

# NAL's aircraft Saras Mk-II to be ready by 2025

Lab banking on Tier-1, 2 cities to be its markets



PEARL MARIA D'SOUZA @Bengaluru

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NAL director  
Jitendra J  
Jadhav

**Jadhav  
confident  
of Saras'  
efficiency**

While NAL's Saras project was started in the 90's and has faced several hurdles along the way, Jitendra J Jadhav was confident of its efficiency and time-bound production.

AS air connectivity between Tier-1 and Tier-2 cities in the country has become a central focus, the National Aerospace Laboratories (NAL) is banking on these places to be its market. The government-run aerospace laboratory is looking to mass produce Saras Mk-II, a 19-seater multi-role light transport aircraft, by 2025. Low-cost airlines are expected to be major attractions.

The reason? The lower factor, which means a reduced number of seats that is supposed to make running the airlines a profitable business.

While commercial aircrafts that are catering to air commuters are larger in size, with several seats left vacant and causing huge operational costs, NAL director Jitendra J Jadhav told TNIE that the 19-seater, which private players are yet to bring to the country, will work out to be more profitable as the seats will be completely occupied.

"At present, NAL is expecting a demand of 145 aircrafts. While the Indian Air Force has committed to 15 and are expected to demand 45 more," he said.

The airlines are expected to connect smaller cities in a major way "While there are 400 airstrips across the country just 100 of them are operational," said Jadhav, pinning hopes on the Ministry of Civil Aviation and the government's Udan Yojana to put some life into the other 300.

Jadhav also said the present model, that will be produced by IIT Kanpur, will be cost and fuel-efficient. "The aircraft will have a digital control system for the engine, lesser aerodynamic drag, light weight materials, and a state of the art avionics system, which will also reduce the maintenance and operational costs," he said.



Union Minister Harsh Vardhan during the inauguration of an NAL facility in Bengaluru on Monday | NAGARAJA GADGAL

## Iron Bird to come up at Belur to test Saras Mk2

EXPRESS NEWS SERVICE  
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MINISTER of Science and Technology Dr Harsh Vardhan on Monday laid the foundation stone for Iron Bird, a ground testing facility where all systems or line replaceable units (LRUs) will be integrated and tested as part of the clearance activity

during the design, development and certification of Saras Mk2.

The 40,000 sqft Aircraft Integration Facility is being set up at the National Aerospace Laboratories' (NAL's) Belur campus in the city, and would help train pilots, maintenance engineers and technicians. This facility also includes a system check facility, which helps NAL

adhere to the requirements of regulatory authorities in terms of testing the LRUs.

"We have given clearance for any requirements. As many as 24 test flights have been run. More specifications have been added for the 19-seater. It will be a boon for the people," Harsh Vardhan said after inspecting the Smart Aerospace Composite Manufac-

turing Facility at Kodihalli, for HANSA-NG high-quality lightweight polymer composite airframes at NAL headquarters.

The facility at Kodihalli, which now houses mock-up systems for the aircraft to design in 3-D and also analyse the operability in a cost effective manner, will be fully operational by 2021-22.

Printed from

**BangaloreMirror**

## Saras to be 19-seater

Bangalore Mirror Bureau | Sep 17, 2019, 04.00 AM IST



The design for the production version of India's indigenous light transport aircraft Saras has been freezed by the National Aerospace Laboratories (NAL). The production version of Saras which will be known as Saras Mk2 will be a twin engine turboprop 19 seater aircraft.

Currently NAL is test flying the prototype of the aircraft Saras PT1N which is a 14 seater. NAL has completed 24 flights since its maiden flight in January 2018 and has now freezed the production version of the aircraft. Union Science and Technology Minister Harsh Vardhan who visited NAL on Monday said that the Saras Mk2 is an ideal aircraft for connecting small cities across the country under the Ude Desh Ka Aam Naagrik (UDAN) scheme.

He said that the Saras Mk2 is not only in tune with the government's 'Make in India' policy but is also cheaper than the light transport aircraft available in the international market.

The aircraft currently available in the international market are of 1970s technology, such as Beechcraft 19000D, Dornier-228 and Embraer EMB 110. A foreign aircraft cost varies between Rs 60 to 70 crore, while Saras Mk2 would cost approximately between Rs 35 to 40 crore per aircraft.

NAL Director Jitendra J Jadhav said that the Saras Mk2 when pitted against the foreign aircraft fared better as they have higher fuel consumption, lower speeds, unpressurised cabin, high operating cost when compared to NAL's 19 seater aircraft.

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## NAL plans design, development of 70-seater aircraft

BY PTI | SEP 16, 2019, 07:45 PM IST

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BENGALURU: CSIR-National Aerospace Laboratories that is developing a 19-seater indigenous light transport aircraft 'Saras Mk2' has plans for a 70-seater aircraft, Union Science and Technology Minister [Harsh Vardhan](#) said on Monday.

"Today itself they have started talking to me to get the permissions from and meetings with civil aviation ministry for their future plan of the 70-seater. That is also very heartening to know," Harsh Vardhan said.

"Seventy-seater has always been in the long-term vision and since they have mentioned about this today we will have to bring the civil aviation ministry on board. We have to take the approval of the Prime Minister's office. Also, we will have to take scientists also on board, so as a science and technology minister I will facilitate them to move in the right direction," he said.

The Minister was speaking to reporters after laying the foundation for NAL's system check facility, aircraft integration facility, and the inauguration of smart aerospace composite manufacturing facility here.

NAL director Jitendra J Jadhav said since NAL has a fair amount of experience, it would start the design of 70-seater.

He said, "First, we will have to get in-principle approval from Ministry of Science and Technology, and Civil Aviation, also from Ministry of Finance, then we can finish design phase one-and-a-half year from that, which will be the preliminary design phase. Then we will submit it to the government, once the government sanctions, we will develop."

CSIR-NAL is currently engaged in the design, development and certification of Saras Mk2, a twin-engine turboprop 19-seater transport aircraft for connecting small cities.

Harsh Vardhan said everything was ready for the 19-seater, and the government has given all its support in terms of clearance and fund requirement to NAL.

Expressing happiness that NAL was ready with a better advanced model and specification for the 19-seater, he said, "This 19-seater will be a boon for the people of the country, specially for improving and strengthening the regional travel or connectivity. Now we are in a stage that in the next few years, this 19-seater will be available for improving and strengthening the regional connectivity," he added.

NAL officials said they have completed basic testing for pre-production standard.

Jadhav said the first production of the 19-seater aircraft is likely by around 2025.

"Four years for certification and and after that one-and-a-half year for production," he said.

The officer said they were looking at civilian market of about 100 aircraft, adding that the [Indian Air Force](#) has committed to induct 15 such aircraft initially, and they may need another 45.

He said the IAF version of Saras would be produced by HAL, and for civilian version also HAL may continue as production partner, but if demand is high, joint ventures may be worked out with private companies.

The cost of the aircraft is likely to be at about Rs 45 crore and it was low compared to foreign aircraft may cost over Rs 70 crore.

Regarding the two-seater Hansa-Next Generation aircraft, the production would start by 2022-23.

Once the project starts its commercial operations, it would ease the availability of indigenous aircraft for pilot training to obtain private pilot and commercial pilot licenses, officials said.

Regarding the cost of Hansa, Jadhav said NAL was looking for two versions, one basic and another deluxe.

"Basic will be around Rs 1 crore, deluxe will cost about Rs 1.25 crore. For Hansa, flying clubs from across the country are potential customers, he said, adding that there may be requirement of over 200 aircraft as flying clubs are increasing.

NAL had last year inked a pact with Delhi-based Mesco Aerospace Ltd for the design, development, production and marketing of the Hansa-Next Generation aircraft.

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17 Sep 2019, 10:04 HRS IST |



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# NAL plans design, development of 70-seater aircraft

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19:5 HRS IST

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# Deccan Herald 16.9.19

## NAL eyes domestic market with Saras-2

*Bengaluru, DHNS*

Despite the troubled history of NAL's Saras light airliner, the Mark II version of the aircraft is set to undergo wind tunnel testing in November which will set the type on a course to production, officials said.

Dr Harsh Vardan, Minister of Sciences and Technology, who visited National Aerospace Laboratories (NAL) on Monday, said that the twin-engined turboprop Saras Mark II light transport could boost regional connectivity.

While the 19-seat Mark II has completed 23 test flights over the last four years, NAL appears conflicted about how the aircraft will be powered - through push-propeller engines or tractor-propeller engines.

"Wind tunnel testing for the pusher configuration has been completed, and November's trials will test the design in tractor-propeller configuration to see if performance is improved," said Jitendra Jadhav, director of NAL.

"In five to six years, certification will be completed and we expect production to begin at HAL, Kanpur by 2026," he added.

However, big questions remain about the Saras' safety record considering a 2009 crash which claimed three lives. NAL has invested in a new aircraft integration facility, dubbed the "Iron Bird," which will educate pilots, flight engineers and technicians on the systems and operations of the aircraft.

Dr Vardhan participated in the stone-laying ceremony for the new 40,000 square-foot facilities near Old Airport Road.

The centre will allow for pre-installation checks for line replaceable units such as landing gear, hydraulic systems, flight control systems and electrical systems.

NAL said that Saras Mark II has already attracted a commitment from the Indian Air Force for 15 machines, with a requirement for another 45. However, the company has its eyes on the civilian market, with the company hoping to sell 100 machines to regional airlines.



# Inauguration of smart aerospace composites manufacturing facility at CSMST, Kodihalli



## AIRCRAFT INTEGRATION FACILITY – Foundation Stone

CSIR-NAL is engaged in the design, development and certification of Saras Mk2, a twin-engine turboprop 19-seater transport aircraft for connecting small cities. To minimize aircraft certification time and cost, the proposed systems have to be integrated and tested on the test bed, before actual integration on the aircraft. This ground test facility is called an Iron Bird or Aircraft Systems Integration Test Rig, wherein all systems / line replaceable units (LRUs) will be integrated and tested as part of the clearance activity.

The Iron Bird is an aircraft flight control and subsystems mock-up, which duplicates the flight control system and supporting subsystems, as installed on the aircraft. Typically, Iron Birds have a limited cockpit to assess functional responses using stick, pedals, throttle, displays, landing gear and hydraulic system controls.

The proposed Systems Integration Test Rig is for Saras-Mk2 aircraft with major systems like flight control system, landing gears, brake system, nose wheel steering, hydraulic system, cockpit controls, avionics, communication and electrical systems etc. in spatially correct locations.

The iron bird facility is also the best facility to train the pilots and maintenance engineers/technicians since most of the system components are visible and provide insight into the general system layout.







## SYSTEM CHECK FACILITY – Foundation Stone

Pre-installation checks (PI checks) for line replaceable units (LRUs) of aircraft system such as landing gear, hydraulic system, flight control system, electrical system etc., are required to be carried out on the ground to ascertain their proper functioning before installing on to the aircraft. These are mandatory requirements for aircraft prototypes as per regulatory authorities such as CEMILAC/DGAQA/DGCA.

This facility is not presently available in CSIR-NAL, and LRUs are being checked on prototype aircraft which is no more acceptable to the regulatory authorities. In addition to the requirement of a PI check facility, CSIR-NAL also requires a good building space with controlled temperature and humidity for safely storing these LRUs.





## SMART AEROSPACE COMPOSITE MANUFACTURING FACILITY

The Smart Aerospace Composite Manufacturing Facility will produce high quality light weight polymer composite airframes for the HANSA-NG program of CSIR-NAL. The process incorporates a Just-In-Time Impregnation technology which meets the stringent aerospace standards. CSIR-NAL is pioneering this technology for aerospace applications. M/s. MESCO Aerospace Pvt. Ltd. is the production partner in this program.

The major advantages of this process are as follows:

- Cost effective & affordable pre-pregs
- Automated uniform spatial distribution of resin
- Minimal variation in mechanical properties
- Superior control on manufacturing parameters
- High rate of production
- Safer working environment

The present prototyping facility established at CSIR-NAL shall produce 3 to 4 aircraft per year.

The same will be scaled up at M/s MESCO facility, SEONI (MP) for production of about 12 aircraft per year initially. This facility will be operational from 2021-22. Based on market demand, the rate of production can be augmented.



## Harsh Vardhan lays foundation of Aircraft Integration Facility at CSIR in Bengaluru

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Harsh Vardhan lays foundation of Aircraft Integration Facility at CSIR in Bengaluru

Updated: 15 Hours, 6 min ago IST

Bengaluru, Sep 16 (ANI): Union Minister of Science & Technology, Dr Harsh Vardhan visited CSIR-National Aerospace Laboratories in Bengaluru on September 16. He laid foundation stones of Aircraft Integration Facility and Systems Test Facility. He also inaugurated fruit garden in CSIR.

# हर्षवर्धन ने रखी आयरन बर्ड की आधारशिला

बेंगलूरु. वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद (सीएसआईआर) और राष्ट्रीय वांतरिक्ष प्रयोगशाला (एनएएल) द्वारा विकसित किए जा रहे 19 सीटर परिवहन विमान सारस मैक-2 को कम समय में सर्टिफिकेशन दिलाने और लागत घटाने के उद्देश्य से एयरक्राफ्ट सिस्टम्स इंटीग्रेशन टेस्ट (आयरन बर्ड) की स्थापना की जाएगी।

विज्ञान एवं प्रौद्योगिकी मंत्री डॉ. हर्षवर्धन ने सोमवार को इस केंद्र के निर्माण की आधारशिला रखी। आयरन बर्ड में उड़ान नियंत्रण प्रणाली (एयरक्राफ्ट फ्लाइट कंट्रोल सिस्टम) और उपप्रणालियों का परीक्षण होगा। यह केंद्र सारस के त्वरित विकास में सहायक होगा।





# உள்நாட்டு போக்குவரத்துக்கு சாரஸ் விமானம்

பெங்களூரு, செப். 17-

“‘சாரஸ்’ ரக விமானம், உள்நாட்டு போக்குவரத்துக்கு பயன்படுத்தப்படும். வருங்காலத்தில், 70 இருக்கைகள் கொண்ட விமானம் தயாரிக்கும் யோசனை உள்ளது,” என, மத்திய அறிவியல் மற்றும் தொழில்நுட்ப துறை அமைச்சர் ஹர்ஷ்வர்த்தன் தெரிவித்தார்.

தேசிய விண்வெளி ஆய்வக நிறுவனம் என்.ஏ.எல்.,லின் சார்பில், பெங்களூரு எச்.ஏ.எல்., விமான நிலைய பின் புறமுள்ள, பேலூர் மையத்தில், விமான ஒருங்கிணைந்த மையம் அமைப்பதற்கு, மத்திய அறிவியல் மற்றும் தொழில்நுட்ப துறை

அமைச்சர் ஹர்ஷ்வர்த்தன், நேற்று அடிக்கல் நாட்டினார். பின், மா, சப் போட்டா, பன்னீர் பழ மரக் கன்றுகளை நடட்டார்.

தொடர்ந்து, கோடி ஹள்ளி என்.ஏ.எல்., மையத்தில், ‘ஹன்ஸ் என். ஜி.,’ பயிற்சி விமான தயாரிப்பு மையத்தையும் அவர் திறந்து வைத்தார். பின், மத்திய அமைச்சர் ஹர்ஷ்வர்த்தன் அளித்த பேட்டி:

‘சாரஸ்’ ரக விமானம், பயிற்சியின்போது விபத்துக்குள்ளானதால், தயாரிப்பு நிறுத்தப்பட்டிருந்தது. ஒருமுறை தோல்வி ஏற்பட்டால், அதன் உற்பத்தியை நிறுத்துவது சரியாகாது.

நம் விஞ்ஞானிகளின்

திறமை பாராட்டக்குரியது. தோல்வியின் போது பல புதிய விஷயங்களை கற்றுக் கொண்டோம்.

இதனால், ‘சாரஸ்’ ரக விமானங்கள் தயாரிக்க அனுமதி வழங்கப்பட்டது. முதலில் செய்யப்பட்ட வமானத்தில், 14 இருக்கைகள் இருந்தன. தற்போது தயாரிக்க கூடிய விமானத்தில், 19 இருக்கைகள் இருக்கும்.

நடுத்தர வர்க்கத்தினர், ஏழைகள் என அனைத்து தரப்பினரும் விமானத்தை பயன்படுத்தும் வகையில், ‘உதான்’ திட்டத்தை பிரதமர் நரேந்திர மோடி செயல்படுத்தினார்.

அவரது கனவை நனவாக்கும் வகையில்,

‘சாரஸ்’ ரக விமானம், உள்நாட்டு போக்குவரத்துக்கு பயன்படுத்தப்படும். முழுவதுமாக உள்நாட்டு உற்பத்தியில் தயாரிக்கப்படுகிறது. வருங்காலத்தில், 70 இருக்கைகள் கொண்ட விமானம் தயாரிக்கும் யோசனை உள்ளது.

வரும் 2022க்குள் ‘புதிய இந்தியா’வை உருவாக்குவது பிரதமரின் லட்சியம். அதை நனவாக்கும் வகையில், அனைவரும் உழைப்போம்.

இவ்வாறு அவர் கூறினார்.

இந்நிகழ்ச்சியில், என்.ஏ.எல்., இயக்குனர் ஜிதேந்திர ஜாதவ் மற்றும் விஞ்ஞானிகள் பங்கேற்றனர்.