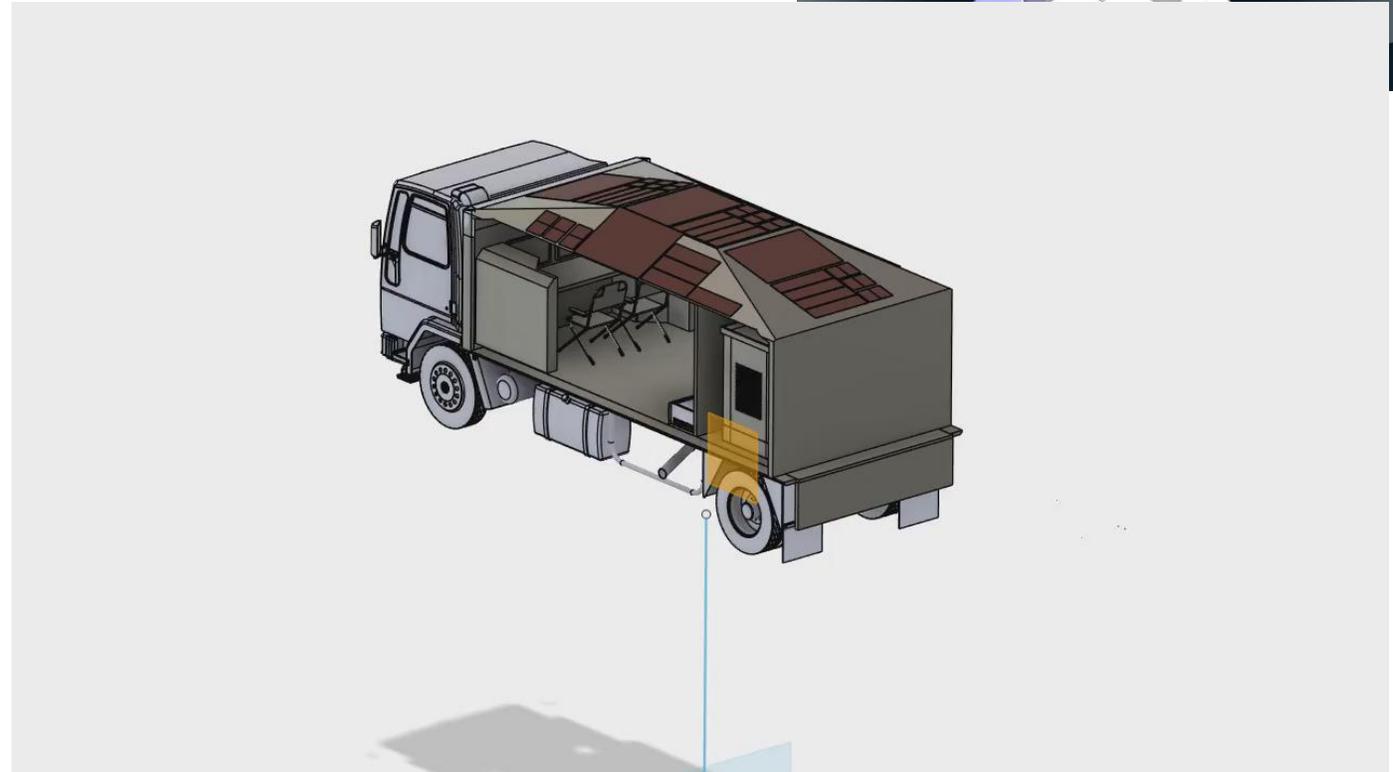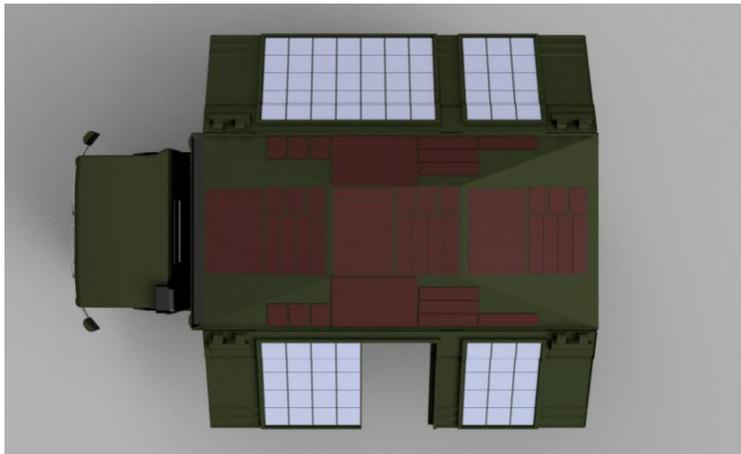

IAF Program : Design of SAR Radar

Indian Army : Smart Anti Jamming systems

IAF Program : Design of ELINT Spaceborne system for 0.5-40 GHz

Mobile Ground Station with Stallion 4x4

ADITI Program : MOBILE GROUND STATION IN S/X/KA BAND
FOR TRANSMITTING AND RECEIVING DATA FROM SATELLITE

Indian Air Force Program

Wideband EW System

0.5 -18 GHz/0.5-40 GHz Wideband EW System

Features

- Instantaneous Bandwidth of 2 GHz

- Upto 18 GHz

- Dynamic Range of 65 dB

- Minimum Detectable signal -105 dBm

- Signal processing pipeline with IQ spectrum, Frequency spectrum, Spectrogram and PDW

- ELINT, SIGINT Pipeline

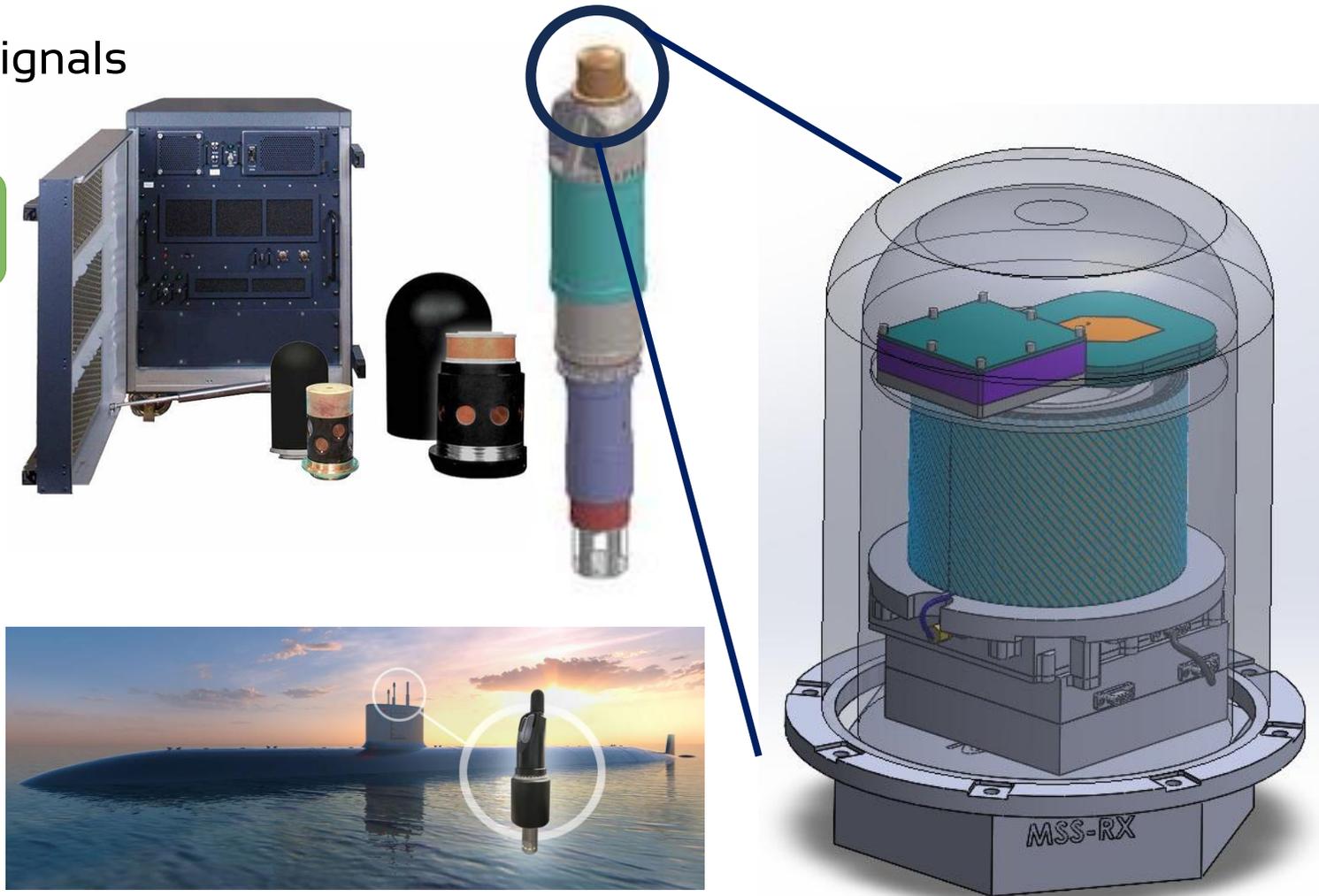Compact COMINT-SIGINT Satellite Receiver System

Vehicle Mounted EW System

ELINT/SIGINT Systems :ESM Warner

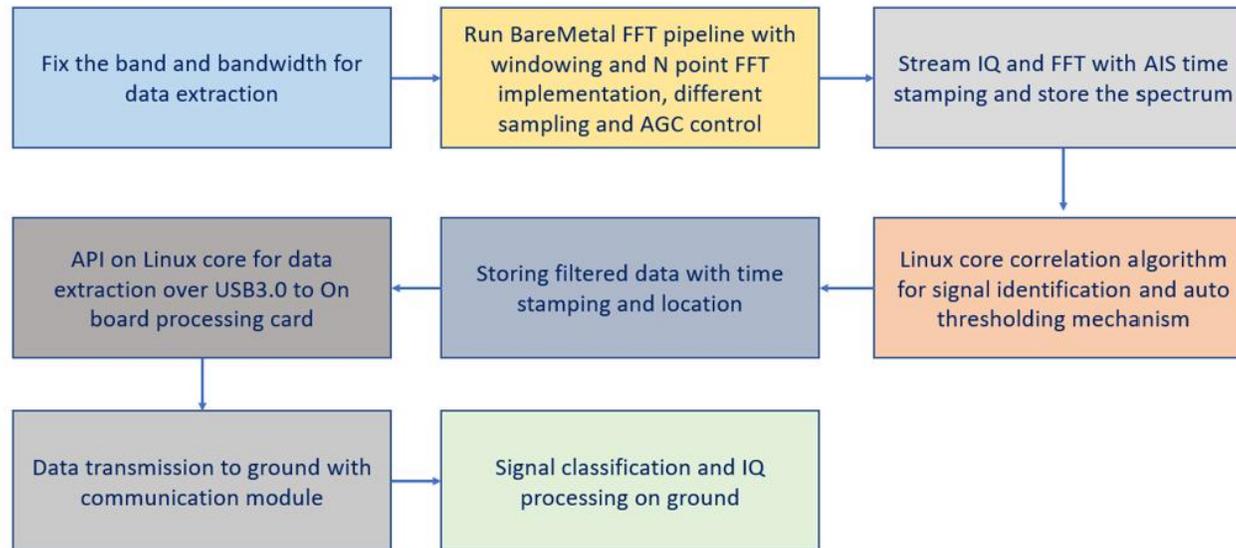## Naval Vessel Technology for Radar Signals

Features

- Real time Radar Signal Detection

- Upto 18 GHz

- Dynamic Range of 65 dB

- Minimum Detectable signal -80 dBm

- Signal processing pipeline with IQ spectrum, Frequency spectrum, Spectrogram and PDW
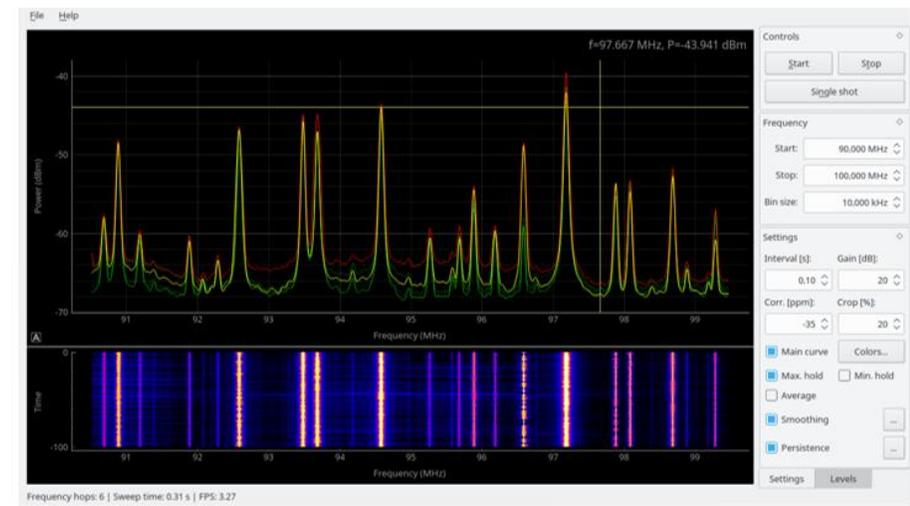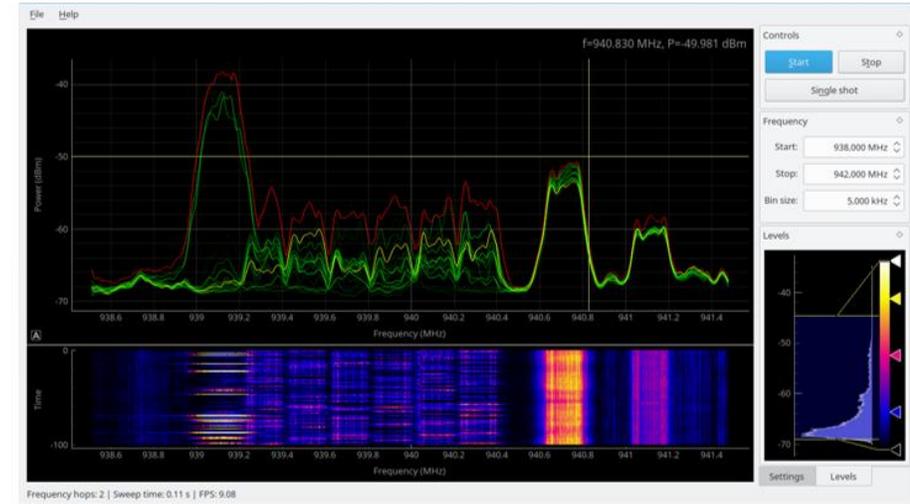
- ELINT, SIGINT Pipeline

EW Software Pipeline

SIGINT, COMINT, ELINT, Drone Detection Pipeline

Fix the band and bandwidth for data extraction

Run BareMetal FFT pipeline with windowing and N point FFT implementation, different sampling and AGC control

Stream IQ and FFT with AIS time stamping and store the spectrum

Linux core correlation algorithm for signal identification and auto thresholding mechanism

Storing filtered data with time stamping and location

API on Linux core for data extraction over USB3.0 to On board processing card

Data transmission to ground with communication module

Signal classification and IQ processing on ground

Algorithm Flow

Thank You !!