



# E-NEWS



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### Revived Saras likely to complete first flight in June

The re-engined and modified version of India's ambitious 14-seater Saras aircraft is gearing up for its first flight in June first week. Having received a thrust from the government under the regional connectivity policy, Bengaluru-based National Aerospace Laboratory (NAL) has handed over the aircraft to Indian Air Force's (IAF) Aircraft and Systems Testing Establishment (ASTE) for test flights. First conceived as a civil aircraft, NAL has been pushing Saras for military certification in the past two years, hoping to sell it to the



Indian Air Force (IAF). Saras will now boast of multi-role capabilities like feeder line aircraft, air ambulance, executive aircraft, troop transport, reconnaissance, aerial survey and light cargo transport. The original design included a maximum takeoff weight of 6,100kg and a maximum payload of 1,232kg. The first prototype which completed its maiden flight on May 29, 2004, was overweight at 5,118kg compared to the 4,125kg design specifications. Even as modifications to make the aircraft airworthy were taken up, the June 6, 2009 crash forced the Directorate General of Civil Aviation to ground the aircraft. The prototype crashed after catching fire in Sheshagiri Halli, near Bidadi, about 30km from Bengaluru. It claimed the lives of three ASTE pilots. NAL Director Dr Jitendra J Jadhav told TOI: "The engine tests have already begun. The low-speed taxi and high-speed taxi trials are expected to be completed by the end of this month. After that, the ASTE will do the first flight most probably in the first week of June." Sources in ASTE, while stating that the completion of the ground tests is followed by a flight, however, said: "We will need to get the go-ahead from the safety review board and the first flight review board." According to NAL, manufacturing of two Limited Series Prototypes of Saras will require Rs 400 crore to Rs 500 crore. "The final product will be taken care of by the IAF, but we will need this amount for the prototypes," Dr Jadhav said. 19-seater plane In February, Union science and technology minister Mr Harsh Vardhan and Dr Jadhav made a joint announcement that a new version of Saras would be converted into a 19-seater aircraft. Harsh Vardhan promised NAL complete support, including any financial requirement. Dr Jadhav said: "A proposal has been sent to our (Council of Scientific and Industrial Research) headquarters and a feasibility study is complete." The new proposal will see Saras with a configurable configuration. While the design is for a 14-seater plane, it can be configured to accommodate 19 persons.

Source : <http://timesofindia.indiatimes.com/>

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## CURRENT AFFAIRS

### **BrahMos missile achieves rare feat**

The Army successfully tested an advanced BrahMos Block III Land Attack Cruise Missile (LACM) in the Andaman and Nicobar Islands. This is its second consecutive test in two days. The test, in an operational configuration, was carried by the Army's South Western Command-based 1 strike corps. Testing BrahMos in the Andaman and Nicobar islands is a symbolic statement, as it brings the strategic Malacca straits under its range. Precise capabilities of BrahMos missile for quick sea access and denial in the event of a conflict, and its testing in the Andaman Sea is a reflection of the changing dynamics in the Indian Ocean. "This is the fifth consecutive time when the Block-III version of BrahMos LACM has been successfully launched and hit the land based target in "top-attack" mode, an incredible feat not achieved by any other weapon system of its genre," the Army said.

### **Russian collaboration**

BrahMos is a product of collaboration between India and Russia and is capable of being launched from land, sea, sub-sea and air against surface and sea-based targets. The range of the supersonic missile was initially capped at 290 km as per the obligations of the Missile Technology Control Regime (MTCR). Since India's entry into the club, the range has been extended to 450 km and the plan is to increase it to 600km. These tests were carried out in full operational land-to-land configurations from Mobile Autonomous Launchers (MAL) at full range. "Meeting all flight parameters in a copybook manner while conducting high level and complex manoeuvres, the multi-role missile successfully hit the land based target with desired precision, in both the trials, demonstrating its accuracy of less than one metre," the Army said. The steep dive capability makes it an ideal precision strike weapon to neutralise targets in a clutter. The Army, which began inducting BrahMos in 2007, currently has three missile regiments and is in the process of adding more.

Source : <http://www.thehindu.com/>

### **Govt. mulls changes to UDAN scheme to attract more players**

The Centre may introduce changes to its regional connectivity scheme or UDAN to attract more players in the second round of bidding. "In a recent meeting, we have received numerous suggestions from stakeholders and we might bring some changes to UDAN ahead of the second round of bidding so that more airlines show interest," said a senior Civil Aviation Ministry official. Allowing single-engine aircraft to fly under the scheme, increasing route exclusivity for airlines and higher subsidy for helicopters among others are some of the proposals which may be considered. Airlines had asked the Civil Aviation Ministry to increase the exclusive flying rights on UDAN routes from three to five years. "However, we do not favour increasing the exclusive rights to five years since we feel airlines get enough safeguards by operating exclusively on a route for three years," said another Ministry official. Justifying exclusive flying rights, Civil Aviation Secretary Mr R.N. Choubey had said last year that since routes become profitable after a certain point of time and airlines are taking risk to operate on regional routes, they should be "given some time to get fruits of the profit."

### **Single engine planes**

The airlines had also asked the Ministry to allow them to operate single-engine aircraft on routes under UDAN. However, the Directorate General of Civil Aviation is not in favour of the proposal due to safety reasons, according to a Ministry official. "We are persuading them to allow single-engine aircraft under the scheme," the official said.

Source : <http://www.thehindu.com/>

### **India test fires Agni-II Ballistic Missile off Abdul Kalam Island in Odisha**

India flight-tested Agni-II intermediate range surface-to-surface ballistic missile from off Odisha Coast as part of user trial. There was, however, no official confirmation by the Defence Research and Development Organisation (DRDO) if the flight-test was successful and met all its mission objectives. Fired at around 10.23 AM from Dr Abdul Kalam Island in Bhadrak district by the personnel of the Strategic Forces Command of the Indian Army, the missile reportedly achieved its full range and splashed down at the pre-designated target in the sea with high degree of accuracy, Defence sources said. Reports added that Naval ships tracked the vehicle homing on to the target, while a network of radars, telemetry and electro-optical instruments monitored the trajectory. The success of the test is significant as Agni-II is considered one of the key weapon systems of India's nuclear deterrence programme. The 2,000-km plus

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range nuclear-capable missile was lifted from the Launch Complex IV. After initial failures, India had in 2010 successfully test-fired Agni-II. The success was repeated in 2014 and in succeeding test-firing exercises. Developed as part of medium and long range Agni series of missile systems, - Agni-II has already been inducted into the Armed Forces. It is a two-stage solid propelled system and equipped with a special navigation system to achieve high degree of accuracy. The missile weighs 17 tonnes and its range can be increased to 3,000 km by reducing the payload. It can be fired from both rail and road mobile launchers. It takes only 15 minutes for the missile to be readied for firing.

Source : <http://www.deccanchronicle.com/>

## **CSIR, CII to collaborate on technology development**

In a move that would give strong indigenous technology development, the Council of Scientific and Industrial Research (CSIR) and the Confederation of Indian Industry (CII) today signed a memorandum of understanding for the commercialisation of technical know-how available with the premier industrial research agency. The agreement will allow members of the CII to tap technologies available with 38 constituent laboratories of the CSIR and develop them towards commercial products and processes. The CSIR has recently reckoned that there are more than 640 technology products and processes available with its labs across the country for commercial exploitation. "This is the coming together of the best of industry and the best of science and technology in the country," said CSIR Director General Mr Girish K Sahni after the signing of the MoU. While the CSIR has the mandate to develop technologies for the industry, the CII has been putting a major emphasis on how to increase Indian industry's technology depth so that it can become globally competitive, said CII Director General Mr Chandrakant Banerjee. "For the last few years, we have been extremely concerned that the Indian industry's contribution to the Research and development (R&D) at 0.3 per cent of the GDP was abysmally low as compared to 1.5 per cent globally," Mr Banerjee said. This collaboration is an attempt to move the needle in the right direction so that the industry's share in the R&D is increased, he said. The CII has always been recommending to the government to abolish R&D tax incentives currently given to the industry and replace this incentive with risk sharing-cum- investment model, Mr Banerjee said. CII, he said, has been instrumental in attracting the industry's R&D investment to a unique PPP joint venture company that we have with the Department of Science and Technology, called Global Innovation and Technology Alliance. "The CSIR-CII partnership I think will be exactly in this direction," he said. If it takes off well, the partnership will be a major boost for the research agency as it has been struggling to take technologies on its own to the market. The government has recently mandated CSIR labs to earn at least 20 per cent of their annual budget from external sources by the end of next financial year and increase it further to 40 per cent over next few years.

Source : <http://www.thehindubusinessline.com/>

## **CAN HAL AIRPORT FLY AGAIN UNDER CENTRE'S UDAN?**

AAI officials visit facilities to check feasibility for commercial ops, which can start in 15 days if all-clear is given. The recently launched Ude Desh Ka Aam Aadmi (UDAN) scheme has offered hope for the Hindustan Aeronautics Ltd (HAL) airport to once again start commercial flight operations. The airport has stayed closed for commercial operations since May 2008. A meeting was convened by the Airports Authority India (AAI), and its senior officers inspected the HAL terminal building and civil enclave for the feasibility of reopening it for commercial flights. The officers inspected the terminal building and discussed the various minimum required facilities for operationalisation of the terminal building. "Instructions were issued to clean up the terminal building and the city side area and it has already been taken up by the staff concerned," an officer said. Further orders were issued to check all electrical fixtures, air-conditioning system, and conveyer system for making it feasible for repairing and operationalising the systems. The Communication Navigation and Surveillance requirement for operationalisation of the terminal include – one public address system, two x-ray baggage inspection screening systems, four door frame metal detectors, 30 hand-held metal detectors, CCTV, and flight information display systems. Besides, it was also proposed that the existing passenger baggage trolleys should be repaired and deployed. "If we receive a green signal we can start commercial operations within a span of 15 days. The NAVAIDS are in place as all south-bound aircraft go through our airspace. The conveyer belts are intact. The escalators and elevators would be put in place. We also do not need any aero bridges as only 80 seater or small aircraft are operated under the UDAN scheme," the officer said. Recently, the state government also signed a Memorandum of Understanding with the Ministry of Civil Aviation under the scheme and 19 airports were identified to operate flights; the HAL airport was among them. The HAL airport ceased commercial operation in May 2008 following the opening of the Kempegowda International Airport. As per the concession agreement signed between the KIA's developers and the government, no new airport or existing one can operate commercial flights within a 150-km radius.



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(of KIA in Devanahalli) for the next 25 years. HAL, which owns the airport, has been requesting the ministry to start operations, stating it has been incurring heavy losses.

Source : <http://bangaloremirror.indiatimes.com/>

## **NASA names bacteria after Abdul Kalam**

Scientists at NASA have named a new organism discovered by them after the much-loved Dr A.P.J. Abdul Kalam. Till date, the new organism — a form of bacteria — has been found only on the International Space Station (ISS) and has not been found on earth! Researchers at the Jet Propulsion Laboratory (JPL), the foremost lab of NASA for work on interplanetary travel, discovered the new bacteria on the filters of the International Space Station (ISS) and named it *Solibacillus kalamii* to honour the late President, who was a renowned aerospace scientist. Dr. Kalam had his early training at NASA in 1963 before he set up India's first rocket-launching facility in the fishing village of Thumba in Kerala. "The name of the bacterium is *Solibacillus kalamii*, the species name is after Dr. Abdul Kalam and genus name is *Solibacillus* which is a spore-forming bacteria," said Dr. Kasthuri Venkateswaran, senior research scientist, Biotechnology and Planetary Protection Group at JPL. The filter on which the new bug was found remained on board the ISS for 40 months. Called a high-efficiency particulate arrestance filter or HEPA filter, this part is the routine housekeeping and cleaning system on board the international space station. This filter was later analysed at JPL and only this year did Dr. Venkateswaran publish his discovery in the International Journal of Systematic and Evolutionary Microbiology. According to Dr. Venkateswaran, even as it orbits the earth some 400 kilometres above, the ISS is home to many types of bacteria and fungi which co-inhabit the station with the astronauts who live and work on the station. Dr. Venkateswaran said even though *Solibacillus kalamii* has never been found on earth till date, it is really not an extra-terrestrial life form or ET. "I am reasonably sure it has hitch-hiked to the space station on board some cargo and then survived the hostile conditions of space," he explained. Naming the new microbe after Dr. Kalam was natural to Dr. Venkateswaran and his team. "Being a fellow Tamilian, I am aware of the huge contributions by Dr. Kalam," he said. New bacteria are usually named after famous scientists. Dr. Venkateswaran is part of a team which is asking that eternal question: "Are we alone in the universe?" Towards that, his responsibilities include monitoring the bug levels on the ISS and he also has to ensure that all spacecraft that fly to other planets are free of terrestrial bugs.

Source : <http://www.thehindubusinessline.com/>

## **World's most powerful aerospace gearbox starts high power testing**

Rolls-Royce has started power runs of the world's most powerful aerospace gearbox for the first time, marking another significant step in the development of its new UltraFan® engine design. UltraFan, which will be available from 2025, will offer a 25% fuel efficiency improvement over the first generation of Rolls-Royce Trent engine, with power scalable for widebody or narrowbody aircraft. The gearbox is a vital component of the UltraFan design, offering efficient power over a wide range of thrust levels, the ability to drive larger fan sizes, while also reducing weight. The tests are taking place at the Rolls-Royce Power Gearbox (PGB) facility in Dahlewitz, Germany, where the gearbox will ultimately run at up to 100,000 horsepower – the equivalent of more than 100 Formula 1 cars. The tests follow successful runs on an Attitude Rig last year.

Rolls-Royce engineering expertise in UltraFan delivers:

- Maximum fuel burn efficiency and low emissions through a new engine core architecture
- Reduced weight via a CTi Fan System of carbon/titanium fan blades and a composite casing
- Increased efficiency through advanced ceramic matrix composites that are heat resistant and require less cooling air
- Efficient power for high-bypass ratio engines of the future through a geared design

Mike Whitehead, Rolls-Royce, Chief Engineer and Head of Programme UltraFan Technologies, Civil Aerospace, said: "We are continuing to deliver on the UltraFan programme and this latest achievement marks another milestone. Having successfully started tests on the Attitude Rig last year we are now starting Power Rig tests and its really exciting to see our future technology come to life."

The Attitude Rig tests allow engineers to simulate the effects of the gearbox being on the wing of an aircraft in flight, through phases such as take-off, climb, descent and landing or banking.

Rolls-Royce is working in partnership with Liebherr-Aerospace, through our Aerospace Transmission Technologies joint venture, to develop manufacturing capability and capacity for the new power gearbox. Rolls-Royce leads the design definition and design integration of the power gearbox, as well as testing activities.

Source : <https://www.rolls-royce.com/>

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## Defence Minister inaugurates Rs 1,300 crore Aeronautical Test Range in Karnataka

Defence minister Mr Arun Jaitley said the country's defence preparedness needs to be at the optimal level in view of the security threat posed by the neighbour. Referring to the frequent security breaches by Pakistan and its sponsored terrorists along the border, he said, "Due to India's geographical location, our country cannot be free from trouble. We have a neighbour who has posed a security threat for the past seven decades." Mr Jaitley was speaking after inaugurating the Aeronautical Test Range (ATR) developed by Defence Research Development Organisation (DRDO) near Challakere in Chitradurga district. Stressing on the need for creating homegrown facilities for defence purposes, he said that with facilities like the ATR, India can aspire to become a world leader in defence technology. Earlier, a huge chunk of the defence budget would go towards procurement of defence equipment from foreign countries. But now the approach has changed. The NDA government is in favour of creating optimal facilities within the country, he pointed out. "In the long run, we need to establish facilities to manufacture defence resources within the country. With time, we will be able to these create facilities for defence and other technologies," he said. Acknowledging Karnataka's role, particularly Bengaluru, in marking its presence on the global scene in the IT sector, he said research in technology should not just be confined to the IT sector. A large number of nationally acclaimed institutions have come forward to take research in technology to the next level, Mr Jaitley said.

### Aeronautical Test Range

The ATR, built at a cost of Rs 1,300 crore in Varavoo Kaval near Challakere in Chitradurga district, will have technical infrastructure on 4,090 acres and transit and residential facilities on 200 acres. The facility will house multiple agencies. Defence Research and Development Organisation (DRDO) has developed the ATR, which has been partially operating since December 2010. The project faced several hurdles as local farmers had protested against land acquisition for the project. In 2013, work was halted by the National Green Tribunal between August 21 and September 3 after the Karnataka State Pollution Control Board (KSPCB) withheld the 'Consent for Establishment' (CFE) application. Later, it gave consent and work resumed.

Source : <http://www.newindianexpress.com/>

## TECHNOLOGY

### GSAT-9 heralds cost-saving electric propulsion

This week's space mission, GSAT-9 or the South Asia Satellite, will carry a new feature that will eventually make advanced Indian spacecraft far lighter. It will even lower the cost of launches tangibly in the near future. The 2,195-kg GSAT-9, due to take off on a GSLV rocket on May 5, carries an electric propulsion or EP system. The hardware is a first on an Indian spacecraft. Dr M Annadurai, Director of the ISRO Satellite Centre, Bengaluru, explained its immediate and potential benefits: the satellite will be flying with around 80 kg of chemical fuel - or just about 25% of what it would have otherwise carried. Managing it for more than a decade in orbit will become cost efficient. In the long run, with the crucial weight factor coming down later even for sophisticated satellites, Indian Space Research Organisation can launch them on its upcoming heavy rockets instead of sending them to space on costly foreign boosters. Shortly, its own vehicle GSLV MkIII is due for its full test flight. Dr. Annadurai told *The Hindu* that GSAT-9's EPS would be used to keep its functions going when it reaches its final slot - which is roughly about two weeks after launch - and throughout its lifetime. Normally the 2,000-kg class INSAT/GSAT communication satellites take 200-300 kg of chemical propellants with them to space. The fuel is needed to keep them working in space, 36,000 km away, for 12 to 15 years. Dr. Annadurai said, "In this mission, we are trying EPS in a small way as a technology demonstrator. Now we have put a xenon-based EP primarily for in-orbit functions of the spacecraft. In the long run, it will be very efficient in correcting the [initial] transfer orbit after launch." He said that the space agency normally uses up 25-30 kg of fuel on the satellite each year to maintain its functions and orbit position. An EP system would vastly bring this amount down. Next big trend A xenon based EPS can be five to six times more efficient than chemical-based propulsion on spacecraft and has many uses, according to Dr Annadurai, whose centre assembles all Indian spacecraft. A 3,500-kg EPS-based satellite, for example, can do the work of a conventional spacecraft weighing 5,000 kg, but cost far less. "One day, we should be able to launch a 5-tonne equivalent spacecraft - but weighing less than it - on our own GSLV [MkIII.] We are not yet there," he said. All this is on the way, may be in around three years. GSAT-20 is planned as the first fully EPS-enabled satellite; its features were not immediately available. ISAC and the Kerala-based Liquid Propulsion Systems Centre are lead centres in developing it. A trend that started about four years back, EPS is expected to drive half of all new spacecraft by 2020. For Space-dependent sectors across the globe, the economic benefits of EP systems are

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said to be immense. Currently government-owned and private space players agencies are said to be scrambling to make space missions 30 per cent cheaper than now - by lowering the per-kg cost of lifting payloads to specific distances.

Source : <http://www.thehindu.com/>

## **Bengaluru chops for South Asia Satellite**

The GSAT-9 satellite, projected as India's gift to South Asian countries, was developed and integrated to the launcher in cityThirty-one years after it played host to the first South Asian Association of Regional Cooperation (SAARC) summit to be held in India in 1986, Bengaluru will now contribute to India's space diplomacy for the region with the launch of the South Asia satellite. The GSAT-9 satellite, projected to be India's gift to South Asian countries, will be launched on May 5 and it has been developed and integrated to the launcher in the city. The Geostationary Communication Satellite, which is expected to facilitate and benefit natural resources mapping, tele medicine and IT connectivity among nations in the South Asian neighbourhood will blast off from the Satish Dhawan Space Centre in Sriharikota. "The GSAT-9 communication satellite was developed and integrated by ISROSatellite Centre (ISAC), Bengaluru, the lead centre for building satellites and developing associated satellite technologies," said an official. Dignitaries from neighbouring countries are expected to witness the launch. Developed for a mission life of more than 12 years, the 2,230-kg satellite's primary objective is to provide various communication applications in Ku-band with coverage over South Asian countries. Though officials from the space agency did not spell out details on the launch, sources said the launch of GSAT-9 onboard the Geosynchronous Satellite Launch Vehicle (GSLV-F09) is expected to take place in the evening and the countdown will start. The idea of launching the regional satellite was first announced by Prime Minister Narendra Modi in 2014. Originally christened the SAARC satellite, it was later renamed South Asia satellite. All SAARC members except Pakistan are part of the programme. The launch is also crucial for ISRO as it marks the eleventh flight of the GSLV and the fourth one with an indigenous cryogenic upper stage. The launch is seen as a precursor to the big launch (developmental flight of the GSLV MkIII) which is expected to take place by the end of the month.

## **SAARC and the city**

- \* In November 1986, the city hosted the South Asian Association for Regional Cooperation (SAARC) summit
- \* It was the second edition of the SAARC Summit and the first to be held in India
- \* The event was hosted by the then Prime Minister of India Rajiv Gandhi and was attended by the head of states of all the SAARC countries

Source: <http://timesofindia.indiatimes.com/>

## **ISRO demonstrates solar hybrid electric car made of in-house resources**

The Indian Space Research Organisation (ISRO) recently demonstrated a solar hybrid electric car at Vikram Sarabhai Space Centre (VSSC) in Thiruvananthapuram. ISRO said this car was developed using in-house expertise and resources within the organization. The demonstration of the car including the uphill drive was held during the last week of March 2017. VSSC is ISRO's lead space research centre responsible for the design and development of launch vehicle technology. The centre's major programs include Polar Satellite Launch Vehicle (PSLV), Geosynchronous Satellite Launch Vehicle (GSLV) and the Reusable Launch Vehicles. "Vehicles using fossil fuels persistently bring serious problems to environment and life. Research and development activities constantly emphasize the acute need to develop high-efficiency, clean and safe transportation systems. Hence, the ideal transportation system should envisage zero-emission without any pollution" ISRO said. The electric car runs on high-energy lithium ion batteries and following this successful demonstration, the organization is now exploring ways to reduce the car costs indigenous Li-ion pouch cells/Fuel cell along with Super-capacitor and an electric motor. "Solar and Electrical energy based hybrid vehicles provide the most effective and viable long-term solution by using renewable energy sources for mobility." the organization said. Other technologies that went into the electric car include a solar panel to suit the rooftop of car, an integral gear box, a conversion kit to fit the electric motor into an Internal Combustion Engine (ICE) based vehicle and control electronics for the battery and solar panel interface.

Source : <http://tech.economictimes.indiatimes.com/>



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## NAL's airboat could help de-weed Bengaluru's lakes

The National Aerospace Laboratories (NAL) has developed an airboat that can be deployed for the cleaning up of polluted water bodies, including the Bellandur Lake. The city-based laboratory involved in the research and development of civilian aerospace sector has developed the boat as part of its societal applications mission. "The airboat will have an air propulsion system which will push it forward. The boat will also have a flat bottom. This kind of boat is ideal for cleaning water bodies. The boat can be pushed into the water and can be scooped out easily. Besides, they have good buoyancy," said NAL chief scientist Mr S Selvarajan. He explained that the difference between an airboat and a regular motor boat is that the former is equipped with an air propulsion system, which makes it more powerful compared with the latter, and this feature would help it to clear weeds from lake's surface. "Airboats can operate easily on marshy waters. The huge propellers on the boat are above the water and the power is generated from air instead of water to prevent the engine from getting jammed. Besides, the powerful propellers can easily push forward the floating weeds and plants to one corner of the lake from where they can be bundled up to be lifted out of the lake," he said. This makes it ideal for cleaning of polluted lakes, such as the Bellandur Lake. Mr Selvarajan said the development programme for the air-propelled ferry system started a few years ago and a few models have been developed by NAL. A new powerful version the airboat has been developed by the laboratory and its integration is currently on. "In a couple of weeks, we intend to test the airboat at the Ulsoor Lake along with the Army's Madras Engineers Group personnel. If the trials are successful, it can be taken up for production by the industry," he said. "The NAL campus borders the Bellandur Lake and it could be tested there; though NAL would not directly be involved in the cleaning process," Selvarajan added.

Source : <http://timesofindia.indiatimes.com>

## BUSINESS

### The next billion-dollar startup will be in aerospace

Late last month, 500 people from around the world gathered in Dallas at Uber's inaugural Elevate Summit. The invite-only conference was the next actionable step forward, post-Uber's white paper published last fall, "Fast-Forwarding to a Future of On-Demand Urban Air Transportation," to catalyze the emerging ecosystem around what Uber, along with partners in aerospace, aviation, and energy storage, see as the next unicorn transportation sector. On the back of the incredible innovations that have disrupted today's urban transit systems, with new ride-share models, electric energy and autonomous technologies, urban air mobility is poised for massive growth over the next five years. At Elevate, with the entire ecosystem gathered in one place, the discussions ranged from identifying key markets and players with commercially viable vehicles to enabling technologies, like battery storage, and aircraft certification and policy, like FAA regulations. After more than 20 years in the aerospace sector, uniting early-stage tech innovators with private capital, my takeaway at the end of this three-day event is that urban air mobility is no longer a future-tech vision... it's happening now. It's only been a few years since we saw the beginnings of a clear renaissance in aerospace. Early unicorns like SpaceX, OneWeb and Planet radically transformed the landscape, seeding innovations in spacecraft, earth observation, space communication and space exploration, while today next-generation players like Boom, Aurora and Wright Electric are hitting a rapid succession of milestones to bring supersonic jets and regional hybrid aircraft into commercial reality. Even as I sat between this next generation of Elon Musks and the traditional legacy players, I was amazed to see all the technologies required to bring what many are calling the first flying cars not just to market, but to implementation in what will become an entirely new mode of daily transportation. The excitement at the event was tangible as we all had the feeling that we are part of something that is going to change the way the world commutes and thus the way we live. Just as autonomous, electric cars will introduce new levels of safety, efficiency and productivity, in this new urban air mobility era, we will spend much less time in transport, in vehicles that will be accessible for most of us and will dramatically reduce the levels of aviation and aerospace emissions. With Uber pushing the bar, we see a clear business case and a real market for the first commercial vehicle categories. We are shifting from the perception of these as a mere leisure type niche market, relegated to a very small percentage of the population, to opening the way to a much bigger market in terms of the number of vehicles and passengers. And, as we have a much bigger and commercially viable market, more investors, from angels to VCs to strategics, are entering the game, translating to the kind of money like OneWeb and Planet have benefited from. Uber, in its role as transit pioneer, has been instrumental in drafting the kind of performance levels required for these future vehicles to operate in a profitable way. It first envisions a varied fleet of urban air vehicles, with an estimated size of 500-1,000 vehicles per city, to carry out the daily trips. The first model that's emerging is the pool/air/taxi, in which an aircraft will average 24 miles per trip, with 4 passengers, including a pilot (at least in the beginning), that can achieve 150 miles per hour, with

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5-minute recharges. The consensus on the best architecture is a mix of a helicopter and an aircraft, like the Aurora project, which has fixed wings and distributed electrical engines, and the vehicle segment that everyone's talking about, Electric Vertical Take Off and Landing vehicles, eVTOLs, will be part of the class that gets us there. Aurora's fleet is poised to fly this year or next. Ideally these trips, which will originate at decentralized helipads, will be fully electric solutions that not only drive cost reductions and fuel safety from day one, but also reduce the noise of the vehicle — an ongoing challenge in aviation — to make these more acceptable in urban environments. On the technology side, the batteries and chargers — already proven in light-, medium- and heavy-duty applications — have the right performance, energy density, capacity and charging time to support frequent, daily trips. With a few expected improvements in coming years, we will see those batteries double their performance in term of size and manufacturing cost, with higher currents and higher power. Our next steps, post-Elevate, are three-fold. From an infrastructure standpoint, we will reactivate helipads, where in a city like Los Angeles 300 of them already exist but would need to be equipped with electric chargers, and get new authorization to operate in and begin to build charging stations in pioneer cities. Key to this phase will be ensuring new aircraft certifications tailored to this new class of vehicles are available and, finally, defining the new rules necessary for safe and efficient air traffic management. Though the last may seem daunting, these vehicles should fit in the current traffic as regular general aviation airplane. The question I was asked more than once over the three days of the conference was “where will we see urban air mobility take flight (and root) first.” Though Uber's initial two pioneer cities will be Dallas and Dubai, with partnerships, infrastructure plans, typical routes and regulatory discussions well underway, I see the real disruption taking place in the urban dense, emerging megacities in South America and Asia. Those regions have already proven their technology ability (and appetite) for leapfrogging to wireless communication systems, and they are once again poised, with their infamously poor and inefficient transit infrastructures, to leapfrog directly to urban air, where the time saved would be tremendous, turning a 1.5 hour drive into a 10-minute flight, 2x/day... for almost the same cost of an UberPOOL.

Source : <https://techcrunch.com/>

## Policy tweak to speed up defence purchases

Under a proposed change to defence procurement policy in select areas, acquisition will continue even if only one foreign original equipment manufacturer (OEM) is shortlisted after competitive evaluation, resulting in a single vendor situation. Under existing rules, the procurement process has to be cancelled and started afresh in such cases, which has considerably delayed critical procurements. The proposed guidelines for Strategic Partnership (SP), which intends to give the Indian private sector greater role in defence manufacturing, are s under final discussion. The policy now awaits clearance from the Defence Acquisition Council and then final approval from the Cabinet Committee on Security (CCS). Preferably, two or more OEMs should be shortlisted for each segment, the proposed policy states. However, it adds that, “Even if only one OEM is shortlisted, the process will be taken forward.” There are still considerable concerns from various quarters on the idea of selecting a single company on a long term basis.

## Four segments

There are four segments listed in the proposed policy — single engine fighter aircraft, helicopters, submarines and armoured fighting vehicles/ Main Battle Tanks (MBT). More segments could be added later. The provision on fighter aircraft is particularly interesting as it specifies “single engine.” The IAF is waiting for the promulgation of the SP model to initiate the process for selecting a single engine fighter to replace the Mig-21s, which are being phased out. The MoD had in the past broadly stated the need for fighter aircraft for the IAF, resulting in much confusion over single and twin engine jets. The MoD shared details of the SP model with the industry last week, details of which were accessed by *The Hindu*. To boost the capabilities of the Indian private sector in defence manufacturing the Government intends to select six companies in each segment . Shortlisting of OEMs will follow the normal process as now and in this Transfer of technology (ToT) will be the “main factor” including various parameters such as extent of ToT, extent of indigenous content proposed, future R&D in India.

Source : <http://www.thehindu.com/>

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