INDIAN ARMY

MAKE IN INDIA

Azadi Ka Amrit Mahotsav

FICCI

ATMANIRBHAR BHARAT

ARMY MAKE PROJECTS

8 November 2021

MAKE IN INDIA DEFENCE : CREATING CAPABILITIES FROM WITHIN

Army Design Bureau

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MESSAGE

The Indian Army is committed to translate the Govt of India's **'Atmanirbhar Bharat Abhiyan'** for promoting self sufficiency, while progressing the procurement of Army's defence equipment requirements. Achieving autonomy in defence manufacturing is a strategic imperative for maintaining sovereignty and military superiority.

The Indian Army has been the torch bearer in promoting 'Make Projects' as a route for achieving self reliance in design and development of indigenous defence equipment. As on date, the Indian Army is progressing **36 Make Projects**, which include 14 'Approval in Principle' projects which are the outcome of **Suo-moto proposals** received from the industry. This clearly exhibits the resolve of the Army to foster indigenous defence manufacturing. It gives me immense satisfaction to place on record, the resolve and commitment of Indian Army in the outstanding progress of 'Make II' projects achieved in the last one year, despite the challenges of the COVID 19 pandemic. The synergy between the Project Facilitation Teams and our industry partners has been instrumental in collaborative progress of the ongoing projects.

Make Seminars, conducted by the Indian Army every year, have been a good forum of interaction with the Industry, to showcase new projects and understand defence industry concerns. It gives me immense satisfaction to see this partnership grow through this platform. We remain committed to work together with the Indian Defence industry and I am sanguine that we will contribute towards modernizing the Indian Army with indigenous equipment.

Jai Hind!

(MM Naravane)
General
Chief of the Army Staff

राज कुमार
सचिव
Raj Kumar
Secretary

सत्यमेव जयते

स्वच्छ भारत

भारत सरकार / Government of India
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रक्षा मंत्रालय / Ministry of Defence
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MESSAGE

1. India's stature as a fast emerging economy has been strengthened by the Hon'ble Prime Minister's vision of **'Atmanirbhar Bharat'** to promote self reliant and self sufficient India. DAP 2020 has incorporated enabling provisions and simplified procedures for Make and Innovation Schemes given in chapter III. DDP has always stressed upon engaging industries including MSME's, Start-ups, Innovators, and Academia and provide them necessary support. I wish to compliment the efforts of Indian army towards promotion of **'Make Process'** and for creating confidence and connect with Indian defence industry through **'Indian Army Make Webinar 2021'**.

2. The multiple schemes to develop future technologies through various schemes of GOI like innovations for Defence Excellence (iDEX) and Make Projects have started showing encouraging results. The need of the hour is to get more and more private sector involved in defence production. Big leaps towards indigenisation have been taken by the Indian army, with full support from DDP. The large number of AIPs accorded to new projects, PSOs and AONs progressed in the last one year, is an indicator of the impetus given to Make projects by the Indian army.

3. The response from the Defence Industry to the make projects has been extremely encouraging, which is a positive indicator of the dream of "Make for the World". I am confident that Indian army will achieve greater laurels and maintain the lead in this direction. I extend best wishes to all Stakeholders.

'Jai Hind'

(Raj Kumar)

Place : New Delhi
Date : 2nd November 2021

MESSAGE

Achieving autonomy in defence manufacturing is a strategic imperative for any nation. It is extremely important for maintaining sovereignty and military superiority. Tremendous efforts have been put in by Indian Defence Industry in achieving self-reliance of our military needs over the last few years. Our government's vision and policy implementation by Ministry of Defence, wholeheartedly support the industry. Our armed forces are also supporting the Indian Defence industry to achieve our national objective of self-reliance.

There are many initiatives spearheaded by our armed forces to compliment the vision of GOI and to create a robust defence industrial base. One such aspect is the Make – II projects where our armed forces and especially the Indian Army has been on the forefront, to work with the domestic defence to innovate and manufacture defence products in India.

In fact, the annual interaction between Defence Industry and Indian Army on Make Projects has created a niche for itself in the overall defence industry engagements. FICCI is highly privileged to have partnered with Indian Army for the last 2 editions of Army Make Projects programme and also to play an active role in bringing defence industry players to this forum. Rightly, this activity is an important annual event for the domestic industry.

I also take this opportunity to highlight the positive outcome of this flagship initiative that are clearly reflected in terms of the multiple Project Sanction Orders that has been given to the industry.

I am confident that this edition of Army Make Projects 2021 Webinar will achieve another milestone in its journey towards Atmanirbhar Raksha Utpadan and Atmanirbhar Bharat.

I extend my best wishes to this Webinar!!!

'Jai Hind'

S Shukla

S P Shukla
Chairman
FICCI Defence and Aerospace Committee

Ser No	Dte	Proj Name	Contact Information
New Projects			
1.	Col AC-3, DG Armd Corps	AUTONOMOUS SURVEILLANCE AND ARMED DRONE SWARM (HIGH ALTITUDE AREA)	*ddgmf.gmg-ihq@nic.in*
2.	Col AC-3, DG Armd Corps	AUTONOMOUS SURVEILLANCE AND ARMED DRONE SWARM (DESERT/ PLAINS)	*ddgmf.qmg-ihq@nic.in*
3.	Col AD (GM-SP), DG AAD	INTEGRATED DRONE DETECTION & INTERDICTION SYSTEM	*skyplan-94@nic.in*
4.	Col AD (TCR & Make), Dte Gen of Army AD	LOW LEVEL LIGHT RADAR (IMPROVED)	*skyplan-94@gov.in.*
5.	Col Arty-9, DG Arty	RUNWAY INDEPENDENT REMOTELY PILOT AIRCRAFT SYS	*dir-arty9@army.mil*
6.	Col AD (GM-SP), Dte Gen of Army AD	LASER BEAM RIDING MANPADS	*skyplan-94@nic.in*
AIP Accorded (Inadequate Vendor Response)			
7.	Col AD (TCR & Make), Dte Gen of Army AD	3P AMMUNITION	*skyplan-94@gov.in.*
8.	Col Arty-5, DG Arty	155MM TERMINALLY GUIDED MUNITIONS	*dir-arty5@army.mil*

AUTONOMOUS SURVEILLANCE AND ARMED DRONE SWARM

(HIGH ALTITUDE AREA)

SWARM DRONES

Drone Swarms are a group of drones operating in conjunction with the ground manoeuvre forces which would provide an aerial manoeuvre capability during offensive as well as defensive tasks. The shaping of the battlefield can be greatly influenced by Drone Swarms, thereby allowing preservation of decisive columns of Mechanised Forces initially and application at place and time of own choosing. The inherent advantages of affordability, flexible employability, redundancy, precision, software domination, reduction in mission costs, Beyond visual Line of Sight (BVLOS) attack capabilities and risk of human causalities make the Swarm Drone a potent weapon for conventional as well as non-conventional operations. With a substantial force deployed in High Altitude Areas exceeding 4500 meters above Mean Sea Level (AMSL) Swarm Drones would be a force multiplier, compensating for limitations of ground based surveillance vectors in terms of time taken to mobilise and relocate and line of sight restrictions. Swarm Drones are being procured under Make-II projects for High Altitude Area. Swarm Drones can be effectively employed to detect enemy ground activities and target enemy ground forces to include troops, vehicles and command and control links. Some of the essential features envisaged are operating altitude above 4500 meters with a range upto 50 Kms, endurance not less than two hours and operating temperature from 20^{0} C to -20^{0} C.

Current Status : Feasibility Study Stage.

AUTONOMOUS SURVEILLANCE AND ARMED DRONE SWARM

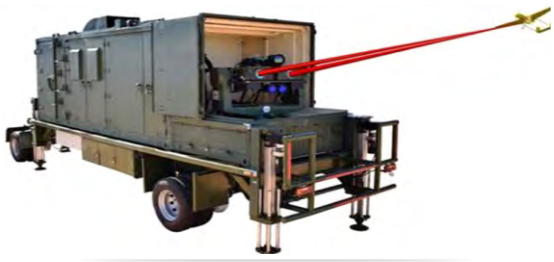
(DESERT/ PLAINS)

SWARM DRONES

Drone Swarms are a group of drones operating in conjunction with the ground manoeuvre forces which would provide an aerial manoeuvre capability during offensive as well as defensive tasks. The shaping of the battlefield can be greatly influenced by Drone Swarms, thereby allowing preservation of decisive columns of Mechanised Forces initially and application at place and time of own choosing. The inherent advantages of affordability, flexible employability, redundancy, precision, software domination, reduction in mission costs, Beyond visual Line of Sight (BVLOS) attack capabilities and risk of human causalities make the Swarm Drone a potent weapon for conventional as well as non-conventional operations. Swarm Drones are being procured under Make-II projects for Desert/ Plains. Swarm Drones can be effectively employed to detect enemy ground activities and target enemy ground forces to include troops, vehicles and command and control links. Some of the essential features envisaged are operating altitude upto 3000 meters with a range upto 50 Kms, endurance not less than three hours and operating temperature from 0^{0} C to 45^{0} C.

Current Status : Feasibility Study Stage.

INTEGRATED DRONE DETECTION & INTERDICTION SYSTEM



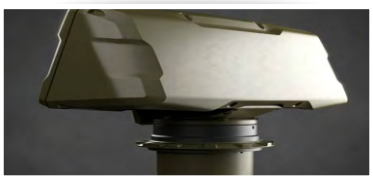
Small size commercial hand held Drones, RPAS & large military UAVs are decisive means of surveillance and delivery of munitions through the medium of air. Development is being undertaken world over, to evolve cost effective Air Defence means to counter this emerging Air Threat. The field of development include Radio Frequency Jamming, Directed Energy Weapons (DEWs) (Laser/High Power Microwave) and kinetic solutions (Air Defence Guns/ Drone Kill System). Army Air Defence is mandated to provide Air Defence protection to vital assets in the Technical Battle Area and therefore seamless surveillance of airspace for detection of this low Radar Cross Section threat, along with integrated weapon system for interdiction of the threat needs no emphasis. Integrated Drone Detection and Interdiction Sys comprises of an active and passive detective system with hard and soft kill options integrated through a suitable command and control system. It includes facilities of cuing the existing Air defence Guns, kinetic kill based drone interdiction system and High Power Microwave based counter drone system. It would be able to track upto 100 targets and engage minimum 20 targets simultaneously.

Current Status : Feasibility Study Stage.

LOW LEVEL LIGHT RADAR (IMPROVED)

In order to mitigate the aerial threat there is a need for maintaining a high degree of operational readiness to cater for unforeseen situations. The Low level aerial surveillance along Eastern and Northern Borders is very restricted due to the terrain configuration, providing an easy ingress route to aerial platforms. Therefore to plug this critical vulnerability, there is an urgent need of Low Level Light Weight Radar (Improved) for surveillance. The radar being proposed is to be an Active Electronically Scanned Array, 3D radar which can provide low level surveillance of over 50 Km and provide tactical control of AD weapons.

Current Status : Feasibility Study Stage.



RUNWAY INDEPENDENT REMOTELY PILOT AIRCRAFT SYS

RAPS/Drones have greatly impacted the modern battlefield Runway Independent concept affords greater operational flexibility in the category of RPAS. Ground based sensors have limited surveillance depth. This is an aerial surveillance platform (RWI-RPAS) with a range of 80 - 100 kms for tactical surveillance, target acquisition, Direction of Own Arty Fire (DOOAF) and Post Strike Damage Assessment (PSDA). It is ideal for mobile operations, reducing fixed wing launch and recovery challenges while freeing troops from stationary runway constraints. It will provide a faster shorter and responsive sensor- shooter Lina. The system is proposed to have automatic vertical take off and landing covering a range upto 80 kms, upto a height of 5 kms. It is proposed to have a day and night all weather high definition / Infrared gimbal stabilized camera with a range of 20 kms for detection and identification of hostile targets.

Current Status : Feasibility Study Stage.

LASER BEAM RIDING MANPADS

Proliferation of hostile platform with multi capabilities and varied characteristics pose great challenge to Air Defence. The Laser Beam Riding MANPADS works on laser beam riding and has three independently guided darts / sub-projectiles which destroy the target by kinetic energy and explosive effect. The multiple launcher is proposed to have two missiles, sensor and control assembly used for target detection and tracking. The sensor would have Thermal Imager and Day Camera producing digital images. The control assembly would provide laser source to guide the missile. The missile is proposed to have Super Sonic Speed with an effective range of more than 7 kms.

Current Status : Feasibility Study Stage.

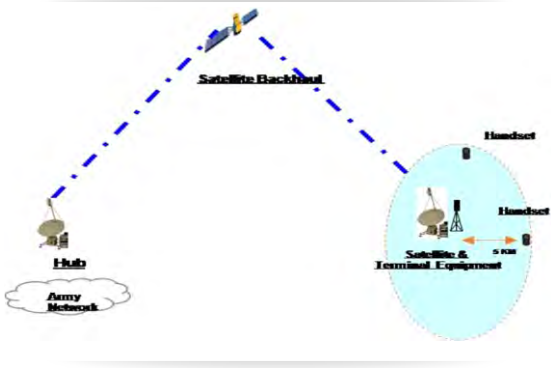
3P AMMUNITION

(INADEQUATE VENDOR RESPONSE)

Programmable, Pre-Fragmented, Proximity (3P) Ammunition system for 40mm L-70 gun is an advanced ammunition. The 3P ammunition system comprises of a round, fuze and Proximity Fuze Programmer (PFP). The fuze of the Programmable, Pre-Fragmented, Proximity (3P) Ammunition system is automatically and individually programmed by a Proximity Fuze Programmer (PFP) and provides a cost effective solution to engage evolving aerial threats.

Current Status : Pre-AoN Stage.

MOBILE INTEGRATED NETWORK TERMINAL (MINT)



Combat Communication Capability of Fd Army deployed in mountainous/ High Altitude Area predominantly rely on Radio Relay (RR) and Combat Network Radio (CNR) inventory which are based on Line of Sight (LoS) and support limited data speeds. There, is a need to enable the fighting elements with a light weight communication system which offers Beyond Line of Sight (BLoS) backhaul connectivity and a local access system which supports voice and high capability data. MINT is envisaged as a light, portable integrated communication solution with satellite backhaul and a high band with capacity access system (akin to 4G or better). Each MINT system will comprise a Field Wireless System (FWS), portable satellite backhaul, compact IP exchange, antennae system, power solution and accessories.

Current Status : Prototype Development Stage.

INTEGRATED AIR DEFENCE COMBAT SIMULATOR (IADCS)

The training of Air Defence gun crew is challenging due to peculiar requirements of large field firing ranges & expensive target systems (aeromodels /pilotless training aircraft etc). The use of simulators can provide effective training especially at the unit level which not only will be cost effective but also result in saving time and reducing move of troops. Thus there is a requirement of an effective simulator at the unit level for the Regiments holding the L-70 guns. The Integrated Air Defence Combat Simulator (IADCS) will include modified replica of L-70-gun model to cater for the specific training of Gun crews to provide realistic feel to the gunners. IADCS system should have the facility for auto evaluation of the student performance.

Current Status : EOI Evaluation Stage.

AD UNIT LEVEL TRAGET SYS

Unit Level Target System is to have VTOL capability/ Catapult Launch facility so as to reduce the requirement of Take off/Landing area. The system will be user friendly in terms of its operation thus reducing the training man-hours and overall cost incurred for training of operators on these target system. This target system will facilitate conduct of training during peace time for the gunners and the missile firers/ training for field firing/ tactical exercises with considerable ease from a restricted area/ small space. Being a unit level target system the same will not be used for live firing practices.

Current Status : EOI Evaluation Stage.

INFANTRY WEAPON TRAINING SIMULATOR (IWTS)

The Infantry Weapon Training Simulator (IWTS) is a modularly designed system which allows handling of Small Arms of a Section and Platoon to include in-service Pistols, Carbines, Rifles, Light Machine Gun (LMG), Rocket Launchers (RL), Sniper Rifle, Multiple Grenade Launcher (MGL) and MP9 (Sub Machine Carbine). A large number of modules can be built into the system which includes Annual Range Courses. Moving Target exercise, Reflex Shooting course, Field Firing, Tactical Engagement etc. In IWTS, scenarios could also be tailor-made to user requirements using 3D graphic softwares and AI and the lane configuration can also be customised to 6 lane, 8 lane or 10 lane profiles. The simulator uses replica or in-service weapons. The system has a tethered (where the compressed air is supplied for the recoil through a cable). Diagnostics suits built into the module, allows the instructor to switch the scenario as well as evaluate the firer's performance.

Current Status : EoI Issued.

MULTI PURPOSE FORK LIFT TRUCK (HEAVY DUTY)

Engineers in Armed Forces are involved in number of infrastructure development projects like construction of Habitats, Permanent Defences, Operational Tracks, Bridges and various ancillaries during peace and operations. Loading/ unloading and carriage/ handling of various stores for construction consume large number of manpower during operations. To obviate the problem of handling these stores manually, use of Material Handling Equipment like All Terrain Fork Lift will extensively save the man hours and improve their efficiency. The induction of Fork Lifts into Units will not only reduce the manhours but also reduce fatigue and stress, thereby improving combat efficiency.

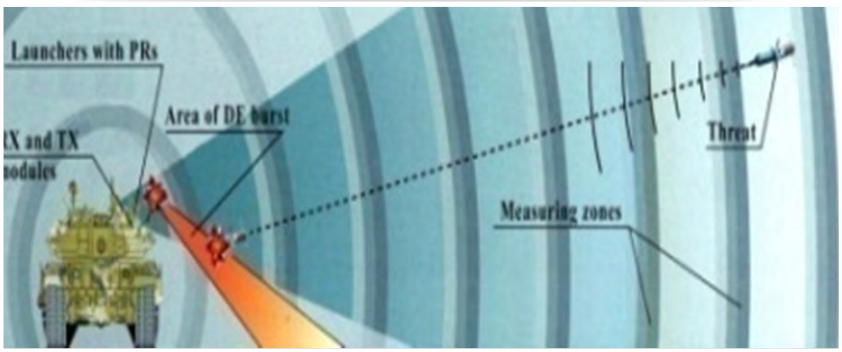
Current Status : EoI Issued.

DRONE KILLS SYSTEM

The air threat from low RCS Drone/Unmanned Aerial System (UAS) employed individually or as a SWARM has grown exponentially. Drone Kill System proposed will be utilized to effectively destroy the hostile drone / UAS by hard kill. Drone Kill System will comprise of 1x Drone Sensor, 10 x Drone Killer per Drone Kill System, 1 x Ground Control Station. The Drone Sensor will detect low RCS (Drone/ SWARM) up to a range of 06 kms and the information from the sensor shall be relayed to the Drone Killer through a Ground Control Station (GCS) that will defeat/ destroy the hostile drone/ UAS by hard kill upto a range of four (04) kms.

Current Status : EOI being issued.

AFV PROTECTION AND COUNTER MEASURE SYSTEM FOR T-90 TK



The population of T90 tanks is constantly increasing and it will be the mainstay of the Mechanised Forces. Tanks T-90s are presently devoid of an Active Protection System and only equipped with ERA panels which provide limited survivability in present battle field scenario. There is a need for an Active Protection System capable of not only detecting an ensuing attack but also defeating it, thereby enhancing own survivability. The enhanced protection is expected to be achieved through soft kill and hard kill capabilities of envisaged AFV Protection and Counter Measure System.

Current Status : Prototype Development Stage

ROBOTIC SURVEILLANCE PLATFORM

It is imperative that troops employed in counter terrorist operations are suitably equipped with equipment which enhances awareness. Robotic Surveillance will enable troops to know in advance the inside dispositions of targets before making an entry in buildings in built up areas. RR Directorate is nominated for Make project 'Robotic Surveillance Platform and the assessment/ Feasibility Study for this project was completed where by likelihood of bringing up such capabilities by Indian industry have been established.

Current Status : Pre-AoN stage.

TRUCK MOUNTED CRANE FOR ULH UNITS

Regiment of Artillery is in the process of modernising its capabilities. All future medium guns are planned to be 155 mm/ 39/ 45/ 52 Cal, thus, ensuring common 155 mm ammunition system. Unlike other calibre ammunitions which comes in single round packages, 155 mm ammunition is palletised. Weight of each shell pallet of 12 rounds is approx 620 Kgs and that of each Bi-Modular Charge System (BMCS) pallet, with 125 modules is approx 540 Kgs. To load and unload each pallet, mechanical means are an inescapable requirement. Truck Mounted Ammunition Crane on Ammunition Vehicles of medium regiments is proposed as a new Make project.

Current Status : EoI Evaluation Stage.

AIR DEFENCE FIRE CONTROL RADAR (LIGHT)

The Air Defence Fire Control Radar (Light) - Fly Ripper system is visualized to be cumulatively weighing a maximum of 6 tons +20% including the weight of vehicle (s). It will comprise of Search radar and Track radar, Fire Control System (FCS), Electro Optical Fire Control System (EOFCS) and Power Supply Unit. The radar will have dual frequency band (separate Search radar band frequency and Track radar band frequency). The radar will have the capability to detect and track wide range of target from fighter aircraft, helicopter, Unmanned Aerial Vehicle (UAV) to small sized drones. In case of jamming the EOFCS will provide target information to the Air Defence Guns and VSHORADS / Man portable Air Defence Missile System (MANPADS).

Current Status : Pre-AoN Stage.

HF SOFTWARE DEFINED RADIO (SDR)

The present radio sets in Indian Army are hardware based with separate radio sets for HF, VHF and UHF frequencies. The legacy radio sets have little or no data capability thereby restricting proliferation of network centric operations. The HF SDR will address these operational and technological voids. The HF SDR will also have provision for interoperability with legacy systems with ability to add, remove or modify the output of the systems through reconfigurable and re-deployable waveform leading to multi-mode, multi - frequency and multiplatform operations in a single hardware configuration. HF SDR will provide communication flexibility to our troops during UN Missions and all types of operations and Humanitarian Assistance & Disaster Relief (HADR).

Current Status : Pre-AoN stage.

MAN – PACK V/UHF SOFTWARE DEFINED RADIO (SDR)

Man-pack V/UHF Software Defined Radio is proposed as a backward compatible Software Defined Radio which is interoperable with future SDRs and other form factor SDRs. It will have the ability to add, remove or modify the out-put of the systems through reconfigurable and platform independent waveform leading to multi-mode, multi - frequency and multi - platform operations in a single hardware configuration. The proposed system should have the ability to establish communication both in fixed frequency and frequency hopping mode in both Clear and Secure Combat Net Radio and Mobile Adhoc Networks (MANET) to have communication range of 15 Km or greater. The system should be able to transmit voice, data, message and video in both Clear and Secure mode in Fixed Frequency and Frequency Hopping mode for transmission of Voice, Ground to Air Voice, Narrow Band Data, Wide Band Data, Narrow Band Mobile Adhoc Network (MANET) having 16 Nodes and Wide Band MANET having 32 Nodes.

Current Status : Prototype Development Stage.

PORTABLE HELIPAD

The size of the helipads made by Corps of Engineers vary from 25Mx25M to 100Mx100M. Presently portable helipads have several shortcomings such as heavy weight, difficult handling, larger requirement of transport, manpower intensive and difficulties in camouflage. Consequent to the developments in metallurgy and other alternatives, that are both flexible and resilient, it is proposed to seek a solution for helipad material that is user friendly, light weight and ruggedized with scope for modularity.

Current Status : Prototype Development Stage.

ARMAMENT UPGRADE OF BMP-2/2K

Armament Upgrade of BMP includes Gunner Main Sight, Commander Panoramic Sight and Fire Control System (FCS) with Auto Target Tracker (ATT).

Night enablement of Mechanised Infantry is an operational imperative in modern war fighting capability of Indian Army. A part of BMP fleet is planned to be upgraded with available niche technology. Based on the same, Indian industry has indicated capabilities for Up-gradation of Fire Control System (FCS) for Infantry Combat Vehicle (ICV).

Current Status : Prototype Development Stage.

155MM TERMINALLY GUIDED MUNITIONS

(INADEQUATE VENDOR RESPONSE)

For Indian Artillery there is a need to optimize the use of ammunition with precision strike capability and greater lethality. 155mm Terminally Guided Munitions are therefore appropriate smart ammunition of the future which will meet requirements of the Indian Artillery in terms of accuracy, faster speed of engagement, improved kill probability and correspondingly reduced logistics.

Current Status : EoI Stage.

AUXILIARY POWER UNIT (APU)

The proposed Auxiliary Power Unit will be an alternate source of power for the Fire Control System (FCS) to cater for power requirements during a lull in the battle or surveillance mode or during training to preserve the life of the main engine of the tank.

Current Status : Prototype Development Stage.

MEDIUM RANGE PRECISION KILL SYSTEM (MRPKS)

The MRPKS is proposed to be an indigenous Loitering Munition System to be developed and mounted on a vehicle. The launcher vehicle should have an integrated Launch Mechanism, Control Station, Communication Systems and Power Supply System. The munition should have a minimum range of 40 kms with an accuracy of less than 5 meters. The munition should have the capability to loiter in the target area for minimum 2 hours, provide real time video to control station and capability for target acquisition through user controlled interface. In addition, the system should have abort, re-attack and re-use capability. MRPKS will enable the rapid engagement of pin point targets with accuracy and will act as a major force multiplier in all operations.

Current Status : EOI being issued.

125MM APFSDS FOR T-72 & T-90 TANK

125mm APFSDS ammunition is primary tank ammunition utilised for destroying enemy tanks. There is a requirement to develop an indigenous APFSDS ammunition for T-72/T-90 tanks with a capability of achieving Depth of Penetration (DoP) of more than 530mm to enhance lethality within the existing safety and consistency parameters.

Current Status : Prototype Development Stage.

UPPER AIR SOUNDING SYS

The Upper Air Sounding Sys (UASS) is a Meteorological equipment used to measure upper atmospheric weather parameters viz, Pressure, Temperature, Humidity, Wind Speed and Wind Direction at various heights with an aim to undertake aviation weather forecasting, missile firing and in identification of atmospheric ducts which is essential for establishing enhanced radar/ sensor ranges.

Current Status : Field Evaluation Trial Stage

FLARES & CHAFFS

Flares are used in aircraft as a defensive countermeasure against heat-seeking missiles. These are discharged individually or in salvos by the pilot or automatically by tail-warning devices.

Chaff radar is a countermeasure in which aircraft or other targets spread a cloud of small, thin pieces of aluminum, metallized glass fiber or plastic, which either appears as a cluster of primary targets on radar screens or swamps the screen with multiple returns.

Current Status : Prototype Development Stage.

ELECTRONIC FUZE (VARIABLE TIME) FOR PINAKA ROCKET AMMUNITION

Indigenised version of the Electronic Fuze (Variable Time) for Pinaka HEPF ammunition is required with following main characteristics :-

(a) 10 m / 30 m Height of Burst (HoB).

(b) Shelf Life of 15 years.

(c) Modes of Operation.

(I) Proximity.

(ii) Point Detonation.

Current Status : Pre-AoN stage.

MANOEUVRABLE EXPENDABLE AERIAL TARGET (MEAT)

MEAT is an expendable Aerial Target Aircraft required to provide realistic live firing for training of crews, testing the efficiency of existing weapon system and validation of various equipment trials. It is capable of flying at the speed of 400 km/h or more at an altitude range of 20m to 5000m. It is launched with the help of a catapult launcher.

Current Status : CNC Stage

AUGMENTED REALITY (AR) BASED HEAD MOUNTED DISPLAY SYSTEM

The Augmented Reality Head Mounted Display System is conceived as a capability enhancement to Land Based Air Defence Weapon Systems such as IGLA shoulder fired IR Homing AD Missile System and ZU 23mm 2B AD Gun System by providing the operator with radar and thermal imaging sight outputs as overlays on the real life view of surroundings and the sky via Augmented Reality Head Mounted Display (ARHMD) System. The proposed system intends to enhance the capability of Land Based Air Defence Weapon Systems so that engagements of hostile aerial targets are possible during night and conditions of inclement weather. At the same time, day-time engagements are intended to be enhanced through increased reaction times, data computation for decision support, and integration of output of Thermal Imaging sights.

Current status : Prototype Development Stage.

NIGHT SIGHT FOR AGS – 30

AGS is an area weapon used by Infantry. Presently there is no night sight for its employment during night. The project aims to develop a Thermal Imaging based night sight alongwith a Fire Control System for employment during darkness and improving the kill probability.

Current status : PrototypeDdevelopment Stage.

3RD GENERATION ANTI GUIDED MISSILE (ATGM) SYSTEM

3rd Gen ATGM System will replace the 2nd Generation MILAN/ Konkurs System. It has a fire and forget, direct attack and top attack capability against intended targets. With active / passive guidance system and Lock-on-Before Launch capabilities have not only increase the accuracy of the system but has also provided quantum jump to operator safety. System has a soft launch capability and can be launched from a vehicle and ground based platform.

Current status : Prototype Development Stage.

GPS/GIS BASED MINEFD RECORDING SYSTEM

The laying, recording and marking of mine fields is covered under Geneva Conventions. Once the requirement of laying the minefield is over, all unused mines are retrieved. There is thus a requirement to record accurately the location of each mine that is laid. Presently such records are maintained manually and involve lengthy and cumbersome manual procedures. The project aims to develop a fully automated GPS/GIS based minefield recording system.

Current status: Prototype Development Stage.

UPGRADED ASSAULT TRACK WAY

The equipment is held with Engineers for construction of operational tracks in under developed/desert terrain. The present ATW has its limitations and a new track way is envisaged to support move of heavier vehicles yet be lighter in weight with a reduced volume for faster employment.

Current Status : Field Evaluation Stage

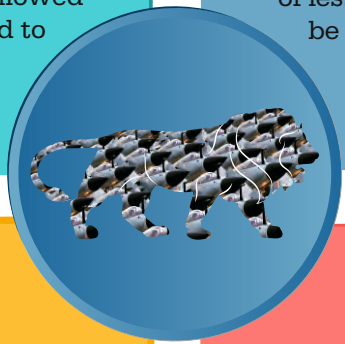
MAKE- II
"FASTER ROUTE TO CAPABILITY BUILDING"

RELAXATION IN CONDITIONS

-Allowing all eligible vendors to participate in the prototype development process
-No Cap on number of players to show interest & offer prototype
-Suo-moto proposals allowed
-Start-ups permitted to supply eqpt

FACILITATIONS & GUARANTEES

-No foreclosure - assured orders
-Provision for Project Facilitation Team
-Reduces the total time from AIP to placing of order
-Projects with developmental cost of less than three crore will be reserved for MSME



REDUCED DOCUMENTATION

-No detail project report required
- Saving of time & efforts

SHQ EMPOWERMENT

-SHQs to give all subsequent clearances after AIP
-Option with SHQs to accept single individual/ firm offers an innovative solution
-SHQs allowed to hire domain experts/ Consultants

RAPID PROTOTYPING AND QUICK DEPLOYMENT

MAKE- II
"FLOW CHART WITH TIME FRAME"

AIP

Project once recommended by SHQ is Approved in Principle by a collegiate headed by Secretary (Defence Production) and listed on the DDP website.

01

Constitution of PFT

04 Weeks

Project Facilitation Team (PFT) is constituted that progresses the project from feasibility study upto arrangements for conduct of field evaluation trials.

02

FEASIBILITY STUDY

12 Weeks

Conducted by a Project Facilitation Team (PFT) at the SHQ to establish technical and commercial feasibility and draw broad Preliminary Services Qualitative Requirements.

03

PSQR

04 Weeks

Preliminary Services Qualitative Requirements are the broad functional requirements and specifications required from the equipment.

04

AoN

06 Weeks

Govt accords "Acceptance of Necessity" for the project through a system of collegiate meetings termed as Service Procurement Board meetings. Higher outlay projects are approved by Defence Procurement Board or Defence Acquisition Council. A Project Facilitation Team (PFT) would hereafter steer the project.

05

EoI Preparation, Issue and Response to EoI

16 Weeks

Expression of Interest is published on the MoD (DDP) website to invite company (ies) to participate in the project.

06

EoI Evaluation

06 Weeks

Response to EoI are evaluated by the Project Facilitation Team. VCOAS approves the EoI evaluation report. Companies found compliant to EoI criterion are called Developing Agencies (DAs).

07

PSO

02 Weeks

Project Sanction Order (PSO) is issued to all DAs who qualify the EoI evaluation criterion.

08

Prototype Development

30-48 Weeks

Close interaction with the companies is maintained by the Project Facilitation Team (PFT) to provide handholding through out the project. Prototype is developed by the Developing Agencies which includes User Trial Readiness Review.

09

Conversion of PSQR to GSQR & Commercial Offer

08 Weeks

PSQR are converted to GSQR & Commercial offers are sought prior to commencement of trials of the prototype.

10

⇒ **Timing in weeks for each stage.**

SUO MOTO

"PROGRESSING FAST YOUR ABILITIES FOR OUR CAPABILITIES"

Suo Moto Proposals – Progressed as Make II Projects

01 Armament Upgradation to BMP2/2K	02 3rd Gen Anti Tank Guided Missile (ATGM)
03 Night Sight for Automatic Grenade System (AGS)-30	04 Infantry Weapons Training Simulator (IWTS)
05 Multi Role Precision Kill System	06 Truck Mounted Crane for Ultra Light Howitzers (ULH) Regiments
07 Integrated Air Defence Combat Simulator (IADCS)	08 Air Defence Unit Level Target System
09 Air Defence Fire Control Radar	10 Drone Kill System
11 Integrated Drone Detection & Interdection System	12 HF SDR
13 VHF SDR	14 Laser Beam Riding MANPADS

Part- I : General Information

1. Name of the Vendor/Company/Firm/Individual.

_____

2. Contact Details.

_____

City: _____ State: _____

Pin Code: _____ Tele: _____

Fax: _____ URL/Web Site: _____

Email: _____ Mobile: _____

3. Local Branch/Liaison Office in Delhi (if any).

Name & Address: _____

Pin Code: _____ Tel: _____ Fax: _____

Email: _____ Mobile: _____

4. Type of the Applicant (Company Partnership firm/ Individuak etc)

5. Company profile (Not more than 500 words)

6. Cetification by Quality Assurance Organisation.

Name of Agency	Certification	Applicable from (Date & Year)	Valid till (Date & Year)

7. Membership of FICCI/ASSOCHAM/CII or other Industrial Associations.

Name of Organisation **Membership Number**

8. Any other relevant information:

Part- II : Details of the proposed product/

Sr No.	Subject
1.	Name of the product:
2.	Brief Description of the product including its functions/applications
3.	Intended End User: Army/Navy/Air Force/ Para Military.
4.	Preliminary specification of Material, Dimensions/ Weight etc
5.	Image of the product, if already developed (may be attached as Annexure)
6.	Tentative cost of the equipment/ system
7	Proposed timelines for development of prototype and if successful production and delivery timelines
8	Proposed methodology for evaluation
9	Details of inspection agency/ Accredited lab likely to be involved
10	Approximate Indigenous Content
11	Equipment/ System life
12	Whether proposed equipment/ system being offered is an upgrade/ Innovation? If yes, Please elaborate.
13	Is any other similar product available with world market? If Yes, a brief comparison of capability/ performance/Cost etc may be furnished
14	Any patents existing
15	If product is yet to be developed, please indicate the following in detail:- (i) Assistance required from end user, If any. (ii) Time frames envisaged

Note: The firm/ individual may attach Video/ images etc of the proposed product separately.

Declaration It is certified that the above information is true.

Date: (Authorised Signatory)

Imp: Suo Moto proposals to be forwarded through
Defence Investor Cell (definvestorcell@ddpmod.gov.in)

ROLE

Undertake technology scan, identify technologies for acquisition and development, facilitate R&D efforts with Industry, Academia, DRDO & DPSUs, provide inputs and enable them to understand user requirements while initiating cases of design & development with the industry, all with the aim of promoting indigenization.

CHARTER OF ARMY DESIGN BUREAU

- Designated as IIO/ PMU for Indian Army
- Act as a central repository of technical know-how for the Indian Army
- To assist in formulation of GSQRs / PSQRs / JSQRs
- To collate operational requirements from the field formations and bring it forward for deliberations with Government Research Institutions, OFB, DPSUs, Defence Industry and Academia
- Promote indigenous design, development and manufacturing through MAKE category
- Assist in identifying various projects for the DRDO and be the single point contact with it
- Generate long term research requirements for the IA and share the same with DRDO and Academia
- Leverage domestic capabilities with Indian Industries, MSMEs including Start-ups for steering innovations
- To steer Innovations undertaken by individuals / formations

PARTNERS IN REALISATION OF INDIGENISATION OF DEFENCE PRODUCTION: ATMANIRBHAR

Number of Make II Projects progressed till PSO and beyond stages -14

DAs to whom PSOs Issued - 159*

Promoting MSME Participation in Make II Projects for Self-Reliance

40-45% of PSOs issued to MSMEs

11 projects costing approx 1000 crore reserved for MSMEs

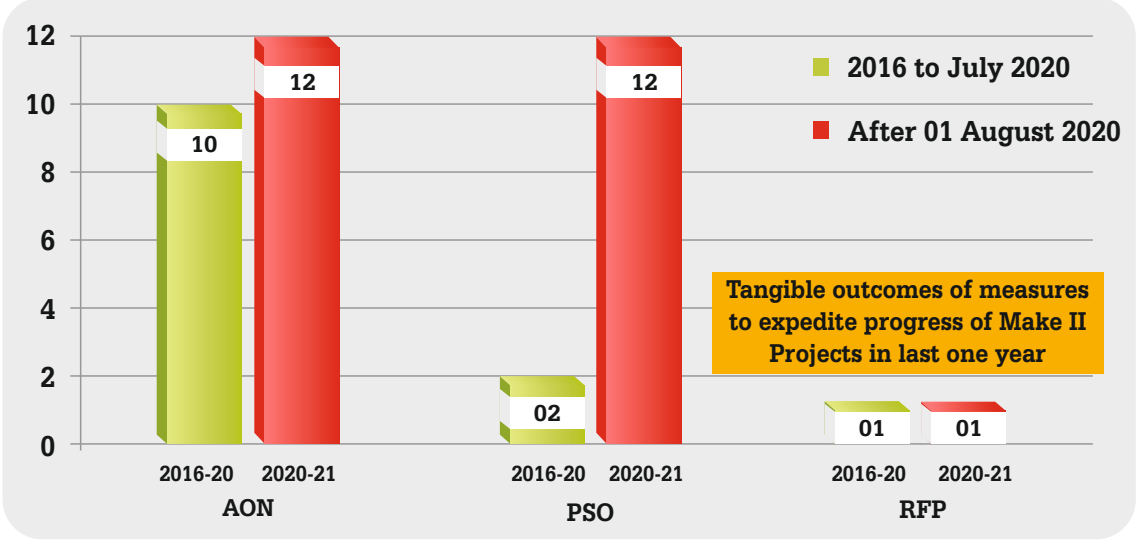
01	M/s Aakash Polytech Pvt Ltd, Faridabad, Haryana
02	M/s Acculytics Chemicals Pvt Ltd, Ghaziabad
03	M/s Accurate Industrial Controls Pvt Ltd, Pune
04	M/s Adani Defence Sys & Tech Ltd
05	M/s Aidin Tech Pvt Ltd, Bangalore
06	M/s Alpha Design Tech Pvt Ltd, Bengaluru
07	M/s Alpha Design Tech Pvt Ltd, New Delhi
08	M/s Altair Infrasec Pvt Ltd, Pune
09	M/s Amalgamated Industrial Composites Pvt Ltd, Nashik
10	M/s Anadrone System Pvt Ltd, Mumbai
11	M/s Ananth Technologies Ltd, Hyderabad
12	M/s Apex Plis Tech Hyderabad
13	M/s Ashok Leyland Defence Sys Ltd
14	M/s Astra Microwave Products Ltd
15	M/s Astra Rafael Comsys Pvt Ltd
16	M/s Audo Viso, New Delhi
17	M/s Avant Advanced Engineering Pvt Ltd
18	M/s Azista Industries Pvt Ltd, Ahmedabad
19	M/s BEL, Panchkula
20	M/s BEL-Thales Systems Ltd
21	M/s Bharat Dynamics Ltd
22	M/s Bharat Electronics Ltd, Bengaluru
23	M/s Bharat Forge Ltd Mundhwa, Pune
24	M/s Bhilai Engineering Co Ltd
25	M/s Brahmm Tactical Sys Pvt Ltd, Pune
26	M/s BTL EPC Limited, Kolkata
27	M/s CE Info Sys Pvt Ltd
28	M/s Cluster Telecom Pvt Ltd, Noida
29	M/s Core Energy Systems Pvt Ltd
30	M/s Coresonant Sys Pvt Ltd
31	M/s Cyient DLM Pvt Ltd
32	M/s Data patterns (India) Pvt Ltd, Chennai
33	M/s Defsys Solutions Pvt Ltd, Bangalore
34	M/s Dimansion NXG, Thane
35	M/s Economic Explosives Ltd, Nagpur
36	M/s ELCOM Innovations Pvt Ltd, New Delhi
37	M/s Elcome Integrated Sys Pvt Ltd
38	M/s Electronic Co of India Ltd, Hyderabad
39	M/s Electropneumatics & Hydraulics (India) Pvt. Ltd, Pune
40	M/s Enabletech Industries Pvt Ltd
41	M/s Enlivening Techn Pvt. Ltd, Ramayondanahalli
42	M/s Eon Infotech Ltd
43	M/s Frog Cellsat Ltd
44	M/s Gainwell Commosales Pvt Ltd, Kolkata
45	M/s Genesys International Co Ltd
46	M/s Greaves Cotton Ltd, Mumbai City
47	M/s HFCL Ltd (Himachal Futuristic Comn Ltd)
48	M/s HH Interiors LLP, New Delhi

49	M/s Hindustan Aeronautics Ltd, Bengaluru
50	M/s ICOMM Tele Ltd
51	M/s Inify Tech Pvt Ltd
52	M/s Innovation Comn Sys Ltd
53	M/s Jackson Public Ltd
54	M/s Kalyani Rafael Advanced System Pvt Ltd
55	M/s Kayani Forge Ltd, Pune
56	M/s Kerala State Electronics Develp Co Ltd
57	M/s Kestrel LLP
58	M/s Kinetix Engg Solution, Bangalore
59	M/s Komoline Aerospace Ltd, Ahmedabad
60	M/s L&T MBDA Missile Sys
61	M/s Larsen & Toubro Ltd, Mumbai
62	M/s Larsen & Toubro Ltd, Bangalore
63	M/s Madnani Engg Works, Kanpur
64	M/s Mahindra Defence Sys Ltd, Mumbai
65	M/s Maitreya Polymers & Speciality Chemicals Pvt Ltd, Pune
66	M/s MAK Controls & Systems Pvt Ltd, Coimbatore
67	M/s Medha Servo Pvt Ltd, Hyderabad
68	M/s Microcomm India Ltd, Delhi
69	M/s Mobile Hospital Designers & Developers India Pvt Ltd, Noida
70	M/s Mtandt Limited, Ghaziabad
71	M/s Muskaan Safety Solutions Pvt Ltd, Dehradun
72	M/s Mwiven Infra Tech Pvt Ltd
73	M/s New Space R&T, Balgalore
74	M/s OFB, Kolkata Ayudh Bhavan
75	M/s Omnitex Industries (India) Ltd, Mumbai
76	M/s Optimized Electrotech, Ahmedabad
77	M/s Opto Electronics Factory, Dehradun
78	M/s Ordnance Devlp Centre, Yaddumailaram Sangareddy
79	M/s Osho Corp Global Pvt Ltd, Delhi
80	M/s Planetcast Media Service Ltd, New Delhi
81	M/s Powerica Public Ltd
82	M/s Pranav Vikas Pvt Ltd, New Delhi
83	M/s Premier Explosive Ltd AOC Centre
84	M/s Precision Electronics Ltd, Delhi
85	M/s Reliance Land System Ltd
86	M/s Reliance SED Ltd
87	M/s Renuka Precision Sys, Hyderabad
88	M/s Right Choice Aviation (ESSD) Pvt Ltd, Mumbai
89	M/s Rolta Def Tech Sys Pvt Ltd
90	M/s Scanpoint Geomatics Ltd
91	M/s Sertel Electronics Pvt Ltd, Chennai
92	M/s SGS Weather and Environmental Sys Pvt Ltd, Delhi
93	M/s Sidwal Refrigeration's Industries Pvt Ltd, New Delhi
94	M/s Signatron System Pvt Ltd, Bangalore
95	M/s Sika Interplant System Ltd, Bangalore
96	M/s Speciality Innotech Pvt Ltd, Pune
97	M/s Sri Kartik Toolings, Pune
98	M/s SS Micro Electronics Tech Pvt Ltd, Ghaziabad
99	M/s Statcon Energiaa Pvt Ltd, Delhi
100	M/s Sterling Generators Pvt Ltd, Mumbai
101	M/s Syncthreads Computing LLP
102	M/s TATA Advanced Systems Ltd
103	M/s Techniche Consulting Services Pvt Ltd
104	M/s Texla Plastics & Metals Pvt Ltd, New Delhi
105	M/s Tonbo Imaging India Pvt Ltd, Bangalore
106	M/s Veda Aeronautics Pvt Ltd, New Delhi
107	M/s VEM Technologies Pvt Ltd, Hyderabad
108	M/s Verdant Telemetry & Antenna Sys Ltd
109	M/s Vihaan Network Ltd
110	M/s Walchandanagar Industries Ltd
111	M/s Yaralava Concepts Pvt Ltd
112	M/s Zen Technologies, Hyderabad

** DAs issued more than one PSO have been mentioned once only in the above list*

MAKE II : INITIATIVES BY INDIAN ARMY

- New Projects - AIP for 07 x New Make II projects was accorded in last three months
- All Feasibility Studies have been Completed, except new cases
- Last one year :
  - 01 x RFP has been issued
  - 12 x PSOs have been issued
  - 12 x AoNs have been granted
- Fast track Guidelines issued
  - Collegiate based Comments on SoC for AoN (within 6 weeks)
  - Revised EOI format (to obviate conditional responses)
- EoIs being issued in 04 weeks instead of 8 weeks
- IWTS is the first tri-service project initiated by IA.



SUPPORTING INCUBATION OF TECHNOLOGY IN DEFENCE

Innovations for Defence Excellence (iDEX)

Aim. Creation of an ecosystem to foster innovation and technology development in Defence and Aerospace. Idex functions as the executive arm of Defence Innovation Organization (DIO) formed as a "not for profit" company.

Funding. Defence Innovation Fund (DIF) will be managed by iDEX.

Army Technology Board (ATB)

Aim. Army Technology Board (ATB) is to support R&D in Academic Institutions in the field of Defence Technology through innovation and integration with exisitng equipment.

Funding. ATB will fund projects on a milestone linked plan.

Technology Development Fund (TDF)

Aim. Technology Development Fund (TDF) encourages participation of public/ private industries to create an eco-system for enhancing cutting edge technology capability for defence application. Proposals that can be supported by TDF are

- Significant up-gradation/ improvements/ further developments in the existing products/ process/ application.
- Technology readiness level up-gradation from TRL3 onwards.
- Development of futuristic technologies/ innovative products.
- Import substitution of components.

Supporting Incubation of Technology in Defence - Projects through other Schemes

iDEX PROJECTS

1 Indlividual Protection System

2 See Through Armour

3 Active Protection System

4 Remotely Piloted Aerial Vehicle

5 Tactical Local Area Network Solution

6 Identification Friend or Foe

7 Foliage Penetration Radar

8 Artificial Intelligence based satalite Image Analysis

9 Next Generation Communication over Existing Radio Network

10 Long Endurance Aerial Surveillance Platform

11 Integrated Mobile Camouflage System (IMCS)

12 Rapid Foldable Infantry Assault Bridge

13 Generation of Quantum Secure Keys over 200 Kms

14 Situation Awareness for Mechanised Columns

15 AR/VR based Sortie Prepration Aid for Helicopter Pilots

16 AI based RF Spectrum Management

17 Precision Guided Kit for 81mm Mortar Ammunition

18 Silent Overwatch for Infantry Combat Vehcles using Fuel Cell/Alternate Fuel based Auxiliary Power

19 Wall Penetrating Radar

20 Xploder-Unmanned IED Disposal :Remotely Operated Vehicle

21 Tactical Recce and Surveillance System

22 Tactical Infared Illuminator (TIRIL)

23 Automatic Drone Based System to detect and mark mines & IEDs

24 Synthetic Training Environment: AR in Military Training

ATB PROJECTS

1 Artificial Intelligence Based Unmanned Ground Vehicle for Creating Vehicle Safe Lane (VSL) by Employing GPR and Image Processing

2 Development of Extended Range Ammunition Using Ramjet Technology with Precision Guidance in Artillery Shells

3 Add on Radar for Jamming of UAVs

4 Sewage Disposal at High Altitude Areas

5 Habitation in High Altitude Area

6 Design & Development of Low Light Imaging Sensors

7 Construction of Concrete Permanent Defence (PDs) (with Tunnel Defence) & Prefab Habitats

8 Artificial Intelligence based Data Management Software for Surveillance Centre

9 Development of Applications for Indian Army

10 Design & Development of Secure Mobile Platform

11 Light Weight Armour

12 Robotic Multi Utility Logistic Equipment (MULE)

13 Design & Development of Naturally Insulated Shelter

14 Module for Locating Humans Trapped in Snow

TDF PROJECTS

1 Course Correction Fuzes for Artillery

2 Devplopement of Drones for Carriage of Stores in High Altitude Area (HAA)

3 English to Mandarin Translator

4 Exoskeleton

5 Real Effective Available Logistics Through AI (REAL-TI)

6 AI Based analysis of Health Data of Past 5 to 10 Years

7 Automated Change Detection in Satellite Images for Monitoring of terrorist Camps/Enemy Posts

8 Amphibious Bottom Crawler

FIND US AT WEB

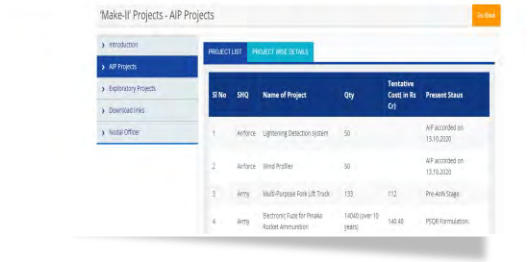
For Army Design Bureau Log in at
https://indianarmy.nic.in/makeinindia

Navigate to Make in India tab

Explore Webpage for

- Army Design Bureau
- RFIs
- Projects
- Latest Policies
- Firing Ranges & Test Facilities
- Olive Pages
- Important Links

For details of Army Make Projects Log in at
https://makeinindiadefence.gov.in/



Explore Webpage for

- Details of Make Process & policies
- Publications
- Progress Status
  - AIP Projects
  - Exploratory Projects
- Brief of Projects
- Questionnaire for Feasibility Study
- Expression of Interest (EoI)
- Details of Project Officers and Nodal Officers
- DIC

NOTES

NOTES

Disclaimer
The information given in this brochure is only indicative and cannot be quoted as authority. For any queries contact us on the details given on the back cover.

All images used in this document are for representation purposes only.

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