



DEFENCE

EQUIPMENT CATALOGUE



MADE IN INDIA





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EXHIBITOR & EQUIPMENT PROFILES



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Organisation Profile

ALPHA DESIGN TECHNOLOGIES PVT. LTD (ALPHA) has its registered office in Bangalore, India and possesses Industrial Licences for development / manufacture / supply of almost all types of defence electronics, avionics, simulation, UAVs, AFV equipment & systems.

Over the years, ADTL has developed its expertise in Research & Development, manufacturing, quality assurance, evaluation and system integration for various defence products such as Fighter aircraft / Helicopters / UAVs, Avionics equipment including Missile Launch Detection System (MILDS), IFF, Optronics, LRF Based Products, Laser Target Detectors, Thermal Imagers & Fire Control Systems, Navigation, Tactical Communication, Software Defined Radios, Image Conversion, Data & Image Fusion, Radar, RF Seekers, C4ISR Systems, EW, Simulators, Microwave Components & RF Units for Indian and International markets.

The Company has set up state of the art R&D, manufacturing / production centers at Bangalore and Hyderabad to meet the requirements of Land, Ship and Air borne Defence Systems in the Country for Army, Navy, Air Force & Para Military Forces on the basis of direct Contracts from MoD. In addition, Alpha has established strong relationship with key Indian defence organizations like Bharat Electronics Limited (BEL), Hindustan Aeronautics Limited (HAL), Defence Research and Development Organisation (DRDO), Ordnance Factories and with International Customers for Defence Offsets.

Recently, ALPHA has made successful entry into Space segment by winning Contracts from ISRO for Assembly, Integration & Testing (AIT) for Satellites (IRNSS Program) and various ground Receiving Stations including up gradation of the North East States Space Application Centre for the 9 states.

ALPHA is one of the fastest growing Defence Electronics & Avionics design and manufacturing Organisation in the Private Sector. ALPHA offers its services in any / all of the above or any new tasks assigned to it to the full satisfaction of the customer.

UNCOOLED HAND HELD WEAPON SIGHTS



NETHRA Uncooled Thermal Imagers can be used as either hand-held, helmet mount or weapon-mounted sights, for ranges upto 1500 meters with different lens combinations. All the NETHRA family members are characterized by compact design, light weight, crystal clear image and reliability, even under intense operational conditions.

NETHRA-S is a compact helmet / weapon mountable, monocular uncooled thermal imaging sight. NETHRA-S can be operational for more than 6 hours in a single set of batteries and has four operational keys which can be easily accessed to control the basic operations (Polarity, E-Zoom) directly or advanced operations through an onscreen menu. NETHRA-S also has provision for low battery indication and security features to protect misuse of the system.

Main Features

- Crystal Clear Image
- Can be integrated with fire control systems
- Compact and ruggedized design

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**NIGHT VISION MONOCULAR -
IMAGE INTENSIFIER (II BASED)**



Model : PNVM-14

The Passive Night Vision Monocular - 14 (PNVM-14) is a unique compact, monocular night vision system based on Image Intensifier technology.

It provides a clear bright image under adverse environmental conditions and is ideal for use of military and para-military forces.

It is available in Single or Dual configuration and is also capable of being used with a helmet or without helmet (using a face mask).

It is submersible upto 20 m (optional) and powered by a single 1.5 V AA size battery (Alkaline) that gives an endurance > 24 hours.

It complies with Mil Std-810.

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RAPTOR REFLEX SIGHT



Model : RAPTOR

The battle- proven Mini reflex sight, RAPTOR is a low silhouette sight that offers a hologram like illuminated red aiming reticule with automated, real time brightness optimization.

It is equipped with a unique Always Ready To Fire (ARTF) mechanism that eliminates the need for manual On/ Off operations while minimising energy consumption.

It is the perfect day and night capable solution for infantry, special operations and law enforcement missions.

It has a Field of View > 12 degrees at 70 mm eye relief and is powered by a single 1.5 V AA Sized alkaline battery that provides about 2 months endurance.

Low battery power indication is also located within the field of view. It complies with Mil Std-810.

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UNCOOLED HAND HELD THERMAL IMAGER – BINOCULAR



NETHRA-B is an uncooled Hand Held Thermal Imager which can view through dust, smoke, fog, haze, and other battlefield obscurants. NETHRA-B senses only heat and not light, it will not shut down or "bloom" when hit by direct light. NETHRA-B's lightweight design allows it to be used effectively as a Hand Held Thermal Imager (HHTI) for observation, border surveillance applications. NETHRA-B is ergonomically designed and easy to use with its quick access keys to essential functions. Powered by standard rechargeable batteries, it offers maximum autonomy. NETHRA-B's excellent thermal sensitivity provides the operator with outstanding target discrimination and recognition capabilities regardless of light or weather conditions

Main Features

- Uncooled HHTI with Optical Zoom & Manual Focus capabilities.
- Ergonomically Design, Compact, Light Weight & Rugged.
- Can observe target clearly under harshest environmental conditions.
- Simple 3 Key operations with graphical menu on screen.
- Powered up by commercially available batteries.
- Provision for Video & Image Storage.

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PASSIVE NIGHT VISION GOGGLE



Model : NVG-11

The Night Vision Goggle- 11 (NVG-11) is designed to provide enhanced viewing in low light conditions. The NVG uses a XD-4 Image Intensifier tube that operates by amplifying existing light using an electro- optical system. It does not require any artificial light sources.

It has following features

- Rugged
- Compact
- Light weight
- Binocular design
- Superior for extended surveillance
- Protected against excess light exposure
- Water proof
- Easy to operate
- Built in IR illuminator
- Low Battery Indicator

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OPTICAL SIGHT



Model : Optical Sight 4 x 22

The Optical Sight is designed for precision aiming even during adverse light and weather conditions. Extremely high light transmission, crystal clear edge to edge image sharpness, robust and ergonomical design, make this sight very effective.

This sight is manufactured to meet the needs of Special Forces / Land Forces and is rugged enough to withstand the rigors of professional usage.

Mount design enables ease of sight's readjustment without necessitating dismounting the sight from the weapon.

Magnification - 4X.

Field of View - 8 Degrees.

Number of illumination levels of reticule - 7. MIL-STD 1913 Interface.

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**HAND HELD / HELMET MOUNTED
NIGHT VISION DEVICES**



Model: NETHRA-B Uncooled Hand Held Thermal Imager

NETHRA is an Uncooled Thermal Sight which can view through dust, smoke, fog, haze and other battlefield obscurants. NETHRA senses only heat and not light, it will not shut down or "bloom" when hit by direct light.

NETHRA's lightweight (under 1.3 kg) design allows it to be used effectively as a Weapon Mounted Sight / Handheld Thermal Sight / Helmet Mounted Sight.

NETHRA series has various products ranging from long range application to light weight applications. NETHRA is ergonomically designed and easy to use with its quick access keys to essential functions. Powered by standard rechargeable batteries, it offers maximum autonomy.

NETHRA's excellent thermal sensitivity provides the operator with outstanding target discrimination and recognition capabilities regardless of light or weather condition.

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**IMAGE INTENSIFIER BASED
PASSIVE NIGHT VISION BINOCULARS**



Model : PNVB 6X

Passive Night Vision Binocular 6X is a unique compact and rugged binocular night vision system based on Image Intensifier technology.

It provides a clear bright image under adverse environmental conditions and is ideal for military and para-military forces.

More than 4200 Nos have already been supplied for use by the Indian Army.

Magnification can be provided from 4x to 6x.

Diopter setting +2 to -4.

Effective range of Detection - 1000 m for group of men, 1200 m for vehicle.

Effective range of Identification - 800 m for group of men, 1000 m for vehicle.

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PASSIVE NIGHT TELESCOPIC SIGHT



These Passive night sights for weapon applications are unique compact and rugged binocular night vision systems based on XD-4 Image Intensifier technology. They provide a clear bright image under adverse environmental conditions and are ideal for military and para-military forces. They can be designed for various field of view and for various effective ranges depending on the requirement.

Key features

- Magnifications, x: 6X
- Field of View, deg : >6
- Lens System : 100 mm F/1.5
- Focus Range, m : 5 to infinity
- Eye Relief distance, mm : 25
- Diopter Setting, D : +2 to -4
- Weight, gms : 830g (without Mount)
- Battery Type / Feed voltage, V : AA (two) Rechargeable batteries
- Overall Dimensions : 370 x 90 x 110 mm

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CORAL CR II



Coral- CRII is an Advanced Hand-Held 3-5 μ m Light weight Thermal Imaging Camera with continuous Optical Zoom and Targeting Acquisition Capabilities.

Main Advantages & Features

- Advanced Real Time Image Fusion between Day & TI Channel.
- Continuous IR optical and digital zoom.
- Long-range performance.
- Advanced high resolution detector.
- Integral, day CCD cameras, digital magnetic compass, integral GPS.
- Target image and data storage memory.
- Advanced binocular viewer.
- Low acoustic noise.

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TEERVA DRUSHTI



Teerva Drushti is a versatile multi-spectral Day, TI, SWIR system for excellent long-range observation and target acquisition. Integrating a long-range zoom, day channel, eyesafe Laser Rangefinder, GPS, magnetic compass, and mounted on a Pedestal/Standalone, Teerva Drushti is an outstanding tool for acquiring targets and engaging fire from long ranges.

Main Features

- Long-range high resolution SWIR, TI, Day Channels.
- Integral DMC, GPS and eyesafe LRF.
- High resolution OLED display; no need for diopter adjustment.
- Remote control option.
- Video recording capability 8 hours.
- Integral target data bank.
- Complete interface to C4I applications.
- Lightweight & completely dismountable.

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MARS



MARS is a versatile family of red dot reflex sights based on the state-of-the-art concept of combining an innovative, high-precision reflex sight with a single or dual-wavelength laser pointer (visible-red and/or IR) for 'round-the-clock' operational response

Main Features

- Reflex Sight and laser aiming lights are boresighted using a single control.
- No extra colour in the field of view owing to high transparency optical transmittance.
- No retro light projected to the enemy.
- Mars IR- 850 nm aiming light (Class 1 according to IEC 825-1), 0.4mW output power.
- Mars visible Red-650 nm aiming light (Class 2 according to IEC 825-1), 1Mw output power.

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DRUSHTI



DRUSHTI is an advanced yet simple and lightweight night vision binocular for long-range observation. This low-cost device, that is easy to operate and maintain, makes it an ideal choice for ground applications. When integrated with its optional GPS and Digital Compass, DRUSHTI displays real-time dynamic data of azimuth, elevation and self-position on a high-resolution OLED display. The system can be hand-held or tripod mounted, according to operational needs.

Main Features

- Modular design for future upgrades in any combination of the optional features.
- Ideal for tactical field commanders, special forces, forward observers, HLS and peacekeeping scenarios.
- Observation through fog/smoke/dust
- Built-in continuous zoom or 3 FOVs
- High-resolution OLED display
- Ruggedized metal casing
- High survivability
- Optional Laser Pointer
- Optional Built-In GPS
- Optional Integrated Digital Compass &
- Inclinometer

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XACT TH



Missions

Thermal Weapon Sight Product Family

- XACT th 64 Short range weapon-mounted or hand-held.
- XACT th 64 Medium range weapon- mounted or hand-held.
- XACT th 65 Marksmen clip-on sight
- Allows engagement from short ranges upto 2 km.

Main Features

- Light-weight and small dimensions.
- Genuine shutter-less uncooled thermal engine.
- Robust aluminum body
- Low battery indication-submersible to 15 meters (optional)
- Complies with Mil-STD-810

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**SOFTWARE DEFINED RADIO
(SDR) BASED 8/34 MBPS RADIO RELAY**



Model : RR 8/34

Software Defined Radio based 8/34 MBPS Radio Relay is an Indigenous, state of the art equipment which provides a powerful communication platform.

This equipment is digital, software controlled, high capacity and operates with line of sight radio.

The Radio Relay is based on IDU & ODU concept which incorporates Frequency Hopping (FH) technique of 1000 hops/sec with at least 16 frequency spots for Electronic Counter-Counter Measures (ECCM).

Supports band 4 (4.4 GHz-5GHz) operations in Point to Point (PTP) and Point to Multipoint (PMP) configuration. Designed to provide current and future requirements of protected data transmission rates of 2 Mbps, 34 Mbps and 100 Mbps in Fixed Frequency (FF) & Frequency Hopping (FH) modes.

It is capable of Transporting different types of signals such as Analog, Digital, Voice/Data/Video over RF links operating through a distance of 25 Kms and above LOS with Single Hop and 40 Kms and above in Repeater mode.

A full duplex digital Engineering Order Wire (EOW) channel is provided for voice communication between the operators which works in both standalone as well as in repeater mode and this communication is secured by encryption.

It is designed to accept the interfaces such as E1, E3, Ethernet and Optical Interfaces which are multiplexed into a single stream and transmitted over RF.

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UNIT LEVEL SWITCH BOARD MK III



Model: ULSB Mk-III

The ULSB MK - III equipment is a small form factor, ruggedized, digital stored program controlled TDM switch designed to function as a unit / sub unit level PBX. Fully automatic and non-blocking, ULSB MK III supports POTS, Magneto, ISDN & E & M voice subscribers. Trunk connectivity is provided using analog and digital (TDM) interfaces. A Universal Card (UTC) provides 12 interface ports, 6 ports fixed for FXS working & balance are ports software configurable for FXS / FXO / TWT / Magneto working in any combination.

The ULSB MK - III is a state-of-the-art unique equipment which employs digital programming controls technology and time switching concept. It has the following features:-

- Modular and non-blocking.
- In built redundancy for greater survivability.
- User friendly MMI, System diagnostics.
- Flexible numbering scheme.
- Audio Visual alarm.
- Call/ Fault Statistics.
- It has versatile operator features.

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SOFTWARE DEFINED RADIO (SDR)



Model Army SDR

To address tactical Communication requirements of Modern Battlefield, Alpha Design Technologies has developed a family of Software Defined Radio products (Handheld, Manpack and AFV Vehicular Adapter versions).

Key Benefits/Features

- Interoperability with legacy Tadiran Radios
- Operates over multiple frequency bands
- Delivers optimum combination of voice, video and high data rate communication required for mission
- Utilizes a single tactical channel for multimedia transmission
- Features intuitive design for operational efficiency
- Operates over maximum range at highest data rate
- Provides high level of immunity through TRANSEC which works through Orthogonal Synchronous Anti-Jamming scheme and COMSEC
- Ad Hoc networking (MANET) for continuous seamless operation

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1.2 MTR FLY AWAY VSAT



Fly Away VSAT is a portable Satellite terminal for quick deployment. The VSAT terminal is fully equipped for handling high speed downloads & data transmissions to support voice & video conferencing.

The antenna drive is fully motorized for azimuth & elevation movement. The antenna of size 1.2 Mtr combined with 4 Watt BUC & LNB Provides an EIRP of 48 dBW and min. G/T of 20 dB/K the mount is designed for speed of 3 degrees per second with accuracy of 0.1 degree. The VSAT is equipped with an electronic inclinometer for obtaining true bearing and elevation

Key Features

- Light Weight & rugged design.
- Fast setup time (15 min typical)
- Integrated electronics
- DVB S2 inbound/2048 Kbps outbound
- 4 Watt BUC & LNB
- Two cases, Man-portable
- External Power Pack
- Built-in compass & GPS
- IP Voice & Data capability
- Auto/Manual Tracking

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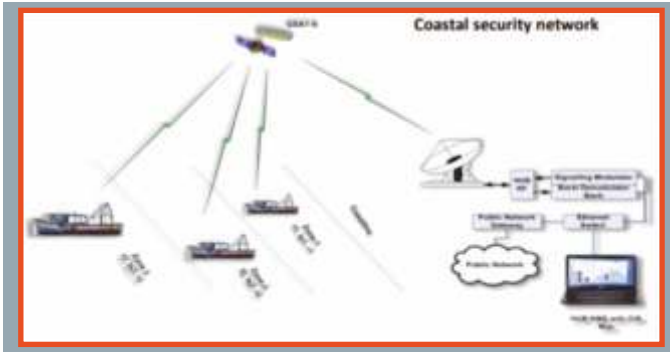
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TWO WAY MSS TERMINAL



- Alpha Design Technologies has designed and developed a low data rate two-way MSS terminal for tracking of small boats.
- MSS based Two-way Data Terminal for Vessel Tracking is an S-band trans receiver with two-way data communications capabilities at programmable bit rates
- Mobile satellite services are known for offering extensive coverage and tracking solutions irrespective of geographic conditions. Two Way MSS Terminal for Vessel Tracking is a maritime solution for tracking bulk numbers of vessels on Ocean waters and their behavioral pattern from a control center. It is a secure way as the communication channel does not use the present dedicated wireless networks for obtaining the location of the vessels under control which in turn can assist the Control Centre Staff in identifying vessels of interests so that necessary prevention measures can be taken as part of a pro-active approach

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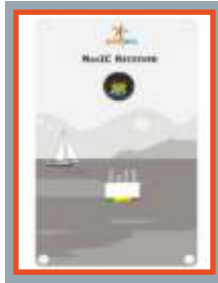
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NAVIC RECEIVER



The NavIC receiver is similar to the GPS receiver, but operates in L5 frequency, allocated to the Indian Regional Navigation Satellite System (IRNSS). The IRNSS satellites, in addition to providing timing signals for determination of NAVIC user's position, also transmit 'Emergency Messages' received from ISRO ground stations, to all the IRNSS receivers. These emergency messages, are targeted to different user groups, who receive "alerts" with warning messages from the NavIC satellites. The Navic Messaging Receiver (NMR), can be very effective for fishermen, not only to identify their own position, but also to guide them to potential fishing zones, to give warnings in case of natural calamities and to give alerts if crossing international borders, unintentionally.

The NMR is small in size, consumes low power (Long Battery life) and is very economically priced. The Bluetooth module, inside the receiver, is used to transmit the warning messages acquired from the IRNSS satellites, directly to the smartphone, using an application specially designed for the assigned purpose.

Applications:

- Navigation
- Asset Tracking
- Disaster Alert

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DISTRESS ALERT TRANSMITTER



DAT is INSAT based battery operated transmitter which is developed for sea going community. In case of emergency DAT transmit an emergency message which consist of [Boat ID, Boat location, Type of distress and time information] DAT transmits to INSAT-3A satellite in UHF band (402 MHz), Then Satellite relays the signal in C-band (4500 MHz), which is received by Indian coast guard Chennai for rescue operation.

Main Features

- Work at Frequency band 402.5 MHz +/- 500 KHz in steps of 1 KHz
- Power 3 ~ 7W in steps of 1W
- Programmable data rate.
- Excellent Long-Term Stability
- Low Power consumption
- Easy Integration
- Error Reporting
- Software Tunable power and frequency

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Organisation Profile

Altair Industrial is an Engineering & EPC Company with expertise in design & development of disruptive technologies in the following areas:

- Rapid Infrastructure
- Fire Protection

RAPID ERCT SUN SHELTERS



Lightweight, Relocatable, Shelters for Aircraft & Mechanized Equipment that can be erected very quickly and without civil work

- Proven with Indian Air Force & Indian Navy
- Temperature reduction of 6 degrees C
- Suitable for remote locations
- Cost Effective
- Relocatable
- Life span of 50+ years
- Designed for wind speeds up to 300 km/hr
- Completely customized with doors, HVAC, lighting, etc.

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RAPID TRACKWAY



Lightweight Assault Trackway to create temporary road surfaces

- Lightweight Road surface for creating temporary trackway for trucks & wheeled equipment
- 25% lighter than aluminum
- Cost Effective
- Life of 10,000+ Passes
- Versatile material that can be handled by troops easily

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FIRE RETARDANT COATINGS



Fire Retardant Coating capable of fireproofing any surface for 2 hour fire rating

- Specialized ceramic coating can be applied on all surface to provide fire protection up to 1200C for up to 2 hours
- Water based, non-toxic coating
- Application areas include ammunition boxes, critical depots, living areas, etc.
- Cost effective approach to fire proofing
- Product appreciated by Indian Army & Indian Navy

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SPAETS (SOUND PROOF AIRCRAFT ENGINE TESTING SHELTERS)



Low Frequency sound generated from Ground Run Tests is a health hazard for families of Defense personnel & civilians living in close proximity to Air Stations.

BENEFITS

- 24x7 operational capability in all weather conditions so Ground Run Testing can be done at will
- Noise attenuation is less than 75 dB(A) at 77 m and less than 65 dB(A) in occupied areas of the building during full power afterburner operations.
- Integration of multiple systems including fuel monitoring, fire safety, etc.
- Completely customized engineering package includes 3D modelling, acoustic mapping and CFD analysis to ensure aerodynamic, thermal, structural and acoustic performance is guaranteed.
- This ensures that OEM qualified cross calibration pass off testing is easily attained
- Engineering partners have experience of over 100+ enclosures for all types of fixed wing & rotary ac

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Organisation Profile

Ashok Leyland, flagship of the Hinduja Group, is the second largest manufacturers of commercial vehicles, 4th largest manufacturers of buses in the world and 12th largest manufacturers of Trucks. Headquartered in Chennai, 9 manufacturing plants gives an international footprint - 7 in India. USD 3.2 billion (2016-17) Company, and a footprint that extends across 50 countries, we are one of the most fully integrated manufacturing companies this side of the globe. Ashok Leyland has a product range from 2.5T GVW to 49T GTW in trucks, 16 to 80 seater buses, vehicles for Defence & Special Applications, diesel engines for industrial, genset and marine applications. Ashok Leyland is also the largest vehicle supplier to Indian Army with the supply of Stallion (ALS) range of vehicles / kits for over two decades. The fleet size with the Indian Army of Ashok Leyland vehicles is over 70,000 vehicles. People, planet and profit for all stakeholders, especially our customers is at the core of Ashok Leyland which resonates with our philosophy of "AAPKI JEET, HAMARI JEET".

GURU 4X4 712



Guru 4x4 712 is a light weight, general service logistics vehicle dedicated to operate in different terrains under normal weather conditions. It is fitted with H4 engine, 5 speed gear box, 2 speed AGB, fully floating axles, full air dual line brakes that provide good mobility and maneuverability.

Capability & Physical Characteristics

- GVW - 6.5T
- Engine power - 88 kW @ 2400 rpm
- Wheelbase - 3330 mm
- Body type : GS load body with tarpaulin

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Organisation Profile

Guided by a farsighted vision to make the country self-reliant in Defence electronics, Bharat Electronics Limited (BEL) was set up in Bangalore in 1954 by the Government of India under the Ministry of Defence (MoD). From a humble beginning, BEL has come a long way. It is now a Navratna PSU and India's foremost Defence electronics company.

BEL is a multi-product, multi-technology, multi-Unit conglomerate which supplies over 350 products in the areas of Radars, Missile Systems, Military Communications, Naval Systems, Electronic Warfare & Avionics, C4I Systems, Electro Optics, Tank Electronics & Gun/Weapon System Upgrades, Solar Photovoltaic Systems, Electronic Components and civilian products.

I P MODEM



BEL IP Modem is a device to connect two IP networks seamlessly over LOS/Satellite Link. The modem uses latest DVB-S2 technology to provide best use of link bandwidth. Latest generation of FEC codes like LDPC and BCH are used to provide better link margin compared to earlier generation codes of RS and Viterbi. Faster Roll-off rates as low as 0.20 are supported for better channel utilization.

- SCPC DVB-S2 modem with Ethernet Interface
- Compliant to DVB-S2 standard (for Modulation, Error Correction and coding).
- FEC codes - LDPC+BCH
- 100 Mbps raw throughput at 30MSPS symbol rate over 36MHz Channel BW.
- L-Band (950-2150 MHz) operation
- Generic Stream Encapsulation for low encapsulation overhead
- PC based Configuration
- FPGA based Signal processing
- Low power consumption
- SNMP Based Remote Monitoring.

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MRC COMBINER



The MRC combiner is used for Tropo communication system. This unit receives the diversity signals from the receive antennas and improves the Signal-to-Noise ratio and also removes the frequency selective fading encountered in the Tropo channel. The improved signal is given to a Modem for demodulation.

- Combines up to four receive channel
- SNR improvement is about 8 dB
- Multipath mitigation by Adaptive Equalization
- Wide Dynamic Range RF Input AGC of 70 dB
- Performs Symbol and Carrier Synchronization
- Throughput up to 20Mbps
- Bar Graph based Signal Level Monitor
- FPGA based Signal processing
- SNMP Based Remote Monitoring.

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SECURE SMART PHONE



BEL in-house secure smart phone provides end to end security between two mobile handsets over 3G GSM/ CDMA network. The secure tactical application works on VOIP (voice over IP) technology to manage the delivery of voice information over the mobile network. BEL's in-house secure smart phone is also provided with secure storage and tamper proofing.

- Android 4.0 (ICS)
- Support for 3G network (GSM / CDMA)
- Secure voice call and Messaging
- End-to-End Encrypted VOIP with Proprietary Encryption
- Supports Clear voice, SMS and browser
- Encryption key is destroyed as soon as the call ends
- Secure voice call requires approximately 8 kbps Bandwidth which makes it suitable for use under low network speed conditions.
- Access Control using Password
- Call establishment using SIP (session initiation protocol)
- Password protection for Crypto data loading
- Local/Remote Key Erasure facility provided
- Customized User Interface

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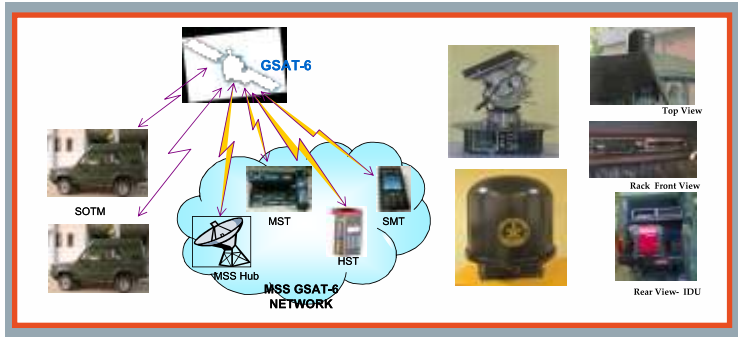
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S BAND SATCOM ON THE MOVE (SOTM) A JOINT DEVELOPMENT BY DEAL & BEL



Major Features

- Fast, Reliable and Secure Communication on the Move & Pause
- Ruggedized; Withstand in Harsh Environment
- Low Profile
- Suitable to mount on any Land based vehicle
- Work in an Off Road environment
- Power backup for 1 hour with super silent Genset

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STARS-V MK III



STARS-V MK III is a Next Generation, Multi-band, High data rate, IP radio with Mobile Ad hoc Networking (MANET) functionality. The radio works in wide frequency band in V/UHF range of 30 - 512MHz. The radio works in Frequency Hopping (FH) and Fixed Frequency (FF) modes with built-in-high-grade digital security in voice and data modes. The radio is built around latest state of the art hardware using DSP and FPGA.

The radio is backward compatible with STARS-V MK II radio in Clear, Secure and Frequency Hopping modes of operation. The radio is designed as 10W man pack transceiver and has in-built MANET feature supporting up to 64 nodes. The network is self-forming and self-healing and support network throughput up to 1Mbps.

- State of the art software intensive IP radio
- Frequency Range : 30 MHz to 512 MHz
- IP based Mobile ADHOC Networking (MANET) upto 64 nodes
- Self configuring, Self healing network
- Frequency Hopping: 500 Hops / second.
- Data rate: upto 1Mbps network throughput
- Built in encryption
- Waveform loading through Front Panel
- Robust connectivity for n/w centric operations in tactical battle field conditions.
- Simultaneous voice & Data services
- Selective / Group Calling

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CELL JAMMER 5W (CJR05)



The low power cellular Jammer instantly blocks and paralyzes cell phone operations in CDMA, GSM (900 and 1800 MHz), 3G, Wi-Fi & Bluetooth and 4G bands in limited defined areas. Once the cellular Jammer is on, all types of cellular activities in the surroundings (including incoming and outgoing calls, SMS, picture sending, etc.) are jammed. Effective jamming range depends upon the site terrain and cellular signal strength at the site. The low power equipment is primarily designed considering the health safety standards and Indian working conditions.

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DUAL MULTI-FUNCTION CONSOLES (DMFC)



Dual Multi-Function Consoles (DMFC) is ergonomically designed single-operator console, built on state of the art technology. DMFC consists of two wide screen displays placed one above the other for display of required information. Touch Input Display (TID) and Keyboard is provided for data entry. Tracker ball allows seamless movement of cursor from primary screen to secondary screen and vice versa.

- Displays: Two 24" displays
- Computing Unit: Server based on latest embedded dual Xeon processor and add-on dual output graphics card for dual Displays. RHEL operating system
- Operating system: RHEL
- Ethernet Switch: Rack mount L2/ L3 managed switch for external interface
- Man machine interface (MMI) desk for operator action and selection

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MRWS



MRWS "Trinetra" is a weapon sight indigenously designed & developed by BEL Pune. It is Compact, Light Weight, Parallax free and Rugged Weapon Sight for instant Target acquisition. "Trinetra" is equipped with Laser Spot Designators, making it an all in one versatile sight for all possible combat operation scenarios.

- Standard Picatinny Mount.
- In-built Visible Laser Spot Designator.
- Infrared Laser Spot Designator (Optional).
- Powered by commercially available battery.
- Lightest in its category.
- Combined Zeroing Mechanism

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LRF EYE-SAFE MODULE



Eye Safe, Laser Range Finder, Modules comprise of Trans-Receiver and Power supply modules. Designed for integration in EO pay loads to measure the distance of target up to 20 Km accurately and instantaneously. Mechanical mounting reference enables easy alignment with pay load sensors.

- Compact Design and Simple to operate
- Range: Max-20Km, Min-100m with accuracy of $\pm 5m$
- Measuring Frequency: one shot every 10 seconds
- Built in Test facility

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LRF 312



Laser Range Finder Eye safe Class-1 (LRF-312) is a lightweight LRF designed to measure the distance of target up to 20 Km range accurately and azimuth / Elevation instantaneously.

- Class-1 Eye safe
- Range: Max-20Km, Min-80m with accuracy of $\pm 5m$
- Measuring Frequency: 5 Hz continuous
- Built-in Compass and Inclinator (Optional)
- Remote readout, Remote Triggering through RS422 / RS232 selectable Serial Interface

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LRF EOFCS - 5PPS



Laser Range Finder, Eye Safe - EOFCS is compact and light weight equipment, which enables the user to measure distances to non-cooperative targets. It can be integrated with Day or Night Sights and incorporates a CCD camera for bore sighting with other sensors.

- Compact Design and Simple to operate
- Range: Max-20Km, Min-200m with accuracy of $\pm 5\text{m}$
- Measuring Frequency: 5 Hz continuous
- Built in Test facility
- Complied to Military Stds

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CUSTOMISED POWER PACKS



- Customised Power packs for various communication, surveillance and special purpose instruments used by Indian Armed and Paramilitary Forces.
- Both rechargeable and non-rechargeable types (Li-ion, Ni-Cd, Ni-MH, Li-SO₂, Li-MnO₂, LTC).
- Complied to Mil standards.
 - Compact, Light Weight and Rugged
 - High Energy density and low self discharge rate
 - Safe application with efficient Power Mgmt system
 - Stable Performance over wide/extended temperature range
 - State of charge indicator for rechargeable batteries (Optional)

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BATTERY: BB2590 (LI-ION)



This battery is compact, lightweight & consists of cylindrical Lithium Ion cells. It is intended for powering Sincgars & ATCS, FALCON, KY-57, MXF430, PRC-119 used mainly in NATO countries.

- Rugged & High performance
- Provided with efficient power management system
- Long Cycle Life & High Energy Density
- Wide Operating Temperature Range
- Designed to meet requirements of MIL-PRF-32052

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BATTERY BB390



This battery is compact, lightweight & consists of Lithium Ion cells. It is intended for powering Communication equipments like Singgars (PRC-119,104), FALCON (PRC-138, 117), MXF430 & other equipments.

- Rugged & High performance
- Built with Safety Vented cells
- Long Cycle Life & High Energy Density
- Wide Operating Temperature Range
- Designed to meet requirements of MIL-PRF-32052

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PASSIVE NIGHT SIGHT FOR INSAS RIFLE/LMG



Advanced passive night sight is a weapon sight system designed to be mounted on different assault rifles / INSAS Rifle / LMG. Its innovative design enables users to lower the distance between the weapon and sight. LOS resulting more comfortable aiming position. An illuminated Red Cross reticule with switchable brightness levels maintains reticule definition allowing fire control for target engagement.

Features

- Strain free viewing
- II Tube with built in bright source protection, reverse polarity protection & Automatic Brightness Control (ABC)
- 5 positional illumination control resistant
- Light weight, compact and rugged

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PASSIVE NIGHT SIGHT FOR ROCKET LAUNCHER



Passive Night Sight is a passive night system designed to be mounted on different rocket launchers. Its innovative design enables users to lower the distance between the weapon and sight. LOS resulting more comfortable aiming position. An illuminated red cross reticle with switchable brightness levels maintains reticle definition, allowing fire control for target engagement.

Features

- Strain free viewing
- II Tube with built in bright source protection, reverse polarity protection & Automatic Brightness Control (ABC)
- Light weight, compact and rugged

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PASSIVE NIGHT VISION BINOCULAR



Passive Night Vision Binocular is a lightweight, durable, water proof and compact night vision device. It is a single tube full field binocular system. It is fitted with XD-4 (Autogated) High Performance Tube and adjustable eyepiece. It is an ideal device for surveillance, patrolling and reconnaissance in the night.

Features

- Full field viewing
- Compact and ergonomic
- Autogated II Tube with built in bright source protection, reverse polarity protection and Automatic Gain Control (AGC)
- Hermetical sealing
- Inter-ocular and Dioptic adjustment
- Infra Red illuminator
- Low battery Indicator
- Bright light cut off facility while exposing high light.
- Water resistant at 1 meter deep for 30 minutes

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PASSIVE NIGHT VISION GOGGLE



Advanced Passive Night Vision Goggle is a lightweight, durable, water resistant and compact night vision device. It is a single tube full field binocular system. It is fitted with High performance Autogated XD4 II Tube and adjustable eyepiece. It is an ideal device for surveillance, patrolling and reconnaissance in the night.

Features

- Full field viewing
- Compact and ergonomic
- Autogated II Tube with built in bright source protection, reverse polarity protection and Automatic Brightness Control (ABC)
- Hermetical sealing with nitrogen filling and water resistant
- Inter-ocular and Dioptic adjustment
- Infra Red illuminator for map reading
- Low battery Indicator
- Bright light cut off facility
- Operates on 1.5V AA size batteries

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PASSIVE NIGHT VISION MONOCULAR



Night Vision Monocular is light weight device capable of being used as a hand held viewer, face & helmet mounted for night patrolling and surveillance and night firing. It is easily used as a hand held viewer, face & helmet mounted. It is provided with an Infrared Laser illuminator for use in totally dark environment for recognition of ranges of 125 mtrs or better.

Features

- Strain free viewing
- Military Grade II Tube with built in bright source protection, reverse polarity protection & Automatic Brightness Control (ABC)
- Works with Commercially available Primary / rechargeable btys
- Battery will run at least 8 hrs

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ACTIVE ELECTRONICALLY SCANNED ARRAY (AESA – SR) RADAR



The BEL's AESA-SR30 is an advanced Active Electronically Scanned Array(AESA) radar effective against the detection and tracking of crawling man, single man, group of men and small, medium and large vehicles. The advanced Electro Optical system enables it to perform passive surveillance throughout day and night. It is a lightweight and man-portable ground-surveillance radar that can be controlled and operated remotely through wired or wireless communication. System versatility allows for tripod, mast, tower or any other elevated static platform. It is highly effective in variety of harsh environments. It provides Superior accuracy, both in range and azimuth, allows for better performance with classification and identification of targets.

- Operates under all-weather conditions
- Very Quick and easy deployment of the system
- Highly reliable system as there are no moving parts
- Remote operation capability
- Enhanced display, PPI and B-Scope, digital map, clutter map and graphics-on-color display
- Automatic TWS
- Target identification via audio Doppler tones
- Auto Classification of targets

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SOFTWARE DEFINED RADIO-AR



The SDR-AR for Airbus is a Airborne software defined radio designed to serve the air-to-air, air-to-ship and air-to-ground voice and data communication between Airborne platforms and Ship borne/Ground based platforms.

The Salient features of this system are as follows

- The LRU is designed for form fit, ruggedness and reliable operations to withstand extreme environmental conditions of temperature, humidity, shock and vibration.
- The design is modular in construction for ease of maintenance. LRU is independently powered from DC source.
- Support Simultaneous transfer of Voice and data
- Interface with external timing source
- IP addressable
- Multi-channel capability in aircrafts

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BEML LIMITED

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Organisation Profile

BEML LIMITED, a Central Public Sector Undertaking, coming under the administrative control of Ministry of Defence, has its Corporate Office at 'BEML SOUDHA', 23/1, 4th Main, SR Nagar, Bengaluru – 560027, India

BEML is a leading defence equipment supplier, in high mobility vehicles and specialized military equipment for the Indian Defence Forces. The company is manufacturing variants of heavy duty All-terrain trucks, Field Artillery Tractor, Medium & Heavy Recovery Vehicle, Pontoon Mainstream Bridge Systems, Crash Fire Tenders and Mobile Mast Vehicle. BEML also supplies Engineering Mine Ploughs, Tank Transportation Trailers, Armoured Recovery Vehicle, Medium Bullet Proof Vehicle, All terrain Vehicle, Mil-rail Coaches and Wagons. The company has also created world class test track at its KGF Complex to test defence equipment and vehicles.

BEML has forayed into Aerospace business by manufacturing aerospace components and offering tooling and engineering services in addition to ground handling and ground support equipment, Aero Bridge System, Crash Fire Tender, Aircraft Towing Tractor, Etc. BEML also plays a major role in the country's integrated Guided Missile Development Project by supplying platforms for all missiles.

BEML TATRA HIGH MOBILITY 8 x 8 VEHICLE (T 815-2TER42 8x8.1R)



BEML TATRA High Mobility 8 x 8 Vehicle is an all-terrain vehicle used for mounting superstructure such as RADAR systems, Bridge laying system in Indian Army. The vehicle is also used for transport of personnel and is having a payload capacity of 17300 kg. the vehicle is used for towing trailers on public roads upto 65,000 kgs and in off road conditions trailer weighing upto 16000 kg.

The equipment is provided with a winch for self-recovery and recovery of other vehicles. Also the vehicle is provided with centralized tyre inflation system inside the cabin which enables inflation / deflation of tyres depending on terrain conditions.

Characteristics of Equipment

- GVW – 32000 kgs
- Engine power - 325 kW Euro 4
- Wheelbase - 2970 mm

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BEML TATRA HIGH MOBILITY 6 x 6 VEHICLE (T 815-2TDR32 6x6.1R)



BEML TATRA High Mobility 6 x 6 Vehicle is used for GS role in Indian Army. This is an all-terrain vehicle intended for transport of personnel and is having a payload capacity of 15700kgs. The vehicle is used for towing trailers on public roads upto 65,000 kgs and in off road conditions trailer weighing upto 16,000 kgs

The equipment is provided with a winch for self-recovery and recovery of other vehicles. Also the vehicle is provided with centralized tyre inflation system inside the cabin which enables inflation/ deflation of tyres depending on terrain conditions.

Characteristics of Equipment

- GVW – 28000 kgs
- Engine power - 270 kW Euro 3
- Wheelbase - 3270 mm
- Body type: GS load body

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BEML – TATRAHIGH MOBILITY VEHICLE(T815 25RR45 17 230 4x4.1)



The BEML TATRA 4x4 High Mobility Vehicle is designed for rough terrain, difficult climatic and environment conditions. Due to its specific design features, this truck is particularly suitable for expeditionary forces.

The 4x4 all-wheel drive chassis employs new development of the independent suspension and backbone tube frame, which are unique characteristics of the TATRA concept chassis which allows each wheel to move independently, with improved steering, and maximum tire-to-ground contact, while featuring extreme resistance of the chassis against torsion and bending.

The 4x4 is provided by a solid 3D frame formed by connecting the backbone tube with a conventional ladder frame via several cross-members. In addition, the backbone tube frame also protects all drive line components, which are placed inside the backbone tube, against impacts, dust, and humidity. Low service and maintenance costs, and service-free design without conventional cardan shaft torque distribution are other benefits of this concept. Independent wheel suspension, care for low vertical vibration, will provide high ride comfort, enabling fast drive in rough terrain.

Characteristics of Equipment

- GVW – 17000 kgs
- Engine power - 240 kW Euro 3
- Wheelbase - 4090 mm

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MULTIPURPOSE AMPHIBIOUS ARMoured VEHICLE ON 4x4 PLATFORM



Application

- Reconnaissance missions, escorting and guarding of motorcades, patrol, fire support, for special operations and for crew protection.
- As an assault vehicle or as a transport platform for light firearms and missile weapons, communications and other defense systems.

Operating conditions

- Ambient air temperatures ranging from -50°C to +50°C and relative air humidity of up to 100% at temperatures of up to +25°C.
- Negotiate water obstacles at water speed of 5km/hr.

Crew Protection

- Armoured Monocoque hull providing perimeter protection of the crew against 7.62mm 57-N-231 AKM bullets from 10m distance at firing angles of 360° in azimuth and 0 to 30° in elevation
- Protects under bottom blasts for F-1 or RGO hand grenades and against detonation of plastic explosive devices containing 0.5kg TNT equivalent.

Flotation

- Can negotiate water obstacles at a speed of 5 km/hr after preparation. The preparation time does not exceed 10 minutes.

Characteristics of Equipment

- GVW - 9500 kg
- Engine Power – 158 (215) kW (hp)
- Wheel base – 3200
- Body type - Armoured Monocoque hull

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LIGHT ARMoured PERSONNEL CARRIER



Light armoured personnel carrier (LAPC) is an armoured, military vehicle on 4x4 Platform, designed to transport personnel and equipment in combat zones.

LAPC are typically designed to protect against small arms and artillery fire

- ❖ Crew Protection :
- ❖ NIJ/STANAG Levels as per customer requirement
- ❖ 4x4 vehicle with unparalleled mobility, back bone chassis frame and swing half axles with independent suspensions.
- ❖ High power to weight ratio with Electronic Water Cooled Engine and Automatic transmission.
- ❖ CTIS and Run Flat Tyres to enhance mobility thereby survivability.
- ❖ Power Steering and Combination suspension – semi articulated axles, air bellows and hydraulic shock absorbers..

Characteristics of Equipment

- GVW - 14000 kg
- Engine Power – 210 kW
- Wheel base – 3710 mm
- Body type - Armoured Monocoque hull
- Crew – 10 persons (1 Driver + 1 Co-Driver + 8 Troops

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MEDIUM BULLET PROOF VEHICLE



MBPV is a blast protected and bullet proof vehicle which conceal crew and troops from Ballistic Arm Fire, Hand Grenades, and Fragment Simulated Projectiles etc. With survivability as major objective carries troops to operate in counter-Insurgency environment.

- ❖ 4x4 chassis with unparalleled mobility developed on BEML back bone chassis frame and semi articulated axles.
- ❖ Crew Protection
- ❖ NIJ/STANAG Levels as per customer requirement
- ❖ High power to weight ratio with Electronic Water Cooled Engine and Automatic transmission.
- ❖ Integrated Hull with Chassis and Automotive system.
- ❖ CTIS and Run Flat Tyres to enhance mobility thereby survivability.
- ❖ Power Steering and Combination suspension – semi articulated axles, torsion bars, air bellows and hydraulic shock absorbers..

Characteristics of Equipment

- Payload – 1000 kg
- Engine Power – 235 kW
- Power to Weight Ratio - 17 kw/T
- Crew – 10 persons (1 Driver + 1 Co-Driver + 8 Troops)
- Wheel base – 3650
- Body type - Armoured hull

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Organisation Profile

Bharat Forge Limited (BFL), the flagship company of Kalyani Group is a technology driven global leader in metal forming having transcontinental presence and serving several sectors including automotive, power, oil and gas, construction & mining, locomotive, marine, defence and aerospace. It offers full service supply capability to its geographically dispersed marquee customers from concept to product design, engineering, manufacturing, testing and validation. Combining its competencies in engineering, design and technology with best-in-class, world-scale manufacturing capacities and skills have transformed BFL from a component supplier to an innovation led, end-to-end solutions provider and a dynamic partner to customers, providing 'partner to print' solutions. In its defence profile, BFL has realized major breakthrough in Artillery Systems and continues to vigorously pursue its exploits in AFV, Protected Vehicles, Ammunition, Missiles and AD, and Defence Electronics.

DUAL TECHNOLOGY MINE DETECTOR



The DTMD-BFL is a Dual Sensor Detector comprising of integrated Metal Detector (MD) and Ground Penetrating Radar (GPR).

The electronics of both systems are housed in a compact metal casing. A telescopic pole links the electronics unit to the search head. The search head contains a Metal Detector coil and the GPR antennas. Both systems can be switched ON and used separately or together and will not influence each other. Both detection signals (MD+GPR) are communicated to the operator acoustically via the integrated loudspeaker. The acoustic signal of the GPR differs from the Metal Detector signal by a large difference in pitch, i.e. the radar uses a very low frequency tone and the Metal Detector uses a very high frequency tone. Furthermore, the MD and GPR signals have different acoustic features, which facilitate the differentiation of their alarms.

Characteristics of Equipment

- Lightweight (4.8kg) and an Ergonomic design
- Metal, Non-Metal and Minimum metal
- MD/ GPR/ Dual/ Gated
- Auto-compensation for High Metal Content Soil
- Audio/Visual/ Sensory Alarm
- Battery life of 8 hours
- PLC support of 15 years
- Dedicated T&M Support

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ATAGS



Advanced Towed Artillery Gun System (ATAGS) is an indigenously manufactured 155mm/52 calibre best-in-class artillery system, jointly designed and developed with ARDE (DRDO). Kalyani Group has developed the Gun structure, Gun Control and Automation, Barrel and Breech and Battery Command Post in the ATAGS, thus realizing the total gun system. The futuristic and technically superior breech, with higher service pressure can withstand up to 560Mpa. During the trial firings at Pokhran Ranges, the ATAGS variant developed by Kalyani Group, set a new record by registering the longest ever distance of 48.074 kms, surpassing the maximum ranges of 35-40 kms fired by any artillery gun system in this category. The ordnance including barrel and breech mechanism, on both variants of ATAGS, has been developed at Kalyani Group Advanced Artillery Manufacturing Facility.

Specifications of Equipment

- 155mm 52 Caliber Gun System
- Achieved World Record firing range in the 155mm family - 48.074kms (HE-ERFB-BB) and 38.569 km (HE-ERFB-BT)
- Zero backlash Electrical drives: Hydro-electric gun system
- The system can be able to fire Zone 7 charge
- Fire: any type of ammunition
- Steering: Steer-by-wire method for manoeuvring the artillery
- Self-propelled capability with a speed of 20 kmph
- Ability to ride at Towing vehicle's speed during towed mode
- Deployment time: 1 minute in day, and 1.5 minute in night

- Fully automatic Ammunition Handling System (AHS) enables firing six successive rounds and has manual backup arrangement

Elevation and Traverse

- Elevation: -5° to $+75^{\circ}$ with the speed of $5^{\circ}/s$
- Traverse: $\pm 30^{\circ}$

Rate of Fire

- Burst rate of fire: 4 rounds in 30 Sec
- Intense rate of fire: 16 rounds in 3 min
- Sustained rate of fire: 42 rounds in 1 hr

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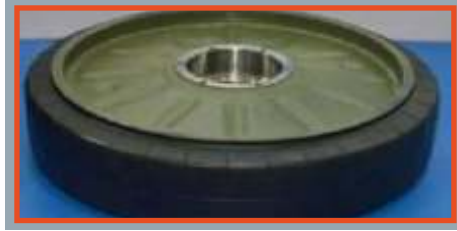
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BMP ROAD WHEELS



Kalyani Group has been the pioneer in indigenization of Road Wheels for BMP-2 IFV and sole private industry supplier of road wheels for IFV in India. We have supplied over 15000 wheels to Ordnance Factories with absolute zero failure rate. It is 100% indigenously developed by BFL. It weighs over 40 Kg.

Characteristics of Equipment

- Durable and long life
- Minimum maintenance
- High tensile strength
- Low running and replacement costs
- High load-bearing rigid base

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T-72 ROAD WHEEL ASSEMBLY



Kalyani Group has been the pioneer in indigenization of Aluminum Road Wheels for T-72 Tanks and sole private industry supplier of road wheels for Tanks in India. They have supplied over 85000 wheels to Ordnance Factories with absolute zero failure rate. It weighs over 165 Kg.

Characteristics of Equipment

- Durable and long life
- Minimum maintenance
- High tensile strength
- Low running and replacement costs
- High load-bearing rigid base

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BMP & TUNGHUSKA TRACKS



(BMP Tracks)



(Tunguska Tracks)

BFL has developed & manufactured Final assembly as ready to fit Track Wraps for Main Battle Tanks and capable of designing & manufacturing Tracks for any ICVs.

Characteristics of Equipment

- Better Maneuverability
- Better Braking Performance
- Lower Noise During Operation
- Significant Reduction Of Vibrations During Operation

Contact Person

Mohit Singh

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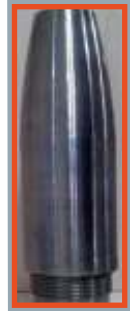
AMMUNITION SHELLS



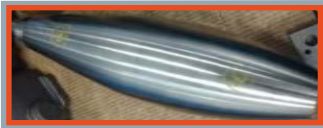
(500 KG Bomb Body)



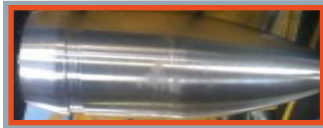
(FZ-319)



(FZ-71)



(120mm Mortar Shell)



(155mm Shell)



(105mm shell)



(130mm Shell)



(108 mm Naval Shell)

Kalyani Group has supplied more than 2 million ready to fill shells to Ordnance Factories and DRDO in the range of 70 to 155mm covering all variants including HE, smoke, illuminating and incendiary. The Group has also successfully developed APFSDS ammunition of 105mm calibre. It has been the development partner to HEMRL, ARDE & BDL for development of shells, rockets & bombs and enjoys a long standing successful partnership with all these agencies.

Kalyani Group also makes 70mm Rocket warheads and 500kg bomb bodies for supply as export order to global market.

- 500 Kg Bomb body weight around 270 Kg.

Contact Person

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Associate Vice President

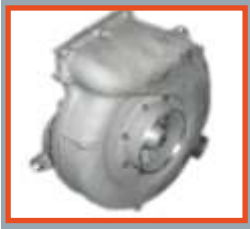
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ENGINE AGGREGATES



(T-72 Supercharger)



(T-90 Turbocharger)



(T72/T90 Crankshaft)

Kalyani Group's high end proven capability for Heavy Forging, Heat Treatment and Machining which make it feasible to supply engine aggregates like crankshafts, turbo charger and super charger for Russian origin tanks. They also have in-house capability to design & manufacture Turrets. Large diameter Turrets get manufactured at their Ring Rolling plant at Satara.

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TANK BARREL, BREECH & MUZZLE BRAKE



(155/52 Cal Barrel)



(Breech Mechanism)



(Muzzle Brake)

Kalyani Group is the first indigenous private manufacturer of Tank Barrels in India with highly sophisticated Operational Barrel Manufacturing line with modern machines. They have also supplied T-72 barrel & Bofors barrels in semi-finished condition. The group has the capability to manufacture Barrels with Superior quality and futuristic design meeting the critical requirements for Russian origin tanks; VT72, T90 and BMP.

- Barrel weighs around 2000 Kg and 8m in length
- Breech Mechanism weighs around 850 Kg
- Muzzle Brake weighs around 200 Kg.

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GARDUA-105



Garuda105 is a 105mm/37 Caliber Gun System mounted on a Tata Truck.

Extremely Light Weight: less than 1 ton.

Incorporates state-of-the-art Hybrid Recoil Technology.

Shoot and Scoot Capability.

High Reliability and low maintenance cost.

Contact Person

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CLENSTA INTERNATIONAL PRIVATE LIMITED

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New Delhi -110016, India

Website : www.clensta.com

Head : Puneet Gupta

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Mobile : +91-9910301069

Email : puneet@clensta.com

Organisation Profile

Clensta International (IIT Delhi Partnered Venture - Providing Waterless Personal Hygiene Solutions and other Innovative products)

Clensta is an Indian startup and in association with IIT Delhi, one of the leading technology institutions in India, has been working to create innovative healthcare solutions to make hygiene accessible for anyone, anytime and anywhere. The inspiration for Clensta came from the visible need to make personal hygiene accessible at locations with scarcity of water. Our mantra of 'clean instantly' is driven by our aim to create products that promote complete and instant cleaning solutions without the use of water and to provide innovative solutions to everyday problems.

We've been fortunate to have receive appreciation by The Honorable President of India Shri Ram Nath Kovind and have also gained recognitions across the U.S. Embassy (Delhi), the Indian Biotech community & many more.

Addressable Concerns

- Hygiene problems for soldiers in extreme weather conditions on ground ship or under water
- Inaccessibility to hygiene at places with scarcity of water
- Personal hygiene problems for disaster hit areas
- Known concerns with sponge bathing for patients
- Maintaining personal hygiene for travel enthusiasts

CLENSTA WATERLESS BODY BATH



Clensta Waterless Body Bath - Alternate bathing solution

Characteristics

- No Water required
- No Alcohol, no SLS & no Gluten free
- Removes body odor
- Makes skin clean and fresh

WATERLESS BODY BATH	
Physical State	Liquid
pH	7 +/- .5
Odour and Appearance	Clear Liquid. Baby Powder #4014 Antiallergenic
Solubility	Soluble in Water

Contact Person

Puneet Gupta

CEO & Founder

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CLENSTA WATERLESS SHAMPOO



Clensta Waterless Shampoo – Anytime Accessible Hygiene

Characteristics

- No Water required
- No Alcohol, no SLS & no Gluten free
- Removes dirt, dust & oil
- Smooth & shiny conditioned hair

WATERLESS SHAMPOO	
Physical State	Liquid
pH	6 +/- .5
Odour and Appearance	Clean & Fresh # 8515 Antiallergenic
Solubility	Soluble in Water

Contact Person

Puneet Gupta

CEO & Founder

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**DECAGON
DEFENSE PROTECTION SYSTEMS**

Address : Plot 102. Cotex House. 16th Road.
MIDC Andheri (East) Mumbai - 400093.

Website : www.decagondefence.com

Head : Kinjal Trivedi
Director (Defence Business), DECAGON

Telephone : +91-9820294474

Mobile : +91-9820017069, (Chirag Trivedi)

Email : kinjal@cotex.com, dilip@cotex.com, chirag@cotex.com

Organisation Profile

Defense Protection System Company Profile

Defense Protection System (India) is an innovative Indigenous company that makes surveillance vans, command rooms, troop carriers and emergency ambulance for safety and protection of soldiers.

- a) Multifold electronics surveillance systems and equipments
- b) Multifold energy support systems and equipment
- c) Multifold long term survival systems and equipment
- d) Full safety devices and equipments attached to the facility.

These bunkers have bullet proof bodies and bullet resistant glass that have bullet and missile deflection dynamic angles.

Decagon Trailers are made for Multi Terrain use: Adventure Off Rooding, Road Work, Agriculture, Mountain Kitchen, Storage, Road Work Sign Posts as well as Emergency Medical/ Hospital Use.

Our new product is Emergency Ambulance for Borders and 4X4 All Terrain Amphibious Vehicles.

The All weather bullet proof bunkers are self sustained and fully loaded to contain the ecosystem of soldiers for longer term.

1/ ALL TERRAIN TRAILERS WITH SOLAR FLOOD LIGHTS



Technical Detail

- LED Floodlight Array
- Solar Panel on Top / on Lid
- Battery Pack with Inverter
- Generator or Alternative Tools
- Towing Hitch
- Size: 5'6" x 3'6"
- Colour Options: Red and Black

Contact Person

Kinjal Trivedi

Director

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chirag@cotex.com

STORAGE TRAILER



Technical Detail

- Storage Trailer
- Lid on top opening
- Tool Box
- Reflector lights
- Towing Hitch
- Size: 5'6" X 3'6"
- Colour Option: White

Contact Person

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STEEL AND BULLET PROOF SURVEILLANCE VAN



Technical Detail

- All Weather Bullet Proof Self Sustained and Fully Loaded
- Bullet and Missile Deflection Dynamic Angles
- 1200W Solar Panel
- Diesel/ Petrol Generator
- Gas Cooking Range for Multipurpose Use
- 2 Fire Extinguisher
- 4 X 4 and 6 X 6 Vehicle
- Size: 9 feet
- Colour Option: Desert Camouflage, Snow White and Military Green

Contact Person

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STEEL AND BULLET PROOF TROOP CARRIER FOR SOLDIERS



Technical Detail

- Bullet Proof Exterior
- Bullet Resistant Glass
- Soldier Sniper Protection
- 360 degree Shooting CCTV Surveillance
- Capacity 16-20 Soldiers
- Radio Frequency Intruder Protection Frequency
- Real Time Earth Mapping System
- Solar Powered
- Extra Shooting Chutes
- All Terrain All Weather
- Size: Manufactured According to Dimension required
- Colour Option: Desert Camouflage, Snow White and Military Green

Contact Person

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chirag@cotex.com

DECAGON CAMOUFLAGE KNITWEAR



Technical Detail

- 100% Cotton
- Camouflage Tshirts in 3 prints
- Solid Colour

Contact Person

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DEFENCE RESEARCH & DEVELOPMENT ORGANISATION (DRDO)

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- Head** : Secretary, Department of Defence R&D
and Chairman, DRDO
- Telephone** : +91-11-23011073
- Fax** : +91-11-23007636
- Email** : dpidrdo@hqr.drdo.in

Organisation Profile

Defence Research and Development Organisation (DRDO) is the premier R&D arm of Ministry of Defence, Govt. of India. DRDO has set its sight on making India self-sufficient in defence systems, developing a wide range of equipments such as Missiles, Light Combat Aircraft, Multi-barrel Rocket Launcher, Electronic Surveillances, Radar, Missile-based Air Defence System, Naval System, Life Sciences and many more world class products. With 52 laboratories, equipped with state-of-art equipment and a dedicated team of over 7000 scientists, DRDO has given a quantum jump to India's military might, generating effective deterrence and providing crucial leverage to Armed Forces.

AIRBORNE EARLY WARNING AND CONTROL SYSTEM (AEW&C)



AEW&C system is a potent force multiplier, providing surveillance, tracking, identification and classification of the Airborne/Sea surface targets. The information from multiple sensors are collated, associated and fused to provide a cogent and comprehensive air situation picture on configurable consoles. Further capabilities include threat assessment and enabling the interception of the hostile targets through guidance of own interceptor.

Characteristics of Equipment

- Active Electronically Scanned Array for Primary Radar(PR)
- Identification of Friend & Foe(IFF) Radar
- Electronic Support Measure(ESM) and Communication Support Measure(CSM) for detection of hostile air defenses
- Satcom & line of sight Voice and Data Communication System
- Self-Protection Suit for safe operation
- Mission Communication System for Air-to-Air, Air-to-Ground V/UHF voice
- Five Operator Workstation and Five rest crew seats
- Extendable Endurance with In-Flight refueling(IFR)
- Dedicated APU's for Mission Avionics
- Fuel Efficient Regional Jet aircraft platform
- Tactical Battle Management Software

Lab Responsible

Centre for Airborne Systems (CABS)
Belur Complex, Bengaluru - 560037

MULTI MODE HAND GRENADE



Multi Mode Hand Grenade is developed to overcome the shortcomings of existing M36 grenade. Multi Mode Hand Grenade 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.

Characteristics of Equipment

- Modular design
- Multimode concept: Offensive mode, Defensive mode
- Uniform fragmentation pattern with higher density
- Additional thrower safety (Safety Release Delay Mechanism)
- High reliability and convenient to handle and use.
- Designed delay of 3.5 to 4.5 seconds for detonation after release.
- Safe for Para-dropping in primed condition.
- Ease in priming and un-priming.

Technical Parameters

Technical Parameters	Mode of Operation	
	Offensive	Defensive
Weight	260 g	495 g
Length	139 mm	139 mm
Diameter	46 mm	63 mm
No. of fragments	Nil	Approx 3800
Lethal Radius	3 - 5 m	8 - 10 m

Lab Responsible

Terminal Ballistics Research Laboratory
Sector-30, Chandigarh - 160003

BRAHMOS WEAPON SYSTEM



BRAHMOS is a two-staged, universal, supersonic cruise missile having flight range of up to 290-km with top speed of Mach 2.8. It operates on 'Fire and Forget Principle', adopting variety of flights on its way to the target. Its cruising altitude could be up to 15 km and terminal altitude to be as low as 10 meters. It can carry conventional warhead weighing 200 to 300 kgs.

Characteristics of Equipment

The BRAHMOS Supersonic Cruise Missile has:-

- 3 times more velocity
- 2.5 to 3 times more flight range
- 3 to 4 times more seeker range
- 9 times more kinetic energy

Lab Responsible

BrahMos Aerospace 16, Cariappa Marg, Kirby Place
Delhi Cantonment, New Delhi -110010

JOINT VENTURE PROTECTIVE CARBINE



The next generation MSMC is the Joint Venture Protective Carbine with more accuracy, reliability, endurance, robustness and manoeuvrability. This is a unique calibre (5.56X30mm) weapon for short range operations. Its low recoil provides stabilized firing during rapid firing and can be fired by single hand. It has ambidextrous features for cocking handle and a retractable butt for balanced firing which is most suitable for concealed area operations.

Characteristics of Equipment

- A unique calibre weapon system for CQB operations.
- Compact, Light weight & Robust.
- Highly accurate in single shot & burst mode.
- Semi bull-pup configuration to facilitate single hand firing capability.
- Low weapon recoil ensures stabilized weapon during rapid firing mode.
- Retractable butt for compactness & better balance.
- Three point sling for quick weapon positioning in different firing postures.
- Ambidextrous features in fire selector, Plunger butt lock - enables left as well as right hand firing. Reflex cum visible laser Sight mounted on Picatinny 1913 rail.

Lab Responsible

Armament Research & Development Establishment (ARDE)
Dr. Homi Bhabha Road, Armament Post Pashan, Pune - 411021

UNDER BARREL GRENADE LAUNCHER (UBGL) FOR INSAS & AK-47 RIFLE



40 mm Under Barrel Grenade Launcher (UBGL) developed by ARDE is an add-on attachment to the INSAS and AK47 Rifle. The launcher is made up of aluminium alloy. It can fire all types of grenades up to a range of 400m. The lethal radius of the grenade is 5m. It is effective against enemy soldiers hiding in bunkers or behind walls. It is inducted into Indian Army.

Characteristics of Equipment

- Modular design, three-point attachment to INSAS Rifle
- Applied & Mechanical safety
- Breech loading enables easy loading of grenade
- Pump action makes extraction of cartridge case easy
- Fires common ammunition with in-service MGL
- Fills tactical gap between max range of hand grenade and min range of mortar

Lab Responsible

Armament Research & Development Establishment (ARDE)
Dr. Homi Bhabha Road, Armament Post Pashan, Pune - 411021

PINAKA MK-III GUIDED



Guided Pinaka rocket is an Artillery rocket system having a maximum striking range of 80 km with a precision of < 30 m. With its family of highly lethal warheads it can neutralise wide variety of enemy targets while minimising collateral damage. Guided Pinaka rockets are highly cost effective.

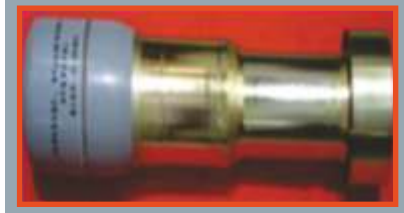
Characteristics of Equipment

- Calibre: 214 mm, Range: 20-80 km, Accuracy < 30 m
- Miniaturized GNC kit housed in warhead ogive
- INS + GPS based Guidance, MEMS INS based Navigation, Canard based Control
- Warheads: Monolithic and sub-munition
- Launched from in service Pinaka launcher system

Lab Responsible

Armament Research & Development Establishment (ARDE)
Dr. Homi Bhabha Road, Armament Post Pashan, Pune - 411021

ANTI-SUBMARINE ROCKET



ARDE has successfully developed the Extended Range Anti-Submarine Rocket (ER-ASR) to enhance the range of existing RGB-60 Anti-submarine Rocket from 5.3 km to 8.5 km. ERASR consists of two motor propulsion systems which can fire the rocket in Short Range mode and Long Range mode to achieve different range capabilities

Characteristics of Equipment

- Physical parameters:
 - Caliber: 212 mm, Length: 1830 mm, Mass: 113 kg
- Propulsion: Case Bonded Composite Propellant (FORE Motor) and Cartridge loaded Extruded Double Base Propellant (AFT Motor)
- Warhead: Underwater Blast Explosion
- Warhead Composition: Insensitive HE Composition (PBX based)
- Maximum Range: 8.5 km in Long range mode (Ballistic 2 mode) and 3.0 km in Short range mode (Ballistic 1 mode)
- Operating Temperature Range: -5° C to +55° C

Lab Responsible

Armament Research & Development Establishment (ARDE)
Dr. Homi Bhabha Road, Armament Post Pashan, Pune - 411021

500 KG GENERAL PURPOSE BOMB



This bomb is a preformed fragmentation bomb in which 15 mm steel balls are used as fragments. The bomb can be carried on both the Russian and NATO origin aircrafts. The bomb is initiated at a height of 9m using a Proximity Fuze. The Bomb is undergoing qualification.

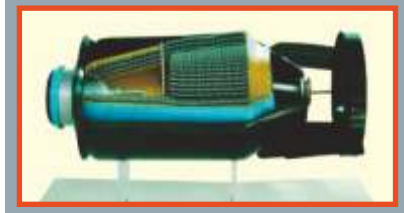
Characteristics of Equipment

- Dimensions: Length-2380 mm, Dia.-400 mm
- Mass: 470 kg
- Filling: Dentex (116 kg)
- Type: Preformed Fragmentation
- Targets: Parked aircrafts, light armoured vehicles, troop concentrations

Lab Responsible

Armament Research & Development Establishment (ARDE)
Dr. Homi Bhabha Road, Armament Post Pashan, Pune - 411021

250 KG PRE-FRAGMENTED BOMB



This bomb is a preformed fragmentation bomb in which 8 mm steel balls are used as fragments. The bomb can be carried on both the Russian and NATO origin aircrafts. The bomb is initiated at a height of 9 m using a Proximity Fuze. The Bomb is in service and under production at Ordnance Factories.

Characteristics of Equipment

- Dimensions: Length-1425 mm, Dia.-325 mm
- Mass: 250 kg
- Filling: Dentex (33 kg)
- Type: Preformed Fragmentation
- Targets: Parked aircrafts, light armoured vehicles, troop concentrations

Lab Responsible

Armament Research & Development Establishment (ARDE)
Dr. Homi Bhabha Road, Armament Post Pashan, Pune - 411021

122 MM EXTENDED RANGE (ER)



122 mm ER rocket is an indirect fire, free flight artillery rocket system designed to deliver large volume of fire over range of 40 km. These rockets are designed to fire from BM-21 launcher system. Rocket can deliver monolithic PF warhead on target using improved case bonded composite propellant based propulsion system. Wrap around fin stabilizer system provides the desired stability to the rocket throughout its flight.

Characteristics of Equipment

- Calibre: 122 mm
- Range: Minimum 9.3 km, Maximum 40 km
- Weight of rocket: 67.1 kg
- Weight of propellant: 27 kg
- Weight of warhead: 20.5 kg
- Length of rocket: 2937 mm
- Operating temperature range: -30° C to +55° C
- Fuze: Turbo powered, Proximity/ Point Detonating
- Brake ring: 1
- Propellant: HTPB based solid composite
- Nozzle end ignition
- Accuracy & Consistency: 1.5% of Range (Free flight)
- Warhead types: Preformed Fragment (PF)

Lab Responsible

Armament Research & Development Establishment (ARDE)
Dr. Homi Bhabha Road, Armament Post Pashan, Pune - 411021

ADVANCED VLF RECEIVER



Very Low Frequency (VLF) is the means of long-range reliable communication from mainland to distributed ships and submerged submarines. Limited bandwidth of the large transmit antenna is a major challenge in achieving enhanced information transfer rate over this link. Advanced VLF Modulator and Receiver is a solution to this challenge which is able to achieve reliable text data communication up to 400 bps in available 200 Hz bandwidth by use of modern communication signal processing techniques implemented in software on indigenous hardware platform.

Salient Features

- Frequency: 10 – 30 KHz
- Throughput: 400 bps
- Bandwidth: 200 Hz
- GMSK Modulation
- Lossless Data Compression
- Serial data interface
- Soft key controlled user menu
- Size: 2U height, 19" rack mountable

Lab Responsible

Defence Electronics Applications Lab
Raipur Road, Dehradun - 248001

SOFTWARE DEFINED RADIO MAN-PACK



SDR-MP is a portable radio with single channel operation in V/UHF for marine applications. The radio has undergone extensive developer trials with all features integrated including security functions, ECCM, adhoc networking, legacy communication support and secure narrow band & wideband digital voice/data communication waveforms. It has high assurance architecture with customized implementation of SCA (software communication architecture) interfaces.

Characteristics of Equipment

- Frequency: 30-512 MHz
- Services: Voice/Data
- Data Interface: Ethernet
- Networking: Yes (MANET)
- Data rate : upto 512 kbps
- Encryption: Built-in (COMSEC/TRANSSEC)
- Weight: 4 Kg
- Size: 230 mm x 225 mm x 90 mm

Lab Responsible

Defence Electronics Applications Lab
Raipur Road, Dehradun - 248001

GAP MEASURING DEVICE MK-III



Gap Measuring Device (GMD) Mk-III enables measurement of distances between banks of canals, ditches and rivers, for laying bridges.

Characteristics of Equipment

- Night operation with 3rd generation MWIR thermal imager.
- Remote control operation.
- Range/gap/vertical height calculation using digital magnetic compass.
- Display of data in remote as well as in thermal imager.
- Operation with rechargeable batteries.
- Weight below 10 Kg including all accessories.

Lab Responsible

Instruments Research & Development Establishment (IRDE)
Raipur Road, Dehradun - 248008

LWPLTD



The state-of-art diode-pumped Light Weight Portable Laser Target Designator (LWPLTD) enables accurate terminal guidance of laser guided munitions during day and night.

Characteristics of Equipment

- Designation of military targets up to 10 km.
- Night operation with 3rd Gen. MWIR thermal imager.
- Built in range finder.
- Weight below 30 kg including accessories.
- Integrated DMC & GPS within Digital Goniometer.
- Operates with rechargeable Li-ion batteries.

Lab Responsible

Instruments Research & Development Establishment (IRDE)
Raipur Road, Dehradun - 248008

OPTICAL TARGET LOCATER



Optical Target Locator is a portable device for detection of active and passive surveillance systems. It finds application in VIP security, active monitoring and sanitisation of sensitive areas and sniper detection. The equipment can be used for detection of optical targets by viewing a strong glint from their front end optics against the background.

Characteristics of Equipment

- Range: 50m-600m
- FOV: 4 degrees
- Battery: Li-ion rechargeable
- Operation: Day/Night (Urban)
- Target Detection : Bright Spot against background
- Weight: 1.9 kg (without Battery)
- Size: 240 X 180 X 75mm
- Potential targets : Sniper Sight, NVD, LRF, CCD Camera, Laser Target Designator

Lab Responsible

Laser Science & Technology Centre (LASTEC)
Metcalfe House, Delhi - 110054

PREEMPTOR



Reliable and stand-off detectors are mandatory for pre-empting the explosive threats. Raman Spectrum Provides finger print of explosives in terms of Raman Shifted light signals. This technique is capable of detecting multiple species of explosives in a single measurement within few seconds.

Characteristics of Equipment

- Mode of operation: stand-off detection
- Agents for detection: All kind of explosives in the form of liquid and solid, even can detect in mixtures
- Detection Range: 30 cm(extendable to 5 m)
- Sensitivity: 10% in solid and liquid explosives
- Detection and Identification time: 8 sec
- Database: 50 explosives/their precursors
- Alarm indication: Display of threat and sound alarm
- Weight: 8 kg

Lab Responsible

Laser Science & Technology Centre (LASTEC)
Metcalfe House, Delhi - 110054

MODULAR BULLET PROOF JACKET



The Modular Bullet Proof Jacket has been successfully developed in three sizes which provide protection against specified threat levels.

Characteristics of Equipment

- Provides protection against AK-47 (MSC) and 7.62 SLR bullets with Back Face Signature (BFS) less than 25 mm.
- Front Hard Armour Panel also provides protection against AK-47 (Varangoan Hard Steel Core Bullets).
- Comply with the conditioning protocols of NIJ 0101.06.
- Weight varies from 2.5 Kg to 11.2 Kg depending upon area of protection required against specified threat levels.

Lab Responsible

Defence Materials and Stores -Research & Development Establishment (DMSRDE)
GT Road, Kanpur - 208013

BLAST PROTECTION SUIT



The Blast Protection Suit (BPS) provides the protection against accidental blast of APNM M14 Mines during mine breaching operation.

Characteristics of Equipment

- Developed for mine breaching operation and it consists of
 - Body Armour, Hand Guard, Leg Guard
 - Groin Pad, Neck Guard, Gloves, Helmet with Visor
- Soft Armour Panels consists of Aramid quilt and Hard Armour Panels consists of layered structure of advanced composites.
- Weight: 6.2 Kg

Lab Responsible

Defence Materials and Stores -Research & Development Establishment (DMSRDE)
GT Road, Kanpur - 208013

BULLET PROOF OUTER VEST



BPOV gives 360° protection to upper torso of body from 9 mm SAF Carbine.

Characteristics of Equipment

- The BPOV consist of soft armor panel of (SAP).
- SAP covers area of 4100 cm² which includes upper torso of body.
- BPV gives 360° protection to upper torso of body from 9 mm SAF Carbine.
- The BFS (trauma) received will be less than 25 mm.
- SAP defeats 9 mm SAF carbine from a distance of 5 m.
- Total weight of Bullet Proof Vest is less than 2.5 Kg.

Lab Responsible

Defence Materials and Stores -Research & Development Establishment (DMSRDE)
GT Road, Kanpur - 208013

BALLISTIC HELMET



Designed as per the requirements of para military forces (Indian Armed Forces) to provide adequate protection to head and neck.

Characteristics of Equipment

- Adequate protection to head neck and ear
- Weight below 1.2 Kg for medium size
- Defeats 9 mm SMC bullets from 10 meter distance with trauma (back face signature) below 13 mm under both dry and wet conditions.
- UV & IR absorbing paint

Lab Responsible

Defence Materials and Stores -Research & Development Establishment (DMSRDE)
GT Road, Kanpur - 208013

BOOT ANTIMINE INFANTRY



Boot is used in Combat/ Ammunition design and meant for assaulting troops.

Characteristics of Equipment

- Weight less than 3.0 Kg/pair.
- Indigenously developed technology.
- The boot is suitable for assault operation in plane, desert and mountain regions.
- Performance of the boot has been adjudged superior in comparison to the boots of foreign origin (USA, Israel and Canada).
- The peak pressure of the AP mine (35g HE) is in the order of 45,000 kg/cm² has been attenuated to less than 160 kg/cm², which is safe against amputation level injury.

Lab Responsible

Defence Materials and Stores -Research & Development Establishment (DMSRDE)
GT Road, Kanpur - 208013

DAKSH – PRIMAL



'Daksh – Primal' has been the first successful mobile robot for military applications developed in India. The robot has been developed for handling, detecting and defusing Improvised Explosive Devices (IEDs). The robot is electrically powered with an endurance of 3 hours and can be operated from a range of 500m on RF or using a Fiber Optic cable up to 100m in a jammed environment. It can climb stairs and has a six-axis robotic arm capable of lifting IEDs up to 20kg at 2.5m

Characteristics of Equipment

- Stair Climbing
- Steep slope negotiation
- Skid steer for zero turning radius
- Online X-Ray facility
- Robust manipulator arm with six degrees of freedom
- Ability to handle suspected objects up to 20kg from 2.5 m
- Multiple cameras with pan, tilt and zoom
- Wireless operation / fiber optic
- Water Jet Disrupter to defuse the IED

Lab Responsible

Research & Development Estt (Engrs)
Alandi Road, Dighi, Pune - 411015

UXOR



The Unexploded Ordnance Handling ROV (UXOR) is developed for handling and defusing Unexploded Ordnance (UXO) at test sites and firing ranges remotely. This Robot is equipped with an Abrasive Water Jet Cutting Machine which is capable of cutting through any ordnance to dismember the fuse. The Robot is equipped with two manipulator arms, one for handling bombs upto 1000kg and the other for smaller ordnance. UXOR is equipped with two different cutting mechanisms to for desired profile cut.

Characteristics of Equipment

- IC engine based remotely operated tracked skid steer loader platform
- Cross country mobility with six hours of endurance
- Range of operation 1 km LOS
- Multiple DOF manipulator to handle UXO's in difficult orientation
- Integrated Abrasive Water Jet Cutting Machine
- GPS based localization
- Carrier Vehicle with Master Control Station,
- Intuitive Control console for operator and Navigator,
- Rugged PTZ camera on hydraulic mast

Lab Responsible

Research & Development Estt (Engrs)
Alandi Road, Dighi, Pune - 411015

DAKSH – MINI



This remotely operated vehicle (ROV) has been specifically developed for handling IED's inside confined space in trains and aircrafts. The robot can be deployed remotely from a distance of 200 m and can traverse through aircraft and railway aisles. The robot has an endurance of two hours on full charge of the on-board battery. The back-pack based Master Control Station provides the operator mobility to approach the suspected object from close by.

Characteristics of Equipment

- Manipulator upto 2.5 m vertical reach and upto 1m horizontal reach with Lift capability 8 kg
- Mobility: All Terrain and 45 degree slope/stair
- Command and Control: Portable Master Control Station
- Real time Video
- Payloads
 - X-Ray
 - Water Jet Disrupter

Lab Responsible

Research & Development Estt (Engrs)
Alandi Road, Dighi, Pune - 411015

NETRA



The Unmanned Aerial Vehicle (UAV) - Netra jointly developed with M/s Idea Forge Technology P. Ltd., is a quadrotor developed for surveillance. The UAV is completely autonomous and capable of surveillance in day or night from a range of 5 km with an endurance of 45 mins. The UAV-'Netra' is also integrated with a miniature radiation sensor for measurement of radiation contamination from air remotely. The UAV -'Netra' is man portable and can be carried in a specially designed backpack with all-weather capability.

Characteristics of Equipment

- Daylight Camera - 10X Zoom
- Optional Thermal Imager
- Inbuilt Radiation Sensor
- Autonomous Operation
- GPS waypoint Navigation
- Encrypted Communication Link
- Return to home on: Low battery, Communication failure

Lab Responsible

Research & Development Estt (Engrs)
Alandi Road, Dighi, Pune - 411015

DAKSH -SCOUT



This man-portable remotely operated vehicle (ROV) has been specifically developed for surveillance operations. The ROV weighs less than 20 kg and can be carried by a single operator. The ROV can be deployed in cross country or urban terrain and climbs stairs. The on-board multiple day /night cameras provide real time video to the operator on his hand held Control Station. The ROV has a range of 200m LOS on RF. The system is silent and would be an invaluable asset for special operations.

Characteristics of Equipment

- Cross-country mobility
- 40 degree slope negotiation
- Stair climbing capacity
- Multiple on-board cameras for all round view
- Night vision capability using Thermal Imager
- Light weight Li-ion battery pack
- Payload :
 - Optional recoilless water jet disrupter
 - Charge delivery mechanism
 - Additional PTZ/under belly camera

Lab Responsible

Research & Development Estt (Engrs)
Alandi Road, Dighi, Pune - 411015

MOBILE SHELTER NBC



Mobile shelter NBC is a collective protection shelter which can carry out tactical functions such as communications, command & control post or medical care centre on mobile platform. Shelter is shielded against NEMP effect and protected against fallout gamma and neutron radiations along with Bio-chemical warfare agents. High mobility of the shelter is achieved by mounting it on VVL Tatra 8 x 8. The shelter provides contamination free over pressure area by isolating it from the external environment and continuously providing clear air using NBC ventilation system.

Characteristics of Equipment

- Sandwich panel wall configuration with protection factor of 1.5 against fallout gamma and neutron radiations
- Designed for 8-10 persons for 96 hours protection
- NEMP protection: 80dB for E-field, 60 dB for H-field, NEMP filters for power, data and control lines
- NBC Monitoring system with indoor and outdoor sensors
- Power supply system: 2 Nos. DG Sets (20kVA each), 1 No. PTO
- Penthouse: 2 Nos of 10.08 sq.m. floor area

Lab Responsible

Research & Development Estt (Engrs)
Alandi Road, Dighi, Pune - 411015

BAR MINE LAYER



The Bar mine Layer (MML-SP) equipment can bury anti-tank ND Mk-III mines (Bar mines) in soil at 0-20 cm depth at 6m, 9m or 12m spacing. This equipment is capable of laying minimum 250-300 mines per hour for spacing of 6m in plains, semi deserts and deserts terrains.. All the operations in the equipment are automatically carried out by Electronic controller The system has been equipped with GPS based mine field mapping device which automatically stores location of laid mine. The equipment is built on TATRA 8x8 VVN chassis.

Characteristics of Equipment

- Mine Laying rate: 250-300 mines/hr at 6m spacing
- Inter-mine spacing : 6,9,12 m with 15% variation
- Depth of trench: 0-20 cm
- Mine Storage capacity : 338 nos.
- Operational Area : Plains, Desert and Semi-desert
- Mode of operation : fully automated
- Mine field data recording : GPS based auto- recording
- Crew for operation : 03 Crew and 01 driver
- Operational temperature : 0-45^o C
- Mine Laying on Slopes : Longitudinal 0- 10^o , Transverse 0- 7^o

Lab Responsible

Research & Development Estt (Engrs)
Alandi Road, Dighi, Pune - 411015

MINE FIELD MARKING EQUIPMENT



The Mine Field Marking Equipment Mk-II is designed for marking the mine fields at faster rate, semi-automatically with minimal human intervention. It is designed to operate in plains of Punjab, semi desert and desert of Rajasthan. This equipment is designed to erect the pickets at any distance from 10 to 35 m (in the step of 5) on to the ground. It also rolls out the rope from the spools which are to be tied manually to the picket at two different heights. The system is based on HMV

Characteristics of Equipment

- Fencing rate : 1.2 km/hr
- Inter picket spacing : 10 to 30 meter in step of 5
- Depth of picket : 100 mm to 450 mm
- Picket Storage capacity : 500 nos.
- Operational Area : Plains, Desert and Semi-desert
- Mode of operation : Semi automated
- Data recording : Yes
- Crew for operation : 04 Crew and 01 driver
- Operational temperature : 0-45^o C

Lab Responsible

Research & Development Estt (Engrs)
Alandi Road, Dighi, Pune - 411015

SHORT SPAN BRIDGING SYSTEM



One prototype of 10m short span bridging system consists of Tatra 8x8 chassis (re-engineered with an auxiliary cabin at the rear end for limited driving capabilities) as carrier vehicle. Suitable launching mechanism is mounted on the carrier vehicle to launch a 10m bridge along with a pier system. The launching operation is carried out manually or with an electrical system.

Characteristics of Equipment

- Material : RDE 40M Al alloy
- Carrier Vehicle : TATRA T815 8X8
- Bridge length : 10M
- Load class : MLC 70
- Roadway width : 4 m during use and 3.5m during transportation
- Bridge deck : Level deck with anti-skid surface
- Launch time : 20 Minutes

Lab Responsible

Research & Development Estt (Engrs)
Alandi Road, Dighi, Pune - 411015

ARMoured AMBULANCE TRACKED (AAT)



Designed for the speedy evacuation of battle field casualties with immediate medical care over a widely dispersed area under armour cover.

Characteristics of Equipment

- Provision for
 - Four stretcher patients (or) Two stretcher & four sitting patients (or) Eight sitting patients.
 - Seating for two medical attendants.
 - Air conditioned with 3 ton ACU.
 - Mobility in all type of terrain, obstacle crossing & amphibious capability.
- Medical Facilities
 - Defibrillator for continuous ECG monitoring, automatic external defibrillation & pacing, NIBP and pulse oxymetry.
 - Ventilator for artificial ventilation.
 - Laerdal suction unit for removal of abdominal fluids.
 - Refrigerator for preserving life saving medicines.
 - Thomas splints & crammers (conventional & inflatable). Urine bottle, Bed Pan & Kidney tray

Lab Responsible

Combat Vehicles Research & Development Estt.
Avadi, Chennai - 600054

ARJUN MBT MARK I



Arjun MBT Mk I is Made in India and Made for India. The ARJUN MBT Mk I manifests the latest battle tank technologies that make it a distinct front-runner amongst the array of contemporary Main Battle Tanks (MBTs) of modern armies in world over. Arjun MBT Mk I offers the troops a state-of-the-art tank with superior firepower, high mobility, excellent protection and accommodates four men Crew. Encouraged by its excellent performance at the highly challenging operational conditions in harsh Indian desert environment, Arjun MBT Mk I has been named as "Desert Ferrari" by tank experts.

Arjun MBT Mk I is indigenously designed & developed by DRDO for the National self-reliance in Armoured Fighting Vehicle and inducted into service with two regiments operationalized.

Lab Responsible

Combat Vehicles Research & Development Estt.
Avadi, Chennai - 600054

LOW LEVEL TRANSPORTABLE RADAR



Low Level Transportable Radar, Ashwini is a ground based rotating Active Phased Array Radar System for air space surveillance to detect and track air targets, under hostile EW operational environments. The radar operates either in staring or rotation mode. The radar is based on solid state active aperture phased array with Digital Beam Forming and has electronic scanning capability in both azimuth and elevation. The Radar is fully programmable through an efficient Man-Machine Interface from the Local Operator Work Station (OWS) and remotely from the Operator Work Station Unit in the operations shelter.

Characteristics of Equipment

- Fully Distributed Active Phased Array with DBF
- Multifunction and multi-mode radar
- Rotation and Staring Modes of Operation
- Multi Beam in azimuth and elevation
- Electronic scanning in azimuth & elevation
- Programmable Operational Modes
- Volumetric Surveillance
- Automatic Target Classification
- ECCM
- Target tracking with external Cue

Lab Responsible

Electronics and Radar Development Establishment
(LRDE), DRDO, Bengaluru - 560093

WEAPON LOCATING RADAR



Weapon Locating Radar (WLR) is a coherent, electronically scanned Pulse Doppler radar. The radar automatically locates hostile artillery, mortars and rocket launchers and tracks friendly fire to locate the impact point of friendly artillery fire to issue necessary corrections. The radar detects projectiles with small cross section across the battle space horizon, and is capable to handle simultaneous fire from weapons deployed at multiple locations. The fence concept of placing beam grazing the covered air space makes it impregnable for hostile projectiles without detection.

Characteristics of Equipment

- User-friendly initialisation
- Slewable phased array antenna
- Communication with higher echelons
- Low encamp and decamp time
- Weapon location in high density fire environment
- Adaptive radar resource scheduling
- Digital receiver
- Programmable digital signal processor
- Tracking and weapon location using advanced algorithms

Lab Responsible

Electronics and Radar Development Establishment
(LRDE), DRDO, Bengaluru - 560093

3D LOW LEVEL LIGHT WEIGHT RADAR



ASLESHA is a multifaceted ground based 3D Low Level Light Weight Surveillance Radar for deployment in diverse terrains like plains, deserts, mountain tops and high altitude regions. Aslesha detects and tracks heterogeneous air targets, including helicopters, fighters and UAVs at low and medium altitudes. The radar can scan the valley. It provides accurate range, azimuth and height information for each target with electronically steerable multi-beam technology in elevation. The radar is engineered in multiple packages to enable easy transportability in mountainous terrain by vehicles, group of men, or as an underslung carriage by a helicopter. The remote operation of the radar through Commander Display Unit (CDU) provides safety to the crew during operation. The facility also enables the Commander to deploy the radar at a tactically favorable point.

Characteristics of Equipment

- 3D surveillance of aerial targets at low and medium altitude
- Detection and tracking of fighter aircraft, helicopters, slow moving micro-light aircraft and UAVs
- Track while scan
- Full 3D capability using multi-beam technology
- Integrated IFF and side lobe blanking in high density fire environment
- Enabled for networking with Integrated Asterix protocol
- Fast and Easy to install and decamp Remote operation and display through Commander Display Unit

Lab Responsible

Electronics and Radar Development Establishment
(LRDE), DRDO, Bengaluru - 560093

BATTLE FIELD SURVEILLANCE RADAR



BFSR-SR is a man portable, battery operated Surveillance Radar. The radar has been developed for deployment in the forward areas with the capabilities to detect, track and classify variety of moving ground surface targets. BFSR-SR is a reliable sensor for day and night operations in all weather conditions. The radar is a simple, easy to use and user-friendly surveillance-sensor. It can be installed and effectively put to use within 5 minutes. Audio and visual aids help identify and classify a target decisively. The radar is also a potential ground based e-sensor for Border Security Force, Coast Guard and Police for surveillance of designated areas. The radar would be a very cost-effective perimeter surveillance sensor for airports, large industrial and other infrastructure.

Characteristics of Equipment

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

Lab Responsible

Electronics and Radar Development Establishment
(LRDE), DRDO, Bengaluru - 560093

FLR/FCC



Flight Level Radar, a Multi Function Electronically Scanned Phased Array Radar, is the Primary sensor at the Flight level for Air Defence Weapon System. The FLR has the capability to perform extensive search, track multiple targets and missiles, and to command and guide own multiple missiles concurrently. The Radar system is mounted on two HMV namely Flight Level Radar (FLR) and Flight Control Center (FCC), to provide sensor support for all Air Defence operations. The distributed hardware i.e. Radar in FLR and control center in FCC, provides distributed work environment and facilities to operate the radar from control center. It is engineered to support Weapon System deployment either in group or autonomous configuration. The radar has built-in UHF communication component providing voice and data communication with squadron control center when deployed in a group. Also, Integrated Radio Line Modern (IRLM) provides data communication to the launchers.

Characteristics of Equipment

- Automatic target identification
- Variable track update rates
- Low Side Lobe Antenna
- Frequency Agility
- Pulse Compression
- Automatic threat evaluation and weapon assignment
- Target Engagement and Kill Assessment
- Multi-Sensor data fusion
- Online status data logging, Remote display and user friendly reply
- Networks centric operation

Lab Responsible

Electronics and Radar Development Establishment
(LRDE), DRDO, Bengaluru - 560093

3 D MEDIUM RANGE SURVEILLANCE RADAR



3 D Medium Range Surveillance Radar, Rohini is a ground based mechanically scanning Pulse Doppler radar for air space surveillance to detect and track air targets with reliability, even under hostile EW operational environment. The flexible architecture is a reliable and adaptable technology for multiple applications - early warning for air defence weapon system, air defence sensor at airbases. The radar has advanced technologies like digital receiver, programmable signal processor providing high resolution, accuracy, response and information availability. The radar, packaged on two vehicles, is easy to operate, transportable by air, rail and road, can be deployed and decamped in less than 30 minutes.

Characteristics of Equipment

- Medium range high resolution 3D surveillance
- Integrated IFF with co-mounted antenna
- 7 channel Digital receiver and Signal Processor
- Programmable Signal Processor
- Cross country mobility
- Clutter/Weather/ECM video maps
- Jamming analysis and presentation
- High altitude deployability
- Transportable by Road, Air and Rail
- COTS hardware for maintainability and cost effective surveillance solution

Lab Responsible

Electronics and Radar Development Establishment
(LRDE), DRDO, Bengaluru - 560093

TORPEDO ADVANCED LIGHT



Torpedo Advanced Light (TAL) is capable of launch from ships and helicopters to attack submarines in shallow and deep waters. TAL performs pre-programmed search patterns, detects the target and homes on to the submarine. M/s BDL has produced 25 torpedoes for Indian Navy. Torpedo Advanced Light is being exported to Myanmar Navy.

Characteristics of Equipment

- Propulsion: Electrical, Mg-AgCl Battery
- Contra-rotating propellers
- Homing: Acoustic (Active, Passive and Mixed)

Lab Responsible

Naval Science & Technological Laboratory
Vigyan Nagar, Visakhapatnam-530027

LITHIUM ION BATTERIES



Lithium-ion cell technology has been developed with active materials suitable for high rate application. The batteries are supported by a battery management system to ensure safety. The technology incorporates features of flexible voltage, current and high endurance and is useful for both defence and civilian applications.

Characteristics of Equipment

- Modular construction
- No Hazardous gases
- Integrated Battery Management System (BMS)
- In-situ charging
- Maintenance free

Lab Responsible

Naval Science & Technological Laboratory
Vigyan Nagar, Visakhapatnam-530027

EXPENDABLE DECOY



Expendable Decoy is developed by Naval Science and Technological Laboratory under Project Maareech. The soft-kill system incorporates programmable features to optimize its performance for deceiving and seducing incoming torpedoes thus ensuring maximum torpedo engagement time to protect own ship. The system has been inducted into Indian Navy in 2015.

Characteristics of Equipment

- Modes of operation : Jammer, Echo repeater, Auto
- Depth of operation upto 100mtrs
- Endurance : 8 min
- Effective range : 2000 m
- ToT with M/s BEL
- Export version available

Lab Responsible

Naval Science & Technological Laboratory
Vigyan Nagar, Visakhapatnam-530027

AKASH



Akash Missile System is designed and developed to protect important assets of the country from enemy air attacks (from Fighter Aircrafts, Unmanned Aerial Vehicles and Helicopters, etc.). It has simultaneous multiple-target engagement capability. Country's first indigenous multi-function phased array radar is used to guide the missile.

Characteristics of Equipment

(a) Dimensions of the missile

- Length : 5.82 m
- Weight : 710 kg
- Diameter : 0.35 m

(b) Capabilities

- Operational Range : 27 km
- Altitude : 18 km
- Speed : Mach 2+
- Single Shot Kill Probability : 88% (Kill probability increases with firing more than 1 missile in sequence).

Lab Responsible

Defence Research & Development Laboratory, APJ Abdul Kalam Missile Complex
Kanchanbagh, Hyderabad - 500058

ASTRA



Astra (Beyond Visual Range Air to Air Missile) is intended to engage and destroy highly maneuvering and supersonic speed air targets. It is powered by a smokeless, single stage, solid fuel propulsion system. It has Inertial-Guidance, Midcourse-Update and Active-Radar-Homing. Astra has "excellent" ECCM to tackle jamming by hostile aircraft and active radar terminal guidance.

Characteristics of Equipment

- (a) Dimensions of the missile
 - Length : 3.8 m
 - Weight : 170 kg
 - Diameter : 0.178 m
- (b) Capabilities
 - Operational Range : 60+ Km
 - Speed : Mach 4.5+

Lab Responsible

Defence Research & Development Laboratory, APJ Abdul Kalam Missile Complex
Kanchanbagh, Hyderabad - 500058

NAG



'NAG' Missile (3rd Gen, Fire & Forget Anti-Tank Guided Missile) is a 'Fire and Forget', third generation ATGM. The Missile is equipped with indigenous high resolution IIR seeker, which provides passive homing guidance for engaging static/moving Tank Targets. The Seeker is capable of operating during Day and Night. The Missile has Direct & 'Top attack' Capability and Tandem Warhead of the Missile can defeat all types of modern MBTs. Min and Max Ranges of NAG are 500Mtrs and 4-5Km

Characteristics of Equipment

- Diameter : 155 mm
- Weight : 42 kg
- Diameter : 1834 m

Launcher System (NAG Missile Carrier)

'NAG' Missiles are deployed on a dedicated BMP-2 based tracked Infantry Combat Vehicle (ICV) called 'NAMICA'. It is equipped with NBC protection (Nuclear, Biological or Chemical), independent Gunner & Commander Sights, and instant fire suppression system for crew safety.

Features of NAMICA

- 06 Nos. Ready to Fire 'NAG' Missiles on the Launcher Platform
- Amphibious Capability
- Hunter-Killer Capability
- Independent Commander's Panoramic Sight for surveillance
- Equipped with Land Navigation System (LNS)
- Silent watch capability (Day & Night)
- 4-man Army Crew

Lab Responsible

Defence Research & Development Laboratory, APJ Abdul Kalam Missile Complex
Kanchanbagh, Hyderabad - 500058

WhAP



WhAP is an 8x8, Wheeled Armoured Platform which can be configured for variety of combat & combat support roles such as Armoured Personnel Carrier, Infantry Combat Vehicle, Recce & Support Vehicle and Command Post vehicle etc. The vehicle is amphibious with hydrojets. It is incorporated with advanced features such as high power engine with automatic transmission, driveline with hydrogas suspension and run flat tyres, modular ballistic and blast protection.

The prototypes have been successfully configured with 30mm turret and 7.62mm RCWS. The platform can accommodate different types of armaments such as ATGMs and other Mission modules / payloads.

Characteristics of Equipment

- Configuration : 8 x 8
- Power pack : 600 hp Diesel Engine
- Driveline : All Live axles with independent suspension (Hydro gas)
- GVW of platform : 21.5 t–with baseline protection of 7.62 AP
- Speed
 - On road : 90 – 100 km/h
 - Cross country : 35 - 40 km/h
 - Speed in water : 8 kmph
- Gradient : 30°
- Ballistic : Modular as per STANAG
- Mine protection : 8 kg TNT - STANAG level III
- Armament : Medium calibre manned turret and RCWS ,12.7 & 7.62 mm RCWS, ATGM etc

Lab Responsible

Vehicle Research & Development Establishment
PO: Vahan Nagar, Ahmednagar - 414006

MDC WITH CBRN MINI UGV AND MPD



Mobile CBRN Detection & Communication Vehicle (MDC) along with CBRN Mini UGV & MPDS is required for early detection of CBRN warfare agents & to communicate to the competent authority for further action. MDC Vehicle comprises of NBC sensor system, communication system, NBC Filtration system, Mini Unmanned Ground Vehicle (UGV), Multi Purpose Decontamination System (MPDS), Power Source (Genset), UPS etc. All these systems have been integrated in various compartments of MDC vehicle.

Characteristics of Equipment

- “Integrated N&C sensor system” for detection of N&C agents in environment.
- “Communication system” to communicate information to appropriate authority for planning further actions.
- “Mini Unmanned Ground Vehicle (UGV)”
 - Mini-Tracked platform with four flippers
 - Max speed : 6 km/hr
 - Stairs climbing - Step Height : 18 cm, Depth : 25 cm
 - Day and Night Vision system
 - GPS/INS based integrated Navigation system
 - Wireless communication link Range : up to 500 m Near LoS and 1 km LoS
 - Endurance : 2 hours
- “NBC filtration system” to supply NBC filtered air to occupants inside the communication compartment and to driver in driver cabin through face mask.
- “Multipurpose Decontamination System (Self powered)” for decontamination operation

Lab Responsible

Vehicle Research & Development Establishment
PO: Vahan Nagar, Ahmednagar - 414006

E-NASIKA



Electronic sensing of hazardous chemical vapors at very low concentration levels is becoming increasingly important in present day security and surveillance scenario. Several technologies are being developed around the world to detect hazardous vapor content. SSPL, Delhi has developed e-Nasika (electronic nose) system which is capable of detecting Chemical Warfare (CW) agents in chemical war scenario. The developed system is light weight, hand held and battery operated with capability of detecting the CW agents up to ppb level. It can also sense the presence of various hazardous chemicals (TICs and TIMs) at low concentration (ppb level) with least false alarm and quick response times.

Characteristics of Equipment

- Compounds Targeted : Nerve, Blister, Blood & Choking Agents, TICs, TIMs
- Analysis Time : < 1 minute
- Compound Identification : Automatic
- Sensitivity : Nerve (ppb), Blister (ppb), Blood (ppm), Choking (ppm)
- Size : 30 x 10.5 x 12 cm³
- Weight : ~ 3 kg with batteries
- Continuous Operation : > 12 hours duration

Lab Responsible

Solid State Physics Laboratory (SSPL)
Lucknow Road, Timarpur, Delhi - 110054

LIGHT COMBAT AIRCRAFT (LCA) FIGHTER



LCA is an indigenous fighter aircraft developed by ADA with Hindustan Aeronautics Limited as its principal partner, in India. The Air Force variant christened as Tejas is the smallest, light weight, multi role, single engine, tactical fighter aircraft with compound delta wing. The special features of LCA fighter are compound delta Planform, Relaxed static stability, composite structure, fly-by-wire flight control system, glass cockpit, etc., LCA fighter can carry Air-to-Air missiles, Air-to-ground missiles, Anti-ship missiles, Laser guided Bombs, Drop Tanks, Night targeting pod, EW suite and bombs of various weights. Indian Air force has placed the production orders for LCA fighter. Final operational Clearance (FOC) is obtained for LCA Tejas and it is under production.

Features

- Single Engine
- Single Seat Multirole Supersonic Aircraft
- Fly-by-wire Flight Control System
- Glass Cockpit
- Open System Architecture based Avionics
- Composite Structure
- Delta Wing

Lab Responsible

Aeronautical Development Agency
Vimanapura Post, Bangalore, India – 560 017

TEMPERATURE-CONTROLLED BIODIGESTER FOR HIGH ALTITUDE AREAS



Temperature controlled- Biodigester is suitable for human waste disposal in low temperature areas. It uses specially optimized anaerobic microbial inoculum and fermentation tank. Large number of such Biodigesters are functional in J&K (Leh, Ladakh and Siachin), Sikkim and Arunachal Pradesh.

Characteristics of Equipment

- Eco-friendly & cost-effective
- Wide applicability under different geo-climatic conditions
- Customized & easily adaptable
- Maintenance free and no need to remove the sludge
- Minimizes water consumption
- Reduction in organic waste by more than 90%
- More than 99% pathogens reduction
- Generation of odourless and inflammable biogas
- Use of toilet cleaning agents is permitted

Lab responsible

Defence R&D Establishment, Gwalior-474002

BIODIGESTER FOR INDIAN RAILWAYS



Railway Biodigester is developed for onboard treatment and disposal of human waste generated during the journey. It has two main components: anaerobic microbial inoculum and fermentation tank. More than 174000 biodigesters are functional in passenger coaches. By October 2019, remaining coaches will be fitted with Biodigesters rendering all the tracks open defecation-free.

Characteristics of Equipment

- Eco-friendly & cost-effective
- Wide applicability under different geo-climatic conditions
- Customized & easily adaptable
- Maintenance free and no need to remove the sludge
- Minimizes water consumption
- Recycling of effluent water for cleaning of toilet pan and gardening
- Reduction in organic waste by more than 90%
- More than 99% pathogens reduction
- Generation of odourless and inflammable biogas
- Use of toilet cleaning agents is permitted

Lab Responsible

Defence R&D Establishment, Gwalior-474002

BIODIGESTER FOR PLAIN AREAS



It is a customized version of Biodigester Technology suitable for application in plain areas for on-site decomposition of human waste. Human waste degradation occurs through microbial action converting it into biogas. The process results into treated effluent which is environmentally acceptable. Thousands of biodigesters are in use across the country.

Characteristics of Equipment

- Eco-friendly & cost-effective
- Wide applicability under different geo-climatic conditions
- Customized & easily adaptable
- Maintenance free and no need to remove the sludge
- Minimizes water consumption
- Recycling of effluent water for cleaning of toilet pan and gardening
- Reduction in organic waste by more than 90%
- More than 99% pathogens reduction
- Generation of odourless and inflammable biogas
- Use of toilet cleaning agents is permitted

Lab Responsible

Defence R&D Establishment, Gwalior-474002

GROUND PENETRATING RADAR (GPR)



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

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

Features	Handheld GPR	Vehicle Mounted GPR
Types of Targets	Anti Personnel Mines (APM), Anti Tank Mines (ATM)	Anti Tank Mines (ATM), IED/UXO
Types of Soil	Red Soil, Laterite Soil, Red-Yellow Soil, Red-Loamy Soil & Black Cotton Soil	Red Soil, Laterite Soil, Red-Yellow Soil, Red-Loamy Soil & Black Cotton Soil
Detection Capability	Real time Detection Online Audio Signature (Headphones), Visual indication (LED)	Real Time 3D Image Presentation, Automatic Target Classification
Power Source	Rechargeable Li-ion Batteries	Rechargeable Li-ion Batteries
Weight	Less than 5 kg	Less than 80 Kg
Technology	Ultra Wide Band (UWB) Radar	Ultra Wide Band (UWB) Radar

Lab Responsible

Electronics & Radar Development Establishment (LRDE)
CV Raman Nagar, Bengaluru - 560093

DRDO BIOTOILET



Defence Research Laboratory, Tezpur, Assam has developed an ecofriendly, appropriate technology for human fecal matter digestion. It consist an anaerobic tank (biotank) and a natural secondary treatment bed (reed bed) for effluent water. This technology is suitable for low temperature high altitude areas and for plains.

Characteristics of Equipment

- Eco-friendly, appropriate & affordable
- Customized for individual family or community level
- Maintenance free (in terms of sludge cleaning)
- Wide application under different climatic conditions
- Smaller size than conventional septic tank
- Minimizes water consumption
- Reduction in organic waste & pathogen
- Generation of biogas, that can be harnessed
- Reduced load on sewage system
- Reuse of water for flushing, gardening etc.
- **Shelflife** 25 years from the date of manufacture

Lab Responsible

Defence Research Laboratory
Tezpur, Assam 784501

WATER IRON CUM ARSENIC REMOVAL UNIT



Water of North East region in many cases do not conform to the drinking water standard with respect to pH, colour, turbidity, Iron, Arsenic etc, content. Iron content exceeds the permissible limits in many of the north eastern regions while arsenic contamination is also observed in some places. Defence Research Laboratory, Tezpur, Assam has developed an iron cum arsenic removal unit.

Characteristics of Equipment

- Removes iron in water from 40 mg/L to < 0.3 mg/L (acceptable limit, WHO & BIS)
- Removes arsenic in water from 0.5 mg/L to < 0.01 mg/L (acceptable limit, WHO & BIS)
- Reduce turbidity to desirable limits
- Filtration rate is 200 L/hr
- Removal of Arsenic via pH control, aeration, co-precipitation and filtrations
- Non-electrical system
- **Shelf life** 10 years from the date of manufacture

Lab Responsible

Defence Research Laboratory
Tezpur, Assam 784501

DRDO WATER TESTING KIT



Water contamination both physio-chemical and bacteriological parameters in different parts of the country, can be tested with the help of DRDO water testing kit in field conditions to ascertain its portability for drinking purposes. The test are semi-quantitative and are based on accept/ reject.

Characteristics of Equipment

- Eleven parameters (pH, total hardness, iron, chloride, fluoride, nitrate, residual chlorine, sulphate, arsenic, TDS and faecal coliform bacteria can be tested with this kit. etc) of drinking water can be assessed in field condition.
- It carries high quality reagents to analyze 100 samples.
- It can be performed by a semi-skilled person with little training
- Cost-effective and portable
- Yields semi-quantitative results
- **Shelf life:** 2 years from the date of manufacture

Lab Responsible

Defence Research Laboratory
Tezpur, Assam 784501

HOUSEHOLD WATER FILTER (DRL PURE)



Water of North East region in many cases do not conform to the drinking water standard with respect to pH, colour, turbidity, Iron, Arsenic, manganese, bacteria etc, content. Iron, arsenic, manganese content exceeds the permissible limits in many of the north eastern regions. Defence Research Laboratory, Tezpur, Assam has developed a Household Water filter unit. .

Characteristics of Equipment

Removes following contaminants in water

- Arsenic: 0.2 mg/l to 0.01 mg/l
- Iron : 30 mg/l to 0.3 mg/l
- Manganese : 2 mg/l to 0.3 mg/l
- Filtration rate is 1.2l/hr
- Reduce turbidity to desirable limits.
- Removal of contaminants via aeration, adsorption and filtrations

Application: Domestic usage for removal of excess iron, arsenic & manganese from water to safe limit

Shelf life: 5 years from the date of manufacture

Lab Responsible

Defence Research Laboratory
Tezpur, Assam 784501

WATER IRON REMOVAL UNIT



Water of North East region in many cases do not conform to the drinking water standard with respect to pH, colour, turbidity, Iron, Arsenic etc, content. Iron content exceeds .the permissible limits in many of the north eastern regions Defence Research Laboratory, Tezpur, Assam has developed an iron removal unit.

Characteristics of Equipment

- Removes iron in water from 54 mg/L to < 0.3 mg/L (acceptable limit, WHO & BIS)
- Control pH of water without affecting other parameters.
- Reduce turbidity to desirable limits
- Filtration rate is 300 L/hr
- Non-electrical system
- **Shelf life** 10 years from the date of manufacture

Lab Responsible

Defence Research Laboratory
Tezpur, Assam 784501

NON-LETHAL CHILLI SPRAY™



DRDO has developed an eco-friendly non-lethal weapon based on oleoresin extracted from Bhut Jolokia, which is one of the hottest chillies in the world and endemic to North Eastern States of India including Assam.

Special Features.

Characteristics of Equipment

- Capsispray™ is available in containers of different materials (MS, SS, aluminium and composite), sizes (50 ml can to 50 litres cylinder)
- Medium sized cylinders come in back pack which can be carried on shoulders
- The large cylinders are trolley mountable for easy transportation.
- Useful for self defence
- Can be used to direct spray at any attacker
- Small and pen type having all safety measure for transportation
- Easy to use

Applications:

- The product is highly suitable for applications in the low intensity conflict (LIC) areas as well as for riot control, personal protection and self-defence.

Lab Responsible

Defence Research Laboratory
Tezpur, Assam 784501

NON-LETHAL CHILLIGREANDE (CAPSIGRENADE™)



Capsigrenade, an indigenous product, has been formulated using oleoresin extracted from Bhut Jolokia. 10,000 units have been supplied to Northern Command for control of violence in J&K.

Special Features.

Characteristics of Equipment

- Organic and less toxicity
- Effective in any climate including rain
- Onset action
- Easy to handle and can operate without canon
- Non-explosive

Applications:

- It is highly suitable for applications in low intensity conflict (LIC) areas as well as for riot control and mob dispersal. It is also very effective for use in "Hostage Crisis Management".

Lab Responsible

Defence Research Laboratory
Tezpur, Assam 784501

NBC SUIT PERMEABLE MK V



NBC Suit Permeable Mk-V is designed & developed for CBRN Scenario. It is developed using state- of- the -art technology of Activated Carbon Sphere(ACS)having higher surface area and Crushing strength ,coated uniformly on fabric and sandwiched between two fabric layers . Multi functional outer fabric offers Oil & Water repellency, Flame retardancy and Antistatic properties. The suit has unique property mix with single piece design with Hood, lightweight and having multiple features .More than 50,000 NBC Suits Mk V along with NBC Socks has already been Supplied to Indian Army & NDRF.

Salient Features

- Excellent chemical agent protection (more than 24 hours against HD)
- LightWeight
- Higher Comfort
- High crushing strength of ACS
- Oil and Water repellent
- Flame Retardant
- Anti-static
- Six times launderable

Laboratory Responsible

Defence R&D Establishment (DRDE)
Jhansi Road, Gwalior-474002

ECONOMIC EXPLOSIVES

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Organisation Profile

Economic Explosives Ltd. (EEL), belongs to “Solar Group” headed by Solar Industries India Limited (SIIL), which is a Public Limited Company. Solar Group is the largest manufacturer and exporter of Industrial Explosives and Initiating Systems in the Country. SIIL is listed on BSE and NSE of India with the current market capitalization of about Rs. 10,000 Crores. We export our products to over 35 countries and have set up manufacturing facilities in Nigeria, Zambia, Turkey and South Africa. Facilities are also coming up at Australia.

Solar Group has also set up State of the Art Facilities for production of High Energy Materials (HMX, RDX, TNT and its Compositions), Rockets, Fuzes & War Heads for Missiles and are operational which includes 'Integration of Rockets', 'Composite Propellant Plants' Production of various types of Detonators, Multimode Hand Grenade, Booster Pellets, Igniters, filling / Assembly and finished integration of Ammunition etc.

We have established production facilities to meet the regular and surge requirements of Indian Armed Forces.

MULTI MODE HAND GRENADE



Multi Mode Hand Grenade as a replacement of the vintage Hand Grenade M 36, offers numerous advantages to the Soldier in terms of Safety, DualMode capability and Lethality.

Multi Mode Hand Grenade offers the following advantages:

- Twin Delay Tubes provided to ensure High Reliability.
- Additional safety to the soldier through minimum 0.5 Sec Arming Delay.
- Battle field supremacy to the soldier with dual mode capability: 'Defensive Mode' & 'Offensive Mode' through quick change.
- 3800 numbers of fragments with uniform fragmentation pattern for higher Lethality.

Characteristics of Equipment

- Delay Time 4 ± 0.5 Seconds
- Operational Temperatures -20-c to +55-c
- Storage Temperature range is -50-c to +75°C
- Uniform Fragmentation pattern
- High Lethality
- High Reliability (> 95%)
- Safe for para dropping in primed condition
- Maintenance Free

Contact Person

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PINAKA MK-I



- Max Range : 37.5km
- Min Range : 12.6 km
- Rocket wt.: 277.4 kg
- Rocket length : 4883 mm

Characteristics of Equipment

- Accuracy and Consistency : 1.5% Range
- Composite Propellant : Cartridge loaded
- Length of Motor tube : 2732
- Wt of propellant: 100 kg

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BUND BLASTING DEVICE



Application: During wartime, crossing obstacle like raised canal banks i.e. bund is a challenging task for mechanized infantry. BBD is used to provide a mobility corridor by reducing the height of bund, so that a bridge can be launched for the forward movement.

Working Principle: A shaped charge makes a pilot cavity in the soil in which Follow Through Projectile (FTP) enters and then explodes to provide breach/ cut in the bund.

Characteristics of Equipment

- Transportable by a Jeep or Man portable.
- Creates a breach of length 8-9m, width 4-5 m and depth 2 m.
- Shelf life of 10 years

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RAIL TRACK ROCKET SLED (RTRS)



Rail Track Rocket Sled (RTRS) Penta Rail Supersonic Track is extremely useful for the testing of wide range of critical systems such as payload for manned missions of Space agency, the navigation system for missiles and aircrafts, proximity fuses for advanced warheads, fuses for armament systems parachutes for payload delivery, arrester systems for aircraft such as LCA.

Characteristics of Equipment

The rocket motor for the system comprises of a propulsion unit based on solid composite propellant with specific impulse of around 240 seconds. The propulsion unit measures around 2m with outside diameter of 200mm.

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HMX



HMX compositions has uses in variety of Military and Civil applications

- Melt casted and pressed military charges.
- Cast Cured changes for Insensitive Munitions (IM)
- Pyrotechnics (cap-relay, cutting cords, de tonators)
- Initiation and main charges for oil well perforating changes

Characteristics of Equipment

- Appearance: White
- HMX content : Min.98%.
- On request, HMX of 99.8 % purity can be supplied
- Melting point : 270C, Min. by DSC
- Detonation velocity: 9100m/s
- Acetone insoluble material : 0.03% Max

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RDX



RDX Composition have uses in variety of Military and Civil application:

- Melt-casted and pressed military charges
- Cast Cured charges for Insensitive Munitions (IM)
- Pyrotechnics (cap- relay, cutting cords, detonators)
- Initiation and main charges for oil well perforating charges

Characteristics of Equipment

- Crystal Density: 1.82g/cm³
- Heat of combustion: -2092±2.1KJ/mol solid phase
- VOD: 8750m/s (1.76 g/cm³)
- Impact Sensitivity: 7.5 J
- Friction sensitivity: 120 N
- Critical diameter of steel sleeve test: 8 mm

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TNT

- Widely used for military, Industrial and Mining application
- Manufacture of Warhead composition.
- Manufacture of Ammunition.

Characteristics of Equipment

- Form : Flake
- Colour: No darker than no .30257
- Solidification pt.(oC) : 80.20 minimum
- Moisture (%) : 0.1 max
- Acidity (as sulphuric acid.%) : None
- Insoluble matter (%) : 0.05 max
- Sodium (%) 0.001 max

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PETN

Application:

- Class 1 : for use in detonating Cord
- Class 2 : for use in primers for small arms ammunition
- Class 3 : for use in Pentolite
- Class 4 : for use in blasting caps & detonators

Characteristics of Equipment

- Melting Point : $140.50^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$
- Nitrogen Content : 17.50% Minimum
- Acetone insoluble material : 0.10% Maximum
- Insoluble Particle : Nil
- Acidity or Alkalinity : 0.003% Maximum
- Vacuum Stability : 5MI Max, gas evolved in 20 Hrs
- Granulation : As per customers requirements

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ENTREMONDE POLYCOATERS LIMITED

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Organisation Profile

Entremonde Polycoaters Limited (EPL) has been a pioneer in the field of coated and laminated technical textiles for over 40 years. We are driven by innovation and have number of first and awards to our credit. We are the only company in the coated fabric industry in India to win “**National Award for Indigenization**” from the **Government of India, Ministry of Defence**. We are one of the largest suppliers of coated fabrics to the Ministry of Defence, Govt. of India.

Our major strength lies in our technical expertise, the versatility of our product range, flexibility arising out of the manufacturing facilities, the rate of development of new products and our record of prestigious supplies made to Defence and other reputed institutions. We have successfully completed supply order of Activated Carbon fabric requirement for NBC Suits, 3-layer breathable fabrics for Coat ECC, Light weight ground sheet, Camouflage nets, Ghillie suits, Sniper tent etc.

MULTI SPECTRAL CAMOUFLAGE NET



Entremonde Multi Spectral Camouflage Nets (MSCN) are designed for providing stealth capability in the visual, near-infrared (NIR), thermal infrared and broadband radar wavebands. Objects covered by the nets merge well with surrounding terrain and reduces the detection probability of target significantly. The camouflage nets are made from specially designed fabrics and in-house developed nano coating materials. Nets can be customised to meet customer requirements.

Characteristics of Equipment

- Product is available in both two-dimensional (2D) and three dimensional (3D) construction
- Available for Plain & Jungle, Desert & Semi-desert and snow bound & high-altitude terrains
- Light weight for easy deployment, folding and packing
- Inherent FR fabric
- Anti-IRR, Anti-Thermal and Anti-Radar protection
- High tear and breaking strength gives longer service life

Contact Person

Muniswamy Reddy

General Manager-R&D

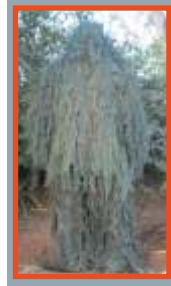
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MULTI SPECTRAL PERSONAL CAMOUFLAGE EQUIPMENT(MSPCE)-GHILLIE SUIT



A ghillie suit is a type of camouflage clothing designed to protect military personnel in the field. It is designed to merge with the background terrain such as jungle, snow or sand. Typically, it is a net or cloth garment covered in loose strips of burlap (hessian), cloth, or twine, sometimes made to look like leaves and twigs and optionally augmented with scraps of foliage from the area.

Characteristics of Equipment

- Light weight
- Easy to wear and down
- Protect from Visual, NIR, Thermal and Radar
- Available for Jungle, Desert and Snow bound terrains
- Low water absorption
- Resistance to Fire, UV, Micro-organism
- Highly durable

Contact Person

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GROUND SHEET/TENT FLOORING



Entremonde has developed innovative light weight, recyclable, thermoplastic composite fabric for ground sheet and tent floor application. Light Weight Groundsheet is patented product of EP and we supplied millions meter of fabric to Indian Defence. This product can be used by Military, Para-military and Police-force. It is 100% recyclable product. This fabric can be used for multi applications such as to take lie down position in field, Stretcher for injured soldier, Bed sheet, to carry luggage, etc.

Characteristics of Equipment

- Light weight, waterproof and high durable
- 100% recyclable
- Weather resistant, resistant to moisture and UV radiation
- Resistant to extreme low temperature (upto -50°C)
- Fire Retardant
- Easy to wash and quick drying
- Gentle with human skin

Contact Person

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FLEXIBLE LIQUID STORAGE TANKS



Flexi tanks are fabricated using high tenacity fabric coated with special polymer for storage of liquids such as drinking water, edible oil, petroleum products, wine etc. Flexi Tanks are available in Pillow and Onion shape. Storage capacity available from 250 liters to 50000 liters.

Characteristics of Equipment

- Fully collapsible, can be easily folded, transported & relocated
- High strength and durable. Minimum 10-years service life
- Weather resistant, resistant to moisture and UV radiation
- Resistant to extreme low temperature (upto -50°C).
- Low maintenance - easy to clean and repair

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CAMOUFLAGE TENT AND VEHICLE COVER



- High strength nylon fabric coated with high weather resistance polymer and printed with camouflage colours.
- Fireproof and water proof tent.
- Side wall of tent provided with 5 nos windows with dettachable Polycarbonate sheet & Mosquito net.
- Tent can be used to park the Military truck

BULLETPROOF OUTER JACKET



- Light weight, High breaking and tear strength.
- Fire resistance, waterproof fabric
- Good UV, weather resistance
- Excellent light fastness

Contact Person

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GARDEN REACH SHIPBUILDERS & ENGINEERS LIMITED

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Head : VK Saxena
Chairman & Managing Director

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Email : Chattopadhy.Saikat@grse.co.in

Organisation Profile

- Garden Reach Shipbuilders & Engineers Limited (GRSE) is a premier engineering company of India and is the largest manufacturer of Portable Steel Bridges (Bailey type) in India, besides being the leading manufacturer of Warships, Deck machinery equipment & Marine Diesel Engines for ships
- GRSE Portable steel bridge unit was set up in 1975 on the advice of the Defence Ministry and enjoys more than four decades of excellent track record in design, manufacture, supply and erection of Bailey type bridges
- Customer Profile for GRSE Portable Steel Bridges (Bailey type) : Indian Army, Border Roads Organization (BRO), National Rural Roads Development Agency (NRRDA), various State PWDs, Hydel projects, other private organizations, besides exporting to foreign countries
- The Quality Management System of the unit is certified for ISO 9001: 2008 and is well established in GRSE for design & manufacturing of Bailey type bridges. GRSE has been nominated as supplier to Indian Army, BRO and many state PWDs which speaks about the high quality & performance of GRSE Bailey type bridges
- GRSE has won the prestigious Raksha Mantri's award of excellence in 2006-07 for innovation in "Design of Double Lane Bridge for a vehicular load up to IRC-6, Load Class 70R"

GRSE PORTABLE STEEL BRIDGES (BAILEY TYPE)



- GRSE Bailey type bridges are fully tested, pre-engineered & pre-fabricated and having high strength & versatility. They are easy to handle, re-usable, portable and upgradable
- The Modular design of GRSE Bailey type bridges enables the installation to be a simple and quick process without the necessity of the mechanized material handling equipment. Maximum weight of a single component is 336 kg. Thereby, the design provides ready solution for emergency / disaster recovery situation
- Expected Life span of the GRSE Bailey Type bridges is 25 years approximately and can be extended, subject to proper maintenance
- GRSE Single lane suspension type bridges are especially suitable for hilly terrains where intermediate pier is not possible. Low Erection Time (45 to 60 days), ease of assembly and Reusability make it ideal for hilly regions
- Delivery Period: Normal lead time for supply of Bridges is 2 to 3 months. However, we can supply some limited quantity ex-stock to meet emergency requirement. The rated capacity of GRSE as per CQA(EE) certification is 13 bridges per month and we are now in the process of upgrading to 30 bridges per month
- Supplied bridges for Disaster management as emergency assistance.

Contact Person

Bailey Bridge Unit (Engineering Division)

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GARWARE TECHNICAL FIBERS LIMITED

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(Formerly Garware- Wall Ropes Ltd.)
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- Website** : www.garwarefibres.com
- Head** : S J Rao
Associate Vice President-Defence
- Telephone** : +91-20-30780 301
- Mobile** : +91-9372270145
- Email** : srao@garwarefibres.com

Organisation Profile

Garware Technical Fibres Ltd (Formerly Garware-Wall Ropes Ltd) , Pune is a Technical Textile Manufacturing company established in 1976 and its present annual turnover is approx. Rs 1000 Cr. It has 2 manufacturing units viz one at Pune and other one at Wai, Satara, Maharashtra. We export to more than 75 countries and been a dividend paying Public Ltd company since inception with listing in BSE and NSE.

The major product line includes, Synthetic Ropes, Cordages, Nettings, Camouflage Nettings, Tents, Shelters, Coated Fabrics, Aquaculture Nettings & Geo Synthetics.

Defence credentials include Fire Retardant Tarpaulins, Deployable Tents, Air Inflatable Tents, Medical Shelters, Inflatable Decoys, Coated Fabrics, Gun covers, Synthetic Camouflage Nettings, Different types of Ropes and Nettings.

We have In house Weaving, Knitting, Coating & Fabrication formost of our manufactured products.

4 X 4 METER INFLATABLE TENT



4 x 4 meter Inflatable Tent can be setup in less than 3 minutes with AC Blowers

Key Features

- Easy to deploy
- Built for self-erecting
- High strength
- Designed aerodynamically
- Water proof
- Cold crack resistant
- Minimum manpower for erecting
- Light weight
- High wind load capacity Name

Applications of Air Inflatable Shelters

- Smaller tents
- Temporary command shelter
- Relief center for disaster management
- Temporary hospital sheds
- Warehousing
- Aircraft Hangars &
- many more.....

Contact Person

S J RAO

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IDEAFORGE TECHNOLOGY PRIVATE LIMITED

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Organisation Profile

ideaForge Technology was founded in 2007, by a team of dynamic graduates from Indian Institute of Technology, Bombay. In 2009, it created the then world's smallest and lightest autopilot at 10 grams, and Technically Collaborated with Defence Research and Development Organization (DRDO) to co-create NETRA. Today, the company is a global technology leader in the VTOL Micro and Mini UAV space, and is also the market leader of the defence and internal security UAV market in India.

ideaForge has a large client base consisting of Defense & Internal Security agencies, as well as Government bodies which employ and procure UAVs. It has also begun introducing UAVs in the industrial segment; delivering drone-based solutions for industries involved in Agriculture, Mining, Energy, Environment and others, and is the first in the country to develop LiDar-mounted UAVs. The company has delivered more than 600 UAVs to various forces, and has trained more than 1100 pilots.

It is a vertically integrated company which is equipped with in-house R&D, manufacturing, software, services and training operations. This provides the flexibility to customize products to deliver end-to-end UAV solutions and services to the industrial and commercial sectors.

NETRA V-SERIES

Endurance Champion Global Class Leading Flight-times with IP53 Qualification & HD Live Transmission for Use in Most

Demanding Application used for:

- Inspection
- Security & Surveillance
- Area Mapping and 3D

Modelling

- Traffic Management
- Crowd Management
- Disaster Response

Characteristics/Specifications

- Surveillance Grade Endurance: Up to 60 min with HD payload @1000AMSL
- Range (LoS): 4-5 Km
- Weight: < 3 Kg with max payload
- Wind Resistance: 24.3 knots (45 KMPH)
- Ingress Protection: IP53 Rated for Dust Resistance
- Max Operating Altitude: 400m AGL
- Max Launch Altitude: 3000m AMSL
- Vehicle Size: < 1m X 1m
- Daylight Payload HD with 10X optical zoom
- Fully Encrypted Data Streaming
- Thermal Payload

Contact Person

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NETRA PRO



Rugged & Powerful Octa-Copter for Maximum Fail-safes & Versatility, even in extreme conditions used for:

- Security & Surveillance
- Supply Drops
- Area Mapping & 3D
- Modeling
- Traffic Management
- Crowd Management
- Disaster Response
- Extreme Environment
- Operations
- Inspection

Characteristics of Equipment (Capability & Physical Characteristics in bullet points)

Endurance: Up to 45 mins with payload @ 1000AMSL

- Range (LoS): 4Km
- Weight: & 6Kg with max payload
- Wind Resistance: 24.3 knots (45 KMPH)
- Ingress Protection: IP53 Rated for Dust Resistance
- Max Operating Altitude: 400m AGL
- Max Launch Altitude: 3000m AMSL
- Vehicle Size: & 1m X 1m
- Daylight Payload Resolution: HD with 10X optical zoom
- Fully Encrypted Data Streaming
- Thermal Payload
- HD Mapping Payload

Contact Person

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SWITCH HYBRID



- VTOL Hybrid for Terrain Independent Area
- Dominance with Long Range & High Flight-time
- Long Range Continuous Border
- Patrolling
- Counter - Insurgency
- Disaster Response
- Radiometric & Black Hot / White Hot
- Thermal Images
- Security & Surveillance
- Area Mapping & 3D Modeling
- Extreme Environment
- Operations

Characteristics of Equipment (Capability & Physical Characteristics in bullet points)

Endurance: 120+ minutes

- Range (LoS): 10Km
- Weight: <6Kg with max payload
- Wind Resistance: 24.3 knots (45 KMPH)
- Ingress Protection: IP53 Rated for Dust Resistance
- Max Operating Altitude: 1Km
- Max Launch Altitude: 3000m AMSL
- Vehicle Size: <2.5m X <1.5m
- Daylight Payload Resolution: HD with 20X optical zoom
- Fully Encrypted Data Streaming
- Thermal Payload
- HD Mapping Payload

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KOTKAR ENERGY DYNAMICS PRIVATE LIMITED

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Organisation Profile

Kotkar Energy Dynamics is engaged in the business of Design, Development and Manufacturing of equipment & products for the Automotive, Defence, Energy, Infrastructure and Telecom industries.

The Company was established in 1993, and has a legacy of family-business of technocrats, since 1953. Over the decades we have gained strong experience in technology domains of mechanized systems, structural engineering, specialty towers, hydraulic applications, electrical systems, systems integration, vehicular applications, automotive air conditioning and truck refrigeration.

We have built a strong capability to offer a dependable support for complete product lifecycle - from concept to design, engineering, prototyping, mass manufacturing and after-sales services.

We have an operations facility in Pune, India; that encompasses the processes from design to manufacturing. It is supported by a strong ecosystem of professional suppliers and vendors developed over the years. Kotkar Energy Dynamics is ISO 9002-2015 certified; and all projects are executed through QAPs.

We are known for our special abilities to come up with excellent technical innovations in the assignments entrusted on us by customers, that usually exceed their expectations. We are known for our consistent quality standards and willingness to offer more than promised.

SKID BASED MAST, 20 M, 47 M/S



Unique, portable, mast system transported in folded condition and unloaded with integrated hydraulics. Does not require civil foundation; is free-standing, on steel legs and support pads. Small footprint of 4.3m X 5.3m. PLC control panel for turning up and raising. Deployable in one day. Suitable for urban & rural areas.

Characteristics

- Overall height of Mast - 20m
- Wind speed sustenance - 47 m/sec.
- Projected Area load -- 2.18 sq.m
- Weight Payload -- 200 kgs
- Footprint in deployed condition - 4.3m x 5.3m
- Minimum Soil Bearing Capacity required - 100 kN/m²
- Loading/unloading into/from cargo truck - Integrated, hydraulic lifting system
- PLC-based Control Panel -- Safe & Sequential operations
- Space provision for -- 10 Kva diesel generator
- Space provision for -- 1 Outdoor Unit
- Electro-mechanical Winching -- with 230VAC supply

Contact Person

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SKID BASED MAST, 30 M, 55 M/S



Cyclone-surviving, portable, mast system transported in folded condition and unloaded with integrated hydraulics. Does not require civil foundation. Is free-standing, on steel legs and support pads. Footprint of 7m X 7m. PLC control panel for turning up and raising. Deployable in one day. Suitable for NE, high altitudes, open expanses & coastal areas.

Characteristics

- Overall height of Mast - 30m
- Wind speed sustenance - 50/55 m/sec.
- Payload Projected Area - 5.1 sqm
- Payload in weight -- 529 kgs
- Footprint in deployed condition - 7m x 7m
- Minimum Soil Bearing Capacity required - 125 kN/m2
- Integral loading / unloading system - Hydraulically operated lifting system
- PLC based Control Panel - Safe & Sequential operations
- Space provision for - 15/20 Kva diesel generator
- Space provision for - 1 ODU on Skid, 2 on ground
- Electro-mechanical Winching - with 230VAC supply

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COMMUNICATION VAN



Designed, engineered and built on AL Stallion chassis for rugged duty, with reinforced, insulated body, having provisions of suitable interfaces to mount communication equipment and devices.

Characteristics

- Steel sectional structure with sandwiched paneling
- Galvanized Steel sheets and structural members with epoxy-liquid painting for long life
- EPDM Insulation

- Sealed joints for dust-free & water-ingress-free operations
- Special Doors, Hinges, Stay & Lock Mechanisms for firm, rattle-free & durable functions
- Mounting interfaces for all equipment & devices with vibration isolators
- Ergonomics & Ease of operations
- Handling system & Quick Clamps for removal/refitting of generators
- Electrical cabling, power source switchgear, lighting provisions
- Engineering/industrial hardware with grades to suit the application & aesthetics
- Optimized Space Management
- Safety features against injury, shock

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AUXILIARY POWER UNITS & ENVIRONMENT CONTROL UNITS FOR BATTLE TANKS & ARMORED VEHICLES



Self-contained, Modular plug-in, Rugged, Silent-running, Independent of Main Tank Power, Non-interfering in Vehicle's Functionality, Separate Fuel Supply.

Characteristics

- Protects the Electronics & Electricals inside Vehicle
- Sustains Terrain vagaries
- External Ballistics Assault Protection
- Extreme temperature sustenance
- Water-fording capability
- NBC Protection
- Prolonged Duty Hours

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HEAVY-DUTY, MULTI-AXLE TRAILERS FOR TRANSPORTING AFVs



Heavy-duty, Multi-axle Trailers are designed & engineered for transporting AFVs easily and quickly for long distances on highways as also rough terrains. Are designed to be towed with suitable Prime Movers.

Characteristics

- Hydraulically steered for requisite turning radius.
- Digital Controller for controlling the steering for accurate, synchronized geometry
- Hydro-pneumatic suspension for terrain capability.
- Synchronized Anti-lock Braking
- Safe & Swift Loading of Cargo on Trailer
- Strong & Strategic Lashings
- Ease of Maintenance

Contact Person

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Organisation Profile

Larsen & Toubro (L&T) is a multi-billion Dollar technology, engineering, construction, manufacturing and financial services conglomerate, with global operations. A strong customer - focused approach and constant quest towards maintaining top-notch quality, have enabled L&T to attain and sustain leadership in its major lines of businesses over seven decades.

L&T Defence, a group company of Larsen & Toubro, is one of India's leading companies for supply of Defence Equipment and Systems in the private sector, with over 30 years of experience in this field. The Company provides indigenous, design-to-delivery solutions across the defence spectrum - from surveillance to strike capabilities, and mobility platforms essential to enhance their effectiveness.

L&T Defence also offers specialised turnkey defence construction solutions like underground structures, military bases, storage depots, smart infrastructure and modernisation of existing facilities. L&T's infotech business provides seamless integration of solutions that enhance both administrative and tactical efficiency of the armed forces.

L&T Defence has nine (09) dedicated manufacturing facilities, across the country, which leverages on the latest design and manufacturing technologies.

CHEMICAL AGENT DETECTOR



L&T Defence in association with DRDE, Gwalior have developed India's first indigenous chemical warfare agent detector. The detector simultaneously samples Chemical Warfare Agents (CWAs) and Toxic Industrial Chemicals (TICs) in positive (G) and negative (H) mode.

Useful during both war and peacetime, the detector is available in two variants: Fixed Chemical Agent Detector (FCAD) and Portable Chemical Agent Detector (PCAD). These detectors are capable of sensing very low concentrations of the following types of chemical warfare agents in different temperature and humidity conditions:

- Nerve Agents
- Blood Agents
- Blister Agents
- Choking Agents.

Characteristics of Equipment

- Rugged, compact and easy to carry
- Operational on 18V - 32V DC supply as well as 230V/50Hz AC
- Analysis time of less than 60 sec and recovery time of less than 180 sec
- Expandable library of CWAs and TICs to update new agents
- Compliance with JS55555 and MIL STD 461E
- Customizable and upgradable Software.

Contact Person

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RAPID DEPLOYED COMMUNICATION SYSTEM



L&T defence has developed state-of-the-art man-portable communication system for rapid deployable exercises, tactical military operations, humanitarian aid and disaster relief operations. It enables communication inter-operability between digital and analog systems, mobile and static and over multiple media types.

Characteristics of Equipment

- Indigenously designed and developed
- Ruggedized for military usage
- Commercial grade AES 256 security
- Integrated radio gateway system
- 220V AC/48V DC

Contact Person

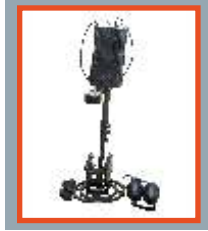
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DUAL TECHNOLOGY MINE DETECTOR



DTMD is an advanced technology, combining leading-edge Ground Penetrating Radar (GPR) and a high-performance Metal Detector (MD). The unit has been designed specifically for use in the most challenging military and humanitarian demining operations..

Characteristics of Equipment

- Zero or low false alarms rate
- Detects metal-free mines and IEDs
- Ultra-high sensitivity
- Easy operation
- Alarm: visual bar graph and audio signal
- Simultaneous operation of metal detector and GPR possible
- Lightweight

Contact Person

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Organisation Profile

MKU is a leading manufacturer of electro optics and light weight armour solutions for personnel and mobility platforms. We work towards increasing the capability and reducing risks, for brave soldiers, who stand in the line of duty to protect us. We have over 3 decades of experience in working for and fulfilling the requirements of defence forces in over 100 countries.

We operate out of 5 manufacturing facilities in India and Germany and our products are trusted by more than 230 forces in over 100 countries worldwide. Our Electro-Optic and Night Vision Devices provide a decisive edge, and night fighting capabilities to soldiers. We have protected over 2 million soldiers, and over 2000 land, air and naval platforms to date.

Our range of solutions include, end to end armouring solutions for Land, Air and Sea platforms. Light weight Body Armour, Armour Inserts, Low trauma Combat Helmets, Shields, Bomb Blankets, Night Vision & Thermal Monocular, Bi-oculars and Weapon Sights for defence and homeland security forces.

C-4012



Cerazone+ armour inserts are manufactured using highly mass efficient and advanced ceramics like silicon carbide & boron carbide (the third hardest material known to man). These are light and offer better comfort during prolonged usage.

Product	:	Cerazone
Model	:	C-4012
Size	:	25 cm X 30 cm (±3mm)
Nature	:	Stand Alone
Shape	:	Top Cut, Single Curve
Weight	:	2.5 Kg ± 50 gm
Thickness	:	19 mm (±2 mm)
Protection Level	:	Level III+ as per NIJ 0101.04

Bullet

- 7.62 x 39 mm AP

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C-7008



Cerazone+ armour inserts are manufactured using highly mass efficient and advanced ceramics like silicon carbide & boron carbide (the third hardest material known to man). These are light and offer better comfort during prolonged usage.

Product	:	Cerazone +
Model	:	C-7008
Size	:	25 cm X 30 cm (± 3 mm)
Nature	:	Vest Dependent
Shape	:	Top Cut, Single Curve
Weight	:	2.2 Kg \pm 50 gm
Thickness	:	15 mm (± 2 mm)
Protection Level	:	Level IV as per NIJ 0101.04

Bullet

- 7.62 x 63 AP (M2AP)

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HIGH CUT BALLISTIC HELMET



High Cut Ballistic Helmet

HCBH (High Cut Ballistic Helmet) are designed to allow maximum sensory & situational awareness to soldiers as they offer an unobstructed field of view and increased ambient hearing capabilities.

HCBH helmets from MKU provide excellent ballistic and impact protection and are compatible with a wide range of devices like Night Vision Devices (NVD's), Communication equipment, Nuclear-Biological-Chemical (NBC) equipment, etc.

Features

- Maximum sensory & situational awareness
- Superior Ballistic protection
- Excellent
 - Mechanical rigidity, toughness
 - Ergonomics
 - Heat insulation
- Resistant to
 - Temperature extremes
 - Water & moisture (Non-absorbent)
 - Flame & UV
- Suitable for snow, deserts, hills, plains and positive buoyant during amphibian/marine operations
- Compatible with add on devices like NV devices, CRBN and communication sets.

Protection Level

- Level III A (9mm) testing as per NIJ 0106.01
- V50-650 M/Sec

Color

- Black (Color customization is possible)

Size & Weight of Helmet

Size	Weight
Medium	1.15 gm \pm 50 gm

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MKS-1002



INSTAVEST, from MKU, is a revolutionary ballistic jacket which incorporates an advanced Quick Release System.

A soldier can divest the vest in a single pull action in less than a second.

Its remarkable design makes it the simplest quick release ballistic over-vest which can be recouped and reassembled in less than 30 seconds. The Quick Release System uses no cables or wires and is ambidextrous in nature.

Design Features

- Donning and doffing in an instant for quick response. It divests in less than a second and can be assembled and donned in approx. 30 seconds.
- Light weight, flexible and extremely comfortable.
- Advanced load distribution system.
- Fully adjustable at waist & shoulder for a precise and comfortable fit.
- Detachable groin, collar and shoulder.
- Incorporates a rifle butt rest for enhanced comfort during operations.
- Compatible with hydration packs, ammunition pouches & other gears.
- Rear drag strap handle.
- D-rings to carry bulky items.
- Manufactured using breathable, fire retardant, water repellent advanced fabrics.
- Inner lining for air ventilation

Protection Areas

- Front, back, side, collar, groin and shoulder

Size and Weight

- Large: 5 Kg \pm 100 gm

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JCO II E



Concealable Vest

Model: JCO II E

Concealable Vest from MKU is ideal for persons who are constantly under threat and want unobtrusive protection gear. The concealed Body Armour has been specially designed for elite & special forces for protection against handgun ammunition.

Special Features

- Excellent ergonomics
- Maneuverability
- Ease and comfort to wear
- Highly Flexible
- Ultra Thin
- No ride up
- Better ventilation

Design Features

- Specially designed to conceal the vest when worn under uniform or shirt.
- Unobtrusive / Concealable protection that ensure peace of mind
- Front and back overlapped to provide side protection.
- Soft Armor panel will be encased in the heat sealed material to protect from moisture.
- Inner mesh lining for ventilation and sweat absorption.

Protection Level of vest

- Level IIIA (9mm) as per NIJ 0101.04

Protection Area

- Front, Back and Sides.

Colors

- Black and White

Dimensions & Weight

Size	Weight of vest
Large	1.5 Kg \pm 100 gm

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JMT IV B



Tactical Military Over-vest

JMT IV B

Ideal for tactical operations, Tactical Military Over-vests from MKU are manufactured using Polyethylene/ Aramid or hybrid materials. External fabric is optimized for camouflage. Designed for easy mobility while providing optimum protection and maximum comfort over prolonged usage, they are capable of offering protection of up to NIJ Level III-A.

Enhanced protection against ammunition like AK-47, 7.62 NATO, 5.56 mm. etc. can also be achieved by upgrading these over-vests with Armor Plates available separately.

Design Features

- Ergonomic construction and design for maximum protection, flexibility and movement
- 2 front & side utility pouches
- Reinforced front & back pockets for Armor Plates
- Water proof & UV resistant ballistic panel covers to provide enhanced safety in adverse conditions
- Adjustable shoulders for a snug and comfortable fit
- Water repellant, removable and washable outer carriers for enhanced durability and performance of over-vests
- Offering enhanced protection by including protection for neck and groin without compromising on mobility
- Detachable and foldable groin guard that does not impede free movement of the wearer during operations
- Adjustable collars

- Unique inner waist belt helps in even distribution of weight of the over-vest

Protection Level

- Level IIIA as per NIJ 0101.04

Protection Area

- Front, back, Sides, Collar & Groin

Sizes & Weight

- Large: 4.03 Kg \pm 100 gm

Colors



Olive Green |Olive Drab |Sand |Black |U N Blue |Navy Blue|
(Also available in Camouflage pattern)

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P-10016 ICW MKS-1002



NIJ 0101.06 certified Vest dependent Polyshield plates from MKU offer best protection at the lowest possible trauma. The plate provides level III protection in combination with level IIIA Soft Armor Panels. These plates are manufactured using the best materials and state-of art manufacturing technologies. The plate has undergone rigorous testing standards as laid down by the Department of Justice, USA. The single curve geometry ensures ease of movement & operations whilst maintaining highest levels of protection.

Polyshield Armor Plates from MKU offer excellent multi-hit capabilities and are safe from secondary fragments upon impact. They do not crack and are resistant to UV radiations, water, sunlight & temperature changes. Acids and oils have no effect on them. MKU is one of the very few armor manufacturers in the world with capacity & technology to produce these Armor Plates in the high volumes necessary for national requirements.

Model	:	P-10016 ICW MKS-1002
Size	:	250 mm X 300 mm (±5mm)
Nature	:	Vest Dependent**
Front/Back	:	Can be used as front or back plate
Finish	:	PU Coated Polyester Cover
Weight	:	1.4 Kg (±50 g.)***
Thickness	:	19 mm (±2 mm)
Protection Level	:	Level III Certified as per NIJ 0101.06
Ammunition	:	7.62 x 51 Lead Core (NATO BALL, M80)
Warranty	:	7 years*

**conditions apply*

*** (The Plate is ICW Soft Armor Panel (MKS-1002), for details refer technical Pager MKS-1002*

**** Also available in Shooter Cut Shape*

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MKH/ACH-4



ACH (Advanced Combat Helmet)

Model: MKH/ACH-4

ACH (Advanced Combat Helmets) are slowly replacing the PASGT helmets worldwide, due to better design and compatibility with various critical equipment & devices used by a modern soldier. They are designed to allow maximum sensory & situational awareness to soldiers as they offer an unobstructed field of view and increased ambient hearing capabilities.

ACH helmets from MKU provide excellent ballistic and impact protection and are compatible with a wide range of devices like Night Vision Devices (NVD's), Communication equipment, Nuclear-Biological-Chemical (NBC) equipment etc. These helmets are available in special suspension systems which allow a soldier to carry out their missions more effectively when wearing body armor.

Features

- Maximum sensory & situational awareness
- Superior Ballistic protection
- Reduced operational fatigue
- Excellent
 - Mechanical rigidity, toughness
 - Impact protection
 - Ergonomics
 - Ricochet damage control
 - Heat insulation

- Resistant to
 - Temperature extremes
 - Water & moisture (Non-absorbent)
 - Flame & UV
- Manufactured using non-toxic materials
- Suitable for snow, deserts, hills, plains and positive buoyant during amphibian/marine operations
- Compatible with add on devices like NVD, CBRN and communication sets etc.

Protection Level

- Level IIIA (9mm) as per NIJ 0106.01

Colors



Olive Green |Olive Drab |Sand |Black |U N Blue |Navy Blue|
(Also available in Camouflage pattern)

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PASGT

**PASGT**

The PASGT (Personal Armour System Ground Troops) helmet was developed by the U.S. Army to address the inadequate protection and other problems of the conventional steel helmet. MKU PASGT Helmet is an adaptation of the standard US Military PASGT Helmet with unique protection properties. The shell is constructed using superior aramid composites which are layered and bonded with impregnable resin for exceptional ballistic and fragmentation protection.

PASGT Helmets from MKU are lightweight and employ the latest processes and material advancements along with optimal protection, comfort and insulation for all situations and weather conditions. They adequately exceed fitting, suspension and ventilation factors as specified by armies worldwide.

Features

- Manufactured strictly as per US Military PASGT shape and style.
- Made of advanced aramid composite materials.
- Full frontal protection.
- Designed for ideal mass distribution which minimizes lag during head movement
- Two-component Aliphatic Polyurethane paint protects from de-contamination after exposure to chemical agents & provides better outdoor exposure resistance
- Superior ballistic protection
- Excellent
 - Mechanical rigidity, toughness
 - Impact protection
 - Ergonomics
 - Ricochet damage control

- Heat insulation
- Resistant to
 - Temperature extremes
 - Water & moisture (Non-water absorbent)
 - Flame
 - UV
- Manufactured using non-toxic materials.
- Suitable for snow, deserts, hills, plains and positive buoyant during amphibian/marine operations.

Protection Level

- Level III A, (.44 Mag) As per NIJ 0106.01

Colors



Olive Green |Olive Drab |Sand |Black |U N Blue |Navy Blue|
(Also available in Camouflage pattern)

Suspension System

- MKH/PA-4

Weight & Size

- Large – 1.48 Kg ± 50 gm

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QUICK RELEASE PLATE CARRIER



Quick Release Plate Carrier manufactured by MKU offers enhanced protection and ergonomics. Manufactured with light-weight materials, these Plate Carriers are extremely comfortable while in use even after prolonged usage.

Unique features

- **Quick release**
- **Unisex design**

Design Features

- Plate carrier consists of Quick release mechanism for faster release.
- Special rugged O-ring to **quickly release the carrier**.
In emergency situation, carrier is **released just by pulling the O-ring with gloved hands** which releases the vest at four points.
- Unique design ensures **fast and quick reassembly**.
- All around **laser cut MOLLE provision** to carry the extra pouches and accessories.
- Ergonomic design ensures comfort while driving the vehicle. Also does not restrict the movements while aiming with hand gun and rifle even while wearing the helmet.
- Cushioned waist-belt at inner side for extra comfort.
- Plate Carriers is **adjustable at sides and shoulders**
- Additional **Drings on both shoulders** to attach or hold the rifle or longgun & other combat gears.
- **Hook Loop and Velcro provision** on upper torso (front & back) and sides to hold radio wire & hydration bag water-tube etc.
- **Soft cushioning pads** at shoulders for comfort during prolonged usage.
- **Extra Soft material at neckline and armhole** for wearing comfort while aiming

and head movements.

- ***Specially designed, reinforced drag handles*** with adjustable ladder system for varied applications.
- The plates are covered with water resistant fabric which ensures protection against moisture.
- The Cover comes apart and goes back as easily and as quickly as possible (shoulder + sides)
- Mesh with Foam provides breathability, Air Circulation, perspiration and Cushioning
- CPPB is as comfortable as possible, even during extended wear.
- This mechanism is ambidextrous in nature i.e. can be released either with left or right hand
- The strong and rugged emergency release is made of highly durable material which ensures operations throughout the life of the vest

SIZE: Medium

Weight of Plate Carrier: 2.9 Kg ± 50 gm

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MKH/VD-20



DETACHABLE BULLET RESISTANT VISOR (MKH/VD-20)

This visor from MKU is designed to enhance ease of use. It allows the user to wear and take of the attached visor over/from the helmet quickly and easily.

VISOR	Protection Level	STANDARD	WEIGHT
Bullet Resistant	Level III A (9 mm)	NIJ 0106.01	1.55 ± 50 gm

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MKH/ACH-4



Bolt Free Helmet

Model : MKH/ACH-4

MKU has pioneered in developing a very unique mechanism which helps in **Trauma Reduction by over 40%** compared to standard helmets.

Traditional helmets though provide protection against bullets and fragments but not very efficient against Resulting Trauma due to their impact which causes Back Face Deformation which transfers considerable trauma to the head that may result in brain injuries and skull fractures.

The **RHT Technology** developed by MKU is to reduce the Trauma on Ballistic helmets due to bullet hit to make the helmet safer for wearer.

Unique Features

- Reduced Trauma
- No drill, No hole

Performance

- Uniform Ballistic protection
- Excellent
 - Mechanical rigidity, toughness
 - Heat insulation
- Resistant to
 - Temperature extremes, Water & moisture
 - Flame & UV

Design Features

- Designed for ideal mass distribution which minimizes lag during head movement for better comfort

- Joint less Rubber edging protecting the outer contour
- Four point system for snug and stable fitting.
- Non allergen materials used.
- Two-component Aliphatic Polyurethane paint protects from de-contamination after exposure to chemical agents & provides better outdoor exposure resistance
- No metal parts negating secondary fragmentation
- Allow use of Communication system, Gas Mask & NVD

Suspension System

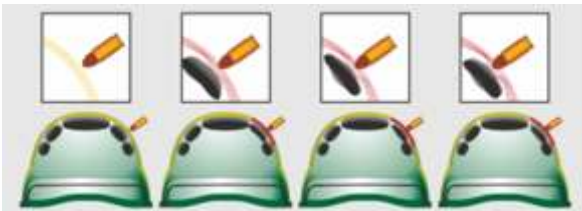
- Modular pad suspension system : Consists of 7 pads (self-configurable system)
- Combination of trapezoidal, oblong & round pads provide extra comfort & stability
- Easy adjustment mechanism for snug fit

Protection Level

- 9 m, Testing as per NIJ 0106.01

Size & Weight of Helmet

- Small :
- Medium :
- Large :
- X-Large :



RHT is a break down helmet technology that substantially reduces the resultant trauma over 40% compared to standard helmet for protection against 9 mm ammunitions fired through handgun.

Trauma in helmets, upon bullet hit, is a known concern amongst all the forces in the world. As per studies, head injuries due to trauma in helmets may result in permanent damage to the brain.

After years of research, MKU is proud to announce a successful breakthrough RHT Technology which helps in reducing the back face deformation created due to bullet hit

in helmets. With RHT Technology, the resulting trauma is less when tested against 9 mm bullets as per HPW-TP-0401.01 standards. The advanced technology not only protects against the handgun ammunitions but also reduces the resulting Trauma to protect against hidden head injuries.

The bolts mounted on the outer shell of the helmet act as lethal secondary fragments due to bullet hit that endanger the soldiers wearing it. Ballistic helmet must be free from bolts to provide uniform protection all around the outers of the helmet shell.

Bolt free helmets from MKU feature a shell which is based on no-drill concept that not only provides enhanced comfort but also increases protection against ballistic threats.



- No Holes, No Bolts
- No unprotected areas
- No secondary fragmentation risk
- No metal parts
- Uniform protection across the Helmet shell



Bullet approaching helmet



Bullet hits on helmet



Bullet is stopped due to uniform ballistic shell

Contact Person

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NETRO NC - 3000 NIGHT VISION BI-OCULAR



NETRO NC - 3000 is a long range Single Tube Biocular night vision goggle that combines a high quality image intensifier tube with two eyepieces. It is a Lightweight and efficient night vision goggle with IP68 water resistance certification with excellent resolution and a wide field of view.

Feature

- Multipurpose, can be used as Helmet Mounted, Head Mounted or Hand Held.
- Light Weight, Waterproof and Rugged Bright Light Cut-off Conforms to MIL Standards.
- All weather capability water proof, dust proof and corrosion free Easy to maintain.
- Magnification: 1x
- Field of View: 45° (min).
- Diopter Adjustment: -6 to +4 diopter.
- Operating Temperature: -40°C to +55°C.
- Environmental Standards: MIL-STD-810G compliant.

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NETRO NM - 3000 NIGHT VISION MONOCULAR



NETRO NM - 3000 is a multi functional, rugged, waterproof ultra-Lightweight night vision monocular. It is an ideal surveillance and observation device that can be either held in the hand or mounted on the head, helmet or weapon

Feature

- Light Weight, Waterproof and Rugged Bright Light Cut-off Conforms to MIL Standards
- All weather capability -water proof, dust proof and corrosion free Easy to maintain
- Magnification: 1x
- Field of View: 45° (min)
- Diopter Adjustment: -6 to +4 diopter.
- Operating Temperature: -40°C to +55°C.
- Environmental Standards: MIL-STD-810G compliant.

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NETRO TH - 4000 HAND HELD THERMAL IMAGER



NETROTH - 4000 from MKU is a combat-proven hand held Thermal Imager.

Modern Design with Military Ruggedness

Rugged & waterproof, NETRO-TH-4000 is a MIL-SPEC 810-G compliant device capable of effectively operating under harshest environment. The NETRO-TH-4000 comes with high quality thermal sensor.

Feature

- Conforms to MIL Standards and Sturdy.
- Intuitive Joystick Control.
- Device is easy to Maintain.
- All weather capability water proof, dust proof and corrosion free.
- Simple Twist & Go (T&G) Battery Packs. Comes with both a Rechargeable Pack and an alternative T&G converter pack for use with AA Batteries (6 x AA Batteries).
- Video output system is available

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NETRO TH - 4100 THERMAL IMAGING MONOCULAR



NETRO TM - 4100 from MKU is a combat-proven Thermal Imaging Monocular.

Modern Design with Military Ruggedness

Rugged & waterproof, NETRO TM-4100 is a MIL-SPEC 810 compliant device capable of effectively operating under harshest environment. The NETRO TM-4100 comes with high quality thermal sensor.

Range Estimation Scale

NETRO TM-4100 offers superiority range estimation scale combined with the well graduated reticule facilitates.

Feature

- Conforms to MIL Standards
- In-built system for marking range
- Real time video output
- Easy to maintain
- All weather capability-water proof, dust proof and corrosion free
- External Video Output: PAL
- Operating Temperature: -40°C to +55°C.
- Environmental Standards: MIL-STD-810G compliant.

Contact Person

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NETRO TW - 4000 THERMAL WEAPON SIGHT



NETRO TW-4000 thermal weapon sight is equipped with a high resolution thermal imaging camera and an in-built system for marking range. It is MIL-1913 compatible and can be mounted on a range of weapons including small arms and heavier guns.

Feature

- Conforms to MIL Standards
- In-built system for marking range
- Real time video output
- Easy to maintain
- All weather capability -water proof, dust proof and corrosion free
- External Video Output: PAL
- Operating Temperature: -40°C to +55°C.
- Mounting: MIL-STD-1913 picatinny rail
- Environmental Standards: MIL810G compliant.

Contact Person

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CERAZONE V

MKU OFFERS THE FOLLOWING RANGE OF CERAZONE SOLUTIONS FOR THE ABOVE THREATS:



Cerazone panels from MKU are made using a wide range of ceramics including advanced ceramics and various fiber combinations. They are cost effective, offer multi hit capability and can be pre-engineered into different shapes. Cerazone solution from MKU consist of wide range of Ceramics like Alumina, Sic, B4C etc as per the mission requirement.

Cerazone panels offer protection against most current threats including

- NIJ 0108.01 Level IV
- STANAG 4569 AEP-55 (Level II to IV)
- EN 1522 Level FB-5 to FB-7

Contact Person

MKU Limited 13, Gandhi Gram

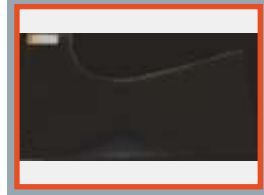
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FLEXAR



Manufactured using Aramid fibers and special rubber materials, Flexar panels are light weight and flexible. They are resistant to corrosion & chemicals, are water repellent and can perform in high temperature zones. They can also be used as 'Fragmentation Blankets' for floors and back of the vehicle seats. They are excellent backing materials for ceramic armour panels and negate mortal damage(s) to the occupants due to secondary fragmentation from armor piercing rounds or IED projectiles when they hit the primary armor or vehicle hull.

Flexar panel offer protection against

- Up to NIJ 0108.01 Level IIIA
- Up to EN 1522 Level FB-4

Properties

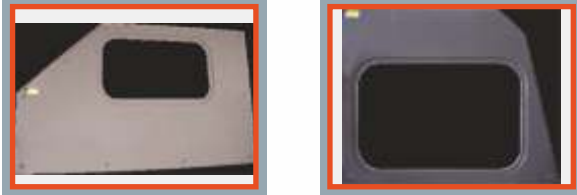
- Fabric Type: Plain weave
- Density: 1.44 g/cm³
- Tensile Strength: 2.3 Nm/dtex
- Breaking Strength: Warp direction: min 16.2 N/5 cm, Weft direction: min 17.4 N/5 cm
- Flammability: Tested and certified as per "IS-11871-1986; method B" (Inclined) not to ignite.
- Heat Resistance: The maximum working temperature for Flexar panels is 800 due to rubber matrix.

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POLYSHILED V



Made using UHMWPE (Ultra High Molecular Weight Polyethylene), Polyshield panels demonstrate high buoyancy and offer multi hit capability. These panels are resistant to cracks, UV radiation, moisture, acid, oil and corrosion and have exceptional FST (Fire,Smoke,Toxicity) properties.

Polyshield panels offer protection against

- NIJ 0108.01 Level IIIA to III+
- EN 1522 Level FB-4 to FB-7

Properties

- Melting Range: 150 C - 200 C
- Flammability: Non flammable
- Temperature Resistance: -40 C to 0 +65 C
- Chemical Resistance: Resist almost all chemicals
- UV Resistance: No effect
- Moisture Resistance: Inert to moisture

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SPALLIN

SOFT ARMOR SPALL LINERS OFFER PROTECTION AGAINST 1.1 GR FSP, 2.8 GR FSP, 7.62 MM FSP, 12.7 MM FSP (TESTED IN ACCORDANCE WIT STANAG 2920).



Occupants of armoured vehicles face additional threats from steel fragments and splinters generated upon impact of high energy projectiles on the steel shell and reinforcements of the vehicle. Spall liners help contain and prevent such fragments from striking the occupants. Spall liners also offer noise and heat insulation and can be cut and drilled using standard equipment.

MKU offers UHMWPE, Aramid and E-Glass spall liners for combat vehicles, ships and aircraft. These not only provide protection from steel fragments and splinters but also provide excellent reinforcement to the areas and parts of the vehicle that carry structural load due to the high compressive properties of the material. Glass spall liner offer high resistance to corrosion, are light weight and provides good ballistic protection.

Benefits of Spall Liner

- Ideal for protection from all kinds of secondary fragments.
- Easily to install by the crews on due to the unique modular designs of the kit and patented attachment systems.
- Available in either rigid or flexible options as per requirement.
- Unaffected by moisture that might seep into the vehicle.
- Excellent noise and heat insulation properties.

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TRANSPARENT ARMOUR



MKU transparent armor (BP Glass) solutions are built to offer protection against the highest threat levels (in no spall configurations). These are manufactured to strict quality standards and are tested for optical distortion, secondary image separation, boiling, radiation, moisture, temperature cycles and ballistic performance. They can withstand temperature changes from -40 oC to +72 oC and are available for a wide range of protection levels.

Transarm panels offer protection against

- NIJ 0108.01 Level IIIA to IV
- EN 1522 Level FB-4 to FB-7
- STANAG 4569 Level I to IV

Property

- Melting Range: 150 C - 200 C
- Flammability: Non flammable
- Temperature Resistance: -40 C to +65 C
- Chemical Resistance: Resist almost all chemicals
- UV Resistance: No effect
- Moisture Resistance: Inert to moisture



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P-1602



GENERATION
ARMOUR TECHNOLOGY

LIGHTER THINNER

POLYSHIELD 6 hard armour solutions offer protection against heavier and more lethal rifle threats. The 6th generation armor solutions, nomenclature as POLYSHILED 6 are UPTO 40% lighter and almost 30% thinner compared to standard solutions. POLYSHIELD 6 hard armour solutions are manufactured using the best materials and latest techniques to offer protection. They demonstrate better energy absorption and dissipation while offering substantially improved multi-hit capabilities.

- **Model** : **P 1602**
- **Size** : 25 cm X 30 cm (±3mm)
- **Protection level** : Level III+ as per NIJ0101.04
- **Curvature** : Top Cut, Single Curve
- **Nature** : Vest dependent
- **Weight** : 950 gm (±50 g.)

Contact Person

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MUKUT HELMET



The 'Kings crown' on the soldiers head, MUKUT helmets from MKU are manufactured using special trauma reduction technology that results in just 10 mm blunt trauma (as tested by HP White Labs, USA). They feature the latest Bolt free shell for uniform protection of the head.

- Maximum sensory & situational awareness
- Superior Ballistic protection
- Reduced operational fatigue
- Excellent
 - ❖ Mechanical rigidity, toughness
 - ❖ Impact protection
 - ❖ Ergonomics
 - ❖ Ricochet damage control
 - ❖ Heat insulation
- Resistant to
 - ❖ Temperature extremes
 - ❖ Water & moisture (Non-water absorbent)
 - ❖ Flame
 - ❖ UV
- Manufactured using non-toxic materials.
- Suitable for snow, deserts, hills, plains and positive buoyant during amphibian/marine operations
- Compatible with add on devices like NV, CRBN and communication sets etc.

Contact Person

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MIDHANI

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Head : Dinesh Kumar Likhi

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Mobile : +91-94220075548

Email : ashwanikumar@midhani.com

Organisation Profile

Mishra Dhatu Nigam limited (MIDHANI) has over 40 years of experience in providing Defence equipments and Armour solutions for various applications. Wide spectrum of Armour solution was provided by MIDHANI to Indian armed force. It is a Public Sector Undertaking (PSU), under the administrative control of Department of Defence production, Ministry of Defence, Govt. of India.

ARMOURING HELICOPTER



MIDHANI is providing Composite Armouring solution for helicopters engage in military operations or any other missions.

Benefits of Composite Armour

- Provide protection to crew against Small Arms Fire.
- Replacing steel Armour by Composite Armour reduces the weight of Armour by 40%. Hence more no. of troops can be carried for different operations.
- Reducing the weight of Armour increases the fuel efficiency, increases the service ceiling, and increases the max. Speed etc.
- Composite Armour Panels are indigenously developed and manufactured in India
- Composite Armour Panels are better in aesthetic.
- Indigenous Armour Panels are Cheaper by 35% /set
- Composite Armour Panels gives protection against 7.62 API round.

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SPALL LINERS



The Spall Effect- a high risk for the crews. The effects from spall are often an underestimated danger for the crew inside the platforms. The spall effect can be caused by a threat (projectiles, missiles, mines or IEDs) hitting the platform from different attack angles and generating a shock wave and stress in the armour-material without penetrating it. When the shockwave creates the secondary spall on the inner side of the vehicle, fragments of very high velocities are ejected into the crew compartment.

Spall Liners are made of energy- absorbing material. Protect soldiers from flying fragments (metals) inside of the crew compartments.

Broad Characteristics

- Rubberized Aramid Fiber
- Thickness: 5.5 ± 0.5 mm
- Protection Level: NIJ IIIA (Stand Alone)

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VEHICLE ARMOURING



MIDHANI undertakes Bullet Proofing of all types of Troops Vehicles (Bus, TATA-407, Scorpio, Fortuner etc.) for deployment in counter Insurgency environment. Armoured Vehicles will foil terrorist attempts to ambush, snipe and facilitate safe mobility and deployment of troops. Vehicles have also been designed to exploit full fire power in case of any misadventure by terrorist.

Complete armouring of Vehicles can be easily customized as per the user requirements (like armouring/all around protection against level 3+/etc.)

Broad Characteristics

- Floor gives the protection against 2 x HE36 Grenades
- All the sides are covered with different sizes of the glass and the same gives the protection against 7.62 x 39 MSC & 7.62 x 39 HSC
- Gross vehicle weight is maintained by using combination of Steel, Composite, Bullet Resistant Glass and Kevlar blankets.
- Overlap Protection on all doors, gun ports, seals, door handles, locks etc. to help reduce risk of bullet protection.
- Gap protection at all doors and turret lid to help reduce risk of bullet penetration and increase overall protection of vehicle.
- Single plate side wall designing to eliminate joints and hence no welding joints penetration probability.
- All materials are certified by reputed testing Laboratories across the country.
- Due to proper design, there is no change in centre of gravity.
- Weight of armouring in case of LBPV and MBPV is controlled as per MHA other agencies guidelines.

Users

Defense Forces, CAPFs and State Police Forces

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PERSONAL AND GROUP ARMOURING



Bhabha Kavach



Bullet Proof Vest



Bullet Proof Shield



Bullet Proof Morcha

BHABHA KAVACH

Light weight Bullet Resistant Jackets has been manufactured using the latest technology by dispersing CNT on the Poly Ethylene Sheets. Depending upon the protection level and the weight, different kinds of ceramic are being used on the facing side. Multi-hit capabilities of BRJs are achieved through proper designing of Ceramics.

Capability: Presently, the light weight jackets give the protection against level+ and the same can be increased to level 4 depending upon the user requirements.

BULLET PROOF VEST

BR Vest are made of many layers of woven or laminated fibers and can be protect the wearer from small-caliber handgun and shotgun projectiles, small fragments from explosives such as hand grenades.

Capability

Armour Protection against 9 x 19 mm Ball ammunition

BULLET PROOF SHIELD

MIDHANI's "BALLISTIC SHIELD" is developed to meet the requirements of the present threat levels of the forces. The shields are meant basically to protect starting from small arms to rifle threat levels. The ergonomics helps the forces for comfortable usage.

MIDHANI, being a manufacturer can understand the user department requirement size and threat level and design as per the requirement

Capability

Armour Protection against Level-3+

BULLET PROOF MORCHA

BP Morcha provides protection to the troops on surveillance duty and can also be used as a protective cover during exchange of fire with enemy/terrorist. Position of the Morcha can be changed easily by mounting castor wheels under each BR Panel.

Capability

Armour Protection against 7.62 x 39 Ak-47 (HSC) and 7.62 x 51 SLR

Users

Defense Forces, CAPFs and State Police Forces

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MINERVA SPECIAL PURPOSE VEHICLE PRIVATE LIMITED

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Organisation Profile

MSPV in India is a relatively new unit, for the manufacturer of Armoured and Specialised Vehicles and is a part of UAE-head quartered Group (www.mspv.com) that specialize in design and production of a wide variety of Armoured Vehicles, Armoured Luxury Cars and Armoured Trucks, Armoured SUVs, Cash in Transit vehicles and other tactical armoured vehicles used by Armies and Law and Enforcement agencies all over the world. In a short duration, MSPV has grown into a leading international manufacturer of armoured vehicles. The company's focus is on the delivery of confidence in protective mobility.

Accommodating today's diverse market, MSPV now specializes in a wide range of customized security/transportation solutions for its clients, including armoured transport vehicles, executive armoured SUVs, Armoured Cars/luxury Sedans and Special Purpose Military vehicles.

MSPV is a proven armoured vehicles manufacturer using different groups of skilled craftsmen to carry out production at the highest levels of designs. MSPV is ISO 9001:2015 certified company. MSPV is committed to Excellence!

On display is PANTHERA TF6, a LIGHT armoured personnel carrier, to seat 4 or 6 crew, with or without turret option.

PANTHERA T6F



MSPV Armoured Personnel Carriers are completely safe from attacks, long lasting, highly mobile and fully protected at all times. Our Armoured Personnel Carrier provides high mobility and superior protection for the armed forces operating in challenging battlefield scenarios. Armoured Personnel Carrier offer enhanced protection, enabling safer infantry deployment in high-threat areas. Our vehicles are used by police, military, peace keeping forces and security companies for the safe transportation of personnel and assets in transit.

Transarm panels offer protection against

- **Protection Levels:** CEN1063 and 1522 BR6/FB6
- **Engine:** 3.0l Diesel Turbo Intercooler
- **Transmission:** Full-Time 4WD, 5-Speed Manual or Automatic
- **Seats:** 2+2+4 (Other Seating Arrangements Available)
- **Body Type:** 5-Door Light-Armoured Personnel Carrier
- **Options:** Gun Mounting Turret, Roof hatch, Winch

Contact Person

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Exec. Director

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NARENDRA EXPLOSIVES LIMITED

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Organisation Profile

We are licensed by DIPP to manufacture Non Lethal Anti Riot Tear Smoke Grenades, Shells, Projectiles & Launchers.

With this we are holding TOT contract with DRDO labs to manufacture herbal oleoresin based Aerosol Chili Grenades and Capsi Spray for its supply to Police Forces. The Grenades are designed for mob dispersal, counter insurgencies/ terrorism situations as well very effective during the course of room intervention. Our products are being widely used by Central as well as different state Police Forces across India in a effective manner.

37/38 MM TEAR SMOKE SHELL



Oleoresin based Tear Smoke Shell being fired with existing Tear Smoke Gun held with Police Forces is designed to counter mob insurgencies, with the use of these Shells, Police Force can easily restrict the violent mob from a safe distance of 135 mtrs.

Characteristics of Equipment

- Contains Oleoresin Capsaicin Pellets
- Effective range is 135 (+/-) 15 mtrs
- Emission time is .30 seconds
- Delay time is .4 seconds
- Made up of Aluminum as well plastic with soft nose

Contact Person

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OLEORESIN GRENADE



An Oleoresin Capsaicin (OC) based Tear Gas Grenade is most suitable for mob dispersal, Counter Insurgency and room intervention Operations. The salient Features of this product is that it is initiated without any explosive or pyrotechnic charge, hence, being absolutely safe to use. The grenade does not permanently contaminate the environment as it does not contain any hazardous chemical, explosive or ammunition but is based on release of chilly extract (natural ingredient) which disintegrates in due course of time without permanently affecting the environment.

Characteristics of Equipment

- Technology is Aerosol based
- Release mechanism is Actuator based
- Contains Oleoresin Capsaicin
- Dispenses the entire gas in 15-20 seconds
- Rapid movement on ground preventing it to be thrown back at security forces.

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OLEORESIN PEPPER SPRAY



An Oleoresin Capsaicin (OC) based Pepper Spray is a strong irritant with pungent smell and adequate toxicity, is a very handy and useful for self defence and Adversary Control Device. Backed by DRDO TECHNOLOGY, it is safe to use in almost all situations. This comes in 3 different sizes suitable for different situations.

Characteristics of Equipment

- Technology is Aerosol based
- Release Mechanism is Actuator based
- Contains Oleoresin Capsaicin
- Severe irritant within permissible toxic parameters
- For the safety of user it contains trigger lock with pin

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38 MM SINGLE SHOT GAS LAUNCHER



This is a very versatile, sturdy and light weight launcher having weight of only 1.8 kgs. It has a smooth bore, double action hammer with safety lock and comes with the option of foldable or fixed butt. It can fire 38mm Tear Gas Shells, Rubber Ball Bullets, Sponge Bullets, Flash Bang etc.

Characteristics of Equipment

- Very light in weight and foldable which makes it very convenient for the jawan to carry without fatigue
- Can launch shells to a distance upto 135 mtrs.
- Consist of safety lock/ trigger lock
- Smooth bore

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Organisation Profile

Nucleonix Systems P Ltd (NUCLEONIX) is a reputed manufacturer & exporter of CBRN detection & management solutions. Established in 1990, it is ISO 9001:2015. Nucleonix has MOUs with leading companies like ECIL, L&T, Bruhn Newtech (Denmark), IIT, Osmania University, Bharatiar University. Products manufactured by Nucleonix conform to stringent International specifications like ANSI/IEC/ MIL / JSS55555. Nucleonix has strong in-house Research & Development (R&D). Nucleonix also has Transfer of Technology (TOTs) from Bhabha Atomic Research Center (BARC) and Defence Labs, Jodhpur. Several products of Nucleonix serve as import substitutes saving crores of rupees to our nation. Nucleonix has won several awards, notable ones from Indian Nuclear Society, Luminescence Society of India, All India Management Association, Electronics Association of India.

Our Defence and Homeland security customers include Indian Navy, Ship Building Centre, Special Safety Services (SSS), Defence Lab - Jodhpur (DLJ), Hindustan Aeronautics Limited, Vehicle Research and Development Establishment, Bharat Earth Movers Limited, Bharat Electronics Limited, Ordnance Factories, National Disaster Response Force, National Industrial Security Academy, Indo-Tibetan Border Police, Central Industrial Security Force, Adani seaport etc.

Our other Customers include all DAE institutions- Bhabha Atomic Research Centre, Indira Gandhi Centre for Atomic Research, Variable Electron Cyclotron Centre, National Power Corporation of India Limited, Electronics Corporation of India Limited, etc. with 1200+ installations, Educational Institutions with 1500+ installations, Hospitals with 1000+ installations, Steel Companies with 1000+ installations & several R&D projects with Defence. We have executed jointly with ECIL three large Nuclear Recycle Board (NRB) turnkey projects.

NXG_UAV - UNMANNED HELICOPTER PLATFORM WITH INTEGRATED CBRNE SENSORS



NXG_UAV1 is an Unmanned Helicopter platform based solution for detection of **CBRNE** - Chemical Agents / Biological agents / Radioactive materials / Nuclear Explosion or accident / Explosives.

It has several applications in Defence & Homeland Security for CBRNE surveillance, counter measures and management.

Characteristics of Equipment

Specification	Details
Payload Type	CBRNE - Chemical/Bio/Radiological/Nuclear/ Explosive sensors
Configuration	Conventional Helicopter
Rotor Diameter	1.74 m
Payload (sea level)	5.5 kg including fuel
Payload (11500 ft)	2.7 kg including fuel
Max All Up Weight	13 kg
Engine	Zenoah 320 RC, 31.8 cc, 3.5 hp
Hover Endurance	2 hr to 2.5 hr (based on payload)
Best Endurance (At 60 kmph)	3 hr to 3.5 hr (based on payload)
Communication Range	5 km - 10 km line of sight
Max speed	110 km/hr
Gust resistance	Up to 50 km/hr
Onboard camera	Foxtech FPV 10x Zoom for realtime video transmission and capture

Telemetry	RFD 900 long range telemetry (manufacturer claim of 25 km range) LoS;
Autopilot	NAAVIK with waypoint navigation, auto takeoff and landing; autonomous autorotation for fail-safe
Material	Metal control system and carbon fiber body for rugged operation
Fuselage	Glass fiber canopy
Fuel	Gasoline with 2T Engine Oil

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NXG_SI-CBRN1 – CBRN DETECTION, HAZARD MANAGEMENT & PROTECTION SOLUTION FOR STRATEGIC GROUND FACILITIES / SHIPS



NXG_SI-CBRN1 is designed to detect, provide early warning, manage hazards & take protective action for the following incidents-

1. Immediate warning of a Nuclear Blast by detection of Prompt Gamma Radiation.
2. Measurement of Residual Gamma radiation Dose-rate in Air.
3. Measurement of Induced radioactive contamination in sea waters from fallout/nuclear accidents
4. Chemical Warfare Agent detection post a Chemical Attack for Remedial action
5. Biological Warfare Agent detection post a Bio Attack for Remedial action

Characteristics of Equipment

- Nuclear Sensor
 - ❖ Detects Prompt Gamma events $> 2R/s$. Complies to MIL 461F & JSS 55555 standards
 - ❖ Measures Dose-rate, Cumulative Dose in the range of 0.1mR/h to 1000.0R/h & 0.1mR to 9999R
- Radiological Sensors
 - ❖ Low range Gamma detection unit
 - 0.1 μ Gy/h to 1mGy/h
 - ❖ High range Gamma detection unit
 - 0.1mGy/h to 9.99Gy/h
 - ❖ Wide range Gamma detection unit
 - 0.1 μ Gy/h to 9.99Gy/h
 - ❖ Neutron detection unit
 - 1 μ Sv/h to 10mSv/h
 - ❖ Water contamination detection unit for Low Range Gamma

- 0.1 μ Gy/h to 1mGy/h
- Chemical Sensor
 - ❖ Detection Principle: Ion Mobility Spectrometry. Complies MIL STD 461E & JSS 55555.
 - ❖ Detects within 30 sec, concentrations as low as:
Nerve Agents(GA, GB, GD, GF and VX) : 0.05mg/m³,
Blister Agents(HD and L1): 0.5 mg/m³,
Blood Agents(HCN) : 20.0 mg/m³,
Choking Agent(CG) : 20 mg/m³.
- Biological sensor
 - ❖ Detection principle: UV Laser Induced Fluorescence (LIF)
 - ❖ Detects within 1 min, all 4 classes of Bio-agents (spore, viral, cellular, protein toxins) at concentrations <100 ACPLA
- Control console system
 - ❖ Weather sensors, Advanced Navigation System
 - ❖ Central & Remote Indication Units
 - ❖ Control Console Software for CBRN Detection and Management
 - ❖ GIS & CBRN Hazard prediction software module
 - ❖ Wireless data transfer to Central Command Centre
- CBRN Hazard Prediction & Management Software
 - ❖ Incident management for Military commanders
 - ❖ Full Situational Awareness of the CBRN Picture in Real time
 - ❖ Adopted in 30 countries worldwide
 - ❖ Calculation of the NATO approved Hazard Areas and Contaminated Areas for all types of CBRN Incidents
 - ❖ Complies with the latest edition of ATP-45/AEP-45 NATO standards
 - ❖ CBRN Training on par with Global standards

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TR1039 - VEHICLE RADIATION MONITORING PORTAL



TR1039 is a state of art, sensitive Radiation Portal Monitor useful for scanning Vehicles of all sizes including containers and Rail Coaches. It helps detect Radiation inside the material on the vehicle thereby preventing:

- a. Illicit import or export of Radioactive material.
- b. Export of products with radioactive contamination.
- c. Import of contaminated un-shredded scrap.

Characteristics of Equipment

- Designed to meet ANSI N42.35 international specification
- 10% better performance compared to other Radiation Portals in the market
- Fully indigenous, state-of-art product with several years of operational record
- Excellent Service, Support with no dependency on any external agency/country
- Multi-level Quality Assurance for Systems & Detectors
- Robust product construction to withstand harsh industrial environment
- Option of Outright Sale or Services model
- Post-sale technical support by in-house RSO's, Nuclear Engineers and Physicist
- Software generated report for every vehicle

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NXG_CBRN_COMPACT – GROUND VEHICLE INSTALLED CBRN SYSTEM



NXG_CBRN_COMPACT is an integrated CBRN solution for Ground vehicles - Wheeled & Tracked. Chemical, Biological, Radiological & Nuclear Sensors are mounted on the vehicle. The system is capable of detecting low levels of CBRN incidents and generate audio-visual alarms. Automatic CBRN protection is initiated for the safety of the vehicle as well as the personnel inside the vehicle. Optionally CBRN data can be transmitted to Central Monitoring station using the Vehicle's Communication system.

Characteristics of Equipment

● Nuclear Sensor

- ❖ Detects Prompt Gamma events $> 2R/s$. Complies to MIL 461F & JSS 55555 standards
- ❖ Measures Dose-rate, Cumulative Dose in the range of 0.1mR/h to 1000.0R/h & 0.1mR to 9999R

● Chemical Sensor

- ❖ Detection Principle: Ion Mobility Spectrometry. Complies MIL STD 461E & JSS 55555.
- ❖ Detects within 30 sec, concentrations as low as:
 - Nerve Agents(GA, GB, GD, GF and VX) : 0.05mg/m³,
 - Blister Agents(HD and L1): 0.5 mg/m³,
 - Blood Agents(HCN) : 20.0 mg/m³,
 - Choking Agent(CG) : 20 mg/m³.

● Biological sensor

- ❖ Detection principle: UV Laser Induced Fluorescence (LIF)

- ❖ Detects within 1 min, all 4 classes of Bio-agents (spore, viral, cellular, protein toxins) at concentrations <100 ACPLA
- Automatic Control Unit
 - ❖ Receives Alarm signal from IIU post CBRN incident
 - ❖ Activates various NBC Protection mechanisms to protect Personnel & Vehicle
 - Engine On/Off, Blower On/Off, Gun control On/Off
 - NBC Filtration On/Off, Shutters/Valves On/Off, Ventilation On/Off
- IIU - Intelligent Integration Unit
 - ❖ Continuously captures data from CBRN sensors and sends to Control Console
 - ❖ In case there is an alarm, it sends signal to ACU

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NXG_UGV1 – UNMANNED GROUND VEHICLE PLATFORM WITH INTEGRATED CBRNE SENSORS



NXG_UGV1 is an Unmanned Ground Vehicle platform based solution for detection of **CBRNE** - Chemical Agents / Biological agents / Radioactive materials / Nuclear Explosion or accident / Explosives.

It has several applications in Defence & Homeland Security for CBRNE surveillance, counter measures and management.

Characteristics of Equipment

Specification	Details
Payload Type	CBRNE - Chemical/Bio/Radiological/Nuclear/ Explosive sensors
Max payload	3 kg
Length:	30.67 inches (779mm)
Ground Clearance:	3 inches
Weight (Without sensors):	19.1lbs (8.66kg)
Height (ride):	13.79 inches (350mm)
Wheelbase:	18.92 inches (480mm)
Shock Length:	7.4 inches (187mm)
Tires (pre-glued):	8.0x4.0 inches (203mm) - All terrain
Wheels:	4.3x5.7 inches (110x145mm)
Electronic Speed Control:	VXL-8s - Waterproof
Motor (electric):	1200XL Brushless, with Cooling fan
Transmission:	Single-Speed

Input Voltage:	4s/6s/8s LiPo (Max 33.6 Volts)
Speed:	>50kmph
Remote Control:	2.4Ghz High output Radio system
Range	>250m
Operation	All Weather conditions
Indicators	LED indication - RED for Alarm / GREEN for Safe, Dual tone Audio alarm
Sensor Data Storage	Sensor Data is stored with Date/Time stamp & can be downloaded to PC

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Organisation Profile

The Indian Ordnance Factories organisation - a family of 41 Ordnance Factories under the aegis of its corporate headquarters **Ordnance Factory Board, Kolkata** - possesses the unique distinction of over 200 years experience in defence production. We are engaged in production, testing, logistics, research, development and marketing of a comprehensive product range in the area of land, sea and air systems.

The patronage we receive both in India and abroad speaks of our quality of products and services. Undoubtedly, we are the force behind armed forces.

Indian Ordnance Factories is the oldest and largest industrial setup which functions under the Department of Defence Production of the **Ministry of Defence**. The ordnance factories form an integrated base for indigenous production of defence hardware and equipment, with the primary objective of self reliance in equipping the armed forces with state of the art battlefield equipments.

RIFLE EXCALIBUR 5.56 MM

Derived from the famous INSAS weapon systems of India which have been tested in large scale infantry combat, anti-terrorist and mob control situations, this weapon is called the INSAS EXCALIBUR MARK-I incorporates, in addition to the features of earlier INSAS Weapons, certain characteristics which makes it truly the ultimate sword- THE EXCALIBUR. The reasons for calling it Excalibur are that it incorporates the



features of a weapon which is rugged for battlefield engagements and at the same time capable of being light and easy to handle during low intensity conflict and CQB situations. It has ergonomically designed with folding butt and can fire 20-30 rounds magazines. It is also fitted with Picatinny rails for mounting of opto electronic devices.

Specifications

Calibre	5.56mm
Length-Butt Folded/Butt Extended	665mm/895mm
Weight without Magazine	3.81 kg.
Weight with Full Magazine	4.03 kg
Weight of Empty Magazine	0.09 kg.
Magazine Capacity	20/30 rounds
Length of Barrel	400 mm
Barrel Chamber and Bore	Chrome Plated
Rifling (No. of Grooves/Twist/Direction)	6/1 turn in 200 /RH
Sight (Front /Rear/ Range Graduation/Radius)	Post type/aperture/200 mm & 400mm/475mm
System of Operation	Gas operated
Mode of Fire	i). Single Shot ii) Automatic
Rate of Fire (rounds/min)	650 to 700
Effective range	400 m

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5.56 MM INSAS RIFLE (FOLDABLE BUTT)

It resembles 5.56 mm Assault Rifle Fixed Butt in all other features except that the Fixed Butt is replaced with a foldable type of Butt to shorten the overall length and it does not include automatic mode of firing.

It is most suitable for combat from ICV and in Para Troopers role.



Technical Data

Calibre	5.56mm
Length in folded condition	750 mm
Weight of weapon	
Without magazine	4.25 kgs.
With full magazine	4.6 kgs.
Recoil Energy	4.43 Joules
Barrel Chrome plated	
PNS/Daylight Telescope	Provided
Range 400 m	
Mode of Firing	Single shot, three round burst. Gas operated.

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RIFLE 5.56 MM INSAS (FIXED BUTT)

Accurate lightweight rifle, compact and handy, suitable for terrestrial and maritime assignments.

Gas-operated rifle can fire in single shot and three round burst (TRB) for conservation of ammunition. A simple action of lever change allows selection of single shot, TRB and safe position.

Additional mechanical safety is provided by means of safety sear and built-in delay in breech mechanism.

Easy to assemble and dismantle, chrome-plated barrel and chrome-plated pin firing ensures maintenance free long life.

Compatible with NATO standard ammunition 5.56 x 45 mm SS 109, M 193.

Quick mounting of Passive Night Sight/ Daylight Telescope.

Stock, Pistol Grip and Hand Guard made of impact resistant plastic in leaf brown colour.

Magazines are made of translucent UV stabilised polycarbonate Resin.

Multipurpose bayonet functions as Saw, Wire cutter, Bottle opener, Knife, Screw driver, Hammer and Dagger.

Eliminator Flash is designed to adopt Blank firing attachment.

Block gas and grenade sight provided for firing multimode grenade and M-36 grenade.

Provision of mounting of 40 mm under Barrel Grenade Launcher.

Provision of fitment of Day light Telescope and passive night sight.



Specifications

Calibre (mm)	5.56	
Muzzle Velocity (m/s)	900	
Length of Rifle (mm)	Without Bayonet	960
	With Bayonet	1110
Weight of Rifle (Kg)	4.15	
Without Magazine & Bayonet		
Effective Range (m)	400	
Range for Grenade (m)	200	
Multi Mode	150	
M 36		
Magazine Capacity (Rounds)	20	

Cyclic Rate (Rounds/min)	600 to 650
Trigger Pull (Kg)	2.10 to 4.00
Recoil Energy (Joules)	4.43
Rifling.	6 grooves R.H 1 in 200 mm.
Sight	Fore sight : Post Type Rear sight : Aperture type
Type of fire	Single, 3 Round Burst

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AMOGH 5.56MM CARBINE (JVPC)

- AMOGH Carbine 5.56 mm is specially designed and developed for close quarter battle (CQB) role.
- It fires 5.56 x 30 mm ammunition specially developed for carbine role.
- The weapon is ergonomically designed, light in weight, easy to carry, handle, operate and maintain
- Barrel of the weapon is chromium plated for longer life.
- It has ambidextrous lever change operation.
- It is provided with Reflex sight & Bayonet as accessories.



Specifications

Calibre	5.56 mm (5.56 x 30 mm ammunition)
Length of Weapon - (a) Butt Folded	575 mm
- (b) Butt Extended	800 mm
Weight - Weapon (without Magazine)	2.95 kg
Weight - Magazine (empty)	80 gms
Weight - Cartridge	8.0 gms
Effective Range	200 m
Rate of Fire	700 rpm
Sight Radius	420 mm
Feed	30 rd Box Magazine
Operation	Gas operated
Mode of Fire	Single & Auto
Mechanism	Rotary bolt. Closed Breech
Rifling	6 Groves, 1 : 200mm
Sight	1. Open Sight 2. Reflex Sight
Muzzle velocity	700 m/sec
Safety	1. Applied 2. Mechanical

Barrel

Length of Barrel	330 mm
Bore Diameter	H - 5.612 mm L - 5.577 mm
Number of Rifling Grooves	6
Twist of Rifling Grooves	Right Hand
Lead of Rifling Grooves	1 Turn in 200 mm

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LMG 5.56 MM INSAS (FIXED BUTT)

Role

- The weapon is used for providing covering fire during assault by infantry.

Function

- LMG 5.56 mm is a gas operated weapon with rotating bolt locking system which can fire in S.S./Auto system



LMG: Technical Data

Nomenclature	Unit	LMG 5.56 mm INSAS (Fixed Butt)
Calibre	mm	5.56
Wt. w/o Magazine	kg	6.23
Wt. w/loaded Magazine	kg	6.73
Length Overall	mm	1050
Barrel length	mm	535
Sight Radius	mm	475
Magazine Capacity	Rds	30
Fire selection	Rds	SS/Auto
Rate of fire (cyclic)	Rpm	650
Effective range	m	700
Muzzle velocity	m/s	925
Muzzle energy	J	1780
Recoil energy	J	2.75

Safety

The system is provided with mechanical & applied safety.

General Characteristics of LMG 5.56 MM INSAS

- i. Light weight weapon
- ii. Commonality of parts amongst the LMG and Rifle, 5.56 mm INSAS.
- iii. Weapon is very compact, easy to handle, operate and simple to maintain.
- iv. Weapon robust enough to withstand rough usage.
- v. Furniture made of Plastic materials
- vi. Foldable Butt version also available to suit paratroopers.
- vii. Barrel Bore Chrome plated for high Barrel life and ease of maintenance.

- viii. Provided with mount for day light telescope & passive night sight.
- ix. Provision for mounting on tripod on armed vehicles for Anti-Air Craft role & Monopod for fixed line firing.

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GUN MACHINE 7.62 MM (MAG) 2A1

The weapon is designed to serve the role of a medium machine gun and is fired from a tripod mounting. It is fully automatic, air cooled, belt fed, gas operated weapon capable of a sustained high rate of fire in bursts. The gun fires from open breech thus preventing any explosion of a cartridge (cook off) after prolonged firing. The gun is provided with a heavy/light barrel, the bore and chamber of which are chromium plated. The weapon is supplied with a gun barrel and a spare barrel which can be quickly and easily changed to avoid over heating which causes cook off and reduction in barrel life. The gun is fed from left to right with belts of disintegrating link which are ejected to the right. Empty cartridge cases are ejected downwards.



Specification

Calibre	7.62 mm
Weight of Gun	11 Kgs
Overall length	1048 mm
Rate of Fire	Adjustable 600 to 1000 rounds /Minute
Max Range	1800 M
Belt	Disintegrating Link
Total No of Components	219
Sight Rear Aperture Graduated	Steps of 100 M
Folded Down	200 to 800 M
Extender	800 to 1800 M
Barrel :	
i) Length of Barrel	545 mm
ii) Bore Dia	H 7.655/L 7.61mm
iii) Number of Grooves	4
iv) Pitch of Rifling	1 Turn in 305 mm
v) Twist of Rifling	Right Hand

Ammunition

7.62 mm NATO Ball Ammunition

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ASSAULT RIFLE 7.62 MM [FIXED & FOLDABLE BUTT] (TAR)

Role

The weapon is ideal for counter insurgency using 7.62 X 39 mm ammunition. It is robust enough to withstand rough usage. Barrel of the weapon is Chromium plated for longer life. The rifle is also provided with a Hold open device for cooling and inspection of chamber & Lock retainer which makes opening & closing of cover easy.



Function

Assault Rifle 7.62 mm is a gas operated weapon with rotating bolt locking system which can fire in single shot / auto mode.

Technical Characteristics

1. Calibre	7.62 mm		
2. Length	Fixed Butt	900 mm	
	Foldable Butt	Butt Extended	890 mm
		Butt Folded	660 mm (Bottom Folding)
	Barrel	414 mm	
3. Weight (without magazine & Sling Assy.)	Fixed Butt	3.08 Kg.	
	Foldable Butt	3.27 Kg.	
4. No. of Rifling Grooves	4		
5. Operating	Gas, Selective Fire (Auto)		
6. Locking	Rotary Bolt		
7. Feed	30 Rds. Box Magazine		
8. Sight	Fore-Pillar.		
	Rear-'U' Notch, Graduated, Ramp type 100-800		
9. Effective Range	400 M		
10. Sight Radius	376 mm		
11. Rate of Fire (cyclic)	600 Rds / Min		
12. Muzzle Velocity	670 M/S		
13. Muzzle Energy	1750 J		

Safety

The system is provided with mechanical and applied safety

Salient Features

- Fires 7.62 x 39 mm ammunition.
- An ideal weapon for counter insurgency.
- Compact design, easy to carry, handle, operate and maintain.
- Robust enough to withstand rough usage.
- Chromium plated barrel for longer life of weapon.
- Hold open device for cooling and inspection of chamber.
- Available in fixed butt and bottom folding butt version.

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UNDER BARREL GRENADE LAUNCHER 40 MM

A low weight, low recoil, long range and accurate Under Barrel Grenade Launcher ideal for use with Rifles 5.56 mm and with Rifles AK-47 type.

The device offers an ideal blend of features and ergonomic comfort to the soldier.



Features

1. Can be fitted on Rifles 5.56 mm as well as on Rifles AK-47 type
2. 3-point attachment to Rifle gives rigidity for fitment
3. In-built safety to prevent accidental firing
4. Breech loading enables easy loading and unloading of ammunition
5. Pump action along with conventional extractor makes extraction and ejection for cartridge case easy
6. Location for trigger enables firing for both Rifle and UBGL without change in firing posture
7. Hard anodizing on all aluminium alloy components for wear resistance and for better thermal barrier properties
8. Low recoil ammunition enables shoulder firing
9. Simple and easy operated ladder sight
10. Provision of Beta light source for firing in low light conditions
11. Fires ammunition common with Multi Grenade Launcher
12. Wide choice of ammunition for different roles
13. Available in stand-alone version also

Technical Information

Calibre	40 x 46 mm
Effective Range	28 to 400 m (approx)
Loading	Breech Loading
Barrel Length	350 mm
Barrel Rifling	6 grooves RH
Overall length	450 mm
Weight of Launcher	1.5 kg

Muzzle velocity	70 m/s
Recoil energy	17 Joule
Safety	In built safety for trigger operation and barrel locking

Sighting System

Foresight	Post Type
Backsight	Ladder Sight with 50m steps
Indirect Firing (300m/400)	Illuminated bubble sight
Night firing	Sights Illuminated with Tritium source

Ammunition

Type of Grenade	HE, HEDP, RP, SMK, TPT
Length of complete round	103 mm
Length of projectile	82 mm
Fuze Arming	9 to 28 m
Lethal Radius	5 m

Mass

• Complete round	230 gm
• Projectile	180 gm
• Fragment	120 mg

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84MM RCL MK-III

Preamble

The 84 mm RCL CARL-GUSTAV M3 (henceforth called the M3, or the weapon) is of the breech loaded and laterally percussion fired type. The barrel consists internally of a steel liner. Around this liner a laminate of epoxy and carbon fibre is wound. The weapon is recoilless as part of the propellant gases escape rearwards through the venturi, equalizing the recoil force.



The weapon can be fired from the standing, kneeling, sitting and prone positions.

The normal sight of the weapon is the telescopic sight, the open sights being an auxiliary means of aiming.

Technical Datas

Weight of transport package packed with weapon and accessories	29 Kg
Dimension of transport package	1173x453x268 mm
Weight of weapon complete with telescopic sight and bipod	10 Kg Approx
Weight of telescopic sight	0.75 Kg. (1.7 lb)
Weight of bipod	0.25 Kg. (0.6 lb)
Length of gun	1065 mm (41.9 in)
Practical rate of fire	about 6 RPM

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PISTOL AUTO 9 MM1A

A Personal and special service weapon capable of semi-automatic fire. It is a recoil operated, magazine fed, self-loading pistol in which the breech is positively locked at the moment of firing. It is not fully automatic. The trigger has to be pressed and released for each shot. When all the cartridges have been fired and the magazine is empty, the mechanism is held in the open position by the action of the slide.



Specification

Calibre	9mm
Weight with magazine empty	0.935 kg
Weight with magazine loaded	1.075 kg
Length Over all	205 mm
Barrel length	120 mm
Magazine Capacity	13 rounds
Ammunition used	Cartridge SA Ball 9 mm MK.2z(Parabellum)
Rifling	6 grooves, 1 turn in 254 mm, R.H.
Muzzle Velocity	396.23 m/sec.
Number of components	54
Range	50 mts

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12 BORE PUMP ACTION GUN

The 12 Bore Pump Action Gun has been specially developed for use as a security weapon. It is a single barrel breach loading weapon superior to 12 Bore DBBL. It is provided with a tubular magazine, which holds 4 nos. of 12 Bore Cartridges and is placed parallel to and below the barrel. Extraction, loading and cocking of the cartridges take place in a single 'pump action' by operating handle, sliding along the magazine. Due to rapid reloading by pump action and spread of shots, it is an ideal weapon for counter ambush tactics.



Specifications

Weapon	Single Barrel Breach Loading
Calibre	12 Bore (18.578 mm to 18.628 mm)
Chamber	70 mm (2-3/4")
Length of Barrel	I. Civilian use - 510 mm (20") NPB II. Military / Police - 478 mm (18") PB
Ammunition	12 Bore 2.5" OR 12 Bore 2.75"
Magazine Capacity	4 Rounds
Weight	3.05 kgs.

Applications

- Banks security
- Anti insurgent applications
- Industrial security
- Personal security
- Sporting Arm
- Anti Riot role by use of Rubber Ball non-lethal ammunition

Contact Person

Marketing & Export Division

Ordnance Factory Board

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0.22" REVOLVER



Calibre	0.22"	
Weight	380 gms	
Barrel length	66 mm	
capacity	8 rounds	
Ammunition	0.22" x 24.8 mm	
Grip	Wooden	
Overall size	Length	187 mm
	Width	116 mm
Range	20 Metres	
Action	Single and Double both	
Pin Firing	Floating	

Contact Person

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.30 - 06 SPORTING RIFLE

.30 - 06" Sporting Rifle is a precision & accurate Bolt Action Rifle incorporating the latest modular design and ergonomics features. The weapon uses 0.30" Rimless ammunition and provided with adjustable Rear & Foresight. Dovetail for accommodating optical sight can be mounted on the top of Body of the Rifle. The weapon has also provided with positive mechanical safety.



Specifications

Calibur	0.30"
Bolt Type	Direct Lug Locking with the Barrel
Total Length	1125 mm
Barrel	Chrome Flash with 4 Grooves
Trigger Pull	1.5 Kg (Max)
Magazine Capacity	3 Rounds
Weight	3.0 Kg
Sight	
(I) Fore Sight	Adjustable ramp type
(II) Rear Sight	Adjustable ramp type from 100m to 400m graduation in step of 100m
Range	400 m

Contact Person

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REVOLVER 0.32 (7.65 MM X 23) NIRBHEEK

Role

Light weight, easy to handle weapon, suitable for personal safety.

Function

32 (7.65 mm) Revolver is capable of firing 6 rounds, loaded in revolving chamber. Misfiring of a round does not affect next firing.



Safety

Positive location of main spring eliminates malfunctioning and additional safety feature provided to prevent accidental firing

General Characteristics of Revolver 0.32 (7.65 MM)

- I. Simple in design & sturdy in construction
- II. Positive location of main spring eliminates malfunctioning
- III. During non-functioning of weapon, springs are not under fatigue
- IV. Misfiring of a round does not effect next firing
- V. Accuracy aimed at high standards
- VI. High grade of alloy steel with heat treatment achieve durability
- VII. Interchangeability of parts ensured
- VIII. Provided with additional feature of safety to prevent accidents

Technical Data

Nomenclature	Revolver 0.32 (7.65 mm)	
Calibre	7.65 mm	
Weight (Without Ammunition)	0.7 kg	
Length of Revolver	177.8 mm	
Effective length of Barrel Bore	76.2 mm	
Rifling	Six Grooves R.H. 1 Turn/380 mm	
Sights	Fore Sight	Blade 'U'
	Back Sight	
Feed	Revolving Chamber, 6 Rounds	

Contact Person

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155-MM HE-ERFB BB

Purpose

Rapid and accurate firing at long ranges to attack the ground targets.



Characteristics

Mass of Shell without Fuze	45.2 to 47.77 Kg.
Overall length of Shell	861 mm
HE Composition	TNT - 99%
	N.C - 0.5%
	PNT - 0.2%
	HNS - 0.3%
Compatible Fuzes	PDM - 572 CI & M85 P13 A3
Compatible Charge	Charge 8 & Charge 9

Performance

Maximum Range	38.4 Km
Maximum Chamber Pressure	345 ± 8 Mpa
Storage Temp.	210C ± 20C
Operating Temp.	- 200C to 600C
Shelf Life	10 years

Contact Person

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155-MM HE-ERFB BT

Purpose

Rapid and accurate firing at long ranges to attack the ground targets.



Characteristics

Mass of Shell without Fuze	42.84 to 45.34 Kg.
Overall length of Shell	843 mm
HE Composition	TNT - 99%
	N.C - 0.5%
	PNT - 0.2%
	HNS - 0.3%
Compatible Fuzes	PDM - 572 CI & M85 P13 A3
Compatible Charge	Charge 8 & Charge 9

Performance

Maximum Range	30 Km
Maximum Chamber Pressure	345 ± 8 Mpa
Storage Temp.	210C ± 20C
Operating Temp.	- 200C to 600C
Shelf Life	10 years

Contact Person

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125 MM HEAT

125 mm Ammunition is used with tank T-72 as main gun ammunition. The gun 125 mm is having smooth bored barrel, sophisticated sighting system and automatic loading gear ensures high effective rate of fire order of 8 rounds/ min and total 39 rounds are carried in the tank.

The Ammunition is of separate loading type to suit auto loader and is fin stabilised.

The complete round comprises of two main points.

- a) Cartridge It comprises of semi-combustible cartridge case, Primer GUV-7 and propellant with two igniters.
- b) Shell 125 mm HEAT It comprises of Fuze B-15, filled shell, Tail unit Assy., Distance Tube and Tracer.

Role

The main role of this ammunition is for direct fire against tank, SP gun, mortar and heavy armoured targets. It is effective against targets fitted with protective devices such as skirting plates and grids. It can also be used against concrete bunkers. The shell is aerodynamically stabilised by means of 6 fins initially folded which open in flight.

Function

- a) On firing, set back plunger of the fuze sets back and the ball gets rolled out from the cavity and unlocks the shutter. At the same time, set forward plunger also sets back. Due to taper on the plunger the ball moves in the cavity of the shutter and locks it in unarmed position.
- b) During flight, when set back force ceases, set forward plunger re-asserts to its original position aided by the spring and set forward force, causing the ball to roll out, thus unlocking the shutter. The shutter slides in the armed position by torsion spring making detonator and crystal unsorted.
- c) On impact, nose of the fuze is crushed in and the impact on piezo crystal generates an electric pulse which is passed to the detonator in the shutter. The detonator functions and detonation wave is passed to the booster. The booster pellet is positioned at the bottom of the lower pellet. A conical resonator having central hole accommodating the tip of the copper cone is placed at the base of the filling embedded in the lower pellet and thus the resonator helps in effective jet formation of detonation wave.



Specification / Characteristics

a)	Mass of complete round	29.0 kgs
b)	Muzzle velocity at +15°C	905 m/s
c)	I. Maximum Range	4000 m
	ii. Point blank Range	960 m
d)	Armour thickness defeated at	
	I. Normal attack	500 mm
	ii. 60 degree angle of attack	220 mm
e)	Max. chamber pressure at +15°C (True)	353 Mpa

Quality

Strict quality measures is adopted during filling and assembly. Added to this, functioning proof is carried out in association with Service Quality Assurance Agency.

Safety

- a) Piezo crystal is shorted in unarmed position of the shutter thus making the fuze safe for handling, storage and transportation.
- b) The detonator is shorted and this prevents passage of electric impulse if accidentally developed, during handling, storage and transportation.

Besides above, multiple mechanical safety arrangements have been provided in the fuze to ensure total safety during handling and transportation.

Reliability

The ammunition has high degree of reliability due to electrical/percussion alternative available in the Primer design. It is highly consistent and accurate due to the basic design features and strict quality control at all stages of production.

Shelf Life

The shelf life for individual items are as follows :

Cartg. Case	05 Years (Prov)
HE from shell	15 Years
Propellant	10 Years
Primer GUV-7	05 Years
Fuze B-15	10 Years
Tracer	07 Years

Packing

One cartridge is packed in a metallic container hermetically sealed which is further packed finally alongwith one shell in a wooden box.

Stowage Dimension

Stowage dimension of wooden box is 863 mm x 540 mm x 292 mm. & Steel box drg. no. C-52A - 755 mm x 430 mm x 230 mm.

Hazard Classification

Compatibility	F
Hazard Division	1.1
Fire fighting classification	1

Contact Person

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MAIN BATTLE TANK AMMUNITION 120 MM FSAPDS

Use of MBT Ammunition of 120mm Calibre became inescapable in the modern warfare and is the answer to counter attack the enemy. The combustible Cartridge Cases/Primers have been introduced in order to derive optimum performance advantages as compared to conventional brass Cartridge cases at high chamber pressure specially in FSAPDS/Proof shot Rounds

Three versions are available

- a) FSAPDS
- b) Proof shot representing FSAPDS
- c) HESH



Brief Description

Rd 120mm FSAPDS (Fin Stabilized Armour Piercing Discarding Sabot) as a primary ammunition.

Role

Capable of defeating NATO Targets up to 4000 Mtrs distance.

Specification

a)	Length of complete round	994mm
b)	Weight of complete round	20.2 Kgs
c)	Type of propellant	NQ/M 119
d)	Weight of Propellant Charge (Normal)	8.3 Kgs
e)	Weight of	
	1. SCCC Liner	0.780 Kgs
	2. Steel Cup	3.4 Kgs
	3. Primer	0.490 Kgs
f)	Weight of projectile	6.8 Kgs
g)	Weight of Bursting Charge	–
h)	Type of Primer	SCP Mk II B
i)	Tracer	No. 33
j)	Fuze	–
k)	CG (From Base cup)	425 mm
l)	Muzzle Velocity	1650 m/s
m)	EFC value	1.00

Performance Characteristics

1 st Rd. HIT probability should be 90%.

Quality Standard

Same as above

Shelf Life

10 years

Packing

Firstly, the round is packed in paper roll cylinder and the cylinder is then packed in the wooden box with casing in two halves being used for cushioning.

Stowage Dimension

The external dimension of the boxes with batten is 1225 mm x 360 mm x 360mm and each box occupies a space of 0.16 Cu. M. One round is packed in one box.

Hazardous Classification

Compatibility group	E
Hazardous Division	1.2
Fire Fight Division	2

Contact Person

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MAIN BATTLE TANK AMMUNITION 120 MM HESH

Use of MBT Ammunition of 120 mm Calibre became inescapable in the modern warfare and is the answer to counter attack the enemy. The combustible cartridge Cases/Primers have been introduced in order to derive optimum performance advantages as compared to brass cartridge cases at high chamber pressure.

Three versions are available

- a) FSAPDS
- b) Proof shot representing FSAPDS
- c) HESH



Brief Description

Rd. 120 mm HESH (High Explosive Squash Head)

Role

Capable of engaging targets up to 2500 Mtrs. should be capable of defeating 135 mm RHA plate up to 1100 Mtrs distance

Specification

a) Length of complete round	998 mm
b) Weight of complete round	22.2 Kgs
c) Type of propellant	AP/S 400-120
d) Weight of Propellant Charge (Normal)	3.3 Kgs
e) Weight of	
1. SCCC Liner	0.780 Kgs
2. Steel Cup	3.4 Kgs
3. Primer	0.620 Kgs
f) Weight of projectile	14.4 Kgs
g) Weight of Bursting Charge (RDX: WAX 88:12)	2.95 Kgs
h) Type of Primer	L1A4 MK II
i) Tracer	No. 30
j) Fuze	L29A3 base
k) CG (from Base cup)	552 mm
l) Muzzle Velocity	736 m/s
m) EFC value	0.33

Performance Characteristics

Should be accurate up to 1100 mtrs. and it should be capable of engaging targets up to 2500 mtrs.

Shelf Life

10 years

Packing

Firstly, the round is packed in paper roll cylinder and the cylinder is then packed in the wooden box with casing in two halves being used for cushioning.

Stowage Dimension

The external dimension of the boxes with batten is 1225 mm x 360 mm x 360 mm and each box occupies a space of 0.16 Cu. M. 1 round is packed in one box.

Hazardous Classification

Compatibility group	E
Hazardous Division	1.1
Fire Fight Division	2

Contact Person

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BOMB 120 MM MORTAR SMOKE PWP

Role

The Bomb is basically smoke type screening ammunition in the combat field, creating a dense smoke screen and facilitating tactical deployment of own troops and vehicles evading from enemy firing.

Function

The Bomb is fired from 120mm Mortar, smooth bore,



muzzle loading weapon. The direct action percussion fuze initiates the Bomb to burst at the target instantaneously and generate the white smoke uniformly. The Bomb can generate the white screening smoke at the target for a period of 20 secs and the time required for the build up of the smoke is 5 secs.

Specification /characteristics

- | | |
|----------------------------|------------|
| a) Mass of the filled bomb | 13.225 kgs |
| b) Muzzle velocity | 331 m/sec |
| c) Max range | 6512 m |
- (Variable ranges can be achieved by adjusting no. of augmenting cartridges)

Advantages

- The Bomb is capable of screening the area with dense white smoke uniformly without any pillaring effect.
- The design adopted in the Fuze Mechanism prevents the fuze from premature arming when air dropped

Quality

Strict quality measures are adopted during all stages of manufacture of components, filling assembly and packing. Each component used is proved/inspected separately before being released for filling/assembly. In addition, functioning, /dynamic proof is carried out in association with Service Quality Assurance Agency. The Bomb is filled and assembled in lots of 2000 Nos.

Safety

Multiple Mechanical Safety devices have been provided in the Fuze to ensure total safety in handling and transportation.

Reliability

- The Mortar 120mm has got a high angle of fire and high degree of accuracy.
- Due to the simple design of the direct action percussion Fuze, the Bomb is capable of functioning in all conditions.

Shelf Life

The shelf life of filled Bomb is 10 years.

Packing

The packing consists of one inner packing and an outer packing. The inner packing is water proof laminated paper container in which one Bomb is packed. Two such containers are packed in a sturdy steel box. The laminated paper container used is capable of protecting the Bomb in all adverse weather conditions.

Stowage Dimension

The Stowage dimensions of the packed steel box are 800 mm x 349 mm x 177mm to hold two bombs.

Gross weight of the package is 44 kgs

Hazard Classification

The Bomb is classified in

Compatibility group	H
Hazard Division	1.2
Fire Fighting Classification	2

Contact Person

Marketing & Export Division

Ordnance Factory Board

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SHELL 105 MM IFG HE

Role

IFG HE ammunition is one of the six different types of projectiles fired from the 105 mm Indian field gun. This ammunition is employed to demolish army concentrations, fortifications, bunkers and many other defence installations. This is suitable for use both in the plains as well as mountains.



Function

105 mm IFG HE ammunition is filled with high explosives, (TNT) and is fitted with fuze 117 MK 20. On hitting the target, the fuze functions and ultimately detonates the explosive charge. The stability of the ammunition is achieved by the spin.

Characteristics and Specification

a) Mass of the filled shell	16.97 kgs max
b) Muzzle velocity	591 M/sec (normal charge) 710 M/sec (super charge)
c) Maximum range	17600 m (Variable range can be achieved by using different types of cartg cases such as normal charge and super charge)

Special Features

Because of the greater range, high firepower and mobility of IFG, the ammn. can be very effectively used both in plains and mountains. The ammn. can be fired at all angles of elevation. To adjust the range, different types of charges such as normal charge and super charge are used.

Safety

Mechanical safety devices are incorporated in the fuze to avoid any premature functioning of the fuze during manufacture, handling and transportation.

Reliability

The IFG weapon has a very high angle of fire and is capable of a very high degree of accuracy. The high angle firing capability enables the gun to be fired as a howitzer.

Shelf Life

The shelf life of the filled ammunition is 30 years.

Packing

The packing consist of an inner container and outer package. Two shells packed in

laminated paper containers, are further packed in a wooden/steel boxes with suitable packing fitments to ensure snug packing.

Stowage Dimension

The stowage dimensions of one box wooden/steel (holding two shells in laminated container) is 741 mm x 210 mm x 352 mm.

Hazard Classification

The filled & packed shells are classified in

Compatibility group	F
Hazard division	1.2
Fire Fighting classification	2

Contact Person

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BOMB 81 MM MORTAR HE

General

This bomb is used in 81 mm Mortar which is a light smooth bore, muzzle loading weapon having high angle of fire and capable of a high degree of accuracy. It is a platoon weapon of the infantry. The equipment can be dismantled into 3 loads and can be carried by 3 men. It can be used for firing in battlefields, mountain warfare or air borne operations.



This bomb is a high explosive bomb streamlined in shape and is of the fragmentation type. It is fin stabilized and has fuze 162MK-8 at the forward end and a tail unit at the rear. Tail unit takes one primary and eight secondary cartridges. The bomb body is made out of steel (specifications JSS 9510-1). 81 mm Mortar bomb has a special feature i.e. it has 0 to 8 charges i.e. a total of 9 charges.

Physical Characteristics

Total length of Ammunition	379 mm
Max. dia of bomb	80.8 mm
Mass	4.2 ± 0.125 kg (without primary) and augmenting cartridges
Explosive filling	705 ± 5 gm T.N.T.
Explosive filling in primary cartridges	7.8 gm NGB 051

Performance Characteristics

Muzzle velocity	295 m/s
Max . Range	5000 Metres
Rate of firing	6 to 8 rounds per minute with Relaying and 20 rounds per Minute without relaying.

Special Features

The fuze assembled with the bomb is a direct action detonating type. The design adopted in the fuze prevents premature arming when air dropped.

Quality

Strict quality checks are observed during various stages of production. The bomb body as well as other components are proved / inspected before separately being taken for filling and assembly. Added to this, functional proving is carried out in association with the Services Quality Assurance Organisation. The bombs are filled and assembled in lots of 2000 Nos.

Safety

The fuze and other components design ensures total safety during handling and transportation .

Reliability

The Mortar has got a high angle of fire and is capable of high degree of accuracy. Due to the simple design of the direct action percussion fuze, the bomb is capable of functioning in all conditions.

Shelf Life

The shelf life is 30 years.

Packing

The packing consists of inner and outer packages. The inner package is a HDPE/LDPE carrier which accommodates two bombs and provides protection during transport and storage in all climatic conditions. This carrier is then packed a sturdy metallic carrier which holds two HDPE/LDPE carriers containing four bombs.

Stowage Dimensions

Package Dimensions	460 mm x 300 mm x 240 mm
Gross weight	25 kgs
Volume	0.033 Cu. m

Hazard Classification

Compatibility group	F
Hazard Division	1.2
Fire fighting classification	2

Contact Person

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84 MM HE 441B

General

This ammunition is fired from Gun 84 mm RCL Carl Gustaf M2 from the shoulder. The cartridge combines some of the characteristics of Rocket and Artillery ammunition in its design. The ammunition is of fixed type and is spin established. This ammunition is intended for use against troops in the open and in slit trenches, machine gun posts soft skinned transport vehicles and similar types of targets. It is fitted with a combined mechanical time and impact fuze.



The design of the ammunition parts and functioning are like Artillery components excepting that the rear of the cartridge case is closed by a plastic blow out disc (base plate) which allows rearward escape of the propellant gas to make it recoilless and the ignition of the propellant is by a side-located percussion cap and an igniter composition.

The cartridge case is made of light aluminium alloy drawn to specification BS 1470 grade 6082 TF or IS 736 grade 64430 WP. At the rear, it is formed with a flange which is cut away over a length to take a guide while loading the round in the gun. At about 90 degree from the cut away flange a hole with two diameters is provided on the body of the cartridge case to take the percussion cap. The shell body is made of steel to specification DIN 17200 Code 25 Cr Mo 4 with carbon percentage 0.26 to 0.29. It encloses two inserts of neoprene rubber containing about 850 steel balls, the inserts surrounding the HE charge RDX/TNT. While filling the HE (RDX/TNT) a central cavity in two diameters is made to take two booster pellets and the time and impact fuze FFV447. The shell body takes the driving band of copper. The shell body is so designed that the danger area for rearward fragments from the point of burst is small. Propellant is NGB204 which is a ballistite propellant. The fuze FFV 447 is dual-purpose fuze of both impact and mechanical time types. This ammunition is of Swedish design and is manufactured to Government of India, Ministry of Defence Specification Number CQA0312 and Drawing No.F1301-115201C.

Physical Characteristics

Total length of ammunition	380 mm
Total mass of ammunition	3.1 kgs
Mass of projectile	2.3 kgs
Propellant (ACM)	0.4 kg
Explosive filling in primer (cap)	0.13 gms (Composition VH 2 & Zirconium)
Explosive filling in Igniter	15.0 gms (Composition Z47B & NC 110)

Explosive filling in Projectile	0.40 kg
Explosive filling in Fuze	3.08 gms
Net explosive content	803.36 gms.

Performance Characteristics

Muzzle velocity	240 m/s
Practical firing range upto	1000 m
Time of flight to 700 m	3.4 sec

Special Features

The weapon is of recoilless type and can be fired from the shoulder. It is assembled with a dual purpose fuze. On bursting of the projectile, the steel balls 850 (Nos) act as splinters.

Safety

The fuze does not get armed unless it is spun at 3500 rpm and thus the ammunition is safe during all stages of operation, storage and transport.

Reliability

Due to its sound design and careful manufacture, the ammunition is very reliable for use in combat field environment.

Shelf Life

The shelf life of the ammunition is 10 years

Packing

Two rounds are packed in twin containers made up of injection moulded tube of high density polyethylene. Three such twin containers (total 6 rounds) are packed in one wooden crate.

Stowage Dimension

Packing box size	660 mm x 463 mm x 356 mm
Gross weight	40.0 kgs
Net weight	24.6 kgs
Volume	0.108 cu.m

Hazard Classification

Compatibility group	F
Hazard division	1.2
Fire fighting class	2

Contact Person

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84 MM HEAT 651

General

This ammunition is fired from Gun 84 mm RCL Carl Gustaf M2 from the shoulder. The cartridge combines some of the characteristics of Rocket and Artillery ammunition in the design. The ammunition functions on the principle of shaped charge. The ammunition is of Swedish design.



The 84 mm HEAT ammunition is used against all types of armoured fighting vehicles, landing crafts, concrete bunkers and similar types of targets. In addition to its good penetrating power against these targets, the fragments of shell body have a high lethal effect on troops in close proximity to the target.

The ammunition is of fixed type. The design of the ammunition parts and functioning are like artillery components excepting that the rear of the cartridge case is closed by a plastic blow out disc (base plate), which allows rearward escape of gases, and ignition of propellant is by a side located percussion cap and an igniter composition. Cartridge case is made of light aluminium alloy drawn to specification BS 1470 Grade 6082 TF or IS 736 Grade 64430 WP. At the rear, it is formed with a flange, which is cut away over a length to take a guide while loading in the gun. At about 90 degree from the cut away flange a hole with two diameters is provided on the body of the case to take the percussion cap. The shell body is made of light alloy to specification BS 1474 Grade 2014 ATF or IS 1285 Grade 24345 WP. Fuze FFV 651 is of Swedish design. Propellant NGB 204 is a ballistite propellant. This ammunition is manufactured to Government of India, Ministry of Defence Specification No. CQA 0310 and drawing number F1321-204571E.

Physical Characteristics

Total length of ammunition	538 mm (Approx)
Total mass of ammunition	2.8 kgs (Approx)
Mass of projectile	1.6 kgs (Approx)
Propellant (ACM)	0.36 kg (Approx)
Explosive filling in primer (cap) (Composition VH 2 & Zirconium)	0.14 gms (Approx)
Explosive filling in Igniter (Composition Z47B & NC 110)	15.0 gms
Explosive filling in Projectile	0.5 kg (Approx)
Explosive filling in tracer	1.4 gms (Approx)
Explosive filling in fuze	20.2 gms
Net explosive content	896.746 gms

Performance Characteristics

Muzzle velocity	305 m/s
Killing range against moving target	450 m
Killing range against static target Penetration	550 m
a) Homohard armour (normal attack)	400 mm
b) RCC target	1000 mm

Special Features

The weapon is of recoilless type and can be fired from the shoulder. In addition to its anti-tank role, anti-personnel role is also being achieved due to splinters of the shells.

Safety

The electric detonator remains off-centre during all stages of operation and this remains disconnected from the explosive train.

Reliability

Due to its sound design and careful manufacture, the ammunition is very reliable for use in combat field environment.

Shelf Life

The shelf life of the ammunition is 10 years

Packing

Two rounds are packed in twin containers made up of injection moulded tube of high density polyethylene. 4 such twin containers (total 8 rounds) are packed in one wooden crate.

Stowage Dimension

Packing box size	742 mm x 538 mm x 315 mm
Gross weight	45.5 kgs
Net weight	22.5 kgs
Volume	0.126 cu.m

Hazard Classification

Compatibility group	F
Hazard division	1.2
Fire fighting class	2

Contact Person

Marketing & Export Division

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84 MM ILLUMINATING FFV 545

General

This ammunition is fired from Gun 84 mm RCL Carl Gustaf from the shoulder. The cartridge combines some of the characteristics of Rocket and Artillery ammunition in its design. The ammunition is of Swedish design.



The illuminating round has been designed to meet the requirement for a very quick illumination of target areas, offering facilities for all types of direct fired weapons and guided anti-tank weapons to engage, Armoured fighting vehicles, support weapons etc. The illuminating round is also intended to facilitate for the sub-units of the battalion, supply of their own illumination of battle field, even continuous, when required. The ammunition is of the fixed type. The design of the ammunition parts and functioning are like Artillery components excepting that the rear end of the cartridge case is closed by a plastic blow out disc(base plate), which allows rearward escape of the propellant gas so as to make the weapon recoilless and the ignition of the propellant is by a side-located percussion cap and an igniter composition.

The cartridge case is made of light aluminium alloy drawn to specification BS-1470 Grade 6082 TF or IS 736 Grade 64430 WP. At the rear of the cartridge case, it is formed with a flange which is cut away over a length to take a guide while loading the round in the gun. At about 90 degrees from the cut away flange a hole with two diameters is provided on the body of the cartridge case to take the percussion cap. The shell body is made of light aluminium alloy to specification BS 1474 Grade 2014A or IS 736 Grade 64430 WP. The shell body accommodates the canister illuminating candle and the parachute assembly. The shell also accommodates the time combustion fuze FFV 64C, at the nose. The shell base is made up of light alloy with six equispaced circumferential holes to fix the base plate and body together with fixing screws. The shell is spin established. Propellant NGB 204 is a ballistite propellant. This ammunition is manufactured to Government of India, Ministry of Defence Specification No. CQA 3815 and drawing number F1301-055361 K.

Physical Characteristics

Total length of ammunition	450 mm
Total mass of ammunition	3.1 kgs
Mass of projectile	2.2 kgs
Propellant (ACM)	0.4 kg

Mass of Illuminating composition	0.5 kg
Explosive filling in primer (cap) (Composition VH 2 & Zirconium)	0.13 gm
Explosive filling in Igniter (Composition Z47B & NC 110)	15.0 gms
Explosive filling in fuze	17.68 gms
Net explosive content	932.81 gms

Performance Characteristics

Muzzle velocity	260 m/s
Range of burst	300 to 2100 m
Height of burst	200 m (approx)
Illuminated area, diameter	400- 500 m
Rate of descent	5 m/s (approx)
Candle power	6,50,000 candela
Burning time	30 ± 5 sec

Special Features

The weapon is of recoilless type and can be fired from the shoulder. The ammunition can be effectively used at any range between 300 m to 2100 m by elevating the gun to 20 degrees or 25 degrees.

Safety

The fuze is provided with a rubber hood and a safety pin. The rubber is for protection against atmospheric condition during storage and transport. Before firing, both the rubber hood and the safety pin is removed and the fuze is set.

Reliability

Due to its sound design and careful manufacture, the ammunition is very reliable for use in combat field environment.

Shelf Life

The shelf life of the ammunition is 10 years

Packing

Two rounds are packed in twin containers made up of injection moulded tube of high density polyethylene. Three such twin containers (total 6 rounds) are packed in one wooden crate.

Stowage Dimension

Packing box size	660 mm x 463 mm x 356 mm
Gross weight	40.0 kgs
Net weight	24.6 kgs
Volume	0.108 cu.m

Hazard Classification

Compatibility group	G
Hazard division	1.2
Fire fighting class	2

Contact Person

Marketing & Export Division

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84 MM TPT 65

General

This ammunition is fired from Gun 84 mm RCL Carl Gustaf M2 from the shoulder. This ammunition is ballistically identical to the 84 mm HEAT round. Except for a tracer, there is no other explosive in the shell. This round is provided in order to save on the costlier HEAT rounds. The soldier is trained on this round and all the



practice firings are mostly done by using the TPT rounds. This ammunition is of Swedish design.

This ammunition is of fixed type. The design of the ammunition parts and functioning are like Artillery components excepting that the rear of the cartridge case is closed by a plastic blow out disc (base plate) which allows rearward escape of the propellant gases and the ignition of the propellant is by a side-located percussion cap and an igniter composition. Cartridge case is made of light aluminium alloy drawn to specification BS 1470 grade 6082TF or IS 736 grade 64430WP. At the rear, it is formed with a flange which is cut away over a length to take a guide while loading the round in the gun. At about 90 degree from the cut away flange, a hole with two diameters is provided on the body of the cartridge case to take the percussion cap. The shell body is made of light aluminium alloy to specification SISAI4250-10 or DEF30A (a) : LM 24M Propellant NGB 204 is a ballistite propellant. This ammunition is manufactured to Government of India, Ministry of Defence Specification No. CQA0311 and Drawing No.F1301-047740J.

Physical Characteristics

Total length of ammunition	535 mm
Total mass of ammunition	2.6 kg
Mass of projectile	1.8 kg
Propellant (ACM)	0.4 kg
Explosive filling in primer (cap)	0.13 gms (Composition VH 2 & Zirconium)
Explosive filling in Igniter	15.0 gms (Composition Z47B & NC 110)
Explosive filling in Tracer	1.4 gms
Net explosive content	416.53 gms

Performance Characteristics

Muzzle velocity : 305 m/s

Special Features

The weapon is of recoilless type and can be fired from the shoulder.

Safety

As no explosive filling is involved in the shell filling, the ammunition is safe during manufacture, transit and storage.

Reliability

Due to its sound design and careful manufacture, the ammunition is very reliable for its end use.

Shelf Life

The shelf life of the ammunition is 10 years.

Packing

Two rounds are packed in twin containers made up of injection moulded tube of high density polyethylene, 4 such twin containers (total 8 rounds) are packed in one wooden crate.

Stowage Dimension

Packing box size	742 mm x 538 mm x 315 mm
Gross weight	45.5 kgs
Net weight	22.2 kgs Approx
Volume	0.126 cu.m

Hazard Classification

Compatibility group	C
Hazard division	1.3
Fire fighting class	2

Contact Person

Marketing & Export Division

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CARTRIDGE AA 40 MM L-70 PFFC

General Description

The 40/70 PFFC IM 212, HE Pre Formed Fragmentation with Tungsten Cubes, has been designed for firing in the 40 mm L70 BOFORS and BREDA 40 L70 guns. It is meant for use against aircraft and sea skimmer missile threats the 40/70 PFFC IM 212 (Pre Formed Fragmented Cubes) fitted with Proximity Fuze Fb 40.

**Characteristics**

1. Calibre	Available on request
2. Length, complete round	Available on request
3. Weight, complete round	Available on request
4. Weight, shell & fuze	Available on request
5. Weight of explosive	Available on request
6. Type of explosive	Available on request
7. Muzzle velocity at +21°C	Available on request
8. Max. chamber pressure at +21°C	Available on request
9. Applicable Fuze	
10. Primer	Available on request
11. Cartridge Case	Available on request
12. Type	Available on request
13. Weight of Fuze	Available on request
14. Propellant	Available on request
15. Self destruction	Available on request
16. Pre formed Fragments	Available on request
17. Function	Available on request

Mechanical Safety range 50 m min.

The ammunition is able to operate in severe climatic conditions

Operating temperature -20° C to 50° C

Storage temperature -40° C to 60° C

The round has a minimum shelf life of Ten (10) years provided that it is stored in its original container and it is stored under the following ambient conditions:

Temperature Between + 10° C to 30° C

Humidity Between 25% and 60%

Contact Person

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CARTRIDGE 30 MM ADEN GUN HE MK 2Z

General

This ammunition is fired from 30 mm Aden Gun mounted on HF24, Hunter and Mystere aircraft. This ammunition consists of a projectile and a cartridge case, which are issued, stored and loaded together as one complete round, that is as fixed ammunition. 30-mm ammunition is supplied belted in lengths of 30 rounds, made up of L.H feed or R.H feed.



The cartridge case made from solid drawn brass, and in the centre of its base is a recess, which houses an electric cap. The recess is provided with a fire hole. Around the base is an extractor groove, and adjacent to the groove is a shoulder by which the cartridge is positioned in the chamber of the gun. The projectile consists of a steel shell to which is screwed a percussion fuze No. 933. This ammunition is manufactured to Government of India, Ministry of Defence Specification No. AIR 1385G and drawing No. ARM 1107 B1.

Physical Characteristics

Total length of ammunition	7.874 inch mm
Mass of complete round	432.0 gms 10 gms
Mass of explosive in projectile	52.5 gms
Mass of propellant (NRN No. 141/A.H)	46.0 gms
Mass of filled fuze	29.5 gms

Performance Characteristics

Velocity at 27.5 m from muzzle	780.8 m/s \pm 12.2 m/s
Accuracy at 457.2 m	609.6 mm MFM
Rate of fire	1200-1400 rds/min

Safety

The ammunition is absolutely safe during manufacturing, storage and transportation as the fuze is provided with adequate safety arrangements to eliminate the possibility of premature initiation. Care should be taken that the electric cap is not struck as a blow is liable to cause the cap to function.

Reliability

Due to its sound design and careful manufacture, it is very reliable for use in combat field environment. It is most effective and reliable in its role as air to air combat, air to ground support, against radar installations, fuel dumps, soft skin vehicles etc.

Shelf Life

Shelf life of this ammunition is 10 years

Packing

29 rounds are fitted in one belt + 1 round in loose condition. The belt along with the loose round is packed in one steel box H60.

Stowage Dimension

Size of the box	355 mm x 241 mm x 315 mm
Gross weight	27.2 kg
Net weight	12.96 kg
Volume	0.026 cu m

Hazard Classification

Cartridge is classified in

Compatibility group	C
Hazard division	1.2
Fire fighting classification	2

Contact Person

Marketing & Export Division

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CARTRIDGE 30 MM ADEN GUN PRACTICE MK2Z

General

This ammunition is fired from 30mm Aden Gun mounted on HF24, Hunter and Mystere aircraft. This is most modern and optimum Air Ammunition calibre for training/practice. This ammunition consists of a projectile and a cartridge case. The projectile consists of a cylindrical steel body into which is screwed an aluminium alloy firing plug. The firing plug is dumb-bell shaped, one end having a blunt nose, a curved taper and a thread to screw into the body. The Cartg case contains a propellant charge of approx. 46 gms of nitrocellulose and potassium sulphate boosted by primer instead of only a propellant charge of approximately 30 gms of Nitro-cellulose & Potassium sulphate. The primer is a bag of silk gauze containing approximately 10 gms of N.P.P 160 Powder and is located over the fire hole in the case. The ammunition is manufactured to Government of India, Ministry of Defence. Specification No. AIR1383H and Drawing No. ARM 1106B1



Physical Characteristics

Total length of ammunition	7.874 inch
Mass of complete round	432 gms \pm 20 gms
Mass of explosive filling	45 gms approx

Performance Characteristics

Velocity at 27.5 m from muzzle	780.8 m/s \pm 12.2 m/s
Accuracy at 457.2 m	609.6 mm of MFM
Rate of fire	1200-1400 rds/min

Safety

The ammunition is absolutely safe during manufacturing, storage and transportation in all conditions. Care should be taken in that the electric cap is not struck, as a blow is liable to cause the cap to function.

Reliability

Due to its sound design and careful manufacture, it is very reliable for use in combat field environment. It is most effective and reliable in its role in air to air combat, air to ground support, against radar installations, fuel dumps, soft skin vehicles etc.

Shelf Life

Shelf life of this ammunition is 10 years.

Packing

29 rounds are fitted in one belt + 1 round in loose condition. The belt alongwith the loose round is packed in one steel box H60.

Stowage Dimension

Size of the box	355 mm x 241 mm x 315 mm
Gross weight	27.2 kg
Net weight	12.96 kg
Volume	0.026 cu m

Hazard Classification

Cartridge is classified in	
Compatibility group	C
Hazard division	1.2
Fire fighting classification	2

Contact Person

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30 MM BMP II AMMUNITION HE/T

General

30 MM Ammunition is fired from 30 mm automatic Gun 2A42 mounted on infantry combat vehicle BMP II as the main armament. The gun has double belt feed system, one belt with armour piercing tracer round and the other with both High Explosive Incendiary and HE Tracer rounds generally in ratio of 4:1. The gun is designed for single shot firing as well as automatic firing at slow and rapid rates.

30 MM HE/T ammunition is a fixed type of ammunition and is intended for use against man power and non armoured ground and aerial targets.



Physical Characteristics

Total length of ammunition (High)	291.84 mm
Total length of ammunition (Low)	288.45 mm
Mass of Complete Round	0.826 kg (Approx)
Mass of projectile	0.385 kg \pm 0.006 Kg
Mass of propellant	0.120 kg (Approx)
Mass of bursting charge	0.0116 kg

Performance Characteristics

Muzzle Velocity	960 m/s \pm 10 m/s
Mean pressure of propellant	3600 Kg/cm ²
Self destruction time of fuze	9.0 to 14.0 sec
Maximum Range	
(a) At ground target	4000 m
(b) At aerial target/altitude	2000 m
(c) Slant range	2500 m
(d) Tracer burning time	9.0 sec

Special Features

HE/T projectiles are equipped with fuze A670M designed to explode on impact with the target and it can cause self destruction of the shell if it misses the target.

Quality

The raw material used for components are tested by independent Quality Assurance

Wing. Major components are test-fired and only passed proof components are taken into final assembly of ammunition. The final round is dynamically proved for i) Velocity ii) Pressure iii) Safety & functioning at low rate of fire and high rate of fire and (iv) Failure free functioning, during time & visibility of tracer.

Safety

Adequate mechanical safety arrangements are provided for safety during handling and transportation.

Reliability

Due to its sound design and careful manufacture, the ammunition is very reliable for use in combat field environment.

Shelf Life

The shelf life of this ammunition is 7 years

Packing

30 rounds are packed in one steel box H-60, a hermetically sealed metallic container.

Stowage Dimension

Packing box size	355 mm x 241 mm x 315 mm
Estimated weight of box	35.12 kgs/box
Net weight of box	24.9 kgs/box
Volume	0.027 cu metre

Hazard Classification

This ammunition is classified in

Compatibility group	F
Hazard Division	1.2
Fire fighting classification	2

Contact Person

Marketing & Export Division

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30 MM BMP II AMMUNITION AP/T

General

30 MM Ammunition is fired from 30 mm automatic Gun 2A42 mounted on infantry combat vehicle BMP II as the main armament. The gun has double belt feed system, one belt with armour piercing tracer round and the other with both High Explosive Incendiary and HE Tracer rounds generally in ratio of 4:1. The gun is designed for single shot firing as well as automatic firing at slow and rapid rates.



30 MM AP/T ammunition is a fixed type of ammunition and is intended for use against light armoured targets and weapon emplacements.

Physical Characteristics

Total length of ammunition (High)	292.84 mm
Total length of ammunition (Low)	289.39 mm
Mass of Complete Round	0.853 kg Approx.
Mass of Projectile	0.40 kg 0.006 kg
Mass of propellant	0.128 kg Approx.

Performance Characteristics

Muzzle Velocity	970 m/s \pm 10 m/s
Mean pressure of propellant	3600 Kg/cm ²
Maximum Range	
(a) At ground target	4000 m
(b) At aerial target/altitude	2000 m
(c) Slant range	2500 m
(d) Tracer burning time	3.5 sec

Special Features

Armour piercing projectile provides armour piercing effect behind the armour due to fragmentation of armoured target as well as the steel body of shell. The tracer gives visibility of its path upto a range of 2500 m.

Quality

The raw material used for components are tested by independent Quality Assurance Wing. Major components are test fired and only passed proof components are taken into final assembly of ammunition. The final round is dynamically proved for i) Velocity

ii) Pressure iii) Safety & functioning at low rate of fire and high rate of fire and iv) Failure free functioning, burning time & visibility of tracer.

Safety

Adequate mechanical safety arrangements are provided for safety during handling and transportation.

Reliability

Due to its sound design and careful manufacture, the ammunition is very reliable for use in combat field environment.

Shelf Life

The shelf life of this ammunition is 7 years.

Packing

30 rounds are packed in one steel box H-60, a hermetically sealed metallic container.

Stowage Dimension

Packing box size	355 mm x 241 mm x 315 mm
Estimated weight of box	36.0 kgs/box
Net weight of box	25.59 kgs/box
Volume	0.027 cu m

Hazard Classification

This ammunition is classified in

Compatibility group	E
Hazard Division	1.2
Fire fighting group	2

Contact Person

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30 MM BMP II AMMUNITION HE/I

General

30 MM Ammunition is fired from 30 mm automatic Gun 2A42 mounted on infantry combat vehicle BMP II as the main armament. The gun had double belt feed system, one belt with armour piercing tracer round and the other with both High Explosive Incendiary and HE Tracer rounds generally in ratio of 4:1.

30 mm HE/I ammunition is a fixed type of ammunition and is intended for use against main power and non armoured ground and aerial targets 30 mm Gun is designed for single shot firing as well as automatic firing at rapid & slow rates.



Physical Characteristics

Total length of ammunition (High)	292.84 mm
Total Length of ammunition (Low)	289.45 mm
Mass of Complete Round	0.833 kg
Mass of projectile	0.389 kg \pm 0.006 kg
Mass of propellant	0.122 kg
Mass of bursting charge	0.0485 kg \pm 0.001 kg

Performance Characteristics

Muzzle Velocity	960 m/s \pm 10 m/s
Mean pressure of propellant	3600 Kg/cm ²
Self destruction time of fuze	9.0 to 14.0 Sec

Maximum Range

a) At ground target	4000 m
b) At aerial target	2000 m
c) Slant range	2500 m

Special Features

HE/I projectiles are equipped with fuze A670M designed to explode on impact with the target and it can cause self destruction of the shell if it misses the target.

Quality

The raw material used for components are tested by independent Quality Assurance Wing. Major components are test-fired and only passed proof components are taken into final assembly of ammunition. The final round is dynamically proved for i) MV ii.)

Pressure iii) Safety & functioning at low rate of fire and high rate of fire.

Safety

Adequate mechanical safety arrangements are provided for safety during handling and transportation.

Reliability

Due to its sound design and careful manufacture, the ammunition is very reliable for use in combat field environment.

Shelf Life

The shelf life of this ammunition is 7 years.

Packing

30 rounds are packed in one steel box H-60, a hermetically sealed metallic container.

Stowage Dimension

Packing box size	355 mm x 241 mm x 315 mm
Estimated weight of box	35.43 kgs/box
Net weight	24.99 kgs/box
Volume	0.027 cu m

Hazard Classification

This ammunition is classified in

Compatibility group	F
Hazard Division	1.2
Fire fighting Group	2

Contact Person

Marketing & Export Division

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CARTRIDGE RIM FIRE .22" BALL

General

The cartridges are of rimmed type. The complete cartridge consists of a cartridge case with rimfire composition, propellant charge and bullet. The rimfire makes thus a cartridge without a percussion cap. It is rimmed out to hold the initiatory composition. The striker of the rimfire rifle is placed eccentric to the axis of the barrel, so that when the rifle is fired, it pinches the rim and thus fires the cartridge. The bullet is made of lead antimony alloy and is unjacketed. The bullet is round nosed and formed with three circumferential grooves.



Physical Characteristics

Total length of Ammunition	25 mm (approx.)
Total mass	3.54 g
Mass of bullet	2.60 g (approx.)
Mass of Initiatory composition	26 to 29 mg

Performance Characteristics

Velocity at 9 m	305 ± 23 m/s
Mean Figure of Merit at 23 m	95% within 19 mm circle dia.

Quality

Various strict quality checks are adopted during manufacture. All the components are proved and inspected separately in empty stages before they are taken for filling/Assembly. Functional proof is carried out in association with Services Quality Assurance Organisation.

Shelf Life

The shelf life of the Ammunition is 18 years

Packing

100 cartridges are packed in one Carton ASA No. 48 MK -1 and 4 such Cartons in one polythene bag and 11 polythene bags are packed in one Case Wood Packing 6A.

Stowage Dimension

Package dimensions	398 mm X 233.5 mm X 211.5 mm
Gross Weight	20 Kgs (approx.)

HAZARD CLASSIFICATION

Compatibility group	S
Hazard Division	1.4
Fire fighting classification	4

0.22" RIM Fire Ammunition

Type of Ammunition	Velocity At 9 Metres	Accuracy	
22 " RF Short	925 ± 50 ft. /Sec (282 ± 15.2 m/Sec)	Mean figure of merit at 25 yds (23 m) Min. 95% with in ¾" dia (19 mm) circle	Distance between two distant shots in a target of 5 rounds at 50 Metres
.22 " RF Long	1000 ± 75 ft. /Sec (305 ± 23 m/Sec)	Min. 95% with in ¾" dia (19 mm) circle	
.22 " RF Tracer	1000 ± 75 ft. /Sec (305 ± 23 m/Sec)	Min. 95% with in 1 ½" dia (38 mm) Circle	
.22 " RF for Precision Shooting	1050 ± 16.4 ft. /Sec (320 ± 5 m/Sec)	-	Min 1" (2.5 cm)

Contact Person

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CARTG. SA .32" REVOLVER

CARTG. SA .32" PISTOL



	Velocity at 30 ft.	Accuracy	Pressure	
.32" Long revolver	775 ± 24 ft./Sec (236 ± 7.6 m/Sec)	at 30 Yds MFM 2.1" (5.33 cm)	at 40 Yds MFM 2.8" (7.11 cm)	4.724 kg/ mm ² or (46.4 MPa) (MEAN MAX.)
.32" short revolver	700 ± 25 ft./Sec (213 ± 7.6 m/Sec)	MFM 2.1" (5.33 cm)	MFM 2.8" (7.11 cm)	
.32" Pistol	950 ± 50 ft./Sec (290 ± 15.2 m/Sec)	MFM 2.1" (5.33 cm)	MFM 2.8" (7.11 cm)	

Contact Person

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CARTG. SA .315"/ 8 MM BALL CARTG. SA .30" - 06



Cartridge	Velocity	Accuracy	Pressure
0.315"/8 mm	2000 ± 50 ft/sec (610 ± 15.2 m/ Sec) at 90 ft. (27.4 m)	3.5" (9 cm) Max at 200 Yards (183 m)	Mean not to exceed 18.0 TSI single not to exceed 19.0 TSI
.30"- 06	850 ± 10 m/ sec at 27.4 m	8 cm Max at 185 m	278 Mpa

Contact Person

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CARTRIDGE SA 12 BORE 70 MM PLASTIC ASTRAM

General

This cartridge can be fired from all types of 12 Bore guns having 70 mm or more chamber length. This is a superior cartridge compared to other types of 12 bore cartridges and is used for shooting sports. Smokeless propellant powder and non-corrosive caps are used in the cartridge. Hardened lead shots give a good impact



on the target. The body is made of special grade plastic tubes to withstand higher pressures and achieve higher velocity compared to paper cartridges. The use of plastic power piston with pouch provides better gas sealing and higher accuracy, i.e. better pattern of shots on target.

Physical Characteristics

Case	Made from bi-axially oriented HDPE plastic tubes
Primer	Mercury fulminate based compo (23 to 29 mg)
Projectile	Lead-Antimony alloy shots (Chilled)
Propellant	Double base shotgun propellant (1.7 to 2.1 g)
Propelling system	LDPE plastic power piston with pouch
Cartg. Length	58 mm
Empty Case Length	70 mm
Weight of Lead shots	32 g
Cartg. Weight	48 g Approx
Shot size	From biggest no. 1 (3.63 mm) to smallest no. 9 (2.02 mm)
No. of Shots	113 in size 1 to 652 in size 9
Type of Closure	Star Crimping

Ballistic Characteristics

Parameter	Measure
Pressure	Max 54.0 Mpa at 1" & Max 29.4 Mpa at 6"
Velocity at 9 mtr from muzzle	350 +/- 15 m/s
Accuracy at distance of 27 m	Min 56% of pellets in a circle of dia. 760 mm on target, Min 90% when fired from choke barrel.

Identification Marks on Cartridge

A) Brass head:

Mark	Meaning
KF	Manufacturing Unit - Ammunition Factory Khadki.
12	12 Bore Cartg

B) Case: Shot No, Shot weight & Brand name are printed on the cartg. case.

Quality

All components like cases, propellant and percussion caps undergo strict quality checks and are proof tested before use in the manufacture of the cartridges. The manufacture of the cartridges in automatic loading machines in controlled atmosphere ensures uniform and highly consistent quality in the cartridges. Finished cartridges are subjected to further inspection and proof testing to ensure quality of performance.

Packing

25 cartridges are packed in multicoloured paper carton. Then 5 such Cartons are packed in polythene bag & heat sealed. Two such bags are packed in one corrugated paper box. Thus each corrugated box contains 250 cartgs.

Dimensions of one corrugated box : 330x240x 130 mm

Gross weight of one packed corrugated box : 13.0Kg approx

Shelf Life

If properly stored in packed condition, expected shelf life is around 5 years. Ammunition should be kept in a cool and dry place, and protected against direct sunlight and rain.

Hazard Classification

Explosive Classification : 1.4S

Fire Fighting Classification : Clause 1

Precaution for Use/ Firing

Weapon should be in good condition. Only authorised & trained personnel should fire the cartridges. Barrel should be cleaned every time after firing. Periodical checks of weapon with gauges are essential to ensure that its CHS, SP and FPI are within the limits.

Contact Person

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CARTRIDGE SA 12 BORE 70 MM PLASTIC MAGNA

General

This cartridge can be fired from all types of 12 Bore guns having 70 mm or more chamber length. This is generally used for scaring away of animals, protection of crops and hunting. Smokeless propellant powder and non-corrosive caps are used in the cartridge. Use of hardened lead shots gives a good impact on the target.



The body is made of special grade plastic tubes to withstand higher pressures and achieve higher velocity compared to paper cartridges.

Physical Characteristics

Case	Made from bi-axially oriented HDPE plastic tubes
Primer	Mercury fulminate based compo (23 to 29 mg)
Projectile	Lead-Antimony alloy shots (Chilled)
Propellant	Double base shotgun propellant (1.7 to 2.1 g)
Propelling system	LDPE plastic power piston without pouch
Cartg. Length	65 mm
Empty Case Length	68 mm
Weight of Lead shots	34 g
Cartg. Weight	50 g Approx
Shot size	From biggest no. BB (4.08 mm) to smallest no. 9 (2.02 mm)
No. of Shots	84 in size BB to 695 in size 9
Type of Closure	Turn over

Ballistic Characteristics

Parameter	Measure
Pressure	Max 54.0 Mpa at 1" & Max 29.4 Mpa at 6"
Velocity at 9 mtr from muzzle	350 +/- 15 m/s
Accuracy at distance of 27 m	Min 56% of pellets in a circle of dia. 760 mm on target

Identification Marks on Cartridge

A) Brass head:

Mark	Meaning
KF	Manufacturing Unit - Ammunition Factory Khadki.
12	12 Bore Cartg

B) Case: Shot No, Shot weight & Brand name are printed on the cartg. case.

Quality

All components like cases, propellant and percussion caps undergo strict quality checks and are proof tested before use in the manufacture of the cartridges. The manufacture of the cartridges in automatic loading machines in controlled atmosphere ensures uniform and highly consistent quality in the cartridges. Finished cartridges are subjected to further inspection and proof testing to ensure quality of performance.

Packing

25 cartridges are packed in multicoloured paper carton. Then 4 such Cartons are packed in polythene bag & heat sealed. Two such bags are packed in one corrugated paper box. Thus each corrugated box contains 200 cartgs.

Dimensions of one corrugated box : 330 x 240 x 130 mm

Gross weight of one packed corrugated box : 10.5 Kg approx

Shelf Life

If properly stored in packed condition, expected shelf life is around 5 years. Ammunition should be kept in a cool and dry place, and protected against direct sunlight and rain.

Hazard Classification

Explosive Classification : 1.4S

Fire Fighting Classification : Clause 1

Precaution for Use/ Firing

Weapon should be in good condition. Only authorised & trained personnel should fire the cartridges. Barrel should be cleaned every time after firing. Periodical checks of weapon with gauges are essential to ensure that its CHS, SP and FPI are within the limits.

Contact Person

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CARTRIDGE SA 12 BORE 65 MM PLASTIC DELUXE

General

This cartridge can be fired from all types of 12 Bore guns having 65 mm or more chamber length. This is generally used for scaring away of animals, protection of crops and hunting. Smokeless propellant powder and non-corrosive caps are used in the cartridge. Use of hardened lead shots gives a good impact on the target. The body is made of special grade plastic tubes to withstand higher pressures and achieve higher velocity compared to paper cartridges. This cartridge is similar to the plastic 'special' cartridge but has a bigger brass head on the body.



Physical Characteristics

Case	Made from bi-axially oriented HDPE plastic tubes
Primer	Mercury fulminate based compo (23 to 29 mg)
Projectile	Lead-Antimony alloy shots (Hardness 13 VPN, Type - Chilled)
Propellant	Double base shotgun propellant (1.7 to 2.1 g)
Propelling system	LDPE plastic power piston without pouch
Cartg. Length	60 mm
Empty Case Length	65 mm
Weight of Lead shots	30.1 g
Cartg. Weight	45 g Approx
Shot size	From biggest no. BB (4.08 mm) to smallest no. 9 (2.02 mm)
No. of Shots	74 in size BB to 616 in size 9
Type of Closure	Turn over

Ballistic Characteristics

Parameter	Measure
Pressure	Max 54.0 Mpa at 1" & Max 29.4 Mpa at 6"
Velocity at 9 mtr from muzzle	320 +/- 15 m/s
Accuracy at distance of 27 m	Min 56% of pellets in a circle of dia. 760 mm on target

Identification Marks On Cartridge

A) Brass head:

Mark	Meaning
KF	Manufacturing Unit - Ammunition Factory Khadki.
12	12 Bore Cartg

B) Case: Shot No, Shot weight & Brand name are printed on the cartg. case.

Quality

All components like cases, propellant and percussion caps undergo strict quality checks and are proof tested before use in the manufacture of the cartridges. The manufacture of the cartridges in automatic loading machines in controlled atmosphere ensures uniform and highly consistent quality in the cartridges. Finished cartridges are subjected to further inspection and proof testing to ensure quality of performance.

Packing

25 cartridges are packed in multicoloured paper carton. Then 5 such Cartons are packed in polythene bag & heat sealed. Two such bags are packed in one corrugated paper box. Thus each corrugated box contains 250 cartgs.

Dimensions of one corrugated box : 330 x 240 x 130 mm

Gross weight of one packed corrugated box : 12.5 Kg approx

Shelf Life

If properly stored in packed condition, expected shelf life is around 5 years. Ammunition should be kept in a cool and dry place, and protected against direct sunlight and rain.

Hazard Classification

Explosive Classification : 1.4S

Fire Fighting Classification : Clause 1

Precaution for Use/ Firing

Weapon should be in good condition. Only authorised & trained personnel should fire the cartridges. Barrel should be cleaned every time after firing. Periodical checks of weapon with gauges are essential to ensure that its CHS, SP and FPI are within the limits.

Contact Person

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CARTRIDGE SA 9 MM BALL

Role

These cartridges are of rimless type and are used with 9 mm pistol or 9 mm Machine Carbine Sten. This cartridge consists of cartridge case, percussion cap, propellant charge and a bullet. This case is of solid drawn brass. At the base of case, a cap chamber with an anvil and two fire holes are formed. A groove is provided on the case for easy extraction of the fired case. The cap is filled with VH2/E1 composition. The cap is secured in the cap chamber and annulus of cap is lacquered to seal the cap and the cap chamber. The bullet is round nosed and consists of Lead-antimony core in an envelope of gilding metal. The cartridge case is tightly coned on to it.



Physical Characteristics

i) Total length of Ammunition	H-29.69 mm L-28.91 mm
ii) Total mass of Ammunition	11.94g ± 0.65 g
iii) Maximum diameter	9.96 mm
iv) Explosive filling in case	0.450 g (approx) propellant SPA-2 or propellant NC-688
v) Cap Composition	23mg VH2 compo E1 compo

Performance Characteristics

i) Mean velocity at 18 m. from muzzle	397 ± 15m/s
ii) Accuracy	75.2 mm Mean Figure of Merit at 45 m
iii) Pressure	Mean 201 Mpa Individual 215 Mpa No single round should exceed 216 Mpa.

Special Features

This Ammunition can be used with Pistol and Machine carbine. Its main role is defence rather than attack.

Quality

Various strict quality checks are adopted during manufacture. All the components are proved/inspected separately in the empty stage before they are taken for filling/assembly. Functional proof is carried out in association with Services Quality Assurance Organization.

Safety

The cartridges are absolutely safe as required for service role since the caps are tested for both sensitivity and insensitivity before assembly.

Reliability

The Ammunition lot is tested as per international norms to give adequate reliability.

Shelf Life

The shelf life of Ammunition is 7 years.

Packing

35 cartgs. are packed in carton 23 A and such 32 cartons are packed in a H2A box (steel)

Overall dimensions Box H2A

Length (approx.)	311 mm
Width (approx.)	156 mm
Height (approx.)	194 mm and such four boxes are packed in steel carrier 6A/L.

Stowage Dimensions

Package Dimensions	667 mm X 327 mm X 205 mm
Gross weight	39 kgs (approx)

Hazard Classification

Compatibility group	S
Hazard Division	1.4
Fire fighting classification	4

Contact Person

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CARTRIDGE SA 7.62 MM BALL M-80

Role

The cartridge SA 7.62 mm Ball M-80 is used in antipersonnel role by infantry and is fired from :

- a) Semi Automatic Rifle
- b) Light machine gun
- c) Medium machine gun



Physical Characteristics

(a) CARTRIDGE

Calibre	7.62x51 mm
Mass	25.40 gm
Length	71.12 mm

(b) CASE

Type	Rimless, Brass 70:30, Bottle Necked, Boxer
Mass	12.3 gm
Length	51 mm

(c) BULLET

Type	Guiding Metal envelope FMJ, Steel insert & lead core
Mass	9.65 gm
Length	29.46 mm

(d) PROPELLANT

Type	Ball Powder
Mass	3.0 gm

(e) PRIMER

Type	Boxer
Mass of Compo	0.042 gm

Performance Characteristics

- (a) Pressure Average 348 Mpa (Max)
- (b) Mean Velocity from 558 mm Barrel at 25 m from muzzle 817 ± 9 m/s.
- (c) Consistency (Mean Figure of Merit at 550 m) 19 cm or less
- (d) Extreme temperature performance -53 to +72 deg C

Shelf Life

The shelf life of ammunition is 18 years.

Packing

Type of Packing	Qty/Box	Qty/Carrier	Weight of carrier Pkd.Ammn
Bandolier Pkd	400 Rds.	1600 Rds.	62 Kgs
CTN Packed	600 Rds.	2400 Rds.	80 Kgs
Belted	235 Rds.	940 Rds.	41 Kgs

This carrier provides protection during transportation and storage.

Stowage Dimension

For CTN & BDR H2A Box size- 311X156X194 mm

For CTN & BDR Carrier (6A/L) size- 667X327X205 mm

For Belted Ammn Box H5A size- 255X182X90 mm

For Belted Ammn Carrier (7A/L) size- 428X300X206 mm

Hazard Classification

Compatibility group	S
Hazard Division	1.4
Fire fighting classification	4

Contact Person

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CARTRIDGE SA 7.62 MM BLANK L.A.

General

The 7.62 mm blank cartridge is used for gunnery training purpose. It is also used for simulated fire, gun salutes, signaling etc.

This cartridge is fired from a Light Machine Gun (LMG) or rifle for training, signaling gun salutes etc.



Physical Characteristics

Length	68.07 mm
Mass of Ammn.	13.63 g.
Diameter	10.16 mm
Propellant	Powder SPA II or NC 688 (0.844 g.)

Cap Composition

F - 1 Mixture	32 mg.
Net explosive content	0.876 g.

Special Features

- 1) The cartridge is very useful for the purpose of gunnery Training.
- 2) Without any injury to the troops under training, it gives live simulation.
- 3) Comparatively it can be produced at less cost than Ball Ammunition.

Quality

Strict Quality measures are adopted during various stages of production. Mouth of filled cartridge case is crimped and sealed with a special type of Ammunition Protective Composition to prevent ingress of moisture. Empty caps are proved/inspected separately before being taken for loading and assembly. After loading, functional proof is carried out. The cartridges are filled and assembled in lots between 50,000 Nos. and 1,00,000 Nos.

Safety

The cartridges are absolutely safe to handle and so designed that they do not function even during rough manual handling.

Reliability

Even though these are meant for training purposes, the reliability is at par with Ball cartridge in functioning.

Shelf Life

Shelf life of filled cartridge is 10 years.

Packing

The packing consists of inner and outer packages. The inner package is carton 8A (50 cartgs. are packed in one carton). 30 cartons 8A are packed in 6 polythene bags. These polythene bags are packed in case wood package 7A (CWP 7A).

The wooden box (i.e.CWP 7A) holds total 1500 cartridges.

Stowage Dimension

Package Dimensions	460 mm X 268 mm X 319 mm
Gross weight	29.00 kg. (approx)

Hazard Classification

Compatibility group	S
Hazard Division	1.4
Fire fighting classification	4

Contact Person

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CARTRIDGE SA 7.62 MM TRACER M-62

Role

The cartridge SA 7.62 mm Tracer M-62 is used for location of target/trajectory during night, incendiary effect and signaling purposes, and to be fired from :

- a) Semi Automatic Rifle
- b) Light machine gun
- c) Medium machine gun



Physical Characteristics

- (a) CARTRIDGE
 - Calibre 7.62x51 mm
 - Mass 25.08 gm (Max.)
 - Length 71.12 mm
- (b) CASE
 - Type Rimless, Brass 70:30, Bottle Necked, Boxer
 - Mass 12.3 gm
 - Length 51 mm
- (c) BULLET
 - Type Guiding Metal envelope FMJ, Pyro Composition & lead core
 - Mass 9.14 gm (Max.)
 - Length 34.29 mm (Max.)
- (d) PROPELLANT
 - Type Ball Powder
 - Mass 2.8 gm
- (e) PRIMER
 - Type Boxer
 - Mass of Compo 0.047 gm (Max.)

Performance Characteristics

- (a) Pressure Average 348 Mpa (Max)
- (b) Mean Velocity from 558 mm Barrel at 25 m from muzzle 817 + 9 m/s.

- | | |
|---|--|
| (c) Consistency (Mean Figure of Merit at 550 m) | 38 cm or less |
| (d) Tracing Characteristics | Up to 13.7 m-dimzone 91.4 m-777.2 m bright crimson red trace |
| (e) Extreme temperature performance | -52 to +72 deg C |

Shelf Life

The shelf life of ammunition is 10 years.

Packing

Type of Packing	Qty/Box	Qty/Carrier	Weight of carrier Pkd. Ammn
CTN Packed	600 Rds.	2400 Rds.	80 Kgs
Seq Belt (Four Ball + One Tracer)	235 Rds.	940 Rds.	41 Kgs

This carrier provides protection during transportation and storage.

Stowage Dimension

For CTN & BDR H2A Box size- 311X156X194 mm

For CTN & BDR Carrier (6A/L) size- 667X327X205 mm

For Belted Ammn Box H5A size- 255X182X90 mm

For Belted Ammn Carrier (7A/L) size- 428X300X206 mm

Hazard Classification

Compatibility group	S
Hazard Division	1.4
Fire fighting classification	4

Contact Person

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7.62 MM A-7 MK-II BALL AMMN



Cartridge 7.62 mm A-7 MK-II Ball Ammn is used in antipersonnel role by infantry and is fired from Semi-automatic AK 47 Rifle

Physical Characteristics

- | | |
|----------------|--|
| (a) CARTRIDGE | |
| Calibre | 7.62mm |
| Mass | 18.75 g average |
| Length | 56mm max |
| (b) CASE | |
| Type | Rimless, Brass 70:30, Bottle Necked, Boxer |
| Mass | 8.00 g approx |
| Length | 38.7 mm max |
| (c) BULLET | |
| Type | Gilding Metal envelope FMJ, Steel insert & lead core |
| Mass | 7.85 g average |
| Length | 27.0 mm max |
| (d) PROPELLANT | |
| Type | Ball Powder |
| Mass | 1.420 g (as assessed) |
| (e) PRIMER | |
| Type | Boxer |
| Mass of Compo | 47 mg max |

Performance Characteristics

- | | |
|--|------------------|
| (a) Pressure Average | 335 Mpa (Max) |
| (b) Mean Velocity from 558 mm Barrel at 25 m from muzzle | 610 m/s |
| (c) Consistency (Mean Figure of Merit at 300 m) | 30 cm or less |
| (d) Extreme temperature performance | -40 to +52 deg C |

Shelf Life

The shelf life of Ammunition is 18 years

Packing

20 Cartgs are packed in one Carton and 36 such cartons in one H2A Box, hermetically sealed. One carrier size (6 A/L) contains 4 H2A boxes. Box H2A size - 311 x 156 x 194 mm and Carrier 6 A/L size - 667 x 327 x 205 mm

Hazard Classification

Compatibility group	S
Hazard Division	1.4
Fire fighting classification	4

Contact Person

Marketing & Export Division

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INSAS 5.56 MM BALL AMMN



Cartridge (INSAS) 5.56mm Ball Ammn is used in antipersonnel role by infantry and is fired from;

- a) Semi-automatic INSAS Rifle
- b) INSAS LMG

Physical Characteristics

- (a) CARTRIDGE
 - Calibre 5.56 x 45 mm
 - Mass 12.85 gm
 - Length 60.00 mm
- (b) CASE
 - Type Rimless, Brass 70:30, Bottle Necked, Boxer
 - Mass 6.7 gm
 - Length 45.0 mm
- (c) BULLET
 - Type Guiding Metal envelope FMJ, Steel insert & lead core
 - Mass 4.16 gm
 - Length 24.5 mm
- (d) PROPELLANT
 - Type Ball Powder
 - Mass 1.64 gm
- (e) PRIMER
 - Type Boxer
 - Mass of Compo 0.025 gm

Performance Characteristics

- (a) Pressure Average 335 Mpa (Max)
- (b) Mean Velocity from 558 mm Barrel at 25 m from muzzle 890 m/s.

- (c) Consistency (Mean Figure of Merit at 457 m) 16.5 cm or less
(d) Extreme temperature performance -53 to +52 deg C

Shelf Life

The shelf life of Ammunition is 18 years.

Packing

20 Cartgs. are packed in one Carton and 40 such cartons in one H2A Box, hermetically sealed. One carrier size (6 A/L) contains 4 H2A boxes. Box H2A size - 311 x 156 x 194 mm
Carrier 6 A/L size - 667 x 327 x 205 mm

Hazard Classification

Compatibility group	S
Hazard Division	1.4
Fire fighting classification	4

Contact Person

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- (e) Tracing Characteristics Up to 13m-dimzone 125m-700m
bright crimson red trace
- (d) Extreme temperature performance -52 to +52 deg C

Shelf Life

The shelf life of Ammunition is 18 years.

Packing

20 Cartgs. are packed in one Carton and 40 such cartons in one H2A Box, hermetically sealed. One carrier size (6 A/L) contains 4 H2A boxes.

Box H2A size - 311 x 156 x 194 mm

Carrier 6 A/L size - 667 x 327 x 205 mm

Hazard Classification

Compatibility group	S
Hazard Division	1.4
Fire fighting classification	4

Contact Person

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5.56 MM BALL MK N AMMN (SS 109)

The Cartridge 5.56 mm Ball Mk N is equivalent to 5.56 mm NATO (SS 109) ammunition and are suitable for 5.56 mm standard weapon for firing, which can use 5.56 mm NATO Ammunition or INSAS Ammunition.



Physical Characteristics

(a) CARTRIDGE	
Calibre	5.56x45 mm
Length	57.4±0.6 mm
(b) CASE	
Type	Rimless, Brass 70:30, Bottle Necked, Boxer
Length	45.0 mm
(c) BULLET	
Type	Guiding Metal envelope FMJ, Steel Insert and Lead core
Mass	4.0 gm
(d) PROPELLANT	Ball Powder Double Base (NG & NC)
(e) PRIMER	Lead Styphnate base, Boxer type

Performance Characteristics

(a) Pressure (Radial)	342 Mpa (Avg) 356 Mpa (Max)
(b) Velocity at 25 m from standard test barrel	910 ± 10 m/s.
(c) Consistency Mean Figure of Merit at 457 m from standard test barrel	16.5 cm or less
(d) Penetration at 700 mtrs	90% of rounds shall penetrate 3.45 mm NATO standard MS Plate to hardness 95-123 VPN
(e) Action time (Hang Fire)	0.003 second max
(f) Extreme Temperature range	-54 to +52 deg C

Quality

Various strict quality checks are adopted during manufacture. All the components are proved and inspected separately in empty stages before they are taken for Filling/Assembly.

Shelf Life

The shelf life of Ammunition is 15 years.

Packing

20 Cartgs . are packed in a paper Carton and 40 such cartons in one H2A Box, hermetically sealed. Box H2A Size- 311 X 156 X 194 mm

Hazard Classification

Compatibility group	S
Hazard Division	1.4
Fire fighting classification	4

Contact Person

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CARTRIDGE 14.5 MM TRAINING AMMUNITION

This ammunition is used as training device for Artillery personnel both individual training of gun crews, observers and fire controllers and combined training of Artillery personnel within a unit.



Specification

Mass of complete round	67 g	
Length	65 mm (Approx.)	
Mass of projectile	59 + 1 g	
Mass of propellant	Velocity	Range
Charge I - .2 g	115 m/s	894 m
Charge II - .3 g	125 m/s	994 m
Charge III - .33 g	135 m/s	1146 m

Chamber Pressure

The average chamber pressure must not exceed 1300 bar at 294 K \pm 2 K.

Function

With time Fuze

The delay time i.e. the time between firing and the detonative deflagration of the smoke charge must not deviate more than 15% from the delay time specified.

Packing

10 rounds are to be packed into a cardboard box. 20 such cardboard boxes (200 rounds) are to be packed in a case for transportation.

Complete round consists of Cartridge Case, Primer No. VI, propellant charge and projectile.

Contact Person

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CARTG SIGNAL 16MM RED/GREEN/WHITE



Technical Specification

Estimated Mass	Red : 12.88 grams Green : 13.43 grams White : 12.00 grams
Net expl content	Red : 6.526 grams Green : 6.026 grams White : 4.026 grams
Length of cartg	39.0-0.2 mm
Diameter	16.6-0.1 mm
Height of burst	60 m
Duration of burning	3.5 sec (min)
Weapon	13 mm 1A hand projector
Shelf Life	5 years

Role

Cartridge 16 mm belongs to the family of signalling ammunition. These are used extensively in battle field for communication, locating position and distress signalling, coded communication.

Function

Cartridge 16 mm is very handy signal. Ammunition fired from a 13 mm hand projector where the ammunition is screwed and fired by triggering. It is used by land, navy and airforce personal for all purpose of signalling.

Advantages

Packed in a pouch containing 6 cartridges, 2 of each colour alongwith projector. Very handy to carry and operate. Easy night identification.

Quality

Quality Assurance System on the product is based in accordance with ISO Standard ISO-9001 IS-2500/BS-6000 Related JSS/BIS/IND (ME) store specn./drawings.

Safety

The ammunition is safe in all respects during handling storage and transportation.

Reliability

Ammunition is produced to a tight AQL. The ammunition has achieved a high degree of reliability.

Packing

Packing consists of inner and outer packages. 6 cartgs. are packed in polythene bag and hermetically sealed. Four polythene bags are packed in a carton. 8 such cartons are thus packed in a steel box hermetically sealed. 4 such steel boxes thus packed in a carrier. Weight - 27.5 Kgs.

Stowage Dimension

667 mm x 327 mm x 205 mm. Holding 768 cartgs.

Hazard Classification

Compatibility	G
Hazard division	1.2
Fire fighting	2

Contact Person

Marketing & Export Division

Ordnance Factory Board

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CARTRIDGE SIGNAL 1" RED/GREEN/ILLG.



Technical Specification

Estimated Mass	Red : 45.5grams Green : 45.5 grams illg : 54.5 grams
Net expl content	Red : 16.142 grams Green : 16.848 grams illg : 20.736 grams
Length of cartg	Red - Green-68.58mm,illg-97.79mm
Diameter	26.29(H)mm, 25.9 (L)mm
Height of burst	36.5 m
Duration of burning	6.5 sec (min)
Weapon	Signal Pistol 1"
Shelf Life	10 years

Role

Cartridge 1" belongs to the family of signalling ammunition. These are used extensively in battle field for communication, locating position and distress signalling. These are also used for colourful display.

Function

Cartridge 1" in fired from a pistol.

Advantages

Ammunition can be fired directly by hand pistol. Can be used in land air and sea. Ammunition is fit for air drop and sea worthy transportation. Easy to handle and convenient to carry by an individual. Easy for night identification.

Quality

Quality Assurance System on the product is based in accordance with ISO standard ISO-9001 IS-2500/BS-6000 Related JSS/BIS/IND(ME)specn./Store drawings.

Safety

The ammunition is safe in all respect during handling operation and transportation.

Reliability

The ammunition has achieved a high degree of reliability & consistency.

Packing

Packing consists inner and outer standard packages. In the inner polythene bags 4 cartridges are packed. 12 such polythene bags are packed in 1 steel box hermetically sealed. 4 such steel boxes are packed in a steel outer carrier 6A containing 192 cartridges. The packing is fit for air drop and sea worthy transportation. Each Package contains illg 192 or R/G 288 cartridges packed in carierr 6A.

Stowage Dimension

667 mm x 327 mm x 205 mm. Holding 192 cartridges weighing 24 kgs.

Hazard Classification

Compatibility	G
Hazard division	1.2
Fire fighting	2

Contact Person

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CARTRIDGE SA 12.7 MM API AND APIT



General

This small arms ammunition is fired from the 12.7mm Anti aircraft machine gun (HCB 12.7mm) which is mounted on commanders cupola T-72 tanks. The design of this ammunition is similar to a small complete round. It includes cartridge case, percussion cap, propellant charge and bullet with spotting and tracer composition.

The cartridge case of the brass is rimless type, formed cap chamber at the base provided with two flash holes and an anvil. The mouth of the case is coned on to the body of the bullet. Percussion cap is Berden type consisting of a brass cap in which is loaded, a cap composition (i.e.FA 956) in form of pellet which is Lead Styphnate based. The propellant charge is made up of Nitrocellulose having multi tubular.

The bullet is of the composite type and streamlined. It consists of two parts which are contained in outer envelope of gliding metal. The first part consists of steel core which is enclosed in outer lead sleeve. In case of API and incendiary composition is placed inside the GM envelope before insertion of steel core and lead sleeve assembly. The end position of the envelope is then turned over. In case of APIT bullet there is an addition tracer capsule at the boat tail end of the bullet. The ammunition is manufactured as per No7E 21.000Ty.

Physical Characteristics

PARAMETER	API	APIT
Total length of ammunition	147 mm (Maximum)	147 mm (Maximum)
Total mass of ammunition	137.00g (Maximum)	132.00g (Maximum)
Mass of bullet	49.00 g (Maximum)	44.8 g (Max)
Mass of case	64.60 g	64.60 g
Mass of cap	0.990 g	0.990 g
Explosive filling in Cap	0.095 g (Max) Dry	0.095 g (Max) Dry

Explosive filling in bullet	1.05 g Incendiary compo	2.785 g Tracer & Incendiary compo
Propellant (ACM)	15.17 g (as reqd)	15.17 g (as reqd)
Net explosive content	16.145 g (Max)	18.93 g

Performance Characteristics

(a) Pressure Average	303.8 Mpa (Max)
(b) Mean Velocity from 558 mm Barrel at 25 m from muzzle	817 m/s
(c) Consistency (Mean Figure of Merit at 100 m)	18 cm or less
(d) Extreme temperature performance	Ambient & 50 deg C

Quality

The raw materials used for components are tested by independent Quality Assurance Department. During manufacturing stage, quality surveillance by both producer and services representative are provided. All the major components i.e case cartridge, bullet filled, cap filled and propellant are test fired and only passed proof components are taken into final assembly of the ammunition. The complete rounds are also proved dynamically for (a) Velocity, (b) Pressure, (c) Armour piercing, (d) Consistency, (e) Tracer functioning.

Safety

The cap being percussion type, gets initiated only if gets a blow. The ammunition is therefore safe during manufacture, transit and storage.

Shelf Life

The shelf life of the Ammunition is 7 years.

Packing

80 rounds are packed in 16 cartons and these 16 cartons are packed in one steel box. 4 such steel boxes are packed in one steer carrier.

Stowage Dimensions

Packing steel box size	311 X 156 X 196 mm
Packing outer carrier size	677 X 327 X 205 mm
Gross weight outer package	62 Kg
Net weight	38.52 Kg
Volume of outer package	0.045 cu meter

Hazard Classification

Compatibility Group	S
Hazard division	1.4
Fire Fighting classification	4

Contact Person

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EQUIPMENT 81 MM MORTAR

A lightweight weapon, which can be easily deployed. The base plate is star shaped with rotating socket in the centre and three sets of ribs and spades which provide all round traverse without movement of the plate and ensures equipment stability in all types of ground conditions. The special steel mount is provided with buffer assembly, cross leveling device and elevating and traversing gears.



Performance

- a) Maximum Muzzle Velocity 295 M/sec.
- b) Rate of Fire:
 - i) With relaying the Mortar for every round 6 to 8 rds/minute
 - ii) Without relaying the Mortar for every round 20 rds/minute (max)

c) Range

Charge	Max. Range	Charge	Max. Range
0	0550 M	5	3725 M
1	1275 M	6	4175 M
2	1980 M	7	4625 M
3	2640 M	8	5000 M
4	3200 M		

6000 M with improved version

- d) Life:
 - i) Max No. of EFC's which may be fired between Examination 2000
 - ii) Condemnation limit Bore Dia 81.91 mm
- e) Maximum Service Pressure 600 Kg/Sq.cm.
Copper (3.80 tsi)

Physical Characteristics

- a) Weights:
 - i) Total Wt. of the Equipment with sight and Accessories including Boxes transit for Barrel and Base Plate 135 Kgs
 - ii) Total Wt. of the Equipment without sight and accessories 40.6 Kgs (89.55lbs)
 - iii) Total Wt. of the Barrel (with Breech Block) 14.5 Kgs (32 lbs)
 - iv) Total Wt. of the Mount 11.7 Kgs (25.8 lbs)

- | | |
|--|--|
| v) Total Wt. of the Base Plate | 14.4 Kgs (31.75 lbs) |
| vi) Total Wt. of the sight heavy Mortar Cased IC | 4.7 Kgs |
| vii) Total Wt. of the sight without the case | 2.5 Kgs |
| b) Length of the Barrel with Breech Block | 1550 mm (61 in) |
| c) Calibre of Barrel | H.81.44 mm/
L 81.40 mm |
| d) Elevation limits | 30 d to 85 d (or 533
mils to 1511 mils) |
| e) Traverse (right or left) | |
| i) By moving the Bipod | 360 degree |
| ii) Without moving the Bipod | 7° 30' to 18° 30' |

Position of Clamping Collar
Angle of Elevation

	45°	60°	75°
Top	7° 30'	9°	16°
Middle	10°	11° 30'	16° 30'
Bottom	12°	14° 15'	18° 30'

b) Height:

- | | |
|---|---|
| i) For loading in unprepared position of Base plate | at 45° Elevation - 47"
at 85° Elevation - 66" |
| ii) For loading in prepared position of Base Plate | at 45° Elevation - 40" |
| g) Striker Protrusion | L 1.5. mm, H 1.8 mm |
| h) Recoil Absorbing arrangement | by Shock absorbers
(i.e. the mechanical
spring type with two
guide Rods / tubes
forms an elastic link
between the Barrel
and the bipod) |
| l) Detachment | 3 men |

Contact Person

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MINE PROTECTED VEHICLE



Technical Data

Length	6.00 M
Width	2.90 M
Height	3.07 M
Ground Clearance	305 mm
Speed	85 KMPH Max
Patrol Speed	50 KMPH
GVW /Pay Load	11 Tons/1400 Kgs
Seats	10 + 2
Range	1000 Km
Fordability	1000 mm
Protection Level	Mine Blast 14 Kgs TNT under wheels 10 Kgs TNT under Hull
Small Arms	7.62 SLR Rifle firing from a distance of 10 meters on all sides of vehicle
LMG/MMG	Rotating Turret provided

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CRN 91 NAVAL GUN



Technical Data

Diameter	2700mm
Height	2100mm
Designation	2A42
Caliber	30mm
Rate of Fire	
Single	200 to 300 rounds per min
Slow	550 rounds per min
Gun feed	Double belt separate
Range of Aimed fire at targets	
When firing armour piercing tracer projectile	2000m
When firing HE incendiary and fragmentation tracer projectile	4000m
Binocular	
Type	BPK 2-42
Day system	
Magnification	6X
Field of view at least	10
Periscope height	221mm
Night system	
Magnification at least	5.5X
Field of view at least	640'
Periscope height	248mm

Contact Person

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EQUIPMENT 120 MM MORTAR

A very effective light artillery weapon which fires HE, smoke and illuminating ammunition. Capable of being carried manually over short distances and transported by animal pack, towed behind a jeep and para-dropped. Provided with a base plate consisting of upper plate having a rotating socket and two housings for the clamping collar pivot axis. The lower part has three sets of ribs and spades which provide stability to the plate.



Performance

(a) Maximum Muzzle Velocity:

- | | |
|-----------------------|---------|
| i) With HE M-44 Bomb | 331 M/S |
| ii) With PEPA LP Bomb | 305 M/S |

(b) Rate of fire:

- | | |
|---|--------------------|
| i) By gravity firing | |
| (a) With relaying the Mortar for every round | 5 to 6 rds/minute |
| (b) Without relaying the Mortar for every round | 8 to 10 rds/minute |
| ii) By lanyard firing | |
| (a) With relaying the Mortar for every round | 3 to 4 rds/minute |
| (b) Without relaying the Mortar for every round | 5 to 6 rds/minute |

(C) Range
PEPA LP

Charge	HE M-44 Assistance	Without Rocket Assistance	With Rocket
0	1360 m	-	-
1	2200 m	-	-
2	3050 m	2530 m	-
3	3850 m	3425 m	6150 m
4	4750 m	4175 m	7180 m
5	5550 m	4800 m	7800 m
6	6150 m	5370 m	8450 m
7	6650 m	5900m *	8950 m

*10000 with improved version

(d) Life	5000 rds (Provisional)
(e) Maximum Service Pressure HE-M 44 Bomb PEPA LP Bomb	820 Kg / Sq.cm 850 kg / Sq.cm
(f) Maximum Towing Speed	50 Km/hr

Physical

(a) Weights:

i) Total Wt. of the Equipment with sight and accessories	421 Kgs
ii) Total Wt. of the Equipment without Sight and accessories	402 Kgs
iii) Total Wt. of the Barrel (With Breech Piece)	68 Kgs
iv) Total Wt. of the Mount	86 Kgs
v) Total Wt. of the Base Plate	80 Kgs
(vi) Total Wt. of the Carriage with Wheels	137 Kgs
vii) Total Wt. of the Carriage Without Wheels	93 Kgs
viii) Total Wt. of the Wheels	44 Kgs
ix) Total Wt. of the Towing Ring	8 Kgs
x) Total Wt. of the Base Plate Clamping collar	6 Kgs
xi) Total Wt. of the Travelling Shield	17 Kgs
xii) Total Wt. of the Army sight (APX-L-811) with Case	3 Kgs
xiii) Total Wt. of the Army sight (APX-L-811) Without Case	1.7 Kgs
xiv) Total Wt. of the IA Heavy Mortar Sight Cased (IMR30GA)	4.7 Kgs
xv) Total Wt. of the IA Heavy Mortar Sight without Case	2.5 Kgs
xvi) Total Wt. of the Accessories	16 Kgs

b) Length:

i) Length of Barrel with Breech Piece	1750 mm
ii) Total Length of Equipment in TOW	2565 mm
c) Calibre of Barrel	120.15 mm
d) Elevation:	
i) Elevation Limits	45 o to 85 o
ii) Elevation per turn of Hand Wheel	18 min. 20 sec.
e) Maximum width of Equipment	1585 mm
f) Ground Clearance in Tow	260 mm
g) Height:	
i) In Tow	1195 mm
ii) For loading in unprepared position of base Plate	
At 45 degree Elevation	1460 mm
At 80 degree Elevation	1945 mm
iii) For loading in prepared position of Base Plate	
At 45 degree Elevation	1145 mm
At 80 degree Elevation	1675 mm
h) Striker Protrusion	1.9 mm Min. Max. 2.5 mm
i) Recoil Absorbing arrangement	Shock Absorber

J) Traverse

1) Distance between top face of Breech and Upper Collar Shock absorber.	Elevation (approx) (approx)	Top traverse (approx)	Traverse per Turn of Hand Wheel (approx)
200 mm	55 d 10'(min) 85 d (max)	22 d 55' 31 d 40'	22' 30'
400 mm	46 d 35'(min) 74 d 10'(max)	18 d 30' 24 d 20'	18' 25'
500 mm	42 d 05'(min) 68 d 10'(max)	16 d 45' 22 d 12'	17' 22'
2) With moving bipod		360 degree	

Contact Person

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EQUIPMENT 105/37 IFG E1 AND 105/37 LFG E2



S. No	Characteristics	EQPT105/ 37mm IFG E1	EQPT 105/ 37mm LFG E2
1.	Calibre	105 mm	105 mm
2.	Barrel length	3890.5 mm	3890.5 mm
3.	Mass of Barrel	587.7 kgs	396 kgs
4.	Mass of Ordnance	840 kgs	716 kgs
5.	Mass of Eqpt	3400 kgs	2380 kgs
6.	Range	17425 Metres	17200 Metres
7.	Elevation	-3 deg. To +73 deg	-5 deg. To +73 deg
8.	Traverse	30 deg. Left 30 deg. Right	I) 5 deg. Left 5 deg. Right II) 360 deg. Traverse on Firing platform
9.	Rate of Fire		
	i) Normal	3 Rds/min	4 Rds/min
	ii) Intense	5 Rds/min (upto 10 mins)	6 Rds/min (upto 10 mins)
10.	Sustained Fair		
	i) Upto Charge 5	1Rd/min (For 2 hrs.)	1Rd/min (For 2 hrs.)
	ii) For Charge Super	1Rd/2 min (For 2 hrs.)	1Rd/2 min (For 2 hrs.)
11.	Time into and out of action	1 min	2 to 3 min
12.	Detachment	7	7
13.	Recoil system	Hydraulic Rotating Valve	Rotating Valve type

	Buffer	type Controlled Hydroposumatic	Hydroposumatic Telescopic
14.	Muzzle brake type	Double baffle	Double baffle
15.	Overall length	7240 mm	7216 mm 5054 mm (Folded Back Position)
16.	Maximum Width	1980 mm	1820 mm
17.	Chamber Capacity	5.178 litres	5.178 Litres
18.	Loading Angle	All angles	All angles

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Organisation Profile

Precision Electronics Limited (PEL) established in 1979, is a Defence Licensee company that provides of Communication & Electronics Products, Solutions for Mission Critical and Critical Infrastructure protection and provides on ground service to the User on behalf of the Foreign Equipment supplier. PEL has formed partnerships with global majors viz Raytheon of USA, IAI/Elta & Elbit of Israel, Ultra Electronics of Canada etc. Our footprint covers all the three services and the Defence Design Development Agency (DRDO).

Our two plants situated in Noida (UP) and in Roorkee (Uttarakhand) are state of art facilities that are approved by the Defence inspection agency (DGQA) are ISO 9001:2015 and AS 9100D accredited.

Precision is Technocrat driven with strong in-house design and engineering capability. It has designed secured MILCOM systems that are deployed by the Indian Army, voice and data recorders that meet the mission critical requirement of the Air force and have undertaken turnkey assignments for securing the Naval bases.

2MB PCM MULTIPLEXER (Model: PFM-3440M)



- PFM3440M is Flexible (Versatile) Transmission equipment, which aggregates various legacy voice and data interfaces onto a trunk channel which could be TDM or IP.
- It is a ruggedized as per JSS-55555 Table L2B for land use and is "Equipment in Service" of the Indian Army
- System works on TDM backplane driving E1 signals with Time Slot Interchange (TSI) capability at 2Mbps and Nx64 Kbps time slots.
- Network Management with cross-connect feature makes it versatile system to integrate with Network and user Interface circuits.

Characteristics of Equipment

- Expandability: up to 8 Mbps
- Access Flexibility: host of various type of voice and data interfaces
- Media Flexibility: supports connectivity to Cu, Optical etc.
- Usability: in Tactical and Peace-time usage
- Future proofing: for supporting Networked force structures
- High Reliability: through redundancies (Power & Control), MIL-spec construction and Hot-swappable Cards
- Built-in Time Slot Interchange (TSI) for Add-Drop functionality between tributary & E1
- Legacy interoperability
- Configuration data storage in non-volatile memory
- PEL View (GUI Based) management software using SNMP protocol

- Ethernet/ Console ports (for in-band/out-band) Configuration & Management
- Local Craft Terminal (LCT) for Monitoring & Configuration
- Indigenous capability to provide upgrades and lifecycle support
- Versatile User Interfaces :
 - Voice: 2W FXO / 2W FXS / 2W Magneto / 2W-4WE&M / 2W hotline
 - Data: G.SHDSL 64 to 2048 Kbps, 64Kbps Co-Directional, V.35, RS-232/V.24 / Bridge / Router Interfaces

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Organisation Profile

Punj Lloyd Raksha Systems Pvt Ltd (PLR) a joint venture company between Punj Lloyd and Israel Weapon Industries (IWI) is India's first private Small Arms manufacturer. Entire range of World Class Weapons such as TAVOR series Assault Rifles, three caliber X95 Assault Rifle and SMG, NEGEV Light Machine Gun, the well known GALIL series of Assault/Sniper Rifles and UZI PRO are to be manufactured in India.

PLR is proud to have rolled out first lot of Indigenous 5.56x45 mm X-95 Assault Rifles from its manufacturing plant. A State-of-the-Art laboratory has also been established by PLR to cater for Maintenance, Repair and Overhaul (MRO) of Optoelectronic equipment.

Punj Lloyd has created an ecosystem for upgrading and manufacturing Artillery Guns. World class upgun solution to upgrade 130 mm Russian Guns into 155 mm / 45 calibre guns by the company achieve ranges up to 40 km. The company's upgrade solution for the existing ZU 23 mm 2B Air Defence Guns by replacing the manual laying system with EOFCS gives it capability to engage aerial targets during day and night in the plain, desert and mountainous terrain.

Punj Lloyd has its presence felt in the Scanning and Imaging systems as well. The company has been awarded an order to supply five Full Body Truck Scanners from MHA and also has a solution for through the wall detection / imaging Systems.

SMALL ARMS

Punj Lloyd Raksha (PLR) Systems Pvt Ltd is the first Indian private company to receive the license to manufacture Small Arms & Ammunition in India.

Punj Lloyd Raksha brings to India world-class production, design and development of unrivalled weapons. World renowned weapons like the innovative TAVOR Assault Rifle, three caliber X95 Assault Rifle and SMG, the reliable NEGEV Light Machine Gun, the well-known GALIL ACE Assault Rifle, the GALIL Sniper Rifle, the brand new DAN Bolt Action Sniper Rifle and the legendary UZI SMG and its latest evolution UZI PRO will be produced for domestic and international markets at Punj Lloyd Raksha Systems Manufacturing Plant. All these weapons are in compliance with the most stringent military standards (MIL STD) and ISO 9000 standards.

These weapons are already in service with all Indian elite forces like Indian Army Special Forces, Garud (IAF), MARCOS (Indian Navy), COBRA Force (CRPF), BSF to name a few.



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X95 5.56 X 45MM | 5.45 X 39MM | 9X19MM ASSAULT RIFLE | CARBINE | SMG

X95 is an innovative firearm and is manufactured out of high strength steel impact modified polymer, providing a strong but light weapon. It incorporates advanced technology that allows conversion among three different calibre within minutes and it saves training time, spare parts and reduces overall cost.



Advantages

- Bull pup configuration
- Rear center of gravity
- Fully ambidextrous
- The only three calibre weapon in the world 5.56x45mm | 5.45x39mm | 9x19mm
- 360° picatinny rail
- Low recoil, enhanced stability when firing
- Enhanced ergonomics: can be shot single handed or with both hands
- Six points for support: stable while shooting in prone position, sitting, kneeling and standing, firing under arms and from hip
- Modularity: a versatile weapon system that can be modified for a variety of operation and scenario
- Short weapon with long barrel

Features

- Simple field stripping into only two parts, no need for special tools
- Last round catch
- Easy and fast to mount 40mm grenade launcher, no need for special tools
- 100% interchangeability
- Flip up back up sight
- Closed bolt gas on piston head, rotating bolt firing operation

Contact Person

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GALIL SNIPER 7.62 X 51 MM



GALIL SNIPER distinguishes itself as the ultimate weapon having proficiency to fire accurately at long distances of 1000m targeting small, mobile or concealed objectives. The semi automatic attribute enables multi-target acquisition. The GALIL Sniper has proven to be a decisive factor in dense and extreme arenas.

Advantages

- 7.62x51 mm calibre
- 10125 round magazine capacity
- X10 MIL-STD day telescope
- Backup sight including tritium for night combat
- Two stage trigger
- Muzzle brake / jump compensator
- Reliable scope mount : no deviation after dismounting and remounting

Features

- Foldable and adjustable bipod
- Adjustable hand grip
- Adjustable butt monopod
- Ergonomic pistol grip
- Foldable butt stock with adjustable cheek rest
- Combat carrying bag including sniper's mattress

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TAVOR 5.56X45MM / 7.62X51MM - ASSAULT RIFLE

TAVOR Assault Rifles have been rigorously tested on all terrain and performed flawlessly, demonstrating traits of superior precision, accuracy, reliability and enhanced human ergonomics.



Advantages

- Bull pup configuration
- Optimized ergonomic design
- Rear centre of gravity
- Fully ambidextrous
- Long picatinny rail version
- 30 round NATO magazine capacity
- Day to night optic conversion without re-zeroing
- Foldable back up sights which include tritium for night combat
- Manufactured out of high strength impact modified polymer, providing a strong but light frame
- Six points for support: stable while shooting in prone position, sitting, kneeling and standing, firing under arms and from hip
- Minimum operator and armourer level maintenance, cost effective

Features

- Simple field stripping into only two parts, no need for special tools
- Last round catch
- Corrosion resistant metal parts
- 100% interchangeability
- Flip up back up sight
- Integrated reflex sight (optional)
- Also available in Semi Automatic version

Contact Person

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NEGEV 5.56 X 45MM I 7.62 X 51MM LIGHT MACHINE GUN

NEGEV is a robust and reliable assault LMG with powerful target acquisition and accurate performance in the modern battlefield. Its semi-automatic feature empowers its user in Close Quarter Battle (CQB) operations safely.



Advantages

- Two operation modes:
- Semi automatic mode for accurate and fast controlled fire for CQB
- Automatic mode for maximum firepower
- Safety mechanisms which minimize uncontrolled fire
- Can be fired from a variety of mounts, special helicopter airborne mounts, vehicle or naval mount
- Enables firing with folded butt stock
- Tritium night sights
- Picatinny rails for optical devices and diverse accessories

Features

- Gas regulator for additional power in adverse conditions
- Fed from an assault drum, belt chain or magazine
- Robust and durable bipod
- Quickly dismantle in the field for maintenance
- Low silhouette
- Backup iron sights
- Adjustable butt stock and cheek rest
- Safety mechanisms

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ACE



The ACE line of Assault Rifle is based on the reliable, proven mechanism of the famous GALIL Assault Rifle, which was the main assault rifle of the IDF.

The weapon was designed to incorporate enhanced human engineering and ergonomics, making it the outstanding assault rifle for the emerging unstable realities of modern combat. These attributes empower the ACE Assault Rifle to obtain high accuracy and reliability under the most extreme conditions.

Advantages

- Short, lightweight Assault Rifle available in different lengths
- It has 5.56x45mm NATO standard 17.62x39mm / 7.62x 51 mm
- 360° picatinny rail
- Proven reliability under adverse and extreme conditions
- Easy-to-use by right or left-handed shooters
- Modern streamlined ergonomic design

Features

- Tritium night sight
- Telescopic butt stock
- Muzzle break / jump compensator [7.62 x 51 mm calibre only]
- Simple maintenance: no tools required when stripping the weapon
- Last round catch [5.56 x 45 mm caliber only]
- Available in Semi-Automatic

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OPTRONICS



Punj Lloyd Raksha is in collaboration with Meprolight that has the entire range of Opto Electronic systems to offer. Day sights, Image Intensifier, Uncooled Thermal Imaging devices act as a force multiplier in increasing the efficacy of any Small Arm.

PLR has also established facilities/laboratory to carry out **Maintenance, Repair and Overhaul (MRO) of Small Arms and Sights cum Associated Accessories** manufactured by IWI and Meprolight. The company is fully geared up to take on MRO at the plant location or insitu to meet the urgent requirement of our customers. Infrastructure in terms of work space, technical manpower, spares back up and Special Maintenance Tools (SMTs) have been put in place.



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THROUGH-THE-WALL DETECTOR / IMAGING SYSTEMS



Through-the-wall Detector / Imaging Systems are compact radar-based devices, optimized for quick tactical decision making in urban operations. They provide real-time mission-critical information on live and static objects hidden behind walls and barriers, including presence of life in the room and room general layout. Military and law enforcement teams conducting urban operations require reliable information for determining the necessary tactical approach for successful mission execution. These scanners are excellent force multipliers to the law enforcing agencies during the time of hostage crisis and room intervention operations. They are also useful during natural or manmade disasters like earthquake or fire to detect life beyond the visual.

Xaver™ 100
Handheld, Through-Wall Life Detector



Xaver™ 100 User Interface

Xaver™ 400
Compact, Tactical Through-Wall Imaging System



Xaver™ 400 User Interface

Xaver™ 800
High Performance ISIR Portable Through-Wall Imaging System



Xaver™ 800 User Interface

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RISE LEGS

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- Head** : Arun Joshua Cherian
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- Email** : arun@riselegs.com

Organisation Profile

Rise Legs is a design firm that creatively uses technology and local resources, in a holistic manner to develop and deliver high quality yet affordable mobility solutions like prosthetic legs and orthotics. Rise Legs develops high quality, cost effective, scalable solutions to provide assistive-mobility devices to the masses in developing countries. Currently, the devices and technology spans flexible-cane prosthetic legs, low resource specific digital body scanning for prosthetics and orthotics and performance wheelchairs for daily-use and sports.

Our work has featured on BBC click, History Channel, among many other media outlets. We partner with world class organizations like, MIT D-lab, Boston, International Committee of the Red Cross, Mercedes Benz Research and Development, among others to create world class solutions that is affordable.

PROSTHETIC LEGS



Rise Legs is a flexible and cost effective prosthetic leg made from cane, a special grade of wood that is protected against water. These prosthetic legs are designed for high impact activities and for rough use environments. Our devices have been trailed and tested by farmers, sports people, and children.

Characteristics of Equipment

- Light weight
- Flexible
- Cost effective
- Digitally printed skin & art texture
- Water resistant

Contact Person

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Founder & CEO

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DIGITAL FABRICATION OF PROSTHETICS AND ORTHOTICS



This process allows low skill personnel to be trained to digital scan, modify and centrally fabricate prosthetics and orthotics with local resources. We can reduce measurement to fabrication time from 3 days just to about an hr. The whole prosthesis/orthosis scanning can be done remotely, negating the need for on-site workshop. Furthermore this setup can be fitted in an shipping container or even fitted on truck as mobile workshop.

Characteristics of Equipment

- Patent Pending Digital Fabrication process
- Reduces 8hr Fabrication to 1 hr
- Highly quantitative, Reduces dependency on skilled personnel
- Remote scanning with low resources at the front line

Contact Person

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SIMULATOR DEVELOPMENT DIVISION

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Organisation Profile

Simulator Development Division based at Secunderabad focuses in the thrust areas of Simulators and Innovations for the Indian Army. It is working in the field of simulation for more than three decades and has developed simulators for varied applications such as driving simulators, firing simulators, medical simulators etc.

SM CARAPACE ARMOR (AN EOU OF SMPP PRIVATE LIMITED)

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Organisation Profile

We take this opportunity to introduce the 'SM Group of Industries'; India's pioneer in development of very crucial technologies for vital Defence products and in finding highly innovative solutions in some of the most challenging areas. Founded in 1985, SM Group is today one of the leading Industrial Groups in India having extensive manufacturing facilities spread over an area of 29 acres on National Highway-2 (in NCR, Delhi) and other parts of India. With more than 30 years of technology-driven innovation and sustained growth, SM Group has presence in diverse areas like:

- Personnel Protection
- Vehicle/Aircraft/Ship Armour
- Tank Munitions: 120mm and 125mm
- Artillery Munitions: 155mm Bofors Gun, 130mm and 105mm artillery guns

PERSONAL PROTECTION/BODY ARMOUR SOLUTIONS



Apart from Military, Para-Military & police forces in India, we already export Light Weight Body Armor, Ballistic Helmets, Armor Plates and Ballistic Shields to many countries like France, Netherland, Egypt, Turkey, Philippines, Saudi Arabia etc.

- **Body Armour**- Ballistic protection of NIJ Level IIIA to IV
- **Armor Plates** - Stand alone or ICW with protection of NIJ Level III, III SP and IV, all shapes and sizes
- **Ballistic Helmets** - For protection of NIJ Level IIIA, III, III+ & fragments, all designs (PASGT, ACH, MICH, TCH)
- **Ballistic Shields** - Protection of NIJ Level IIIA to IV

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AIRCRAFT/HELICOPTER/VEHICLE/BOAT ARMOR



Light weight armor solutions for SUVs/Passenger Cars, Aircraft/ Helicopter and Ships. We are currently supplying ready to fit cut kits of advanced ceramic-B4C plates (CaraSTOP) & composite/PE Plates (CaraPRO) for armoring of **Airbus A400M aircraft** and already supplied hundreds of cut kits for armoring of:

- A-109 Augusta, Chinook Helicopters
- Naval Fast Petrol Boats (FPBs)
- Military Vehicles, Tanks
- Special Purpose Vehicles-Missile Carriers, ATVs

Armour solutions offered are for protection of STANAG Level -1 to 5 and Blast Protections.

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**ADVANCED CERAMIC B4C
(CARASTOP) PLATES FOR ARMOUR**



SM Group is one of the very few OEMs in the world and only one in India who also manufacture raw materials used in Armour. The CaraSTOP-B4C ceramic which was developed by SM GROUP using in-house R&D is one of the lightest ceramic being exported to Armour manufacturers in Germany, Australia, South Korea, France, Israel, Poland etc. Its salient features are :

- Lightest Weight Ceramic for armor applications
- Multi-hit capability on monolithic plate
- Custom shape size and thickness as per application
- Being used successfully across the world

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TANK AND ARTILLERY MUNITIONS



We are among the first to develop and manufacture Combustible Cartridge Cases in India and we have played a key role in meeting the specific ammunition needs of the Indian Army for their main battle Tanks - Arjuna and T-72, T-90 series of Russian guns. We have certified manufacturing facilities for these tank and Artillery munitions and we have already supplied more than 2,00,000 combustible cartridge cases to Indian Army:

- Tankammunition : 120MM and 125MM (FSAPDS and HESH)
- Artilleryammunition : 105MM and 155MM (LZ & HZ), 130MM (FVC and RVC)
- Mortar Bomb ammunition : Augmented Cartridges and Transparent Celluloid Sheets

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Organisation Profile

Star Wire India Ltd. engaged in manufacturing Special Steel, conforming to International specifications for power, defence, shipbuilding sectors and other industries. SWIL strength lies in metallurgy due to melting facilities like EAF, Ladle Refining Furnace with Vacuum Degassing thereby producing very clean steel which is further refined in ESR furnace which helps in achieving better quality final products. We fabricate various Bullet Proof Products from ballistic steel manufactured in house. SWIL has been manufacturing bullet proof jackets in-house by adopting advanced technology to ensure complete protection to the users including short Burst fire of AK 47. Our BP Jackets are designed to provide more protection than as given in NIJ standards against all small arms NATO weapons. BP Jackets provide Level II, IIIA and III and III+ protection. We are also supplying Track Assy for BMP TANK, T-90 Tank, T-72 Tank and Support Roller, Steel sheet for Bofors Gun 155 mm and Steel for Light Field Gun.

B.P. RETRIEVABLE PERMANENT FIGHTING / LIVING BUNKER



BP Bunker has been designed to enable the forces involved in counter insurgency operations or conventional warfare to obtain a fighting bunker that provides complete protection against fire assault of infantry small arms. The design enables quick erection and dismantling by an untrained team of soldiers while the construction material is transportable by any mode of conveyance including man-pack to animal transport to helicopters in all type of terrain and weather conditions.

Characteristics of Equipment

- No maintenance required
- Portable Bunker can be employed in all types of terrain and weather conditions.
- Bunker is provided all round protection from small arms fire
- It is economical, simple in design and user friendly
- It can accommodate 4-6 fully equipped soldiers for extended periods of time with provision for resting (sleeping) as well in rotation.
- The bunker on dismantling can be shifted to new location with minimum losses restricted to nut bolts only.

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BULLET PROOF JACKET



SWIL has designed a discreet armour waistcoat to meet the requirements of Defence, Paramilitary and State Forces and the Dignitaries. The Bullet Proof Jackets (BPJ) are designed as modular to meet requirements various forces. It is fabricated with high quality ballistic grade aramid / PE fabric to provide complete protection to the torso from the front, flanks and the back of an individual wearing the jacket.

Characteristics of Equipment

- SWIL BPJ have more than 60% indigenous and 40 % Import material in our product (BPJ) thus meeting the Honorable Prime Minister 'Make in India' initiative, whereas other firms are providing only 30% indigenous and 70% import material.
- A very important feature of the Jacket is that unfair shot area is 25 mm vis a vis standard specifications where shot from edge up to 51mm is considered unfair thus reducing the effective area of protection to that extent. Similarly Inter-shot distance has to be 51 mm else it is considered unfair shot

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BULLET PROOF PATKA



The Bullet Proof Patka is a head protection cap. Our patka provides protection against fragmentation munitions and low velocity bullets and AK-47 in the front part only. The Patka has a ballistic strip manufactured from a die pressed BP Steel with high density. It provides higher protection to the Forehead against fire of AK-47 from 10 meters while weight wise it is at par with Kevlar Helmet.

Characteristics of Equipment

- It slight oval shape for comfortable wear on the head and covers the entire circumference of the head above eyes and ears.
- It does not impede the movement of the wearer in carrying out his functions.
- The materials is breathable.
- It does not have an ill effect on the head of a soldier.
- It provides protection against direct hits/splinters.
- It is provided to absorb shock.
- It has balance strapping system using Velcro fasteners. Specially designed chin strap to avoid excessive sweating and irritation on the chin area due to prolong wearing of B.P Patka.
- Harness of the Patka is washable

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BULLET PROOF SENTRY POST



Bullet Proof Mobile Senty Post developed by Star Wire (India) Limited can be installed on any type of terrain as well as at residence of VVIPs/VIPs, Bank, Embassy, Hotel, Airport, Station, Govt Buildings etc. It has been designed to suit all types of terrain conditions. It can be moved from one place to another and established without loss of much time.

Characteristics of Equipment

- Easy to erect and dismantle
- Can be easily shifted from one location to other
- It has observation/firing slots with provision for BP Sliding shutter from inner side. If user requires more firing/observation slots, the same can provide accordingly.
- The observation slot can have Bullet Proof Steel sliding cover or fix Bullet Proof Glass as per user requirement.
- Colour as per user's choice.
- Available in three distinct designs - each suited for different operational requirement

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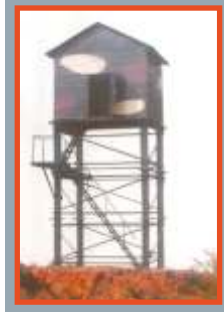
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BULLET PROOF OBSERVATION TOWER



BP Observation Tower is designed to provide all round observation with complete safety against small-arms fire-assault from infantry weapons. The observation tower is provided with bullet proof steel flooring while the roof is fabricated of fiber-glass sheets. Bullet Proof Machan can be used and installed at Border location, high security zones like Forces HQ, airports, govt buildings etc.

Characteristics of Equipment

- Bullet Proof Observation Tower's internal walls shall be provided Puff Panelling which help to maintain the required temperature.
- Design is based on 'nut & bolt' technology.
- BP Observation Tower can be easily assembled and dismantled.
- The height of the Machan can be adjusted/resized upto 45 feet or above
- It can be accommodated 4-5 fully equipped soldiers (depends on the size of Machan).
- A trap door has also been provided for entry and exit during an emergency or once the normal ladder is withdrawn.
- Bullet Proof Observation Tower has number of observation ports and firing slots. If user requires more observation / firing slots, the same can provide accordingly.

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BULLET PROOF MOBILE MORCHA



BP Mobile Morcha is a multipurpose product. Bullet Proof Mobile Morcha can also act as Picket/Naka/Check Post/ Barricade/ at important and vulnerable security points such as Bank, Embassy, Hotel, Airport, Stations, Govt Buildings, etc. It is designed to replace the concept of sand bags for both high security zones as well as in the field of operations. It also provides security to troops when put in a vehicle, thus making it as an interim Bullet Proof Vehicle.

Characteristics of Equipment

- Easy to erect and dismantle
- It's provided with two handles (one top and one bottom on each plates) to carry & erect.
- It has 3 firing slots, one on each plate and BP Sliding shutter from inner side.
- Angle of the side plates provides coverage from three directions i.e. front, left and right
- It has multiple utilities.
 - ❖ Battlefield usage
 - ❖ Temporary Armouring of Troop / Load Carrying Vehicles
 - ❖ Podium High Threat Environment
- There is a provision to attach/detach wheels as per requirement of the users.

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HAND HELD BALLISTIC SHIELD



HHBS enables security staff to close in and shoot the intruder with NIJ level III / II+ protection to his own self. It provides effective protection in action while charging into building and /or installation to weed out hiding terrorists / militants and also acts as a cover for security staff to contest and engage terrorists in close quarter battle fearlessly. It can be easily carried from place to place with least physical effort.

Characteristics of Equipment

- It has a carry belt with shoulder pad so that it can be carried carry across the shoulder.
- It has aluminium ambidextrous handle
- The ballistic shield is made of composite material consisting of High performance steel plate with HPPE material
- The ballistic window, if required, can be provided with bulletproof glass of similar protection.
- LED can be provided in front on any corner as per user requirement.
- It can be designed in size, colour as per customer requirements.

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BULLET PROOF PODIUM



BP Podium to provide vital protection to the VIP's/VVIP's during election meeting in their own / other constituencies. With the growing unrest in the country, it is essential to provide this impregnable cover to thwart any threat to their life from anti-social elements. It can be installed on any type of terrain as well as at Bank, Embassy, Hotel, Airport, Station, Govt Buildings etc etc. It can be moved from one place to another and established without loss of much time.

Characteristics of Equipment

- The Bullet Proof Podium consists of three separate BP Steel plates and three BP Glass.
- Easy to erect and dismantle
- Bullet Proof Steel Plates are joined with hinges and pins. These plates are laminated with wooden board & sunmica, which gives a feel of wooden material only.
- On top of BP Steel Plates have the provision of channels on the back side where Bullet Proof Glass is inserted and clamped tightly so that it may stand properly.
- Colour of the Podium as per user's choice.

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TATA AEROSPACE & DEFENCE

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Organisation Profile

Over the last 150 years, the Tata Group has established a remarkable story of Enterprise, Fortitude and Social Responsibility in India. The Group has pioneered to create strategic businesses that have gone a long way in nation-building. In the same spirit, in the field of Defence and Aerospace (D&A), the Tata Group is investing and organising to create Tata Aerospace & Defence (Tata A&D) to offer group-wide D&A integrated solutions.

Built on trusted strength and a clear vision of India's needs, the consolidated Tata A&D is one of the country's largest private Aerospace & Defence solutions provider. With the requisite capabilities, resources and scale, we are equipped to deliver end-to-end innovative solutions encompassing Systems, Hardware, Software, Technology, and Digital solutions; all of which can be fully integrated across the key platforms necessary to secure India's land, sea and skies for the future.

Tata A&D has a strong portfolio of partnerships with leading global Aerospace and Defence firms, making us an integral partner in the international supply chain and in some instances, a global single source provider for global Defence companies. In addition to our growing list of joint ventures and agreements with leading global equipment manufacturers, we are also deeply invested in development of indigenous defence platforms for the Indian Defence Forces which is central to our long-term capability building strategy.

The Tata Group has served as a trusted partner to India's armed forces for over six decades and will continue to provide the world-class standards of quality and delivery that the Tata name is known for.

2KW FUEL CELL SYSTEM



2kW Fuel Cell System (FCS) is an indigenously developed Proton Exchange Membrane Fuel Cell (PEMFC) based, clean, light-weight, silent, reliable and rugged power solution for Auxiliary Power Backup applications. The 2kW FCS is suitable for both Stationary and Mobile applications and can operate in Industrial as well as Military environments. It is ideal for deployment in Repair / Maintenance Depots, Border Outposts (BOP), Tracked / Wheeled Vehicles, Disaster Management Vehicles, Emergency Communication Systems, Command Posts and can be used as an Auxiliary Power Unit (APU) to provide long endurance and silent power backup without the risk of detection.

Characteristics of Equipment

- DC Output: 28V / 48V DC
- Power: 2kW rated, 2.3kW Peak
- Modular & Scalable to higher capacities
- Weight: ~20 kg
- Startup time: < 15 seconds
- Communication Interfaces: RS485, USB OTG
- High Altitude Operation: < 3000m ASL
- Zero emission (only water vapour)
- Silent, Very Low Thermal / IR Signature
- MIL-STD-810F & JSS-55555 Compliant
- PESO safety certified Hydrogen Cylinders

Contact Person

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30W FUEL CELL SYSTEM



The 30W Fuel Cell System (FCS) is an indigenously developed Proton Exchange Membrane Fuel Cell (PEMFC) based, light-weight, silent, and rugged power solution for portable / back-pack applications, suitable for both Industrial as well as Military Environments. It offers the highest energy density (Watt-hrs/Kg) vis-à-vis battery solutions for applications where portable power is required for extended period of autonomy. It uses hot swappable Chemical Hydride Fuel Cartridges, where hydrogen is produced in-situ giving upto 15 hours of power with one cartridge. Coupled with light-weight Composite cylinders of Hydrogen, it can provide silent power for extended durations.

Characteristics of Equipment

- DC Output: 12~18.5VDC Adjustable
- 30W Rated Output Power
- 450Whr hot-swappable Fuel Cartridge
- Weight: ~ 2.3 kg (60% reduction vis-à-vis Battery solution)
- Communication Interfaces: RS485, USB OTG
- High Altitude Operation: < 3000m ASL
- Zero emission (only water vapour)
- Silent, Very Low Thermal / IR Signature
- MIL-STD-810F & JSS-55555 Compliant
- PESO safety certified Hydrogen Cylinders

	VRLA	LiIon	FCS + Cartridges
Typical Solution Weight for 3600Watt-hr endurance (kg)	80	17.5	7.4
Energy Density (Wh/kg)	37.5	172	405

Contact Person

Manoj Karam

Head - Renewable Products & Solutions

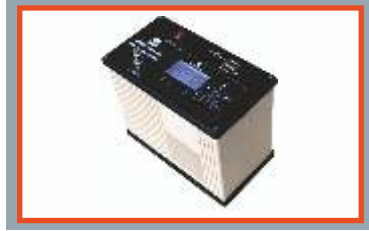
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75W FUEL CELL SYSTEM



The 75W Fuel Cell System (FCS) is an indigenously developed Proton Exchange Membrane Fuel Cell (PEMFC) based, light-weight, silent, and rugged power solution for portable applications, suitable for both Industrial as well as Military Environments. It offers the highest energy density (Watt-hrs/Kg) vis-à-vis battery solutions for applications where portable power is required for extended period of autonomy. It uses hot swappable Chemical Hydride Fuel Cartridges, where hydrogen is produced in-situ giving upto 6 hours of power with one cartridge. Coupled with light-weight Composite cylinders of Hydrogen, it can provide silent power for extended durations.

Characteristics of Equipment

- DC Output: 12~18.5V DC Adjustable
- 30W Rated Output Power
- 450Whr hot-swappable Fuel Cartridge
- Weight: ~ 2.5 kg (60% reduction vis-à-vis Battery Solutions)
- Communication Interfaces: RS485, USB OTG
- High Altitude Operation: < 3000m ASL
- Zero emission (only water vapour)
- Silent, Very Low Thermal / IR Signature
- MIL-STD-810F & JSS-55555 Compliant
- PESO safety certified Hydrogen Cylinders

FCS Weight Benefits vis Batteries			
	VRLA	Li-Ion	FCS + Cartridges
Typical Solution Weight for 3000Watt-hr endurance (kg)	80	17.5	7.4
Energy Density (Wh/kg)	37.5	172	405

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MOBILE EMERGENCY COMMUNICATION SYSTEM



Mobile Emergency Communication System (MECS) is a Robust / Rugged Unified Communication System which can be quickly deployed to provide connectivity to support Fire Fighters, Disaster Response Teams and Relief Operations, special Forces etc.

MECS is designed to enable cross-communication of messages between varieties of communication technologies, intended to optimise communication during emergencies. It uses Hybrid IPPBX having both VoIP and TDM Voice capabilities. It has a powerful Voice and Video DSPs to deliver high performance encoding and decoding and conferencing features. It can be integrated with existing legacy interfaces through gateways.

MECS also provides wireless communication using state of art 4th generation cellular technology (LTE) to its users. Users can seamlessly communicate between wired and wireless clients within the local network as well as can communicate with the remote control central through long distance backhails.

The system also supports latest encryption technologies for security and privacy of communication.

Salient Features

- Trusted platform based design with embedded security
- 12-Slot, 12U Chassis, 19 inch rack mountable
- Non-blocking Back Plane with switching capacity upto 640Gbps (1+1)
- Power option: 2.5 KW Generator OR Fuel Cell (1.7 KW)
- Rod Antenna for Tactical LTE deployment
- Designed for LTE Band 28 supported (703MHz - 803MHz), but can be tailored for other bands too.
- Indigenously designed external Four Sector Phased Array Antenna with High gain (18 dBi)

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AQUILON UAV



Aquilon is a hand launched, man portable UAV, ideal for providing frontline troops with increased situational awareness. This quick to deploy, easy to use system is designed for fully autonomous operations from Launch through Mission Execution and Recovery. The UAV is equipped with Two-axis retractable stabilised gimbal with HD colour video or IR camera, thereby enabling operations by day and night.

Characteristics of Equipment

- Fully autonomous operations with pre-set search patterns
- Ruggedised Ground Control Station for harsh environments
- Low noise, Low visibility, Low operational footprint
- Quick and easy assembly of airframe

Maximum Take off Weight	Approx 4 kg
Time to launch	< 15 minutes
Operational footprint	2 soldiers and 2 lightweight backpacks
Total weight of the system	Approx 12 -15 kgs
Endurance	> 60 minutes
Range	> 10 km
Propulsion	Electric motor for covert operations
Power source	Non-spillable rechargeable Li-Po batteries
Launch & Recovery	Hand launch & Conventional belly landing on skids
Cruise speed	54 kmph or 900 metres / min
Maximum winds	10 - 15 knots
Operational height	100 m to 1,000 m AGL
Ceiling height	Upto 6000m / 20000ft Above Sea Level

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TIME REFERENCE SYSTEM



- Provides Time Synchronisation between Master and Slaves over IP networks.
- Implements Precision Time Protocol (PTP) as per IEEE 1588, V2
- Timing accuracy in microsecond range suitable for real time control systems
- Employs Best Master Clock Algorithm for automatic selection of masters
- Software configurable for Master / Slave roles
- 1PPS input / output signals for connecting to external units
- Ruggedised for Military Applications

Characteristics of Equipment

- 1PPS : 1 x Input & 1x Output Over RS422
- Accuracy : Less than 5usec between Master to Slave
- Ethernet Port : 1 x for 1588 V2 & 1x for Host Interface
- Dimensions : 1U, 19" Rack Mountable
- Weight : Less than 6Kg
- Connectors : Mil Std 38999
- Power : 230V AC
- Op.Temp : 0° to 50° C (-200 Optional)
- Storage Temp : -30° to 50° C
- Environmental : As per Mil-Std 810F
- EMI/EMC : As per Mil-Std 461E

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RUGGED COMPUTER



- Ruggedised for Military Applications
- Intel Quad Core Processor
- Hardware RAID 0/1/5/10 configurable
- 4x USB 2.0 / 3.0 Ports
- 6 x 10/100/1000 Mbps Ethernet Ports
- 1 x RS232, 1 x RS232/422/485 configurable
- SSDs easy accessibility from front
- MIL DTL 38999 Circular Connectors
- Windows, Linux support

Characteristics of Equipment

- RAM : 8GB DDR4 @2133MHz
(Expandable up to 64GB)
- Disks : 1 x 128GB SSD , 3 x 256GB SSD
- VGA / DVI (Optional) resolution : Supported up to 1920 x 1200
- Dimensions : 3U* Height, 19" Rack Mountable
- Weight : Less than 15Kg
- Connectors : Mil Std 38999
- Power : 230V AC
- Op. Temp : 0^o to 50^o C
- Storage Temp : -30^o to 50^o C
- Environmental : As per MIL-STD 810F
- EMI/EMC : As per MIL-STD 461E

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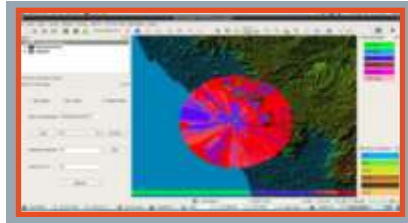
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TACTICAL RF NETWORK PLANNING TOOL



- Useful for pre-mission deployment planning
- Point to Point & Point to Multipoint Radio Line Of Sight (LOS) radio link design
- Frequency Range 20MHz – 20GHz
- Implements Enhanced Longley-Rice and ITU 380.530 RF propagation models. Seamless integration of GIS and propagation models
- Considers atmospheric conditions (Rain, Temperature, Pressure & Humidity)
- Provision to mark enemy locations. Estimates driving time based on vehicle speed and shortest path by road

Characteristics of Equipment

- Software Loaded in Rugged Laptop with Linux OS
- Intel® Core i3-2310M Processor (2.1GHz)
- Storage Disk & RAM : 320GB HDD & 4GB DDR3
- Display Size & resolution : 13.1" XGA sunlight-viewable touch screen LED with resolution support of 1024 x 768.
- Dimensions : 2U* Height, 19" Rack Mountable
- Weight : Less than 6Kg (with 19" Rack Mountable kit)
- Connectors : Mil Std 38999
- Power : 230V AC, Rechargeable Battery Built in
- Op & St Temp : 0° to 50° C & 30° to 50° C
- Environmental : As per MIL-STD 810F
- EMI/EMC : As per MIL-STD 461E

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LIGHT-WEIGHT TACTICAL FIELD COMPUTER



Light-weight Tactical Field Computer (TFC^{lite}) is the latest generation of Rugged Computers that allows soldiers to get a real-time situational picture of their own battlefield assets and that of the enemy. TFC^{lite} is designed for applications where light weight is required without compromising high-processing power. The system has a removable mass storage that is fully encrypted and has other unique security features ensuring real-time data security.

TFC^{lite} has a 10.4" high-brightness rugged display with an integrated Touchscreen and host of communication interfaces. Internal expansion site allows for integration of new generation Wireless interfaces or accommodation of additional Storage devices. Dual hot-swappable Li-ion battery packs provide TFC^{lite} with the capability of uninterrupted power for continuous operation.

The unit is designed for use in extreme harsh environments encountered in the battlefield. It operates uninterrupted even when dropped from a height of four feet in any orientation and upto depths of 1m underwater.

Features

- 6th Gen Intel® Core™ i7 platform with upto 8GB RAM
- IP-67 sealing protection (1m water immersion)
- Drop resistant upto height of 4ft
- Dual hot-swappable battery backup
- Multiple RS-422, RS-232 and Ethernet interfaces
- Conduction cooled design, no fans
- JSS5555:2012 L3 compliant
- MIL-STD-461E compliant

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MOBILE RUGGED COMPUTER



Mobile Rugged Computer (MRC) is an Intel® Atom™ based Ruggedised Light-weight Tablet Computer suitable for use in harsh environments. The system is designed specifically for mobile applications and has interfaces such as GNSS, Ethernet, USB & multiple RS-422.

MRC has a 7" high-brightness rugged LCD and an anti-glare shock / scratch-resistant touchscreen. It also has a 10-key compact fixed function keyboard.

MRC is rugged and meets all JSS5555 requirements for drop resistance, shock, rain, temperature, humidity & vibration.

The MRC is thus a versatile and rugged computer which can be configured for different types of end applications in a very short time. Depending on the application interface requirements, the circular connector pin-out and peripherals can be customised.

Features

- Low power Intel® Atom™ Platform with up to 1GB of RAM
- Fully Conduction cooled design, no fans
- Light Weight
- Integrated Compact fixed function keypad
- IP-65 sealing protection

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WEARABLE MOBILE COMPUTER



Wearable Tactical Computer (WTC) is a Low Power ARM Cortex A9 or equivalent based Wearable Computer, suitable for use in harsh environments. It has a variety of communication interfaces such as Ethernet, USB and RS-422. It also has an Interface for acquiring and displaying video from electro-optic sights or platforms.

WTC has 5" integrated display of WVGA (800x480) resolution and a resistive Touchscreen for operation. There are two storage options available in WTC, 8GB Nand Flash for storing OS and Application and 32GB μ SD card for data logging.

WTC has 5MP rear camera for taking pictures and videos in an actual field scenario. This can be disabled or enabled as required in different configurations. WTC is ideal for wearing on the wrist of the mobile Warrior. It can also be used with a MOLLE type or PALS type pouch and fixed on the soldier BLCV.

Features

- ARM Cortex A9 or equivalent platform with 1GB RAM
- Low Power & high performance
- Variety of I/O Interfaces
- Fully Conduction cooled and sealed design

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RAJAK TWS THERMAL WEAPON SIGHT



RAJAKTM TWS series of Weapon Sights are single channel TI (Un-cooled) based weapon-cum-observation systems in monocular configuration. This series of Weapon Sights comes in 3 variants – Long, Medium & Short Ranges (i.e., LR, MR & SR) depending upon the weapon being used (CQB Carbine, Assault, LMG, MMG, RL, Sniper, etc.). The smallest version i.e. RAJAK-TWS-SR can also be head / helmet mounted for short range observation.

Real-time video feed can be taken onto a console for remote observation and in-built video recording capability can also be provided as per user requirements.

Characteristics of RAJAK TWS series of Night Sights

- **Variants:** LR, MR, SR
- **Weight:** 500g to 1.5kg (depending on the variant)
- **Ranges:** Upto 1500m human detection (depending on the variant)
- Sights use Uncooled TI Engine with 320x240/ 640x480 detector resolution @ 17µm pixel pitch

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RAJAK TBC DNL



RAJAK™ TBC-DNL-1 is a multifunction observation & surveillance system which encapsulates a Day camera, a Cooled TI camera, LRF, GPS, DMC in a rugged enclosure while keeping the system quite light weight (< 4kgs). It is capable of being mounted on a small PTZ motor for remote controlled operations and achieves ranges of upto 10km for vehicle detection in clear weather scenario.

The system comes in 2 variants – with and without LRF (i.e., DNL & DN). Real-time video-feed can be taken onto a rugged console for remote observation at upto 100m via Ethernet cable and upto 10km (Line of Sight) wirelessly, depending upon the types of Tx-Rx radios used. Thus the system can be remotely controlled & operated from a safe distance.

Characteristics of RAJAK DNL series of Multifunction Systems

- **Variants:** DNL & DN
- **Weight:** ≤ 4kg (depending on the variant)
- **Ranges:** Upto 10km
- The equipment comprises of the following 5 Sensors in a single rugged MIL-STD housing:
 - Night Camera: Cooled TI Engine with 640x512 detector resolution @ 15µm pixel pitch
 - Day Camera: High Resolution Low Light Camera
 - GPS, DMC & Optional LRF

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RAJAK II-TUBE NVDS



Weapon Sight



Goggles



Monocular



Binocular

RAJAKTM series of Image Intensifier (II-tube) Night Vision Devices (NVDs) use the latest **Gen-3 II-tubes with FOM of 1700+** and are best suited for Night Operations (observations, surveillance, reconnaissance & firing). Major classification of these NVDs is: Monoculars, Binoculars / Goggles and Weapon Sights. The end use configurations are: Hand-held, Head / helmet mounted or Weapon mounted for Night firing. The Weapon Sights come in variants viz. 1X, 3X, 4X & 6X and can be used on weapons such as CQB Carbine, Assault, LMG, MMG, RL, Sniper, etc. as per the operational requirement.

Characteristics of RAJAK II-series of NVDs

- **Variants:** Monoculars, Binoculars / Goggles & Weapon Sights
- **Weight:** 320g to 1.5kg (depending on the variant)
- **Ranges:** Upto 700m human detection (depending on the variant)
- **Battery Endurance:** 8 hrs to 60 hrs (depending on the variant & operational requirement) using commercially available AA cells
- Sights use latest Gen-3 II-tubes with FOM of 1700+

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Organisation Profile

Tata Motors Limited (BSE: TATAMOTORS), a USD 45 billion organization, is a leading global automobile manufacturer of cars, utility vehicles, buses, trucks and defence vehicles. Part of the USD 100 billion Tata group, Tata Motors is India's largest and the only OEM offering extensive range of integrated, smart and e-mobility solutions. Tata Motors has operations in the UK, South Korea, Thailand, South Africa, and Indonesia through a strong global network of 109 subsidiary and associate companies, including Jaguar Land Rover in the UK and Tata Daewoo in South Korea.

Tata Motors has been a strategic partner to the Indian Armed Forces since 1958. During World War II, India developed a series of Wheeled Armoured Carrier, Indian Pattern or ACV-IP better known as the 'Tatanagar'. The vehicles used Ford truck chassis imported from Canada and armour-plated hulls constructed by TELCO (Tata Motors) Between 1940 and 1944, 4,655 units were built at the Railway workshop with a special plant set up for Armour, Hull, Axle and Tyre tracks. Tata Engineering & Locomotive Company or TELCO (now Tata Motors) completed the last order in 1945 when it took over the railway workshop.

Tata Motors Product portfolio: Tata Motors is present across the military spectrum providing all categories of vehicles catering to the specific needs of the Indian Armed Forces - Light mobility, mobility, utility, platforms, engineering, special mission, Armoured, Command posts, NBC and ICVs.

It is the only Asian company to have this spread of competence. A leading supplier of mobility solutions, it has supplied over 100,000 vehicles to the Indian military and para-military forces thus far.

In addition to the Indian Army, Navy, Air force and various Para-military forces, the company now also supplies to the defence forces of other countries including Sri Lanka, Bangladesh, Nepal and Tanzania, and to UN peace-keeping forces in conflict zones in Africa.

MINE PROTECTED VEHICLE (MPV)



- Mine Protected Vehicle (MPV) used as an armored personnel carrier with blast protection to transport personnel with protections from landmine explosives and small arms fire.
- Approx. 90 vehicles are in service with export markets such as Nepal army, Bhutan Army, Mozambique Army and state police forces such as Maharashtra, Chhattisgarh, Arunachal Pradesh and Jharkhand Police.
- A wheeled vehicle, which will operate in explosive hazardous environments to support in area clearance operations, Explosive Hazards Teams in explosive hazards and reconnaissance operations.
- The vehicle has **Single Piece V-Shaped Joint less Hull** Construction to prevent hull ruptures and also to protect the crew against severe blast conditions.
- Firing Ports available all round the vehicle for better survivability.

Characteristics of Equipment

- (a) Protection -
 - Protection against 14 kg of TNT under belly and 21 Kg of TNT under wheels (STANAG 4569 level B3)
 - Ballistic - NIJ Level III
 - Seats - Blast attenuating
- (b) Seating capacity - 10+2 seater with optional 12+2 available
- (c) Engine - Powerful 245 HP @ 2500 rpm with latest emission norms

- (d) Tyres - Runflat tyres
- (e) Equipped with HVAC and Power steering
- (f) Provision for Roof Mounting Ring Mount, Machine Gun Turret & Gun Mount for counter insurgency operations.

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WHEELED AMPHIBIOUS PERSONAL CARRIER (WhAP 8x8)



- **VERSATILE AMPHIBIOUS PLATFORM CAPABLE FOR ALL MISSIONS AND MOUNTING OF ANY WEAPON SYSTEM.**
- WhAP (8X8) (Wheeled Amphibious Platform), an Infantry Combat Vehicle, designed for optimized survivability, all-terrain performance and increased lethality jointly with VRDE, Indian Defence Research and Development Organization (DRDO)
- **Universal type turret mounting provision to accommodate any type of turret with 360° of surveillance**
- WhAP will create a dramatic impact on the future battlefield with state of the art features suitable for combat operations and best in class mobility, firepower and safety feature

Characteristics of Equipment

- Modular & scalable design caters for a future increase in Gross weight from 22 tonnes to 26 tonnes.
- Powerful 600 HP engine.
- Independent hydro pneumatic suspension.
- Speed - 100 kmph on land and 10 kmph in amphibious mode.
- Seating capacity of 10+2 personnel

- **USPs**

- Blast Protection : Options of STANAG level II to IV
- Ballistic Protection : Options of NIJ Level III - IV {B6 - B7 or STANAG II - III}
- NBC protection option

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Organisation Profile

Tonbo Imaging is an OEM for advanced imaging and sensor systems to sense, understand and control complex environments. Modern day battlefields, critical infrastructures, unmanned reconnaissance, transport vehicles driving in the dark – all offer very challenging environments for effective visualization. Obscurants like smoke, dust, fog and camouflage make observation and navigation very difficult. Tonbo offers a suite of solutions that address critical market needs in military reconnaissance, critical infrastructure security and transportation safety. The company's offerings consist of sophisticated imaging products being used by Tactical Land, Border, Coastal & Airborne surveillance platforms, custom design applications and intellectual property cores that can be licensed by OEM's and systems integrators.

To address our customer needs, Tonbo Imaging is located at six main locations – Singapore, India, United States, Greece, Poland and Lithuania. Each of Tonbo's engineering centers has a specialized R&D and electro-optic testing center that manages the engineering and product development for the full spectrum of the company's products.

RAPTOR: CLIP-ON THERMAL WEAPON SIGHT



RAPTOR is a lightweight multipurpose uncooled thermal imaging sight designed and optimized for small and medium caliber weapons. Raptor can be used as a Clip-on sight, standalone sight, handheld scope or as a helmet mounted sight.

Unlike any other weapon sight Raptor in its clip-on configuration is placed directly in front of existing Day scope without zeroing the weapon again at night. It is designed with custom tactical mounts that provide zero retention even after firing hundreds of rounds. The sight is designed to maintain zero even if detached and reattached thus allowing the soldier to change optics on the battlefield without requiring to zero the weapon.

Characteristics of Equipment

- Shutterless Thermal Imaging
- Integrated NIR pointer (Optional)
- Digital Zoom: Maintains boresight
- Recording: Video and Snapshot (Optional)
- Aircraft grades Aluminium construction
- An easy and intuitive user interface
- Full Frame Rate - 25fps/50Hz PAL
- Reduced SWaP
- Weight < 500g

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ARJUN: THERMAL WEAPON SIGHT



Arjun is a small, lightweight uncooled thermal imaging sight designed and optimized for small and medium caliber weapons. It can also be used as a standalone hand held thermal imager or a helmet mounted TI sight.

Unlike any other weapon sight, it is designed with custom tactical mounts that provide zero retention even after firing hundreds of rounds. The sight is designed to maintain zero even if detached and reattached thus allowing soldier to change optics on the battlefield without requiring to zero the weapon.

It is compatible with tactical head mounted wireless display which allows soldier to accurately shoot around corners.

Characteristics of Equipment

- Uncooled Shutterless Thermal Imaging
- Recording: Video and Snapshot
- Field Interchangeable Optics for different Weapons
- Easy and intuitive user interface
- Full Frame Rate - 25fps/50Hz PAL
- Compatible with most weapons with a Picatinny MIL-STD-1913 rail
- Reduced SWaP
- CLIP ON Sight compatible with most 4x day optics
- Weapon Sight for
 - Light Machine Guns / Sniper Rifles (like (Minimi / Dragunov Sniper Rifle or similar)
 - Assault Rifles (like AK series, INSAS, SIG551/553 or similar)
 - Sub Machine Guns (like MP5, Beretta or similar)
- Handheld sight
- Helmet Mounted compatible with most ACH and MICH helmets
- Body-worn

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EK- HANDHELD THERMAL IMAGER



Ek is a compact, lightweight uncooled thermal imaging monocular that is built on the state of the art HawkVision thermal core providing outstanding sensitivity and excellent image quality.

The External I/O port is compatible for real-time streaming of thermal video over secure broadband signalling to extended distances.

Ek is ideal for operation on all border and in all battlefield environments whether air, sea or land.

Characteristics of Equipment

- Uncooled shutterless thermal imager
- Integrated NIR/VIS pointer
- Full Frame Rate - 25fps PAL
- Lightweight
- Onboard Video Recording
- Digital Lock Capability
- Wireless video interface to Head-mounted displays
- Video port for wireless transmission
- Reduced SWaP

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BLOODHOUND



Bloodhound uncooled binocular is a compact lightweight thermal imaging binocular that is built on the state of the art high resolution shutterless HawkVision thermal core providing outstanding sensitivity and excellent image quality.

Bloodhound employs dual FoV or a single FoV optics enabling very long range detection with increased situational awareness.

This is the lightest and ergonomically designed Binocular on the planet with its long-range detection capability. It can detect a NATO sized target at up to 3km.

The external I/O port is compatible for real-time wireless streaming of the video.

Bloodhound is ideal for operation on all borders and in all battlefield environments whether air, sea or land.

Characteristics of Equipment

- Uncooled shutterless thermal imager
- Binocular with an optional laser pointer, DMC and GPS
- Dual field of view optics
- NATO target detection at 3km
- Full Frame Rate - 25fps PAL
- Onboard Video Recording
- Digital Lock Capability
- Wireless video interface to handheld display
- Video port for wireless transmission
- Reduced SWaP

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GEOLOCATOR UNCOOLED



Geolocator uncooled alternatively called F640-U is an all-weather target acquisition system with state of the art optronics for tactical reconnaissance missions. It includes a day optical channel and an uncooled thermal imager along with a laser range finder, GPS and magnetic compass all integrated into one compact system.

F640U images simultaneously in the visible and longwave IR spectrum providing fused imagery that gives greater situational awareness. The system can recognize targets in day, night, obscurant conditions, range to the target at an eye-safe wavelength, and calculate grid coordinates with its own GPS, Elevation, Azimuth capability.

Characteristics of Equipment

- Handheld / Remote operation
- Uncooled LWIR thermal imager
- Long Range low lux Day imager
- Laser Range Finder
- GPS, DMC and Laser pointer integrated
- Multi-Sensor Fusion enabled
- Full Frame Rate - 25fps PAL
- Onboard Video Recording
- Wired / Wireless Transmission and control from up to 10-20km LOS
- Wireless video interface to Head-mounted displays
- Tripod / Pan-tilt compatible
- Remote console for complete remote operation
- Reduced SWaP

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MINION



Minion is the smallest, lightest, shutter less, low power rugged thermal imaging module for driver vision enhancement and similar applications.

It does not require any physical shutter for NUC correction at any point, even with changing environmental conditions. With no shutter, the images never freeze making it an ideal solution for situational awareness and driver vision applications. Absence of shutter also eliminates the need for a motor, the first point of failure in harsh environments.

Minion finds its applications across a range of deployments ranging from driver vision enhancement, panoramic surveillance.

The module is available as fully rugged as per MIL-STD-810G, nitrogen purged and sealed for direct use in harsh environment.

Characteristics of Equipment

- Miniature Rugged Thermal Imager
- Shutterless uncooled thermal imaging
- Designed for off road vehicles for operation in harsh environments
- Onscreen graphics with lane markers
- Full Frame Rate - 25fps PAL
- Reduced SWaP
- Driver Vision for off road, on road and commercial vehicles
- Remotely operated vehicles (ROVs)
- Situational awareness

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Organisation Profile

Incubated from IIT-Delhi in 2005, Vehant Technologies is now a pioneer in Artificial Intelligence based Physical Security, Surveillance and Traffic Monitoring & Junction Enforcement Solutions. Designed and developed indigenously to meet global standards, features and quality. Our enterprise class solutions are continuously leveraging technological innovations such as Machine learning, Deep learning etc. Excellence in R&D being our core strength allows us to offer several industry leading features to our customers.

Technological innovation and advancement is the core strength of Vehant and our highly efficient team of researchers is impelled to offer Vehant's client such products which are crafted to perfection.

Our idea is to take technological expertise available all across the institutes and convert that into realizable product. With an excellent team of product development engineers we aim to produce globally competitive products at 1/4th of the global cost.

NANOSNIFFER™ - EXPLOSIVE TRACE DETECTOR



About NanoSniffer

Explosives remain the weapon of choice for terrorist around the world. Improvised Explosive Devices (IEDs) are a threat from various terrorist organizations across the globe. NanoSniffer is a Microsensor based highly sensitive and selective trace detector, in a portable desktop configuration. It can be used to accurately detect a wider range of military, commercial and homemade explosive threats.

Operations

Operator collects traces of explosives on a swipe, and inserts the swipe into the instrument. Particles collected on the swipe are internally transferred to the microsensor, which tests if the collected particles are explosives or not. Signal from microsensors are further analyzed by electronics, which then appropriately informs the operator of the result.

Technology

Based on Microsensors, High Sensitivity & High Speed Electronic Instrumentation, and Intelligent Mathematical Algorithms.

Detection

Any Person, Bag, Clothes etc. if interacted with the explosive would have remains of the same on them. These traces are further used to detect the kind of threat through our product.

Characteristics of Equipment

- First Microsensor based explosive trace detector
- Detection in less than 10seconds

- Can detect "Nanogram" quantities of Explosive Traces
- Less than 3% false alarms
- Video and audio alerts with sunlight-readable colour display
- Battery Life > 4 hours (Backup provision)
- Works at -5 ? to 55 ?
- Data can be viewed offline

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KRITISCAN™ 6040R - 3D X-RAY BAGGAGE SCANNER



About KritiScan 6040R

KritiScan 6040R X-ray baggage scanner is designed and developed by Vehant Technologies, which creates virtual 3D images and provide operator with isometric view of the scanned baggage by generating three dimensional image of the object. KritiScan 6040R provides extremely detailed images with enhanced detection capabilities. It is a compact X-ray baggage scanning system ideal for checkpoints and small baggage scanning at high security premises such as Airports, Government offices, Railways, MRTS etc. KritiScan 6040R offers numerous optional features such as Threat Image Projection (TIP), Network Supervisory Workstation (NSW) & Video management for effective operation.

Characteristics of Equipment

- Dual energy based virtual 3D imaging
- Radiation safe as per AERB India
- High density alert feature
- Distortion correction through software
- Self-diagnosis feature
- Multi-energy high penetration
- Central supervisor console (Optional)
- Threat Image Projection (Optional)

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KRITISCAN™ 6040DV - MULTI-ENERGY X-RAY BAGGAGE SCANNER



About KritiScan 6040DV

KritiScan 6040 DV is an advance Multi-energy X-ray baggage scanner designed and developed by Vehant Technologies with Tunnel size - 600 mm (W) X 400 mm (H). It uses innovative dual view technology to generate a horizontal and vertical view of the object under inspection. Dual view system provide multi-dimensional view of the save object which helps in enhanced detection of contraband objects. It is a compact X-ray baggage scanning system ideal for checkpoints and small baggage scanning at high security premises such as Airports, Government offices, Railways, MRTS and other baggage scanning applications.

Characteristics of Equipment

- Multi energy based Dual view Technology
- Radiation safe as per AERB India
- Horizontal & Vertical view of scanned objects
- Distortion correction through software
- Self-diagnosis feature
- High density alert feature
- Central supervisor console (Optional)
- Threat Image Projection (Optional)

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NUVOSCAN™ (P) - PORTABLE UNDER VEHICLE SCANNER



About NuvoScan (P)

NuvoScan (P) is the advance Portable automated Under Vehicle Scanning System (UVSS). NuvoScan (P) is based on the latest and highly advance area scan imaging technology. It uses the combination of high end electro-mechanical assemblies, cameras, illuminators and sensors besides NuvoScan's Area by Area image composing software. The visual information captured is synthesized by the system and subsequently produce a high quality composite underside image of vehicle to facilitate efficient viewing and detection of any potentially harmful object that may be attached to the under belly of the vehicle.

NuvoScan (P) gives a seamless composite image without distortion, even if vehicle halts completely on top of the UVSS.

Characteristics of Equipment

- CE, ISO certified system
- High resolution composite image
- All weather proof IP-67 certified
- Air cleaner mechanism for all weather operation
- Vehicle entry database & reporting features
- Security password protection

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NUVOSCAN™ 3D - AUTOMATED UNDER VEHICLE 3D SCANNING SYSTEM



About NuvoScan 3D

NuvoScan-3D, is an advance automated 3D viewing Under Vehicle Scanning System based on the area scan imaging technology. It provides an optimum solution to scan, inspect, and digitally document the under side of the vehicles. The system is equipped with dual high-resolution cameras that help in capturing the 3D color view of any vehicle passing over the UVSS. Hard- to view areas are easily scanned with this dual camera setup within fraction of seconds. Two important features available in the system are 'real time 3D morph' of the underside which allows operator to see multiple angular views of the underside very quickly and 'compare image' which helps in comparison of the captured view of the vehicle with the image of the similar model of the vehicle fetched from the database.

Characteristics of Equipment

- Dual imaging feature (3D) from left & right view in order to identify any possible threat
- High resolution COLOR left and right composite images of the vehicle's underside
- Novel morph creation feature to see real life 3D video of the underside
- Hard-to-view areas can be scanned easily through 3D UVSS system
- Stop&Go Image Formation doesn't affect the image quality
- Dual LED array for better illumination
- Zoom facility upto 25x of the composite image to facilitate a closer view of niche areas

- All weather proof IP-67 certified underground enclosures
- Air cleaner mechanism for all weather operation
- CE, ISO certified system

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Organisation Profile

Zen Technologies Limited, incorporated in 1993, designs, develops manufactures world-class, state-of-the-art training simulators. Its mission is to provide its customers quality products and services. It has AS9100:2016 from DQS Inc., ISO 9001:2015 (QMS), ISO 14001:2015 (EMS), ISO/IEC 27001:2013 (ISMS) certifications. Zen Technologies appraised at the highest maturity Level 5 of the Capability Maturity Model® Integration for CMMI®-DEV 1.3 (Development).

Zen is at the forefront of applying new technologies and developing new products. It is actively involved in indigenization of technologies, which is beneficial to Indian Security Forces. Now Zen is the leader, offering Firearms, Tank, Driving, and Unmanned Aerial Vehicle (UAV) simulators & 30 products.

We provide a unique training solution the Combat Training Centre (CTC), wherein we provide a full training solution for the armed forces for obtaining perfection individually & as a team. Our solution assists in mission planning as well as provides a war-gaming solution for the senior commanders.

ZEN COMBAT TRAINING CENTRE (ZEN CTC)



Zen CTC is a one-stop training solution for Armed Forces and State police. The secure facility, equipped with modern training equipment/infrastructure, free from routine encumbrances and other disturbances, is designed to provide performance-oriented training in realistic, tactical and operational environment.

Characteristics of Equipment

- Operational Training In Geo-Specific 3D Terrain
- Specialise In CQB Drills
- Always Mission Ready To Neutralise Internal and External Threats
- Attain Marksmanship In Small Arms & Excellence In Crew Served Weapons Faster
- Validate Tactical Standard Operating Procedures
- Accelerate Adaptability of Units/Sub-units to New Op Roles & Terrain

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ZEN ADVANCED WEAPONS SIMULATOR (ZEN AWESIM)



Zen AWeSim® is a state-of-the-art firearms simulator aimed at training recruits to Special Forces and Commandos. It recreates Small Arms firing range indoors. The simulator can be adapted to a number of firearms and the versatile simulator imparts basic training, hones firing skills, improves weapon handling skills and tests the skill level of trainees in complex and war-like scenarios.

Characteristics of Equipment

- Supports all direct-fire small arms
- All static and dynamic characteristics of the weapon are sustained Ballistics performance of the projectiles is replicated in terms of range, velocity/time of flight and trajectory
- Employs un-tethered recoil generation system Simulates firing sounds
- Firing Group analysis, with hold and aim graphic representation
- Close-up/zoom facility and auto display/recording of results
- Simulates environmental conditions such as wind, rain, fog and light conditions with time of day/night and moon phases
- Shows realistic effects of ammunition simulated at target end
- Incorporates use of white light illumination, trip flares and smoke/hand grenades and other munition for tactical exercises
- Provides all firing modes—single shot, burst/controlled burst and automatic fire available in the weapon being used
- Allows firing of mix of weapons in same detail, on targets at respective ranges of various weapons
- Facilitates training in combat tactical situations on video scenarios Allows selection of trainee for a lane and select target, range and bullets issued

- Provides comprehensive Scenario Builder and Video Editor modules
- Reports cant angle, trigger pressure and breathing pattern Provides telescopic sighting system for Rocket Launcher and Sniper Rifles
- Includes facility to record and playback a stopped training session Syncs with the firing positions of trainees (lying, kneeling and standing)
- Allows injection of faults to test trainees Has provision for night firing practices and use of night vision sights

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ZEN ANTI TANK GUIDED MISSILE SIMULATOR (ZEN ATGM)



Zen ATGM® Sim is an indoor simulator, designed and developed to meet the challenging training requirements of missile pilots. It trains recruits and hones the skills of trained pilots in handling and firing missiles. The guided missile simulator enables instructor to track the performance of trainees in real time.

Characteristics of Equipment

- Realistic missile dynamics.
- Integrates with an Infantry Combat Vehicle like BMP-II.
- Compatibility with MILAN/KONKURS/FAGOT missiles.
- Setting of training scenarios in accordance with the skill levels.
- Technical faults of missiles can be introduced to practice drills.
- Exact replica with actual controls.
- Trains recruits and hones the skills of trained pilots in handling and firing Missiles.
- Realistic sound effects and artificial illumination for night training.
- Offers a variety of targets, including aerial targets.

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ZEN TACTICAL ENGAGEMENT SIMULATOR (ZEN TACSIM)

Zen TacSim® trains soldiers to utilize the skills acquired during training in field craft, battle drills and live-fire practice while carrying out operational exercises. It assimilates lasers fired from different weapon systems and effectively records the result of the engagement.



Characteristics of Equipment

- Modular & scalable system for training needs. Can exercise upto 3000 troops with supporting elements.
- Covers effectively a training area upto 5 kms diameter. Additional range obtained through repeaters.
- Excon and communication module equipment is light, portable & mobile. Can easily be mounted & transported cross-country on a light Jeep-like vehicle.
- Battlefield commanders can conduct briefings, analyse terrains, plan operations & test efficacy of plans.
- Rugged, simulates accurate firing of weapons/detection of hits & is tamper proof.
- Simulates minefields, artillery fire, booby traps/IEDs & grenade effects.
- Seamless transition from outdoor to indoor activity.
- Room Awareness Device (RAD) enables soldiers/sub-units to train in built-up area/indoors, where GPS is ineffective.
- Effect of direct fire weapons such as RL on building structures and troops inside buildings is simulated & effects recorded.

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ZEN SMART TARGET SYSTEM (ZEN STS)



ZEN STS® is an electro-mechanical, software-driven, acoustical projectile detection and reporting system designed to be used at outdoor ranges for live Small Arms firing. The equipment is rugged, light-weight, easy to assemble and operate. It is available in wired and wireless configurations. The system can be operated with 230V AC 50 Hz or with DC battery power.

Characteristics of Equipment

- Immediate feedback of position of the shot on the Firing Point Equipment (FPE) and Master Control System (MCS).
- MCS can run multiple lanes with same or different exercises simultaneously.
- Can be employed for various target exercises on any existing firing range.
- Army Range Course (ARC) and Customized exercises can be operated.
- Grouping, Static, Timed & Snapshot exercises.
- Auto recording and replay of all exercises.
- Allows user to edit existing firing exercises.
- Displays Group size, MPI, Possible and Aggregate Scores.
- Target illumination for night firing.
- Reports can be printed from the MCS.
- Cross Fire detection.
- Displays possible and aggregate scores.
- Portable and easy to install.
- Eliminates need to man the firing range butt.

- Pop-up mechanism for snap-shot exercises.
- Available in both cable and wireless configuration.
- Zoom In/Out, Panning of the targets on both FPE and MCS.
- Quick analysis of firers performance and comparison with past firing records

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ZEN MULTI-FUNCTIONAL TARGET SYSTEM (ZEN MFTS)



Zen MFTS® is an electro-mechanical system of versatile targets which are programmable from Firer's End to perform various movements for firing practices. The system is designed for use both at outdoor and indoor shooting ranges. It is portable and easy to operate. It is a rugged, all-weather system and meets IP 65 standards.

Characteristics of Equipment

- Designed for Outdoor/Indoor live firing.
- Provides realistic environment for specialized training.
- Improved reflex shooting of the trainee.
- Capable of recording single shot slow fire, single shot rapid fire and fully automatic fire.
- Target exposure time can be set by the controller.
- Adjustable for various types of Infantry targets.
- Motion sensors for exposing target automatically on proximity of firer.
- Target illumination for night firing.
- All parts are sealed to avoid dust and moisture.
- Operating Temperature 0 to 50 degree Celsius

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MODEL OF ZEN SHOOT HOUSE

Zen Shoot House is a safe indoor facility, built to meet the training needs of security personnel involved in operations to eliminate enemy/terrorist threat in closed environment of a built-up area. Shoot House is a concrete and brick/masonry structure with ballistic protection and other essential features like ballistic doors/windows, wooden staircase, elevator shaft, trap-door, rubber furniture and realistic equipment.



Characteristics of Equipment

- Creates realistic and dynamic live-fire training environment
- Ballistic tiles insulation enables 360 degrees internal live fire with high velocity small arms 5.56 & 7.62mm
- Variety of rubber/fibre sheet targets – static & multi-function
- Realistic rubber furniture/equipment as appropriate to settings
- Sliding/pivoting walls provided to quickly change internal layout for varied training
- Ballistic doors/windows, wooden staircase, elevator shaft, trap-door etc provided
- Ventillation/air circulation, varied lighting & sound suppression
- Video cameras to monitor & record all actions of trainees for AAR & critique
- High-end safety & security system, fire-retardant materials
- Generator & emergency lighting back-up
- Inter-communication between Instructor/Control Station & Trainees
- International safety standards compliant

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ZEN SHOOTEDGE



ShootEdge® is synonymous to shooting without risk of exposure to retaliatory shooting by adversary. It is amplified by ability to maneuver behind a shield or protection thereafter fire for effect. These systems are necessary and are force multipliers in encounters with terrorists and insurgents in wide ranging situations from battles in built up areas to hostage situations.

Characteristics of Equipment

Getting into action. Simple to use, can be easily carried by a soldier, takes less than a minute to get it into action. Can be adapted for many weapons, it has the ability to be used in all possible eventualities in close combat.

Aimed Fire. Provides ability to shoot with accuracy and consistency from angles and enhances the effectiveness of encased weapon. Simple aiming methodology provides ability to scale up shooting skills and hence enable firer to become a marksman.

Firing from the Hip. The inherent ability and accuracy of the weapon to fire from the hip is maintained and gets better due to added parts of the system.

Night Firing. IR Camera enables effective firing in night, this lethal ability to fire at night from a covered position without exposure provides perceptible ascendancy over adversary.

Ease of Operation. ShootEdge is customized for a particular weapon and this enables ease of assembly in shortest possible time frame and getting the weapon into action.

Light Weight. The system is lightweight and can be carried along with a pistol into battles or encounters. ShootEdge comes with a sling that allows ease of carriage

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ZEN HAND GRENADE SIMULATOR (ZEN HE36S)



Zen HE36S® is a patented hand grenade simulator that helps trainees develop a high degree of mind-body coordination, essential for effectively firing hand grenades and preventing accidents. It is a non-fragmenting and reusable hand grenade. It is useful for soldiers for handling, practicing lobbing techniques and reacting to the timing of the fuze. The simulator is of the same dimension, shape, weight, look and feel of the HE36 hand grenades used by Security Forces.

Characteristics of Equipment

- Overcomes the problem of shortage of grenade firing ranges.
- Option to either lob or fire with a rifle.
- Produces blast, flash, smoke and sound but does not fragment.
- Removes fear, improves reflexes and increases mind-body coordination.
- Fills gap between squad post training and live grenade throwing/firing to perfection.
- Allows 24X7 training in restricted space, saving time and logistics.
- Reusable up to 80-100 times.
- No serious casualties or injuries.
- Realistic training.
- Allows arming and disarming drills of grenade as in actuals.

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ZEN CONTAINERIZED TUBULAR SHOOTING RANGE (ZEN CTSR)



Zen CTSR is a secure indoor substitute for live firing. It is self-contained, transportable and reduces considerably the area required for a range. It can also be used to test weapons or as a forensic ballistic test facility.

Characteristics of Equipment

- Facilitates training with Small Arms
- Lets firers practise even in lying position
- Accommodates extension of the length of range with additional containers
- Includes a target system that detects bullets' points of hits and displays them on Firing Point Equipment which is placed close to the firer
- Contains projection systems that beam selected target, terrain and range on to the detection system
- Offers a display system that enables Commander/instructor to view the activities of firers inside the container as well as bullet hits on targets
- Provides record-replay facilities for After Action Review

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ZEN CONTAINERIZED INDOOR SHOOTING RANGE (ZEN CISR)



Zen CISR is a self-contained, transportable, live-fire shooting facility. It is designed and built to include the target retrieval system/firearm judgmental training video simulator or to serve as a forensic ballistic test facility

Characteristics of Equipment

- Helps overcome logistics involved in outdoor shooting
- Cost-effective against indoor shooting ranges
- Offers facility to fire at target ranging from 25 metres to 300 metres or even upto 2000 meter with the help of the application software for scaling the target.
- Does not require construction of infrastructure
- Transportable
- Installation process is minimal
- Ventilation system ensures there is no health hazard from smoke/fire either for the trainee or staff inside the premises or even outside the CISR.
- Acoustic treatment to keep the noise to acceptable levels

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About FICCI

Established 90 years ago, FICCI is the largest and oldest apex business organization in India. Its history is closely interwoven with India's struggle for independence, its industrialization, and its emergence as one of the most rapidly growing global economies.

A non-government, not-for-profit organization, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, FICCI articulates the views and concerns of industry, reaching out to over 2,50,000 companies. FICCI serves its members from large (domestic and global companies) and MSME sectors as well as the public sector, drawing its strength from diverse regional chambers of commerce and industry.

The Chamber with its presence in 14 states and 10 countries provides a platform for networking and consensus-building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community.



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