



Technology Assessment at DRDO

KEYWORDS

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ABSTRACT *Many innovations have failed not due to any deficiency in technology, but due to failure of total system for translating the concept into a successful operational product, process or service. Therefore it is important to assess the technology and the process of its translation into use/ applications.*

Introduction

Many innovations have failed not due to any deficiency in technology, but due to failure of total system for translating the concept into a successful operational product, process or service. Therefore it is important to assess the technology and the process of its translation into use/ applications. Technology Assessment means determining whether the technology development is meeting, or will meet, the organizational/project objective to justify/require the decision to commit enterprise resources. It includes the study and evaluation of new technologies. According to Benson & Sage, an individual technology must pass through three gateways to become commercially or socially embedded in its environment. These three gateways are market gateway, systems-management Gateway, Technology Gateway.

Technology Assessment at Defense Research and Development Organization (DRDO)

Defence Research and Development Organization (DRDO), the R&D arm of Ministry of Defence, Government of India joining hands with FICCI - the apex industry chamber of India, by initiating a "Accelerated Technology Assessment and Commercialization (ATAC) Programme" for the Assessment of DRDO developed technologies for commercial markets

DRDO in association with industry to actively spinout several of DRDO's technologies for appropriate commercial markets both nationally and internationally. In the operation of the various programme as many as 26 DRDO labs across India have participated and over 200 technologies are being assessed under the programme by FICCI. The technologies that are currently assessed are from sectors as diverse as electronics, robotics, advanced computing and simulation, avionics, optronics, precision engineering, special materials, engineering systems, instrumentation, acoustic technologies, life sciences, disaster management technologies, information systems, etc.

Following technologies had been assessed and its commercialization is under process

1. Acoustic Life Detector (Sanjeevani) Naval Physical & Oceanographic Laboratory (NPOL),

Cochin The technology is used to detect and save human beings trapped under the debris of collapsed buildings due to earth quake or land slide. This equipment is based on highly air sensitive acoustic sensor and audio signal processing to clearly listen to the victim's low frequen-

cy sound from below the debris. The sensors and related equipment are hermetically sealed and hence it can be used in wet or raining environment after a calamity.

2. Bioidigester Defence Research & Development Establishment (DRDE), Gwalior

Bio-Digester technology has been developed for resolving the problems of undecomposed human waste. The innovation degrades and converts the human waste into usable water and gasses in an eco-friendly manner. The generated gas can be utilized for energy/ cooking and water for irrigation purposes. The process involves the bacteria which feed upon the faecal matter inside the tank, through anaerobic process which finally degrades the matter and releases methane gas that can be used for cooking, along with the treated water.

3. Multi-Purpose Foldable Cot Institute of Nuclear Medicine & Allied Sciences (INMAS), New Delhi, India

DRDO's INMAS in Delhi has developed a Multi-Purpose Foldable cot that can be carried as backpack, due to its compact folding configuration and light weight. It has been designed to be used as a stretcher for fast evacuation of jawans/patients and is also useful in all types of terrains to be used as a sleeping bed for comfortable sleep to Jawans. The accessories like pouch for toilet/ medicines and I-V fluid pole, make it suitable to use it as medical bed in emergency situations. Its backpack size and light-weight make it user friendly and important life saving device. The high strength low density aluminum alloy used in its frame is anodized to make the structure corrosion free to increase its durability and aesthetics. The fabric being used is of high strength, low weight and it is even washable.

4. RO based Mobile Water Purification System (MWPS) Defense Laboratory Jodhpur (DLJ)

Large-scale biological and chemical contamination of environment, equipment, food and water may take place in case of an Industrial accident, natural calamity, terrorist activity, etc. Water is one of the most basic requirements for survival of human beings during any type of calamity. Keeping the above scenario in view to meet the challenges of post disaster management, the lab has developed a reverse osmosis based Mobile Water Purification System (MWPS) mounted on Stallion vehicle for efficient removal of suspended solids, dissolved salts (up to 4000 ppm) and

biological and toxic chemicals from contaminated water. WPS is a mobile unit fitted on 5/7.5-ton stallion vehicles along with a self-supporting power system by a DG set. It has a capacity to produce up to 3000 litres of drinkable water per hour from brackish water, contaminated water with biological and toxic chemicals. The NBC Water Purification System has undergone the extensive trials by various agencies, proving its capabilities. The vehicle has proved its efficacy in the relief work after various natural calamities like TSUNAMI at Nagapattinam district of Tamilnadu and Kawas floods at Barmer district of Rajasthan.

5. Dissipative Acoustic Silencer Naval Science and Technological Laboratory (NSTL), Visakhapatnam

The subject technology is a sound absorption device to moderate the sound effect of a machine. Noise reduction can be achieved by modification of source or path or receiver. Among these, modification of path is most practicable. For intakes and exhausts of air/gas handling systems, Dissipative Acoustic silencers is one such solution. These silencers attenuate noise in ducts through which gas/air flows by baffling process. The silencers are made up of ducts filled with spaced baffles. They work on the principle of sound absorption for reducing the noise

6. Interrogator Centre for Air Borne Systems (CABS), Bangalore

The Interrogator system also called Secondary Surveillance Radar (SSR) in civil application plays a vital role in the Air Defence system of a country. In an emerging complex security environment, timely and accurate identification of all targets –friendly and hostile as well as locating threat targets – is of paramount importance. This can be achieved with the help of Interrogator system.

7. Short Range Surveillance Radar Electronics & Radar Development Establishment (LRDE), Bangalore. The innovation is the state-of-the-art Lightweight, Man-Portable Battery- Powered Electronic Short Range Battlefield Surveillance Radar to provide All- Weather Surveillance against intrusion.

8. Explosive Detection Kit (EDK)

An explosive test kit has been developed for identification of explosives in pre and post explosion field conditions. Explosives in trace quantities (as low as 10 g) can be identified using the kit. It is in use by paramilitary forces etc.

9. Remotely Operated Vehicle (ROV)/Unmanned Ground Vehicle (UGV)

The Remotely Operated Vehicle has been developed to handle Improvised Explosive Devices, detect or confirm its presence and also to diffuse it. Additionally it can also measure Radiation and Chemical Contamination levels. It has been designed for the Army, Police and other paramilitary forces engaged in counter terrorist operations.

10. Liquid spring based Shock Absorption System (SAS)

The innovation is a compact designed Shock Isolator based on Liquid Spring based Shock Absorption System mainly meant for automotive applications to reduce/eliminate the jerking effect. It works on principles of hydraulic piston and cylinder having holes on piston. Very high shock (in general term jerk) can be absorbed/isolated and accepted shock level can be imparted to the system mounted on it. In technical term, fluid inside the Liquid spring plays the role of Spring and holes on piston plays the role of damper. Compare to conventional SAS (isolator), its size can be almost 4-5 times less and it can be designed and developed for the restricted space. The relative size of the Liquid Spring is very small compared to conventional shock absorbers and hence it can be successfully and efficiently utilized in a comparatively smaller space, thus leaving more space that can be utilized by the other devices, if required. Other possible areas of applications include, Aircraft Landing Gear, Civil Structure prone to earthquake zone.

11. Hydraulic and Lube Filters

The hydraulic system of LCA-Tejas operates at 280-bar pressure and provides power for quadruplex digital flight control system and aircraft utility services. LCA- Tejas hydraulic system is fitted with filters having mesh sizes in the range of 10 to 25 micron. Filters are used in pressure, return and drain lines, to ensure supply of clean oil to the system components for their reliable operations as per NAS (class-1) cleanliness level

These filters have a higher filtration rating ($\beta \geq 100$) and operate at -54 °C to 135 °C temperature conditions. Filters have been provided with unique by-pass valve & automatic shut-off valve arrangement, visual clogging indicator with manual reset and excellent resistance to flow fatigue. Filters developed are qualified for aircraft applications, in conformity with requirements of MIL-F-8815D standard

Conclusion

Although technology assessment is a very complex exercise but the technologies are assessed and its commercialization is carried out with a view to encompass following objectives

1. Product and services will be provided at optimal cost
2. Ease in manufacturability
3. Satisfy planned application utilities
4. Meeting stated technological goals

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