

GOVERNMENT OF INDIA  
MINISTRY OF DEFENCE  
DEPARTMENT OF DEFENCE PRODUCTION  
**RAJYA SABHA**  
**UNSTARRED QUESTION NO. 1329**  
TO BE ANSWERED ON 13<sup>th</sup> March, 2023

**INNOVATION IN DEFENCE PRODUCTION PROJECTS**

1329. SHRI ANEEL PRASAD HEGDE:

Will the Minister of Defence be pleased to state:

- (a) whether Government has taken special measures to promote innovation in defence production projects under Make in India programme;
- (b) if so, the details thereof and the list of projects approved during the last four years;
- (c) the number of industries including MSMEs, start-ups, individual innovators, R&D institution and academia which have been provided grants/fund to foster innovation and technology development in defence and aerospace under the "Innovations for Defence Excellence (iDEX)"; and
- (d) the number of items which are notified under the Public Procurement order of Department for Promotion of Industry and Internal Trade (DPIIT) of the Ministry of Commerce and Industry?

A N S W E R

MINISTER OF STATE  
IN THE MINISTRY OF DEFENCE

(SHRI AJAY BHATT)

(a) to (d): Innovations for Defence Excellence (iDEX) framework was launched by the Government with the aim to foster innovation and technology development in Defence and Aerospace Sector by engaging Industries including MSMEs, startups, individual innovators, R&D institutes and academia to promote self-reliance. The Government has also approved Technology Development Fund (TDF) Scheme to encourage industries especially MSMEs and Startups to design and develop various Defence Technologies. Dare to Dream Innovation contest was launched by DRDO to support startups & innovation. Lists of iDEX challenges processed and TDF projects approved during the last four years are attached at Annexure I & II, respectively. Up to 28.02.2023, 139 iDEX winners have been provided grants/fund to foster innovation and technology development in Defence and Aerospace.

46 defence items have been notified by Department of Defence Production, under Public Procurement Order 2017 of Department for Promotion of Industry and Internal Trade (DPIIT).

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**ANNEXURE-I REFERRED TO IN REPLY TO PARTS (a) to (d) OF RAJYA SABHA UNSTARRED QUESTION NO. 1329 FOR ANSWER ON 13.03.2023 REGARDING “INNOVATION IN DEFENCE PRODUCTION PROJECTS”.**

List of iDEX challenges for which contracts signed during the last four years.

Sl. No.	Name of iDEX Challenge	Sl. No.	Name of iDEX Challenge
1	AI in SCM & Logistics	21	Long Endurance Aerial Surveillance Platform
2	Remotely Piloted Airborne Vehicles	22	AI based Satellite Image Analysis
3	Unmanned Surface/Underwater Vehicles	23	Artificial intelligence based technique for prediction of Atmospheric visibility
4	See Through Armour	24	Remote real time health monitoring of aircrew
5	Secure Hardware Encryption Device	25	Target Detection in Chaff Environment
6	Carbon Fibre Winding	26	Computer Generated Targets for Virtual Training
7	Desalination/Bilge-Oily water separation	27	Certified Compiler and Code Analyser based on AI Tech
8	Individual Protection System	28	Integrated Mobile Camouflage System (IMCS)
9	4G/LTE Tactical LAN	29	Autonomous Underwater Swarm Drones
10	Active Protection System	30	Indigenous Loitering Munitions
11	GPS Anti Jam Device	31	Quantum Security Keys Over200Kms
12	Countermeasures for illegal drones	32	Development Of Machine learningAlgorithms For Maritime Analytics
13	Anomaly detection in Air trajectory	33	HAPS (High Altitude Pseudo Satellite)
14	Friend or Foe Identification System	34	Axial Flux BLDC Motor
15	Portable Spoof Emitter	35	Rapid Foldable Infantry Assault Bridge
16	Four-axis stabilized antennae for C & Ku band operation	36	Helmet Mount Conformable Antenna
17	Foliage Penetration Radar	37	Enhancing UDA by the use of AI/ML or other Novel Techniques
18	Predictive, Preventive & Prescriptive Machine Monitoring	38	Image recognition & target tracking and non-cooperative collision avoidance system for UAVs
19	Reduction of RCS of Naval Warships	39	Development of Artificial Intelligence based Training modules for Technicians for operation and maintenance of Su-30MKI aircraft
20	Next Gen Comn over existing radio network without modification to existing infrastructure	40	Development of Part Task Trainer for Mirage 2000 Upgrade aircraft

Sl. No.	Name of iDEX Challenge
41	Motion Pattern Classification on Online / Active data
42	Defender (Data Collection, Collation and Analysis)
43	Silent Overwatch for Infantry Combat Vehicles using Fuel Cell / Alternate Fuel based Auxiliary Power
44	Precision Guided Kit for 81 mm Mortar Ammunition
45	FM CW Real time RADALT Tester
46	Development of Wide Band HF Modem for Networked secure voice, data & Video Communication.
47	Development of Inertial Energy Storage System for Naval Applications
48	Non-Lethal Devices for stopping vessels at sea
49	Augmented Reality/Virtual Reality based Sortie Preparation Aid for Helicopter Pilots
50	AR Tool for Technical Type Training and Usage of Smart glasses to assist Technicians
51	Adaptive Data Rate Burst Modem for Wireless Mobile Ad-Hoc Network
52	Miniaturization of electronics modules by use of low power industrial devices and ruggedizing hardware & software components
53	Design of Active Roll Stabilization System for Naval Ships
54	Situational Awareness for Mechanised Columns
55	Monolithic Telescope based Imagary System
56	ALFA-S (Air Launched Flexible Asset - Swarm Drones)
57	Skin Spray Gun
58	Amphibious Crawling Robot
59	Artificial Intelligence based Radio Frequency Spectrum Management.
60	EMI/EMC Shielding for bridge window glasses on Naval Ships

Sl. No.	Name of iDEX Challenge
61	Development of a Bore-sighting / alignment system for SU-30MkI aircraft sensors, tray and weapon adaptors
62	Find out the overlapping percentage of two 3D objects and display of Combined geometry
63	Fire Fighting BOT to allow a user to control a fire fighter robot
64	Development of AI enabled welders' helmet
65	Axial motor based portable submersible pumps in order to sustainability reduce weight
66	Indigenous development of Door Control Unit (DCU) and Gear Motor for automatic operation of platform screen doors at metro stations
67	Caged Drone with TIC for fire fighting in confined spaces
68	Development to achieve uniform circular polarization in designing a cavity backed spiral antenna 1- 18GHz
69	Multi Sensor real time monitoring of running machinery on-board submarine
70	Development of low cost, indigenous Morpene compound
71	Development of Hydro acoustic ASW Vector Sensors which can be used with drones
72	Development of Suitable Process for Composition Manufacture & Filling of Smoke Shell
73	AI Based Condition Monitoring System for Yard Assets
74	Development of Torque Generator Stator-800 intended for use in Gunner Sight of Tank T-90
75	Development of Torque Generator Stator-1000 intended for use in Gunner Sight of Tank T-90
76	Depth Based Positioning System to navigationally fixing position of Submarine
77	AI based adaptive noise cancellation for sonars of Autonomous Underwater Vehicles(AUVs) and ship borne sonar
78	Non hull penetrating connectivity solution for submarines at harbour
79	Underwater Remotely Operated Vehicle (UWROV) for underwater inspection and repairs
80	GNSS based 3-D helo approach and landing aid for IN helicopters for assistance in approach on landing in bad weather/ reduced visibility/ night at sea states

Sl. No.	Name of iDEX Challenge
81	Scalable Wireless Communication Network for Autonomous Mobile Platforms
82	Design and development of Parachute for parasailing
83	AI Based Gun Parts Inspection System (software & hardware)
84	Development of Submerged Submarine Launched Expendable Bathythermograph (SSLXBT)
85	Underwater Photography Noise Cancellation using Artificial Intelligence and Deep Learning
86	AI based Multi Radar Signal Conversion, Distribution & Multi Target Tracking for IN ships (particle Filter)
87	Portable RCS Measuring Device that is capable of independent operation and deployable from multiple platforms (ship, boat, UAV, etc.)
88	Airborne high performance lightweight COMINT System
89	Remote controlled NBC monitoring BOT using suitable sensors
90	ASIC Based Space Communication using software defined Antenna
91	Portable rugged, waterproof and lightweight torch for DC/FF activities including underwater/Light weight Portable Illumination Device
92	Lightweight filtration -based Breathing Apparatus
93	Long Range Communication for tracking and exchanging short message between IN helicopter (Chetak) and the ship
94	Design and development of virtual assistant with AI/ML and AR tools, deployed onboard ships/submarines to support maintenance crew for Radar System
95	Underwater Communication for a Swarm of AUVs
96	AI Based barrel crawling Bot Inspection System (software & hardware)
97	Expendable Mobile ASW Training Target (EMATT), capable of simulating the sounds and movement of a real Submarine
98	AI Based FOD(Foreign Object Debris) detection and classification system for FOD management at IN Air Station
99	Autonomous starting, running and shutting down of a Diesel Alternator suitable for charging Lithium Ion Batteries
100	Moisture wicking Hydrophobic Weapon Cover

Sl. No.	Name of iDEX Challenge
101	Hardware enforced solution against advanced, persistent and coordinated attacks to prevent kernel mode malware
102	Aerogel based Fire Fighting proximity suit for better efficiency in fire fighting
103	Noise Augmentation Unit for masking submarine's own signature when operating within the vicinity of FFCs (Friendly Foreign Countries)
104	Continuous Surveillance Tied System for Mechanised Forces
105	AI Based UGV for Identifying and Marking Mines in a Minefield
106	Intelligence Fusion Centre
107	OSINT Framework
108	Personal Locator Device with Fall Detection for Firefighters/ Damage Control Teams on-board ships
109	Underwater Navigation System for AUVs
110	AI based collision avoidance system for unmanned vessels
111	AI based Remote Monitoring System to assess wear down of Outboard Shaft Bearing
112	Design of Active Hydro Pneumatic Suspensions with variable dampening characteristics to meet Different Road profiles
113	Development of equipment capable of automatic weighing and filling of powder like substance explosives within 2 mg tolerance (i.e. 28-30 Mg)
114	Smart Firefighting features to the existing Breathing Apparatus
115	Hand -Held Hardkill Counter UAS
116	Autonomous Weaponised Boat Swarms
117	Airborne high performance Multi-Mode Active Electronic Scanned Array(AESA Radar)
118	Indigenous & cost-effective solution for development of Axis MEMS GYRO which has excellent performance in vibration & shock and low bias drift, bit rate and line termination with low noise
119	Autonomous Beach Check Survey Device
120	Advance Truss Bridge

Sl. No.	Name of iDEX Challenge
121	Beamforming ASIC based Radar with massive MIMO technology
122	Design of a Steering Console for Maneuvering underwater vessel.
123	Aviral- A tethered drone system for Surveillance and Monitoring Purposes
124	Development of Shipborne lightweight integrated ESM cum COMINT system
125	Disposable Light Weight Drone (DLD) capable of providing the ground soldier with immediate situational awareness
126	Measuring and Sensing Air Disturbance for Drone Detection
127	AI Based Ship Recognition Software using Image Processing
128	Automatic floatation device dispersal drone
129	Axial flux motor based lightweight Electric OBM with optional fuel cells
130	Submersible Boat
131	Digital radio frequency memory (DRFM) based simulator on a drone for AC training and radar calibration
132	Improved Lighting management system for BMP-II/IJK and its Variants
133	Converting Oxygen torpedoes to UW targets for ASW training and practice torpedo firings
134	Development of Super Hydrophobic paint for torpedoes to reduce skin friction of water

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**ANNEXURE-II REFERRED TO IN REPLY TO PARTS (a) to (d) OF RAJYA SABHA UNSTARRED QUESTION NO. 1329 FOR ANSWER ON 13.03.2023 REGARDING “INNOVATION IN DEFENCE PRODUCTION PROJECTS”.**

List of projects approved under TDF scheme during the last four years.

Sl. No.	Name of TDF Projects	Sl. No.	Name of TDF Projects
1	Development of Course Correction Fuze for Artillery	21	Leveraging Health and Usage Monitoring System (HUMS) for enhancing Aircraft Serviceability
2	Standalone Miniaturised Telemetry package (SMTP) for an airborne article	22	Pressure Measuring Instrument for Aircraft Application
3	Development of 03 Concentric Rings for Aero Engine Application	23	Development of Indegenous water jet propulsion System
4	Development of Drones for Carriage of stores in high Altitude (ICE Engine Based)	24	Development of VLF LOOP AERIAL
5	Development of Drones for Carriage of stores in high Altitude (Electric Multicopter)	25	Development of Composite Material based High Pressure (HP) Air Bottles and Hydrogen Cylinders
6	Development of Drones for Carriage of stores in high Altitude (Hybrid Aerial Vehicle)	26	Development of Fuel Flow Metering Unit for Fighter Aircraft (BRZA-7)
7	Development of Futuristic high-Performance Propulsion system for small Satellites EOR and Station Keeping	27	Development of Exoskeleton of Indian Army
8	Development of prussian blue formulation under GMP facility	28	Auxilliary pressure reducing & shut off Valve for Aircraft application
9	Development of Electrical LRUs for Aircraft Applications	29	VLF HF Matrix
10	Development of Total Air Temperature Probe (TATP) for Aircraft Application	30	Development of Pulse HVPS (High Voltage Power Supply) for ELTA ASPJ (Airborne Self Protection Jammer)
11	Development of Avionics Antenna LRUs for Aircraft Application	31	Fuel system - Temperature Transducer for Aircraft Applications
12	Development of Dual flow self regulation JT Cooler	32	Fuel Probe for Aircraft Application
13	Development of Engine Driven Hydraulic Pump (EDHP) for Aircraft Application	33	Marine Desalinators for Life Rafts Onboard Indian Naval Ships
14	Development of Fuel System Components for Aircraft Application	34	Development of P-19 Modulator Valve
15	Development of Fuel System Valve for Aircraft Application	35	Development of Tide efficient gangway
16	Development of Futuristic high-Performance Propulsion system for small Satellites EOR and Station Keeping	36	Development of Fuel System - Transfer Control Valves for Aircraft Applications
17	Development of Nose Wheel Steering Manifold for Aircraft Application	37	Development of Fuel System Pressure Transducer for Aircraft Application
18	Development of Slide and Swivel Joint for Aircraft Application	38	Autonomous Drone as First responder for search and report missions in closed/indoor environment
19	Development of WT(Water Tight)_GT(Gas tight) and Fire Class EMI EMC compliant doors and hatches for Indian Navel Ships	39	Multi therapeutic technology for faster healing of wounds

20	Development for Pump for Aircraft Application
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40	Design and Development of Reconfigurable Digital Intercept Receiver for ES
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Sl. No.	Name of TDF Projects
41	Development of Simulator for unmanned Ground, Marine (Sea Surface and underwater) and Aerial Vehicles
42	AI based detection of a person based on physiological parameters
43	AI Recognize
44	AI-Passive Distributed FOS Interrogator
45	Technology of Recovery of Lithium Precursors from used Lithium ion Batteries
46	Translation of Mandarin Speech to English Speech and vice versa, M/s Cogknit
47	Translation of Mandarin Speech to English Speech and vice versa, M/s Gnani
48	Development of CW HVPS for ASPJ MAIN UNIT
49	Development of Cold Flaps (Four Types) for Aero Engine
50	Development of Tethered Underwater Communication Buoy
51	Propellant Machining 6-DOF Robot
52	Development of Tools for Data Assessment Active learning & Believability for Visual Data
53	Development of Composite Flex Seal for Large Aerospace Vehicles
54	Development of Long Life Sea Water Battery
55	Bearings for Aircraft Application
56	Development of Direct Drive Frameless BLDC Motor
57	BLDC Motors and Quadrature Incremental Encoders
58	Encoders
59	BLDC Motors and Quadrature Incremental Encoders.
60	Development of Direct Drive Frameless BLDC Motor

Sl. No.	Name of TDF Projects
61	Solid State Power Amplifier (SSPA) for AMDR Radar
62	Design and Development of Robotic Propellant Machine System
63	Aero Gas Turbine Engine Health Monitoring System: Chistats Labs Pvt. Ltd.
64	Portable Automatic Weather Station

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