

AEROMAG

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Singapore Airshow Day - 2

ASIA



Dr Ng Eng Hen, Minister for Defence, and Khaw Boon Wan, Coordinating Minister for Infrastructure and Minister for Transport at the ribbon cutting ceremony of Singapore Airshow 2020.

Wings up for Singapore Airshow 2020

Singapore Airshow 2020, considered Asia's largest aerospace and defence event unveils its curtain for its latest edition at Changi Exhibition Centre, Singapore.

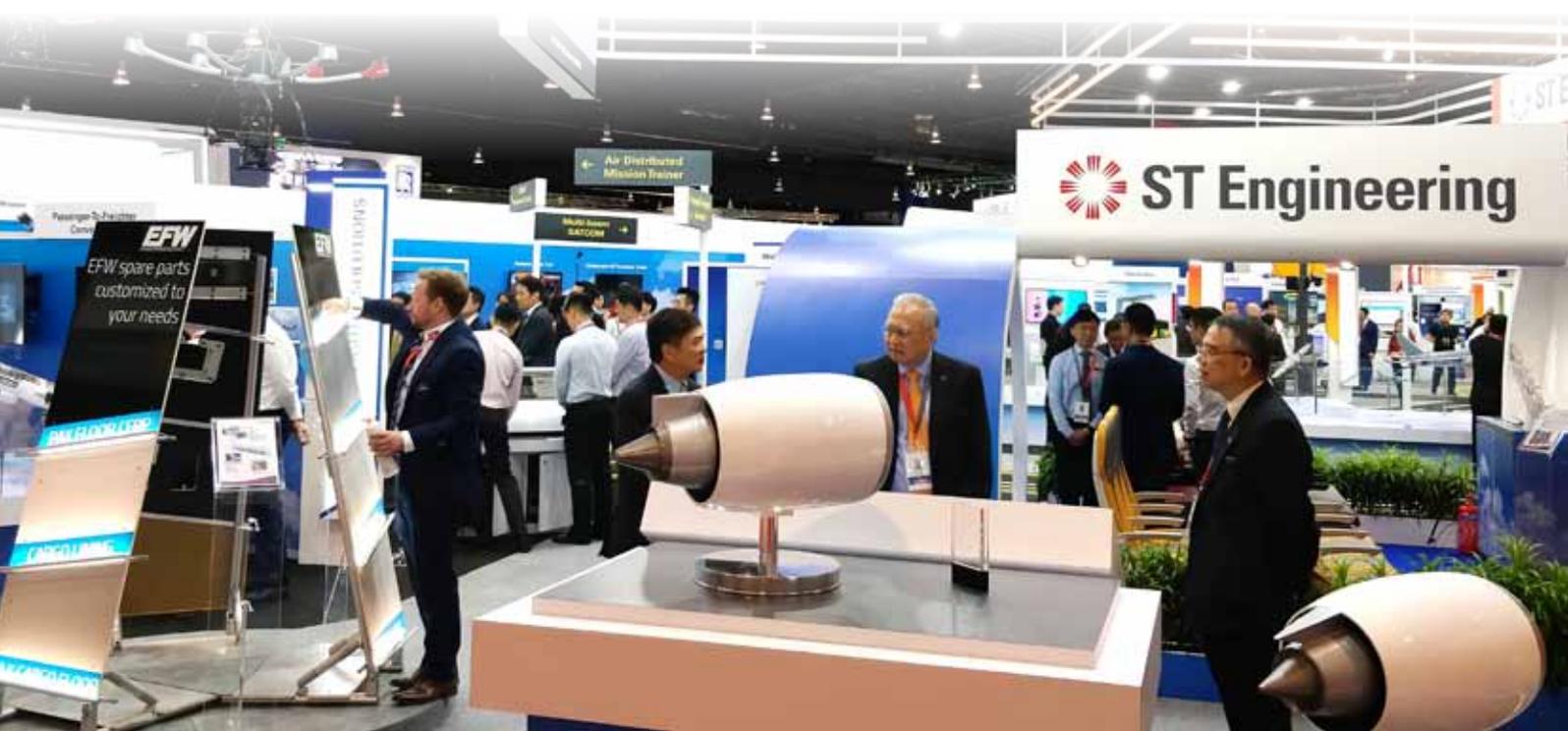
An international marketplace strategically located in the heart of the thriving Asia Pacific region, the Singapore Airshow is Asia's largest and one of the most important aerospace and defence

exhibitions in the world. The show has established itself as an important global marketplace and networking powerhouse for the world's aviation community. It consistently attracts more than 60 of the top 100 global aerospace companies to showcase their latest technologies, solutions and developments.

Vincent Chong, Chairman, Experia Events, at the opening ceremony of the show, said that they have implemented

a range of precautionary measures and remain ready to introduce further measures as necessary, in close consultation with the health authorities.

"We are standing at the cusp of transformation. As we position ourselves for the decades ahead, we need to constantly challenge current mindsets to stay relevant and sustainable. The Singapore Airshow offers multiple ways to facilitate such discussions," he said.



New UAV Turbine Engines From PBS

PBS turbojet engines have proven to be efficient propulsion units in hundreds of aerial targets, UAV and UCAV systems and piloted micro jets.



An excellent power-to-weight ratio, compact design, reliable operation, low fuel and oil consumption together with starting at high altitudes and at high speeds make PBS jet engines stand out among competing engines.

Latest development –
Turbojet Engine PBS TJ150

With its in-house expertise in design, development, production and testing, the company PBS continually works on a new engine development in order to meet missile and UAV market requirements. Recently, the company PBS finalized the development of a new turbojet engine PBS TJ150.

Weighing just 19.6 kg and

with a diameter of 272 mm, the engine offers 1,500 N thrust. It features an integrated starter-generator with 600 W electrical power output. Gearbox design offers the possibility to install an additional alternator with output power up to 1.5 kW. The engine is controlled through full-authority digital system FADEC.

The PBS TJ150 can operate at a speed of up to 0.9 M, ambient temperature of -50 °C to +45 °C and altitudes of up to 9,000 m. It has an ability of ground and in-flight restart of up to 4,000 m with maximum speed of 0.6 M.

The newly developed engine PBS TJ150 is based on the most commercially successful model PBS TJ100 turbojet engine



PBS Turboprop Engine TP100

Technical parameters

Max. power 180 kW 241 HP

El. power output 720 W

Dimensions and weight

Length 891 mm 35.08 in

Weight 61.6 kg 135.8 lb

Operating range - engine operation

Max. altitude 9,000 m 29,500 ft

Operating range - engine start

Max. altitude 6,000 m 19,700 ft



PBS Turbojet Engine TJ150

Technical parameters

Max. thrust 1,500 N 337 lbf

El. power output up to 1,500 W

Dimensions and weight

Outer diameter 272 mm 10.7 in

Weight 19.6 kg 43.2 lb

Operating range - engine operation

Max. altitude 9,000 m 29,528 ft

Max. speed 0.9 M

Operating range - engine start

Max. altitude 4,000 m 13,123 ft

Max. speed 0.6 M



(1,250 N thrust). It is a single-shaft engine composed by a starter generator integrated in the radial compressor impeller, one axial turbine, autonomous oil system and digital control system. To this day almost 1,000 units have

been delivered to customers.

PBS Turboprop and Turboshift Engines

PBS is also a manufacturer of turboprop and turboshift engines designed for MALE UAVs, unmanned helicopters

and small experimental aircraft. The PBS TP100 and TS100 develop max. power of 180 kW. Low weight, small installation dimensions, extended intervals between overhauls (TBO) and high efficiency at high altitudes are

the competitive advantages of PBS turbine engines. They are able to achieve flight levels of 9,000 m with a maximum starting height of 6,000 m.

Auxiliary Power Units

Auxiliary Power Units (APU) which are used all around the world, both in defence and civil airplanes and helicopters is also one of the main product lines of PBS.

They operate as air generators for starting systems and as emergency power and hydraulic sources.

Their main advantages are simultaneous supply of electric power and compressed air, continuous operation for up to 6 hours, long service life and ability to start and operate in altitudes of up to 6,000 m.

Safeguarding Space Assets



Dr G. Satheesh Reddy
SA to RM, Chairman, DRDO & Secretary, Defence R & D

Sir, as the chief architect of India's path-breaking anti-satellite missile test Mission Shakti which is completing one year, how do you analyse the programme and could you explain the follow-up measures taken?

The importance of Mission Shakti lies in demonstrating deterrence in space and proving the country's technological capability to provide protection for our space assets. It is intended only for technology demonstration.

As the Chief of DRDO, what are your priorities?

Launch of Next Gen flagship programs, platforms specific to reduce the major imports in defence is the priority. DRDO is taking major steps in the direction of 'Make in India' with defence corridors being planned by the Government of India. We have laid emphasis on NG MBT, LCA Mk-II, AMCA, new generation missile systems and HEAUV. The thrust would be to incorporate advanced technologies in design and development of flagship programs so that we are ready for meeting the futuristic requirements.

Artificial Intelligence would be a key factor in the

modern battlefield. Please update us about DRDO's programmes in this regard.

DRDO has been working in the field of Artificial Intelligence and the work is being majorly carried out at one of our laboratory, CAIR. Other laboratories like R&DE and VRDE are also working on autonomous technologies. To provide greater impetus for the research activities in the niche areas of AI, we have started a young scientist laboratory exclusively as a center of excellence with all scientists below 35 years including the director. It was dedicated to the nation by the Hon'ble PM recently. In addition, AI and Decision Support based technologies are being used for the development of futuristic systems.

Nations and non-state actors are adopting cyber warfare methods and India too is facing the threat. Could you reveal the programmes launched by DRDO and allied organisations for India's defence on this front?

DRDO is working on the development of state-of-the-art cyber security systems to protect critical information infrastructure for defence facilities and installations.

Dr. G. Satheesh Reddy, Chairman of the Defence Research and Development Organisation, Secretary of the Department of Defence Research and Development and Scientific Adviser to the Defence Minister, opens up about his priorities – launch of DRDO's Next Gen flagship programs, platforms specific to reduce major imports in defence. Excerpts from an interview with Aeromag:

The technology ranges from separation kernel based operating systems to Artificial Intelligence enabled cyber security systems for detection of cyber threats and their mitigation.

India has now created history when its indigenous military jet, the Naval LCA, made a landing and take-off from the aircraft carrier, INS Vikramaditya. Your views?

We are one of the few countries in the world having the capability to operate our own fighter aircraft from an aircraft carrier. This was possible through many years of painstaking research and development activities on arrestor hook and modified landing gear. We have developed a shore-based set up for practicing arrestor barrier landing by our aircraft, before proving the historic landing of Naval Tejas on INS Vikramaditya. It was a tremendous work and I congratulate our Navy pilots and the scientists associated in the development team for the achievement.

DRDO's Nirbhay missile project has been in the pipeline for some time now. What is the latest in this regard?

Nirbhay has completed the Development Trials, including long endurance and low flying cruise flight profile. Production will commence once procurement process is completed.

Could you talk to us about the status of DRDO's anti-tank guided missile system programme?

Our ATGM program has come of age. Nag, the ground based ATGM has completed the User Trials and is ready for production. The helicopter launched version, Helina is in advanced stage of development. The development of Helina, called Dhruvastra will be completed by this year end. MPATGM is also in the final phase of development. This arsenal will suffice the user requirements in this segment.

Could you share with us about the major upcoming projects of DRDO?

The upcoming new initiatives in the form of new platforms and systems development include advance medium combat aircraft, new-generation main battle tank, long-range radars, advanced airborne early warning and control system, sonar suites, high-thrust aero engines, high power engines for wheeled platforms, underwater autonomous vehicles and hypersonic vehicles.

Some of the weapon systems under advanced stages of development are long-range air-to-air missile, standoff anti-tank missile, advanced torpedoes, medium-range surface-to-air missile for the Army, a ship-launched short-range surface-to-air missile for the Navy, Naval anti-ship missile, etc. ■

Collins Aerospace signs 12-year service agreement to support Singapore Airlines' 787 fleet

Collins Aerospace Systems, a unit of United Technologies Corp.



(NYSE: UTX), has entered into a long-term agreement to support Singapore Airlines' (SIA) fleet of Boeing B787 aircraft through its DispatchSM flight hour program. Dispatch guarantees the availability of high-performance avionics and communications assets to customers around the globe.

The 12-year agreement marks the continuation of a successful relationship between SIA and Collins Aerospace. SIA will have comprehensive support that includes critical on-site spares, maintenance services including upgrades, access to Collins Aerospace's worldwide 787 asset pools, and technical assistance.

"With thousands of aircraft covered globally, Dispatch is a proven, cost-effective solution for our customers, reducing or eliminating the need for a spares inventory, delivering quality repairs, and improving aircraft availability," said Craig Bries, vice president and general manager, Avionics Service and Support for Collins Aerospace. "We have a longstanding relationship with SIA and we're dedicated to providing world-class service for years to come."

Collins Aerospace has existing service agreements that cover Singapore Airlines' A350 fleet, SilkAir's Boeing 737 fleet and Scoot's Boeing 787 aircraft.

Korean Air Selects Pratt & Whitney GTF™ Engines to Power up to 50 Airbus A321neo Aircraft



Pratt & Whitney, a division of United Technologies Corp. (NYSE: UTX), and Korean Air announced the formal selection of the Pratt & Whitney GTF™ engine to power up to 50 Airbus A321neo aircraft. The aircraft are expected to begin delivery in 2021.

Korean Air and Pratt & Whitney are also entering into discussions for the Korean Air Maintenance and Engineering Division to join Pratt & Whitney's PW1100G-JM GTF MRO network.

"We look forward to continued efficiency, fuel savings and environmental benefits of these latest A321neo aircraft powered by the Pratt & Whitney GTF engine," said Mr. Soo-Keun Lee, Korean Air's Executive Vice President and Chief Operations Officer. "Joining the GTF MRO network is a significant milestone that will allow Korean Air to enhance its MRO capability."

"Pratt & Whitney has shared a long-standing relationship and history with Korean Air dating back to the late 1960s and we are honored to power their next-generation fleet," said Rick Deurloo, chief commercial officer at Pratt & Whitney. "We appreciate Korean Air's continued confidence in Pratt & Whitney and we remain committed to supporting their fleet for many years to come."

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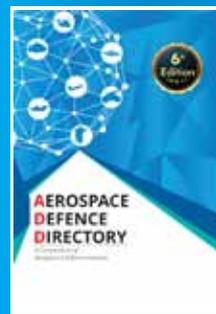
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Eurosatory - 08-12 June 2020

Farnborough Airshow - 20 - 24 Jul, 2020



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6th Revised Edition

**AEROSPACE
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MRF stall at Singapore Airshow. MRF is supplying tyres for Military Aircraft and Helicopters of Indian Airforce and also exporting to few other countries including Malaysian Airforce



Singapore Defence Minister Dr. N.G. Eng Hen visiting the Rafael stall at the Israel Pavilion





IAF Chief Air Chief Marshal Bhaduria visiting Brahmos stall.





UAV engine producer with more than 50 years of worldwide experience



PBS TJ150



1,500 N
19.6 kg
ø 272 mm

PBS TJ100



1,300 N
19.5 kg
ø 272 mm

PBS TJ80



900 N
12.5 kg
ø 235 mm

PBS TJ40



395 N
3.3 kg
ø 147 mm

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MEET US IN 2020

We look forward to seeing you at these exhibitions where you can sit with our professionals and discuss the best solution for your aerospace project.

We have sold more than **7000** turbine products including APU and ECS worldwide.

Thanks to our research and development we are prepared to modify our engines according to your needs.

