
Gets
Systems
Seeing The Unseen

GETS Systems Value Proposition

- Cutting Edge RADAR Technology
- Modular Design
- Excellent cost/performance Ratio
- High Reliability Products
- Short Development Cycle
- Based on Gets' Elite Multidisciplinary Technologies.

GETS Technology edge

- Best RADAR performance made possible by unparalleled high-end technology:
  - First Signal processing on the RADAR Antenna.
  - A unique calibration algorithm for the RADAR & Satcom T/R module.
  - Low transmission power leads to a very high MTBF.
- GETS unique technology enables modular design precisely to the customer's needs
- Highest margins in the industry due to Value Driven Design approach:
  - All products are Designed to Target Cost (DTC).
  - Use a standard of the shelf components.
  - Gross Margin > 75%.
- All products are designed for Testing & manufacturing.

GETS Technology Partners

Partner	System	use
AERIALX	DroneBullet	HardKill solutions
DatCon	Support all GETS Systems	E/O Systems
mPrest mPrest	Air Defense Systems	C⁴I

GETS Customers

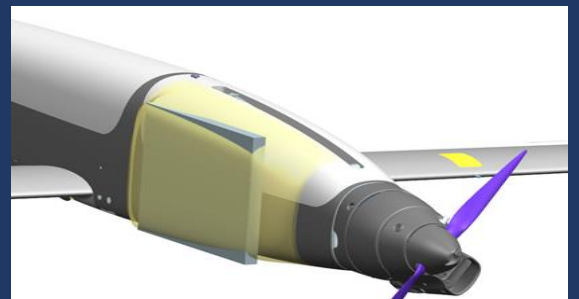
Products and Services

Products

Naval Radar S-500

Air Defense Radar S-800

HLS Radar



Lightweights SAR

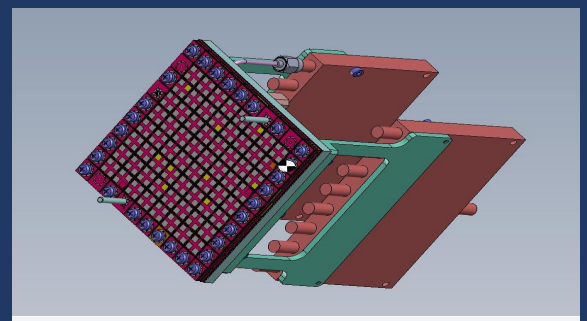
Coastal HLS Radar

SatCom

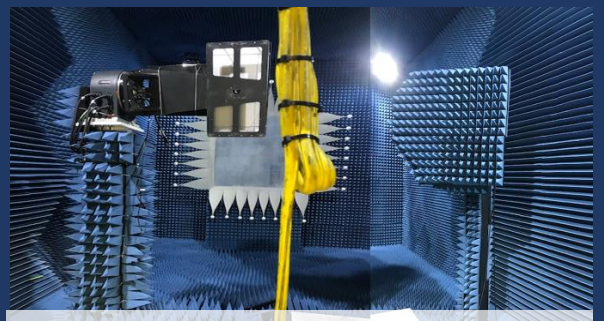
Iron Shield

Drone Protection

Services



R&D



Radar Range

Radar Simulations

Testing Systems

Sales Funnel

Reference Letters

ST Engineering Electronics

discrimination between drones and birds at longer distances, allowing more response time for the law enforcers.

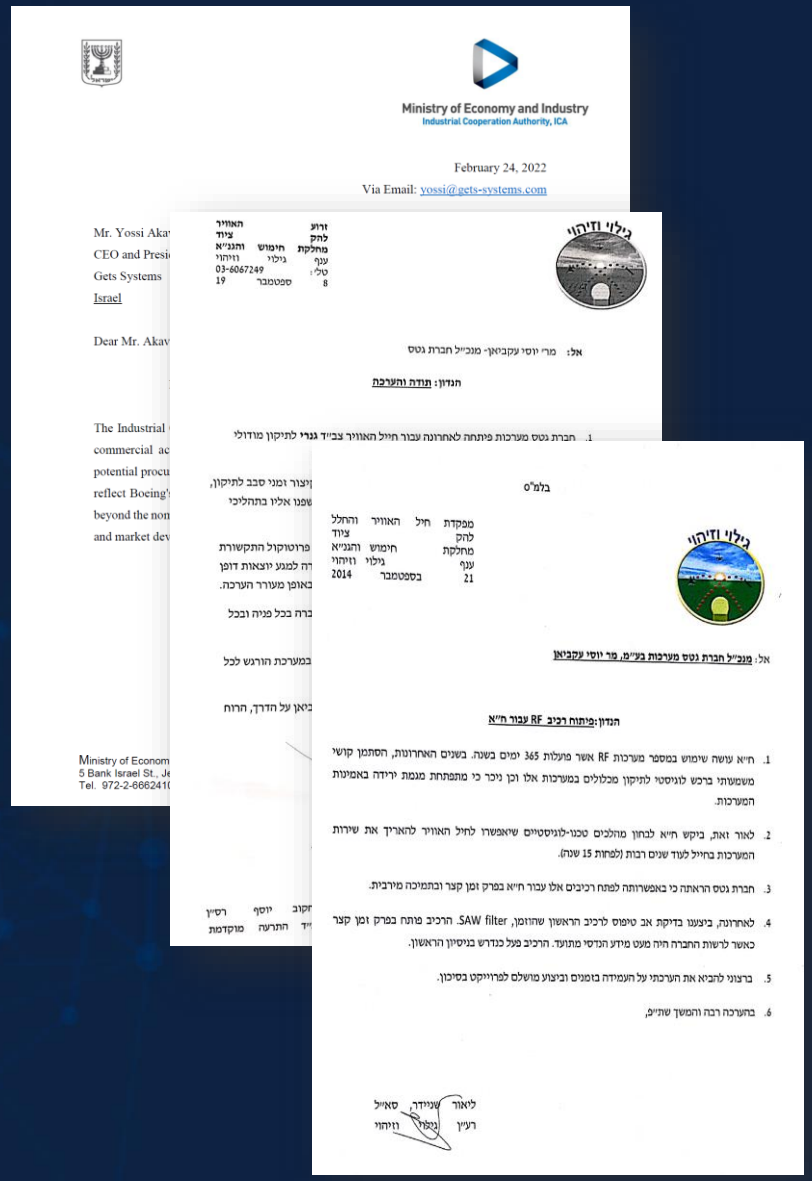
7. We did a comparison of Drone Detection Radars in the market, some of which are shown in Table 1

Parameter	3D DDR X Band	3D DDR S Band	3D DDR X Band	3D DDR-L Band
OEM Supplier	**WEIBEI**	**RADA / RPS 42**	**GETS GSR-16**	**Aveillant (Thales)**
2D / 3D	3D	3D	3D	3D
Frequency	X Band	S Band	X Band	L Band
Transmit power	0.5 W	60 W per panel	60 W	2000 w
Azimuth coverage	360°	90°	90°, option 360°	90°
Elevation coverage	8° ✗	30°	90°	30°
Update rate	1 Sec	0.25 sec	1.5 sec	0.25 sec
Waveform Type	CW & FMCW	Pulse Doppler	FMCW	Pulse Doppler
Technique of Classification	Yes by Kinematic, Classification by Optic 1.1km	No, 600 meter by EO, Doppler Processing	Micro Doppler processing	Yes, classification at 2.5km Micro Doppler processing
Drone detection range	3km (DJI Phantom III) min detection range 5m	3.5km for DJI Phantom III	3 km For RCS 0.01m²	3 km for DJI Phantom III Min Detection Range 300
Weight & Dimension (Diameter X Depth)	85 Kg, 0,9 x 0,9 x 0,8 meters, excl. mount	23kg Per Module 0.50m (diameter) x 0.20m (depth)	10-15kg 600 x 400 x 200 (mm) excl mount	250kg Per Module 3.5m (H) x 0.95m (W) x 0.35m (D)
Export License	No	Yes ✗	No	NO
Price	**TBD**	**USD 150k**	**USD 80k-100K**	**SGD 550k** ✗

Table 1 Survey of 3D Drone Detection Radars

8. Our conclusion is that the radar solution from GETS Systems Ltd offers the following advantages:
   a. One of the cheapest radars at around US$100K
   b. One of the lightest at 15 kg
   c. No export license
   d. One of the best elevation coverage at 80 degrees
   e. Drone detection range for target RCS of 0.01 sq m (typical DJI Phantom IV) is more than 3 km

RCS (m2)	Altura de objetivo (m.s.n.m)	Precipitación (mm/hr)	ALCANCE DE DETECCIÓN DE RADAR [NM] HENSOLDT Torre (45m) ANIMAS	HENSOLDT Torre (50m) LA TOLA	GETS Torre (45m) ANIMAS	GETS Torre (50m) LA TOLA	DESEADO
1	1	0	27,9	11	27	27	12
		10	NA	5,2	18	18	
		30	NA	1,4	10,5	10,5	
		50	NA	0,8	7,5	7,5	
5	1	0	32,7	12,3	40	45	
		10	NA	7,1	23	27	
		30	NA	5,1	12,5	12,5	
		50	NA	3,9	9	9	
100	2	0	42,3	16,3	>60	60	24
		10	NA	13,1	35	35	
		30	NA	10,7	17	17	
		50	NA	7,3	12	12	
10000	10	0	48,2	24,2	>85	85	40
		10	NA	21,5	45	45	
		30	NA	17,0	21	21	
		50	NA	10,5	14	14	



Products and Services

HLS GSR Radars – Drone & Ground Detection

HLS GSR Radars – Drone & Ground Detection

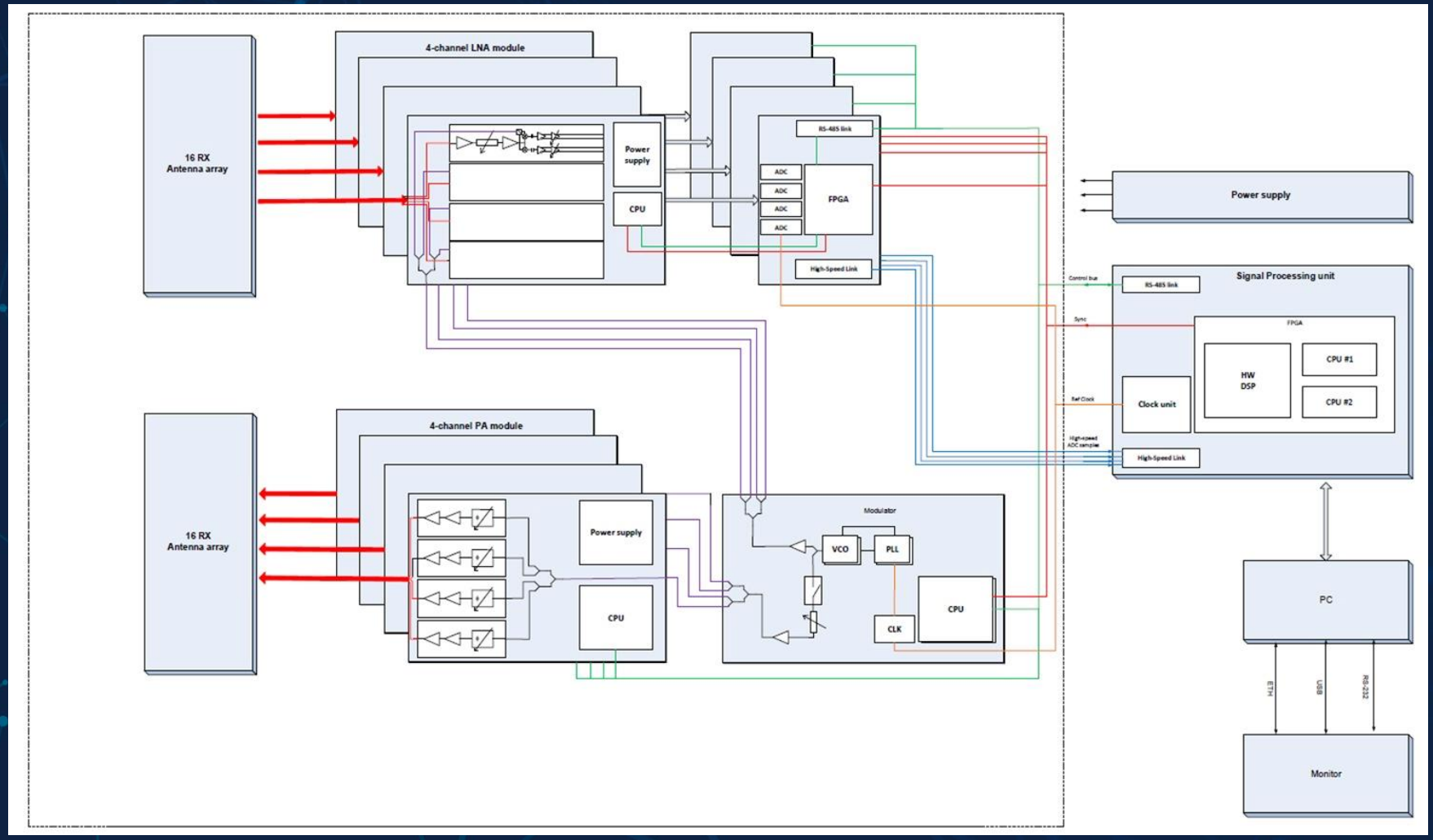
Gets Systems IHLS GSR series for Radar Systems, include:

- **HLS-GSR-4ch**
- **HLS-GSR-8ch**
- **HLS-GSR-16ch**
- **HLS-GSR-32ch**

These state-of-the-art, high performance FMCW, X band radar systems

Detection and classification of People, Vehicles, UAVs, Airborne and Seaborne targets

HLS GSR Radars – Drone & Ground Detection



HLS GSR Radars – Drone & Ground Detection

Each Radar System in the HLS GSR series can be delivered in two optional configurations:

1. **Integrated with a single axes pedestal with up to 360° azimuth coverage and 90° elevation coverage using Phased Array Beam steering.**
2. **Fixed mount, Phased Array Beam steering with 90° azimuth or elevation coverage.**

HLS GSR Radars – Drone & Ground Detection

- **Modular Antenna Design:**
  - 4ch - 32ch (The Antenna Module is added to the standardized, base Rx/Tx unit)
  - Electronic Scanning on Azimuth or Elevation
  - Receiver sensitivity: -140 dBm
  - Dynamic Range AGC: 120 dB
  - First Side Lobe: 27 dB
  - Antenna Gain: 28 dB
  - Isolation between Tx/RX:75 dB
  - Range Accuracy: 0.1 meter
  - Range Resolution:0.5 meter
  - BIT and Self test without Equipment
  - Digital Receiver with first algorithm processing on the antenna module.

HLS GSR Radar Systems Spec.

Technical parameters		HLS- 4 Ch.	HLS- 8 Ch.	HLS-16 Ch.	HLS-32 Ch.
Model		GSR HLS-4	GSR HLS-8	GSR HLS-16	GSR HLS-16
Freq. Band		X band	X band	X band	X band
Type		FMCW	FMCW	FMCW	FMCW
Detection Ranges:					
Ground Detection					
Graving Human detection	0.5 m2	5 Km	8km	15 Km	25 Km
Vehicle Detection)	2.0 m2	8 Km	18km	30 Km	50 Km
Medium Size ship-	50 m2	20Km	35km	45 Km	70Km
Air Detection					
Compact UAV	0.008 m2	1.2KM	2.34Km	4.4 Km	6 Km
Manned Hang – glider	0.01 m2	1.3 Km	2.6Km	4.87km	7 Km
Standard UAV	0.02 m2	1,57 Km	3Km	5.0 Km	7.5 Km
Power consumption (max), W		<30	<60	< 300	<600
Antenna Dimensions (max), mm		300X400	500X400	900 x 400	800X600
Weight – Kg Only antenna frame		<7	<10	< 25	<50
Temperature range, ˚C		-40 ÷ +55	-40 ÷ +55	-40 ÷ +55	-40 ÷ +55
Waterproof		IP66	IP66	IP66	IP66
Elevation Converge		90°	90°	90°	90°
Azimuth converge Scanning sector- n X 90		90-360	90-360	90-360	90-360
Min. Detection Target Velocity		0.6-120Km/Sec	0.6-120Km/Sec	0.6-120Km/Sec	0.6-120Km/Sec
Distance accuracy , m		<0.1	<0.1	<0.1	<0.1
Distance resolution, m		<0.5	<0.5	<0.5	<0.5
Elevation accuracy (max)		<1°	<1°	<1°	<1°
Resolution Doppler		0.5km/h	0.5km/h	0.5km/h	0.5km/h
MTBF		>30,000	>25,000	>20,000	>15,000
TWS		>100	>100	>100	>100

HLS GSR Radars – Coastal Solutions

Gets Systems HLS GSR Coastal Radar Systems, include:

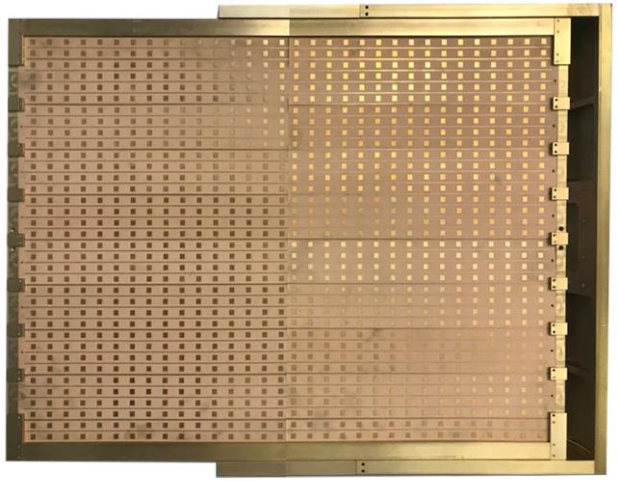
Radar Types	RCS	Detection Range
HLS -GSR-08 Coastal	(RCS= 1m2)	07.0 nm
HLS -GSR-16 Coastal	(RCS= 1m2)	12.0 nm
HLS -GSR-32 Coastal	(RCS= 1m2)	18.7 nm
HLS -GSR-64 Coastal	(RCS= 1m2)	35.0 nm
HLS -GSR-08 Coastal	(RCS= 100m2)	20.0 nm
HLS -GSR-16 Coastal	(RCS= 100m2)	37.9 nm
HLS -GSR-32 Coastal	(RCS= 100m2)	59.0 nm
HLS -GSR-64 Coastal	(RCS= 100m2)	90.0 nm

Air Defense Family Radar- Pulse (Phase Phase)

Air Defense Family Radar- Pulse (Phase Phase)

State of Art Technology - Fully digital & new concept:

- Cost effective Price
- 30-400Km detection - Medium & Long-Range Radar
- Flexible and modular Antenna Size : 128-2028 Modules.
  (based on the same Module Tx/RX L, S, C-Band).
- Full digital & new concept Electronic Scanning By Azimuth& Elevation.
- 3D solution Phase Sitcoms or 360 degree by Pedestal.
- L, S, C -Band Frequency Solution.

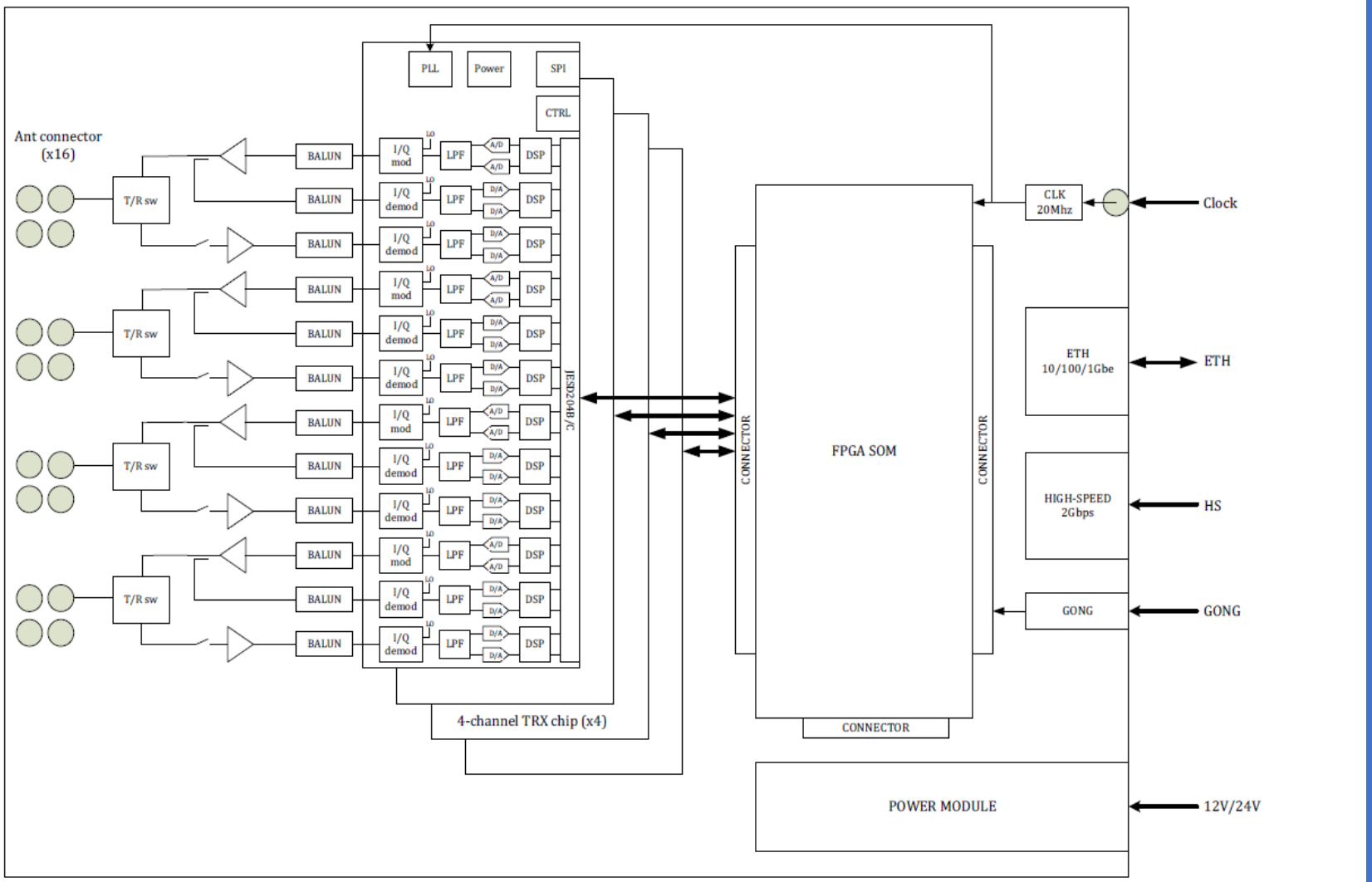


S-800S

Air Defense Family Radar- Pulse (Phase Phase)

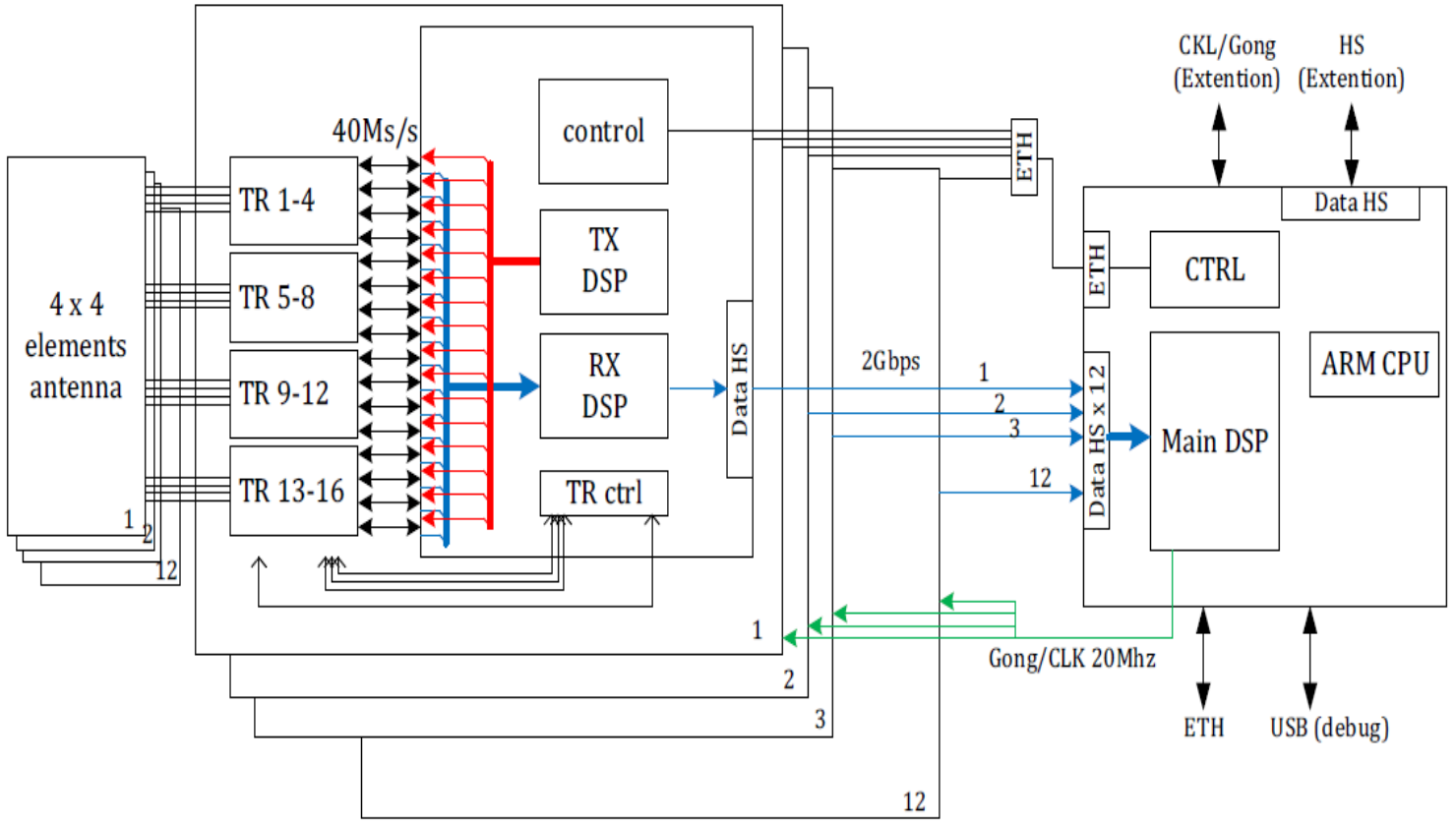
Property	Model S-800S	Model S-800A	Model S-800B	Model S-800C	Model S-800D
Instrumental range	60K	120km	200km	300Km	400Km
Num. of Channels	192	384	1400	1872	2016
Azimuth coverage	360°	360°	360°	360°	360°
Elevation coverage	60°	60°	60°	60°	60°
Combat AC, RCS $2m^2$	>40km	>60km	>120km	>180 km	>320 km
Stealth targets, RCS $0.1m^2$	>15 km	>30 km	>60 km	>80 km	>130 km
velocity resolution	1m/sec	1m/sec	1m/sec	0.5m/sec	0.5m/sec
Max detection speed	>300 m/sec	>300 m/sec	>300 m/sec	>300 m/sec	>300 m/sec
Range Resolution (m)	20	20	20	20	20
Range accuracy	<4m	<4m	<4m	<4m	<4m
Azimuth accuracy	<0.52°	<0.17°	<0.1°	<0.1°	<0.1°
Elevation accuracy	<0.69°	<0.21°	<0.12°	<0.1°	<0.1°
Range Resolution (m)	20	20	20	40	60
Azimuth Resolution	<2.6°	<2.6°	<1.75°	<1.5°	<1.05°

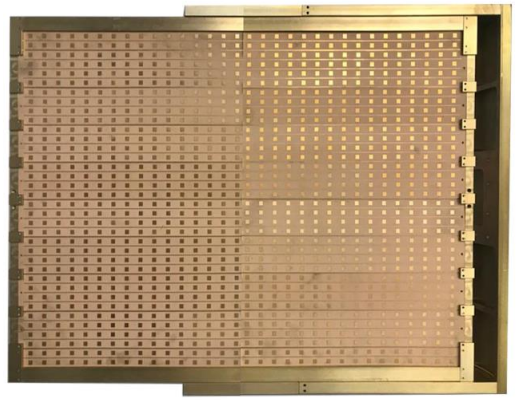
Air Defense- S-800 Block Diagram – 16Ch. based



Air Defense- S-800S Type Block Diagram

Basic 192 Ch. antenna system design

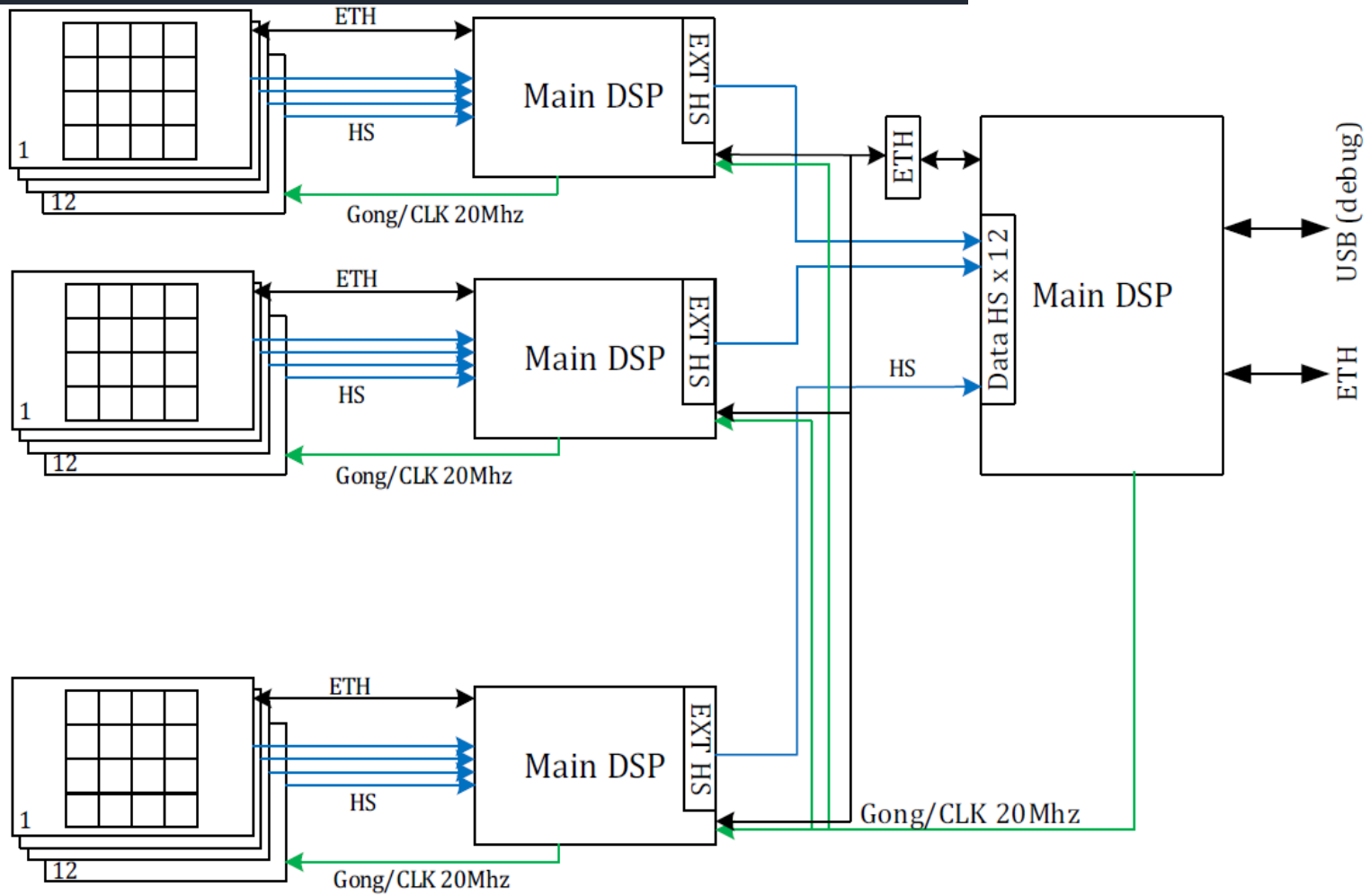




S-800S

Air Defense- S-800 Block Diagram

Full system (n x 192 Ch. antenna system design



Air Defense Family Radar- Pulse (Phase Phase)

S-800 Advantages:

- State of art Technology- Modern and updated technology.
- Multi Band Radar – 1-6 , X Ghz (only antenna change)
- Modular Radar- 30km-400Km based on 192 Ch.
- Multi mission Radar: Air defense, Weapon location, Missile location tracking .
- High MTBF- Low power Transmit (5-15W) 60Km version -125 W average.
- T/R Module- 16 Channels ,Fully digital, Phase shifter part of FPGA
- Printed Antenna – Easy to calibrated, duplicate, produce & cost effective
- Digital Signal processing- of the Shelf & standard , easy to upgrade .
- Test systems & Simulator- Proven technology ,Module & System level.
- Full Phased array:
  - 90X60(120X90),
  - 360 by mechanical TWS < 1.5 sec.
  - 4 Panels TWS < 500usec

Naval Solutions
S-500 DIGITAL AESA RADAR Family

S-500 DIGITAL AESA RADAR Family

- The S-500 digital AESA multi-function radar for the new generation naval vessels.
- The radar system delivers high quality situation picture and weapon
- Incorporating advanced technology and robust system architecture.
- The S-500 employs multi-beam and pulse Doppler techniques as-well-as cutting edge ECCM techniques to extract low RCS target.
- The S-500's Family basic TR Element digital output enables software.
- The S-500 family radars Modular and Scalable from 30-200Km

S-500 DIGITAL AESA RADAR Family

The S-500 antenna includes 4 scalable Panels of active arrays (or One Panel with pedestal)

The S-500 antenna includes 4 scalable Panel of active arrays in S/C - Band frequency.

These 4 Panels can be installed in various configurations and in different sizes:

- 4 Panels on a single mast.
- 3 Panels on a front mast and single face on aft
- 2 Panels on 2 masts.
- 1 Panel with Pedestal on Mast or other place.
- All around the vessel structure installation.

S-500 DIGITAL AESA RADAR Family

Property	Model S-500S	Model S-500A	Model S-500B
Instrumental range	60K	120km	200km
Num. of Channels	192	384	1400
Azimuth coverage	360°	360°	360°
Elevation coverage	-20°-70°	-20°-70°	-20°-70°
Combat AC, RCS 2m^2	>40km	>60km	>120km
Stealth targets, RCS 0.1m^2	>15 km	>30 km	>60 km
velocity resolution	1m/sec	1m/sec	1m/sec
Max detection speed	>300 m/sec	>300 m/sec	>300 m/sec
Range Resolution (m)	20	20	20
Range accuracy	<4m	<4m	<4m
Azimuth accuracy	<0.5°	<0.17°	<0.1°
Elevation accuracy	<0.7°	<0.2°	<0.12°
Range Resolution (m)	20	20	20
Azimuth Resolution	<2.6°	<2.6°	<1.75°

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- The S-500's Family basic TR Element digital output enables software.
- The S-500 family radars Modular and Scalable from 30-200Km

S-500 DIGITAL AESA RADAR Family

Features

- **Fast threat alert response time**
- **Very high tracking update rate and accuracy for priority targets.**
- **Short search frame/TWS revisit time**
- **Mid- course guidance of active/semi-active anti-air missiles**
- **Automatic splash detection and measurement for gunnery support**
- **Instantaneous multi-beam**
- **Scalable, modular actives Solid-state phased array**
- **High reliability and high availability**

Border/ Coastal Control Full Solution

Border/ Coastal Control Full Solution

Detection – Radars

- Coastal Radar systems
- Air detection (drone, helicopter),
- Ground (human, vehicle) detection Radar.

Detection – E/O and Camera

- Long range passive day/night Mil-Standard surveillance system/ electro-optic camera system.
- EO based surveillance drone system with associate accessories.

Data Links

- Microwave RF link for data communication
- Satellite communication
- Private or commercial LTE network

Communication

Advanced VoIP communication switch, operators can communicate:

- Radio networks command & control
- Telephone
- Intercom, conference calls
- Public announcement
- Text chat
- Video conference
- Interoperability

C²I

Command and control software providing:

- Radar picture
- Radar optics data
- CCTV video
- Alerts
- Procedures upon alerts

Logging

Multi-media logging of:

- Voice networks (radio, tel., operators)
- Video
- Operator screens
- Synchronized playback

Mass Notification

Upon event, the C²I software activates mass notification over:

- Radio networks
- Telephony numbers
- PA zones
- SMS

Multi-Site

System sites can be interconnected by:

- LAN
- WAN
- Satellite links
- Smart bandwidth management enabling data sharing between sites and main control site

Main Control Site

Data from remote sites

- Radar data
- C2 data
- Logged data (voice, video, screens)

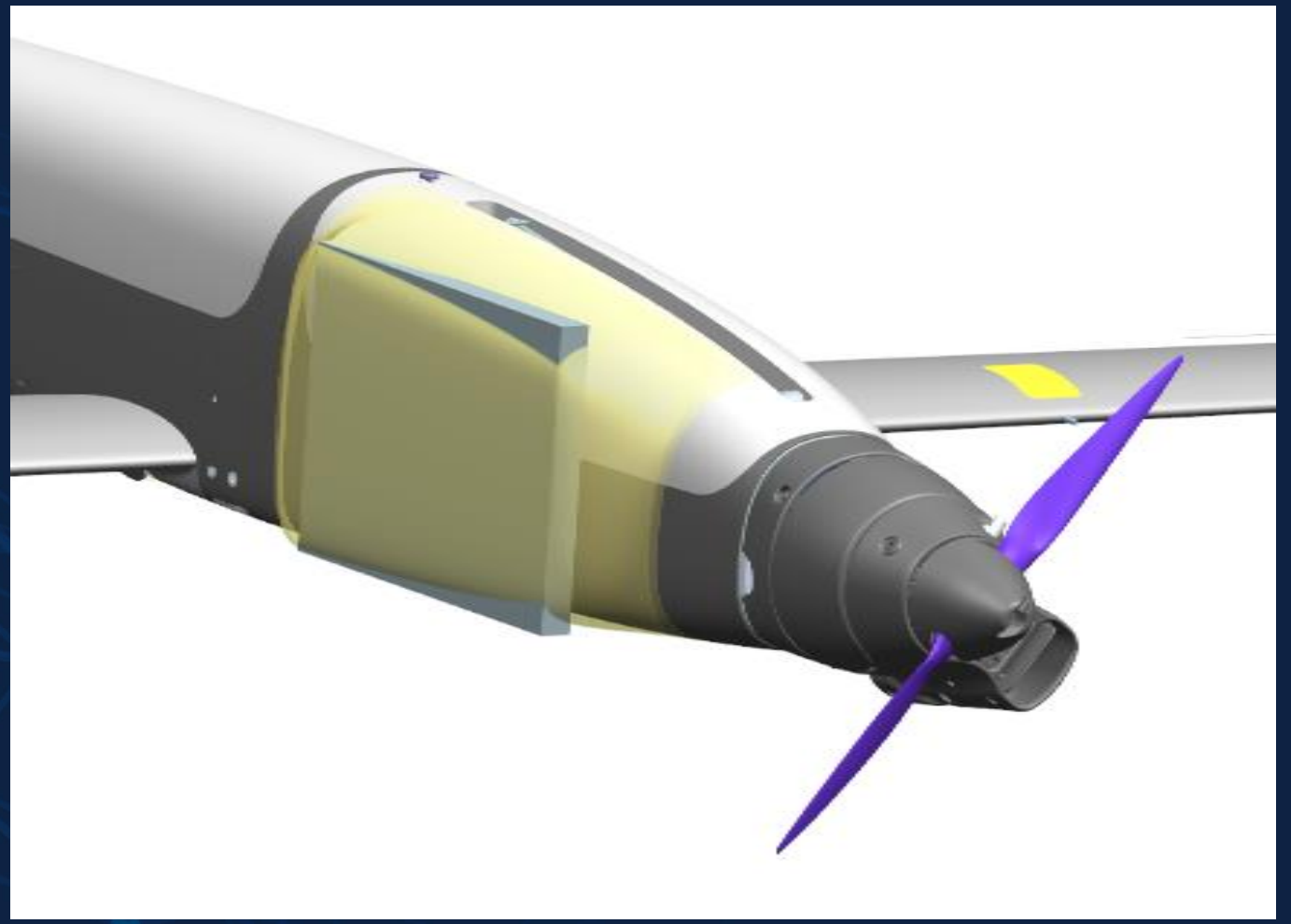
Simulation & Training

Operators simulation and training using advanced simulation and training simulator

ADDITIONAL SUB SYSTEMS

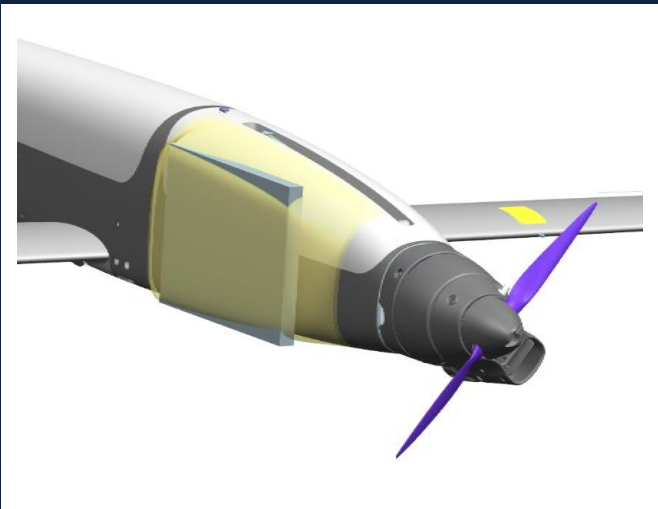
- W-AIS (Warship Automatic Identification System).
- Weather station equipment
- Radio direction finder (VHF & UHF)

Lightweight Airborne SAR Radar



Lightweight Airborne SAR Radar

Parameter	8ch.	12ch	16ch
Max Instrumental Detection range	80Km	100km	120km
Detection Range Target RCS 1000 m^2	55Km	77Km	90Km
Detection Range Target RCS 70-100 m^2	30Km	42Km	50Km
Detection Range Target RCS 10 m^2	12Km	20Km	28Km
Range Profile Resolution (m)	0.7	0.7	0.7
Weight (Kg)	7-10	10-12	12-15
Size (W, H, D,) mm	250, 400, 150	250, 550, 150	250, 700, 150
Power Dissipation (Watts)	200	250	300
Power Transmit (Watts)	8	12	16



SAR Functionality & Performance

- High Radar resolution is normally associated with large size antenna. In SAR the desired single, large antenna is substituted by a virtual or synthetic antenna composed, over a period of time, from the individual, temporal instances of a small size, physical antenna under linear motion.
- Mounted on a fast moving aircraft, a physical antenna of few feet long produces a synthetic antenna hundreds of meters long thus allowing resolution in the order of a few meters or less. Focused images are created using the vibration compensation process
- Combined with Pulse compression techniques the SAR allows similar resolution in range as well, thereby providing means for Radar based high resolution observation of ground areas .
- The reliance on Radar, as opposed to traditional optical means of observation, provides all-weather day and night capability. SAR resolution does not depend on visibility conditions

Figure 1 : SAR Image Example

SAR Radar- Modes

GMTI Mode

In GMTI mode the radar detects the ground moving targets within the planned area. Targets detections are displayed over a map as a synthetic symbol in the display of the operator.

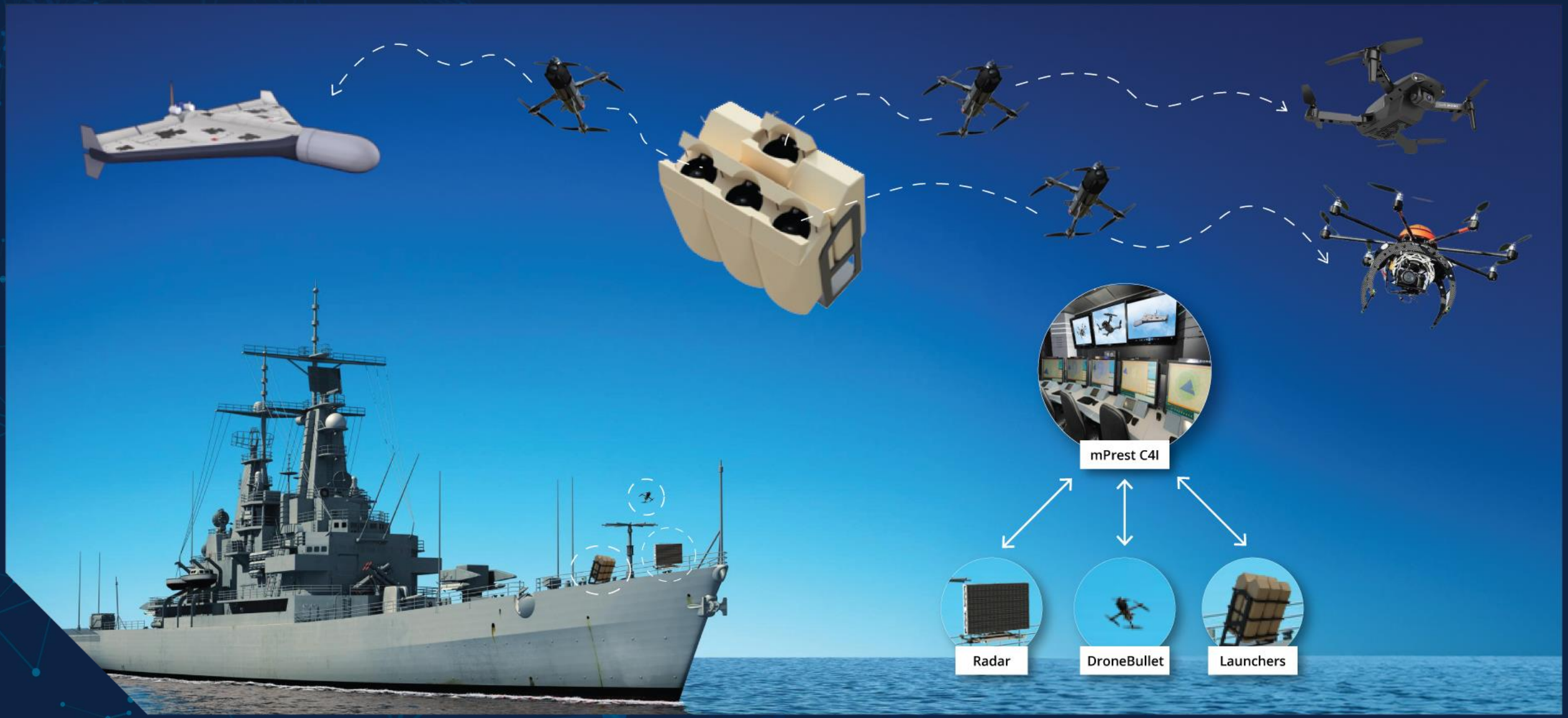
Figure 4 – GMTI Display Example SAR Sensor

Drone Guardian: Drone Detection and Neutralization System

Vehicle Solution – DroneBullet & Radar KPP

Ground Solution- DMML & HLS, Air Defense radar

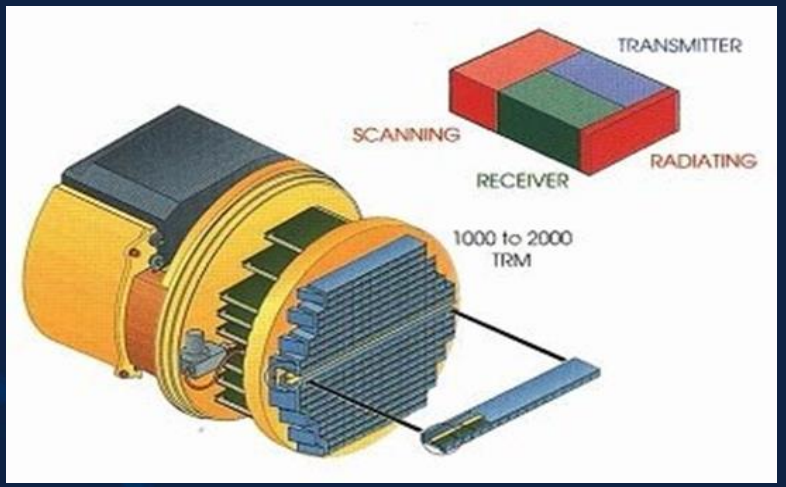
Naval Solution -DMML & HLS, Air Defense radar



Cutting Edge R&D

- ❑ AESA Lightweight Airborne Radar – X-Band
- ❑ SatCom Antenna
- ❑ SAR Radar for Drone

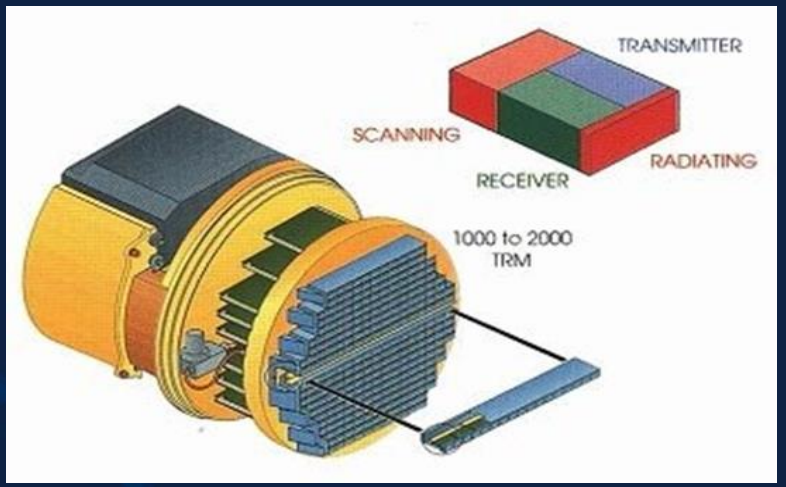
AESA Lightweight Airborne Radar – X-Band



- Full Phased Array Radar.
- AESA with high-efficiency low-consumption GaN technology
- Multiple channels fully pulse Doppler processed
- High reliability for reduced maintenance and lower through-life support costs
- Test System & simulator for Repair & long-term maintenance
- Azimuth coverage Scan: ±45°(±60°)
- Elevation Coverage Scan: ±15°(±30°)
- Pulse mode transmit with (LFM Chirp)
- Matrix T/R modules : 16X16 (20X20)

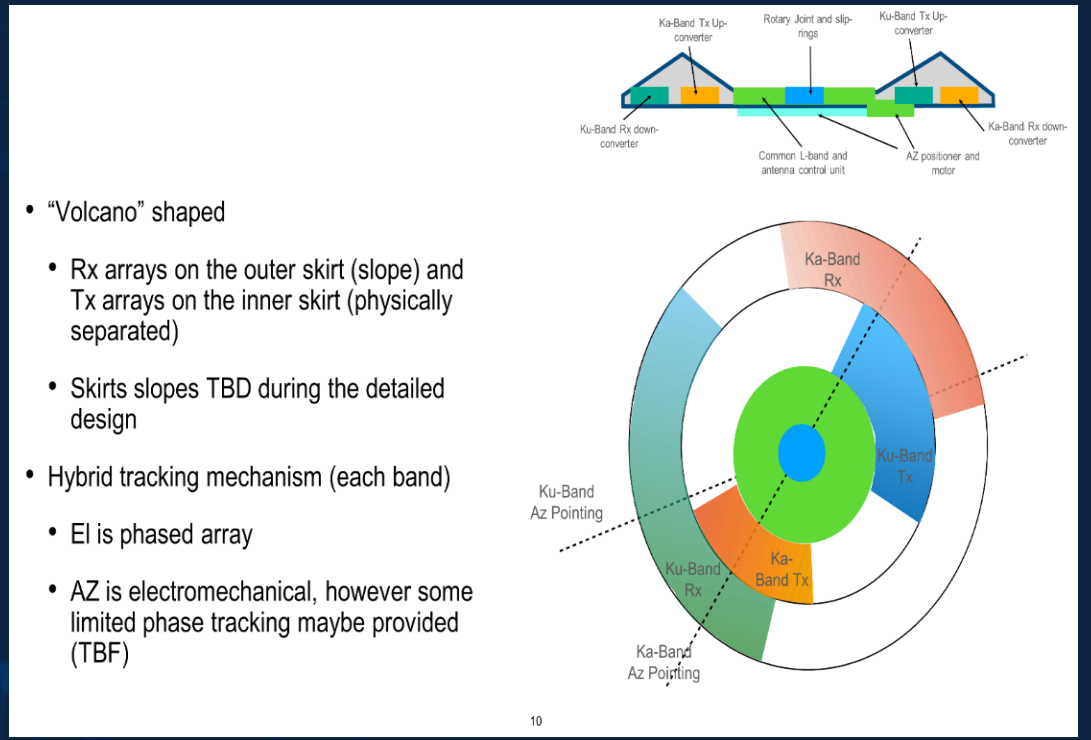
AESA Lightweight Airborne Radar – X-Band

- Pulse Power Transmit- 2.5-3 KW.
- Power Transmit each module- 8-10 Watt.
- Range detection- 60 Km.(RCS=2 m2)
- Range Resolution - 50 meter.
- Max. Speed detection-250-300 m/Sec.
- Antenna Array dimension : 40X40X40 cm.



SatCom Solution Ku-Ka antenna configuration

- ❑ Minimal height above fuselage (less than 6” including Radom as a design goal)
- ❑ Meet airborne installations standards, e.g., DO-160, Boeing and Airbus requirements
- ❑ Bi-directional Ku and Ka Bands transmit / receive
- ❑ Only one band (Ku OR Ka) is active at the same time
- ❑ Automatic satellite tracking in 3 axes: Azimuth, Elevation and polarization

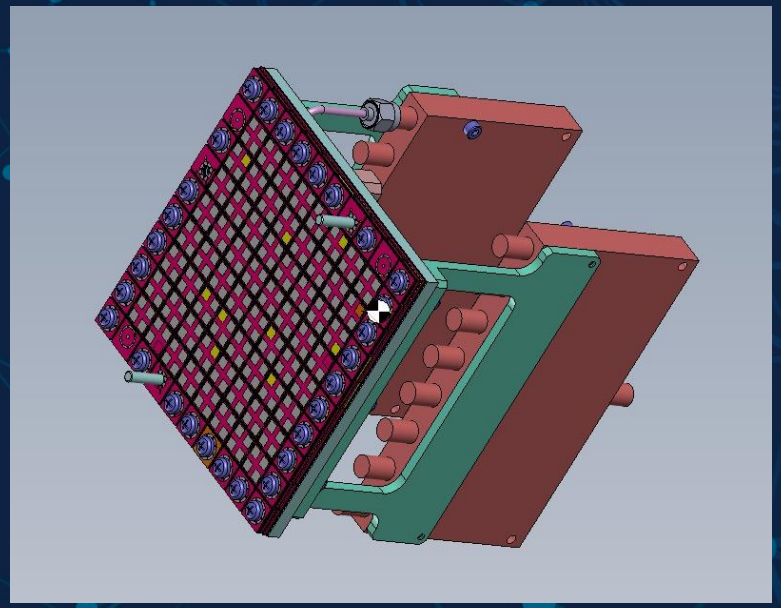


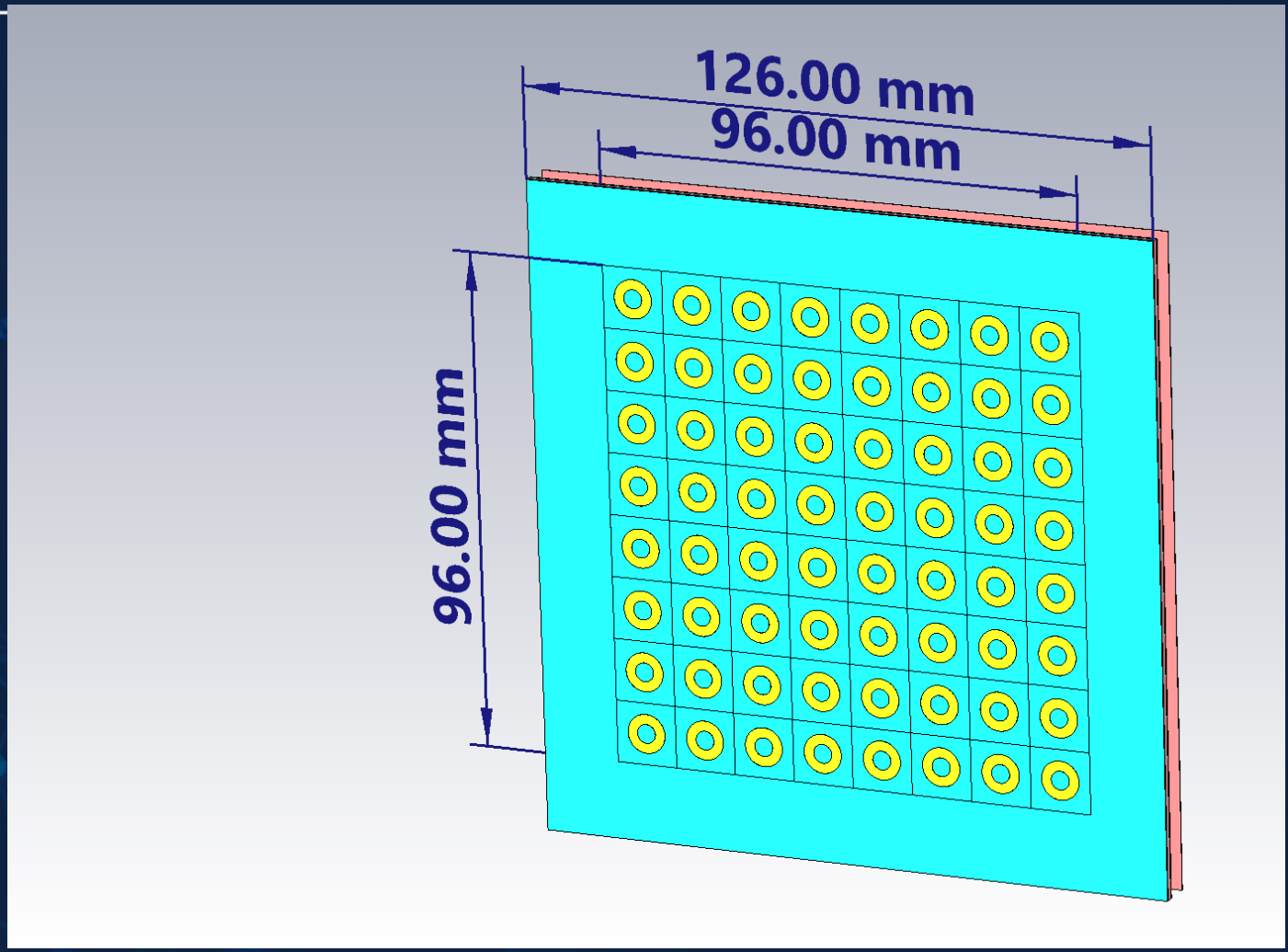
MISA (8X8) specifications highlights

- **Mechanical**
  - **Footprint 12cm diameter**
  - **Height 6cm (excluding Radom, if exists)**
  - **Weight – 2.5-3Kg**

Mechanical concept:

- The antenna array is a flat panel (96x96mm) with additional ground surrounding (126x126mm).





MISA specifications highlights

- Elevation over azimuth scanning
  - Azimuth scanning is electromechanical
  - Elevation scanning is electrical. Scanning range 0-90º.
  - Some degradation (~2dB) at high (80-90) and low (0-15) EL scanning
- Array configuration:
  - 6 rows by 6 columns (option to implement 6 rows by 10 columns)

MISA specifications highlights (Cont.)

- **Rx**
  - **RF band 12.5-12.7GHz**
  - **Occupied bandwidth 1MHz maximum**
  - **Expected G/T -7dB/K**
  - **Output to Modem -5dBm to -70dBm**
  - **Minimum SNR at modem input -3dB @1MHz BW**
  - **Expected BER (user): better than 10^{-5}**
  - **Available data rate (user) 50kBaud (maximum)**
  - **Modulation (BPSK – TBF with modem)**

MISA specifications highlights (Cont.)

- **Rx**
  - **RF band 12.5-12.7GHz**
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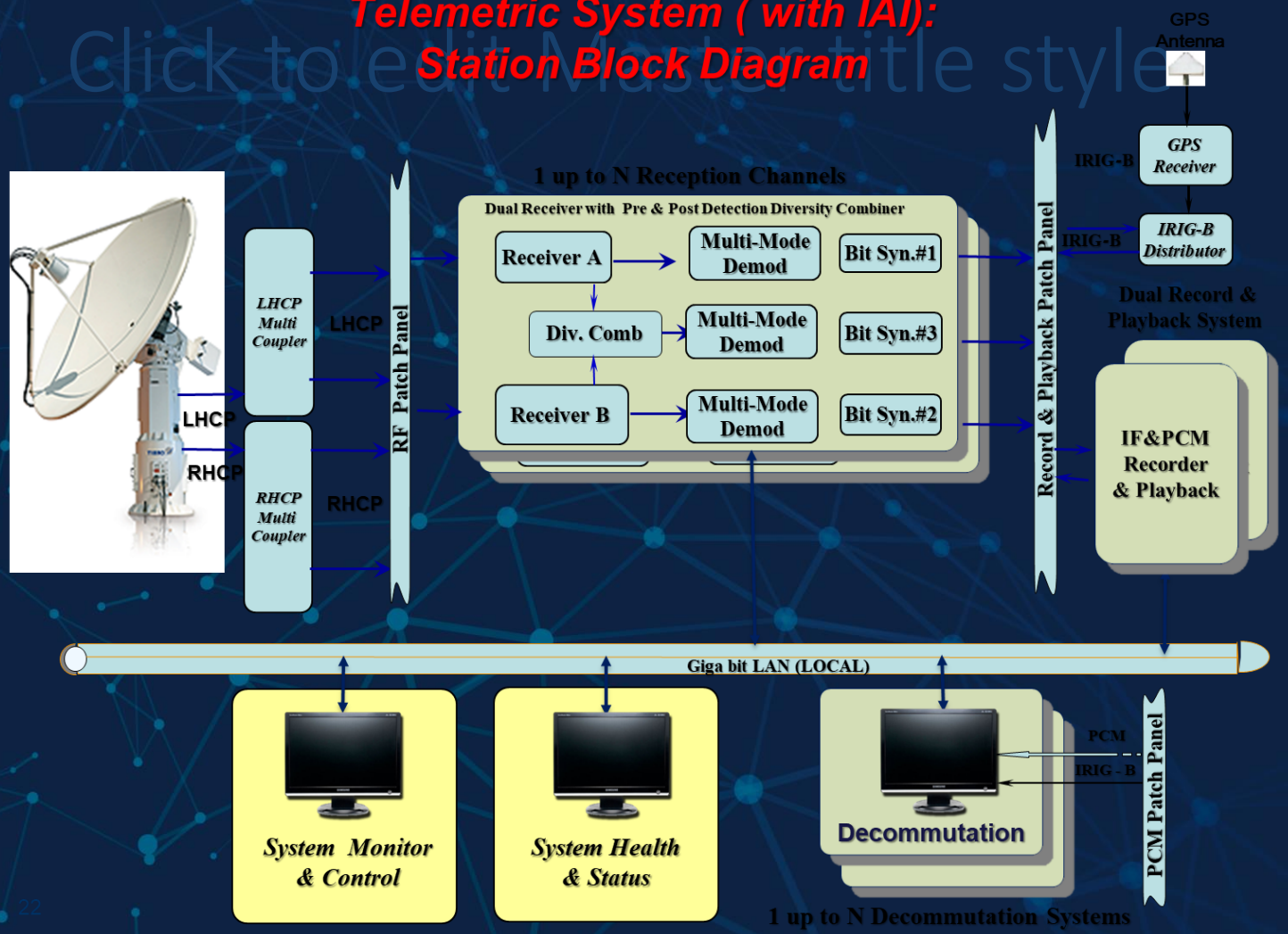
  - **Output to Modem -5dBm to -70dBm**
  - **Minimum SNR at modem input -3dB @1MHz BW**
  - **Expected BER (user): better than 10^{-5}**
  - **Available data rate (user) 50kBaud (maximum)**
  - **Modulation (BPSK – TBF with modem)**

MISA specifications highlights (Cont.)

- **Tx**
  - **RF band 14.0-14.2GHz**
  - **Occupied bandwidth 1MHz maximum**
  - **Expected EIRP 14dBW at full EL scan, 20dBW at bore-sight**
  - **Output from Modem -5dBm to -35dBm**
  - **Minimum SNR at modem input -3dB @1MHz BW**
  - **Expected BER (user): better than 10^{-5}**
  - **Available data rate (user) 50kBaud (maximum)**
  - **Modulation (BPSK – TBF with modem)**

Telemetric System (with IAI): Station Block Diagram



General Description

Ground fixed or transportable, shipborne or airborne telemetry stations and flight test centers fully integrated with first class, field proven subsystems and equipment. The overall station will be integrated with patch panels and matrixes as necessary for end to end station testing, configuration control, signal interconnection and maintanace.

Based on the application and the customer requirements the best auto-tracking antenna system to be provided with:

- Parabolic dish with auto-tracking feed
- Auto-tracking system based on phase array antenna
- Auto-tracking system based on flat antenna

Applications

Tracking a Device Under Test (DUT), reception of the telemetry data, recording and decommutation.

Main Features

1. Integrated with workstations for station operation and complete SW package for:
   - Overall station setup, monitor, command, and control
   - Reception of Slaving/Queuing data for auto-tracking antenna pointing and transmission of the system status, mode of operation and antenna auto-tracking parameters to remote center/ users
   - Data logger for overall station Local Data/Station Health monitor, display and post mission debriefing
2. Integrated with workstations and KVM switch for overall station operation, monitor and control.

Arsenal Products
IAF- Radar Test & Simulator System

- Generic H/W & S/W can be easily adopted for different Systems/Sub-Systems/Modules
- Cost effective Price:

  System level ,Module level, Chip Level Tester

  Powerful GUI for troubleshooting .

  Cost effective Price:

- Customer Agreement and cooperation's:
  - IAF- Supplied first System. Long Term Maintenance.
  - Strategic Radars Customer- for long Term Maintenance .

Thank you!

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