

## DRDO offers tech from LCA Tejas oxygen system to hospitals fighting Covid-19

*The system generates oxygen directly from the air and can be useful in remote areas*

*By Anantha Krishnan M*

A spin-off from a critical technology that would aid future pilots of the Indian Air Force (IAF) flying the Light Combat Aircraft (LCA) Tejas with a non-stop supply of oxygen while undertaking long-endurance missions is now being offered to hospitals combating the coronavirus.

This product to fly out from the hangars of the Defence Research and Development Organisation (DRDO) is in the form of a Medical Oxygen Plant (MOP), is an offshoot technology from the Onboard Oxygen (OBOX) generation system being developed for the Tejas.

The MOP technology is developed by Defence Bioengineering and Electromedical Laboratory (DEBEL), a life sciences wing of DRDO situated in Bengaluru's C.V. Raman Nagar.

MOP utilizes pressure swing adsorption (PSA) technique and molecular sieve technology to generate oxygen directly from atmospheric air.

The OBOX technology for Tejas being developed by DEBEL has been approved by the Centre for Military Airworthiness and Certification (CEMILAC), an agency mandated to certify the products being transferred to a Coimbatore-based firm.

"This plant will be useful to provide oxygen supply during corona pandemic in hospitals in urban and rural areas. The installation of MOP helps in avoiding hospital's dependency of scarce oxygen cylinders," says a DRDO official monitoring the work.

Ever since the coronavirus outbreak, the scientists at DEBEL have been working on developing various products for the healthcare sector.

Masks and sanitizers developed by the lab have already been distributed in bulk, while work on affordable ventilators has reached advanced stages of completion.

### Several benefits

Scientists say that the MOP can be used extensively at hospitals situated at high altitude and inaccessible remote areas.

"There are several benefits including reduced logistics of transporting cylinders to these areas, low cost, continuous and reliable oxygen supply available round the clock. The facility can also be used for filling the cylinders in addition to direct installations at the hospitals," says a scientist.

DRDO has already used this technology to install oxygen plants at some of the military hospitals and establishments in the northeast and in the Leh-Ladakh region.



The naval Tejas fighter taking off from the ski-jump with Derby's (mounted on the inner-wing hardpoints) and R-73s (painted white, on outer-wing hardpoints) | Twitter handle of DRDO

The first such plant set up in Tawang is operational since 2017 and it complies with international standards like ISO 1008, European, US and Indian pharmacopoeia.

### **Unique features**

The MOP has high reliability, full in dependency with automation and reduces logistics. This safe technology needs only minimum maintenance and can be operated at low cost. It is free of oil and produces oxygen instantaneously from ambient air and works round-the-clock.

The electric oxygen compressor can charge the cylinders up to 200 bar. It has stored oxygen supply for transient power failures and boasts of low energy consumption. It can also be operated via remote control.

The MOP contains an air compressor, air dryer, oxygen generator and a compressor. Each plant can fill up to 60 47-litre (water capacity) cylinders a day and operate round-the-clock.

“The oxygen capacity depends on the pressure of filling, which is about 150-200 bar. The industry holding the transfer of technology can ramp up its production and can install up to 20 plants in five weeks,” says a scientist.

The system can cater to 60 patients at a flow rate of 5 LPM (litres per minute) and can charge up to 60 cylinders per day. The capacity can be varied as per the hospital requirement. The plant is designed for a capacity of 18 NM3 per hour (NM3 or normal meter cubed per hour is the unit to measure the gas flow rate).

For the Tejas OBOX, the scientists have used a zeolite-based technology and the system will undergo trials soon.

“We have completed all ground-based trials of OBOX on the test rigs and the pilots are satisfied with the results. It will now be integrated on one of the test variants of Tejas for flight trials. IT has been already cleared by the Regional Centre for Military Airworthiness,” says an official.

The Ministry of Civil Aviation and Indian Railways are among the several prospective users who have shown interest in DEBEL’s MOP.

*(The writer is an independent aerospace and defence journalist, who blogs at Tarmak007 and tweets @writetake. This article was originally published in OnManorama)*

<https://www.theweek.in/news/india/2020/04/24/drdo-offers-tech-from-lca-tejas-oxygen-system-to-hospitals-fighting-covid-19.html>

**hindustantimes** विस्तार

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Sat, 25 April 2020

## **DRDO offers oxygen plants to hospitals in far-flung areas**

*The technology is in service with the army which has installed  
oxygen plants at some of its facilities in Ladakh and the North-east*

*By Rahul Singh*

New Delhi: In its latest offering to combat the coronavirus disease (Covid-19), the Defence Research and Development Organisation (DRDO) has stepped forward to provide medical oxygen plants to hospitals in far-flung areas to generate their own oxygen supply, two government officials said on Friday.

The oxygen generating system is an offshoot of a critical system on board the homegrown Tejas light combat aircraft and it utilises “the pressure swing adsorption technique and molecular sieve technology” to generate oxygen directly from atmospheric air, said the first official cited above.

“The oxygen plants will help provide medical-grade oxygen supply during the corona pandemic in hospitals in urban, rural and far-flung areas. The installation of these plants will reduce the

dependence of hospitals on oxygen cylinders. They will be of great help in high altitude and inaccessible remote areas,” the official said.

The technology has been approved by Centre for Military Airworthiness and Certification, a regulatory body under DRDO.

The oxygen generator system has been developed by Bengaluru-based Defence Bioengineering and Electro-medical Laboratory (DEBEL, a DRDO unit) and the technology has been transferred to a Coimbatore-based private firm.

The firm has the capability to install four plants in two weeks, 20 in five weeks and production can be ramped up if required, said the second officer.

“The benefits include reduced logistics of transporting cylinders to remote areas. The plants will ensure low cost, continuous and reliable oxygen supply round the clock,” he said.

The technology is in service with the army which has installed oxygen plants at some of its facilities in Ladakh and the North-east. The plants can also be used for the filling up oxygen cylinders. Each plant can fill 47 litre (water capacity) cylinders at the rate of 60 per day, he said.

The DRDO is among the several government agencies that have been at the forefront of the fight against the coronavirus disease, having developed several products to combat the pandemic including ventilators, personal protective equipment (PPE) kits, large area sanitisation solutions and Covid-19 sample collection kiosks.

Defence minister Rajnath Singh on Thursday unveiled, via video conference, a mobile virology research and diagnostics laboratory (MVRDL) that will speed up coronavirus disease screening and other Covid-19 research and development activities. The MVRDL has been developed by the DRDO, Hyderabad-based Employees’ State Insurance Corporation hospital and the private industry.

The DRDO last week shifted a key testing facility for carrying out quality checks on PPE kits from Gwalior to New Delhi to cut down delays and ensure faster delivery of the safety gear to healthcare workers battling Covid-19.

<https://www.hindustantimes.com/india-news/drdo-offers-oxygen-plants-to-hospitals-in-far-flung-areas/story-wZpmIVcTIGJnYKVfMvvgxM.html>



The technology has been approved by Centre for Military Airworthiness and Certification, a regulatory body under DRDO. (Sanchit Khanna/HT PHOTO)



Sat, 25 April 2020

## Defence Minister inaugurates first of its kind mobile Lab for COVID-19 sample collection

*The Union Defence Minister Rajnath Singh on Thursday inaugurated the first of its kind mobile lab for COVID-19 sample collection. The minister dedicated the lab to the country via video conference.*

The lab has been developed by Defence Research and Development Organization (DRDO) in collaboration with ESIC Medical College and Hospital, Hyderabad with the permission of Indian Council of Medical Research (ICMR) and Telangana government, read an official statement.

Speaking on the occasion, the Defence Minister appreciated the efforts of DRDO and ESIC in setting up of this Bio-Safety Level 2 and Level 3 lab in a record time of 15 days which usually takes about six months time.

He further said this testing facility can process more than 1,000 samples in a day and will enhance the country's capabilities in fighting the coronavirus.

It will be the first of its kind facility in the country for COVID-19 and other related testing and research purposes.

The design of Mobile 'BSL-3 VRDL' Lab has been developed by DRDO scientists whereas specification of the lab has been given by ESIC Medical College and Hospital, Sanathnagar, Hyderabad. The project has been executed and constructed by three industry partners of DRDO, read the statement.

<https://www.newkerala.com/news/2020/72293.htm>

## ఆంధ్రజ్యోతి

Sat, 25 April 2020

**We are ready.. You?**

*DRDO's offer to industrialist*

# మేం రెడీ.. మీరు?

**పారిశ్రామికవేత్తలకు డీఆర్డీవో ఆఫర్**



రక్షణ పరిశోధన, అభివృద్ధి సంస్థ (డీఆర్డీవో) అనగానే చాలా మందికి క్షీవణులు, ఆధునిక యుద్ధ వ్యవస్థలు గుర్తుకొస్తాయి. కానీ, దేశంలో కరోనా వ్యాప్తి మొదలైన తర్వాత.. ఈ వైరస్ పై కూడా డీఆర్డీవో యుద్ధం ప్రకటించింది. కరోనాను దీటుగా ఎదుర్కోవటానికి 23 టెక్నాలజీలను అతి తక్కువ సమయంలో అభివృద్ధి చేసింది. అంతేకాదు.. ఉత్పత్తి కోసం వాటిని ప్రైవేట్ సంస్థలకు అందించింది. "మన పరిశ్రమలకు ఇది ఒక మంచి అవకాశం. మా వద్ద ఉన్న టెక్నాలజీలను ఇవ్వటానికి మేము సిద్ధంగా ఉన్నాం. ఉత్పత్తి చేయటానికి పరిశ్రమలు సిద్ధమేనా?" అని ప్రశ్నిస్తున్న డీఆర్డీవో చైర్మన్ డాక్టర్ సతీశ్ రెడ్డితో 'ఆంధ్రజ్యోతి' ప్రత్యేక ఇంటర్వ్యూ..

**2**

**సాంకేతికత అందించడానికి మేం సిద్ధం**

**తీసుకోవడానికి పరిశ్రమలు సిద్ధమేనా?**

**వీలైనంత త్వరగా ఉత్పత్తి ప్రారంభించాలి**

**శానిటైజర్ల నుంచి వెంటిలేటర్ల వరకూ**

**మొత్తం 23 టెక్నాలజీలు అభివృద్ధి చేశాం**

**'ఆంధ్రజ్యోతి'తో డీఆర్డీవో చైర్మన్ సతీశ్ రెడ్డి**

<https://epaper.andhrajyothy.com/c/51275012>

## Defence Minister launched DRDO mobile testing lab

*Mobile virology research and diagnostics laboratory (MVRDL) can be positioned anywhere in the country and will be able to process over 1000 samples in a day that can speed the diagnosis of the COVID-19 virus*

*By Shailja Tripathi*

The inaugurated lab which can be positioned anywhere in the country will be able to process over 1000 samples in a day which can speed the diagnosis of the COVID-19 virus.

Defence Minister unveiled MVRDL through a video conference. The laboratory has been developed by DRDO in associated with ESIC Hospital, Hyderabad, and private industry.

### Objective:

Mobile Virology Research and Diagnostics lab (MVRDL) developed by DRDO will be able to speed up COVID-19 screening and to carry out immune profiling of the patients of the virus for the vaccine development. The lab will be able to screen 1000-2000 samples in a day.

The lab will help in carrying out COVID-19 diagnosis, convalescent plasma-derived therapy, virus culturing for drug screening, and early clinical trials which will be specific for the Indian population.

### Key Highlights:

- Defence Minister while inaugurating the lab stated that several timely decisions by the government have been taken under the leadership of PM Narendra Modi. Because of this, the impact of the virus in India is far less than the other countries.
- The biosafety level 2 and level 3 lab has been set up in a record time of 15 days which usually takes 6 months.
- The lab which can be positioned anywhere in the country will enhance India's capabilities in fighting COVID-19.
- The first such type of Mobile Viral Research lab for R&D activities and COVID-19 screening was developed by the Hyderabad based laboratory of DRDO, Research Centre Imarat (RCI), in consultation with ESIC Hospital, Hyderabad.
- The lab has been built as per the bio-safety standards to meet international guidelines of WHO and ICMR. The lab has LAN, inbuilt electrical controls, CCTV, and telephone cabling.

<https://www.jagranjosh.com/current-affairs/defence-minister-launched-drdo-mobile-testing-lab-1587705054-1>





Sat, 25 April 2020

## Can AMRAAM be Integrated into LCA-Tejas Mk1A?

By Anita Desai

India has been cleared to acquire Integrated Air Defense Weapon System (IADWS) which is the advanced form of National Advanced Surface to Air Missile System (NASAMS-II) along with it will it India has been cleared to get two main and important weapons system in the package that are 118 AIM-120C-7 and AIM-120C-8 missiles which are latest Beyond Visual range Air-to-Air missile with no external changes then what is used on fighter jets.

LCA-Tejas Mk1A will be getting India's Astra Mk1 BVRAAM which according to developers of the missile system is comparable to the AIM-120C-5 which is used by Pakistani Air Force F-16 fleet in terms of range and technical specifications.

India has decided not to integrate Russian BVRAAMs like R-77 and R-37 due to performance issues but has tested an older version of the Derby BVRAAM which was originally procured for the Sea Harrier upgrade program which now has been retired from Tejas Mk1 aircraft. Israel has offered India its upgraded I-Derby BVRAAMs which has double the range and according to weapons maker offers 80% of the operational performance of the Meteor air-to-air missiles which are super exclusive to the 36 Dassault Rafale at least till now since MBDA the makers of the weapons system do not want to clear it for integration with India's Su-30MKI and Tejas Mk1A fleet anytime soon.



So India is left practically with only one option that is I-Derby BVRAAM. DRDO has promised to double the range of future variants of Astra BVRAAMs and according to certain media reports a Dual-Pulse motor with additional booster might be offered as Astra Mk2 with a range of around 140-150km against fighter-sized aircraft and Solid Fuel Ducted Ramjet (SFDR) which DRDO is developing with Russia and is equipped with solid fuelled air-breathing ramjet engine might become Astra Mk3 in near future with a range from 140-300km for fighter and AWACS sized targets.

### Technical flexibility

Tejas Mk1A will come equipped with Israeli ELA ELTA-2052 AESA Fire Control Radar which already has been integrated with the ARMAAM variant due to Israeli manufacture which also needs to cater to both Israeli origin BVRAAMs and AMRAAM which are used by the Israeli Air force.

South Korean FA-50 which is Light attack/fighter version equipped with EL/M-2032 multimode planar array fire-control radar which is used in current Tejas MK1 use AIM-120 AMRAAM as its main BVRAAM on its FA-50 Block 20 variant which is still in work and interestingly also offered Israeli ELA ELTA-2052 AESA Fire Control Radar if any prospective customer desired to have an AESA Radar instead of older EL/M-2032 fire-control radar, which at least confirms that technically at least it's viable.

## **Americans Clearance**

AMRAAM Family has been integrated into Non-American fighter jets like Saab's Gripen and Gripen-E, Euro-Fighter Typhoon, and light class fighter jet aircraft like FA-50. so It is unlikely Americans will object in the integration of AMRAAMs on the LCA-Tejas Mk1A and Mk2 soon since we are already getting them in another form.

## **Why AMRAAM?**

Astra Mk1 BVRAAM which is comparable to AIM-120C-5 is a commendable achievement for the DRDO and India but the amount of time take to reach also suggests the development of smaller missile systems particularly air to air weapons are not so easy and the future variant of Astra will take no time to come.

Astra Mk1 BVRAAM production is yet to be scaled up and it still has entered only limited scale production and as per media reports initially will be cleared only with the Su-30MKI fleet and later will move to LCA-Tejas Mk1A and Mk2.

Production constraints will ensure that Tejas Mk1A will feature either Israeli I-Derby BVRAAM or the older Derby BVRAAM till the scale of Astra production is scaled up and IAF places orders in larger numbers. Astra Mk2 and Astra Mk3 won't be available at least for the next 7-10 years which means Tejas Mk1A and Mk2 will have to rely on at least one foreign-made BVRAAM along with Astra MK1.

AIM-120C-7 and AIM-120C-8 are way superior then Astra MK1 in terms of range and technical specifications and is the system which we are already getting in the country.

## **Conclusion**

Until Astra Mk1 are mass-produced and until Mk2 and Mk3 arrive in the picture, Tejas Mk1A will require a foreign BVRAAM it can be I-Derby BVRAAM or AMRAAMs, even when Astra Mk1 is available in large numbers just to maintain a rigid combo of BVRAAMs it will continue to have secondary missile as a back up until off course Astra Mk2 and Mk3 arrives.

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<https://idrw.org/can-amraam-be-integrated-into-lca-tejas-mk1a/#more-225859>