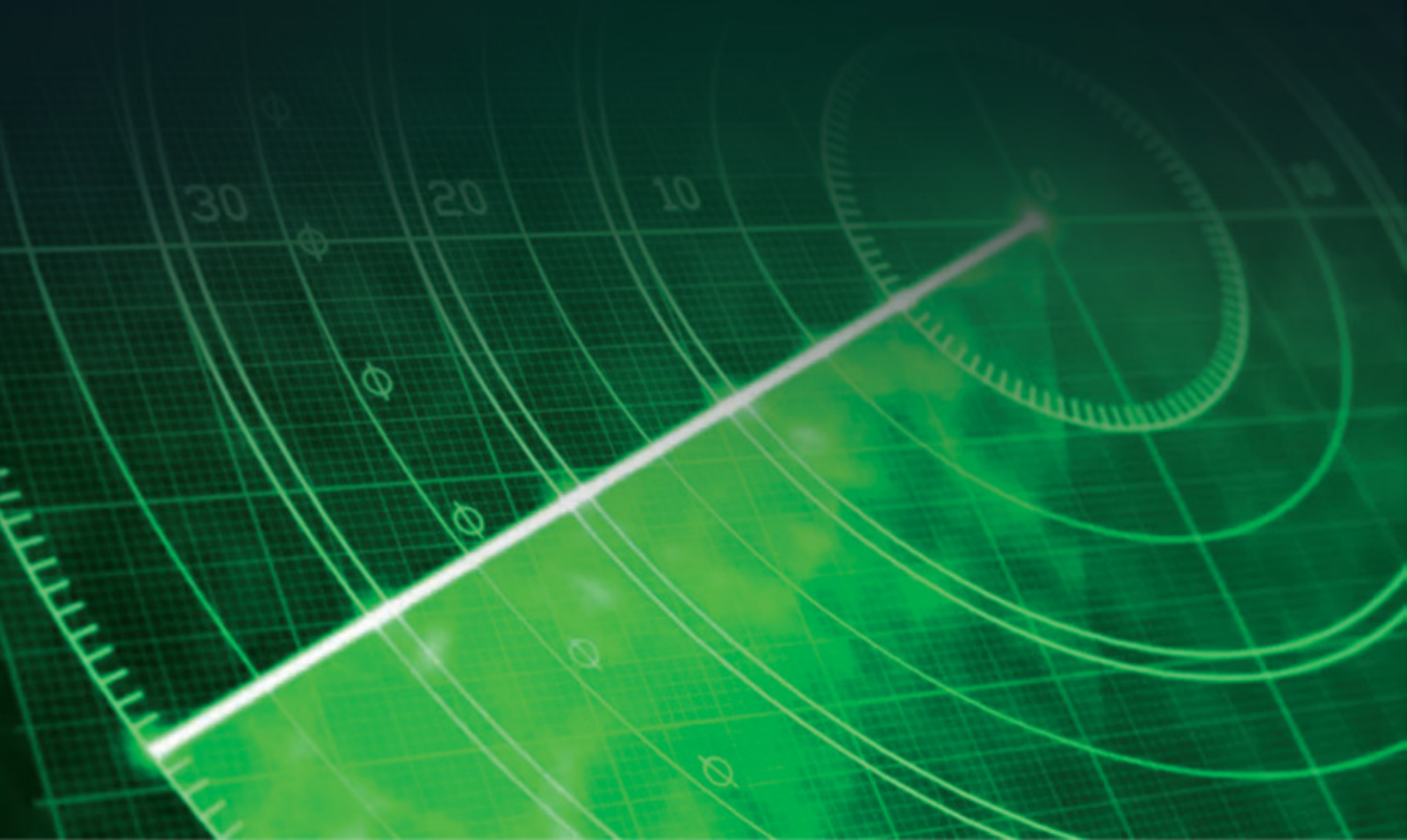
LRDE

Electronics & Radar Development Establishment



About Lab

LRDE is a premier Radar Systems laboratory with Core Competence and established expertise to build advanced Radar Systems, which include short to long-range Radars for ground based, ship borne, air borne and space-borne surveillance, tracking and weapon control. LRDE has developed many advanced Radar technologies including transmit and receive modules from L to X Band, slotted waveguide array antennas, micro-strip array antennas, multi-beam antennas, high power transmitters, high purity signal sources, high bandwidth waveform generation systems, programmable signal and data processors and Radar controllers. LRDE has nurtured and established a robust indigenous Industry ecosystem in the private sector for Radar sub-systems manufacture in the Country, thereby giving a fillip to the Atma Nirbhar Bharat initiative of the Government Of India

Products

- Active Phased Array Radars in VHF, UHF, L, S, C and X Band
- Passive Phased Array Radars
- 3D Multi beam Surveillance Radars
- Airborne Radars for helicopters / UAVs / Transport &Fighter Aircraft
- Man Portable Light Weight Radars for Homeland Security
- Light Weight Surveillance Radars for High Altitude Operations
- Imaging Radars for Airborne/ space-borne Platforms
- Ground Penetration and Through Wall Imaging Radars for Home-land Security/Counter insurgency/Anti-Terrorist operations
- Ground based Radars for Coastal Surveillance and Sea Surface Surveillance Radars on Naval Platforms and harbour operations
- Radars for Ballistic Missile Defence
- Navigation Radars for Underwater Vessels
- Radars for Long/Medium Range Surveillance
- Radars for Surface to Air Missile Systems
- Radars for Weapon Location (against Shells/Mortars/Rockets)
- Synthetic Aperture Radars (SAR)
- Passive Coherent Location Radar
- Multistatic Radar
- Drone Detection radar
- Surface Wave Over-The-Horizon Radar

Technologies

- Mechanically Scanned Antennas
- Reflector Antennas
- Horn Antennas for HPM Technologies
- Slotted Waveguide Array Antennas
- Micro-strip Array Antennas
- Multi Beam Antennas
- Electronically Scanned Antenna Arrays
- Passive Phased Arrays
- Active Phased Arrays
- Digital Active Phased Arrays
- Mechanical Engineering
- Antenna Assembly / Sub assemblies
- Pedestals
- Power Systems
- Cooling Systems
- DG Sets, UPS & Power Distribution equipment
- Antenna Power Supplies
- Exciter Receiver Modules
- Transmit / Receive modules
- Transmitters / Exciter- Receivers
- High spectral purity sources and high dynamic range multi-channel receivers
- Digital Beam Forming
- Microwave Beam Forming
- Large size Antenna frames
- Pallet Assemblies

Active Electronically Scanned Array Radar (AESAR)

AESA Radar is a multimode, solid-state active phased array fire control Radar with scalable architecture that can be adapted for various types of fighter class of aircraft. It is a fully electronically scanned agile beam Radar which uses Transmit / Receive module (TRM) technology. The Radar has state of the art features including wide band RF front end, ultra low sidelobe antenna, frequency and waveform agility, multiple SLC channels for jammer suppression, Low Probability of Intercept and Non Co-operative Target Recognition. It is capable of tracking multiple targets with high accuracy suitable for missile firing with interleaved Air to Air, Air to Ground and Air to Sea modes for all terrain operation.

- Multimode, Multifunction, Active Phased Array Radar with 4D capability
- Air to Air and Air to Sea search & tracking
- Interleaved operational capability
- High Resolution SAR for Ground mapping
- High resolution ISAR for Sea targets
- High accuracy Ground Target Tracking
- Auxiliary channels for jammer suppression
- Weather mode and Terrain Avoidance mode
- Advanced ECCM features
- Highly compact and modular design to meet size, weight and power constraints in fighter aircrafts

Hand Held Ground Penetrating Radar (HH-GPR)

GPR System is used in detection of Anti-Tank Mines, Anti-Personnel Landmines (metallic and non-metallic) and Improvised Explosive Devices (IED) in a variety of Indian soils such as Sand, Red, Laterite, Black Cotton. Hand held GPR is configured on a 1.6m collapsible wand. Handheld GPR system is extremely useful for Army and Para-military forces respectively in jungle area where very narrow path ways exist.

Vehicle Mounted GPR is mainly used for scanning and detecting buried objects on roads and tracks that are used by patrolling parties of Para-military forces and services.

- Portable unit for handheld operation
- Operable in various types of soils & terrains
- Real Time detection of buried targets
- Detection presentation through multiple modes
- Ultra wide band Technology for High resolution Low Power Signal & Data Processing
- Post Processing techniques for classification

Through Wall Imaging Radar (TWIR)

TWIR is a sensor used for detection and location of static and moving targets, especially human beings behind walls. The Radar can image in real time the scenario behind wall, identify the number of people and their location behind walls, study their activity patterns and thus help in identifying a hostage scenario behind the wall. The different types of wall include concrete, reinforced concrete, brick, cement, wood, stone etc. Imaging the scenario behind wall, tracking the path of the moving targets and presenting fine Doppler information like heart beat and breathing of a person are the important functions of this Radar.

Passive Coherent Location Radar (PCLR)

It detects and tracks targets by processing the reflections from targets due to illumination by FM broadcast emission. It uses low frequency of operation which is highly suitable for low observable target detection. The Radar is completely passive, covert, immune to Anti-Radiation Missile attack and jamming. The system works in multi-static configuration with multiple geographically separated receivers which makes it suitable for detecting emerging stealth threats.

It is a low cost, green Radar requiring low maintenance. System can be used for military as well as commercial applications

- Conduct cross boarder surveillance without alerting neighbouring nations.
- Air defence and passive surveillance for military and security operation
- Gap free inland surveillance and augment existing Radar coverage throughout the country
- Early warning system and monitoring of commercial and military traffic
- Surveillance Radar providing queue to active phased array Radar systems for LPI mode of operation
- Sensitive site protection / Event protection / Airport protection

3D Low Level Light Weight Radar (ASLESHA)

3D Low Level Light Weight Radar is a multi-beam ground based 3D Surveillance Radar for deployment in diverse terrains like plains, deserts, mountain tops and high altitude regions. This Radar detects and tracks heterogeneous air targets, including helicopters, fighters and UAVs at low and medium altitudes. This semi-distributed active aperture Radar uses advanced VLSI and high-speed digital technologies like high efficiency TRMs, DDS, digital receiver and programmable signal processor to provide 3D air space awareness with high accuracy, resolution and reliability. The Radar is engineered in multiple packages to enable easy transportability in mountainous terrain by vehicles,

group of men or as an under-¬slung carriage by a helicopter. The remote operation of the Radar through Commander Display Unit provides safety to the crew during operation. The facility also enables the Commander to deploy the Radar at a tactically favourable point.The quadripod-mounted Radar is built to operate in networked or stand-alone mode to support joint or independent operations. The Radar being compact, lightweight and modular, can be used in different roles like air space surveillance in urban areas for VVIPs and large critical installations.

- 3D surveillance for aerial targets at low and medium altitude
- Detection and tracking of fighter aircraft, helicopters, slow moving micro-light aircraft and UAVs
- Track while scan capability
- Full 3D capability using multi-beam technology
- Integrated IFF and side lobe blanking
- Extensive BIT
- Easy transportation by men, light vehicles and under-slung by helicopter
- Fast and Easy to install and decamp
- Remote operation and display through Commander Display Unit

Battle Field Surveillance Radar (BFSR-SR)

BFSR-SR is a man portable, battery operated Surveillance Radar. The Radar has been developed for deployment in the forward areas with the capabilities to detect, track and classify variety of moving ground surface targets. BFSR-SR is a reliable sensor for day and night operations in all weather conditions. The Radar can be installed in a very short time. It is easy to use with user-friendly HMI, requiring minimal training for operating personnel. The audio and visual aid helps to identify and classify a target decisively. The Radar is a potential ground based e-sensor for Border surveillance of designated areas. The Radar would be a very cost-effective perimeter surveillance sensor for law enforcement agencies for surveillance of airports, large industries and other infrastructure.

- Light weight, man-portable Pulse Doppler Radar
- Digitally coded waveforms with choice of RF channels
- Presentation of ground clutter map/geographical map in PPI format
- Ability to detect, track and classify
  - Crawling man
  - Single/group of walking men
  - Moving Light and Combat Vehicles
  - Low flying helicopters
- Audio alarm on new target detection over fenced area
- Audio Doppler through head phone/built-in speaker

2D Low Level Light Weight Radar (Bharani)

2D Low Level Light Weight Radar (2D LLLWR) is a light weight battery powered compact sensor which provides 2D surveillance in mountainous terrain against hostile aerial targets like UAVs, RPVs, helicopters and fixed wing aircraft flying at low and medium altitudes. The Radar can be transported by vehicles, animals, group of men or as helislung loads. It can be dismantled into packages to facilitate quick relocation and installation in mountainous terrain. It will act as an early warner to air defence weapon systems employed to provide protection to vulnerable areas or vulnerable points. The Radar detects and tracks short-range air-to-ground threats with a high probability of detection. The Radar has an integrated IFF that can detect, confirm, classify and attain IFF status on every target in the battle space under surveillance. The Radar has an integral GPS and it supports display tracks over tactical map overlay. The Radar with modular architecture, ruggedness as per Mil standards can be operated in varied conditions including extreme climatic and geographical conditions and in battlefield situations.

- 2D Surveillance of aerial targets flying at low and medium altitudes
- Target designation and distribution to Weapon Sites and Command Centre
- Track while scan capability
- Solid state transmitter
- Easy transportation by men, animals and under-slung by helicopter
- Distribution of target updates to weapon system/command post at regular interval using target designation unit(TDU)
- Modular for quick setup
- Remote operation and Radar display through the Commander Display Unit

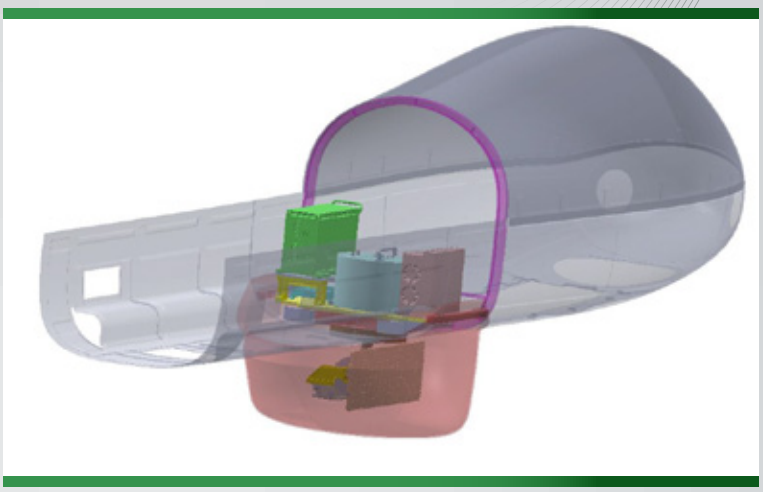
Coastal Surveillance Radar (CSR)

Coastal Surveillance Radar (CSR) is a part of the Integrated Coastal Surveillance System (ICSS) which comprises of chain of ground based microwave Radar, EO sensor, Electronic Support Measures (ESM) and optical sensors. All these sensors are integrated through a fusion centre to produce the best estimate of the position, velocity, classification and identification of all maritime traffic in the area of interest. Coastal Surveillance Radar (CSR) is a dual band Radar designed and capable of detecting small boats at sea that are likely to be a security threat, by providing 24x7 surveillance.

- Dual Frequency band operation
- Frequency and time diversity
- Wide band Pulse compression
- Sea clutter mitigation & detection of small boats/ dinghies at sea
- Can be installed on tower or high raised platform
- Operated remotely or locally
- Operation : 24 x7 in all weather conditions

SWaP Optimized SAR

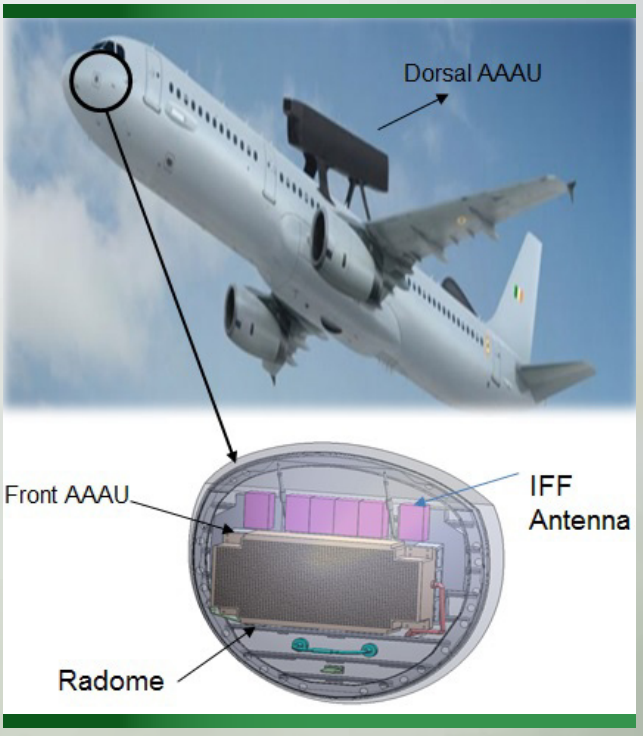
Synthetic Aperture Radar (SAR) is an all-weather, day/night capability imaging sensor which can provide ground imagery for both peace time information gathering and usage during conflict. It is capable of generating ground images of varying resolution at a maximum slant range of 60 Km. This radar operates in two imaging modes viz., Strip Map and Spotlight and also has GMTI capability.



Primary Radar for AEW&C Mk-II

The Primary Radar is the main sensor of the AEW&C Mk-II System which provides early warning capability and all-weather surveillance capability. This system is an enhanced version of 'NETRA' with improved range performance.

The Primary Radar system is a long range, multi-function, solid state, active phased array radar for surveillance, detection and tracking of airborne and sea surface targets. The Primary Radar consists of two radars, operating in two different frequency bands, giving a total coverage of 300 deg in azimuth.



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DRDO Complex, Dr APJ Abdul Kalam Rd, Viswa Vihar, C V Raman Nagar,
Bengaluru, Karnataka 560093