

# India plans high-tech warfare with 5 new DRDO labs focusing AI, Quantum, Cognitive tech & Smart materials

*By Vardaan*

India has set sight over high-tech warfare as state-owned military research & development agency, Defence Research and Development Organisation (DRDO), has announced that it has launched five new laboratories known as Young Scientists laboratories, each focusing core areas of futuristic technologies including Artificial Intelligence (AI), Quantum Technologies, Cognitive Technologies, Asymmetric Technologies and Smart Materials — object which can change shape, size and behavior upon external stimuli.

These five new defence labs under the DRDO, formally launched on Thursday by PM Narendra Modi, are located in Bengaluru, Mumbai, Chennai, Kolkata and Hyderabad. These labs will be led by under-35 directors and young military scientists to drive India's warfare technologies of the future.

Jadavpur University campus in Kolkata will have research lab of futuristic area of Asymmetric Technologies. While, the research in hot and critical area of Smart Materials and their applications will be based out of Hyderabad. Research in the area of Artificial Intelligence will be carried out at Bengaluru, while the all-important area of Quantum Technology will be based out of IIT Mumbai.

In the area of cognitive technologies research, IIT Madras will house the lab for the same.

To recall, in 2018 a govt. of India initiated task force led by Tata Sons Chairman N. Chandrasekaran handed over the report to the Indian defence minister for implementation of its recommendations on using AI for military superiority. While AI and Quantum computing are familiar to tech enthusiasts, Asymmetric technologies and smart materials are quite new and described in brief as below –

**Asymmetric technologies**, in our understanding, refers to technologies involved in war between enemy or entity that acts in a hostile manner and whose relative military power/strategy/ tactics differs significantly. Asymmetric warfare is a form of irregular warfare and the term is also frequently used to describe what is also called “guerrilla warfare”, “insurgency”, “counterinsurgency”, “rebellion”, “terrorism”, and “counter-terrorism”, essentially violent combat between a formal military and an informal, less equipped and supported, undermanned but resilient and motivated opponent.

**Smart Materials** are objects that can change shape or behaviors with hot water, pressure, chemical, light or heat. Essentially, these materials sense and react to environmental conditions or stimuli (e.g., mechanical, chemical, electrical, or magnetic signals). Smart materials are said to be beneficial for industries such as aerospace, medical, textile, construction, and electronics as it improves efficiency and



save resources by responding to corrosion, pH changes, water content, temperature, mechanical forces, and much more.

These smart materials could even self-assemble when one touches them. When a stimulus is applied on such a smart object, it is possible to transform into a brand new shape as these materials are reacting to their external environment.

**Cognitive Technologies**, on other hand, extend the power of information technology to tasks traditionally performed by humans, such technology can mimic functions of the human brain through various means, including natural language processing, data mining and pattern recognition.

### **High-Tech Warfare Programs of US & China**

While DRDO is India's military research body, the analogous of same in the United States is DARPA (Defense Advanced Research Projects Agency), which has developed several futuristic technologies and warfare systems way beyond imaginations to countries in southeast Asia. While cognitive tech research are being done since 2002 by the US agency, asymmetric warfare technologies is said to be first introduced by DARPA in 1960s used for fighting Communist insurgents in Vietnam and Thailand.

DARPA is working on 'Sensor plants' which uses plants to gather intelligence information" through DARPA's Advanced Plant Technologies (APT) program, which aims to control the physiology of plants in order to detect threats including chemical, biological, radiological and nuclear threats.

DARPA is also said to be working on creating a 'black box' for brain, which is much like the black box used in airplanes. The microchip implanted in brain will record every moment and make it possible to obtain information one's final moments.

The Chinese counterpart of DARPA is considered to be COSTIND (Commission for Science, Technology and Industry for National Defense), which aims to facilitate the transfer of technology between the military and civilian sectors and has played an important role in China's space program.

<https://www.indianweb2.com/2020/01/05/india-plans-high-tech-warfare-with-5-new-drdo-labs-focusing-ai-quantum-cognitive-tech-smart-materials/>

# Army may soon get robot option for recce ops

By Akhil Kadidal

Bengaluru: Robots on wheels, robots on tracks and robots resembling a ball, not unlike a robotic character seen in the new Star Wars films may soon be rolling out to join Indian Army troops.

For the last three years, Bengaluru-based DRDO lab, the Centre for Artificial Intelligence and Robots (CAIR), has been perfecting four different models of mobile robots designed to infiltrate military and combat zones, map the area and help friendly troops punch their way in.

Two of these models, which were on display at the 107th Indian Science Congress, showed the maturity of the technology. The ‘Sentry’ is a four-wheeled robot which looks almost spider-like with a large central eye and a battery of sensors in front. The unit is designed to probe flat or semi flat landscapes for the military.



“Both of these models are completely autonomous, which means that if you give them a destination, they will create their own waypoints and chart a course to the destination using their inbuilt Artificial Intelligence module,” explained the project director.

He clarified that the ‘Sentry’ is also capable of patrolling a medium-sized perimeter constantly for as long as the battery held a charge. The maximum battery endurance of both machines is about four hours, scientists clarified.

Both systems use a battery of sensors, including GPS, 360-degree cameras and an infrared sensor.

The other model of robot, which was not displayed, is said to be a robot ball (called “ballbot”) which could be dropped by the mini-UGV across the various floors of a terrorist-held building, which would then be controlled by an operator from a remote location.

The operational doctrine has already been formulated for all the robots. “Eight of these various robots are designed to operate as a team. Each robot has something that we call “multi-agent collaboration. ’ This means they can talk to each other,” explained another scientist involved in the project.

“The last class of machine is a larger reconnaissance ground vehicle which again has autonomous capabilities,” the senior scientist said.

The DRDO said both machines have completed testing and are ready to be deployed. DRDO officials, however, would not comment about whether the Indian military had expressed interest in the inventions.

<https://www.deccanherald.com/state/army-may-soon-get-robot-option-for-recce-ops-791664.html>

# Despite schemes, women scientists small in number

*By Akhil Kadidal*

Bengaluru: In spite of the several government programmes intended to elevate women into careers in science, their numbers continue to be low in India, scientists and government officials said.

“We have various schemes to reward and promote women scientists. Nevertheless, we are much behind global developments with regard to women in science,” said Trilochan Mahapatra, secretary, department of agriculture, research and education.

He was speaking at the inauguration of the Women’s Science Congress at the 107th Indian Science Congress. The event was intended to showcase the coming of age of women scientists across all fields, including those at the apex of their professions.

Dr S Rajendra Prasad, the Vice Chancellor of the University of Agricultural Studies, said that the role of women in society is vital for its progress.

“According to recent surveys, the pursuit of women in science rivals that of men. In this forum, we have 25 women who can be counted as high achievers,” he added.

Another speaker, Dr Tessy Thomas, the Director of Aeronautical Systems at the DRDO, said the women of today have made significant studies in science and technology. Speaking broadly of the work being done by DRDO, she credited organisational scientists with having made significant advances in recent years.

“In the medical field, a nano drug-delivery system can potentially help treat cancer. In the next 20-30 years, we could see nanorobots living in our body to keep us healthy,” she predicted.

However, Mahapatra pointed out that many breakthroughs are being done by men, as not many young women enter the realm of higher studies in science, and because women in science are often marginalised. “Though Indian culture celebrates women in religion, this has not translated to giving women their due in science,” he said.

“Women have not been given their place they deserved. This country has woken up very late and now, we have some schemes to elevate women in science,” he added.

<https://www.deccanherald.com/national/despite-schemes-women-scientists-small-in-number-791708.html>