ADITI 2.0

Acing Development of Innovative Technologies with iDEX

Problem Statements

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INDIAN ARMY

PROBLEM STATEMENTS

Problem Statement – 1: Anti-drone capability for Armoured Fighting Vehicles (AFVs)

Organization Name	Indian Army
Problem Statement/ Challenge title	Anti-drone capability for Armoured Fighting Vehicles (AFVs)
Challenge brief/definition	Recent conflicts have highlighted the Importance of 'Drone Warfare'. Drone warfare is a form of aerial warfare using Unmanned Combat Aerial Vehicles (UCAV) or Unmanned Aerial Vehicles (UAV). These unmanned vehicles are capable of undertaking precision strikes on AFVs. The existing ammunition of 12.7mm Anti-Aircraft Gun of AFVs is not very effective against smaller aerial targets.
Future Expectation from the prototype / Technology developed	Drone detection and development of fragmentation rounds for anti-drone capability.

Problem Statement – 2: Adaptive Camouflage for 'A' & 'B' Vehicles

Organization Name	Indian Army
Problem Statement/ Challenge title	Adaptive Camouflage for 'A' & 'B' Vehicles
Challenge brief/definition	Presently the vehicles of Mechanised Infantry both A & B Vehicles do not have scientific methodology adopted to undertake camouflage. The camouflage standards need to be improved. Towards this, adaptive camouflage is to be utilised for better camouflage in all terrain.
Future Expectation from the prototype / Technology developed	Development of “Adaptive Camouflage” to overcome existing challenges to camouflage in all terrain.

Problem Statement – 3: MILGRAD/JSS-55555 Compliant 5G Mobile handset (UE) for Military Applications

Organization Name	**Indian Army**
Problem Statement/ Challenge title	MILGRAD/JSS-55555 compliant 5G Mobile handset (UE) for Military Applications
Challenge brief/definition	Presently owing to the limited range of the commercially off shelf mobile handsets (UE), base stations/ gNodeB are deployed at regular intervals to provide connectivity to the users. The deployment of base stations at regular intervals increases the manpower required for manning the eqpt thereby increasing the fingerprint in the Tactical Battle Area (TBA) and increasing administrative load. The proposed mobile handsets (UE) will provide enhanced ranges of military mobile network coverage thereby reducing the need for deployment of base stations thereby reducing security risks. MILGRAD/ JSS-55555 compliant dual band (Band n3 & n28) 5G mobile handset (UE) for military applications having a power output of 500mW or better with a high gain antenna of 3 dBi or better, internal MIMO 2T4R or better, physical PTT, detachable battery capable of providing standby time of 48 hours or better and talk time of 12 hours or better in QPSK modulation shall be utilized in the Tactical Communication System along the Western Borders, Network in a Box (NIB) and MINT. The mobile handset (UE) shall enhance the operational efficiency of the system by providing enhanced ranges thereby requiring deployment of lesser number of base stations.
Future Expectation from the prototype / Technology developed	The JSS-55555 compliant 5G mobile handset (UE) should have a slot for hardware security chip and detachable S-band satellite sleeve.

Problem Statement – 4: AI as a Service along with Infra Setup

Organization Name	Indian Army
Problem Statement/ Challenge title	AI as a Service along with Infra Setup
Challenge brief/definition	As the Software & Systems continue to grow and evolve, Indian Army recognises the importance of leveraging Artificial Intelligence (AI) and Machine Learning (ML) to drive innovation, empowering decision-makers to make informed decisions, mitigate risks, and capitalize on opportunities. DGIS plans to offer modular AI services for users across the Indian Army that can help with automated data analysis using state-of-the-art AI algorithms and processing techniques. There is a need for unified platform to integrate AI services and connect them to the diverse applications hosted allowing us a. Leverage AI driven insights and recommendations. b. Enhance user experiences through personalised interactions and recommendations. c. Automate manual processes and improve operational efficiency. d. Develop new insightful streams through AI powered services & applications.
Future Expectation from the prototype / Technology developed	Integrating various AI services and enables seamless integration with multiple applications. The AI as a Service (AIaaS) platform will serve as a core of a decision support system, providing actionable insights and recommendations to users. The platform will host key AI services.

Problem Statement – 5: Multi Barrel Loiter Munition (MBLM) System

Organization Name	Indian Army
Problem Statement/ Challenge title	Multi Barrel Loiter Munition (MBLM) System
Challenge brief/definition	Loiter Munition (LM) is new generation unmanned aerial platform which is designed to sense & shoot a target with pinpoint accuracy. It is pre-fitted with a warhead & has the capability to loiter over target and strike on confirmation by crashing into it. The current variants of LM can be launched by Rail/Canister/VTOL platforms. In case MBLM is developed to be launched from existing platform i.e. Artillery Rocket Systems (GRAD/PINAKA/SMERCH), it will enable employment without need of any manpower addition. Further, it will enable mass employment thereby enhancing its effectiveness multifold. The challenge envisages development of following system/sub-system: - • Multi Barrel Launch System, compatible with GRAD/PINAKA/SMERCH platforms • Capability to launch 10 or more LM in salvo mode • Engine and propulsion system • High speed air frame with actuators & cable harness • On board flight control computer with instruments/sensors • Long range communication system with data immunity and integrity • Warhead and fuse • Anti-jammer GPS/EO-IR seeker with vision guidance • Ground Control Station (Software & Hardware) with capability to control multiple LMs together • Ground based Simulator

	• Any other component/sub-component deemed essential by the developing agency
Future Expectation from the prototype/ Technology developed	Extended range upto 500 Kms with satellite-based command, control & communication system

INDIAN NAVY

PROBLEM STATEMENTS

Problem Statement – 6: Development of 76 mm DART Ammunition

Organization Name	Indian Navy
Problem Statement/ Challenge title	Development of 76 mm DART Ammunition
Challenge brief/definition	Design and Development of DART Ammunition for 76 mm (NATO Standard) with RF beam rider Command Line of Sight (CLOS) continuous guidance. (a) 76 mm DART ammunition with RF beam rider CLOS continuous guidance by existing STRALES radar of SRGM (U). (b) High performance Warhead with fuse operating in Continuous Wave mode with Frequency Modulation. (c) Provision of detonating upon direct impact or proximity mode via multi-functional fuze programming feature, self-destruction mode feature. (d) Maximum manoeuvrability upto 40g.
Future Expectation from the prototype / Technology Developed	(a) Higher probability of hit against manoeuvrable targets. (b) Reduced ammunition expense, thus enhancing replenishment time. (c) Indigenous development of a niche technology.

Problem Statement – 7: Design and Development of High-Power Laser Source (>10 kW)

Organization Name	Indian Navy
Problem Statement/ Challenge title	Design and Development of High-Power Laser Source (>10 kW).
Challenge brief/definition	a) Design and Development of High-Power Laser Source (> 10 kW). b) The High-Power Laser Source should be capable of utilising different designs to emit light across wide range of wavelengths, thereby addressing diverse application requirement. c) The High-Power Laser Source should enable scalable power output, without significant change in architecture thereby ensuring suitability for developing niche technologies with varying power application.
Future Expectation from the prototype / Technology Developed	The High-Power Laser Source (> 10 kW) prototype should be capable of utilisation in development of various niche Laser technologies. These Laser technologies would be used in state-of-the-art Laser based Weapons and Sensors.

Problem Statement – 8: Design and Development of Infra-Red (IR) Detectors

Organization Name	Indian Navy
Problem Statement/ Challenge title	Design and Development of Infra-Red (IR) Detectors
Challenge brief/definition	(a) IR Detectors are typically sensitive to IR radiation from 700 nm to1 mm (near-IR to far-IR). (b) IR detectors are pivotal technological components with a multitude of applications across diverse fields. Their versatility spans from night vision and surveillance to medical diagnostics and environmental monitoring. (c) These detectors play crucial role in enhancing security, optimizing industrial processes, advancing scientific research and improving various consumer electronics. (d) Despite their importance, IR detectors are not currently manufactured in India and are imported from foreign countries, particularly from European countries. (e) Further, production of these detectors in India will develop local vendor base and ensure their availability at reduced cost. (f) Therefore, it is imperative for stakeholders to recognize and act upon the potential benefits of local IR detector manufacturing. This will not only reduce the dependency on foreign countries but will also position India as a key player in the global market.
Future Expectation from the prototype / Technology Developed	Manufacturing of IR detectors in India will benefit the various sectors as follows: (a) **Enhancing National Security and Surveillance:** IR detectors are essential for advanced security and surveillance systems, including night vision and thermal imaging. By manufacturing these detectors domestically, India can bolster its defence and security infrastructure, reducing reliance on foreign technology and fostering local innovation in critical areas of national security. (b) **Boosting Industrial and Infrastructure Maintenance:** IR detectors are used for thermography to monitor machinery and

	infrastructure. Local production of these detectors would enable more cost-effective maintenance solutions and improve the efficiency and safety of industrial operations. This would also support the growth of the industrial sector and infrastructure development within the country. (c) **Advancing Medical Technologies:** Medical applications of IR detectors, such as in thermography for diagnostic purposes, could greatly benefit from domestic manufacturing. By producing these detectors locally, India can enhance its healthcare capabilities, reduce costs for medical facilities, and promote the development of innovative healthcare solutions. (d) **Supporting Environmental and Agricultural Monitoring:** With increasing emphasis on environmental conservation and sustainable agriculture, IR detectors are instrumental in monitoring vegetation health, soil moisture, and atmospheric conditions. Domestic production of theses detectors would support India's efforts in environmental management and agricultural efficiency, contributing to sustainable development goals. (e) **Fostering Research and Technological Innovation:** The scientific community relies on IR detectors for research in astronomy, material science, and various other fields. By establishing a local manufacturing base, India can facilitate advanced research and innovation, positioning itself as a leader in cutting-edge technologies.

Problem Statement – 9: Naval- Collaborative Combat Air Vehicle (N-CCAV)

Organization Name	Indian Navy
Problem Statement/ Challenge title	Naval- Collaborative Combat Air Vehicle (N-CCAV)
Challenge brief/definition	1. Threat Capabilities: The primary threat has acquired significant A2/AD capability at sea, even at extended ranges. a. Threat quality posed is very high and based around anti-air destroyers and AEW a/c. b. Threat quantity has significant overmatch over own forces which Cannot be rectified in a reasonable timeframe. c. Threat defences have become highly evolved against existing conventional weapons including sub/supersonic ASMs. d. Threat can manifest a significant sea denial capability in areas of interest maritime via fait accompli scenarios necessitating a lethal and capable response. 2. Own Strike Capability: Own assets which are operationally competitive to these threats are available in limited numbers specifically a. The number of own 4+ gen aircraft that can be brought to bear is low. b. The number of VLS cells onboard ships are highly restricted and operational capability cannot be rapidly regenerated when engaged in conflict. c. The cost of even achieving parity with the threat is unaffordable and will require unacceptably long build times. 3. Therefore, there is an urgent need to restore: a. Counter-air capability against integrated air defences to enable own maritime forces to conduct their missions

	b. Air to Surface capability even in the presence of high end A2/AD threat 4. Creation of operationally competitive "Combat Mass At Range" utilizing Collaborative Combat Air Vehicles (CCA). The capabilities created need to be: a. Able to undertake teaming operations with manned aircraft for air to surface missions. b. Affordable/ capable of being deployed in a short time frame. c. Sustainable at sea for multiple engagements in an extended conflict. This necessarily requires a ship-based solution. d. Revitalise existing 4+ gen fighters and air/surface to surface weaponry.
Future Expectation from the prototype / Technology Developed	System: An air to surface strike solution capable of operating in the presence of sophisticated integrated air defence systems utilizing Collaborative Combat Air Vehicles. The system must be ship installed/launchable to integrate seamlessly with IN operations. Collaborative combat air vehicles that can/are: a. Operate as a complement/team with manned aircraft within acceptable levels of crew workload. b. Equipped with a customizable array of sensors, weapons, and other mission-specific equipment. c. Capable of use in contested environments. d. Operate semi-autonomously, capable of executing high-level commands from pilots, enhancing operational flexibility and responsiveness. e. Significantly less expensive than crewed aircraft.

Problem Statement – 10: Quantum Positioning System

Organization Name	Indian Navy
Problem Statement/ Challenge title	Quantum Positioning System
Challenge brief/definition	The Global Navigation Satellite System (GNSS), has been widely used for PNT (Position, Navigation and Time) services. With availability of cost effective GNSS jammers and spoofers, the services of GNSS can be degraded/denied. The selective availability of GNSS signals that can be exercised by the service controllers also puts a question mark on the availability of these services in times of conflict. Accurate functioning and availability of reliable signal poses a challenge for operational efficiency. In absence of positional information from GNSS, Inertial Navigation System exist that can provide Positional information for a limited period of time; however, the precision decreases due to induction of drift errors. The challenge is to design and develop a Passive Quantum Positioning System that once aligned (using GNSS), can maintain PNT accuracy for over 10 days in absence of an external GNSS inputs.
Future Expectation from the prototype / Technology Developed	1. Miniaturisation of Passive QPS. 2. Enhanced mission survivability and ability to withstand high speed manoeuvres. 3. Obviate dependency on foreign OEM.

INDIAN AIR FORCE

PROBLEM STATEMENTS

Problem Statement – 11: Counter Swarm Drone System

Organization Name	Indian Air Force
Problem Statement /Challenge title	To design and develop a swarm of multi domain launch capable loitering aerial interceptor against swarm drones (counter swarm-drone system)
Challenge brief/definition	Long range swarm drones are a threat to vital installations. The interception of these drones will require large infrastructure and high per weapon cost. The swarm drones carry distributed intelligence with some drones as communication, warhead, dummy, navigation systems, etc. With increasing development of swarm drones, an autonomous swarm drone interceptor system is required to detect, identify, disrupt, neutralise and destroy these drones. The system to be developed requires multiple drones that act against swarm to disrupt communication, create confusion by smoke/any other optical disruptor, soft kill, hard kill etc. The launch of system may be from a tube/any other technology that can be shoulder carried, vehicle mounted, aerostat, balloon or any other multi-domain launch capability. The challenge entails design, development, testing and certification of an autonomous multi-domain launch capable interceptor system against drones: (a) To act against a swarm drone attack and neutralise the attack by multiple collaborative swarms of drones neutralising individual targets. (b) Desirable to have all drones with similar form factor and design with modular concept towards hard kill, soft kill or any other mechanisms. (c) It may be based on tube launched drone system/any other design for easy carriage, rapid deployment and long-term storage in harsh environment that can be launched from ground vehicles or static installations. (d) The swarm drones must be able to maintain loiter over a vital installation while waiting for an incoming drone threat. The

	system must be able to home on to drones. The neutralisation may be a combination of hard kill, soft kill, communication disruption, navigation disruption, sensor disabling, electromagnetic pulse or any suitable technology in different drones. (e) It is desirable to have sensor payload bay/nose cone/sensor carriage design reconfigurable for replacing sensor (RF homing, radar guidance/EO guidance/data link or any other technology) for minimal design changes between different type of launch platform and threats. (f) Desirable to have warhead compartment as modular to fit in different warheads as offered by developer or future development. (g) The system must be portable and capable of transportation on vehicles, rail, ships and aircraft for quick deployment. (h) All system protocols, communication structure and Interface control documents must be made available to integrate with IAF systems in future. (i) The system must be able to operate till 5000 mtr & above. (j) Integral IFF for avoiding friendly fire with own drones and aircraft. (k) Desirable to recover unused drones for the next mission. (l) Desirable to have a combination of electric, internal combustion, rocket assisted, jet powered drones or any other technology for interception against different class of drone attacks. (m) Desirable swarm autonomy in intercept and target allocation by algorithm. However, option of manual override should also be provided.
Future Expectation from the prototype / Technology Developed	To develop autonomy and collaborative system for protection of a designated area. To develop re-launch capability for extended operations.

Problem Statement – 12: Personal Oxygen Delivery System

Organization Name	Indian Air Force
Problem Statement/ Challenge title	Development of a personal oxygen delivery system for aerial operations for aircrew and passengers.
Challenge brief/definition	There is no inbuilt oxygen delivery system in helicopters, the aircrew and passengers are required to carry independent oxygen delivery system. An oxygen system that can deliver oxygen to aircrew and passengers is required. There is a requirement to develop a personal body carried oxygen delivery system capable of operating till 22,000 ft along with all adapters for nasal delivery, pressurised delivery, warning alarms, high pressure storage for 1hour 30 minutes (90 minutes). The system must be light weight for carriage on aircrew body, easily replaceable oxygen bottles, charging system for mother cylinder and oxygen generators. The regulator should be able to reduce pressure as required for breathing. The rate of delivery must be capable / variable as required by pilots during flying and passengers/ crew for loading/ unloading tasks. The alarm for low pressure, high pressure, no breaths should be deliverable via vibrations and aural alerts. The system must operate upto 22000 ft and corresponding temperatures. There must not be any restriction on carriage by air in unpressurised environment or rapid decompression scenarios during transportation. Certification for safe carriage and use by aircrew in all flying envelope of helicopter must be provided.
Future Expectation from the prototype / Technology Developed	The complete system for cylinders, hoses, delivery system, charging system, adapters, nasal delivery mechanism, integration with masks to be carried out. It may be used in all helicopters for aircrew and passengers.

Problem Statement – 13: Universal Anti-G Suit Test Rig

Organization Name	Indian Air Force
Problem Statement/ Challenge title	To develop a Universal Anti-G Suit Test Rig (Portable) for effective testing of all types of Anti-G Suits in use across the fleets of Fighter aircraft of IAF at Field level
Challenge brief/definition	1. India is in the status of design, development and manufacturing of Advanced fighter aircraft in the very near future. With the success of indigenous super manoeuvrable LCA and recently inducted Rafale from foreign OEM, in the IAF Aircraft inventory, use of Correct Anti-G Suit (AGS) as a mandatory flying clothing cannot be overemphasized. 2. The AGS is a special garment worn by all the fighter aircrew to deal with the stresses of Acceleration in flight. The importance of using a correct and fully functional AGS during combat mission is paramount. 3. The Anti-G suits are required to be periodically inspected and tested for any wear and tear, degradation and effectiveness before being used by the fighter aircrew at Squadron level. However, the effectiveness of the Anti-G Suit cannot be tested visually, which requires a specific test rig to find out the following: - a) Peak flow rate b) Fill time c) Time lag for filling d) Total suit volume e) Balance between Rt and Lt bladders 4. Unfortunately, the availability of the specified AGS Test Rig at Squadron level is a challenge. 5. In view of the above, it is necessary to have indigenous industrial capacity building towards development of a **robust although portable and universal AGS Test Rig** which can be placed at each Fighter Squadron as an aid to properly test the AGS in use for its maximum efficacy.

	6. If not found feasible, technological solutions towards developing a Universal Anti-G-suit Test Rig can also be explored.
Future Expectation from the prototype / Technology Developed	Upon test validation of its efficacy, the AGS Test Rig can be considered for usage in the following areas: • At the Institute of Aerospace Medicine for training students of MD (Aerospace Medicine). • At the Institute of Aerospace Medicine for training fighter aircrew undergoing Operational Training in Aerospace Medicine. • Used by Field Aerospace Medicine experts at each fighter Squadron level. • By agencies developing any indigenous Anti-G Suit in the future.

Problem Statement – 14: Road Mobile Tethered Aerostat System

Organization Name	Indian Air Force
Problem Statement/ Challenge title	To design and develop a road mobile tethered aerostat system with radar and communication relay for 80-120km coverage.
Challenge brief/definition	Low-level coverage of radars and communication equipment is limited due to radio line of sight. The antenna elevation is one of the factors to increase radio line of sight. A portable system with an aerostat or similar technology that can provide low-level coverage for 80-120 km with radar and radio communication equipment is required. The Challenge entails design, development, and testing of aerostat with radar and radio communication equipment: (a) Aerostat or any similar technology with 2000-5000 ft operational height (AGL). (b) Road mobile on a vehicle up to 15000 ft altitude (AMSL) with all accessories, tether, and power generators. (c) Integrated payload of radar for tracking, locating, ID, and recording of aerial objects. With display console, recorder, primary and secondary radar modes, integrated IFF capability with facility to integrate with IAF systems. (d) Radio communication over Air Band VHF and UHF, with facility to integrate with IAF systems. (e) Data connectivity to integrate IAF systems for radio communication and radar data feeding. (f) Tethering mechanism to operate up to 40 kts of winds. (g) Integral weather sensors for warning generation to the system in case of weather hazards. (h) Must be able to maintain position without probability of damage to the tethering mechanism in different weather conditions. (i) System should have a mechanism to remain operational in case of limited damage caused to tether, aerostat, or power supply.

	(j) Stabilization mechanism for payloads. (k) Operational with minimal crew to operate the system. (l) All interface control documents, and connectivity modules must be available to IAF for future expansion without any vendor lock. (m) Vehicle must be able to travel with the system over rugged terrain with full equipment load. (n) Time to become operational must be less than two hours at any location, similar time to winch down/deflate the system and ready to move to a new location.
Future Expectation from the prototype / Technology Developed	Development of additional payloads and bigger systems with additional capabilities like higher height etc.

Problem Statement – 15: Rubberized Fuel Tank (RFT) for Storage of ATF

Organization Name	**Indian Air Force**
Problem Statement/ Challenge title	Development of rubberized fuel tank for storage of Aviation Turbine Fuel (ATF) and other fuels.
Challenge brief/definition	1. Rubberized Fuel Tanks (RFTs) are often used in remote or harsh environments where traditional metal tanks may not be suitable due to their susceptibility to corrosion and damage. These RFTs are available in various capacities from small to large sizes for storage of up to five lakh Liters. Few militaries are already using the RFTs for forward operating bases, rapid deployment, tactical operations, and contingency planning. 2. Though a few global manufacturers and suppliers of RFT farms are existent, no such capabilities are believed to exist in India for design, development and mass production of such RFTs. 3. The availability of RFTs for the Indian Air Force (IAF) may provide a flexible and portable solution for fuel storage with quantifiable advantages over traditional storage techniques.
Future Expectation from the prototype / Technology Developed	For storage and utilization in forward bases and other ops location.

MISSION DEFSPACE

PROBLEM STATEMENTS

Problem Statement – 16: Space Weather Package

Organization Name	Defence Space Agency
Problem Statement/ Challenge title	Development of Space Weather Package to include Sensors, Processing and Analysing Software
Challenge brief/definition	To develop a Software based space weather package including sensors, data processing and analytics. Space Weather comprises a set of naturally occurring phenomena that have the potential to adversely affect critical functions, assets and operations in space and on the Earth. Failure of these may result in direct or cascading failures across key services. Therefore, the changes in space weather are required to be sensed and analyzed to either take a predictive or a preventive action for protection of space assets.
Future Expectation from the prototype / Technology Developed	This software shall help in sensing the space weather events using sensors suite and thereby would help in assessing the impact through analytic software. The output will help to take predictive and protective actions to our space assets in case of any adverse space weather event.

Problem Statement – 17 Autonomous Docking Operations for On-Orbit Maintenance and Refuelling (OOMR)

Organization Name	Indian Air Force
Problem Statement/ Challenge title	Autonomous Docking Operations for On-Orbit Maintenance and Refuelling (OOMR)
Challenge brief/definition	This project is about Refuelling, Maintenance and Upgrading operations of a spacecraft, while in orbit, which entails the development of technologies for precise rendezvous, proximity and docking with the spacecraft and subsequent Refuelling, Maintenance, and Upgrading spacecraft operations. The expectation from the challenge is to design and develop technologies for docking operations with friendly/cooperative spacecraft that need to be serviced, refuelled, or maintained. The technologies for precise guidance during all phases of operation (proximity, terminal guidance, and docking) and subsequent docking methodologies are envisioned to be designed and developed in this challenge.
Future Expectation from the prototype / Technology Developed	The spacecraft is intended to undertake maintenance and refuelling space operations on the friendly/cooperative space assets already in space.

INDIAN COAST GUARD

PROBLEM STATEMENT

Problem Statement – 18: Portable Battery-Operated Towing Aggregate

Organization Name	Indian Coast Guard
Problem Statement/ Challenge title	Indigenization of Portable Battery-Operated Towing Aggregate for helicopters and fixed wing aircraft movement
Challenge brief/definition	Portable Battery-Operated Towing Aggregate (PBOTA) or Multi Aircraft Nose Tail Interface System-Remote Aircraft Mover (MANTIS-RAM) with reduced weight and size, is a non-integrated and free-standing aircraft handling system for manoeuvring rotary wing aircraft in or out of hangars on board ships, on the airport apron, or any location having a hard standing. As an added advantage, MANTIS-RAM can also transport ship's stores, heavy cables, ground support equipment, etc. on its robust flat top deck. The existing PBOTA held with squadrons has a weight of 1950 kg approximately and dimensions of 1.78 m X 2.56 m X 0.35 m. Although the equipment is described as "Portable," however, due to its heavy weight and comparatively larger dimensions, carriage and transportation to and from ships and other locations become a cumbersome task.
Future Expectation from the prototype / Technology Developed	It is proposed to design and develop an indigenized PBOTA with equivalent or better technical specifications with reduction in weight and dimensions so as to ensure ease of transportation to afloat platforms.

GARDEN REACH SHIPBUILDERS & ENGINEERS (GRSE)

PROBLEM STATEMENT

Problem Statement – 19: Hovercraft for Military Operations

Organization Name	Garden Reach Shipbuilders & Engineers Ltd (GRSE)
Problem Statement/ Challenge title	Indigenous Design & Prototype Development of Hovercraft for Military Operations.
Challenge brief/definition	Hovercrafts, also known as Air Cushion Vehicles (ACVs) which ride on a layer of air trapped below it and can traverse over multiple types of terrains such as sand, marshes, marine, mud, ice, pavements etc. on a single journey without needing any modifications to the vessel. They have a distinct operational advantage over other marine vehicles whereas they can operate without the presence of dedicated facilities such as harbours, docks or a jetty. Their versatility makes them ideal for a wide range of applications, from military and rescue operations to commercial transportation and recreational activities. Hovercraft design is a specialized domain and the same is not available in India. All the major equipment and machineries for these hovercrafts are foreign make and accordingly maintenance support is also dependent on foreign OEMS. Ancillary industries to support maintenance or production of hovercrafts has not grown in our country. Since these hovercrafts are based on foreign design and equipment fit, it will have fait-accompli reliance on foreign OEM for maintenance support as well. Globally, a few foreign players were well entrenched creating an "Economic Moat" making it difficult for new players to complete / sustain in the market. Depending on foreign manufacturer for design/ technology will further restrict ability to meet the diverse operational requirements of the Indian defence forces, GRSE in collaboration with domestic partner would like to develop a prototype with high indigenous content as a part of “Atmanirbhar Bharat” initiative, for more Military centric applications, to cater for the Indian Coast Guard and Indian Army requirements, which would enable GRSE to provide product lifecycle support to the customer without dependency on foreign OEMs.

	Primary Mission of the Product: The product shall be able to perform multipurpose maritime operation as follows: (a) High & Low speed amphibious coastal patrol in shallow waters, marshy areas and deep sea with higher operational envelope. (b) Interception and interdiction of offending vessels by both day and night. (c) Search and Rescue operations. (d) Rendering assistance to ships and ACV in distress. (e) To meet logistics requirements w.r.t. cargo carrying and troops carrier. (f) Relief operations, carrying troops, cargo and pollution control equipment are also the roles envisaged for HDACVs. **Principal Requirement:** • Length: Not less than 28 mtrs • Beam: not less than 10 mtrs • Displacement: As per design to suit range, endurance, loading and speed requirements • Max Speed: Not less than 45 knots with maximum AUW • Cruising Speed: Not less than 35 knots • Endurance: Not less than 12 hrs with expendable fuel at cruising speed • Range: Not less than 420 Nm at cruising speed. • Payload: Minimum payload of 20 tonnes which may include vehicle like Troops carrier, Gemini Boats, ATV or Container or Pollution Response equipment & personnel • Hull: Marine grade material composition like Al/ GRP/Composite • Sea worthiness: Operations upto sea state 4 with significant wave height of 2 mtrs and shall have survivability up to sea state 5. • Obstacle Clearance: Shall be able to clear obstacles of minimum 1.0 mtr in height without any damage to its hull and fittings • Propulsion: Diesel Propulsion with Min two Main Engine and suitable electro-hydraulic CPP and steering system.

	• Bow Thruster: Bow thrusters or equivalent arrangement to assist in controlling bow. • Lift fan system • Skirt System: open or close loop skirt or both • Service Life: Not less than 20 years with annual exploitation upto 500 hrs. • Suitable Navigation & Communication Equipment package • Power generator: Suitable quantity of Main Engine driven alternators to provide power to all critical electrical equipment and two independent Power Generation units of adequate capacity with separate starting batteries • Solar power generation system • Suitable sized ramp with minimum 3.5 mtrs width to be provided to facilitate embarkation/ disembarkation of wheeled or tracked Vehicles/ Gemini Boats, Cargo/ Containers/ PR equipment. • The achievable Indigenous Content of the product shall be minimum 50%. **Class Notation**: The prototype is to be designed & built to LRS class notation "+100 A1 SSC Patrol ACV HSC LDC Group 3 MCH" (Service extends to 200 Nm for refuge)" or equivalent of IRS/ABS/DNV/BV.
Future Expectation from the prototype / Technology Developed	Once developed the prototype may be scaled up to leverage following opportunities: • Leveraging National Waterways: Multiple waterways movement opportunities have been identified in Maharashtra, Kerala, Gujrat & West Bengal as an expansion plan of National Waterways (NW). • Huge potential for hovercraft for transportation and tourism, ferry terminals planned across 60+ locations on Arth Ganga model. • Military centric applications, to cater for the Indian Coast Guard and Indian Army requirements