



DRDO

Products for Export

2025





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Products for Export

2025



Defence Research & Development Organisation
Ministry of Defence, Government of India
www.drdo.gov.in
2025



राजनाथ सिंह
RAJNATH SINGH



रक्षा मंत्री
भारत
DEFENCE MINISTER
INDIA



MESSAGE

The Indian Defence industry has substantially increased its capabilities under the 'Aatmanirbhar Bharat' guided vision of the Hon'ble Prime Minister Shri Narendra Modi. India is now manufacturing world-class and cost effective weapons, equipment and platforms which are being internationally recognised. Our defence products are not only exceptional and reliable, but also relatively economical.

The Indian defence ecosystem is emerging strongly with improved synergy between the Government and defence manufacturing industrial base, with several policies announced and implemented by the government to support industry. With aspirations to reach Rs. 3 Lakh Crore in defence production by 2029, India is solidifying its position as a global manufacturing hub for defence. India's defence exports have reached an all-time high, to Rs. 21,083 Crore in FY 2023-24, reflecting a remarkable increase of over 30 times in export value over the past decade.

I congratulate DRDO for releasing the next version of the compendium on "DRDO Products for Export", which provides a comprehensive list of DRDO technology based, state-of-the-art products with export potential. This compendium will further assist in enhancing the export capabilities of Indian industries in defence systems and realising the 'Make for the World' vision of our Hon'ble Prime Minister.

Jai Hind!

Place: New Delhi
Date: 24th January, 2025


(Rajnath Singh)

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MESSAGE

To foster defence manufacturing ecosystem in the India, the Government has taken several policy initiatives in the past few years and brought in reforms to encourage indigenous design, development and manufacturing of defence equipment, thereby promoting self-reliance in defence manufacturing and technology in the country.

The measures taken by Government are aimed at increasing ease of doing business to boost defence exports and to achieve the target of Rs 50000 Crore from defence exports by 2029. Due to these reforms India is today exporting to over 100 countries, with the top three destinations for defence exports being the USA, France and Armenia.

Of late, there has been a growing interest in different parts of the world in the products and technologies developed by DRDO, as seen at various expositions in and outside the country. Many of the DRDO developed products have already been exported.

I congratulate the DRDO for taking this initiative of collating the information on 'DRDO Products for Export'. In the long run, this will promote confidence in DRDO developed equipment and systems, resulting in higher self-reliance in defence systems and creating opportunities for Indian industries for export of indigenously developed product and systems to friendly foreign countries.

(Sanjay Seth)

Date: 30 Jan, 2025



डॉ. समिर वी. कामत
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सत्यमेव जयते

भारत सरकार
Government of India



MESSAGE

सचिव, रक्षा अनुसंधान तथा विकास विभाग
एवं
अध्यक्ष, डीआरडीओ
Secretary, Department of Defence R&D
&
Chairman, DRDO

1. DRDO develops critical defence technologies and products to meet the requirement of the Indian Armed Forces. The products developed by DRDO are world-class and have immense export potential.
2. The present pro-export ecosystem has created an environment for Indian industries to venture out and establish brand India globally. DRDO is extending all support required by the industries to become the exporters of indigenous defence products, and many of the DRDO developed products have already been exported to friendly foreign countries.
3. This compendium on "DRDO Products for Export" provides the necessary and handy information on Defence Products ready for export. It will allow interested industries and relevant agencies to initiate dialogue for exports with interested friendly foreign countries, and vice-versa. The compendium is also hosted on DRDO website for benefit of industries at large.
4. I congratulate all DRDO personnel for their efforts in preparing the Compendium of "DRDO Products for Exports" to pave the way for enhanced defence exports by India.

Samat

(Dr. Samir V. Kamat)

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DEFENCE RESEARCH & DEVELOPMENT ORGANISATION



MESSAGE

DRDO is the technological arm of Ministry of Defence and spearheads Defence Research & Development in India. DRDO has developed technologies across the entire spectrum of defence over the past almost seven decades. As on date DRDO, in partnership with Indian industries, has delivered numerous high-end products to Indian Armed Forces.

To bring economics of scale in production, the industries need to market their products to both domestic and international customers. At the same time, in order to remain competitive, the Indian Industry is striving hard to meet the highest and most stringent production quality standards, while offering products at competitive prices.

The increasing production capability and standards of the Indian Industries makes them ready to produce systems, platforms and equipment for export. Many friendly foreign countries have evinced an interest in procuring DRDO developed systems. Defence exports from India would help them in strengthening their defence forces and homeland security while establishing and nurturing long-term relationships with India.

I congratulate all DRDO personnel for their efforts in compiling the compendium of 'DRDO Products for Export' which is a step forward in the process of initiating larger defence exports by India.

Chandrika Kaushik

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MESSAGE



DRDO, founded in 1958, is mandated with the design and development of defence systems ranging from Aeronautics, Missiles, Electronics Warfare, Communications, Armament, Naval Systems, Materials and vital Soldier Support Systems for armed forces. Being the leader in indigenous defence technology development meeting international standards, various DRDO developed systems produced by the Indian Industry have been inducted into the Indian Armed Forces.

DRDO has developed systems with complex technologies, configured and adapted to the Indian scenario. DRDO is capable of customising these systems to address varied requirements in interface, interoperability and Services requirements as required by users. The design and development of varied systems leading to their induction gives an edge in any specific modification and possibility of interface with a system-of-systems.

The compendium on 'DRDO Products for Export', both in print and on-line, will give greater visibility of these products to interested friendly foreign countries.

अरुण चौधरी



About DRDO

DRDO (Defence Research & Development Organisation) is the R&D Organisation of Ministry of Defence, Government of India, with a network of more than 40 laboratories, centres and establishments which are deeply engaged in developing defence technologies, aimed at achieving the government's aim of an *Aatmanirbhar Bharat*.

Charged with the mandate of empowering Indian Armed Forces with defence technologies suitable to the current and future battlefield milieu, and a mission to achieve self-reliance in defence technologies and systems, DRDO is rigorously involved in the development of state-of-the-art weapon systems in accordance with requirements of Armed Forces.

Formed in 1958 with 10 establishments/ laboratories and, DRDO has progressively evolved over the past almost seven decades in terms of technological disciplines and laboratories. Currently, the Human Capital of DRDO, with approximately 25,000 Staff members, including 7,500 scientists belonging to the Defence Research & Development Service (DRDS), is involved in the specialized technology domains of Aeronautics, Armament, Combat Vehicles, Naval Systems, Missiles, Soldier Support Systems, Electronics and Information Systems, Engineering Systems, Instrumentation, Advanced Computing & Simulation and Special Materials. They are responsible for design and development of state-of-the-art weapons and systems, enhancing operational and combat effectiveness of the Services.

DRDO has taken an important step of harnessing youth for the purpose of achieving self-reliance in niche advanced technologies by forming Young Scientists Laboratories (DYSL) to commence focused research. Selected young scientists of DRDO have been given this opportunity to work in identified research areas of Artificial intelligence, Quantum technologies, Cognitive technologies, Asymmetric technologies and Smart materials.

Indian Industry, in its role as a Development Partner or a Production Agency, is a valuable contributor to the DRDO mission. Industries, including Public Sector Undertakings, private industries, Micro, Small and Medium Enterprises (MSMEs) and Start-ups, render an invaluable role in the productionisation and supply of DRDO developed systems through the Transfer of Technology process. These include technologies developed by DRDO that have potential for application in commercial markets for civilian use also.

More than 2000 Industry partners work with DRDO for the production and delivery of platforms, systems, subsystems, components and technologies for Indian Armed Forces. They have placed India on the global manufacturing map by exporting DRDO developed systems and sub-systems to friendly countries.

DRDO has adopted a two-pronged approach to address this requirement of export by Indian industry. In addition to supporting industry for meeting the requirements as per RFPs of friendly foreign nations, DRDO also carries out customization of products to meet the exacting requirement of customer countries. The "DRDO SoP for Export of Military Equipment", which is in line with the MoD SoP for exports, facilitates Indian industry to respond to RFI and empowers DRDO labs to provide essential technical support to industry, even before necessary approval from MoD is obtained by the industry.

This compendium brings out the DRDO developed, well proven systems/products that have been extensively trial evaluated, with many already inducted into the Indian Armed Forces. These products have immense export potential and many of them have already been exported to friendly countries.

Directorate of Industry Interface and Technology Management (DIITM), at HQ DRDO may be approached with queries and interests related to exports at the following address:-

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AERONAUTICAL SYSTEMS





Light Combat Aircraft

The LCA is configured with a single engine, compound delta wing, relaxed static stability and advanced digital fly-by-wire control system, which makes it an agile war machine. The aircraft has an advanced avionics suite, Unified Electronics Warfare Suite, Self Protection Jammer for enhanced survivability, On-board-Oxygen Generation System and an expanded weapon suite. It is capable of hot-refuelling to reduce turn around time, doubling the sortie rate and mid-air refuelling to enhance operational range.

Salient Feature/ Specifications:

- 2-seater aircraft
- Speed : Supersonic
- Service Ceiling : 50,000 ft
- Dimensions : Span (8.20 m), Length (13.20 m), Height (4.40 m)
- Powerplant : GE-F404-IN20
- Air-to-Air Refuelling
- Beyond Visual Range Combat Capability
- Multi-Mode Radar



Airborne Early Warning and Control System



Air Borne Early Warning & Control (AEW&C) System, integrated on Embraer ERJ145 aircraft, can search, detect, track, identify, integrate sensor data, communicate Air Situation Picture (ASP) to networked fighters and ground stations, execute net-centric operations through secure data-links in the surveillance area and function as a Command & Control (C2) Centre. AEW&C aircraft has radar and sensors for long range detection and identification, multiple data-links to share ASP with fighters and with ground stations through Ground Exploitation Stations (GES).

Onboard Electronic Support Measures (ESM) and Communication Support Measures (CSM) help intercept, identify and classify radar transmissions and communication signals. The AEW&C aircraft is equipped with five operator work stations to enable C2 in the area of operation. The AEW&C aircraft has a self-protection

suite consisting of Radar Warning Receiver (RWR), Missile Approach Warning System (MAWS), Counter Measure Dispensing System (CMDS) and Battle Management Functions like threat evaluation, weapon assignment, intercept control & guidance.

Salient Features/ Specifications:

- Mission crew: 5 on station and 5 resting crew
- Cruise speed: 550 knots / 0.75 Mach
- Operating altitude: 30,000 ft
- Service ceiling: 35,000 ft

Mission System Performance:

Radar

Parameter	Specifications
Range	200 km for 2 m ² target; 300 km for 2 m ² target in extended mode
Azimuth coverage	240°
Sector scan	
No of search targets	500
No of track targets	Simultaneous search & track
Type of IFF	Mk-XII S
Mission Planning, restitution and debrief system	

CSM

- Frequency coverage: 20-1000 MHz
- COMINT recording & replay capability

ESM

- Frequency coverage and Scan rate: 0.5–40GHz & 8 GHz/ Sec
 - Emitter identification capability: > 500
 - Emitter localization capability
 - Inter & Intra pulse analysis capability
 - Mission planning, restitution & debrief system
-
- Emitter identification capability
 - Emitter localization capability
 - Mission planning, restitution & debrief system

Unmanned Aerial System (UAS)

UAS is a highly reliable UAV with fail-safe architecture employing redundant hi-reliability subsystems to meet the requirements of Intelligence, Surveillance, Target Acquisition and Tracking, Reconnaissance (ISTAR) missions. The maximum payload capacity is 350 kg with maximum operating altitude is 25,000 ft and has an operating range of 250 km with Line of Sight & more than 1000 km with SATCOM links and endurance of more than 20 hours.

Equipped with LREO payload, the IUAS can recognize targets at ranges more than 40km with daylight and infrared full HD video at ground station. The SAR is capable of sub-meter resolution ground imaging and detects ground moving targets in all weather conditions. It is also equipped with ELINT payload and a COMINT payload, capable of detecting, direction finding, location fixing of RF emitters, geo-locating radio communication nets as well as listening in to active conversations.

Situational awareness payloads such as TCAS (Traffic Collision Avoidance System) & Identification Friend or Foe (IFF) system enable it to operate in contested civil airspace under ATC surveillance along with an UCR (UAV Communication Repeater) that provides support to ground troops by relaying tactical communication for operations in difficult terrains as well as ATC voice communications with high capacity storage for recording full UAV telemetry and intelligence data and live streaming of intelligence to User in real-time.

SALIENT FEATURES:

- SBAS System (GAGAN) integrated for accurate navigation and ATOL system enabling automatic landing in any pre-defined runways with night flying capability.
- Real time Simulator to provide comprehensive training platform for the UAV crew: EP, IP and Payload Observer.
- Encrypted, anti-jam & anti-spoof proof Full HD compatible Data Link.
- Spin-off applications for civilian missions
 - a) SAR operations
 - b) Disaster Relief & Humanitarian operations
 - c) Law Enforcement
 - d) Border enforcement



Archer UAS

Archer is a Short Range Weaponised UAV which also caters to Intelligence, Surveillance, Target Acquisition, Tracking and Reconnaissance (ISTAR) requirements. It can operate up to an altitude of 22,000 ft with an endurance of 12 hours and can gather real-time, high-quality imagery, video and signal intelligence. The UAV has a range of 250 km with conventional and Automatic Take-off and landing (ATOL) Capability.



SALIENT FEATURES:

- Powerplant : AvGAS Piston Engine
- Flight Endurance : 10-12 hr
- Speed : Max 135 kt (250 kmph)
- Operating Altitude : upto 22,000 ft (with EO payload)
- Flight modes : Command, Autonomous and Get- you- home feature
- Weight : ~ 750 kg
- Conventional take-off and landing with EP assist
- Proven and redundant ATOL (SBAS, GAGAN based)
- Self- protection capability : 02 wing stations
- Can carry upto two missiles (ATGM, APM) per wing station
- State-of-the-art GOS; Commonality and Interoperability with other Indian UAVs
- UAV Simulator for flight crew training
- Ergonomically designed GCS layout for crew
- Reliable data link systems
- Return Home Auto Landing in Link-loss situation

Pilotless Target Aircraft – Expendable Target

A cost-effective high-speed expendable target solution for Air Defence Artillery, air-to-air and battleship target practice, Pilotless Target Aircraft has flight control computer, navigation system and user-friendly ground control system. It is launched with rocket motors from a zero-length launcher and sustained with a small gas turbine engine. It is fully pre-programmable and can fly with waypoint navigation. The system requires minimum logistics for its operation.



Salient Features/ Specifications:

- Dimension (in mm) : Length (2385 mm), Wingspan (1280 mm), Diameter (180 mm)
- Weight : 75 kg
- Launch mechanism : Rocket Assisted
- Power plant : Gas Turbine Engine
- Maximum speed : 0.5 Mach
- Range : 50 km
- Endurance : 30 min
- Service ceiling : 5000 m
- Manoeuvrability : 2.0 g

Integrated Life Support System

This system prevents in-flight hypoxia (during high altitude flying and emergency escape) and G-Induced Loss of Consciousness (G-LOC) during high G manoeuvres. The system consists of provisioning of breathing oxygen generated through On-Board Oxygen Generation System (OBOGS) using conditioned compressed air available from engine bleed air and a breathing Demand Oxygen Regulator (DOR) that supplies the breathing oxygen to the aircrew at desired flow and pressure. It also consists of Anti-G-Valve (AGV) that inflates the Anti-G suit to apply desired counter pressure and an Electronic Controller Unit (ECU) to control, monitor and coordinate various functions of Line Replaceable Units (LRUs). All these systems are integrated within the very limited confines of a fighter aircraft.



Salient Features/ Specifications:

- OBOGS for both of single and twin crew fighter aircraft
- Backup Oxygen System (BOS) to provide 40 minutes of breathing oxygen
- Emergency Oxygen System (EOS)
- Automatic backup and emergency oxygen selection.
- Operating Temperature : -55 °C to 85 °C
- Altitude : Sea level to 50,000 feet AMSL
- MIL-STD-810G, MIL-D-85520(AS), MIL-C-85521(AS), MIL-STD-3050 compliant

Identification Friend or Foe Mk XII(S) System Variants

The system compliments the primary surveillance radar by identifying the cooperative targets and provides vital inputs to prevent fratricide. It has three sub-system variants, namely Interrogator, Transponder and Combined Interrogator Transponder (CIT). The Interrogator is integrated with the primary surveillance radar. The target aircraft transponder responds to the interrogation by using different waveforms and techniques. CIT is used for ground/ surface as well as airborne applications. The VERSA Module Eurocard (VME) based architecture provides complete flexibility for futuristic upgrades. Operation in Mode S-level 2 gives capability of selective addressing and data link features, which is very critical in dense air-traffic. It complies with ICAO Annex 10 and STANAG 4193 standards.



Salient Features/ Specifications:

- Mk XII Mode 1, 2, 3/A, C & 4 (IS1) with Mode S Level 2
- Mode IS2 Compatible (In-line with Mode 5)
- AESA as well as PESA based system
- Dual channel monopulse receiver
- Solid-state transmitter with modular and distributed architecture
- Antenna diversity operation
- Real time operating system
- Extensive BITE facility
- E-Scan and M-Scan antenna compatibility
- Applique crypto unit
- Operating temp: - 40 °C to +71 °C
- MIL STD 810E/MIL STD 461E compliant

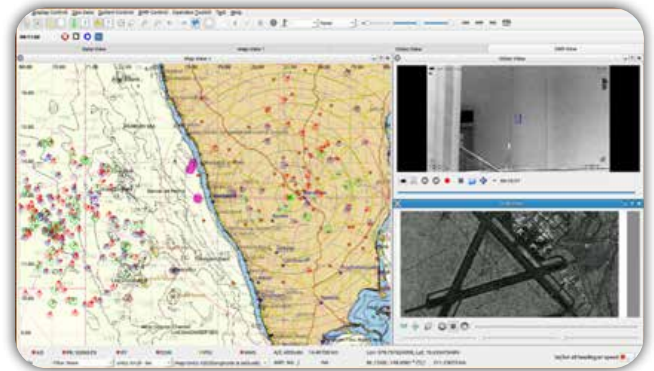


Mission Management System (MMS) for Pollution Surveillance Suite (PSS)

Real-time data generated by the Pollution Surveillance Suite (PSS) sensors, i.e - Side looking airborne Radar (SLAR), IR/UV Line Scanner, VIS Line Scanner and Laser Fluoro-Sensor (LFS), is received by the Mission Management System, processed and displayed to the Operator on Multi-functional Tactical Consoles (MTC). The MMS is the heart of any mission system that commands & controls the sensors, integrates data and forms situational picture to be presented to the operator. It is also responsible for the task of coordinating and monitoring the overall mission. In addition, the system interfaces with various other sensors including MPR, AIS, EOIR, PSS, MMS and MTC.

MMS is composed of multiple, interdependent and mission critical sub-systems. Each component depends on the sensors and/or operations data in order to function. This data can be sourced directly from sensors and/or from some other components of the MMS. MMS adopts Service Oriented Architecture (SOA) to manage this composition of components and intercommunication. Each component of the system is designed as a Service and standard protocols are used for communicating with each other. MMS provides below services,

- Sensor Management Services
- Data Collection and Analysis Services
- Decision Support Services
- Data Provision Services
- Database Services



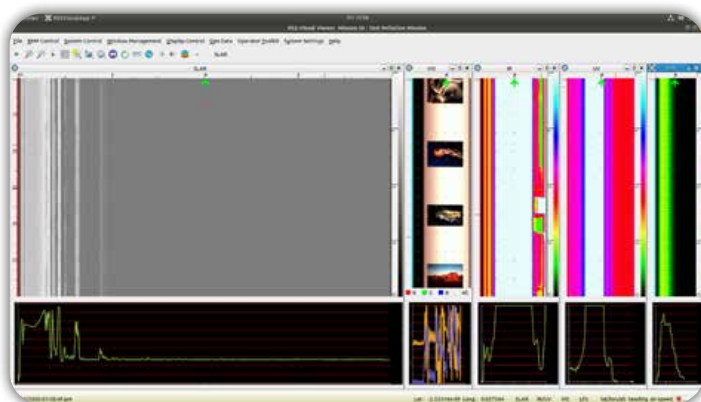
Salient Features/ Specifications:

- Form factor - Small Form Factor Embedded Computer
- Weight < 5 Kgs
- Cooling - Conduction cooled
- Dimensions - 105mm (Height) x 217mm (Width) x 260mm (Depth)
- Power : < 65 W (28 V DC)
- Software Architecture - Distributed Service Based Architecture

Pollution Surveillance Suite (PSS) Simulator

The Pollution Surveillance Suite (PSS) is used for detection, classification and identification of maritime pollution. The PSS Simulator suite is envisaged to have the following multi-sensor system for effective simulation of pollution surveillance in terms of oil slick detection, identification, quantification, classification and documentation:

1. Side looking airborne Radar (SLAR) as a primary sensor for far range detection of oil spills on the sea surface.
2. IR/UV Line Scanner for mapping of the oil distribution on the sea surface and calculating the areal extend.
3. VIS Line Scanner for color mapping of the oil on the water surface for securing evidence and documentation.
4. Laser Fluoro Sensor (LFS) for classification of Oil.



Salient Features/ Specifications:

- Simulation of marine pollution.
- Provide wide simulation of oil slicks.
- Mapping of the oil distribution on the sea surface and calculation of the aerial extend; Relative Oil thickness in UV/IR Bands.
- Color mapping of the oil on the water surface; Provide relative oil thickness in visible bands (RGB).
- Integrated with Mission Management System (MMS) and Multi-functional Tactical Consoles (MMS)

Computerised Pilot Selection System (CPSS)

CPSS is a state of the art system Psychomotor and Cognitive testing system used for inducting pilots by exhaustively evaluating advanced cognitive, psychomotor skills, memory recall, reaction time, response orientation and speed anticipation by subjecting the candidates to perform multiple concurrent tasks. It consists of two major sub-systems:

- Cognitive Testing sub-system with PC based cognitive terminals networked and connected to a server. Each cognitive terminal has a customized membrane keyboard with OLED display.
- Psychomotor testing sub-system with Aircraft Simulator Cockpit where candidates are required to operate the aircraft controls like control stick, rudder and throttle, with various aural and visual warning systems.

SALIENT FEATURES:

- Security features to prohibit unauthorized access of the system
- Modular system with plug-in units at sub-assembly level for easy maintenance
- State of the art ergonomically designed fiber-glass based cockpit with sensors and controls
- Provision to test large number of candidates simultaneously with automated test generation test scores
- Comprehensive diagnostic software for easy fault finding and calibration
- High reliability redundancies in networking infrastructure and power supply
- Health monitoring system as part of Instructor Station with
- Hot swappable high end database servers



CPSS – Cognitive Systems



CPSS – Psychomotor Systems

Aircraft Arrestor Barrier System

The system engages a fighter aircraft to halt its forward momentum in the event of aborted take-off or landing overrun with minimal damage to aircraft or injury to crew. Aircraft Arrestor Barrier System is based on Water Twister technology and is available in two weight-class categories, namely 20 T class and 40 T.

Salient Features/ Specifications:

	20 Ton	40 Ton
Type	Net Barrier / Arresting System	Net Barrier / Arresting System
Max. Engagement Speed	170 knots	For 11-40 Ton aircraft mass – up to 160 knots
Max. Runout Distance	270 m	270 m
Min. Runout Distance	270 m	270 m
Raising Time	3 to 5 sec	3 to 5 sec



Flight /Mission Simulators for Manned and Unmanned Aircrafts

The system provides real time actual replication of aerial systems validated by actual flight trial data. The cueing system plays a significant role in providing high fidelity simulation to the pilot and includes wide area dome based projection systems and their close integration with the flight dynamics to provide low latency visual scenery during the entire flight and aural cue while carrying out simulator sorties for higher fidelity.

The flight simulators designed & developed for manned/unmanned aircraft are as under:

- Avionics Part Task Trainers for the upgraded MiG-27 aircraft, a real-time Part Task Trainer used for providing training to the pilots of upgraded aircraft.
- Real time Simulators for the evaluation of handling qualities of the Digital Flight Control System for all the variants of LCA (Fighter, Trainer and Naval variant)
- Full Mission Simulator for LCA MK1
- Research simulator facility for the assessment of fighter pilot's mental workload, consisting of a flight simulator based on Real Time Simulator (RTS) and three channel visual projection display system along with cylindrical screen integrated with other psycho physiological measurement systems.
- External Pilot / Internal Pilot training simulator for sub-system testing and simulated system evaluation of number of UAVs.

Salient Features/ Specifications:

- Platform-specific high fidelity models
- Data-Model decoupling, Plug-and-Play Autopilot
- Standard wind, gust & turbulence
- Realistic visual & aural cues
- Realistic flight maneuvers and EM Spectrum maneuvers
- Mission sensors affected by environment
- Data-driven weapon systems (CCIP/CCRP, Firing envelope, DLZ calculation, etc)
- Advanced Instructor Operator Station
- Virtual tactical air combat environment
- Computer Generated Forces (including Air Defense Systems and EW elements)
- Scenario building and real-time editing
- Unclassified generic models
- Multiple world views available (pilot view, external view, sensor view, etc)
- COTS based, Robust, reconfigurable, easy to deploy, low cost, portable simulator

Training elements:

- Real as well as synthetic pilot-vehicle interfaces
- Real Time Virtual, Constructive Simulations
- All system emergencies and procedures
- After Action Review (record, replay, what-if, etc)
- Procedural training for payload operators



Brake Parachute

Brake Parachute for MiG-29 Aircraft

Brake Parachute for MiG-29 aircraft is an effective device used for retarding speed and shortening the run of an aircraft on its landing roll as well as during aborted take-off. The brake parachute is very useful during unfavorable landing conditions such as wet and icy runways.



Salient Features/ Specifications:

- Aircraft : MiG 29
- Type : Unicross
- Weight of Parachute : 8.2 kg
- Max. Operating Speed : 190 km/h (Normal), 310 km/h (Emergency)
- No. of Deployments : 55

Brake Parachute for Su-30 Aircraft

Brake Parachute for Su-30 aircraft is an effective device used for retarding speed and shortening the run of an aircraft on its landing roll as well as during aborted take-off. The brake parachute is very useful during unfavorable landing conditions such as wet and icy runways.



Salient Features/ Specifications:

- Aircraft : Su-30
- Type : Unicross
- Weight of Parachute : 24 kg
- Max Operating Speed : 260 km/h (Normal), 300 km/h (Emergency)
- No.of Deployments : 60

Brake Parachute for HAWK (AJT) Aircraft

Brake Parachute for HAWK (AJT) aircraft is an effective device used for retarding and shortening the landing run of an aircraft on its landing roll as well as during aborted take-off. The brake parachute is very useful during unfavorable landing conditions such as wet and icy runways.

**Salient Features/ Specifications:**

- Aircraft : Hawk
- Type : Ringslot
- Weight of Parachute : 6.0 ± 0.2 kg
- Max Operating Speed : 296 km/h
- No.of Deployments : 45

Heavy Drop Systems (HDS)

3 Ton for An-32 Aircraft

The system is used for para drop of combat materials and cargos having a flight weight of 3000 kg from An-32 Aircraft. The system comprises a metallic platform and multi-stage parachute system along with associated devices & accessories.

Salient Features/ Specifications:

- Payload Delivery : From 750 kg to 2470 kg
- Drop Altitude : From 300 m – 1500 m (AGL) with ceiling 4500 m (AMSL)
- Rate of Descent (Max) : 7 m/s



Packed condition



7 Ton for IL-76 Aircraft

It is used for para drop of combat materials and cargo having a flight weight of 3750 kg to 8500 kg using IL-76 Aircraft. The system comprises a metallic platform and multi-stage parachute system along with associated devices & accessories.

Salient Features/ Specifications:

- Payload Delivery : From 3750 kg to 8500 kg (All-Up Mass)
- Drop Altitude : 600 m AGL (Min) with a ceiling 4000 m AMSL
- Rate of Descent (Max) : 9 m/s



16 Ton for IL-76 Aircraft

This system is used for para drop of military equipment of 16 ton weight class from IL-76 aircraft. HDS-16T comprises platform & parachutes.

Salient Features/ Specifications:

- Payload Delivery : From 13000 kg to 20000 kg (All-Up Mass)
- Drop Altitude : From 1000 m to 4000 m (AGL)
- Rate of Descent (Max) : 9 m/s



Platform Sub-system with Payload in Air with Deployed Parachute Sub-system



Platform Sub-system with Payload & Parachute Sub-system in Packed Condition

P-7 Duck Drop System for IL-76 Aircraft

It is used for para dropping 4 rubberized Gemini boats over high seas for marine operations. The system comprises a metallic platform and multi-stage parachute system along with associated devices and accessories.



Salient Features/ Specifications:

- Payload Delivery : 3750 kg (All-Up Mass)
- Drop Altitude : 600 m AGL (Min) – 4000 m AMSL (Max)
- Rate of Descent (Max) : 8 m/s

Controlled Aerial Delivery System For An-32 Aircraft

It is a fully autonomous system capable of precise delivery of payload during day & night with manual override feature during terminal phase of flight. It is available in 500 kg and 1000 kg all up weight.



CADS - 500



CADS - 1000

Salient Features/ Specifications:

		CADS-500	CADS-1000
Gross Rigged Weight (kg)	Min	200	500 kg
	Max	500	1000
System Weight		50 kg	70 kg
Altitude	Max. Release (AMSL)	7620 m	6000 m
	Min. Release(AGL)	900 m	1200 m
Max. Glide Ratio	No wind	3:1	3:1
Standoff distance	Max 3 times the drop height (AGL)		
CEP	100 m		
Mode of Operation	Autonomous, with manual override capability		

Combat Free Fall (CFF) System

The system is used to protect free fall paratroopers from decompression sickness, hypoxia and hypothermia during high altitude jumps from up to 30,000 ft. It consists of oxygen system and protective equipment which provides breathing oxygen on-demand for enhanced breathing time. It can support 6-8 paratroopers for approximately one hour during pre-breathing with 100% oxygen.

Salient Features/ Specifications:

- Automatic control of oxygen concentration as per altitude.
- Manual selection of 100% oxygen.
- Visual flow indicator during breathing.
- Hands free communication through Helmet-Mask-Radio set combination.
- Detachable visor on helmet.
- Inner and outer jump suit for protection at low temperature.
- Specially designed boots for protection from leg injuries and landing shock.



PBOS



PBC



DDOR



HOSES

O₂ MASK

HELMET



JUMP SUIT



GLOVES



SOCKS



SOCKS



JACK KNIFE



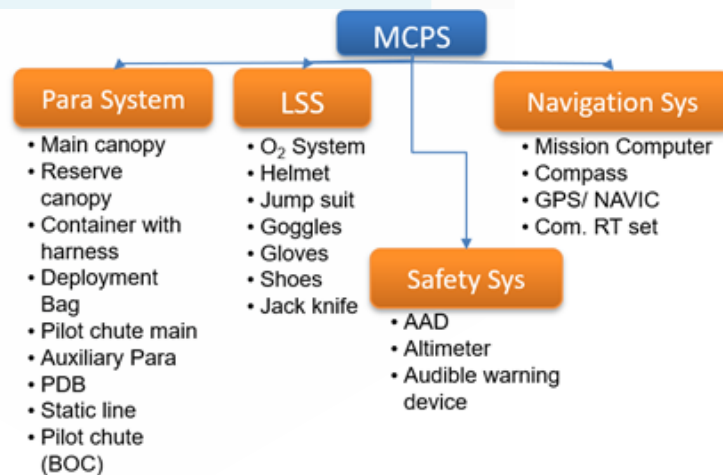
BOOTS

Military Combat Parachute system (MCPS)

Combat free fall with Ram Air Parachute is a mode of insertion used by militaries to insert paratroopers with combat load into designated area of operations, where there are terrain restrictions or sensitive ground-environment prevents low altitude penetrations. The MCPS can be used for Special Missions where paratroopers need to be air-dropped away from the target area.

The MCPS comprises of the parachute system, Life Support Systems, Nav systems and Safety systems and allows paratroopers to jump from an aircraft and deploy their parachutes at pre-determined altitude, navigate and land safely as a tactical unit.

Salient Features/ Specifications



Parameters

Weight of System

Max Payload

Min Payload

Maximum Deployment Altitude

Min Deploy. Altitude

Deployment Speed | Static Line

Free Fall

Glide Ratio

No. of Cells

Canopy Area

Shelf Life

Jump Life

Canopy Fabric

Reserve Canopy

Harness Container

Deployment Method

Main Parachute

Reserve Parachute

Rucksack Capacity/PDB

Technical Parameters

: 22 kg

: 200 kg

: 50 kg

: Free Fall - 30,000 ft AMSL (9145 m)

: 2000 ft (610 m)

: Maximum: 150 KIAS (280 Km/h IAS)

: 280 Km/h, IAS

: > 4:1 (in full glide)

: 9 (or more for Better Shape Formation)

: 34 sq.m

: 10 years

: On condition basis

: Main: Hybrid & Reserve: 0-3 CFM

: Same flying characteristics as Main

: Capable of sustaining the opening load of parachute and provisioning for attachment of combat loads.

: - Free fall/HAHO/HALO (Ripcord activation)

: - Double deployment bag for static line (DDBSL)

: - Bottom of container throw out pilot chute (BOC)

: - RSL /Reserve Ripcord / AAD

: - Three sizes of PDB (80 litre)

Protective Equipment and Flying Clothing

Flame Retardant Aircrew Survival Jacket

Aircrew Survival Jacket (ASJ) is intended to house the Pilot Locator Beacon (PLB) including V/UHF whip antenna and GPS. The PLB along with accessories helps pinpoint the geographical location of a downed pilot after ejection.

Salient Features/ Specifications:

- Flame retardant material.
- Withstand wind blast of upto 600 Knots IAS.
- Variants developed for MiG, Mirage, Hawk & Jaguar aircraft.
- Jacket weight <1.5 Kg with PLB and battery.



Flame Retardant (FR) Overalls

Flame Retardant overall is used as an outer garment to provide protection to the aircrew in case of fires.

Salient Features/ Specifications:

- Made from inherently flame-retardant Meta-Aramid fabric.
- Exhibits minimum TPP rating of 9.
- Comfortable and available in different sizes.
- Low heat release rate and sufficient escape time in the event of fire accident.



Flame Retardant (FR) Gloves

FR Glove is an aircrew protective clothing to protect hands in the event of fire while providing maximum dexterity & sense of touch besides protecting hands.

Salient Features/ Specifications:

- Meta-Aramid knitted fabric on dorsal side and leather on palmar side.
- Available in 7 sizes.
- Conventional 5 finger design.
- Made out of Flame-Retardant fabric.



Flame Retardant Automatic Inflatable Life Jacket

The jacket prevents aircrew/ pilots from drowning in the event of ejection over water or ditching. It is made from Meta-Aramid fabric which provides adequate time to escape in the event of fire accident in the aircraft and inflating automatically to increase survivability in water.



Salient Features/ Specifications:

- PU bladders with stole pouch for protection of bladders.
- Automatic inflation mechanism (CO₂ cylinder) with sea activated battery to inflate the bladder in less than 3 sec.
- Para Aramid fabric with very high Limiting Oxygen Index (LoI) is provided for additional protection of bladder.
- It is available for Jaguar and other aircraft with provision for PLB and has a buoyancy of 18 kg.
- Special Para-Aramid layer to protect against molten metal splashes.

Flame Retardant Anti G Suit (FR-AGS)

FR-AGS enhances the tolerance of a pilot to positive G forces. It has been developed for different aircrafts like LCA, Hawk, Mirage, Jaguar, MiG and Su-30 in cut-away type trouser-like garment with inflatable bladder and is in service.



Salient Features/ Specifications:

- TPU coated fabric for bladder
- 75% reduction in heat release
- Provides 1 to 1.5 positive G protection

Light Weight Integrated Su-30 Aircrew Helmet

The helmet protects aircrew/ pilots during crash besides acting as a platform for accommodating HMSD and RT. The aircrew helmet is equipped with internally retractable dual optical grade polycarbonate visor system with independent locking of either of the visors, user adjustable comfort pads and fitting system, mask attachment assembly, chin strap assembly, adjustable ear cup assembly, nape pad and aircraft compatible communication assembly.



Salient Features/ Specifications:

- Impact attenuation and penetration resistance: MIL-DTL-87174A) compliant.
- Optical and ballistic grade PC visors for protection of eyes and face from wind blast, sun glare, UV light, bird hit, etc. (MIL-DTL-43511D& MIL-V-29591/1 (AS) compliant).
- R/T communication through R/T cord and earphones in conjunction with mask microphone (MIL-DTL-83425A compliant).
- Provision to mount HMSD on the outer surface of the shell.
- Microencapsulated Phase Change Materials (MPCM) adjustment pads provided in different thickness for effective fitment and thermal management.
- Ear cups designed to meet noise attenuation in low and high frequency.

Pressure Breathing Oxygen Mask for Su-30

The Pressure Breathing Oxygen Mask is a vital lifesaving personal protective equipment used by all aircrew of both fixed wing and rotary wing aircraft. The oxygen mask administers breathing oxygen under pressure from the aircraft regulators to aircrew. The mask is also fitted with microphone for communication.



Salient Features/ Specifications:

- Protection from windblast upto 600 Knots IAS.
- Caters for 1st to 99th percentile pilot population.
- Available in small, medium and large size
- Ability to hold positive pressure breathing in fixed wing aircraft.
- Breathing resistance valves (Inhalation & Exhalation) and anti-suffocation valve meets the requirements of MIL-M-27296C & section-6 of DEF STD 00-970.
- Fitted with aircraft specific length fabric laminated corrugated hose & mask end connector
- Fitted with adjustable mask anchoring mechanism.
- Human friendly face piece made of silicone rubber fitted inside the hard exoskeleton.

Countermeasures

Aircraft Chaff Cartridge 118

Chaff Cartridge 118 is used as electronic countermeasure for anti-aircraft RF seeker missiles and contains millions of chaff fibres having diameter of the order of few tens of microns to cover the broadband microwave frequency range. It is dispensed into the atmosphere to deny radar acquisition, create false target and to deny or disrupt radar tracking by creating volumetric radar clutter designed to interfere with, and confuse radar detection.



Salient Features/ Specifications:

- Frequency Coverage : 2 to 18 GHz
- Bloom Time : < 200 ms
- Bloom RCS : ≥ 30 sqm average RCS @ 0.2 sec across its entire frequency range
- Weight : $127g \pm 3g$
- Dimensions (in mm) : Length 206 mm, Cross Section 25 mm x 25 mm
- Net Explosive Quantity : 390 ± 13 mg
- Ejection Velocity : 25 to 50 m/s
- Operating Environmental Condition : -46°C to $+76^\circ\text{C}$
- Dispensing System : CMDS used for 1"x1"x8" Chaff
- Storage Life : ≥ 10 Years

Aircraft IR Flare 218 MTV

The Aircraft IR flare is used to seduce missile IR seekers away from the target aircraft by having a stronger signature than that of the target itself. The flare of size 2" x 1" x 8" compatible with various CMDS system like TAAS, TRACOR and BDL. It is fitted with 1W-1A impulse cartridge which ensures safety from EMI-EMC. The safety & functioning unit in the flare ensures that flare is activated only after ejection from aircraft dispenser. Spectral coverage is in the 3-5 μm band.



Salient Features/ Specifications:

- Rise time : <0.2s
- Peak IR output : ≥ 20 kW/sr
- Burnout time : ≥ 3.5 s
- Operating temperature : -46°C to $+76^{\circ}\text{C}$
- Exposure temperature : -65°C to $+85^{\circ}\text{C}$
- Ejection velocity : 25-50 m/s

Aircraft Multispectral IR Flare 50 mm

The multispectral IR flare has a spectrally matched payload and is intended to be used in aircraft countermeasures systems to combat advanced third generation heat seeking missiles employing spectral discrimination techniques. It can be housed in a 50 mm diameter format multiple shot magazine and is fired through aircraft dispenser with the help of impulse cartridge.



Salient Features/ Specifications:

- Rise time : <0.6s
- Peak IR output : min. 5 kW/sr
- Burnout time : min 4.0s
- Operating temperature : -46°C to +76°C
- Exposure temperature : -65°C to +85°C
- Ejection velocity : 25-50 m/s
- Weight : <1000 gm
- Dimensions : Length: 202 mm
- Cross section : 50.2 mm
- Net explosive quantity : 400±15 gm
- Dispensing systems : APP-50 UV MKI 30
- Storage (shelf) life : 5 years

Aircraft Multispectral IR Flare 218

The Aircraft Multispectral IR Flare has a spectrally matched payload and is intended to be used in aircraft countermeasure systems to combat advanced third generation heat seeking missiles employing spectral discrimination technique. Flares are fired through aircraft dispenser with the help of impulse cartridge.



Salient Features/ Specifications:

- Spectral coverage : 1.8-2.6 μ m and 3-5 μ m
- Rise time : <0.2s
- Peak IR output : min 3kW/sr
- Burnout time : min 4.0s
- Operating temperature : -46°C to +76°C
- Exposure temperature : -65°C to +85°C
- Ejection velocity : 25-50 m/s
- Weight : 380-390 gm
- Dimensions : 206 mm (length) x 51.82 mm (width) x 24.64 (height)
- Net explosive quantity : 400 \pm 15 gm
- Dispensing systems : CMDS system like TAAS, TRACOR, BDL of 2"x1"x8" size
- Storage (shelf) life : 5 years

Self-Protection Suite for Mi-17 Helicopter Versions

Self-Protection Suite (SPS) for Helicopter versions is an integrated system comprising of multi spectral warning system and counter measures system. The suite is designed to detect, declare and provide warning to the pilot upon detection of any RF threat or IR missile threat. Upon declaration of threat, the system provides audio visual display to the pilot and activates the CMDS for counter measure. The RWR acts as a controller of the Self Protection Suite and interfaces with the operator through a display unit provided in the cockpit. The system is modular in nature and is easily adaptable to a helicopter platform.

Salient Features

Self-Protection Suite consists of:

- Radar Warning Receiver (RWR)
- Missile Approach Warning System (MAWS)
- Counter Measures Dispensing System (CMDS)



ARMAMENT & COMBAT SYSTEMS





Main Battle Tank (MBT)

The MBT is endowed with superior firepower, high mobility and excellent protection characteristics required to meet the challenging requirements on the 21st century battlefields. It manifests the latest battle-tank technologies that makes it a distinct front-runner amongst the array of contemporary MBTs of modern armies, the world over.



Salient Features/ Specifications:

- Crew : 04 (Commander, Gunner, Loader, Driver)
- Weight : 68 tons
- Engine : 10 cylinder V90 Turbo Charged, charge cooled, water cooled, diesel engine
- Power (hp) : 1030 kW at 2400 rpm
- Gun Caliber : 120 mm Rifled Bore
- Rate of Fire : 06 to 08 rounds per minute
- Ammunition fired by main armament : FSAPDS, HESH
- Supporting armament : 12.7 mm (NSVT) on RCWS, 7.62 mm MG co-axial
Smoke Grenade Dischargers
- Day and Night Operation : AGMS, DNS, ICPS
- Anti-Mine Operation : TWMP (Track Width Mine Plough)
- Mobility
 - ◇ Max Speed on Roads : 58 km/h
 - ◇ Cross Country Speed : 40 km/h
 - ◇ Gradability : 30° (with TWMP) / 15° (without TWMP)
 - ◇ Shallow Fording : 1400 mm (Unprepared)
 - ◇ Medium Fording : 2150 mm (Prepared)
 - ◇ Vertical Obstacle Crossing : 910 mm
 - ◇ Trench crossing : 2430 mm

Wheeled Armoured Platform (WhAP) 8x8

The WhAP (8x8) is an amphibious carrier with high power engine, fully automatic transmission, hydro-gas suspension, double floor mine protection and modular add-on composite armour for ballistic protection. The Vehicle design/configuration is suitable for integration of different caliber/types of armament such as 30mm manned turret, 30 mm RCWS, 7.62/12.7mm RCWS, 105mm Low Recoil gun and anti-tank guided missiles.



Salient Features/ Specifications:

- Amphibious with Hydrojets up to 24.5 ton GVW
- Double floor V-type mine protection with shock resistant seats and foot pads
- Modular add-on type ballistic protection as per the threat level
- Integrated with 30mm in-service turret for APC role (RCWS - 7.62 mm PKT / 12.7 MG (NSVT) option available)
- Provisioned with Instant Fire Detection and Suppression System (IFDSS) , NBC protection and HVAC system
- Dimensions : 7.9 x 3.05 x 3.2m (2.3m up to hull top)
- Crew : Up to 10 + 2 (As per user requirement)
- GVW of platform : 21.5 ton – with base line protection of 7.62 mm AP all round
24.2 ton with BMP II turret
- GVW of Variants : 19.5 ton to 26 ton (Amphibious capability upto 24.5 ton)
- Engine : Diesel engine configurable with three power ratings (600, 525 & 450 hp)
- Mobility
 - ◊ On road speed - 100km/h
 - ◊ Off road speed - 35 to 40 km/h
 - ◊ Floatation Speed - 08 km/h with hydro jets
 - ◊ Max Gradient - 30°
 - ◊ Slide slope - 20°
 - ◊ Vertical Step - 0.6 m
- Day and Night Operation : CCD with TI & LRF

Advanced Towed Artillery Gun System (ATAGS)

The ATAGS provides superiority in firepower in terms of range, accuracy, consistency and high rate of fire with excellent mobility, both in towed and self propelled mode. The gun system is fully autonomous, built with an all electric drive technology and fitted with advanced sensors including ILNS, MVR and optronic sight. It is the only gun in the world capable of firing BMCS Zone 7 and having a range of more than 48km, making it the most lethal and survivable gun system.

Salient Features/ Specifications:

- High accuracy & consistency
- High Rate of Fire (ROF)
- All electric servo drives for laying, breech, closing/opening ramming and crane operation. Completely silent operations with all drives on battery backup.
- Auto Gun Alignment & Positioning Sys (AGAPS) integrated for navigation & orientation.
- Advanced thermal sight for direct firing role, at targets up to 2 km.
- Four wheel configuration and higher capacity APU for better maneuverability/manoeuvrability
- Compact gun configuration with backpack arrangement for lower turning circle dia. Transportation by air and rail with existing resources possible. Improved wireless communication with Software Defined Radio (SDR).
- Dimensions : Length(16500 mm), Width (10950 mm), Height(\leq 3000 mm)
- Crew : 07
- Engine power output : 110 kW
- Day and Night Operation
- Mobility (Max Speed)
 - Self propelled : 18 km/hr (Black Top)
 - : 10 km/hr – cross country
- Gradability : 18°
- Fording : 700 mm



Advanced Towed Artillery Gun System (ATAGS)

Multi Barrel Rocket Launching System (MBRLS)

MBRLS is an all-weather, indirect fire artillery weapon system. It delivers accurate and massive firepower at a high rate over extended ranges. A battery of six launchers can fire a salvo of 72 unguided Mk-I rockets in 44 seconds.



Salient Features/ Specifications:

- Launcher built on a rugged 8x8 high mobility vehicle
- High speed computer (RTOS-based) fully automatic servo controlled system for laying and vehicle stabilisation
- Launcher fully autonomous with integration of AGAPS (Sigma-30 Land navigation system)
- 4 outrigger based vehicle stabilization system for launcher
- Fast Coming in to & out of Action < 3 min

Rocket Variants	Rocket Mk-I	Enhanced Rocket	Guided Rocket
• Max Range	35.5 km	50 km	70 km
• Min Range	12.5 km	13 km	20 km
• Accuracy & consistency	1.5% (PE) of range	1.5% (PE) of range	40 m CEP at all ranges
• No of Rockets per pod	Six	Six	Four
• Shelf Life	10 years	15 years	15 years

Armoured Engineer Reconnaissance Vehicle (AERV)

The AERV is built on the BMP-II chassis and is designed to meet tactical combat requirements of the Military Engineers for carrying out terrestrial and underwater surveys in hostile terrain. It is an amphibious vehicle having state of art water recce, land recce and navigation equipment to provide support to combat engineers for both offensive and defensive operations in plains, desert and riverine terrain.

This vehicle can carry out underwater survey with the help of ruggedized water recce instruments, giving canal bed profile with details of strata underneath, assisting combat engineers in deployment of bridges. It also has a route marking system, data storage facility, advanced land navigation system & environment control unit.



Salient Features/ Specifications:

- Crew + Troops : Crew - 03 (commander, gunner, driver) Troops - 03
- Weight : 13.55 ton + 2% (Combat Loaded)
- Engine : UTD -20
- Power : 285-300 hp
- Maximum Speed : 65 kmph
- Floatation speed in still water : 8 km/hr
- Operating Temp : 0° C to + 45 °C
- Ranging Distance : 2 km

Armoured Amphibious Dozer (AAD)

The AAD is a tracked, armoured, amphibious vehicle, combining cross country performance with an effective engineering capability. The vehicle is based on the BMP – II chassis and has been designed as a highly mobile earthmover and support vehicle for use in combat areas.



Salient Features/ Specifications:

- Equipped with Dozer blade
- Self-recovery by using Rocket Propelled Anchor(RPA) and winch
- Jib crane – 3 Ton capacity (Add on attachment)
- Crew : 2+1
- Weight : 14.8t
- Max Engine Power : 300 hp@2600 rpm
- Aux.Engine Power : 100 hp @ 2100 rpm
- Weapon : 7.62mm Pkt
- Max speed : 65 km/hr
- Floatation speed in still water : 8 km/hr
- Gradeability : 35° (45° with RPA)

Armoured Recovery & Repair Vehicle (ARRV)

The ARRV is used for recovery and repair cover for medium weight combat vehicles upto 60 T. Its functions are comprehensive and multifaceted and include winching, towing and pushing, lifting and moving with load, anchoring, dozing, welding, cutting, replenishing, maintenance and repair services in the field. It also caters for spares supply, provision of power supply & power operated tools and battery charging.



Salient Features/ Specifications:

- Crew : 2 - Commander & Driver and 4 Technicians
- Weight : 65 t ± 2 t (Base Vehicle with Spares)
- Power (hp) : 1400 hp

• Main Winch	Pull Capacity Rope Length Rope speed In & Out	50 t 180 m ≥ 7 m/min & ≥ 55 m/min respectively
• Auxiliary Winch	Pull Capacity Rope Length Rope speed In & Out	2 t 360 m ≥ 55 m/min & ≥ 150 m /min respectively
• Maximum Speed	58 kmph	
• Operating Temperature	-20 °C + -50 °C	
• Crane	Capacity Slew Angle	20 t @ 3 m 360°
• Communication	Two way communication	5/50 W VHF
• Weapon System	RCWS	12.7 mm NSVT Gun

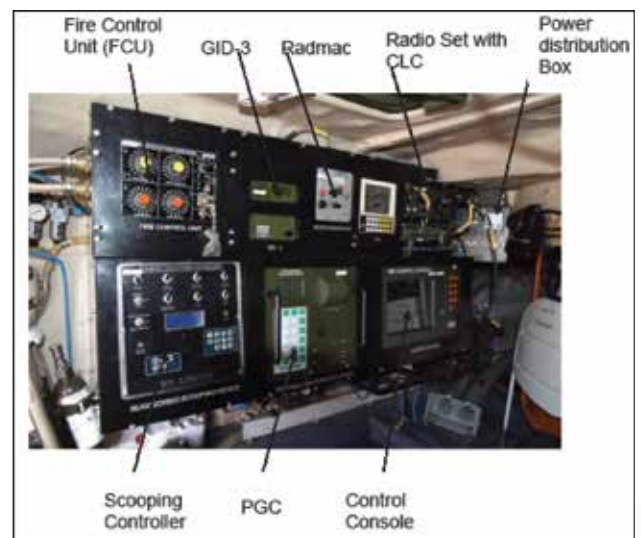
Nuclear, Biological, Chemical Reconnaissance Vehicle

The NBC Reconnaissance Vehicle (NBC RV), developed on infantry combat vehicle conducts survey, detection, identification, monitoring and marking of the radiological and chemical contaminated areas. It is also equipped with sample collection device which can collect the contaminated soil and liquid samples and data transmission capability to command centre. It is a full-tracked, armoured, amphibious, air transportable vehicle having a combat loaded mass of 15 ton + 2%. It can carry six persons and operate with maximum speed of 65 kmph.



Salient Features/ Specifications:

- Type of Gamma and X-ray radiation
- Agent concentration and response time
 - Nerve agent
 - Sarin, Soman & Tabun: 0.1 mg/m³, <30 sec
 - Vx : 1.0 mg/m³, < 30 sec
 - Blister agent : 2.0 mg/m³, < 120 sec
 - Blood agent : 20 mg/m³, < 10 sec
 - Choking agent : 20 mg/m³, < 10 sec
 - Radiological/Nuclear:
 - < 7 sec for lower range
 - < 3 sec for higher range
- Alarm indication: Audio – Visual
- Detection range/ dose rate:
 - Roentgenometer - 0.1 R/h to 1000 R/h
 - PDM - 50R, 75R and 150R
 - PDRM - 0.5 R/hr to 1000 R/h
 - RPL – 1 cGy to 1000 cGy
- Chemical reconnaissance instrument (in terms of Sensitivity):
 - Nerve agents (V agents) 0.04 mg/m³ <90 sec,
 - G agents : 0.1 mg/m³ <30 sec
 - Blood agents : 22 mg/m³, < 60 sec
 - Blister Agents : 2 mg/m³, < 120 sec



Bridges

Bridge Layer Tank

Bridge layer Tank on T-72 Chassis is an instant bridge launching equipment for bridging gaps within a short time span (03 min for launching & 05 min for retrieval) as and when required.



Salient Features/ Specifications:

- Load Class : MLC -70
- Span : 20 m
- Width : twin treadway 1.643 m each
- Launch Time : 3 to 5 min for launching and 5 to 8 min for retrieving
- Maximum Speed : 60 kmph (vehicle)
- Operating Temperature: + 5 0 C to 50 0 C
- Submerged fording capability (1.8 m with preparation)
- Dimensions : Length (11.36 m), Breadth (4 m), Height (3.8 m)
- Crew : 2 - Commander & driver
- Weight : 49 T \pm 3 %
- Engine : V-46-6, Four Stroke, Multi Fuel, Liquid-Cooled Supercharged
- Power (hp) : 780 hp

Multi-Span Mobile Bridging System

It offers versatile bridging solutions for all types of military traffic for negotiating wet or dry obstacles of upto 75m span in steps of 15m. It can be used as an emergency bridge during natural calamities like floods and earthquakes.

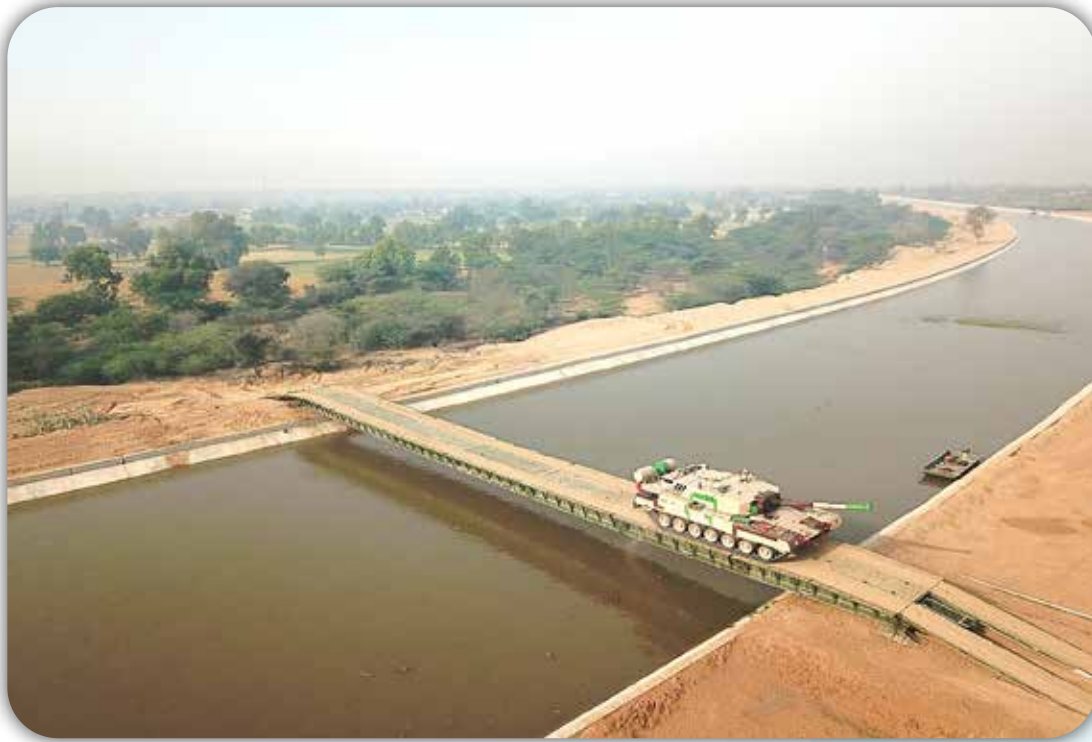


Salient Features/ Specifications:

- Load Class : MLC - 70
- Span : 75 m span in steps of 15 m
- Width : 4 m
- Obstacle Depth : 2.5 m – 6 m
- Launch Time : 20 min per span
- Drive : Rear cabin with dual drive facilities
- Beta Light : For night guidance of traffic

46 Metre Modular Bridge

It is a mechanically launched mobile bridging system which provides single span bridging capability with 4m wide fully decked roadway width. The system can be laid in different spans varying from approximately 14m to 46m in steps of 6.5m.



Salient Features/ Specifications:

- Mechanically launched by a crew of 06 + 01 commander
- Variable span – 14 m to 46 m
- Single span fully decked roadway width of 4 m
- MLC 70 for both tracked and wheeled vehicles
- Launching System mounted on 10 x 10 HMV
- Carrier vehicle for other components based on 8x8 HMV
- Launch / Retrieval from either bank
- Launching time 90 minutes by day & 120 minutes by night

Manually Launched Assault Bridge (MLAB)

It is a deck type, two-girder bridge system which provides 4m wide roadway. It is fully modular and pin-joined structure with inter-locking components. This standard double story bridge can bridge gaps upto 31m. The capability can be extended to 49m using ancillary equipment. MLAB constructed using two parallel girders consisting of top panels each 1.83m long that can be pinned together.



MLAB ACROSS OBSTACLE



MLC-70 BLT ON MLAB

Salient Features/ Specifications:

- Light weight aluminium alloy construction
- Load Class : 60 ton
- Low maintenance and suitable for tropical climates
- Quick to construct with minimum manpower
- Palletized load and interchangeability of components
- Little or practically no site preparation

Short Span Bridging System – 5 Metre

It consists of 6x6 HMV over which two 5m long bridge superstructures made of aluminium alloy are stacked one above the other. A mechanical handling device to handle the bridges for deployment is also mounted at the rear of the vehicle.



MLC70 BLT Crossing 5m SSBS



5m SSBS ON 6X6 HMV

Salient Features/ Specifications:

- Bridge Span : 5 m
- Width : 4 m
- Load Class : MLC-70
- Launching time : 10 min
- Carrier Vehicle : 6x6 HMV
- Quick construction with minimum crew
- Beta light for deployment at night

Short Span Bridging System – 10 Metre

This bridging system consists of 8x8 HVM chassis (re-engineered with an auxiliary cabin at the rear end for limited driving capabilities) as the carrier vehicle. A launching mechanism is mounted on the carrier vehicle to launch a 10 m bridge along with a pier system. The launching operation is carried out manually or with an electrical system. In addition to support in combat operations, it can also be used as an emergency bridge during natural calamities like floods and earthquakes.



Salient Features/ Specifications:

- Bridge Span : 10m
- Width : 4m
- Launching Time : 10 min
- Carrier Vehicle : 8x8 HVM
- Load class : MLC-70
- Rear cabin with dual drive system
- High mobility launching platform suitable for military traffic
- Quick construction with minimum crew
- Beta light for deployment at night

Crevasse Crossing Bridge

This bridge is used for crossing crevasses in snow bound areas and comprises of man portable modules. The bridge is a two-girder bridging system and is fabricated using light weight, high strength, weldable and self-ageing aluminium alloy. It is launched manually with the help of a nose launching assembly. Detachable railings are provided for safety. The bridge is designed for a load up to 550 kg. It enhances the mobility of troops, arms, ammunition and supplies snow bound areas.



Salient Features/ Specifications:

- Bridge length : 10m
- Roadway width : 1.75m
- Construction time : 30 minutes
- Interchangeable components
- Anti-skid deck

Mountain Foot Bridge (MFB)

The MFB is a light-weight bridge of total length 34.5 m that can bridge clear gaps up to 32 m with a pathway of 0.8 m. The bridge comprises high-strength aluminium alloy segments, a launching system and a light-weight nose, all of which are man-portable. It can be launched from home bank without any access to the far bank by launching the light-weight nose first from home bank in cantilever mode. After the nose is lowered across the gap, bridge panels are attached to the nose and pushed across the gap.



Salient Features/ Specifications:

- Back-space (for assembly) 12 m x 8 m for 34.5 m and lesser for shorter spans
- Maximum weight of components: 18 kg
- Manually launched within 90 minutes with a crew of 15
- A maximum of 10 men including their battle-loads are able to cross the bridge with 3m spacing in between, at one time.

Mat Ground Surfacing (MGS)

Mat Ground Surfacing is a trackway expedient which provides for smooth movement of tracked and wheeled vehicles in marshy terrain, shallow waters of up to 1 m depth and on soft soil. In addition to its primary role, the trackway can be laid and used on approaches to bridge sites, shallow rivers, marshy areas and road diversions.



Salient Features/ Specifications:

- Load Class : MLC 70
- Total Weight of Roll: 8500 Kg
- Life of Mat: 2000 passes of MLC 70
- Corrosion resistant
- Hydraulic laying and retrieval system

Munitions

Explosive Reactive Armour (ERA)

It is a reactive protection system which is used for providing additional protection to tanks against various anti-tank threats like tank fired High Explosive Anti-Tank (HEAT) ammunition, ATGMs, Rocket Propelled Grenades (RPGs), normal attack bomblets, FPV Drones and other shaped-charge warheads. There are 4 sizes of Explosive Reactive Armour panels fitted on different locations of the tank, which can be customized based on the form factor of the tank. Fitting of panels doesn't affect any of the functional parameters of the tank adversely.



Single Era Panel



Panels on T-72 Tank

Salient Features/ Specifications:

- Dimension of single panel : Length 350mm, Width 150mm, Height 70mm
- Weight : 1.5 Ton for tank T-72 (165 panels)
- Shelf life : Min 15 years
- Installation time : 3-4 hours
- Application areas : Fitted on tank T-72. It can be customized for adaptation on any tank
- Global standard : KONTAKT 5 Russia and FY4, China equivalent

125mm Fin Stabilised Armour Piercing Discarding Sabot Practice Ammunition (FSAPDS – Prac)

The FSAPDS-Prac tank round is designed specifically for crew training of T72/ T90 tanks with 125mm smooth bore gun. This round provides a low cost solution for crew training and is ballistically matched with service ammunition. There is no need for separate zeroing of the gun for firing of practice ammunition. It is a reliable and accurate ammunition with shelf life of more than 10 years. It has split sabots, obturating band and low drag fins with resin based combustible cartridge case and it provides enhanced barrel life because of its low EFC. The round is compatible with existing autoloader.



Salient Features/ Specifications:

- Round length (Primary) : 408 mm
- Round length (Secondary) : 662 mm
- Round mass : 20 kg
- Shot Mass : 5.7 kg
- Cartridge Case : Resin Based, Combustible
- Primer : GUV 7
- Consistency : 0.40 mils
- Tracer : For trajectory mapping
- Operating temperature range : - 10° C to + 55° C

Anti-Thermal Anti-Laser Smoke Grenade 81 mm (AT-AL)

This grenade rapidly generates a smoke screen to defeat enemy Thermal Imaging (TI) sights & laser equipment. The grenade is fired from the 81mm calibre launchers mounted on AFVs to a distance of 55 to 75m and generates a dense white smoke screen of 30m width and 10m height for more than 20 seconds with a salvo of 4 grenades. The smoke screen blocks/obscures the visual and IR regions of electromagnetic spectrum (0.4 to 14 μ m).



Smoke Grenade Discharger on Tank



81 mm ATAL Smoke Grenade



Salient Features/ Specifications:

- Time : 3.8 \pm 0.3 s
- No of grenades per smoke screen : 4 per Salvo
- Operating Temperature : -15°C to +55°C
- Storage Temperature : -30°C to +55°C
- Shelf life in controlled storage condition : 7 yrs (provisional)

Multi Mode Hand Grenade (MMHG)

The MMHG can be used in two modes i.e. offensive mode and defensive mode depending upon the tactical requirement of users. The two modes can be changed easily from one to another by removing/ applying fragmenting sleeve and thus changing the lethal radius of the grenade.



Salient Features/ Specifications:

- Light weight < 500g
- Multimode concept
- Offensive mode : Lethal radius 3 to 5m
- Defensive mode : Lethal radius 8 to 10m
- Uniform fragmentation pattern
- Higher fragment density > 3800 fragments
- Pyro-delays provided to ensure time delay and reliability.
- Additional thrower safety (Safety Release Delay Mechanism for minimum .5s Arming delay)
- High reliability > 95%
- Shelf Life in controlled storage > 15 Years
- Storage in the temperature range of -20 °C to + 55 °C.

40x46mm Grenades with Self- Destruct Mechanism for UBGL/MGL

Family of 40x46mm Grenades with self- destruct mechanism consists of four variants of grenades viz.

- High Explosive Anti-Personnel(HEAP)
- High Explosive Dual Purpose(HEDP)
- Red Phosphorus (RP)
- Target Marker (TM)

HEAP grenade has HE filling surrounded by a fragmentation unit of the pre-patterned steel cup for producing fragments. In HEDP grenade, HE shaped charge is enclosed to provide armour penetration capability. The RP grenade is used for producing smoke screens. It is also used in tactical applications like clearing trenches, bunkers and buildings. The TM is a target practice as well as marking grenade. On impact it explodes to release a small quantity of orange smoke that is emitted for at least 20 seconds for marking purposes.



HEAP



HEDP



RP



TM

Salient Features/ Specifications:

- Incorporated with pre-programmed SD feature to minimise unexploded ordnance.
- Mechanical Fuze for HEDP grenade.
- Electro-Mechanical Fuze for HEAP, RP, TM grenades.
- Can be fired from all 40x46mm UBGL/MGL weapons.
- Fixed arming distance to ensure safety of the weapon and firer.
- Payload content maximized for enhanced terminal performance.
- Range : 375-400 m
- Mass : 282 ± 3 gm
- Consistency Grouping : 0.95 m x 0.95 m on a vertical target at 75m
- SD delay (Factory Programmable) : 12 – 19 sec
- Reliability : More than 90%
- Operating Temperature : -20° to 52°C
- Shelf life in controlled storage conditions (years) : 10
- Fuze Type (i) Electromechanical
(ii) Mechanical (HEDP only)
- Mode of functioning : Impact and self destruct

Bund Blasting Device (BBD)

The BBD is used for creating breaches through controlled demolition in the embankments of raised linear obstacles or Bunds, reducing their effective height to facilitate either launch of combat bridges by assault engineers or create a gap in the obstacle. It is man-portable and can be deployed in a quick timeframe to tackle a variety of raised linear, earth-filled obstacle systems.

Each BBD comprises of a hollow charge initiation device to create a pilot hole in the embankment. The High Explosive Main Charge attached to a rocket motor is then propelled into this cavity and detonates, lowering the height of the embankment by creating a crater/ breach. A number of BBDs are used in tandem/ as per need to achieve breaches of required dimensions.



Salient Features/ Specifications:

- Creates a breach of length 8 - 9 m, width 4 – 5 m and depth 2 – 2.5 m
- Easy Transportation from storage site to field
- Shelf life >10 years.

Bi Modular Charge System (BMCS)

BMCS has two types of modules viz, lower and higher zone to replace conventional cloth bag charges. Modules are filled with cooler propellant and offer longer ranges, improved barrel life, eliminate wastage of charge and increase ease in logistics. Lower zone modules are used for firing at shorter ranges and higher zone module for longer ranges. For ease of identification, LZ modules (CC) are made green in colour while HZ modules (CC) are white. Top surface of LZ module (CC) has notches for night identification. Each module contains propellant, combustible case, igniter, flash reducing discs, additive liner and lead tin foil.



Salient Features/ Specifications:

- Operating temperature from -30 to +55°C
- IM Compliant
- Suitable for all 155 mm Artillery Guns (39 / 45 / 52 Cal Gun)
- Apart from primary ammunition like ERFB-BT and ERFB-BB, secondary ammunition like HE, Illuminating or smoke can be fired with BMCS.



BMCS

Oleoresin Grenades

These user-friendly non-lethal munitions are used during enclosed spaces operations to disarm/incapacitate agitated individuals, disperse small crowds, or reduce threat levels from militants in bunker or building. The plastic body of the grenades melts upon bursting, making them difficult to throw back. The grenades emit tear gas for 60-80 seconds after a 1-2 second delay, causing laceration, irritation, and suffocation to compel individuals to leave the affected area.

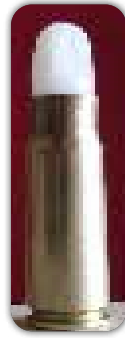


Salient Features/ Specifications:

- Oleoresin is a potent and less toxic sensory irritant.
- Effects wear off within 30 to 45 minutes.
- No physiological damage to the human body.
- More effective and safer compared to other known tear gas compounds.
- No risk of fire
- Dimension : Height (130mm), Weight (360±10 g)
- Shelf Life : 05 years

Non-Lethal Plastic Bullet

The plastic bullets may be used for less/ non-lethal crowd/ mob control as well as practice ammunition. These non-poisonous bullets do not expand after penetration and cause only superficial injuries to target at a range of 50 m and above. Ammunition can be tailored made for requirement. These bullets can be used by in-service weapon 7.62x39mm calibre without any modifications.



Salient Features/ Specifications:

- Non – Metallic & Non-poisonous bullet
- Induces similar sound effect as that of ball ammunition
- These can be fired in single shot mode
- Calibres : 7.62 × 39 mm
- Weight : 0.7 g
- Minimum recommended distance \geq 30 m
- Shelf life: 05 years

Mines & Support Equipment

Anti-Tank Point Attack Munition

This munition is designed to immobilise tracked armoured and wheeled vehicles in all types of terrain.



Salient Features/ Specifications:

- Weight of munition: 7.5 kg
- Major Dimensions: Diametre 280 mm & Height 150 mm
- Type of explosive charge & warhead type: Comp-B, Blast type
- Fuze: Pressure actuated ,single & double action
- Arming delay: Arming delay of 60 ± 10 min
- Anti-removal device: Inbuilt electronic Module
- Self neutralization features: Inbuilt

Anti-Tank Bar Munition

This munition is designed to immobilise tracked armoured and wheeled vehicles in all types of terrain.



Salient Features/ Specifications:

- Weight of munition: 11.75 kg
- Dimensions: 1220 x 110 x 90 (in mm)
- Type of explosive charge & warhead Type: Comp-B, Blast type
- Fuze: pressure actuated, single & double action
- Safe arm time: Timer based arming delay
- Anti removal device: Inbuilt Electronic Module
- Safety features: 3 Layers of safety during transportation and laying
- Laying method: Manual and Mechanical
- Service life in storage: 10 years
- UNHD Compatibility: 1.1D

Mechanical Mine Layer (MML)

MML is a self-propelled mine layer which lays/ buries Anti-Tank (Bar mines). All the operations like trenching, dispensing, burying etc. are automatically carried out by electronic controller/ operator. The position of various actuator or mine is detected by sensors fitted at various location. The system can be operated by a crew of four. The system is equipped with a GPS based minefield mapping device which automatically stores location of laid mines with accuracy up to 50 cm.



Salient Features/ Specifications:

- Dimensions : Length (10.6 feet), Width(2700mm), Height(3350mm)
- Crew : 04
- Weight : 30 ton
- Auxiliary Engine Power : 134 hp
- Mine laying rate : Min. 270 mines/hr for 6m spacing
- Inter-mine spacing : 6m, 9m or 12 m
- Depth of trench : 12-22 cm below ground surface
- Recording accuracy : within 50 cm
- Slope negotiation : Fore slope : 9° (Plains), 6° (Semi-desert), 3° (Desert)
- Aft Slope : 4°
- Transverse Slope : 7°
- Maximum speed : 1.5 to 3 kmph during mine laying operation
- Carrier vehicle : 8 x 8 HMV
- Operating temperature : 0° to 45°C
- Mine storage : 338 Bar Mines

Self Propelled Mine Burier (SPMB)

It is used for laying Anti-Tank mines. The equipment digs pits at pre-defined intervals, places the mines and camouflages them. The pre-defined interval or inter-mine spacing can be decided by the user at the start of the mission. It is a semi-automatic equipment wherein dispensing and arming of the mine is done manually and all other operations are executed in autonomous mode in a pre-defined manner. The equipment records the details of minefields like type of mine laid, mine coordinates, depth of mine and inter-mine spacing along with date and time stamp for records.



Trenching Mode

Salient Features/ Specifications:

- Mine Laying rate : 200 at 3 m inter-mine spacing
- Inter-mine spacing : 3 – 30 m in steps of 3 m
- Mine Storage : 360 mines in four containers
- Maximum depth at which mine can be laid : 25 cm
- Recording accuracy : Within 50 cm
- Slope negotiation : Fore & Aft slope up to - 8°
- Transverse slope : - 9°
- Carrier vehicle : 8x 8 HMT
- Operating temperature : 0° to 45° C
- Dimensions : Length (11.9 m), Width(2.82 m), Height (3.6 m)
- Crew : Five (Including driver)
- Weight : 28 ton
- Engine power : 85 kW
(Auxiliary power pack)

Mine Field Marking Equipment

This equipment is based on carrier vehicle 6 x 6 HMT, designed for speedy marking/fencing of mine fields with minimal human intervention. Marking/fencing is carried out with the help of Long Angle Iron Pickets (LAIPs) and polypropylene rope. The pickets are—placed mechanically with the help of this equipment at an interval of 10/15 meters and the rope is tied manually at two locations on to the picket thus making a fence around the minefield.

It is a semi-automated equipment wherein handling of picket and tying of rope on to the picket is done manually. However, the most arduous task of hammering the picket into the ground up to the desired depth is done mechanically with in built automation (using on-board controller, sensors and pneumatic actuators).

The equipment is designed to operate in plains, semi-desert & desert terrain, in all weather conditions. The equipment also records the details of fencing operation like picket number, burying depth and inter-picket spacing .



Salient Features/ Specifications:

- Fencing rate : 1.2 kmph, with inter-picket distance 15 m
- Inter-picket spacing : 10 – 35 m in the step of 5 m
- Picket storage (No.) : 500
- Rope storage : 15 km
- Slope negotiation : Up to 15°
- Operating temperature : 0° to 45° C
- Dimensions : Length (9 m), Width (2.5 m), Height (3.75 m)
- Crew : Five (Including driver)
- Weight : 21 ton
- Power of Auxiliary power pack : 25 kW

Counter-Mine Flail

This system de-mines the area through hammering action. It either detonates or disintegrates the mines to create vehicle safe lane of 4.5m width in a single pass. The prime mover and the flail system can withstand blast of anti-tank mine with explosive content up to 9 kg of TNT equivalent, detonating under the flail unit.



Transport Mode



Mine clearing Mode

Salient Features/ Specifications:

- Flailing depth : 20 cm
- Flailing speed : 2 kmph
- Deployment time : 5 min.
- Slope negotiation : Gradient negotiation capability not less than 30%
- Operating temperature : Minus 5° to 55° centigrade.
- Dimensions : Width(3.59 m), Height (3.15 m)
- Weight : 43 ton
- Crew : 2 (Commander & Driver)
- Engine Power
 - o Prime mover (MBT T72) : 784 hp
 - o Aux powerpack for flail system : 665 hp

Personal Weapons

5.56 mm Indian Small Arms System (INSAS)

The INSAS is a modern gas-operated, magazine-fed and light-weight family of weapons (Rifle and Light Machine Gun) of 5.56 x 45mm caliber which can incapacitate personnel up to a range of 400 m. It is easy to field-strip, clean and maintain. The magazines are of 20 and 30 round capacity and are interchangeable between rifle and LMG.

Salient Features/ Specifications:

- Light weight and low recoil ensure easy carriage and operation
- Three round burst mode economizes ammunition usage
- Folding butt version used for paratroopers
- Transparent magazine facilitates visibility of rounds.
- Silencer/ suppressor can be attached
- Same ammunition for rifle and LMG
- Commonality of components for interchangeability
- Simplified and reduced maintenance & logistics
- Chrome plated barrel for enhanced barrel life
- Operation : Gas operation
- Modes: Single shot, Three round burst & safe
- Rifle Mass with loaded magazine : 4.1 kg
- Rifle Max length : 954 mm
- Rifle Folded length : 750 mm
- Rifle Barrel length :464 mm
- Sight : Iron, DLT, PNS
- Muzzle velocity : 900 m/s
- Rate of fire : 650 rpm
- Effective range : 400 m



5.56x30 mm Joint Venture Protective Carbine (JVPC)

This is a light weight, compact, gas operated, magazine fed, select fire weapon with a unique caliber for use in close combat counter-insurgency/counter terrorist (CI/CT) operations.



Salient Features/ Specification:

- Caliber : 5.56 x 30mm
- Weight(without magazine) <3.0 kg
- Length 560 mm (butt folded)
- Barrel length : 300 mm
- Operation : Gas
- Magazine capacity : 30 rds
- Mode of fire : Single & auto
- Sights : Iron, Reflex, laser spot designator.
- Accessories : Silencer, bayonet, sling, muzzle cap, BFA.

5.56x45 mm Close Quarter Battle (CQB) Carbine

It is a light weight, compact, effective weapon for use in close combat CI/CT operations developed to fire 5.56 x 45 mm INSAS in-service ammunition as well as 5.56 mm NATO ammunition. Effective range of the weapon is 200 m.



Salient Features/ Specification:

- Calibre : 5.56 x 45 mm
- Effective range : 200 m
- Max length : < 800 mm
- : < 650 mm Butt folded
- Overall weight (w/o magazine) : < 3.30 kg
- Operation : Gas operated
- Modes of fire : Single shot and auto
- Magazine capacity : 30 rounds
- Muzzle velocity : 850 m/s
- Rate of fire : 650-700 rds/ min
- Safety : Applied and Mechanical
- Sights : Iron, Reflex
- Picatinny rail : 3,6,9 & 12 o'clock

9x19 mm Machine Pistol

It is a self-loading pistol capable of firing single shot or in fully automatic mode. The 9x19 mm machine pistol can be described as a pistol style Personal Defence Weapon (PDW), capable of firing in single shot or fully automatic role. It is compact and lightweight, firing 9x19 mm calibre ammunition. It has higher accuracy and a longer effective range than normal pistol due to incorporation of longer barrel and collapsible buttstock or arm brace.



Salient Features/ Specification:

- Calibre : 9x19 mm
- Effective Range : 200 m
- Max length : < 650 mm
< 400 mm with butt folded
- Overall weight : < 2.5 kg
- Operation : Gas operated
- Locking : Rotating bolt
- Mode of fire : Single shot and auto
- Magazine capacity : 30 rounds
- Rate of fire : 600 min
- Safety : Applied and mechanical
- Sights : Iron, Reflex
- Picattinny rail : 3,6,9 & 12 o'clock

7.62 x 51 mm Light Machine Gun (LMG)

It is an automatic, gas operated bipod mounted and man-portable, belt fed firearm. The LMG comprises of rivetless machined body, with bipod, butt and recoil mitigation system. It can be used in sustained fire-support role.



Salient Features/ Specification:

- Commonality with MG -58, firing from the open bolt position.
- Safe, single shot and automatic mode of fire.
- 7 stage height adjustable & foldable bipod
- Capacity : 50 rds
- Caliber : 7.62 x 51mm
- Weight : 9 + 10% kg
- Length : Not more than 1200 mm
- Rate of fire : Not less than 600 RPM
- Life of the barrel : Not less than 20,000 rounds
- Accuracy : 9/10 Shots 12 cm x 12 cm
- Accessories : Spare barrel, blank firing attachment, sling
- Picattiny rails : MIL std 1913

Under Barrel Grenade Launcher (UBGL)

The UBGL is an add-on area weapon and a force-multiplier for engagement of massed troops in the open, enclosed spaces or in dead-ground, in addition to targets like vehicles and structures. It can be attached to the Indian Small Arm System rifle (INSAS) and AK-47 Assault Rifle and can be mounted/detached quickly under the forehand guard/ barrel of the rifles in field conditions. The 40x46mm grenade is fed from the rear of the tube and is operated by its built-in trigger assembly. It has its own sighting assembly with a back and foresight.



Salient Features/ Specifications:

- Wide choice of ammunition for different roles
- Can fire different variants of 40 mm grenades
- Can be upgraded to fire air bursting and non-lethal grenades.
- Location of trigger enables firing of both Rifle and UBGL
- Caliber : 40 X 46 mm
- Overall length : 450 mm
- Mass of launcher : 1.5 kg
- Loading type : Breech Loading
- Barrel length : 350 mm
- Back sight : Ladder sight (With 100,150,200,250,300 & 400 m)
- Fore sight : Post type
- Beta light sight : 100 m & 200 m in Ladder sight
300 m & 400 m in Bubble Sight
- Safety : Inbuilt safety for trigger operation & barrel locking
- Effective range : 400 m

MISSILE SYSTEMS





Surface to Air Missile System

This surface to air missile system provides short range air defence to mobile, semi-mobile and static vulnerable points / areas against multi directional air threats. Missile system can operate in autonomous or group mode of operation. The real time operating system and open system architecture of the weapon system provides fully automatic and network centric operation. It is available on prime mover – trailer or High Mobility Vehicles (HMV). It possesses state of the art active and passive ECCM features.



Salient Features/ Specifications:

- Target set : Fighter aircraft & helicopters
- Range (Min / Max) : 3.5 km to 25 km
- Warhead type : Pre-fragmented
- Altitude of engagement : 100 m to 18 km
- Altitude of deployment : upto 3000 m
- Mode of operation : Manual/ Semi auto/ fully auto
- Dimension & weight of missile : 5800 mm x Ø 350 mm, 710 kg
- Reliability / SSKP : > 88%
- Transportability : Road/ Rail/ Air
- Simultaneous multiple engagement : 4 Targets with 8 Missiles
- Data link : Command Guidance Unit with Uplink and Downlink
- Seeker / Guidance : Command Guidance
- Operating temperature : -20°C to +55°C, 95% Humidity

Anti-Tank Guided Missile

It is a 3rd Generation, fire & forget, lock-on before launch, top attack anti- tank guided missile. The platform for missile is built on BMP2K based Infantry combat vehicle carrying six missiles on the launcher platform in ready-to-fire state. The launcher has hunter – killer (gunner sight & commander sight) and amphibious capability and possess target handing-over capability (from the launcher to missile).

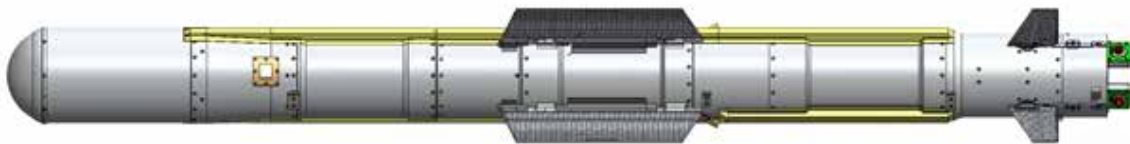


Salient Features/ Specifications:

- Max range : 5000 m
- Warhead type : Tandem warhead , Up to 5 km
- Altitude of deployment : 5000 m (AMSL)
- Mode of operation : Single & Salvo
- Size and weight of missile : 1832 mm x Ø 155 mm, 42 kg
- Reliability/SSKP : 90%
- Transportability : Air/ Road/ Water/ Tracked Vehicle
- Seeker/ Guidance : IIR Seeker Homing Guidance
- Operating temperature : -30°C to +55°C

Helicopter Launched Anti-Tank Guided Missile

Helicopter Launched Anti-Tank Guided Missile is a Fire and Forget Tandem Warhead Missile. The missile is effective against hard targets and armoured vehicles with conventional armour as well as Explosive Reactive Armour (ERA) in all weather conditions during day and night. Missiles can be carried in four launchers of two missiles each on helicopter hard-points to engage stationary as well as moving targets upto a range of 7 Km. The missile can be launched in hover condition or in forward speed, in direct and top attack modes.



Salient Features/ Specifications:

- Max Range : 7 Km
- High Resolution IIR seeker
- Lock-on-before-Launch (LOBL)
- Mode of Attack : Top & Direct Attack
- Four launchers and Eight Missiles (two on each launcher)



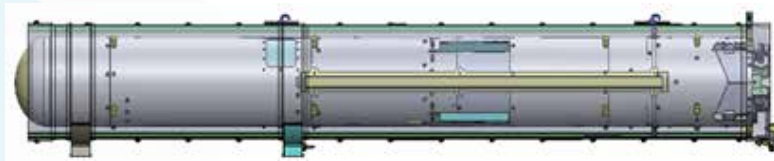
Firing at high altitude



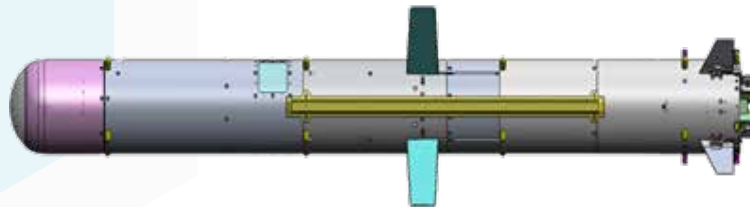
Two missile launcher

Man Portable Anti-Tank Guided Missile (MPATGM)

MPATGM is a Tripod Launched, 3rd generation ATGM for ranges from 200m to 2500m. The Weapon system is capable of operating from -20°C to +45°C and altitudes upto 3000m.



MPATGM in Tube



MPATGM

Salient Features/ Specifications:

- Missile Diameter 120 mm, In-tube Diameter 150mm
- Lock on Before Launch
- Soft Launch
- Top and direct attack mode
- Ground/ Vehicle – Dual Launch
- Day and Night Firing capability
- Accuracy $\geq 90\%$
- Tandem Warhead to defeat armour of > 600mm beyond ERA
- Total Weapon System Weight <30Kg
- Detection, Recognition and Identification (DRI) ranges for Target Acquisition: 4.5Km, 3.5Kms and 2.5Kms respectively



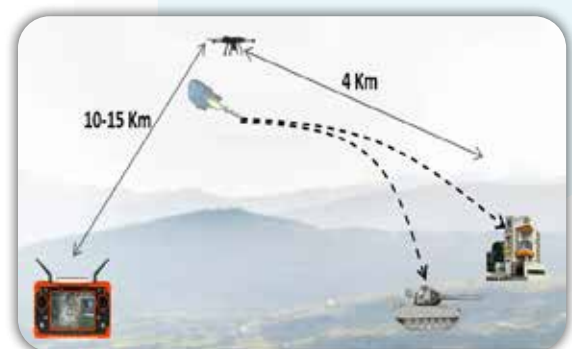
UAV Launched Precision Guided Missile (ULPGM)

ULPGM is an Air to Surface weapon released from Drones and is capable of hitting and destroying static/moving targets. It consists of dual sensor (visible & uncooled IR) strap-down seeker with day and night capability. It has a Modular warhead for varied applications, viz, Anti-Armour/ Penetration Cum Blast /Pre-Fragmentation. Supported by an Integrated Ground Control System for UAV and Missile, it has the capability to switch/ update targets post-launch.

Missile	
Parameter	Specification
Length, Diameter, Weight	890 mm, 100 mm, 8.5 Kg
Propulsion	Double base, Dual Thrust Rocket
Propulsive Range	Upto 4 Km
Launch mode	Lock on Before Launch
Warhead	2 Kg
Targets	Light moving Armoured Vehicles, Buildings, Bunkers, Wall Breach, Anti-Personnel



Launcher	
Parameter	Specification
Type	VTOL – Hex-copter
Range	15 Km
Endurance	35 minutes hover
High Alt Operation	Upto 4500m MSL
Carriage Capacity	10 Kg
All-up weight	70 Kg
Day and night Target Acquisition Sight Automated/Semi automated safe return to Home	



Operational Scenario

Very Short Range Air Defense System (VSHORADS)

This is a 4th generation Missile system for interception of fast moving, manoeuvring aerial targets. Equipped with an uncooled Imaging Infrared Seeker Homing Head, it has a very high SSKP and Hit to Kill Capability. Suitable for High Altitude operations, the system is easy to operate, has an advanced discrimination of IR flares and is immune to jamming due to the IIR Homing Head.



Launch tube with Missile



Missile



VSHORADS WEAPON SYSTEM
(With Tripod Launcher & Sighting System)

Parameter	Specification
Range	0.5 – 6km for targets at 10 m to 3.5 km AGL
Wt of Missile	21.5Kg
Missile Dimensions	Length: 2m & Diameter:90mm
Launcher	Man Portable Tripod Launcher (25 kg)
Homing Head	Uncooled IIR Seeker (LWIR band)
Propulsion	Dual Thrust Solid Propellant Rocket Motor
Warhead	Blast Fragmented Warhead

NAVAL SYSTEMS AND MATERIALS





Sonar Systems

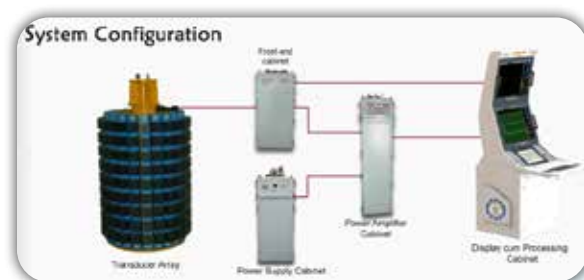
Hull Mounted Sonar

It is an advanced and compact sonar system designed for Anti-Submarine Warfare ships (ASW). It is an integrated active cum passive sonar system, specifically designed for installation on small to medium size platforms such as ASW corvettes and patrol vessels. It employs advanced adaptive signal and information processing techniques for detection, tracking and classification of targets. The hardware architecture is based on state of the art open-architecture processor technologies that will enable smooth upgrade of the system capabilities. A compact transducer array, modular front-end signal conditioning hardware and high efficiency switched mode power amplifiers make up the rest of the system.



Salient Features/ Specifications:

- Simultaneous active and passive operation
- Choice of cylindrical transducer arrays
- Auto target designation
- Audio in both active / passive modes
- Self-noise cancellation
- Beam stabilization for environmental adaptability
- Automatic LRU-level Fault Detection & Fault Localization
- Integrated sonar performance prediction
- Built – in simulator & sensor data recorder



Active Sonar Features

- Panoramic active detection in dual frequencies
- Waveforms – conventional & combo
- Selectable pulse lengths
- Selectable range scales
- Adaptive signal processing techniques
- Automatic tracking of multiple active targets

Passive Sonar Features

- Passive panoramic broadband surveillance
- Conventional and adaptive beam forming
- Automatic tracking of multiple passive targets
- Spectral analysis of the tracked targets
- Display formats with different integration time constants

Hull Mounted Torpedo Alert System

It is an extension to Hull Mounted Sonars (HMS) on ships part of Torpedo Alert System for detecting torpedoes. The signal from HMS transducer array is tapped after the pre-amplification of the signal, and the data is independently processed using unique torpedo detection algorithms. It carries out torpedo localization, quick target motion analysis and tracking with accuracy and subsequently it works out evasion/escape solutions. The system does not require a dedicated operator, rather the HMS operator himself can attend to the alert raised.

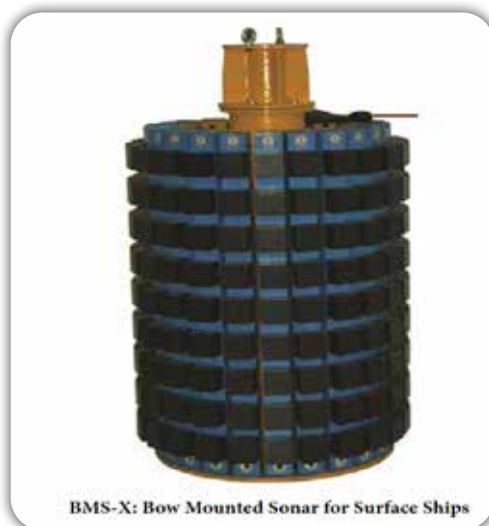


Salient Features/ Specifications:

- Portable & versatile system
- Advanced adaptive beam forming techniques for torpedo detection and tracking
- User-friendly system with excellent built-in Fault detection/fault Location (FDL)
- Unique algorithms for 'Auto Torpedo Recognition'
- Remote displays available for access to information at multiple locations
- Real-time data recording & online/ offline processing

Bow Mounted Sonar for Surface Ships

Bow Mounted Sonar for Surface Ships is similar to Hull Mounted Sonar. It is designed for fitting at the bow of the ship. It consists of common Wide band acoustic transducer array catering to multiple requirements of active sonar and passive sonar.

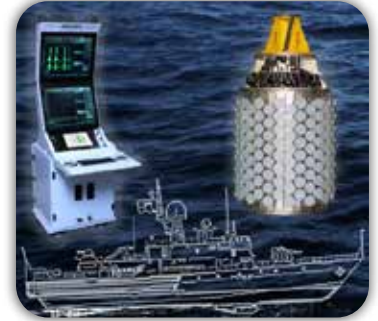


Salient Features/ Specifications:

- Simultaneous active & passive operation
- Choice of cylindrical transducer arrays
- Automatic LRU-level fault detection & fault localization
- Integrated sonar performance prediction
- Built-in simulator and sensor data recorder simultaneous detection upto 4 targets
- Simultaneous active and passive detection and tracking upto 8 targets
- Intercept detection
- Selectable Bandwidth and Pulse Width

Compact Hull Mounted Sonar for Small Surface Vessels

This is an advanced and compact sonar system designed for ASW ships. It is an integrated active cum passive sonar system, specifically targeted for installation on small to medium platforms such as ASW corvettes and patrol vessels. It detects, tracks and classifies targets. The hardware architecture is based on open-architecture processor technologies that enable smooth upgrade of the system capabilities. A compact transducer array, modular front-end signal conditioning hardware and high-efficiency switched-mode power amplifiers make up the rest of the system.



Salient Features/ Specifications:

- Choice of cylindrical transducer arrays
- Auto target designation
- Automatic LRU-level fault detection & fault localization

Active Sonar Features

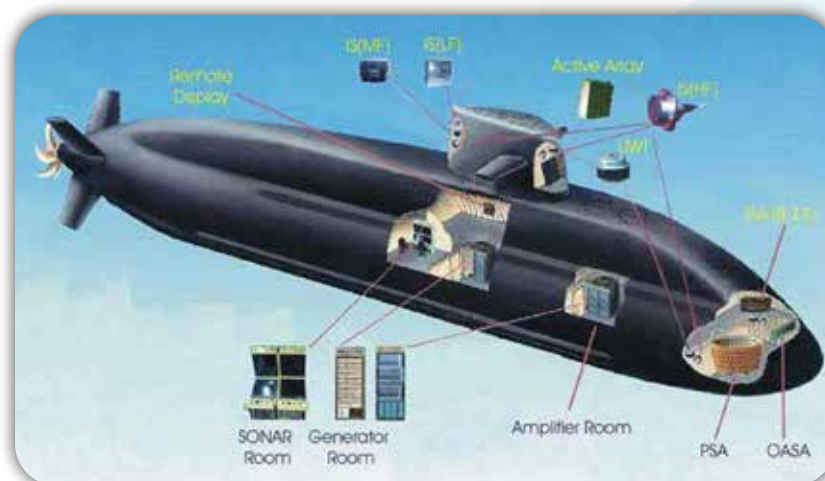
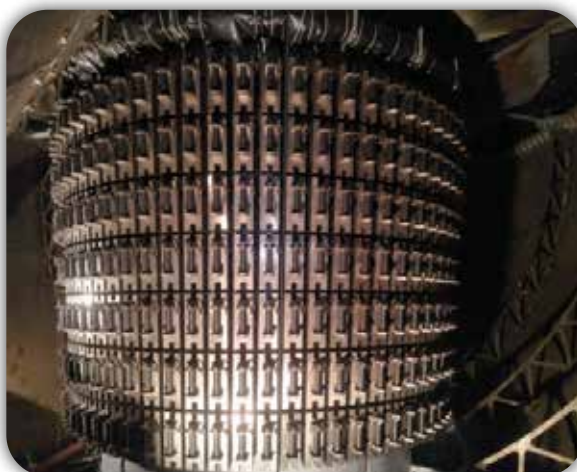
- Panoramic active detection in dual frequencies
- Waveforms – conventional and combo
- Selectable pulse lengths and range scales
- Adaptive signal processing techniques
- Automatic tracking of multiple active targets

Passive Sonar Features

- Passive panoramic broadband surveillance
- Conventional and adaptive beam forming
- Automatic tracking of multiple passive targets
- Spectral analysis of the tracked targets
- Display formats with different integration time constants

Submarine Sonar Suite

This integrated suite of sonar systems for installation on-board submarine, it is essentially a compendium of multiple sensors for surface and sub-surface target detection. The constituent sonars in the suite include passive sonar, active sonar, intercept sonar, obstacle avoidance sonar and underwater telephony. It collates different characteristics of the same target through multiple sensors and provides target data through information fusion. The suite incorporates advanced signal processing techniques and state of the art hardware platforms. It is scalable to suit submarine platforms with varying levels of displacement capacity.



Salient Features/ Specifications:

- Passive sonar > 30 km.
- Active sonar > 16 km.
- Detection range of intercept sonar > 50 km with 360° coverage.
- Obstacle avoidance sonar has a detection capability of 2000 m for 0.4 m radius target.
- Communication range of underwater communication system is more than 8 km in all modes.
- The suite is capable of continuous operation of more than 1000 hrs.

Low Frequency Dunking Sonar (LFDS)

LFDS is an airborne sonar system which can be deployed from rotary wing platforms, for effectively acting as force multiplier for naval ships. It provides the advantages of lower frequency combined with higher source level for range advantage in littoral Anti-Submarine Warfare (ASW). It enables deployment of sensors to deeper depths for detection of deep dived submarines, thereby substantially enhancing performance. It is capable of simultaneously processing inputs from sonobuoys and operating the dunking sonar for establishing exact range and bearing of targets with active low frequency transmission.

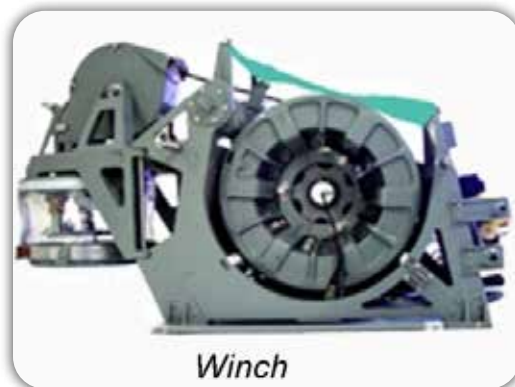


Salient Features/ Specifications:

- Both Sonar & Sonics functions integrated into a single system
- Both active and passive sonar modes
- Software Defined Radio for Homing & VHF systems
- Foldable array for higher acoustic aperture
- Capabilities for target localization and classification
- Low frequency for extended ranges

Cutting Edge Technology

- Electromechanical actuator for stave folding mechanism
- Low frequency projector array of Flex-tensional Transducers
- Dual stave configuration for receiving hydrophones array
- On-board electronics using state-of-the-art COTS-like technology
- Sensors for monitoring heading, depth, temperature, leak and tilt
- Echo-sounding for bottom proximity



Passive Towed Array Sonar for Surface Ships

This system provides the advantage of towing a large array of hydrophones, with inbuilt provision for instant resolution of target bearing ambiguity. It consists of a towed sensor array, armoured tow cable, winch and onboard electronics. PTAS uses the Network Towed Array (NTA), which has an efficient signal telemetry scheme, envisages a modular architecture and reduction in the amount of wiring.



Salient Features/ Specifications:

- Towed array sensors to track & detect silent submarines
- Excellent signal to noise ratio
- NTA data telemetry with 16 channels
- Digitization of array information & conversion to Ethernet format

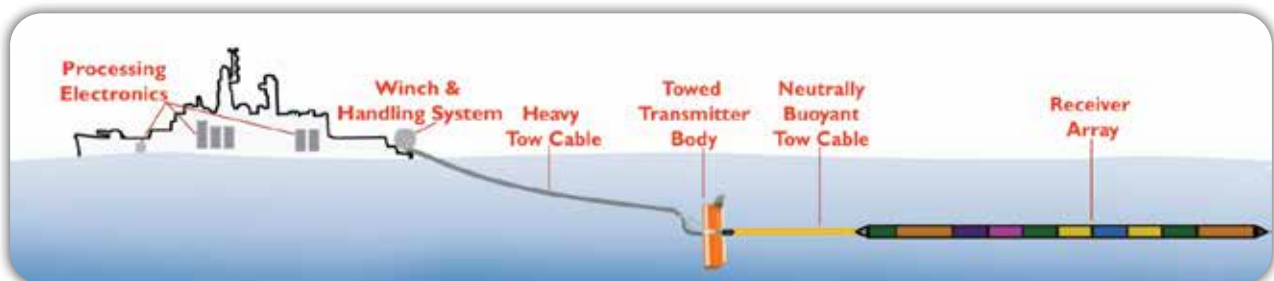
Advanced Light Towed Array Sonar

It is a variable-depth surface-ship sonar system designed for detecting, localizing, and classifying silent submarines in active and passive modes. It provides early warning of torpedo attacks, thereby strengthening the Anti-Submarine Warfare (ASW) capabilities of advanced warships. It has a long array to exploit the low-frequency spectrum of the radiated noise, low propagation losses, the capability to operate at different depths to make the best use of prevailing hydrological conditions, with minimal impact from noise of its own platform.



Salient Features/ Specifications:

- Low frequency variable depth sonar
- Advanced adaptive beam forming techniques for detection and tracking of silent submarines
- Transmit waveforms, pulse lengths, bandwidths and range scales.
- Adaptive noise cancellation and own Doppler nullification techniques
- Advanced signal processing techniques for broadband and narrowband functions
- User-friendly system with excellent built in FDFL
- Real time data recording for online/offline processing
- Feasible for fitment on destroyers, frigates, corvettes and OPVs.



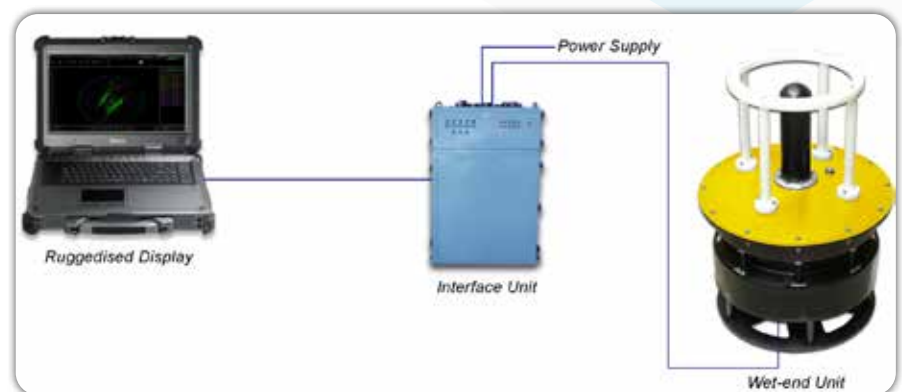
Portable Diver Detection Sonar

This is a portable sonar system capable of detecting potential underwater threats such as divers and diver delivery vehicles in various weather and water conditions. The system alerts the operator to confirm the type of threat, allowing effective countermeasures to be initiated promptly. The system can be deployed either outboard on a ship or at any location in a harbour, typically beside a wall, pier, or at the sea bottom. The system comprises two parts: an underwater unit and a shore unit, interconnected by a water-blocked cable carrying data and power supply lines. The underwater unit includes a sonar head with transducer arrays, a transmitter, and front-end receiver electronics hardware. The shore unit consists of processing and display units, a data recorder, and power supply. As an auto-alert system, it automatically detects, tracks, and classifies divers or diver-like targets, alerting the operator with target position (range and bearing) and target dynamics (speed and course) information.



Salient Features/ Specifications:

- High frequency sonar with extended detection range
- Built-in sensors for temperature, humidity, heading, tilt and depth
- Range of detection: Not less than 300m
- Resolution: 0.01 m
- Continuous operation: 24 x 7
- Target strength: > -20 dB
- Detection range: 300m
- Coverage sector: 360° Azimuth, 6° Elevation
- Deployment scheme: Out-board ship, Pier or harbour
- Dimension: 0.45 m (dia)
- Weight in air: ~ 50 kg
- Operating depth: Up to 20 m
- Range resolution: 1 m
- Bearing resolution: 1°



Sonar System Simulators

Submarine Sonar Simulator

Submarine Sonar Simulator is a simulator system, in which training can be imparted to operators in all the modes of operation and maintenance of a submarine sonar suite.

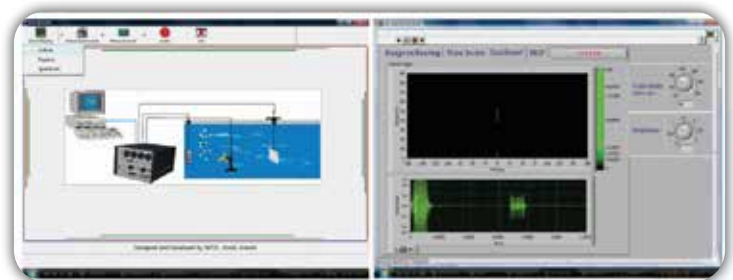


Salient Features/ Specifications:

- Actual operational scene is simulated.
- Considers operational area, environmental parameters, own ship trajectory, target trajectories, target specific spectral parameters, transmission parameters and machinery regime parameters.
- The sonar simulator generates the sonar output corresponding to the set external scenario and the sonar configuration settings.
- Software modules for sensor data simulation, data processing and recording
- 3D view of operational area.

Automated SONAR Trainer

The underwater Acoustics Trainer bridges the gap between theoretical understanding of sonar principles and practical training on a sonar simulator. The system comprises a transparent acoustic tank with provisions for positioning projectors and hydrophones, a control console, and a data acquisition unit connected to a computer. The bench-mounted, transparent acoustic tank, measuring 100cm x 60cm x 50cm, holds over 250 litres of water. A target transportation system is used for positioning targets and projectors at specified distance.



Salient Features/ Specifications:

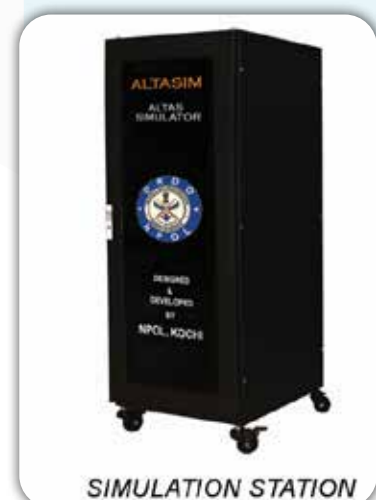
- Demonstration of active & passive sonar, doppler effect , scattering effect and range resolution
- Selectable pulse length, power level and range
- Customised target motion control and target noise generation
- Additional function generator, Oscilloscope and multimeter operation modes

Advanced Light Towed Array Sonar Simulator

This ship-borne towed array sonar is designed to operate in a low-frequency band and variable depths. It comprises a towed receiver array, towed projector unit, winch & handling system, on-board electronics, and system software. The simulator, a PC-based sonar simulator, imparts training on Sonar functionalities and operational details. It can simulate both Vessel dynamics and ocean environment, with an added 3D scenario viewer.

Salient Features/ Specifications:

- A generic configurable sonar simulator using COTS Technology
- Simulation functions using Matlab/C++ on Linux platform
- 3D Simulation of target trajectories/dynamics
- Facility for towed array deployment simulation
- Own ship maneuverability
- Detailed control of target parameters
- Replay of recorded data from field trials
- Replica shipboard console with same 'look and feel' as operational equipment



Torpedo Advanced Light (TAL)

The Torpedo Advanced Light is capable of launch from ships and rotary/fixed-wing aircraft. It targets submarines in shallow and deep waters. It performs pre-programmed search patterns, detects the target, and homes in on the submarine. Operating in both active and passive modes, equipped with digital control and guidance, its guidance system includes pursuit and deviated pursuit modes to maximize hit probability.



Salient Features/ Specifications:

- Acoustic homing (Active/Passive)
- Battery : Sea water activated
- Dimension : Diameter 324mm x 2752 mm (Length)
- Weight : 220 kg (War shot Version), 197.5 Kg (Training Version)
- Propulsion : Electrical
- Explosive weight : 42 kg
- Speed : 33 kts
- Endurance : 6 min
- Range : 6 km
- Depth of operation : 450 m

Heavy Weight Torpedo

It is a ship launched Heavy Weight Anti-Submarine Electric Torpedo capable of targeting quiet, anechoic material coated submarines, both in deep and shallow waters in intense countermeasures environment. It can be fired from the SNGs.

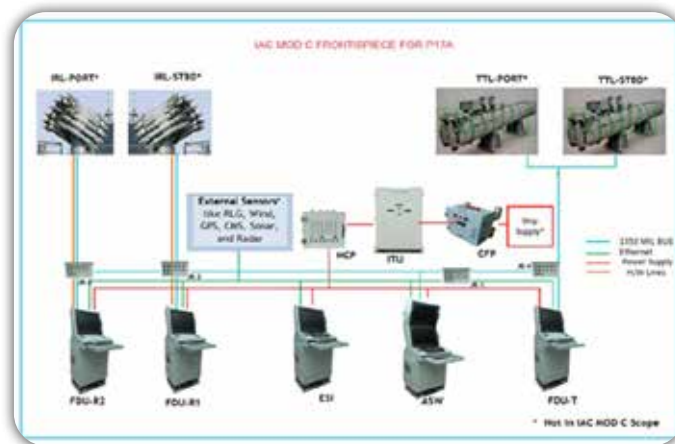


Salient Features/ Specifications:

- Speed : 40 kts
- Depth of operation : up to 500 m
- Dimensions : 534mm diameter, 7.8m length
- Weight : 1900 kg (combat), 1600 kg (practice)
- High speed electric propulsion with CRDC motor with 250kw power output
- Zinc oxide silver battery
- Insensitive Munitions Warhead

Torpedo Fire Control System

Torpedo Fire Control System (FCS) for ships, provides a sensor-to-weapon end-to-end solution. It can accurately track multiple surface and subsurface targets and launch torpedoes, ASW rockets, and decoys. The system tracks enemy ships & submarines, generates attack solutions, and facilitates ASWO tactical decisions. It can recommend attack manoeuvres and evasive tactics.



Salient Features/ Specifications:

- Dimensions: Console- Height (1900 mm), Width (650 mm), Depth (850 mm), Weight (250 kg)
- Integrated console for control and monitoring weapons systems.
- Tracking up to 8 Active and 8 Passive tracks.
- Generation of attack solution in 30 s.
- Redundancy to enhance availability of system.

Anti – Torpedo Decoy System

The Anti-Torpedo Decoy System generates tactics (own ship manoeuvring recommendations and decoy deployment patterns) and launches decoys to protect ships from enemy torpedoes. It consists of a Fire Control System (FCS), Expendable Decoy (ED), and Decoy Launcher (DL). The FCS uses onboard sonar data to identify incoming torpedoes and generates tactical solutions for decoy deployment patterns and own ship escape manoeuvres. The ED deceives enemy torpedoes, deployable in various modes including remote, local, and manual. Deployable from decoy launcher in various modes viz. remote, local and manual. The decoy can be deployed by hand also in case of non-availability of launcher. The decoy launcher supports single/salvo deployment of decoys.



Salient Features/ Specifications:

- Fire Control Dimension : Console Height (1900 mm), Width (620 mm), Depth (820 mm), Weight (300 kg)
- Weapon data converter Dimension : Height (1400 mm), Width (620 mm), Depth (820 mm), Weight (250 kgs)
- Decoy launcher Dimension : Height (1600 mm), Width (135 mm), Depth (1600 mm Tube Length)
- FCS : Open system architecture and modular approach.
- Expendable decoy : Programmable (ship libs, modes)
- Decoy Launcher : 10 Barrels, (Hz: 0-360; Voltage -5- 35)
- Safety interlocks

Advanced Torpedo Defence System

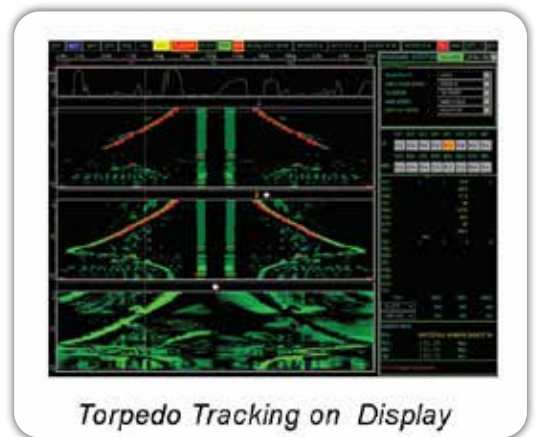
This complete package involves sensors and decoys for defence against both vintage and modern torpedoes. It is a fully integrated system with torpedo detection and countermeasure capabilities. The system receives inputs from Hull Mounted Sonar (HMS) and Towed Array Sonar (TAS) for panoramic torpedo detection and tracking. Acoustic decoying utilizes both towed decoy and expendable decoys, and a hydraulically operated winch system launches and retrieves the complete wet end including towed array sonar and towed decoy. The Fire Control System (FCS) processes sonar data to localize torpedoes and provides critical information for evading torpedoes.

Salient Features/ Specifications

- Automatic detection and alert of acoustic homing torpedoes (passive and active)
- Acoustic decoying of the torpedo
- Classification of torpedo along with localization and target motion parameters
- Advanced adaptive beam forming techniques for torpedo detection and tracking
- Intelligent soft kill decoy systems with multi mode operational capability
- Appended with Left-right ambiguity resolving module in the towed array sonar
- Real time data recording & online / offline processing
- Unique auto torpedo recognition algorithms
- Escape solutions on the most appropriate manoeuvre and countermeasure Actions
- Custom configurability for ASW & Non ASW platforms



Operator Console



Torpedo Tracking on Display



Expendable Decoy (ED)

Expendable Decoy is a versatile countermeasure to seduce/ deceive incoming enemy torpedo by mimicking own ship. It is deployable from decoy launcher in various modes viz; remote, local and manual. It is compact and low weight, can be deployed manually in case of non-availability of launcher.



Salient Features/ Specifications:

- Effective range : 2000 m
- Endurance : 8 min
- Dimensions : 100mm diameter and x 1060mm length
- Weight : 6.1 kg
- Frequency band covers vintage and modern torpedoes.
- Own ship lib can be ported in decoy.

Submarine Fired Decoy-Soft Kill Countermeasure

The Submarine Fired Decoy is a soft kill countermeasure designed to protect submarine platforms from hostile torpedo attack. Deployed in a pattern, it operates in various mode and sinking rates to jam, seduce, and confuse attacking torpedos, thereby safeguarding the mother platform. Compatible with C303 launchers, it offers higher endurance and source levels for increased effectiveness against torpedo threats.

Salient Features/ Specifications:

- Advance algorithm for seduction logic
- Effective against active and passive homing torpedo
- Higher endurance and source level
- Advance signal processing hardware
- Dimension : 76.2 mm x 1125 mm
- Weight : 5.3 Kg

Standard Underwater Projectors and Hydrophones

Test Projector: NP-20

NP-20 is a standard test projector for acoustic measurements in the low and medium frequency band. It is used as an acoustic source for calibration of other transducers and for characterisation of passive materials in the frequencies up to 60 kHz.



Salient Features/ Specifications:

- Resonance frequency : 21 kHz
- TVR (dB ref 1 μ Pa/V at 1 m) : 148 dB @ 20 kHz
- Source Level (dB re 1 μ Pa at 1 m) : 198 dB @ 20 kHz @ 400 W
- Max. Input Power : 400 W
- Directionality : Omni (Horizontal) Toroidal (Vertical)
- Max operating depth : 300 m
- Capacitance : 80 nF with 30 m cable
- Weight : 2 kg
- Dimension : 60mm outer diameter and 346 mm length
- Cable connection : Two core shielded cable
- Insulation resistance : 1000 Mega-Ohms @ 1000V DC

Test Projector : NP-30

NP-30 is a standard test projector for acoustic measurements in the medium and high frequency band. It is used as an acoustic source for calibration of other transducers and for characterization of passive materials in the frequencies up to 100 kHz.



Salient Features/ Specifications:

- Resonance frequency : 30 kHz
- Frequency band : 5-100 kHz
- TVR (dB ref 1 μ Pa/V at 1 m) : 148 dB @ 30 kHz
- Source Level (dB re 1 μ Pa at 1 m) : 197 dB @ 30 kHz @ 200 W
- Max. input power : 300 W (10% duty cycle)
- RS (Ref 1 V/ μ Pa) : -195 dB @ 30 kHz
- Directionality : Horizontal omni, Vertical Torodial
- Weight in air : 0.9 kg
- Dimensions : 45 mm (outer diameter) x 290 (length) mm
- Cable connection : Two core shielded cable
- Insulation resistance : 1000 Mega-Ohms @ 1000V DC

Standard Hydrophone (NP-H)

NP-H is a low frequency, high sensitivity standard hydrophone for acoustic measurement. It is used for calibration of other transducers and for characterization of passive materials.



Salient Features/ Specifications:

- Frequency Band : Up to 80 kHz
- RS (dB ref V/ μ Pa) : -203 ± 2 dB
- Directionality : Omni
- Dimension : 22mm Outer Diameter and 122mm length
- Insulation resistance : >500 Mega Ohms @ 100V DC
- Max operating depth : 300 m
- Weight in air : 1.45 kg
- Encapsulant : Neoprene Rubber
- Cable connection : Two core shielded cable

Composite Anti-Vibration Mounts

Composite Anti-Vibration Mount (CAVM)

Composite Anti Vibration Mount is a high load capacity mount with minimum creep and least failure due to misalignment with high cyclic fatigue life. It is available in two variants, for rated loads of 220 kg and 1200 kg.



Salient Features/ Specifications:

- Resonance : 20Hz
- Vibration isolation : >25 Hz
- Vibration damping : upto 60dB
- Shock isolation : 60% upto 220g
- Deflection : 0.6+0.3 mm
- Dimension : 447 mm x 244 mm x 125 mm

Rubber Anti Vibration Mounts

These mounts are used extensively in naval platforms and provide insulation to on-board machinery against the effects of underwater explosions and minimize machinery vibrations from transmitting to the hull of platform. Rubber anti vibration elastomeric mount have superior shock and vibration isolation capability.



Salient Features/ Specifications:

- Vibration damping : upto 60dB
- Shock isolation : 60% upto 220g
- Shelf life : >5 years
- Service life : > 15 Years
- Deflection @ rated load : 0.6+0.3 mm
- Capacities : 15, 25, 85, 120 & 220 kg

Magnetorheological Fluid Semi-active Anti-vibration Mount (Load Rating 60 kg)

The Magnetorheological Fluid Semi-Active Anti-Vibration Mount features a load-bearing elastomer, an MR fluid chamber, a micro-electro-mechanical system (MEMS) based vibration sensor, and an electronic controller for a closed-loop feedback mechanism. The controller regulates solenoid current in the MR fluid chamber, adjusting fluid flow through the valve. The mount provides both passive and active damping, switching automatically from passive to active mode when vibrations exceed a threshold programmed in the controller.



Salient Features/ Specifications:

Load rating	: 60kg
Greater dB reduction between 10 – 50 Hz region compared to Passive mounts	
Shock test (MIL-STD-810-F)	: 70g, 8 ms, 3 axis
Salt spray test (MIL-STD-810-F)	: Qualified
Cold storage tests (MIL-STD-810-F)	: -70 °C for 72 h
Endurance test (JSS 55555)	: 5 lakh cycle sinusoidal at resonance @ 60 kg
Oil immersion test (MIL-STD-810-F)	: in Servo Prime 78 oil for 72 h
Vibration transmissibility test (JSS 55555):	1 Hz - 2 kHz, @ 0.1 – 2 g
Static load vs deflection (JSS55555)	: ≤ 5 mm at 60 kg
Electromagnetic tests (IEC 61000)	: CISPR 11:2010

Magnetorheological Fluid Anti-Vibration Mount (Load Rating 120 Kg)

This is a feedback controlled closed loop Magnetorheological (MR) anti-vibration mount utilizing MR fluid as the working fluid to enable dynamic damping and isolation of the incoming vibration. The mount consists of an elastomer element as spring and a MR fluid chamber with solenoid as dash-pot. A MEMS accelerometer is mounted on vibration machinery which picks up the vibration spectrum and passes the information to an electronic control unit. The embedded algorithm further calculates the power requirement in the solenoid of MR mount and appropriately draws power from a DC power supply unit.



Salient Features/ Specifications:

Load Rating	: 120 ± 10 kg
Height	: 65 ± 2 mm
Base footprint	: 200 mm dia
Shock tolerance	: 70g for 8 ms transient & >2g for continuous use
Operating frequency	: >20 Hz
Static load deflection	: 2 ± 1 mm under full load
Dynamic deflection	: 2 mm
Damping at resonance	: 3 ± 1 dB
Operating voltage	: 12 VDC

Maximum current requirement per mount: 2 A

Environmental tolerance: Hydraulic oil, Salt fog, Low temperature, vibration tolerance of CU

Tolerance towards EM, EM Polarization, Induced RF field, Static Discharge

Electromagnetic emission, Within tolerance level specified in IEC 61000

Air Droppable Container (ADC-150)

Air-droppable container is designed for delivery of critical engineering stores and supplies to platforms in distress over 2000km at sea. It features a GPS system for location identification and incorporates a rechargeable battery for extended use.



Salient Features/ Specifications:

- Two stage parachute
- Capability to withstand high shock
- Pay load capacity : 150 kg
- Dimensions : Dia (324 mm), Length (2023 mm)
- Weight : 130 kg
- Material of Container : GFRP

Underwater Acoustics Communication System

A compact version of the 3rd generation Underwater Wireless Acoustic Communication System, built on Software Defined Radio (SDR) architecture. This system employs advanced modulation and coding techniques, data recording, and analysis features. It offers a tuneable wideband communication capability over multiple bands in Voice (NATO / EKM) and data communication modes. Alongside operational flexibility through a comprehensive GUI, it also supports remote operation and monitoring through standard networking technologies. The transducer array is flexible for hull-mounted or portable manual deployment.

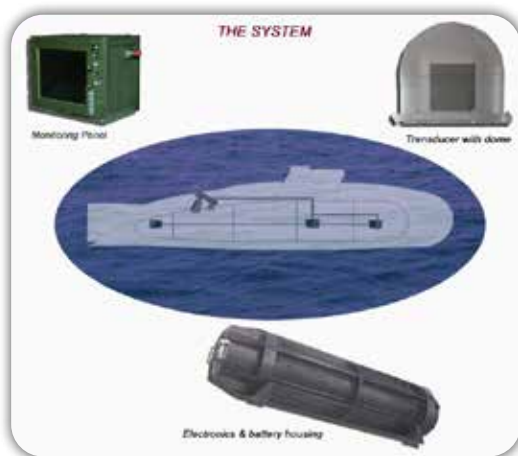
Salient Features/ Specifications:

- Optional IEEE 1588 based synchronization
- Optional GPS interface
- Online and offline analysis
- Tunable carrier frequency for multiple standards
- CSK based robust long range mode
- Compact single enclosure design
- Dimensions in mm : 350 (W) x 400 (D) x 550 (H)
- Weight : 50 kg
- Display : 15" Touch Screen
- Modulation : CSK
- FEC Coding : Optional
- Inter-leaver : Optional
- Operation mode : Half Duplex
- Mobility support : High



Emergency Sound Signalling Device (Beacon Sonar) for Submarine

The Emergency Sound Signalling Device is a life-saving alarm system. It indicates when a platform is in distress, facilitating quick rescue and salvage operations. Designed to transmit sonar signals of a pre-designated frequency and pulse shape during an emergency while submerged, it attracts the attention of passive surveillance sonar on nearby ships or submarines, or standard rescue vessels in operation.



Salient Features/ Specifications:

- Functional in deep water
- High endurance batteries
- Automatic and manual emergency activation
- Analog and digital realisation of electronic circuits
- Pressure-tolerant monitoring panel.
- Network-based control and monitoring
- High accuracy fast digital output pressure transducer
- Automatic activation by pressure sensing / cable cut
- Power over Ethernet
- Hull penetration through underwater connectors

Own Noise Measurement & Analysis System

This system can be installed on-board any ship or submarine for continuous monitoring and localization of abnormal noise levels from the platform, radiated noise around passive sonar arrays, and measurement of cavitation noise. The system comprises on-board sensors (accelerometers) and outboard sensors (hydrophones). It monitors external noise and internal vibration around the vessel, including propeller cavitation, facilitating the identification of noise sources and vibrations for preventive intervention. Data obtained can be interfaced with sensors or evaluators of underwater acoustic systems.



Salient Features/ Specifications:

- Audio for selected sensors
- Multi point measurement of external noise
- Vibration measurements at critical frames
- Flexibility in positioning monitoring station
- Fully networked data bus
- Scalability of sensors with flexibility in layout
- Provides real time input for the passive sonar for automatic gain control and noise cancellation
- Modular and easily scalable to any platform requirement

Integrated Coastal Surveillance System

A suite of sensors offering round-the-clock electronic surveillance of the coastline. Sensors include Coastal Surveillance Radar, Electro-Optic Cameras, Indian Automatic Identification System (I-AIS), Diver Detection System, and Communication Target Interception System (CTIS). Integrated display of targets from each sensor is shown on a Common Operating Picture. The system fuses and displays targets from different sensors as a single target based on position and movement coherence. The system includes a decision support feature analyzing target movement and providing automatic alerts to operators for suspicious movement pattern. Wide area networking solution connect sensors to servers and processors in control station geographically separated.



Salient Features/ Specifications:

- Detects and tracks very small non-cooperative targets in extreme environments and harsh weather
- Facility for replay of recorded target information
- Handles up to one million tracks and predicts future movement of targets
- AI based inference generation, event correlation, self learning and pattern recognition
- Modular design that can be configured for customized application and optimized for local weather condition
- Interference rejection and resistance to extreme environment
- Provides useful information to boatmen while at sea on international-border-crossing alert, potential fish finding zone
- Sea weather forecast & cyclone/tsunami warning



Composite Sonar Dome for Naval Ships

The Sonar Dome is a component of Anti-Submarine Warfare (ASW) in surface ship. It's mounted at the bow of the ship, housing a sonar array, protecting it from hostile conditions like slamming and shock loading. The dome is acoustically transparent yet structurally robust. The sandwich construction in the window region is acoustically transparent and realized through Vacuum Assisted Resin Transfer Molding (VARTM) process for low insertion loss in the required frequency range.



Salient Features/ Specifications:

- Thickness variation : 21 mm to 60 mm
- Low maintenance and corrosion resistant
- Dimensions : 10.5 m x 3.0 m x 3.0 m
- Weight : 7.5 ton
- Material for construction – GFRP
- Baffle for enhancement in performance

Submarine Escape System

Used to rescue submariners from abandoned submarines up to a depth of 100 m, the Submarine Escape System comprises two subsystems, the Hydro Suit and Breathing Apparatus. A positively buoyant system provides an ascent rate of 1 m/s during escape, with the Hydro Suit offering adequate buoyancy for flotation on the sea surface. The Breathing Apparatus supplies the necessary breathing gases for different depths, safeguarding submariners as per underwater physiology.



Salient Features/ Specifications:

- Dimension : 220 cm (approx.)
- Weight : 24.5 kg (approx.)
- Hydro suit and Breathing bag made of Neoprene coated nylon fabric. Metal components made of non-ferrous alloys.
- System with Automatic Demand Valve, Valve Box, Pressure Relief Safety Valve, Trimix cylinder with reducer, Pure Oxygen cylinder with reducer cum feeder, Regenerative canister and inflation cylinders.

Materials

High Nitrogen Steel (HNS) for Armour Applications

Traditionally, ultra-high-strength low-alloy steels with tempered martensitic microstructures have been used in various armor applications. High nitrogen, nickel-free steels with a significant nitrogen content represent a recent group of materials with versatile properties. Apart from savings due to the absence of nickel, these steels combine strength, toughness, corrosion resistance, wear resistance, and non-magnetic characteristics. High Nitrogen Steel (HNS) finds potential applications in infantry combat vehicles, main battle tanks, helicopters and naval vessels.

Salient Features/ Specifications:

Ballistic performance: Equivalent or superior to RHA against soft projectiles (7.62 ball, AK-47), armour-piercing projectiles (7.62 AP, 12.7 AP, 14.5 AP) and tungsten heavy alloy long rod penetrator (WHA).

- Density : 7.7 g/cc
- Specific heat : 477 J / kgK
- Modulus of elasticity : 195 GPa
- Thermal conductivity : 16.5 W/ mK
- Electrical resistivity : 68.5 μ ohm cm
- Melting range : 1350-1420°C
- Coefficient of thermal expansion : 16×10^{-6} / K

Mechanical properties (at room temperature)

Thickness range (mm)	Yield Strength (MPa) (min)	Ultimate Tensile Strength (MPa) (min)	%Elongation (min)	CVN@RT (min)	Hardness (HV) (min)
3-8	1000	1100	20	-	370
9-16	800	950	35	200	320
20-50	700	850	50	250	275

Rubber Tiles for Submarines

The synthetic rubber tiles are used on outer steel hull of submarine for suppression of sound reflection from outer hull and reduction of own self noise transmission from within the submarine. It is a multi-layer tile with an outer protective layer and inner sound absorbing layer with specially designed cavities. The tiles are applied by treatment of the surface and bonding using high strength adhesives and sealing the joints using water resistant sealing compound.



Salient Features/ Specifications:

- Temperature range : +4°C to +30°C
- Standards : ASTM D297, ASTM D2240, ASTM D412, ASTM D471, ASTM D395, ASTM D573
- Dimensions : Length (980±5 mm), Width (980 ± 5 mm), Thickness (51 ± 1.5 mm)
- Weight : 51 ± 2 Kg
- Underwater acoustic stealth performance- Insertion Loss : Minimum 6 dB
- Echo Reduction : Minimum 9 dB
- Service life : 20 years

Accelerated Bioremediation for Mitigation of Marine Oil Pollution

It is an eco-friendly technology to combat oil pollution in seawater in a rapid and effective manner. This product comprises of 'BIOMIX' a mix of three highly potent oil degrading bacteria and 'NUTRIMIX'; a nontoxic, oleophilic nutrient formulation as bacterial growth enhancer for rapid removal of pollutant oil. Complete oil bioremediation takes place within 24 - 48 hrs. This technology is safe and cost effective as compared to conventional cleanup methods which are cumbersome and pose environmental risks.



Spraying of BIOMIX



Cleared in 24 hrs

Salient Features/ Specifications:

- Suitable for weathered oil, HSD, Crude oil spills in marine water.
- User friendly one step spray application method of bioremediation agents.
- Emulsification, dispersion & degradation of pollutant oil results in bioremediation.
- Areas of application: Naval dockyards, Coast Guard, Oil refineries, Commercial ports

Porous Conducting Carbon Paper for Fuel Cell Application

Thin carbon paper is used for making gas diffusion electrodes of Phosphoric Acid Fuel Cell (PAFC) and Proton Exchange Membrane Fuel Cell (PEMFC). These are light weight composite panel corrosion resistant filtration media.



Salient Features/ Specifications:

- Dimensions : 450 mm x 350 mm x 350 mm
- Porosity : 75%
- Electrical resistivity : <math><0.07\text{ nem}</math>
- Pore size distribution : 10 to 60 Jm
- Flexural strength : >40MPa

Polyurea Coatings

Polyurea coating aids in improving the blast survivability of existing structures and also used as a protective coating on military vehicles. The coating is resistant to chemicals, rapid curing and zero shrinkage having tuneable properties.



Salient Features/Specifications:

- Tensile strength : $15.6 \pm 0.5\text{ MPa}$
- Elongation : $265 \pm 9\%$.
- Balanced mechanical properties (high strength and elongation)
- Service temperature range : $-30\text{ }^{\circ}\text{C}$ to $250\text{ }^{\circ}\text{C}$
- High strain to failure (when subjected to dynamic load)



ELECTRONICS AND COMMUNICATION SYSTEMS



Radars

3D Low Level Surveillance Radar

A ground-based 3D rotating semi active phased array radar is based on high efficiency solid state transmit/receive modules. It is used for volumetric surveillance, detection, tracking and friend/foe identification of aerial targets. It is capable of automatic detection and tracking of helicopters, UAVs, RPVs, and fixed wing aircrafts flying at altitudes of above 20 meters to 12 km. The radar provides continuous 3D airspace awareness with high accuracy, resolution and reliability. The radar is configured on two vehicles and offers cross country mobility. It can also be used in single vehicle configuration.



Salient Features/ Specification:

- Frequency : S Band
- Instrumented Range : 120 Kms
- Digital beam forming
- Target detection & tracking
- Target Identification with IFF
- Advanced ECCM features
- Transmission of target data to multiple command posts/weapon systems

Four Walled Active Array Based Multifunction Radar

The radar has been configured with four active arrays mounted on four walls of the 8x8 HMV. It uses active phased array technology combined with advanced signal processing and data processing algorithms to detect and track fixed and rotary wing aircrafts including UAV and hovering helicopters in intense EW environment.

The radars use advanced platform motion compensation and electronic stabilization algorithms along with high accuracy motion sensors. It is capable of operating on the move in plains, deserts and semi-desert terrain. Radar can also be configured to operate in static and ship borne platforms.



Salient Features/ Specification:

- Frequency: BSR - C Band; BMFR – X Band
- Instrumented Range: 150 Km
- Electronically scanned arrays
- Advanced data & signal Processing
- GaN Technology based QTRMs
- Wireless communication to launcher
- On-board power supply & cooling system

Air Defence Fire Control Radar

This radar, in conjunction with anti-aircraft guns forms a ground based air defence system which provides effective point defence against all air threats at short / very short ranges during day and night, under all weather conditions and also in the presence of jamming. The system primarily comprises of a state of the art Active array antenna based 3D-Search Radar and Reflector Monopulse antenna based dedicated Single Target Tracking Radar. There are Electro-Optical Sensors (CCD & TI cameras) for passive 2D-tracking & LRF for Radar independent ranging. The Gun Control Unit, Power generator, and a suitably equipped commander's cabin are mounted on a single High Mobility Vehicle (HMV).



Salient Features/ Specification:

- Frequency : Search Radar - X Band; Tracking Radar – Ka Band
- Instrumented Range : 60 Kms
- Active phased array antenna based surveillance radar
- Precision tracking Radar for accurate tracking of low flying targets
- Fully automatic acquisition & tracking of designated targets
- Fire Control of L-70 guns
- Capable of cueing and/or controlling other weapons (Laser/HPM/Short Range Missiles)
- Integrated IFF Mk XII

Air Defence Tactical Control Radar

It is used for volumetric surveillance, detection, tracking and friend/foe identification of aerial targets of different types and transmission of prioritised target data to multiple command posts/ weapon systems. The radar is capable of detecting very small and low flying targets. The system employs Active Phased array technology with Digital Beam Forming, Distributed Digital Receivers and IFF Mark XII. The Radar system including 4D Radar, power and cooling systems, operator shelter and communication equipment are configured on two High Mobility Vehicles. The Radar can be deployed in plains, deserts and in the mountain region for tactical EW for ground based Weapon Systems.



Salient Features/ Specification:

- Frequency : S Band
- Instrumented Range : 150 Kms
- Transmission of data to multiple Weapon Systems/Command Posts
- Fully Distributed Active Phased Array Radar
- Advanced Signal & Data Processing
- Road, rail, air transportable

Active Electronically Scanned Array Radar

It is a multimode, solid-state Active Phased array fire control Radar with scalable architecture that can be adapted for various type of fighter aircraft. It is fully electronically scanned agile beam radar which uses Transmit / Receive Module (TRM) Technology. The radar has wide band RF front end, ultra-low side-lobe antenna, frequency and waveform agility, multiple SLC channels for jammer suppression, low probability of interception 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.



Salient Features/ Specification:

- Frequency : X Band
- Instrumented Range : 130 Kms
- Multimode, Multifunction, Active Phased Array Radar with 4D capability
- Interleaved operational capability
- High resolution SAR for ground mapping /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

Coastal Surveillance Radar

It is a part of the Integrated Coastal Surveillance System (ICSS) which comprises of a chain of ground-based Microwave radars, EO sensors, Electronic Support Measures (ESM) and optical sensors. All 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 is a dual band radar designed and capable of detecting small boats at sea, providing 24x7 surveillance.



Salient Features/ Specification:

- Frequency : S and X Band
- Instrumented Range : 50 Kms
- 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

Low Level Transportable Radar

It is a ground based rotating Active Phased Array 4D radar for air space surveillance to detect and track aerial targets, under hostile EW operational environment. The radar operates either in staring or rotation mode and has electronic scanning capability in both azimuth and elevation. It is fully programmable through an efficient Man-Machine Interface from the Local Operator Work Station (OWS) and remotely from the OWS unit in the operations shelter.



Salient Features/ Specification:

- Frequency: S Band
- Instrumented Range: 200 Kms
- Ground based surveillance radar
- Fully distributed Active Phased Array with Digital Beam Forming (DBF)
- Multifunction and multi-mode radar
- Rotation and staring modes of operation
- Multi beam in azimuth and elevation
- Programmable operational modes
- Volumetric surveillance with automatic target classification
- Advanced ECCM features

Medium Power Radar (MPR)

A fully active, rotating, multifunction phased array radar which carries out ground based 4D surveillance for generation of true air picture, with accurate and precise measurement of aerial targets for air defence operation. The radar employs adaptive data rate, dynamic waveform selection and adaptation to environment. It can operate in rotation mode with 360° azimuth coverage or staring mode with 120° azimuth coverage with higher update rate. It is fully programmable from the local Operator Work Station (OWS) and also remotely from remote OWS unit.



Salient Features/ Specification:

- Frequency : S Band
- Instrumented Range : 400 Kms
- Fully distributed active phased array with Digital Beam Forming(DBF)
- Rotation and staring modes of operation
- Multi Beam in azimuth and elevation with electronic scanning
- Programmable operational modes
- Volumetric surveillance
- Automatic target classification
- Advanced ECCM features
- IFF Mark XII
- Target tracking with external cue
- Transportable by road, rail & air

Weapon Locating Radar

An Electronically Scanned Phased Array radar, which automatically locates hostile artillery, mortar and rocket launcher fire and tracks calculate locate the impact point of friendly artillery fire and issue necessary corrections. The radar is designed to detect projectiles with small cross section across the battle space horizon and has the capability to handle simultaneous fire from weapon deployed at multiple locations.

The radar uses advanced signal processing technique for detection and tracking projectile in the presence of ground, weather clutter and other forms of interference in EW scenario.



Salient Features/ Specification:

- Frequency : C Band
- Instrumented Range : 60 Kms
- Slewable Phased Array antenna
- Mono pulse tracking with pulse compression
- Digital receiver
- Programmable Digital Signal Processor
- Adaptive radar resource scheduling
- Tracking and weapon location using advanced algorithms
- Automatic height correction using digital map
- High mobility, quick deployment and decamping capability

Battle Field Surveillance Radar

It is man-portable, battery operated J-Band surveillance radar. The system has the capability to detect, track and classify variety of moving ground surface targets. It is a reliable sensor for all weather, and day/night operation. The radar can be carried in a three man-packs load. It performs automatic detection, tracking and classification of moving targets based on Doppler tones and displays a high resolution output on the control and Display Unit (CDU).



Salient Feature/ Specifications:

- Pulse Doppler with low probability of intercept (LPI)
- Time into action: Five minutes
- Audio and Visual aids help identify and classify targets
- Can detect crawling man, single/group of walking men, light/heavy vehicle and low flying helicopter
- Ranges for different class of targets:
 - Crawling man : 700 m
 - Single man walking : 3 Km
 - Group of walking men : 7 Km
 - Moving jeep size vehicle : 8 km
 - Moving heavy vehicles : 14 km
- Azimuth accuracy : 0.50
- Azimuth resolution : Better than 40
- Shock, Vibration : JSS 55555 Compliant

Multi-Function Radar (MFR) for Surface to Air Missile (SAM) System

Multi-Function Radar (MFR) for Surface to Air Missile (SAM) System is a multi-function Radar with IFF XII (S) and a Four Wall Active Antenna array unit to provide azimuth coverage of 360°. The Radar utilizes state-of-the-art Gallium Nitride based TR Modules for the array. It is capable of detecting aircraft, helicopters, Air-to-Surface missiles, sub-sonic Cruise Missiles and Remotely Piloted Aircraft (RPA) for the Surface to Air Missile System.



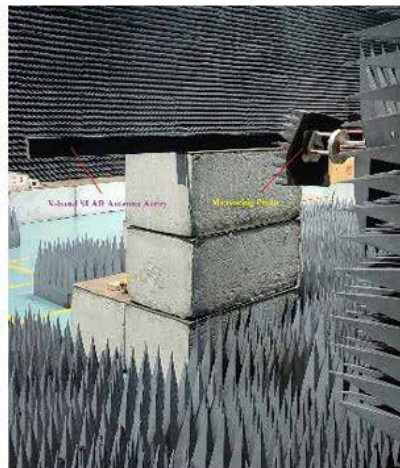
Salient Features:

- Surveillance, Tracking, Cue Acquisition
- Fire control support for SAM
- Multi-wall Active Array Antenna Units
- Electronic Counter Counter Measure (ECCM) features
- IFF

X-Band Side Looking Airborne Radar (SLAR) Antenna (Ultra-Low SWaP Slotted Waveguide Antenna for SLAR)

X-Band SLAR Antenna has been designed and developed with ultra-low SWaP and improved performance. The X-band SLAR antenna provides a low mass of 6 kg compared to 15 kg of comparable systems. The X-band SLAR is a Monolith Slotted waveguide antenna with very low Side-lobe levels compared to existing SLAR Antenna.

The X-Band SLAR antenna also features an integrated Cladded Radome which adds to the packaging efficiency while greatly improving the ease of integration to the airborne platforms.



Salient Features/ Specifications:

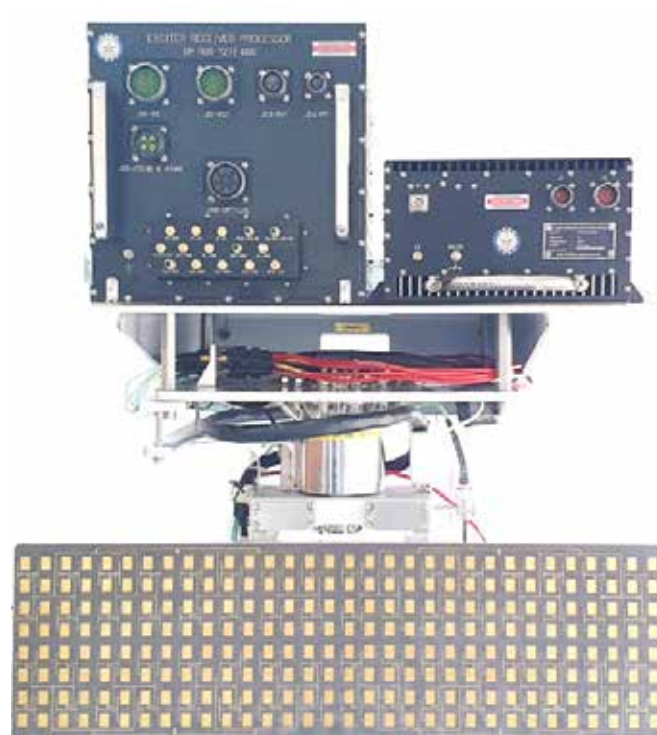
Parameter	Value
• Frequency	: 9.4 GHz \pm 0.1 GHz
• Gain	: >32.5 dB
• Azimuth Beamwidth	: < 0.8 deg
• Elevation Beamwidth	: < 20 deg
• Sidelobe level	: <23 dB
• VSWR	: Better than 1.5
• Feed	: Waveguide feed
• Polarization	: Vertical
• Dimension	: 3 meter (L) x 0.1 meter (W)
• Mass	: <6 Kg
• Other Features	: Cladded Radome, Monolith Waveguide, Adaptable feed

Radar for Naval Utility Helicopter (RNUH)

The RNUH is a lightweight, low-cost Maritime Surveillance and Weather Radar for Naval Utility Helicopters. It consists of an Exciter Receiver Processor, Antenna Scanner Unit (ASU) Assembly, ASU controller and Transmitter LRUs. The mechanically scanned Radar offers maritime surveillance and weather modes. The software can be upgraded to provide Air to Air and SAR modes as well. The modular architecture ensures that the Radar is adaptable to all types of airborne platforms.

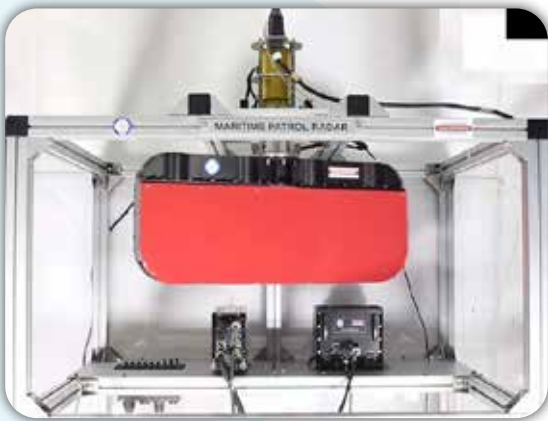
Salient Features

- Usable on Helicopter and UAVs
- Automatic Target Classification
- AIS Correlation
- Upgradeable for bigger Platforms
- Upgradeable for Air-Air & SAR Modes



Maritime Surveillance Airborne X Band Radar System

The versatile Maritime Surveillance Airborne X Band Radar System is designed for maritime surveillance and Search and Rescue (SAR) missions. It is easily adaptable to a variety of platforms for search, detection and tracking of multiple targets at long range. The radar has good sea-clutter suppression features to detect small targets. In addition to the standard air to sea surface search modes with TWS, this radar provides high resolution range signature and ISAR image of the target which enables the user to classify the intercepted target. There is an air to air mode to detect and track aerial targets. Other modes include weather avoidance, beacon and navigation. The Radar provides 360° azimuth coverage in both belly and chin mounted configuration.



Main Features

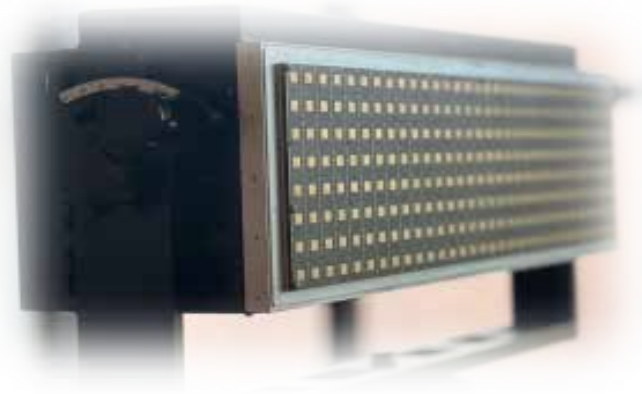
- Programmable signal and data processor
- Sea-clutter mitigation techniques
- Short blind zone for landing on ship
- High instantaneous bandwidth
- High resolution modes - RS and ISAR
- Interleaved TWS and RS Profile
- Staring mode for ISAR
- Display orientation
- Aircraft heading reference
- North reference
- Fixed ground reference (True motion)
- Navigation waypoint and ground map overlay
- Weather avoidance with 4 color coding
- Detection of SART Beacon for search and Rescue
- ECCM

VISR-AX (Versatile ISR – AESA (X Band))

(Software defined multi-channel RF front end)

VISR-AX, is the next-generation software-defined AESA transceiver that redefines ISR (Intelligence, Surveillance, and Reconnaissance) capabilities. Engineered around a Tile based architecture, with Multi-channel RFSoc backend, VISR-AX offers seamless scalability and reconfigurability across a broad spectrum of ISR functions. VISR-AX offers a compact, scalable solution designed for agility, to perfectly match mission demands.

Featuring cutting-edge GaN Tile-based AESA technology, advanced MIMO processing, and future-ready Joint Radar and Communication waveforms, the air-cooled VISR-AX integrates conformally into UAVs, helicopters, fighters, and surveillance aircraft, to create a cohesive Distributed Aperture system with full 360-degree coverage. It features an Ultra-low SWaP Digital AESA, State-of-the art RFSoc Tile Based Multi-functional transceiver.



Salient Features/ Specifications:

- Frequency : X-Band
- T/R Module : 8x16 GaN based T/R Tile
- Architecture : Software Defined RF System-on-Chip & Radar-over-IP Architecture
- Digital Channels : 32T32R
- Capabilities :
 - MIMO Processing, Advanced Space Time Adaptive Processing
 - Digital Beamforming
 - Advanced Jammer Resistance, LPI Features
 - X-Band LoS Communication, Joint Radar and Communication (JRC)
 - Advanced Multifunctional Software Defined Mode
- Modes of Operation :
 - Surveillance– SR, LR, Periscope Detection
 - High Resolution SAR/ISAR
 - Drone Detection, Passive Sensing, Weather
 - LoS Communication

Ground Penetrating Radar (GPR) System

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 soils such as Sand, Red, Laterite, Black Cotton. The Hand held GPR is configured on a 1.6m collapsible wand and is extremely useful for Forces in areas with very restrictive pathways.

The Vehicle Mounted GPR is mainly used for scanning and detecting buried objects on roads and tracks that are used by patrolling parties of Forces.



Hand Held GPR



Vehicle Mounted

Salient Features:

<p>Hand Held</p>	<p>Operable in various types of soils & terrains Real Time detection of buried targets through multiple modes Ultra wide band Technology for High resolution Low Power Signal & Data Processing Post Processing techniques for classification</p>
<p>Vehicle Mounted</p>	<p>Operable in various types of soils & terrains Large swath coverage due to sensor array for quick scanning Real Time detection of buried targets Ultra wide band Technology for High resolution SBAS based GPS for target location accuracy Advanced Post Processing techniques for classification</p>

Narrow Band Digital Radar Warning Receiver

Narrow Band Digital RWR system provides versatile solutions to a Fighter platform offering high sensitivity, selectivity and wideband instantaneous bandwidth, while detecting all Radars in a battle scenario. Digital Signal Processing techniques are exploited to replace complex RF and analogue hardware. Built using Digital Receiver and Fast switching down converter hardware, the dynamic reception regime promises excellent probability of intercept against variety of radars.



Salient Features:

- Wideband, High sensitivity multi-Bit Digital Receiver
- Dynamic Reception Regime Control with accurate parameter measurement
- Handling of high pulse densities
- Detection of simultaneous CW / Pulse radars
- Detection within Interference / Jamming scenario
- Audio Visual Situational Awareness (SA) to Aircrew

Surveillance and EO Systems

Electro-Optical Tracking System (EOTS) for Surface to Air Missile

The EOTS provides a stabilized line of-Sight to perform surveillance, target detection and automatic tracking of targets. EOTS allows the EO Sensors' (LOS) to be aimed and maintained, in required orientation, in the field of regard, independent of platform altitude and motion. The gimbal has three EO Sensors (Thermal Imager, day camera and Eye-safe Laser Range Finder) as its pay load. EOTS is mounted on Combat & Control Unit (CCU) of Surface to Air missile and it works with radars or any external sub-system for cue-in in integrated mode.



Salient Features/ Specification:

- Two axes stabilized gimbal with n x 360° freedom in azimuth
- Wide coverage of upto 70° in elevation axis
- Automatic target tracking

Electro-Optical Infrared (EOIR) Sensor System

Electro-Optical Infrared (EOIR) Sensor System is a tactical multi-sensor long range camera system, for day and night operations. It provides the capability to passively search for and detect, automatically classify, localize, and track observer selected targets in blue water, littoral, and land regions. The system provides colour video, grey scale videos from day and night vision camera systems and consists of the following components - Day Imager, Medium Wave Infra-Red Camera (MWIR), Short Wave Infra-Red Camera (SWIR), Laser Pointer and Laser Range Finder. The EO and IR sensors are co-aligned and provide 360° azimuth coverage and the capability to image targets.



Salient Features/ Specifications:

- Weight ~ 55 Kg
- Dimensions : 490 mm height x 390 mm diameter
- Power : < 380 W (28 V DC)
- Pay loads - HD Day Camera, HD Thermal Camera, SWIR Camera, Laser Range Finder, Laser Pointer.
- IMU, Geo Pointing and Geo Referencing

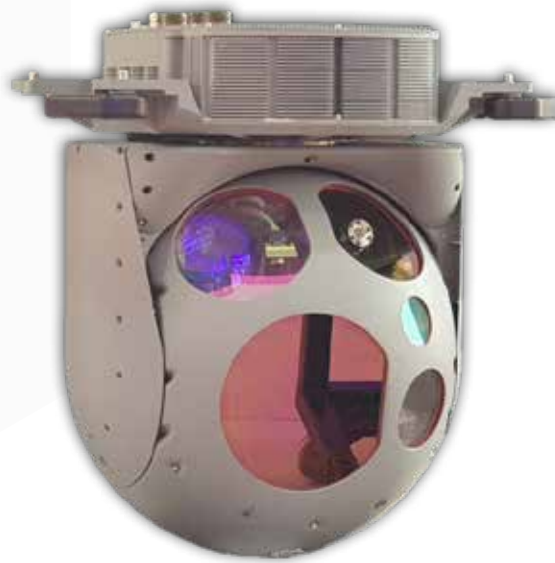
Turret Specifications:

- 4-axis Gimbal Stabilization
- Stabilization Accuracy < 10 μ rad
- In-built IMU
- Slew to Target
- Field of Regard –
 - Azimuth: N x 360°
 - Elevation: N x 360°



Compact Airborne Multi-sensor Optronic Payload (CAMOP)

CAMOP is a long range high definition multi-sensor system used for surveillance, reconnaissance, and search & rescue operations by various platforms. It has MWIR thermal imager, day TV, SWIR and LLLTV imaging cameras alongwith Laser Range Finder (LRF), laser pointer and laser illuminator. It can detect & track long range targets round the clock and also has geo pointing & geo location capability.

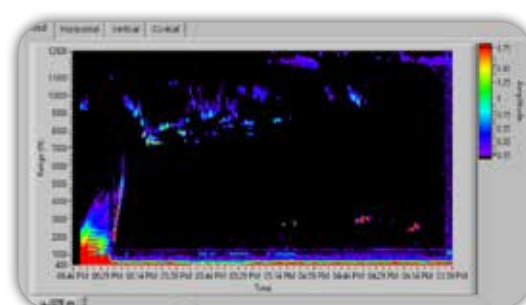
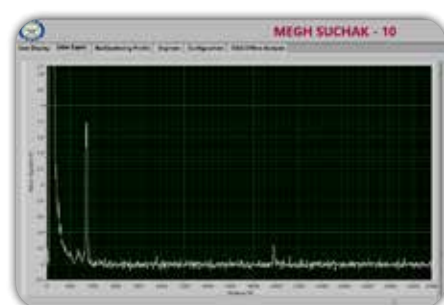


Salient Features/ Specification:

- Stabilized, compact Multi Sensor package
- Day, Night and Twilight operation with HD payloads for target acquisition at longer ranges
- Eye-safe laser range finder for target ranging
- Automatic video tracker for target tracking
- Modular design with reconfigurable payloads
- Support all airborne interfaces like MIL1553, ARINC 429 etc.

Cloud LiDAR

Cloud LiDAR is an optical remote sensing system used to measure cloud height, number of cloud layers, thickness etc. It is based on Mie scattering phenomenon from atmospheric aerosols and clouds. Such systems are widely used for cloud ceiling height measurement at airports/ helipads. This Lidar measurement unit (payload) is mounted on two axes gimbal system for scanning atmosphere in vertical and horizontal plane with slew rate of 0.1°/sec to 20°/sec.



Salient & Unique Features

- Configuration: Bi-axial
- Detection range : up to 10 km
- Aerial/conical scanning of atmosphere:
 - Azi: 0 – 360 °
 - Elev: +90 ° to -10 ° from vertical
- Eye safe: Yes
- Operating temperature : -20° to +50° C
- Operation: Day/ Night
- RH : 90 %
- Wind gust : 55 m/ sec (survivability)
- Ingress protection: IP66 complaint
- Dimensions : Length(1500 mm) × Height (1420 mm), Width (620 mm)
- Output parameters: Cloud base height, Number of cloud layers & Backscatter profile
- Only LiDAR system having scanning feature in azimuth and elevation.
- Can be used for helicopter landing sites.
- The system can provide information related to cloud cover in 360 deg span

Commander's Panoramic Sight (CPS)



Commander's Panoramic
Sight



Display & Control Unit



Power Conditioning Module



Display Control Panel

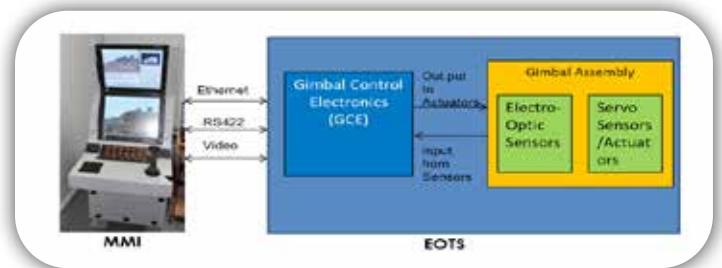
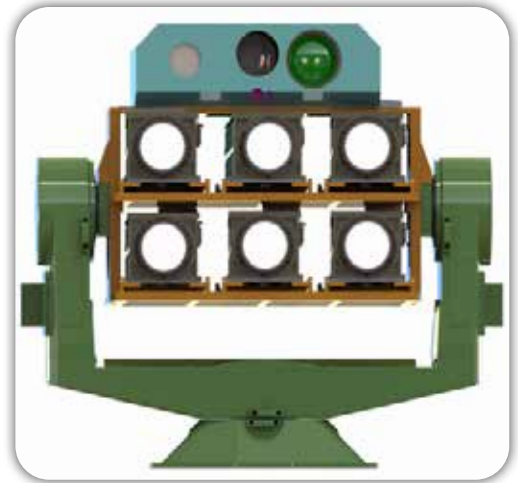
The CPS provides a stabilized Line-of-Sight (LOS) to a tank commander for surveillance over $n \times 360^\circ$ in azimuth and from -20° to $+40^\circ$ in elevation, from a static/moving tank for engaging the target both during day and night. On detecting a target, the commander can either engage the target himself or designate the target to the gunner by pressing an over-ride control on the Commander's Control Handle (CCH). While the gunner engages the target, the commander can continue with battlefield surveillance. Conversely, if he wishes to observe the field of view of the gunner, he can go to the follow-up mode and thereby align his LOS with that of the gunner. CPS is integrated with Gunner's Main Sight (GMS), Gun Control System (GCS), Gun Elevation Resolver (GER) and Fire Control Computer (FCC) in Main Battle Tank.

Salient Features/ Specification:

- Third gen HD thermal imager
- Eye-Safe Laser Range Finder
- Multi-Functional Display Control Unit

Electro-Optical Tracking System (EOTS)

It provides a stabilized Line of Sight (LOS) to perform surveillance, reconnaissance, automatic target detection & tracking and cueing for Directed Energy Laser System (DELS). It allows the Electro-Optical sensors' LOS to be aimed and maintained, in required orientation, in the available field of regard, independent of platform disturbances and motion. After getting cue from radar (or any other external source), EOTS positions the LOS on designated location and bearing and provides automatic detection & closed loop tracking of targets. This is further fine tracked by Beam Directed Optical Channel (BDOC) tracker to facilitate the fine pointing and focusing of high power laser beams to neutralize the designated targets like drones and UAVs.



Salient Features/ Specification:

- Two axes stabilized gimbal
- Wide coverage of upto 180° in azimuth
- LOS stabilization accuracy: 50 μ Rad
- Automatic target tracking

Counter Drone System (CDS)

It is a multi-sensor detection and neutralization system against drones of different categories. It can search in real time and track, drones using radars, EO sensors and COMINT. It is equipped with both soft and hard kill measures. The soft kill is carried out by RF jamming & anti-GNSS technologies. Laser Directed Energy Weapon is used for the hard kill. The complete system is integrated to a single command and control centre.



Salient Features/ Specifications:

- Frequency : X Band
- Instrumented Range : 10 Kms
- Multi Spectral, Multi sensor technologies
- RF based detection and jamming systems consisting COMINT, GNSS for soft kill
- EO & IR payload, HD-Day camera and HD tracker system for target confirmation
- Integrated command post providing situation awareness to detect, track and neutralize the drone
- Highly portable and easily deployable

UAV equipped with DELRAD Probe

Used for aerial radiological surveillance of nuclear contaminated areas, the DELRAD probe is compact and lightweight. Integrated with the UAV, it transmits radiation data via an RF link to the Ground Control Station (GCS) for analysis. The device assists in searching for abandoned radioactive sources, acts as an early warning for NBC teams in nuclear scenarios, and is used during nuclear reactor accidents.



UAV NETRA with DELRAD



DELRAD PROBE

Salient Features/ Specifications:

- Based on Si PIN Diode Detector.
- Measures Gamma radiation
- Sensitivity: 1 mR/h to 1000 R/h from air, 10 Ci Co-60 source can be detected from a height of 40-50 m.
- Real time detection and display
- Detection range / dose rate: 1mR/h to 1000R/h
- Size of device: Probe size: 50x45x27 mm, UAV size: < 1m x 1m
- Display/ Monitor unit parameters: Display at Ground Control Station displaying radiation data on map.
- Handheld/ Installation requirement: Independent aerial radiation surveillance system.
- Weight: probe: 40 g, UAV:<10kg
- Power requirement: Onboard UAV battery chargeable through LiPO charger: 220V 50Hz AC
- Operational endurance: 30 minute flight time and detection

Remotely Operated Vehicles (ROVs)

Unexploded Ordnance Handling Robot (UXOR)

UXOR is used to handle and defuse Unexploded Ordnance (UXO) up to 1000 kg, remotely from a distance of 1 km Line-of-Sight. It consists of a Remotely Operated Vehicle (ROV), container-based master control station and carrier vehicle. The ROV is based on a skid steer loader with primary manipulator arm for handling the UXO, seven-axis secondary manipulator arm along with cutting mechanism and a spark-free Abrasive Water Jet Cutting Machine(AWJCM), which can cut through the steel casing of UXOs of up to 25mm thickness



Salient Features/ Specifications:

- UXO handling capability : 1000 kg
- Remote Operation Range : 1 Km
- Maximum Speed : 6 Kmph
- Operating Temperature : 0° to +55°
- Communication : Secure RF link
- Dimensions UXOR : Length (4 m), Width (2.5m), Height (2.6 m)
- Carrier Vehicle : Length (12 m), Width (3), Height (3.2 m)
- Weight : 5t
- Crew : Two (Navigator and Operator)

Remotely Operated Vehicle (ROV)

The Remotely Operated Vehicle can be deployed within buildings and can climb stairs for handling and extracting hazardous materials or Improvised Explosive Devices (IEDs). It can assess threats by using an on-board X-Ray scanner and thereafter defuse it using a water jet disruptor. It also has an on-board shotgun for blasting through door locks or breaking windshields or glass panes of potential car bombs. It is controlled from a trolley-based Master Control Station (MCS). The ROV and MCS are carried to site on a specially designed carrier vehicle. The ROV is capable of being controlled over a range of 500 m .Line-of-Sight (LOS) or up to behind three walls within buildings for bomb disposal



Salient Features/ Specifications:

- Load Lifting Capacity : 20 kg at 2.5m
- Range of Remote operation : 500 m
- Maximum Speed : 1.2 kmph
- Operating Temperature : -20° to +55°C
- Max Arm length : 2.5 m
- Max arm length with arm extension unit : 4 m
- Arm Degree of Freedom : 6
- Endurance : 3 hrs
- Dimensions : Length (1.390 m), Width (0.880 m) Height (2.150 m)
- Weight : 0.4T
- Crew : Single person operated MCS

Confined Space Remotely Operated Vehicle (CSROV)

The CSROV is used to traverse confined spaces within train compartments and aircraft, reach onto berths or cabin-baggage space and extract suspected objects. It can also assess threats by using an on-board X-Ray scanner and thereafter defuse it using a water jet disruptor. The CSROV can be deployed remotely from a distance of 200 m and is controlled using a backpack-based Master Control Station (MCS).



:Salient Features/ Specifications

- Load Lifting Capacity : 8 kg @ max extension
- Range of Operation : 200 m Line of Sight (LoS)
- Maximum Speed : 2 kmph
- Operating Temperature : -20° C to +55° C
- Arm Reach : 2 m vertical, 1m horizontal
- Arm Degree of Freedom : 06
- Stair Climbing Capability : Up to 40° slope, and 200 mm riser
- Endurance : 2 hr
- Dimensions : Length (1.2 m) ,Width (0.45 m), Height (1.2 m)
- Weight : 120 kg
- Master Control Station : Back pack based
- Crew : One person

Surveillance Remotely Operated Vehicle (SROV)

It is a remotely operated vehicle equipped for multi-role Short range surveillance/detection capability. It is one man portable and can be deployed using a hand held operator console. The SROV can traverse through urban and cross country terrain. The vehicle is capable of climbing stairs and is equipped with cameras with day and night vision capability. In addition, the SROV can be used as a platform to carry a Water Jet Disruptor (WJD) to defuse Improvised Explosive Devices remotely.



Salient Features/ Specification:

- Range of operation : 200m Line of Sight (LoS)
- Maximum Speed : 1 kmph
- Stair climbing capability : 30° slope with 150 mm riser
- Communication : Secured RF Link
- Endurance : 2 hr
- Payload : Water Jet Disruptor with PT unit, Under belly scanning camera, Remote Charge Drop Zoom Camera
- Dimensions : Length (0.6 m), Width (0.35 m), Height (0.42 m)
- Weight : 25 kg
- Crew : One man operation
- Operating temperature : -20° to +55°

Mobile Autonomous Robotic System (MARS)

MARS is an unmanned vehicle used to extract and Defuse Improvised Explosive Devices (IEDs). It is equipped with a manipulator arm which can reach the location of the suspicious object and extract the object without any human interference. It can plan its own path, stop at the location, scan the complete area for suspicious object and pick it up with the help of its on-board 6 DoF intelligent manipulator. The complete operation is autonomously controlled by on-board controllers and the live video feed of the operation can be transmitted to a centralised control station for monitoring. This platform is capable of being operated in day or night.



Salient Features/ Specification:

- Manipulator arm with a reach upto 2.0 m
- Arm lifting capability of 15 Kg at 2 m
- Climbing capability : 12° slope
- Speed up to 5 kmph on flat surfaces
- In-built brakes, camera for detection and classification of object, LIDAR based scanning and force controlled gripper
- Endurance :4 hrs

CBRN Mini Unmanned Ground Vehicle (UGV)



Operator Control Unit



CBRN Mini UGV



Stair climbing



Sample Collection

CBRN Mini UGV offers benefit in terms of personnel safety during dismounted recce operation in confined areas, in case of any suspicious activity in CBRN environment. It is a tracked platform with four flippers. The mission module comprises of features like CBRN detection and remote monitoring, digital marking of contaminated zones, robotic arm for sample collection and day/night vision system. It can perform stair climbing, ditch crossing, water obstacle crossing and confined area recce operations. These Mini-UGVs can be easily deployed for dismounted recce operation in limited access areas, bunkers, buildings and urban environment. The handheld operator control unit is used for tele-operation of driving and payload systems using wireless communication link.

Salient Features/ Specifications:

- Operating temp. range : -20° C to +55° C
- Power requirement : 24V, 54 AH Li-ION battery
- Battery back up : 2 hr
- Dimensions : 880 mm x 670 mm x 740 mm
- Weight : ~ 86 kg
- Detection time : Chemical concentration < 7 sec for lower range and < 3 sec for higher range
- Biological concentration : 1 minute
- Radiological / nuclear : Real time (display updates constantly)
concentration

Robot Sentry

It is an autonomous and steerable four-wheel drive unmanned robot intended for urban outdoor operations on relatively flat terrain. It explores and map the area, while continuously providing a video feedback of its surroundings. The robot utilizes sensors for determining its location and position. It has perception sensors for environment mapping during navigation. The robot communicates with the remote station on a WiFi network. This makes it possible to operate a number of such sentry robots in a multi-agent configuration.



Salient Features/ Specification:

- On-board algorithmic capability includes Simultaneous Location And Mapping (SLAM), path planning, exploration, object detection identification and road detection
- Perception suite consisting 3D-LiDAR, monocular and stereo cameras, ultrasonic sensor with on-board computer
- Payload : upto 5 kg
- Weight : 62 kg
- Dimensions : Length (640 mm), Width(504 mm), Height(564 mm)
- Max speed : 7.2 Kmph
- Max slope : 15°

Communication Systems

VHF Frequency Hopping Radio

It is based on state of the art DSP technology for operation in 30-88 MHz band. It works in anti-jamming frequency hopping (ECCM) and fixed-frequency secure and clear modes. This radio has built in high grade digital secrecy and supports both voice and data communication. It incorporates extensive networking features. The radio can be used by armed forces for man-pack operations, mounting on Armoured Fighting Vehicles (AFV) and track/ground mode.



Salient Features/ Specifications:

- Frequency band : 30-88 MHz
- Modulation type : FM, MSK
- Modes of operation : FH(AJ) Fixed Frequency Clear & Secure
- Output power (nominal) : 5W / 50W
- ECCM mode : Yes
- Operating voltage : 24 V (nominal)
- Operating temperature : -20°C to +55°C
- Weight : < 15 kg

Advanced VLF Communication System

This communication system facilitates long-range reliable communication from mainland to distributed ships and submerged submarines. It is able to achieve reliable text data communication upto 400 bps in available 200 Hz bandwidth by use of modern communication signal processing techniques implemented in software on indigenous hardware platform.



Figure: AVLF Modulator

Salient Features/ Specifications:

- Frequency band : 10 – 30 kHz
- Modulation type : MSK, GMSK
- Modes of operation : Simplex
- ECCM mode : No
- Operating voltage : AC/DC 24 V
- Operating temperature : JSS 555555 complaint operating temperature range
- Dimension : 2U (3.5 inch) height, 19" rack mountable



Figure: AVLF Demodulator

High Data Rate VLF Communication System

It provides secure transmission and reception of data at 800 bps. The system comprises of HD-VLF modulator and HD-VLF receiver. HD-VLF modulator has the capability to broadcast secure VLF data in interface with high power VLF transmitter. HD-VLF-HF receivers are capable of receiving VLF and HF broadcast data.



Salient Features/ Specifications:

- Frequency band : 10 kHz to 30 MHz
- Modulation type : MSK, GMSK & STAGNAT
- Mode of operation : Simplex
- ECCM mode : No
- Operating voltage : AC/DC 24 V
- Operating temperature : JSS 55555 compliant operating temperature range
- Dimension : 2U (3.5 inch) height, 19" rack mountable

Software Defined Radio

Naval Communication (SDR-NC)

It is a multi-mode, multi-band ship-borne Software Defined Radio (SDR) for naval communication in 3 to 512 MHz RF band. The SDR has high assurance security architecture, ECCM enabled and high level software operating environment in line with Software Communication Architecture (SCA) standard. It supports secure speech and anti-jam data communication for ship to ship, ship to shore & ship to air with future upgrades capability for new waveforms. The waveforms can be instantiated and used through front panel GUI or Remote-Control Unit (RCU).



Salient Features/ Specifications:

- Waveforms : AM, FM, ATC, Digital Voice & Data
- Frequency band : HF (3 – 30 MHz) and V/UHF Band (30 -512 MHz)
- Number of channels / simultaneous operation - Three (1 HF and 2 V/UHF)
- Modes of operation : Clear, Secure, Point to Point, Point to Multi Point
- Output power (nominal) : 50W V/UHF &100W HF
- Operating voltage : 115/230 V AC, 50/60 HZ
- Operating temperature : -20° C to +55°C
- Weight : ~150 kg
- Dimensions : Height (850 mm), Width (600 mm) Depth (750 mm)

Tactical (SDR-TAC)

It is a 4 channel multi-mode, multi band, 19" rack mountable, ship borne Software Defined Radio (SDR) system. The system is intended for ship and shore applications and it supports simultaneous operation of all the 4 channels covering V/UHF and L Band. This SDR system houses multiple types of waveforms for narrow band and wide band applications with ECCM enabled Mobile Ad-hoc Network (MANET). The waveforms can be instantiated and used through front panel GUI or Remote-Control Unit (RCU). SDR architecture in line with SCA2.2.2 with high assurance security grading. It has ten waveforms to support voice & data for ship-to-ship, ship-to-shore & ship-to-air with future upgrades capability for new waveforms.



Salient Features/ Specifications:

- Data rates : Up to 1 Mbps in V/UHF & up to 6 Mbps in L-Band
- Frequency band : V/UHF Band (30 -512MHz) & L-Band(960-1240MHz)
- Modes of operation : Clear, Secure, Point to Point and MANET
- Output power (nominal) : - 50W CW for V/UHF & 100 W CW- L-Band
- Operating voltage : 115/230 V AC,50/60 hz
- Operating temperature : -20° C to +55° C
- Weight and Dimension : 180 kg, 19" Rack with 14U (24.5 inch) Height, Width (550 mm), Depth (700 mm), Height (900mm)

V/UHF Software Defined Radio for Manpack (SDR-MP) for Land Forces

This radio has modular hardware architecture with in-built high-grade security and software operating environment in line with Software Communications Architecture (SCA). The radio has frequency hopping based ECCM enabled MANET and non-MANET waveforms for IP data and network centric operations in addition to interoperability with other family of radios in conventional modes of operation. Upgradeability to new waveforms and feature through software is inherent by virtue of design as SDR.



Salient Features/ Specifications:

- Data rate : 1 Mbps
- Frequency band : 30 MHz-512 MHz
- Modulation details : AM, FM QPSK
- Modes of operation : Half duplex
- Output power (nominal) : 10 W
- Operating temperature : JSS 55555 compliant operating temperature range
- Weight : ~ 4.5 kg (with battery)

Man Pack (SDR-MP) for Naval Applications

SDR-MP for Naval applications serves the Special Operations requirements of Marine Commandos. It is used for ship to ground, ground to ground and ground to air communication during amphibious operations. SDR-MP supports SCA & provides both narrowband & wideband point to point networked LOS communication in V/UHF band (30-512MHz). It supports voice & data services in frequency hopping mode.



Salient Features/ Specifications:

- Frequency band : V/UHF Band (30 -512 MHz)
- Preset channels : 10
- Modes of operation : Fixed frequency & frequency hopping
- Output power (nominal) : 5W
- ECCM mode : Yes
- Operating voltage : 25.9V DC (Nominal); Rechargeable Battery
- Operating temperature : -20°C to +55°C
- Weight : 5.5 kg (with battery),
- Dimensions : Width(290 mm), Depth (230 mm), (90 mm)

Handheld (SDR-HH)

It is a compact single channel UHF band SDR for ship to ground and ground to ground communication during amphibious operation of Marine Commandos. This radio provides a higher degree of flexibility and run time re-configurability to support interoperability for mission requirements. SDR architecture in line with SCA 2.2.2 with high assurance security grading and secure authentication based access.



Salient Features/ Specifications:

- Frequency band : 325 MHz – 470 MHz
- Channel spacing : 25 KHz (FM & Digital Secure Voice)
- Mode of operation : Clear and secure
- Output power : Programmable (1W maximum)
- Operating temperature : -20°C to +55°C
- Weight : < 500 gm (with battery)
- Dimension : 148 mm x 70 mm x 43 mm (without antenna)

Compact Trans-horizon Communication System (CTCS)

Compact Trans-horizon Communication System (CTCS) is a Man-portable Communication Terminal which provides communication beyond the horizon by using a radio path through the troposphere. CTCS provides capability to establish high-capacity wireless links among remote locations in hilly terrains for range extension of user network, managing disaster scenario and effective retaliation to tactical threats. The solution can deliver reliable IP network connectivity between Command and Tactical levels with data rate up to 20 Mbps up to 60 Km path ranges in Tropo/ Diffraction mode & upto 100 Km in LOS mode.

The terminal incorporates sensor-assisted alignment mechanism for setting up the communication link. An AI enabled CTCS Link Prediction Software is also integrated with CTCS for easy and fast link prediction and establishment. The terminal can be packed in two light weight enclosures for easy transportability.



Salient Features/Specifications:

- Compact Man/Mule Portable Communication System for Tactical Extension of existing Infrastructure for Hilly Terrain Operation
- Frequency : C Band
- Mode : Troposcatter, Diffraction & LOS
- Ranges : Upto 60 Km in Beyond Line of Sight (BLOS -Tropo/ Diffraction) mode & 100 Km in LOS mode
- Data interface : Ethernet IP
- Link rate : Upto 20 Mbps
- Equipment Weight : less than 35 Kg (excluding accessories)
- Link analysis & mission planning tool provided as accessory

Quad-Diversity Troposcatter Modem

Quad Diversity Troposcatter Modem provides communication beyond the horizon by using a radio path through the troposphere. The modem utilizes latest multicarrier modem technology with LDPC codes. The modem forms part of the baseband with IP interface and directly converts baseband data into two RF outputs.

A combination of Frequency & polarization diversity allows the Troposcatter communication system to take advantage of the diversity gain derived from the transmitted energy scattering from different parts of the common scattering volume. The dual RF output of modem is fed to two independent SSPAs for transmission of RF signals towards receiver through the antenna. On the receiver side, the four received signals are fed to Quad-diversity tropo-modem after selective filtering and low-noise amplification which are processed and converted to baseband data in IP format.



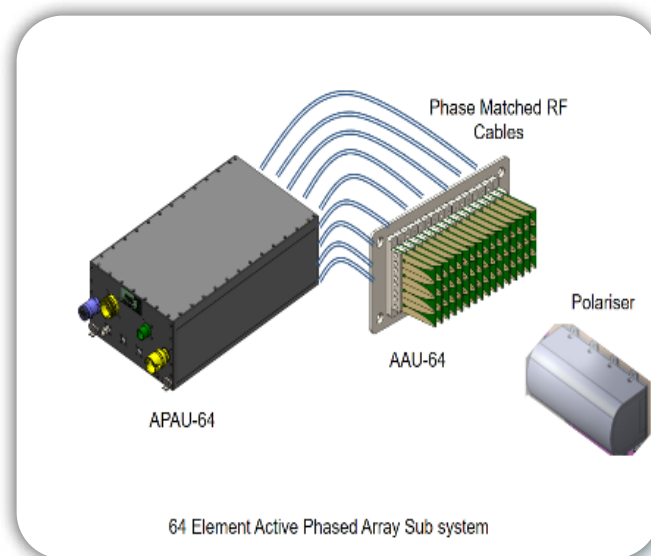
Salient Features:

- Frequency: 70MHz IF / L / S Band
- Data Rate: Upto 20 Mbps
- Data Interface: L2 Gigabit Ethernet
- Monitoring & Control: SNMP

Electronics Sub-systems

Active Phased Array Sub Systems (APASS)

The APASS is a Pod based Advanced Wing Tip Jammer for Fighter aircrafts. The Jammer pod consists of Receiving antennae, Exciter-Receiver and Processor unit (ERPU) and Active Phased array sub-system



Salient Features:

- Ultra wide frequency band of operation
- System can form two simultaneous beams
- Fast beam switching of the order of 200 ns
- Grating lobe free Wide FOV for the complete frequency band
- Active Transmit unit uses GaN power amplifier.
- Polariser made of a sandwich structure of flexible substrates

Advanced Flight Data Transfer Unit (AFDTU)

The AFDTU performs the functions of loading of Mission data to the Mission Computer and also for recording data from the Mission Computer.

Salient Features:

- Transfer Mission Plan data stored in PCMCIA based Cartridge to Mission Computer on ARINC-429 channel.
- Record data in PCMCIA based Cartridge from Mission Computer in ARINC-429 for post flight analysis.



Display Processor

The Display processor is meant for generation of STANAG-3350B cockpit display to drive Raster Scan Multi-Function Displays (MFD) and Vector Scan Head Up Display (HUD). This processor interfaces aircraft platform via MIL-STD 1553 for navigation data, and other data from Mission computer to provide display cues to the pilot.



Salient Features:

- Display Processor is built over VxWork RTOS for deterministic cue generation.
- It has multiple interfaces like are MIL1553B Buses, ARINC-429 interface, Fast Ethernet, Discrete Input & Output, STANAG-3350B Interface to cater for legacy equipment and current generation sensors.
- Some of the interfaces comprise of a modular architecture based on Intel ATOM processor.

Video Format Conversion & Switching Unit (TVCSU)

The Video Format Conversion & Switching Unit processes, converts and switches multiple videos of different standards, formats and resolution for displaying on cockpit displays.



Salient Features:

- Switching with format conversion of eight monochrome and seven colour video signals represented in composite or split form (GOST Standard)/ YHV to any of the eight STANAG 3350B outputs.
- Can perform video format conversion and switching to ARINC-818 format.

Unified Mission Computer (UMC)

UMC meets futuristic, high computational requirements of fighter platform avionics towards weapon aiming computations, weapons stations-bus control and management, operational data link, video conversion & switching, display symbols and overlay symbols on the incoming video.



Salient Features:

- Airborne computer to expand the avionics bus for interfacing Indigenous weapons
- Capable of Weapon Aiming Computations
- Capable of Interfacing Operational Data link
- Capable of OGL library based symbols generation and overlay of incoming videos

Blanking Signal Distribution Unit (BSDU)

Blanking Signal Distribution Unit (BSDU) is used to distribute the incoming blanking pulses from various on board transmitters on the aircraft to New Generation Anti-Radiation Missile (NGARM) and Radar Warning Receiver (RWR) system simultaneously.



Salient Features:

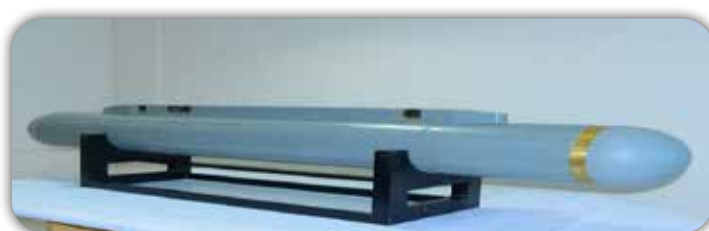
- BSDU is based on current generation technologies and meant for obsolescence management for SU30-MKI class of aircraft
- It interfaces with the various on-board transmitters through K-130 Unit present in the aircraft and supplies the blanking signals to NGARM and RWR unit simultaneously

Pod Shells

Airborne Pod Shells are designed to house electronic systems. Pod shells are semi-monocoque aero structures designed with various form factors for operations in high internal load, aerodynamic load and vibration environments.



Wing Tip Pod Shell



Pod Shell with Inbuilt Adapter



Pod Shell with Rocket Pod Adapter

Salient Features:

- **Wing Tip Pod Shell**
 - Diameter 300 mm x 3.5 m length
 - Capable of housing a 120 Kg payload
 - Customised mounting interface for installation on SU-30 MKI
- **Pod Shell with Inbuilt Adapter**
 - Diameter 300 mm x 2.5 m length
 - Capable of housing an 80 Kg payload
 - Inbuilt adapter suitable for any NATO standard Pylon.
 - Qualified for outboard application on aircraft
- **Pod Shell with Rocket Pod Adapter**
 - Diameter 406 mm x 2.25 m length
 - Capable of housing a 60 Kg payload
 - Rocket Pod based mounting interface

2 kW ACM Based Pod Cooling System

The 2 KW Air Cycle Machine based Liquid Cooling system is a self-contained cooling system configured for application in an airborne pod of 300 mm diameter. The system consists of a Cold Air Generation unit called ACM Module, Liquid Circulation Unit and an Electronic Control Unit. The Cold air generation required for cooling the hot coolant is done using an Air Cycle Machine contained within the module.



ACM Module



Liquid Circulation Unit



Electronic Control Unit

Salient Features:

- Coolant flow rate of 10 Lpm @ 5 bar pressure head
- Power consumption <1000 VA
- Weight < 35 Kg
- Suitable for operation up to 1.4 Mach
- No flight-envelop limitation at higher speeds since the system is Air Cycle Machine Based.
- Modular construction – Developed as three modules, i.e. 2 kW ACM Module, Liquid Circulation Unit, Electronic Control Unit
- Health monitoring & safety aspects built in the system

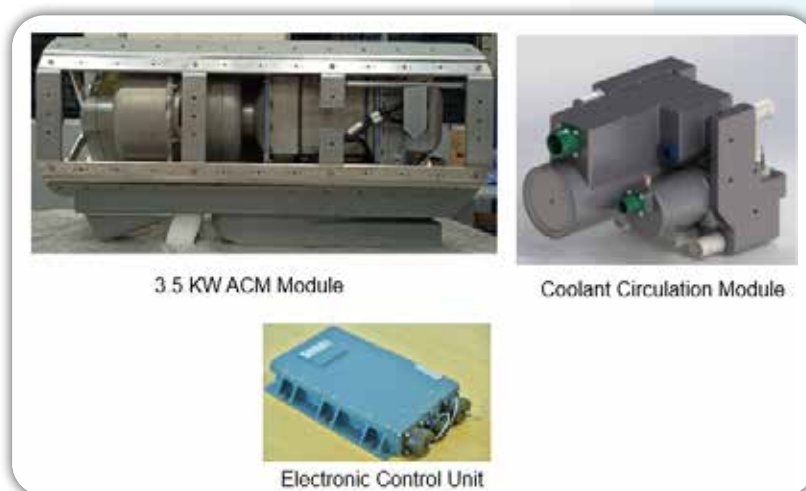
3.5 kW ACM Based Cooling System for ASPJ Pod

The Air Cycle Machine based liquid cooling system is configured for integration in the Advanced Self Protection Jammer (ASPJ) Pod of fighter platform of SU30-MKI class of aircraft. The cooling system can handle a heat load of 3.5 kW and is designed to maintain the coolant temperature less than 450°C throughout the flight envelope.

The Cooling system is configured in the form of three LRUs, i.e. ACM Module, which is a Cold Air Generation Unit, Coolant Circulation Module for circulation of the coolant through the electronics and an Electronic Control Unit which enables different operational modes of the cooling system and maintains the coolant temperature. The necessary health monitoring functionalities are also incorporated as part of the cooling system.

Salient Features:

- Self-contained, compact and modular cooling system suitable for pod based applications.
- Capable of handling 3.5 kW Heat load and maintaining coolant temperature 100°C to 450°C throughout the flight envelope.
- Air Cycle Machine and Compact plate fin Heat exchanger based Cold air generation unit.
- Compact , lightweight Liquid Circulation Unit with inbuilt health monitoring features.
- Advanced Electronic Control Unit optimises the performance of the system through selection of appropriate modes of operation.
- System qualified for operation in wing tip / outboard station mounted pods.
- Size, weight and power optimised for pod based applications.
- Prime power requirement is 1000 VA, 115V 400 Hz AC.



2 kW Air Cycle Machine

The 2 kW ACM is a state of the art machine designed for airborne applications. It is basically a turbine and compressor coupled on a single shaft which is designed to be operated in Reverse Bootstrap Mode of operation. The purpose of the Air Cycle Machine is to generate cold air from hot ram air sourced from external ambient during flight. The cold air is generated by the machine by expansion of the air through the turbine. The cold air is supplied to an Air to Liquid Heat Exchanger to remove the heat from the coolant which is circulated through electronics. The work generated by the turbine is used by the compressor to purge the hot air from the heat exchanger to the external ambient.

Salient Features:

- Driven by ram air and no electrical energy is needed.
- Suitable for application in pods as well as internal to aircraft.
- Suitable for heat loads up to 2 kW.
- Can operate in flight envelope of 0.5 to 1.4 Mach.
- High coefficient of performance.
- Turbine and compressor scrolls are adjustable to suite installation requirements.
- Weight < 7 Kg
- Air Flow: 6 to 12 Kg/min
- Designed to operate in high vibration environments



3.5 kW Air Cycle Machine

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Salient Features:

- Driven by ram air and no electrical energy is needed.
- Suitable for application in pods as well as internal to aircraft.
- Suitable for heat loads up to 3.5 kW.
- Can operate in flight envelope of 0.5 to 1.6 Mach.
- High coefficient of performance.
- Turbine and compressor scrolls are adjustable to suite installation requirements.
- Weight < 5 Kg
- Air Flow: 6 to 15 Kg/min
- Designed to operate in high vibration environments.



Computational System Geographical Information System

It is an encumbrance-free Geographical Information (GIS) for military applications. It offers a suite of GIS libraries which can be customized to build military systems, to meet geo-spatial analysis requirement of a collaborative defence environment. It is a force multiplier for planning, execution and monitoring of military operations. It offers a common platform for visualization, analysis and decision support involving spatio-temporal data of various formats and specifications corresponding to land, sea and air. As a spin-off, this GIS technology can also be used for civilian GIS applications. It has a rich set of spatial analysis functions for computation of location, distance, direction, slope, aspect, curvature, area, volume and other geometric values pertaining to spatial objects with respect to different geodetic datum and map projection.

Salient Features/ Specifications:

- **Spatial data Interoperability:** Support for commonly used map and image data formats, Geo-databases and spatial data exchanges.
- **Amphibious Operations:** Integrated visualization and analysis of topographic, hydrographic and air space data for amphibious operation support
- **Scale Space Visualisation:** Retrieval and rendering of spatial data based on Level of Details (LOD) and view extent to offer high system performance while handling large volume of spatial data.
- **Projections & Datum:** Support map data with commonly used projections and datum. It supports on the fly projection of maps, charts and images.
- **Geo Cache:** Native Geo caching mechanism for raster, vector data to achieve operational performance agnostic to data volume.
- **Decision Support Aids:** Integrated tools for Multi criteria decision support involving vector, raster and elevation data.
- **Portable Military Symbol Library:** It caters to the requirement of armed forces and aids in operation planning and overlay creation for Intelligence Preparation of the Battle field (IPB)
- **Temporal Data Handling:** Visualisation and analysis of large volume of dynamic data corresponding to moving objects like aircrafts, ships, ground vehicles.
- **Multi-OS Support:** Support for Linux and Windows operating systems.
- **SDK:** Offers customizable APIs for visualization and analysis.
- **Type of GIS:** Standalone/ Web based GIS
- **Visualisation:** 2D & 3D
- **Spatial Data Formats:** vector, raster, satellite images, DTED supports 25 different formats.

Quantum Random Number Generator

It is an opto-electronic system which uses principles of quantum mechanics to generate true randomness. The system detects random quantum events and converts them into a stream of binary bits. The approach followed in the design uses the path superposition property of single photons in the fibre optic medium to generate random numbers. It has application in areas of cryptography (key generation, key wrapping, authentication etc.) modelling and simulation, quantum communication and fundamental physics experiments.



Salient Features/ Specifications:

- Quantum Entropy : Based on the path superposition property of single photon in the fibre optic medium
- Unconditioned entropy rate : ~ 140 kbps
- Conditioned entropy rate : ~ 30 kbps
- ENT test compliant
- NIST SP 800-22 Test suite compliant
- Diehard test Compliant
- Output Interfaces : USB to UART interface

Anti-Aircraft Simulation System

It is a Simulation system for training with one Instructor and 10 trainee stations and the ability to create ground tactical scenarios. It can annotate International Borders (IB), airbases, bridges, weather and critical assets on OGC compliant open sources GIS system. It has facility to simulate deployment of deploy radars for air threat surveillance, Anti-Aircraft Artilleries (AAAs) and Surface to Air Missiles (SAMs) for the protection of critical assets against enemy air threats. The system consists of mathematical models of ground based sensors and weapon systems. It has also the ability to plan and simulate offensive operations and to generate effective coverage of radar systems considering terrain, quantitative evaluation of mission objectives, deployment tactics and their effectiveness and Measure of Effectiveness (MOE) based results analysis

Salient Features/ Specifications:

- Terrain analysis tools.
- Resource manager to integrate different weapon systems, air defence assets, sensors, aircraft, weapon configurations and critical assets.
- 3D visualization.
- Facility to configure on a standalone system or on a local area network.
- “What –if “scenario analysis.
- Operating system: Windows 10 or above

SOLDIER SUPPORT SYSTEMS





Soldier Survivability

Bullet Proof Jacket (Level-6 of BIS 17051-2018)

Bullet Proof Jacket (BPJ) Level 6 provides protection against 7.62x54mm R API (level 6 of BIS 17051) ammunition. The front Hard Armour Panel of BPJ (Two options of area: 1000 cm² and 750 cm²) defeats multiple hits (06 shots) of 7.62x54mm R API (Sniper rounds) in both ICW (In-conjunction with) and Stand-alone design. The ergonomically designed front HAP is made-up of monolithic ceramic plate with polymer backing which enhances the wearability and comfort during operations. The areal density (AD) of ICW Hard Armour Panel (HAP) and standalone HAP is less than 40 kg/m² and 43 kg/m² respectively.



Level 6 (BIS 17051)
Bullet Proof Jacket



Tested Hard Armour Panels
(HAPs) against multiple hits of
7.62x54mm R API

Salient Features/ Specifications:

- Equipped with Quick Release Mechanism (QRM) and Weight Distribution System (WDS)
- HAPs consist of monolithic single curvature advanced armour grade ceramic backed by UHMWPE composite.
- Front HAP defeats 6 rounds of 7.62 x 54 mm R API bullets from 10 m distance after Thermo-Mechanical Conditioning (TMC) protocol followed by mechanical durability test.
- Back Face Signature (BFS) < 15 mm (ICW) with AD < 40 kg/m² for 6 rounds of 7.62x54mm R API
- BFS < 40 mm (Stand-alone) with AD < 43 kg/m² for 6 rounds of 7.62x54mm R API

Bullet Proof Jacket

Bullet Proof Jacket for Level 5 of BIS 17051-2018 which meets all the requirements including conditioning protocol testing. It is light weight and comfortable to wear with no restriction in movement. It is made up of lightweight polymeric and ceramic materials consisting of Hard Armour Panels (HAPs) in front and Soft Armour Panels (SAPs) in back and jacket carriers to adjust HAPs and SAPs. SAPs and HAPs defeat multiple shots of level 1 to level 5 with flexible armour conditioning protocol for SAPs and thermo-mechanical conditioning protocol for HAPs. All HAPs defeat AK-47 (7.62 x 39 mm) MSC and 7.62 x 51 mm SLR bullets from 10 m distance. In addition, front HAP defeats multiple shots of AK-47 hard steel core bullets



Salient Features/ Specifications:

- Weight range : 9.0 – 10.4 kg
- Provides 360° protection upto level 5 of BIS 17051-2018.
- SAPs defeats 9x19 mm SMC/MP-5 bullets from 5 m distance.

Advanced Riot Protection Suit (Brick batting, knife, baton attack and Level-IIIA Protection)

Advanced Riot Protection Suit (ARPS) is a modular and formidable impact resistant full body protector providing complete safety to the security personnel upto 9x19 mm bullet. Suitable for Police and paramilitary forces during riots, civil unrest and mob control situations.

Salient Features/ Specifications:

- Ergonomic, snug fit and modular design.
- Anti-stab, anti-impact, anti-ballistic test qualified
- Weight is ≤ 6.5 Kg
- Fit body height is 180-190 cm



Boot Anti Mine Infantry

Boots Anti Mine Infantry is designed for combat for infantry troops and is suitable for assault operation in plane, desert and mountain regions.

Salient Features/ Specifications:

- Weight less than 3.0 kg/pair.
- The hybrid composite inserts attenuate the blast over-pressure to a value less than 100 kg/cm².
- Effective against 35 g APNM M-14 Mines to avoid amputation level injuries.



Phase Change Materials (PCM) Cool Vest



PCM cool pack



Inner view of cool vest



Outer view of PCM cool vest

Phase Change Materials (PCM) cool vest is useful to reduce heat stress and to protect persons deployed in high heat conditions from adverse effects of high heat exposure. The PCM cool packs are kept inside the refrigerator for 3-4 hours for charging and store the coolness in form of latent heat of solidification of phase change materials. The charged PCM cool packs are inserted inside the specially designed pockets of vest and cap before operating in high ambient temperature conditions.

Salient Features/ Specifications:

- Suitable for ambient temperature ranging from 40°C to 50°C.
- PCM cool packs can be recharged in 3-4 hours by keeping them in deep freezer.
- Reduces sweat loss significantly and stabilizes heart rate and body temperature within safe limit.
- Provides comfort for 2-4 hours (depending on ambient temperature)

Phase Change Materials (PCM) Heat Packs

The extreme low ambient temperature at high altitude regions adversely affects the health of inhabitants and may cause frost bite, hypothermia etc. Physiological alterations in the vital organs like brain, digestive and respiratory system may also occur due to the prolonged exposure to the very low temperature. PCM heat packs provide relief from extreme cold at high altitude area. The PCM heat packs contain Metastable Super Cooled Liquid Phase Change Material (MSLPCM) to store heat and a triggering device to release the stored heat at the time of requirement.



Reusable PCM Heat packs

Salient Features/ Specifications:

- Suitable for ambient temperature upto -10° C
- Provide heat at nearly constant temperature (~50°C)
- Recharged by dipping in boiling water for 30-40 minutes
- PCM heat packs size 14.5cm x 8.5cm, 20cm x 17cm and 28cm x 20cm provide comfort for ~80, 100 and 270 minutes respectively at -10°C ambient temperature
- Provides comfort in muscle pain

High Altitude Pulmonary Oedema (HAPO) Chamber

Personnel deployed in high altitude mountainous regions face a fatal condition of High Altitude Pulmonary Oedema (HAPO) that occurs when rapid ascent is coupled with physical exertion. One man HAPO chamber is a life saving device that provides emergency treatment to HAPO, a condition characterized by breathlessness, tachycardia, tachypnoea, mild fever and cough, beside blood stained sputum & accumulation of fluids in lungs. HAPO Chamber increases the atmospheric pressure around the patient thereby simulating descent in altitude by about 6000-8000 ft in a controlled manner when inflated to a pressure of 130 ± 10 mm Hg pressure. HAPO chamber can be inflated using foot pump and light weight automation unit in backpack configuration (6.5 ± 1 kg) that works with built-in rechargeable battery or with AC mains. The battery can be re-charged using AC mains or by an optional solar panel.



Salient Features/ Specifications:

- Operates up to -40° Celsius and provides a battery endurance of 240 minutes.
- In built pressure management system allows multiple patient treatment simultaneously with fewer attendants.

Survival Blanket

It is intended to be used in sub-zero temperature conditions in which the casualties for evacuation can be completely covered by this blanket in order to prevent the loss of metabolic heat of the casualty in extreme cold conditions. The blanket is made from polyester film vacuum metalized with aluminium. The other side is coated with a lacquer in signal red/deep orange/golden yellow colour.



Survival Blanket

Salient Features/ Specifications:

- Size : Universal (240 x 150 cm)
- Preserves metabolic heat of the body by reflection from the metallized surface
- Weight : 90 grams (max.)
- Very light weight, less pack volume and can be kept in pocket

Radiation Contamination Detection, Measurement & Monitoring Systems

Integrated Radiation Measurement System (IRMS)

It is portable equipment capable of measuring Alpha, Beta and Gamma radiations in contaminated zone. This is a single system with multiple probes for measurement of various type of nuclear radiation. This equipment is also capable of identifying the radiation sources along with radiation monitoring.



Salient Features/ Specifications:

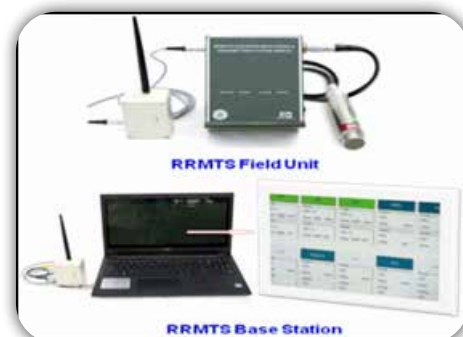
- Sensitivity (Gamma) : ~10 μ R/h
- Detection time taken : Real-time (display update every second)
- Alarm indication : Audio Visual Alarm
- Detection Range / dose rate :
 - Gamma : Background to 1000R/h
 - Alpha : 1-100 kCps
 - Beta : 1-100 kCps
- Size of device :

Main Unit	:	190 mm X 145 mm X 78 mm
Probe: Gamma	:	Cylindrical \varnothing 40mm x H180mm
Alpha/Beta	:	Cylindrical \varnothing 60mm x H 280mm
- Weight :

Main Unit	:	Approx. 1.34Kg
Probes	:	
1.0" NaI (TI) Probe	:	330 gms
2" ZnS Alpha Probe	:	685 gms
2" Plastic Scintillator Beta Probe	:	685 gms
Carrying Case / Protection Unit	:	Approx. 3 Kg
- Power Requirement : 220V 50Hz AC adapter / Inbuilt Battery.
- Battery Backup : 8-10 hours
- Test Qualification : Environmental tests as per JSS55555(L1) and EMI-EMC Tests as per MIL-461C462 Complied

Remote Radiation Monitoring and Transmitting System

This system continuously measures and monitors radiation at unattended remote locations. It comprises of field unit and base station. The field unit transmits gamma radiation dose rate and energy spectrum data to the base station through RF transceiver enabling constant radiation monitoring.



Salient Features/ Specifications:

- Sensitivity : $\sim 10\mu\text{R/h}$
- Detection time : Real-time (display update every second)
- Alarm indication : Audio Visual Alarm
- Detection range / Dose rate : Background to 1000R/h
- Size of Device: Main Unit : 190mm x 145 mm x 78mm
 Probe : Cylindrical $\varnothing 40\text{mm}$ x H180mm
 RF Module : 100mm x 68mm x 47mm
- Display/ Monitor Unit parameters: Central display at the base station displaying radiation data of 32 RRMTS installation locations.
- Handheld/ Installation requirement: Fixed installation at radiation monitoring location
- Weight:
 - Field unit : 2.6 kg
 - Base station : ~ 2.5 kg
 - Carrying case / Protection unit: ~ 3 Kg
- Power : 220V 50Hz AC / inbuilt battery.
- Battery backup : 8-10 hours
- Test qualification: Environmental tests as per JSS55555(L1) and EMI-EMC Tests as per MIL-461C462 complied

Aerial Dosimetry System

Aerial Dosimetry System is intended for aerial survey (through UAV/ helicopter) of large contaminated terrain by measuring the gamma radiation levels at the survey altitude of 5m to 300m. This system comprises aerial unit and Ground Control Station (GCS). The aerial unit can record energy spectrum and can transmit data to GCS through RF transceiver. The radiation data is displayed at GCS on map and tabular format



Salient Features/ Specifications:

- Sensitivity : $\sim 10\mu\text{R/h}$
- Detection time : Real-time with display update every second
- Alarm Indication : Audio Visual Alarm
- Detection range / dose rate : Gamma : Background to 1000R/h
- Size of device: Main Unit : 190 mm x 145 mm x 78 mm
 - Probe : Cylindrical $\varnothing 45$ mm x H 210 mm
 - RF Module : 100 mm x 68 mm x 47 mm
- Weight:
 - Aerial Unit : 2.6 kg
 - Ground Control Station : ~ 2.5 kg
 - Carrying case / Protection unit : ~ 3 Kg
- Power : 220V 50Hz AC / Inbuilt Battery.
- Battery backup : 8-10 hours
- Test qualification : Environmental tests as per JSS55555(L1) and EMI-EMC Tests as per MIL-461C462 complied

Portal Monitoring System (PMS)

PMS is used for rapid screening of personnel with respect to gamma radioactive contamination during routine monitoring and nuclear/radiological emergency. Detector consists of plastic scintillator rods coupled with photomultiplier tubes (PMT). Plastic scintillator produces flashes of light on interacting with gamma radiation. The PMT converts these light flashes into electrical pulses, which is used for measurement of radiation level.



Salient Features/ Specifications:

- Sensitivity : 2 μ Ci of ^{137}Cs
- Detection time : Real time detection
- Counting range : 1-105 CPS
- Dimension : 100 cm x 80 cm x 225 cm
- Weight : ~120 Kg
- Display monitor parameters : Display with user specific GUI
- Power requirement : 230 V AC
- Battery backup : 8 hours
- Test qualification : MIL STD 461E & JSS 55555 compliant

Contamination Monitoring System-Linen

This system is used to detect radioactive contamination in linen/ clothing. It performs rapid screening of linen for gamma and beta contamination during nuclear and radiological emergency scenario. Detector consists of plastic scintillator sheets coupled with Photomultiplier Tubes (PMT). Plastic scintillator produces flashes of light when it interacts with gamma & beta radiation. The PMT converts these light flashes into electrical pulses, which are used for measurement of radiation level.



Salient Features/ Specifications:

- Mode of operation : 230 Volt AC / battery operated.
- Minimum Detectable Activity (MDA): 1 Bq/cm²
- Detection time : Real time
- Counting range : 1-105 CPS
- Dimension : 225 cm x 95 cm x 170 cm (approx.)
- Weight : ~ 250 kg
- Display monitor parameters : Display with user specific GUI
- Battery backup : ??
- Test qualification : MIL STD 461E and JSS 55555 compliant

Contamination Monitoring System-Terrain

This is a mobile, fast and effective portable system for screening of large area to detect gamma and beta surface contamination in nuclear facilities, trans-shipment points of radioactive waste container and during nuclear/radiological emergency scenario. Detector consists of plastic scintillator sheets coupled with Photomultiplier Tubes (PMT). Plastic scintillator produces flashes of light on interacting with the PMT converts these light flashes into electrical pulses which can be used for measurement of radiation level.



Salient Features/ Specifications:

- Mode of operation : 230 Volt AC / battery operated.
- Minimum Detectable Activity (MDA): 1 Bq/cm²
- Detection time : Real time
- Counting range : 1-105 CPS
- Dimension : 70 cm x 90 cm x 120 cm (approx.)
- Weight : ~ 60 kg
- Display monitor parameters : Display with user specific GUI
- Battery backup : 12 hours
- Test qualification : MIL STD 461E and JSS 55555 compliant

Hand Feet Contamination Monitoring System

It is a portable system used for measurement of beta and gamma radiation contamination in the hands and feet of personnel. The system is capable of screening during routine contamination monitoring at nuclear facilities and during nuclear and radiological emergency scenario. The detector consists of plastic scintillator sheets coupled with Photomultiplier Tubes (PMT). Plastic scintillator produces flashes of light when it interacts with gamma & beta radiation. The PMT converts these light flashes into electrical pulses, which can be counted/analysed using microcontroller based electronics for measurement of radiation level.



Salient Features/ Specifications:

- Mode of Operation : 230 V AC / battery operated.
- Minimum Detectable Activity (MDA): 1 Bq/cm²
- Detection time : Real time
- Counting range : 1-105 CPS
- Dimension : 65 cm x 70 cm x 150 cm (approx.)
- Weight : ~110 kg
- Display monitor parameters: Display with user specific GUI
- Battery backup : 4 hours
- Test qualification : MIL STD 461E and JSS 55555 compliant

Water Radioactivity Contamination Monitoring System (β , γ)

The Water Radioactivity Contamination Monitoring System (β , γ) is used to monitor beta (β) and gamma (γ) radioactivity in water in case of any nuclear/radiological emergency. A portable / vehicle mounted system, it can be used to monitor community drinking water, industrial waste & sewage treated water.



Salient Features/ Specifications:

- Detectors Scintillator : β - Plastic Scintillator, γ - NaI(Tl)
- Mode of operation : Using laptop USB port output.
- Detection range : (100 – 105) Bq/L
- Gross activity computation & Identification of Gamma Radioisotopes
- Audio & video warning levels
- Power Supply : through USB
- EMI/EMC compatible as per MIL STD 461 E
- Environmentally rugged as per JSS 55555
- Weight : 35 kg (without packaging)

Food Radioactivity Contamination Monitoring System (FRCMS)

It is a NaI(Tl) scintillator based radioactivity measurement system encompassing the unique concepts of computer controlled data acquisition and processing, detector shielding and field portability; which detects, identify and quantify the radioactive material(s) present in solid and liquid food samples. It displays contamination warning depending on the radioactivity concentration. It declares the food item "fit / not fit" for general consumption and generates the test report. Three sample containers of capacity 1000 ml, 500 ml and 100 ml are provided to cover wide measurement range.



Salient Features/ Specifications:

- Operating temperature : 0 °C to 50 °C
- Manually operated through computer based control unit.
- Sensitivity (Minimum Detectable Activity): 50 Bq/ kg in 60 sec for Cs-137 isotope
- Detection time: Radiation detection is real time; activity computation & reporting takes minimum 60 sec.
- Detection range : 50 to 106 Bq/ kg
- Dimension : Unit (60 cm x 60 cm x 60 cm \pm 5 cm all sides)

- Display unit : Laptop / Desktop PC
- Weight : 130 kg (Approx)
- Power requirement : 220 V @ 50 Hz AC / Laptop battery power
- Battery back-up : 20 minutes

Pocket Dosimeter

This is a handheld microcontroller based instrument used to measure exposure dose & dose rate of gamma and x-ray radiation in nuclear environment. Based on the dose and dose rate, it generates an audio alarm at 50R, 75R, 150R to alert the soldier in nuclear scenario. It is based on energy compensated Geiger Muller Tube (GM Tube).



Salient Features/ Specifications:

- Response time : 10 sec for dose rate \leq 1 R/hour
3 sec for dose rate $>$ 1 R/hour
- Detection range : 0.1 to 999.9 R (Dose) & 0.1 to 999.9 R/hr (Dose Rate)
- Size of device : (96 mm x 65 mm x 32.5 mm) \pm 1 mm
- Display/ Monitor unit parameters: LED four digit
- Weight : 200 g \pm 20 g (without cells)
- Power requirement : 2 x 3.6 V Lithium cells AA/ R6
- Test qualification : EMI/EMC compatible as per MIL STD 461D and JSS 55555 compliant

Portable Dose Rate Meter (PDRM)

This is a handheld electronic instrument used to measure the dose rate of the exposure level of gamma and X- ray radiations in a nuclear environment. It is a light weight portable instrument with long battery life. Based on Geiger Muller Tube (GM Tube), it has four ranges with audio alarm, dial illumination and self-diagnostic facility.



Salient Features/ Specifications:

- Sensitivity : 10mR/h
- Detection time : Real-time with display update every second
- Alarm indication : Audio Alarm
- Detection range / dose rate: Gamma Dose Rate 10mR/hr to 1000R/hr
- Dimension : 160 mm x 95 mm x (52 mm/90mm)
- Display/ Monitor Unit parameters: Analog Display
- Weight : 750 gm
- Power requirement : 4 x 1.5 V Drycell (Size: R6 / AA).
- Battery backup : 75 hrs
- Test qualification : JSS55555 and MIL STD 461C compliant

Roentgenometer

Roentgenometer is a radiation monitoring equipment for tanks and underground shelters. This instrument is capable of measuring gamma radiation level at a place due to nuclear fallout upto a dose rate of 1000 R/h. The device is provided with an audio alarm and analog display. The detector unit and the measuring units are housed separately and are interconnected to each other through a cable. It is based on Geiger Muller Tube (GM Tube).



Salient Features/ Specifications:

- Sensitivity : 20mR/h
- Detection time : Real-time with display update every second
- Size of device
 - Main Unit : 280mm x 180mm x 125 mm
 - GM probe : 150mm x 95mm x 85mm
- Weight : 2.5 kg (main unit) + 550 gm
- Power requirement : 24 V tank power supply
- Test qualification : JSS55555(L-2) and MIL STD 461C compliant

Radiation Detection Measurement & Control Unit

It is capable of detecting nuclear detonation and generate necessary signals for activation of NBC protection system. It also measures nuclear radiation Gamma Dose and Dose Rate level in the range of 1mR to 9999 R and 1mR/hr to 1000R/hr respectively in the nuclear contaminated area. It also guides the soldier in the nuclear warfare scenario, with appropriate help & warning messages on its display. It can be used in AFVs and underground field shelters. It is based on Geiger Muller Tube (GM Tube) and PIN Photo Diode.



Salient Features/ Specifications:

- Sensitivity : 1mR/h Measurement, 0.1m R/h detection
- Detection time : Real-time with display update every second
- Alarm indication : Audio-Visual Alarm
- Size of device : 210 mm x 85 mm x 110 mm (with mounting bracket)
- Weight : 3.5 kgs with mounting bracket
- Power requirement : 24 V DC
- Test qualification : JSS55555(L-2) and MIL STD-461C compliant

Surface Acoustic Wave (SAW) Chemical Warfare Agent Detectors: CAM and ACADA

This is a ruggedized electronic nose vapour point detector for Chemical Warfare Agents (CWA) available in two variants namely CAM (Chemical Agent Monitor), which is hand-held equipment and ACADA (Automatic Chemical Agent Detector and Alarm) which is a wall/ vehicle mounted equipment with remote alarm. The detectors work in an automatic manner with simultaneous detection of all the targeted compounds without need for mode change and sample preparation. They also detect the compounds as a whole and not by its constituent elements, thus leading to low false alarms. The detectors find application in stocking and transportation of CWA, NBC battlefield scenario, installations at places of strategic importance, large huge public gatherings, etc.



SAW ACADA



SAW CAM

Salient Features/ Specifications:

- Sample size requirement for detection: Minimum 500 cc of environmental air per sample for detection.
- Type of Chemicals detected: Sarin, Soman, Tabun, Cyclosarin and Vx, (G Agents), Sulphur Mustard and Lewisite (H Agent), Phosgene (Choking Agent), Hydrogen Cyanide (Blood Agent)
 - Sensitivity:

Nerve (G) agent	:	Down to 0.05 mg/m ³
Blister (H) agent	:	Down to 0.5 mg/m ³
Blood (B) agent	:	Down to 20 mg/m ³
Choking (C) agent	:	Down to 20 mg/m ³
- Detection Time ≤ 60 sec
- Size of Device

CAM	:	30 cm x 10.5 cm x 12 cm
ACADA	:	15 cm x 15 cm x 25 cm
- Display : Sun readable LCD with backlight facility for night.
- Weight :

CAM	:	~3 kg with battery
ACADA	:	~5 kg with battery
- Power : 3.7V battery / AC
- Battery Backup : 8 hrs
- Test Qualification : JSS 55555 (Environment) and 461 E (EMI-EMC) compliant.

OPX Revilator: Handheld Device for Trace Explosive Detection and Identification

OPX-Revilator is an embedded controller based handheld device useful in detection and identification of explosives in pre and post blast scenarios in the pure form, in composition and also as traces with contaminants.

The suspect sample for the test is collected directly or by swabbing and its solution prepared with the revilator reagents. The device identifies explosives, by the optical image processing of the images of the mixtures formed during the reaction between the sample solution and Revilator reagents. The device is capable of detection and identification of more than 20 explosives & compositions and the name(s) of identified explosive(s) is displayed on LCD screen



Salient Features/ Specifications:

- Sample size 10 to 100 mg depending on the purity and the situation on the ground
- Time taken for identification: < 3 minutes
- Dimensions: Length (185 mm), Width (126 mm), Height (75 mm)
- Compact, handheld, weight ~ 510 g (including battery)
- Battery operated, with 6 hours backup
- Power requirement: Mains adaptor / rechargeable battery
- Extendable library for identification of more explosives

Explosive Detection Kit

The Explosive Detection Kit (EDK) is used for the detection and identification of suspect explosive materials, trace explosive residues and improvised explosive device constituents accurately on site. Explosives are identified based on the principle of 'colorimetry'. The kit uses reagents that trigger chemical reactions to identify explosives by the resulting colours. A few drops of the reagents on the suspect explosive material solution accurately confirm or negate the presence of explosives. EDK comes in three variants, the Drop variant, the disposable pocket size variant and the spray variant.



Salient Features/ Specifications:

- Explosives from classes like Nitro-aromatics, Nitramines, Inorganic nitrates and Nitrate esters
- TNT, RDX, CE, PETN, Ammonium Nitrate, RDX based plastic explosives etc. detected and identified
- Useful in the pre blast and post blast scenario
- Minimum false alarms
- Result in 3 minutes

Through Wall Imaging Radar

This sensor detects and locates static and moving targets, particularly human, behind walls. The radar provides real-time imaging of scenarios behind walls, identifying the number and location of individuals, analyzing activity patterns and assisting in identifying hostage scenarios. It tracks moving targets behind walls, traces their path, and provides detailed doppler information like heartbeat and breathing rate.



Salient Features/ Specifications:

- Penetrable walls : Concrete, reinforced concrete, brick, cement, wood and stone
- Display : LCD panel indicating target position
- Imaging : 2D
- Dimension : Length (38 cm) , Breadth (25 cm),Depth (25 cm)
- Weight : 8.7 kg + 1.3 kg Battery
- Power supply : 12 V Rechargeable batteries
- Environmental : IP65, MIL-STD-810F

Instant Fire Detection and Suppression System for Armoured Fighting Vehicles (AFVs)

It is a microcontroller based automatic fire detection and suppression system that saves crew and ICVs/AFVs from fire/explosion eventuality. For fire detection, dual spectrum IR detectors, linear thermal detectors (fire wire) are used. In case of fire in AFV, the signal from detector is given to designated automatic fire extinguishers through Master Control Unit (MCU). Fire/ explosion is suppressed within 150 milliseconds in crew compartment. In engine compartment, the system provides overheat warning through audio visual alarm unit and actuates the fire extinguishers through MCU in case of fire and suppresses it within 10 seconds.



Salient Features/ Specifications:

- Fire Detection & suppression time : < 150 milli sec in crew Compartment
: < 10 sec in Engine Compartment
- Immune to false alarms
- Built in test facility
- Combat & Normal mode of operation
- Logging of fire events for post fire analysis
- Environmental tests qualified as per JSS-55555
- EMI/ EMC qualified as per MIL-STD-461E

Portable Handheld & Backpack Water Mist System

This system is a very useful and effective first-hand fire-fighting equipment. The system can be used for Class A & B fires and also for live electrical fire. The twin fluids water and air under pressure at 15 bar are mixed in the gun to produce water mist, 2-3% foam solution is also added in water to improve the fire fighting performance of the system for flammable liquids.



Salient Features/ Specifications:

- Working Pressure : 15 bar
- Water Capacity : 9 litre
- Compressed air bottle 2/4.7/6.8 L (200/300 bar)
- Lancing Distance : 12-15 m.
- Weight of the system ~ 25 kg.
- Fire rating conformance: 55 A & 233 B and live electrical as per EN 3-7 :2004

CBRN Protective Equipment

Underground Composite Shelter

This shelter provides protection from radiation and biological and chemical agents. It is designed for protection from blast overpressure and ground shock. It can accommodate a maximum of 8 personnel for a period of 10 days in case of an NBC attack and can protect against a 1MT weapon yield nuclear blast at a distance of 1.6 km. Entry to the shelter is through a hydraulic operated hatch and entrance way. The shelter is pre-fitted with all subsystems and can be transported on a trailer to the installation site. Installation of modules and sub-systems can be done manually. All equipment can be operated from inside the shelter.



Interior of underground
Composite Shelter

Salient Features/ Specification:

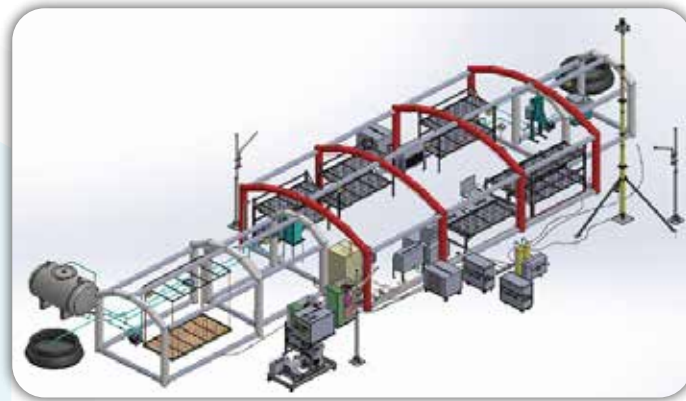
- Equipped with various life support systems like DG set, ventilation, climate control and sensors for NBC monitoring etc.
- Audio visual alarm system
- Underground installation in any terrain.
- Display/ Monitor Unit Parameters: CBRN monitoring system
- Length: 7.5 m, Dia: 3m
- Sandwich structure using GFRP face sheet & PUF core



Underground Composite Shelter

CBRN Inflatable Shelter

It is a multipurpose collective protection shelter which can be used in CBRN contaminated area as a Command & Control post and as arrest, relief and medical treatment centre. The system is rugged, easily transportable and offers fast deployability at required site. Installation of modules and sub-systems can be done manually. All equipment can be operated from inside the shelter.



Inflatable Shelter model with all sub-systems

Salient Features/ Specification:

- Type of radiations measurement: Gamma radiation
- Equipped with various life support systems like AC, ventilation system, UPS and sensors etc.
- Deployment time: 40 min in day time and 60 min in night time with 10 trained personnel.
- Audio / Visual alarm system
- Detection range/ dose rate: Detection range 0 to 999.9 R (Dose) and 1 to 999.9 R/hr (dose rate)
- Display/ Monitor unit parameters: CBRN monitoring system
- Power requirement: Power sourced through 16 kVA Diesel Generator.
- Battery back up: 3 kVA UPS
- Protection for operators: All operation can be done from inside the shelter completely protected.

Mobile Shelter-NBC

It is a collective protection shelter in which individuals can carry out tactical functions such as communication, command & control or medical care, without the hindrance of Individual Protective Equipment. It is designed to provide protection for 8-10 persons for 96 hours duration. The shelter is shielded against EMI/NEMP effects and is protected against fallout gamma and neutron radiation with specified protection factor of 1.5.

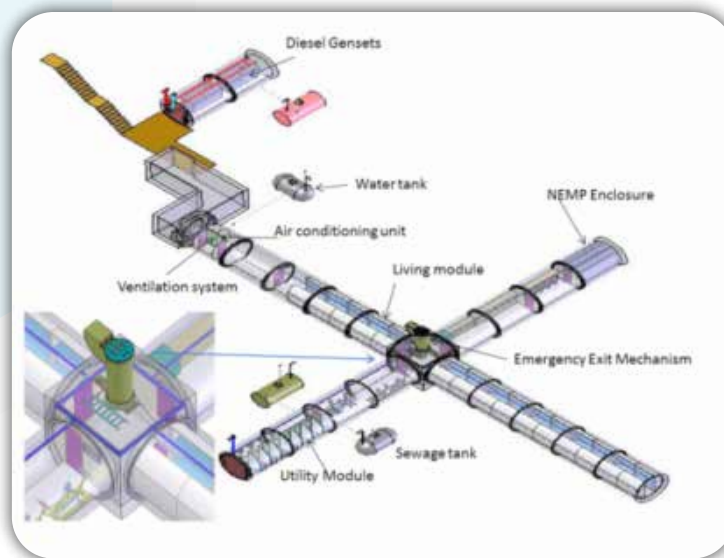


Salient Features/Specification:

- Shelter is mounted on 8x8 HMT for high mobility in various terrains.
- NBC monitoring system with indoor and outdoor sensors.
- Powered by diesel generator: 20 kVA (Redundancy 100%)
- Battery back up: UPS performed
- All operations can be from inside of the shelter with operators completely protected.

Reinforced Hardened Shelter (RHS)

It is an underground collective protection shelter designed to protect up to 60 people and equipment in the event of nuclear blast at a distance of 1.6 km or along with capability to safeguard from biological and chemical contaminated environment. Its life support system can provide safe living environment inside the shelter for a period of up to seven days. To fulfill the need of protection against nuclear blast and radiation effects, the shelter structure is made of high strength Steel Fibrous Reinforced Cement Concrete (SFRCC) and buried below earth cover. It is equipped with NBC ventilation system of 600 m³/hr capacity, O₂, CO₂, differential pressure, fuel level and water level and fire sensors, biological, chemical and radiation sensors, flash sensors, decontamination unit, surveillance cameras, NEMP enclosure, power supply system and water supply and sewage system.



Salient Features/ Specification:

- Type of radiations measurement: Gamma radiation
- Audio visual alarm system
- Can be deployed and operated in different terrains
- Display/ Monitor unit parameters: NBC monitoring
- Power requirement: Powered by Diesel Generator: 30 kVA (Redundancy 100%)
- Battery back up : Two UPS of 7 kVA each
- All operations can be performed from inside of the shelter with total protection for operators.

NBC Suit

The NBC Suit is a protective suit for providing protection against Chemical Warfare Agents (CWA). It can be used from temperature range of -50 C to 400 C. The inner filter layer absorbs the harmful and hazardous chemical agents while the multi-functional outer layer repels liquid agent, provides protection against unforeseen fire. It is antistatic and also provides camouflage. The suit can be used over the inner clothing depending upon climatic conditions. It is durable, air permeable, light weight and provides protection against harmful chemical agents such as nerve agents, blistering agents, blood agents etc.



Salient Features/ Specifications:

- Oil and water repellent
- Protection : > 24 hours (HD-BTT > 24 hours)
- Weight (XL size) : < 2.75 kg
- Breathability : Water Vapor Resistance < 9.6 m² Pa/W
- Air permeable : AP > 30 cc/ cm²/ sec
- Activated Carbon Sphere (ACS) coated polyester/ viscose fabric.
- Suit is placed in a laminated, aluminized bag of suitable size & thickness with nitrogen filling
- Shelf Life : 5 years
- Certification : Certified by ProQares (a TNO Company), The Netherlands for the following Test : Physiological Protective Dosage Factors (PPDF) according to ASTM F 2588

Activated Carbon Fabric (ACF) based CBRN Suit Mk VI

CBRN Suit Mk-VI is a low burden chemical protective suit based on new generation advanced adsorbent media (ACF). It comprises of two layers, the first layer worn next to the skin is laminated Activated Carbon Fabric providing improved performance in terms of adsorption & carbon shedding. Next to laminated activated carbon fabric is a multifunctional outer fabric from blended yarn of different fibres in appropriate composition. It is used as an Individual Protective Equipment (IPE) for Forces during chemical warfare for protection against Sulphur mustard, Choking & Nerve agents.



Salient Features/ Specifications:

- Activated carbon fabric (ACF) based adsorbent media in self-supporting textile form
- Reduction in filter layer weight (~ 300 gsm as against 450 gsm spherical carbon based Suit)
- Weight is 2.3 kg
- Available in four sizes (S, M, L & XL)
- Launderability is more than six times

NBC Casualty Bag

It is a positive pressure evacuation bag intended for isolating and shifting the casualty from a contaminated area to a non-contaminated area (medical aid bag). It allows rescue teams to transport NBC contaminated casualties without the risk of spreading the contamination to others. This bag can be inflated within 1 minute and provides air-tight protection against contaminants, from within and outside.



Salient Features/ Specifications:

- Equipped with blower and four filters with semi/ auto change over option.
- The blower is AC/DC operable. Status of the battery indication provided.
- Equipped with medical ports for safe entry of intravenous lines or oxygen tubing/ cables.
- Equipped with active controlled filter layers, leak control valve, relief valve and status chart for casualty
- Impermeable film having BTT >72 hours is provided on the upper surface to overcome claustrophobia effect.

NBC Casualty Bag Half

It is a positive pressure evacuation bag intended for casualty who is able to walk on his own. The bag can be inflated within 10 sec and provide air-tight protection against contaminants.

Salient Features/ Specifications:

- Equipped with blower and three filters with changeover option.
- The blower is DC operable. Status of the battery indication provided.
- Equipped with medical ports for safe entry of intravenous lines or oxygen tubing/ cables.
- Equipped with active controlled filter layers and status chart for casualty.
- Impermeable film having >72 hrs BTT is provided on the upper surface to overcome claustrophobia effect.
- Flow rate >130 lpm.



NBC Respirator

NBC Respirator is used to protect respiratory tract and face in the NBC environment. The sub-systems of the equipment are inhalation port, exhalation port, face piece with visor, 6 point harness system, drinking water facility and voice enhance. Materials used can withstand more than 24 hours penetration resistance for each sub-system to make this system continuously usable. To enhance voice, there is a provision of external voice enhancer attachment.



Mask



Voice enhancer



Hydration Pack

Salient Features/ Specifications:

- Protection from radioactive aerosols particles
- Shelf life: 10 years; after 5 years selected test has to be carried out to confirm its suitability
- Weight < 650 gm

Nuclear Shielding Pads for Combat Vehicles

Nuclear shielding pads are used in combat vehicles to attenuate different type of radiation i.e. fast neutrons, thermal neutrons, primary and secondary gammas in nuclear environment. There are 118 types of nuclear shielding pads with varying polymer composition which are used to provide a certain degree of radiation protection.



Salient Features/ Specifications:

- Possess very good dimensional stability & vibration damping characteristics in addition to functional characteristics.
- Shelf Life : 14 years

CBRN Water Purification System

This is a Chemical, Biological, Radiological & Nuclear Water Purification System (CBRN WPS). It is vehicle mounted and self-powered, capable of generating 2500 Litre/ hr to 6500 Litre/ hr of water in three different modes of operation surface water/ flood water purification mode, salinity/ TDS removal mode and CBRN contamination removal mode. The system displays TDS, pH, temperature, feed flow & product flow rate, nuclear and chemical - biological contamination using supplied systems and kit.



Salient Features/ Specifications:

- Capacity/ Rate of water purification:
 - o Surface Water Mode : 6500 Litre/ hr
 - o CBRN Mode : 2500 Litre/ hr
- Operating temperature : 5° C to 45° C
- Storage temperature : -15°C to 50° C
- Power : 25 kVA DG Set (integrated with system)/3 Phase external power supply
- Time taken for purification : 03 to 04 min
- Dimension : 7.3 m x 2.5 m x 3.7 m
- Weight : 12 Ton (vehicle mounted)
- Shelf Life : 07 Years



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*Compiled by DIITM and
Designed & Printed by DESIDOC*