



Defence Electronics Application Laboratory (DEAL)



About Lab

DEAL is a major "Systems Laboratory" of DRDO engaged in pursuing technologies in front-line areas of Defence Communication and Surveillance.

It is working in the area of Satcom ground segment, Software Defined Radio Systems, Data links, VLF and Troposcatter Communication Systems.

DEAL is engaged in the development of Communication and Surveillance Systems right from Very Low Frequency (VLF) to Extremely High Frequency upto 94 GHz.

In this wide frequency spectrum, during its journey in the past 50 years, many products have been inducted in services like Troposcatter Communication System, Transportable Satcom Terminals, VLF Receivers, Combat Net Radio, Software Defined Radio, Briefcase & Manpack S-Band Terminals and Data Link for UAVs & AEW&CS.

DEAL also has a facility for reception, processing and dissemination of high resolution satellite imagery. Project development activities are ably supported by facilities like Technical Information Center, CAD, Precision Workshop, MIC Lab, EMI/EMC Lab, Antenna Test Range, Environmental Test Facility and Reliability & Quality Assurance.

Core strength

- ▶ Software Defined Radios.
- ▶ LOS and BLOS (Satcom) Data Links for UAVs, AEW&CS & other airborne platforms.
- ▶ Satellite Communication & Network Management Systems.
- ▶ VLF Communication systems.
- ▶ Troposcatter Communication Systems.

Focus area

- ▶ Software Defined Radios
- ▶ Satellite Based Systems & Surveillance
- ▶ Data Links
- ▶ Troposcatter/ VLF Communication

Recent Products/Technology Achievements

DEAL is working on Futuristic Communication and Surveillance Systems like Software Defined Radios, Satellite Phones / Miniaturized Satcom Terminals for satellites, Data Links for AEW&CS, UAVs & other airborne platforms, Static and Mobile Troposcatter Communication systems. Some of our products/ technology achievements are

Power Amplifier at L-band and UHF –band frequencies.

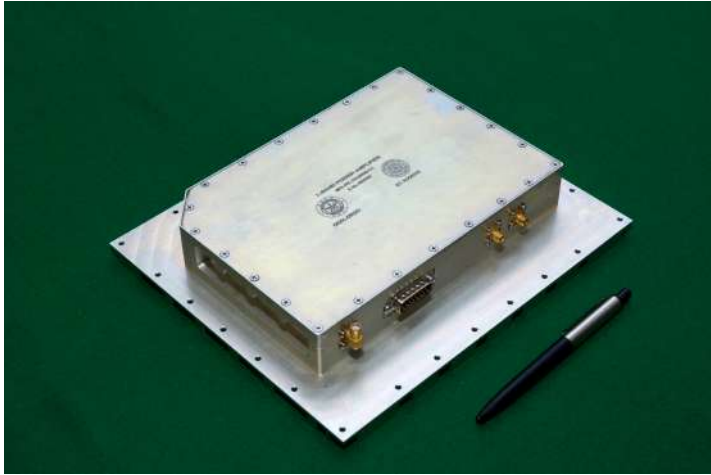
New generation of Software Defined Radios employ advanced waveforms which require backing-off the power amplifiers from its peak capacity.

This limits the efficiency of the PA and poses thermal challenges in design, when packaged in a small volume.

To meet these requirements, DEAL has developed UHF & L-band High Efficiency Power Amplifiers in collaboration with IIT, Roorkee.

Based on 50V GaN devices, these amplifiers are optimized for high efficiency in both back-off and saturation conditions, while simultaneously providing the required IMD suppression and harmonics.

Capable of operating over a wide temperature range of -40 to +71 C, the amplifiers can be adapted for Airborne as well as ground based SDRs. The amplifiers incorporate built in DC-DC converters for MIL-STD-704D compliance.



Software Defined Radio- Manpack(SDR-MP)

V/UHF Manpack SDR is a multi-mode, multi-rate software defined radio in the V/UHF bands. It is a small size man portable radio transceiver unit, specifically designed for ground to ground communication requirements. It consists of modular and re-configurable components of both hardware and software. It has SCA based Operating Environment, hopping / fixed frequency / point-to-point / networking / wideband / narrowband featured waveforms and Human Machine Interface (HMI) for platform / waveform configuration & management.



Software Defined Radio- Handheld (SDR-HH)



SDR-Handheld (SDR-HH) is a compact single channel UHF band SDR for marine commandos for secure speech applications. It provides a higher degree of flexibility to support Interoperability for Mission Requirements.

Advanced Quad Diversity Modem

The Advanced Quad Diversity Modem provides high speed data with Gbps Ethernet IP connectivity. The Modem waveforms incorporate advanced technologies like OFDM, SCFDE, LDPC and Maximum Ratio Combining (MRC) to provide reliable network connectivity between command & tactical levels with data rate up to 21 Mbps in LOS & BLOS modes extendable to 100 Mbps.

It has been designed to combat Long/short term fading behavior of Channel. The Modem hardware has compact form factor & enables porting software based waveforms as per mission needs.



Data Links for TAPAS UAV

The Data Link System is significant part of TAPAS (Rustom-II) MALE UAV which provides full-duplex communication between UAV & Ground Control Station. LOS communication is provided via C-band datalink whereas beyond LOS communication is catered through Ku-band SATCOM link.

The Secure & anti-jam Uplink carries aircraft command & voice information whereas the secure downlink comprises multi-sensor Hi-resolution payload data, multiplexed telemetry and voice.

The Ship-borne Data Terminal provides maritime surveillance and the Remote Video Terminal assists forward soldiers with accurate situational awareness and quick battlefield assessment.

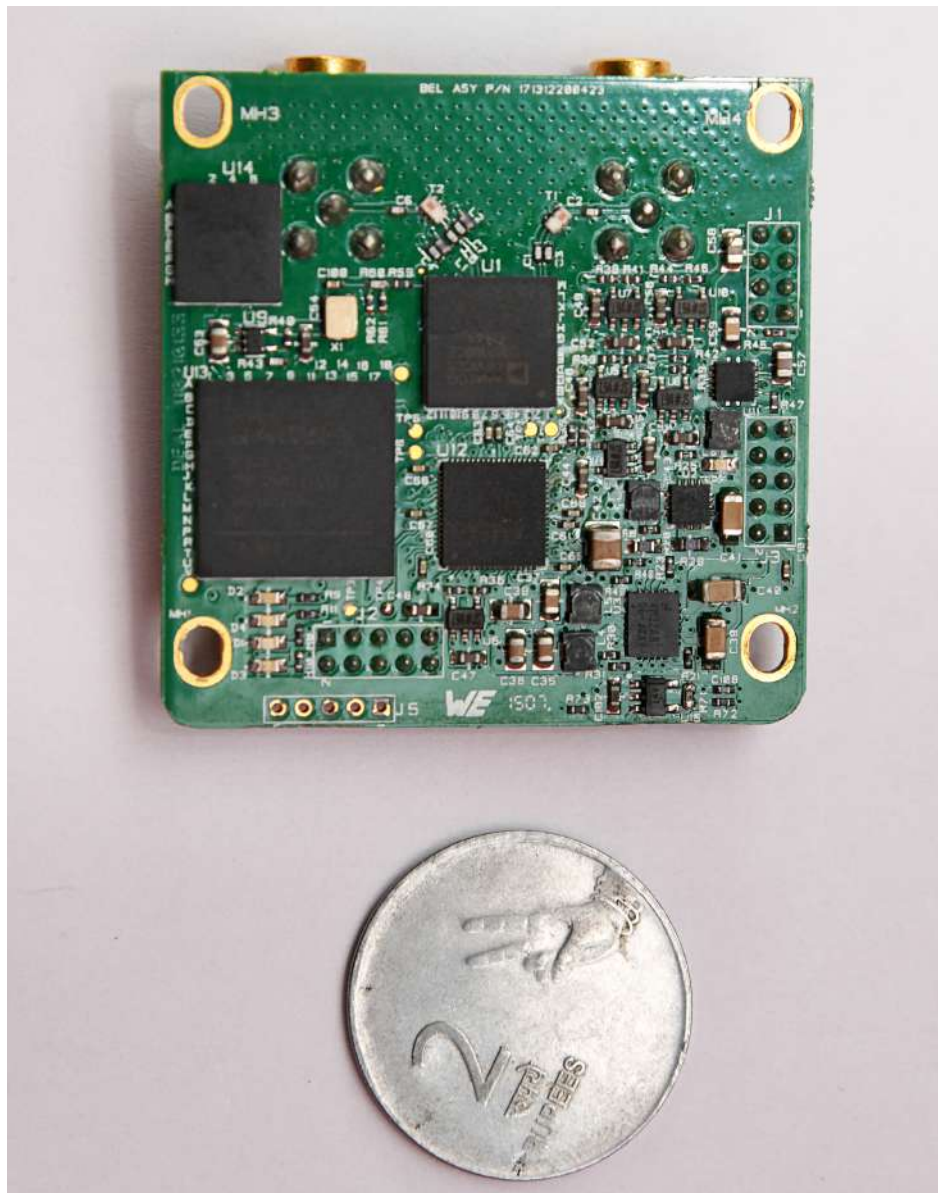


Satcom terminals For GSAT-6

S Band RF Modem

S band RF Modem is a single PCB solution based on SDR approach for complete RF transceiver and baseband signal processing with ultra-low power modem controller. This Board implements state of the art Direct RF conversion architecture enabling realization of low power and compact integrated S Band transceiver & programmable Modem hardware.

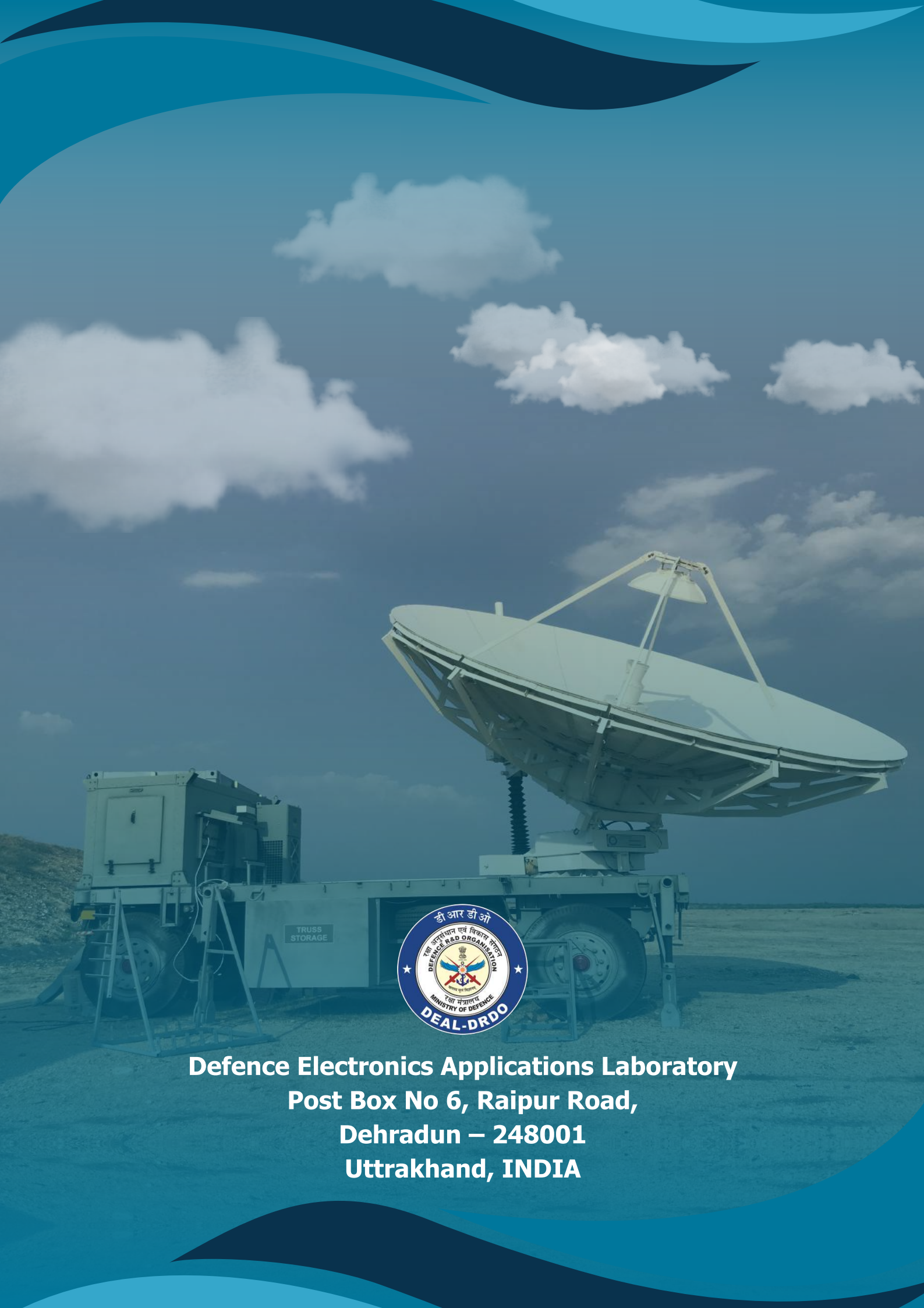
It is compact in size of 50*45 mm and operates with 3.7V supply with power consumption of less than a Watt. This board is ideal for low power SATCOM applications operating in full duplex mode



Handheld Satcom Terminal (HST)

DEAL has developed Handheld Satcom Terminal (HST) for Indian Satellite i.e. GSAT-6. HST is the first Indian rugged satellite phone with built in security for both signalling and traffic. It has built-in navigation support and can be monitored at Hub. This battery operated terminal provides secure voice/data services anywhere within satellite footprint, making it suitable for all strategic and tactical applications.





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