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DefenseNews

Tue ,18 Dec 2018

DRDO keen on indigenising defence products

Organisation chief stresses collaboration with industry, academia

Defence Research and Development Organisation (DRDO) chairman G. Satheesh Reddy on Sunday said the organisation is keen to work with industry and academia to indigenise products to reduce dependency on imports.Mr Reddy was speaking on the sidelines of the inaugural session of the four-day IEEE InCAP 2018. He said the DRDO is populating a list of products, including spare parts, which will soon be displayed on its website for startups, industry and academia to access and indigenise.

"We are making a list — right from spare parts and systems such as electronic systems and other types of systems, which we are importing. This will be available to the public which can indigenise and we will be able to buy (these products)," Mr Reddy said.The DRDO chairman added that the list would be made public in two to three months and the products would be worth "a few thousand crores".

Touching upon the organisation's collaborative efforts, Mr Reddy said, "We are working with academia, and research and development institutes across the country.

We are working on materials in a big way and have established centres of excellence (CoE)." He added that the CoE are in some of the IITs and Jadavpur University, Kolkata.Mr Reddy said the collaborations are in various fields such as artificial intelligence, deep learning and robotic systems. He expressed interest in setting up a CoE for antennas as well.

During his talk at the event, Mr Reddy pointed out the evolving scenario for antennas and said that combat is dependent on communication. He said that there is a need to produce state-of-the-art products to export them.An exhibition with around 25 sponsors and exhibitors and paper presentations were also held as part of the event.

https://www.thehindu.com/news/cities/Hyderabad/drdo-keen-on-indigenising-defence-products/article25759380.ece

Business Standard

Tue ,18 Dec 2018

IAF goes green with An-32

Plans to fly the biofuel-powered transport aircraft over New Delhi during the Republic Day parade

On Monday, the Indian Air Force (IAF) took a major step towards making good its promise to fly a biofuel-powered An-32 transport aircraft over New Delhi during the Republic Day parade."Experimental test pilots and test engineers from the IAF's premier testing establishment ASTE, flew India's first military flight using blended bio-jet fuel on the An-32 transport aircraft.

The project is a combined effort of IAF, DRDO (Defence R&D Organisation), Directorate General of Aeronautical Quality Assurance (DGAQA) and CSIR-Indian Institute of Petroleum (IIP)," announced the air force on Monday.On July 27, the IAF chief, Air Chief Marshal BS Dhanoa, had announced his intention to promote bio-jet fuels. Addressing a seminar in Delhi on promoting indigenised technologies, Dhanoa said The IAF intended to fly the An-32 with aviation turbine fuel (ATF) diluted with 10 per cent biofuel on Republic Day Dhanoa offered IAF aircraft and all its testing facilities to realise this project, along with financial support under the IAF's fund for indigenisation R&D.After extensive engine tests on the ground, the project has entered the flight trials phase.

This fuel is made from Jatropha oil sourced from Chhattisgarh Biodiesel Development Authority (CBDA) and then processed at CSIR-IIP, Dehradun.The An-32 is not the first IAF aircraft to fly with bio fuel. In 2011, the US Air Force (USAF) announced that the C-17 Globemaster III — which the IAF also operates — was certified for unlimited use of hydro-processed blended biofuels, known as hydro-treated renewable jet fuels.

In 2010, the USAF had flown a fighter aircraft powered with bio fuel. In essence, a bio fuel is a fuel produced from living matter that includes plant waste and animal fat, rather than a fuel produced through the geological process, such as coal, diesel and petroleum. Last August, Prime Minister Narendra Modi said that bio fuels and ethanol blending could help India save $1.7 billion a year on import bills and called for more support to biofuels in the country.Earlier this year, the government approved a new policy that expanded the feedstocks that could be used for ethanol production.

https://www.business-standard.com/article/economy-policy/iaf-goes-green-plans-to-fly-biofuel-powered-an-32-transport-aircraft-118121800020_1.html

THE ASIAN AGE

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HAL's Light Utility copter project hits new milestone

The Hindustan Aeronautics Limited's Light Utility Helicopter project has notched another milestone as the third prototype (PT3) made its maiden flight on December 14.The helicopter was flown by test pilots, Wg Cdr (Retd) Anil Bhambhani and (Retd) M R Anand VM, the Hindustan Aeronautics Limited (HAL) said in a release here Monday.

The flight was flawless and the prototype would augment development flight testing in conjunction with other two Prototypes towards Certification, it said.Indigenously designed and developed by the state-run aviation major Hindustan Aeronautics Limited, the Light Utility Helicopter (LUH) achieved an important milestone of flying at a 6-km altitude here recently. Based on the feedback from flight testing of PT1 and PT2, PT3 is built to the standard of deliverable configuration,

The release said. With this achievement, LUH is now close to production clearance and the unit is confident of meeting requirements of the armed forces, HAL CMD The successful completion of the first flight of LUH's third prototype is a quantum leap and will soon replace the aging fleet of Cheetah and Chetak helicopters, according to HAL Director (Engg and R&D) Arup Chatterjee.

The LUH is a 3-ton class new generation single engine helicopter indigenously designed and developed by the Rotary Wing Research and Design Center (RWR&DC) of HAL, it said. The first flight of LUH PT-1 was carried on September 6, 2016 and the second Prototype flew on May 22, 2017.High altitude cold weather trials of LUH are planned in January 2019, the release added.

https://www.business-standard.com/article/pti-stories/hal-s-light-utility-chopper-project-notches-another-milestone-118121700861_1.html

The Indian EXPRESS
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WWW.INDIANEXPRESS.COM

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Second time lucky

A new engine could bring back supersonic air-travel

EVERY MORNING, time once was, a giant roar from Heathrow Airport would announce the departure of flight BA001 to New York. The roar was caused by the injection into the aircraft's four afterburners of the fuel which provided the extra thrust that it needed to take off. Soon afterwards, the pilot lit the afterburners again—this time to accelerate his charge beyond the speed of sound for the three-and-a-half hour trip to JFK. The plane was Concorde.

No more. Supersonic passenger travel came to an end in 2003. The crash three years earlier of a French Concorde had not helped, but the main reasons were wider. One was the aircraft's Rolls-Royce/Snecma Olympus engines, afterburners and all, which gobbled up too much fuel for its flights to be paying propositions. The second was the boom-causing shock wave it generated when travelling supersonically. That meant the over-land sections of its route had to be flown below Mach 1. For the Olympus, an engine optimised for travel far beyond the sound barrier, this was commercial death.

That, however, was then. And this is now. Materials are lighter and stronger. Aerodynamics and the physics of sonic booms are better understood. There is also a more realistic appreciation of the market. As a result, several groups of aircraft engineers are dipping their toes back into the supersonic pool. Some see potential for planes with about half Concorde's 100-seat capacity. Others plan to start even smaller, with business jets that carry around a dozen passengers.

The chances of such aircraft getting airborne have recently increased substantially. General Electric (GE), one of the world's biggest makers of jet engines, has teamed up with one of the groups of engineers, at Aerion, a company based in Reno, Nevada, to design an engine called Affinity. This, the two firms hope, will be the first civil supersonic jet engine to enter service since the Olympus, designed originally for a British bomber, was adapted for Concorde half a century ago.

The plan for Affinity, once prototypes have been built and tested, is that Aerion's AS2, a 12-seat supersonic business jet, will be powered by three of them. The AS2 (maiden flight scheduled for 2023) will have a top speed of Mach 1.4. That is slower than Concorde, which could belt along at just over Mach 2. But GE reckons that, unlike the Olympus, Affinity will be efficient at subsonic as well as supersonic speeds, and will meet existing and forthcoming noise and environmental regulations at airports. Under present rules, however, it too would be required to fly subsonically over land, although in time that might change. The design could also be scaled up, which Aerion says would allow business jets to fly at Mach 1.8 or more, and permit the construction of bigger supersonic passenger aircraft, should demand emerge.

Force majeure

Like all jet engines, Affinity relies for its propulsion on Newton's third law of motion (to every action there is an equal and opposite reaction). The action comes from the mass of air drawn into the engine's front opening being thrust out of the back at far greater velocity. The reaction against this action propels the engine, and anything attached to it, in the opposite direction—ie, forward.

In a simple jet the ingested air is first squeezed by a compressor, and then mixed

with fuel and ignited in the engine's core to create a fast-moving exhaust. Modern fan jets, however, use some of the exhaust energy to drive a shaft which turns a fan near the engine's intake. That fan pushes a proportion of the incoming air, known as the "bypass", around the engine's hot core and out of the back, thus providing additional thrust. Bypass thrust is more economical to create than core thrust, but it is slower moving. A supersonic aircraft can therefore afford only a small bypass ratio (1:1 in the case of many military jets). In a civil airliner the bypass ratio (which, if high, brings not only efficiency but also quietude) may be as great as 10:1.

Affinity is a compromise between the two approaches, combining technologies from military and civil engines. Though its designers have not revealed the actual ratio (and much else, too, is secret at the moment), they describe it as a "medium bypass" engine, and have said that it has a bigger fan than any other supersonic engine. Nor does it require a thirsty afterburner.

Achieving all this has been made possible by advances in thermal coatings, engine acoustics and materials such as lightweight carbon fibre. Novel production methods like 3D printing have helped as well—as has the involvement of other partner firms, including Lockheed Martin, a giant aerospace company, and Honeywell, a producer of avionics.

A particular design challenge, observes Brad Mottier, one of the GE executives leading the project, was that unlike conventional civil jet engines, which hang from an aircraft's wings, Affinity has to blend into a plane's airframe. The laws of aerodynamics require this if it is to perform efficiently. Blending also helps damp down the generation of a sonic boom. Sonic booms are caused by air piling up in front of various parts of the plane, particularly its nose, wings and engine inlets. This air turns into a shock wave that contains a huge amount of energy, which offends the ears when it reaches the ground. Blending engine and body, together with design tweaks such as a specially shaped long, thin nose, can muffle a sonic boom before it gets going.

To mute it after it has happened, and thus strengthen still further the case for letting the AS2 fly supersonically over land, the aircraft's control systems will constantly monitor nearby atmospheric conditions. By tracking these, aerospace engineers believe they can take advantage of a phenomenon called Mach cut-off. This involves directing the sonic boom in such a way as to refract it through layers of thicker air at lower altitude. Refract it enough and it will, in effect, be reflected—never arriving at ground level. Feeding the autopilot information about where the relevant layers are would let the plane steer itself in a way which maximised Mach cut-off.

Experts are now testing these ideas. In November, an F/A-18 fighter performed a series of supersonic dives over Galveston, Texas, at the behest of NASA, America's aerospace agency. The agency was attempting to simulate the sort of muted boom that might be expected as a result of Mach cut-off. It installed sound-measuring equipment on the ground, and asked more than 400 residents to note down anything they heard. Some said they heard nothing, others that they noticed what sounded like a car door slamming.

In coming years, NASA hopes to fly an experimental supersonic jet aircraft around America in a further test of ways of moderating the intensity of booms at ground level. If successful, this might lead to changes in the rules to let future supersonic jets, like those planned by Aerion, cut yet more of a dash across the land. If they can do so cheaply as well as quietly, these new speedbirds should face a rosier future than that afforded to Concorde.