

Start-up India Campaign Makes Defence Sector Self-Reliance

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Abstract: *This paper concerns the role of start-up campaign in defence sector. It includes the evolution of start-up campaign in defence sector along with short description of ten successful start-ups of defence (Airforce, army and Navy). Evaluation and targets of campaign is also being described here.*

Keywords: self-reliance, innovation, encryption/decryption, Research & Development(R&D), System on Module (SOM), System on Chip (SOC), Innovations in Defence Excellence (iDEX) programme, Defence India Start-up Challenge (DISC), Problem Statements(PS), underwater awareness (UDA)

I. INTRODUCTION

Star-tup India is an initiative of the Government of India. The campaign was first announced by Indian Prime Minister, Narendra Modi during his speech on 15 August 2015. The action plan of this initiative is focussing on three areas: Simplification and Handholding. Funding Support and Incentives. India has **around 194** defense tech startups building innovative tech solutions to empower and support the country's defense efforts. IdeaForge, Tonbo Imaging, CM Environ systems, and VizExperts are among those building innovative solutions to strengthen India's defense efforts India's defence industry has grown substantially in recent years and seems headed for even better days. The country is now tapping its domestic start-up ecosystem for technological innovation and self-reliance in defence. While Indian entrepreneurs are building niche technologies that will help in boosting the country's military combat capabilities, the Make in India initiative has attempted to transform this reality by promoting the private sector's role in defence production and Research & Development. Although India began this journey only a few years ago, today, several start-ups have emerged in this sector and are engaged in developing prototypes and products for the Indian military across different technologies.

Realizing the same, we have focused on this niche market segment in this special issue. The cover story of this issue features Forty-two Labs, which delivers provable digital trust for organizations in the form of cryptographic authentication, transaction authorization, e-signing, encryption/decryption, and secure remote access. The company designs a range of solutions to address the needs of customers in a variety of operational areas in the defence sector. Also featuring in this issue is Acculytics Chemicals, which has been developing future-oriented solutions to boost the Indian defence sector. The issue also covers Edgeforce Solutions, which is a renowned company that designs, develops, and creates secure and hardened deep technology products based on System on Module (SOM), System on Chip (SOC), Tiny ML, and other technologies. Reading on, you will find more such stories on some of the other top players in this segment. The Government aims to achieve an export target of Rs.36,500 crore (US\$4.8 billion) by 2025.

Top 10 Defence startups in India till 2022

After studying this market landscape in-depth, we have zeroed-in on the Top 10 companies that have excelled in this market with their innovative approach. Having proven their dedication to efficiency in order to meet the customer expectations in an end-to-end manner, these companies have stood out from the crowd.

Top 10 Defense startups in India till 2022

Sr.No	Name of the company	Product
1	Acculytics Chemicals: A Group Of	Portable Halipad and Temporary Assault Trackway



	Evangelists Working Towards Making India A Defence Hub	Soil Stabilizer High Temperature Resistant Weapon Paints Blast Mitigation Solution / Self Healing Ballistic Protection and BattleJacket - India Use Case
2	1) Big Bang Boom Solutions	Offers a range of defence solutions that include T-Series Unmanned Tank Development, Next Generation Hybrid Personal Combat Armour, 360 Advance Battle Interface, Anti-drone Defense System, and more
3	2) Cron AI 3)	Cron AI is an adaptive 3D data perception platform company. We are powering the heart of automation with senseEDGE – our unique out of the box, deep learning first platform to revolutionize Intelligent Transport Systems, Smart Spaces, Robotics Applications, Autonomous Vehicles and Security.
4	4) Edgeforce Solutions 5)	Designs, develops and creates secure and hardened deep technology products based on System on Module (SOM), System on Chip (SOC), Tiny ML and other niche technologies
5	6) Exicom Technologies India 7)	Provides advanced battlefield solutions, along with specializing in manufacturing & developing indigenous defence and allied technologies
6	8) Forty-two Labs 9)	Designs a range of solutions to address the needs of customers in a variety of operational areas in the defence sector
7	10) KVR Solutions 11)	A team of specialists comprising policy experts & personnel who were formerly with the Indian armed forces, defence procurement and programme development, along with subject matter experts in varied fields
8	12) Sagar Defence Engineering 13)	Specializes in manufacturing completely Unmanned Marine Vehicle solutions to Commercial, Defence and Scientific areas
9	14) Techera Engineering 15)	One of the largest tooling manufacturing companies for the Defense& Aerospace sector in India with a 75,000 sq. ft. world-class manufacturing facility
16) 10	17) Zosh Aerospace 18)	A DPIIT Recognized company with over 10 years of experience in the Defense technology landscape

India's start-up ecosystem, which is propelling India's digital economy, is now expanding its presence in the defence domain. If start-ups nurtured properly, these start-ups can transform India's military capabilities, achieve technological self-reliance while building much-sought-after investment linkages with the U.S.' Silicon Valley

India is the world's largest arms importer. This is ironic, since India has long sought self-reliance in defence. Those efforts have yielded very little. Beyond serial licensed production of defence equipment in the defence public sector units, true self-reliance in indigenously designed and developed equipment, has proved difficult in recent years, the 'Make in India' initiative has attempted to change this reality by promoting the private sector's role in defence production and research and development (R&D). The production aspect is yielding slow change, but what has received traction is R&D, with start-ups enthused by the mission of innovating for Indian military.

In the U.S., the Central Intelligence Agency was one of the first to set up a venture capital firm, In-Q-Tel, in 1999. It provided seed funding to several start-ups, including big data analytics company Palantir Technologies, which played a crucial role in hunting for and killing the al-Qaeda mastermind, Osama bin Laden. Today, Palantir is hailed as a 'tech unicorn' and is a symbolic of the defence innovation base in Silicon Valley and other parts of the U.S. The Pentagon, too, has aligned itself with this trend by establishing the Defence Innovation Unit to work closely with the tech industry and start-ups to shortlist, fund and develop emerging technologies. Likewise, a thriving defence innovation base in and around Tel Aviv has given Israel a technological military edge in a region surrounded by hostile neighbours.

India only began this journey a few years ago. Today, several start-ups are engaged in developing prototypes and products for the Indian military across various technologies. Notable are ideaForge (drones), Tonbo Imaging (imaging and sensor systems), IROV Technologies (underwater drone) and Axis Biosolutions (surgical and wound care). Among these, ideaForge and Tonbo Imaging are already significant players with their combat-proven technologies. For instance, ideaForge's drones for the Indian military and paramilitaries have been used in many surveillance, reconnaissance and counter-insurgency operations. Tonbo's imaging and sensor systems improve the lethality of munitions and missiles of the Indian military, and have had their systems' combat-readiness tested by the U.S. Special Forces and Israel Defence Forces.

The government is also tapping the start-up ecosystem through its flagship Innovations in Defence Excellence (iDEX) programme. iDEX works with R&D institutes, academia, industry, start-ups and individual innovators by providing them funding of up to Rs. 1.5 crores to create solutions for the military's technological problems. Since its launch in 2018, iDEX has been hosting the Defence India Start-up Challenge (DISC) which awards start-ups for mentoring and funding, based on their ability to solve specific technological challenges posed by the military. So far, 60 start-ups have been beneficiaries, and iDEX has identified technologies such as soldier protection systems, secure hardware encryption devices, unmanned surface and underwater vehicles, 4G/LTE tactical local area network, foliage penetration radar, artificial intelligence-based satellite image analysis, among others.

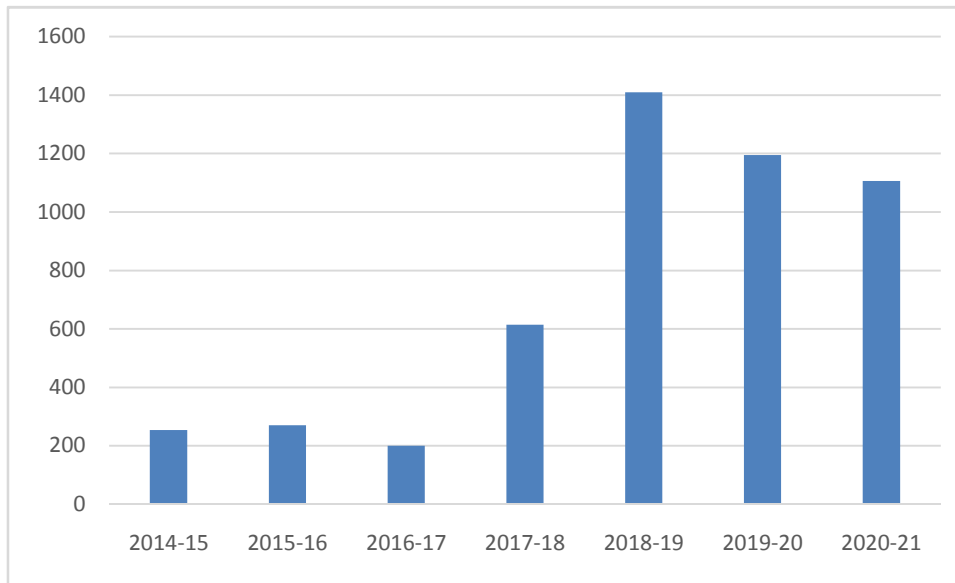
As is the norm with defence R&D worldwide, these technologies are dual-use. For instance, IROV Technologies' underwater drone being developed with the Defence Research and Development Organisation for surveillance and repair will also have a commercial case. Likewise, AxioBiosolutions, which has created haemostatic dressing – specialised bandages for treating injured personnel in combat, can also be used for similar purposes in any accident or disaster-like situation. These technologies can also be used for the homeland security products market, currently dominated by Chinese companies like DJI (drone maker) and Hikvision (IoT solutions and video security systems provider).

The evolving defence start-up ecosystem is enabling a much-needed commercial synergy between India and the U.S., as many Indian start-ups have participation from Silicon Valley venture firms like Artiman Ventures (Tonbo), Accel and IDG Partners (AxioBiosolutions), Intel Capital (Saankhya Labs), WRVI Capital (ideaForge). This will only expand as India and the U.S. deepen collaboration in defence technology.

One policy change is needed: reduction of the lengthy defence acquisition procedure, which typically takes seven-to-eight years for major weapons. Longer timelines don't fit with start-up business models, neither they will be appropriate given the rapid pace of technological obsolescence. The government will need to devise and enforce shorter timelines commensurate with the start-up culture.



Value of Defence exports



Value of Defence exports (US\$mn)

Source: The Mint

As the graph shows the start-up and self-reliance campaign aim to enhance the defence export (US\$4.8 billion) by 2025.

Defence India Startup Challenges and Opportunities

There are so many opportunities bringing star-tup in defence sector. This will help defence sector self-reliance. Generally maximum defence material is imported.

1. Defence India Start-up Challenges and Opportunities (DISC):-Hon'ble Raksha Mantri Smt. Nirmala Sitharaman launched the 'Defence India Start-up Challenge (DISC) on 4th Aug 2018 at Bengaluru, wherein innovators, organizations as well as individuals were presented with eleven 'Problem Statements' for resolution. In this event four incubators namely (i) Centre for Innovation Incubation and Entrepreneurship , IIM Ahmedabad (ii) SINE, Society for Innovation and Entrepreneurship, Indian Institute of Technology Bombay, (iii) T-Hub, Hyderabad (iv) FORGE - a branded incubation enterprise launched by the Coimbatore Innovation & Business Incubator (CIBI), were given Certificate of Partnership for helping Ministry of Defence in discovery, exploration and mentorship of Start-ups/MSMEs to co-create innovative Defence Technologies. Subsequently, two more Partner Incubators have come within the iDEX fold viz. Incubation Cell, IIT-Madras and FITT, IIT-Delhi.

- (a) Individual Protection System with built in censor
- (b) See through Armour
- (c) Carbon Fibre Winding (CFW)
- (d) Active Protection System (APS)
- (e) Secure hardware based offline Encryptor device for graded security
- (f) Development of 4/G LTE based Tactical Local Area Network
- (g) Development of Advanced Technology based Desalination System (water purification) and Bilge water separation System.
- (h) Artificial Intelligence in Logistics and SCM
- (i) Unmanned surface and underwater vehicles.



2. Defence India Start-up Challenges and Opportunities (DISC 2):-It was launched with four Problem Statements that require to be taken up by innovators to provide for development /incubation of state-of-the-art technological solutions. The four challenges pertain to important domains such as Avionics, Drones, GPS based equipment and Radars.

- (a) GPS Anti Jam Device
- (b) Data analytics for air Trajectory
- (c) Illegal usage of Drones

3. Defence India Start-up Challenges and Opportunities (DISC 3):-The 3rd iteration of the Defence India Startup Challenges calls applications in response to 3 new and exciting challenges from the Indian Army, Navy, and Airforce.

1. Four axis stabilized antennae CKU ban operation
2. To create portable spoof Emitter for surveillance and ground based air defence weapons
3. Fri-end and Foe Identification System

4. Defence India Start-up Challenges and Opportunities (DISC 3):-Innovations for defence excellence (iDEX)

1. AI based Satellite Image Analysis (Army)
2. Prediction and Forecasting of Atmospheric visibility (Airforce)
3. Computer Generated Targets for Virtual Training
4. Real time Health Monitoring of Aircrew (Airforce)
5. MF-TDMA based Wideband SATCOM Modem
6. Foliage Penetration Radar (Army)
7. Reduction of RCS of Naval Warships
8. Target detection in Chaff Environment

5. Defence India Start-up Challenges and Opportunities (DISC 5):-The 5th edition of Defence India Start-up Challenge (DISC) are launched with 35 Problem Statements(PS) from Armed Forces and OFB/DPSUs for resolution by start-ups & innovators.

1. Situational awareness for mechanized columns (Army)
2. Augmented Reality/ Virtual reality-based Sortie Preparation Aid for Helicopters Pilots
3. Artificial intelligence-based radio frequency spectrum management
4. Precision Guided kit for 81 mm mortar ammunition.
5. Silently overwatch for infantry combat vehicles using fuel cell/ Alternate fuel based- Auxiliary Power
6. Development of Part task trainer for mirage 2000 upgrade aircraft
7. Development of Wide band HF Modem for network secure voice, data & Video Communication
8. Infusion of augmented reality in technical type training and usage of smart glasses to assists technicians
9. Non-lethal Devices for stopping vessels at sea
10. Enhancing underwater awareness (UDA) by the use of artificial intelligence/ machine learning or other naval techniques
11. Development of inertia energy storage system for naval application
12. Image recognition and target tacking noncooperative collision avoidance system for UAVs
13. Design of active roll stabilization system for naval ships
14. Development of NDT technique for quality assessment of cast ingot
15. Development of automation and data capturing in a quality control lab
16. EMI/EMC shielding for bridge window glasses on naval ships
17. Development of an AI enabled robot to carry phased array ultrasonic inspection on curved/straight ship hull structure.



6. Defence India Start-up Challenges and Opportunities (DISC 6):-The 6th edition of Defence India Start-up Challenge (DISC) is launched with 38 Problem Statements(PS) from Armed Forces, Indian Coast Guard, DPSUs, and Ministry of Home Affairs for resolution by start-ups & innovators.

1. Design and development of track with detachable rubberised track for BMP-II
2. Automation of track adjustment mechanism of BMP-II
3. Improved lighting management system for BMP-II
4. Scalable wireless communication network for autonomous mobile platforms
5. Design of active hydro pneumatic suspensions with variable dampening characteristics to meet different road profiles.
6. Indigenous and cost effective solution for development of axis MES GYRO which has excellent performance in vibration and shock and low bias drift, bit rate and line termination with low noise
7. Indigenous development of door control unit (DCU) and gear motor for automatic operation of platform screen doors at metro stations. These platform screen doors are for passenger safety and isolates platform from track
8. Development to achieve uniform circular polarisation in designing a cavity backed spiral antenna
9. AI based condition monitoring system for yard assets.
10. Design and development of parachute for paragliding and parasailing
11. Development of Gyro Motor (GA7/30A-2M) intended for use gunner sight TPKD-1 of tank T-72
12. Development of Torque Generator stator-1000 intended for use in gunner sight of Tank-90
13. Create a safer environment for handling volatile & hazardous chemicals. Development of suitable process of composition manufacture and filling of smoke shell.
14. Development of equipment capable of automatic weighing and filling of powder like substance explosive within 2mg tolerance
15. Providing fresh vegetables/fruits to Jawan at BOPs instead of tinned ration
16. Indigenous development of amphibious vehicles.

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