

## **‘Massive Army reform under way’**

*Aimed at greater combat ability: Nirmala*

Defence Minister Nirmala Sitharaman, in her first address to the armed forces on the eve of Independence Day, highlighted the government’s efforts to reform the Army in a big way.

“In a first ever exercise after Independence, the Ministry of Defence in consultation with the Indian Army has decided to reform the Indian Army in a planned manner... This restructuring is aimed at enhancing the combat capability of the Army in a manner that the officers, Junior Commissioned Officers (JCO) and Other Ranks (OR) will be used for improving the operational preparedness,” the Minister said in the address on Tuesday.

### **Redeployment**

Ms. Sitharaman said the first phase of the reforms involved redeployment and restructuring of approximately 57,000 posts of officers, JCOs, ORs and civilians.

The major reforms include optimisation of signals establishments, restructuring of repair echelons, redeployment of ordnance echelons, better utilisation of supply and transport echelons and animal transport units besides closure of military Farms and Army postal establishments in peace locations.

Assuring that there shall be no shortcoming in providing all dues and facilities to soldiers, Ms. Sitharaman said that in line with the recommendations of the 7th Pay Commission, the Ministry has taken “the decision to pay uniform allowance” and clarity has been brought in with respect to “what is covered within the ambit of the allowance and what clothing items will be provided by the government.”

Ms. Sitharaman also stated that to ensure faster decision making, for day-to-day requirements of the troops or ammunition, greater powers have been delegated to the service headquarters and other lower functionaries.



Wed, 15 Aug 2018

## **‘No decision to shift Aero India from B’luru yet’**

Bengaluru: Amid a row over reports that the venue of the prestigious Aero India show would be shifted from Bengaluru to Lucknow, Union Minister Ananth Kumar has said Defence Minister Nirmala Sitharaman had confirmed that there was no decision on the matter. Kumar’s statement comes after Karnataka Chief Minister HD Kumar swamy shot off a letter to Prime Minister Narendra Modi on Monday, insisting that Bengaluru would be the “best choice” for the aerospace exhibition.

“There is no decision on shifting #Aero India 2019 venue out of Bengaluru to Lucknow, as clarified by Defence Min officials. I have spoken to Sitharaman ji, who has confirmed the same. There were similar rumours last time too, which were proved to be unfounded,” Kumar tweeted Aero India has traditionally been organised at the Indian Air Force’s Yelahanka air base near Bengaluru since its inception in 1996. Reports about shifting venue have kicked up a storm between the BJP and Congress. Deputy CM G Parameshwara alleged that Karnataka was losing key defence projects to other states under the NDA rule.

## सैनिकों की युद्ध क्षमता बढ़ाने को चीन ने तिब्बत में बनाए ऑक्सीजन स्टेशन

बीजिंग, प्रेस: तिब्बत में तैनात अपने सैनिकों की युद्ध क्षमता बढ़ाने के लिए चीन ने कई ऑक्सीजन स्टेशन बनाए हैं। इनसे सैनिकों को ज्यादा ऊंचाई वाले इस इलाके में ऑक्सीजन की कमी से नहीं जूझना होगा। ज्यादा ऊंचाई पर सैनिकों को मस्तिष्क संबंधी बीमारी का खतरा बना रहता है, जिसके इलाज के लिए चीन की आर्मी मेडिकल यूनिवर्सिटी हाई-प्रेसर ऑक्सीजन थेरेपी भी विकसित कर रही है। यह यूनिवर्सिटी भारत से लागू वास्तविक नियंत्रण रेखा के समीप स्थित है।

चीन ने इसके पिछले साल से तिब्बत में स्थित सैन्य बेस को पोर्टेबल बैस्कों में तब्दील करना शुरू कर दिया है। कभी भी स्थानांतरित की जा सकने वाली इन बैस्कों को खास तौर पर ज्यादा ऊंचाई वाले इलाकों के लिए ही डिजाइन किया गया है। कितनी भी ठंड होने पर इन बैस्कों के अंदर का तापमान 15 डिग्री सेल्सियस तक रहेगा। जाल से ढकी इन बैस्कों की पहचान

### साझा सैन्य अभ्यास करेंगे भारत, पाक व चीन

जागरण ब्यूरो, नई दिल्ली : शंघाई सहयोग संगठन (एससीओ) के तहत रूस में होने वाले साझा सैन्य अभ्यास में चीन और पाकिस्तान साथ भारतीय सैनिक भी भाग ले रहे हैं। इस सैन्य अभ्यास में आठ देशों के साथ भारतीय सैनिक भी कंधे से कंधा मिलाकर अभ्यास करेंगे। युद्धाभ्यास पीसफुल मिशन-2018 रूस के चेल्याबिंस्क

में 22 अगस्त से आयोजित किया गया है। शंघाई सहयोग संगठन के सदस्य के तौर पर भारत और पाकिस्तान को इसी साल शामिल किया गया है, इसलिए भारत और पाकिस्तान की सेनाएं पहली बार इस अभ्यास में भाग लेंगी। भारतीय सैन्य टुकड़ी में थलसेना के 167 जवान और वायुसेना के 33 जवान भाग ले रहे हैं।

आसानी से नहीं की जा सकती।

चीन अपनी पीपुल्स लिबरेशन आर्मी (पीएलए) के प्रशिक्षण और युद्ध संबंधी तैयारियों की जानकारी समय-समय पर देता रहता है। पीएलए के एक अखबार के अनुसार पिछले महीने चीन की स्पेशल फोर्स ने तिब्बत में अभ्यास किया था। उस दौरान हेलीकॉप्टर पांचलटों को भी ट्रेनिंग

दी गई थी। भारत और चीन के बीच पिछले साल हुए डोकलाम विवाद के बाद जून में तिब्बत में तैनात चीनी सैनिकों ने अपने हथियारों को परखने के लिए पहली बार अभ्यास किया था। रिपोर्ट के अनुसार चीन अरुणाचल प्रदेश से सटे तिब्बती इलाके में एक स्वचालित मौसम अवलोकन स्टेशन भी स्थापित करने जा रहा है।



## NASA chief supports 'space force' proposal

NASA Administrator Jim Bridenstine expressed full support Monday for President Donald Trump's proposed military "Space Force" but added that it will have a role separate from NASA. Bridenstine said in New Orleans that NASA's responsibilities involve science, space exploration and technology development.

As for defence and national security, he told reporters in New Orleans: "We want to be an agency that maintains its independence from those capabilities." Bridenstine, a former Republican congressman, was nominated by Trump to head NASA last year and confirmed by the Senate in April. He was among the officials with Trump in June when he called for creation of a new military branch known as the Space Force. He said it's needed because the nation's space assets including satellite technology and global positioning systems are vital to numerous interests and industries, including communications, navigation, food and energy production, banking and climate. "If we lose GPS, we lose banking in the United States of America," he said. The space force plan requires congressional approval. Military leaders and

experts have questioned the wisdom of launching an expensive, bureaucratic new service branch. Bridenstine spoke enthusiastically about the much-delayed James Webb Space Telescope, what is now a nearly \$10 billion project. That next-generation technology is envisioned as the successor to the Hubble Space Telescope, despite an announcement in June for the third time in less than a year of a lengthy postponement. He also praised workers at Michaud for their work on the Orion spacecraft and the SLS rocket that will launch it into space, saying their efforts are helping the U.S. get ahead and stay ahead of other nations in space. "This is a brand new, very large project that is unmatched in the world," he said. "And it will remain unmatched for a very long time."



Wed, 15 Aug 2018

## **A completely new form of carbon created**

A new form of carbon has been created, opening up a whole new world of potential technological applications. Carbon can already be moulded into precious diamonds, the graphite in pencils and graphene and "schwarzites" are the latest addition to this family. Schwarzites have long been predicted by chemists, who have suggested they would have unique properties that make them useful in batteries and as catalysts. In a surprising turn of events, after decades of searching these theoretical materials were accidentally created by researchers working in South Korea and Japan.

The scientists were investigating zeolite-templated carbons - crystalline forms of silicon dioxide with carbon structures built inside them - and checking for any interesting properties. In doing so, they unintentionally made schwarzites, but their creation was ignored until University of California, Berkeley chemists noticed their unusual structure. "We now have the recipe for how to make these structures, which is important because, if we can make them, we can explore their behaviour," explained professor Berend Smit, a chemical and biomolecular engineer who led the research. Carbon can be arranged into 2D "crystals", including sheets of graphene and football-shaped fullerenes, which are defined by how their structures curve when the carbon atoms lock together. Unlike fullerenes which are positively curved and graphene which is not curved at all schwarzites are negatively curved. "The experimental validation of schwarzites thus completes the triumvirate of possible curvatures to graphene; positively curved, flat, and now negatively curved," said Braun.



Thu, 16 Aug 2018

## **With human space flight, India to push frontiers**

*ISRO chief says most of the critical technologies are ready*


*By Madhumathi D.S.*

Gaganyaan, the human space flight Programme green-flagged and set for 2022 by Prime Minister Narendra Modi, is highly doable, Chairman of the Indian Space Research Organisation K. Sivan said here soon after it was announced on Wednesday.

V.R. Lalithambika, a specialist in advanced launcher technologies, will helm the project as Director of the Human Space Flight Project. The mission is estimated at ₹9000 crore. Most of the critical technologies and hardware required for the project are ready or have been demonstrated by its centres. ISRO would now stitch them up into a complete project and present a comprehensive project report to get a formal approval of the government, Dr. Sivan said. "We have tested the necessary critical technologies required for the Human Space Flight Programme (HSP) and are confident of achieving it as stated by the Prime Minister," he said. "We will now speed up the paper work and submit a project report for formal approval."

**2022: India's space odyssey**  
 What is the Human Space Flight Project all about?

- In 2022, 3 Indian astronauts, mostly flight test pilots from the IAF, will circle earth for seven days from a distance of 300-400 km
- They will travel in a 7,000-kg crew capsule. A GSLV-MkIII launch vehicle will lift them to their orbit
- The flight will take off from a refurbished launchpad at Sriharikota
- The entire project could cost roughly between ₹7,000 to 9,000 crore



**ALSO PROPOSED**

- Food, suits and other life systems for crew
- Astronaut selection & training
- Two unmanned trials, the first in two years
- A new command & tracking centre at ISTRAC, Bengaluru
- Improved launchpad at SDSC, Sriharikota

We may immediately need around ₹ 2,000 crore for enhancing infrastructure and technologies at two or three centres and we will be asking for this amount,” he told *The Hindu*. Describing it more as a national mission than ISRO’s alone, Dr. Sivan, who is Secretary, Department of Space, said it would be the pride of India. It would raise scientific and technological temper across the country and inspire youngsters.

“We are excited by this announcement. It is a gift to the nation and we feel proud. It actually energises us across our centres. We do not feel intimidated or tense. We have seen many challenges in our work,” Dr. Sivan said. When it achieves the mission, India would be the fourth

nation to circle Earth after the Soviets, the Americans and the Chinese. In 1984, India’s first astronaut Wing Commander (retd.) Rakesh Sharma orbited Earth as part of a Soviet mission.

### **A 15-year-old space dream coming true**

ISRO revealed the first germ of an HSP in November 2004 and got incremental funds for supporting projects over the next few years. It could not go ahead mainly because the GSLV MarkIII vehicle was not ready until last year. ISRO has also met most of its regular needs. Dr. Sivan said, “In the last few years, we did a lot of groundwork as part of R&D at our centres. We have developed most of the critical technologies needed for a human mission. We demonstrated the flight of a crew module and its re-entry in 2014. On July 5 this year, we conducted an experiment for emergency escape of astronauts called the Pad Abort Test. It will be repeated at higher distances. The rest of the technologies are getting ready and will be realised in time.”

Before his elevation in January this year, Dr Sivan was the Director of the Vikram Sarabhai Space Centre that handled most of the HSP activities.

The most critical elements of the human mission are the Environment Control and Life Support Systems that make the crew capsule liveable and the flight safe for the astronauts. Food and hygiene are other aspects. These technologies are getting ready while space suits are being developed at ISRO, he said.

Facilities are being added or upgraded at a few centres that work on the HSP. The spacecraft will be monitored 24/7 from the ISRO Telemetry Tracking and Command Centre in Peenya. A new dedicated control centre for HSP would be set up at ISTRAC. It must be tracked globally through ISRO stations or of other countries.

The launchpad at the Sriharikota spaceport, the Satish Dhawan Space Centre, would be enhanced for the human mission. The Space Applications Centre which makes electronic devices and instruments for ISRO missions will also get refurbished.

While formal agreements are not yet in place, ISRO will collaborate with the Indian Air Force and its Institute of Aerospace Medicine, Bengaluru, to train astronauts. Various defence labs will be tapped for crew support systems.

Much of the work related to ramping up of infrastructure and supply of hardware would be outsourced to industry in a major way and academia would be involved.



Thu, 16 Aug 2018

## Indian in space by 2022 is target for Team ISRO

If successful, India will become the fourth nation to send an astronaut into space after the US, Russia and China. A project underway for at least 15 years, ISRO has continued to build its capabilities and develop critical technologies required to send a human being into space.

When Prime Minister Narendra Modi announced from the ramparts of the Red Fort in Delhi that India would send an astronaut to space by 2022, it meant that a definitive timeline for which ISRO has long waited was finally set. A project underway for at least 15 years, ISRO has continued to build its capabilities and develop critical technologies required to send a human being into space.

Following the announcement, ISRO chairman K Sivan Wednesday said that the mission would be completed at a budget of Rs 10,000 crore and that “technology required have already been developed”. This includes the heavy-lift launch vehicle, re-entry and recovery technology, the crew module, Environmental Control and Life Support System (ECLSS) and astronaut training. Before the actual 2022 launch, ISRO is expected to complete two unmanned missions, according to Sivan, and the spacecraft will be launched using the Geosynchronous Satellite Launch Vehicle (GSLV) Mark-III. ISRO’s experimental crew module in the sea in December 2014 successfully brought back to Earth after experimental launch aboard GSLV Mk-III. The key technologies ISRO will have to develop for such a mission includes the ability to launch recover and ensure earth-like conditions for astronauts. Over the years, ISRO has successfully tested many of the technologies required for such a manned mission, but there are still others to be developed and tested.

If successful, India will become the fourth nation to send an astronaut into space after the US, Russia and China. Rakesh Sharma, a former IAF pilot, was the first Indian to travel to space. Sharma was a part of the Soviet Union’s Soyuz T-11 expedition, launched on April 2, 1984, as part of the Inter cosmos programme.

Thu, 16 Aug 2018

## How to send an Indian into space

*PM Narendra Modi announces 2022 target, marking culmination of nearly 15 years of preparations by ISRO. How much ground have scientists already covered, and how much more remains before manned mission takes off?*

*By Amitabh Sinha*

With Prime Minister Narendra Modi announcing Wednesday that an Indian astronaut would go into space by 2022, the Indian Space Research Organisation (ISRO) has finally got a definitive timeline for a project it has been working on for the last 15 years.

While preparations have been going on since 2004, when the manned space mission was first endorsed by the ISRO Policy Planning Committee, there was lack of clarity on when exactly the mission would be launched, although the target initially in discussion was 2015. As recently as May 2016, the government had told Lok Sabha, as it had done earlier, that there was no plan for a manned mission to be launched in the “near future”. In fact, formal approval from the government is still awaited. But over the years, the government had continued to support ISRO’s efforts to build its capabilities for sending a human being into space.

A manned space mission is very different from all other missions that ISRO has so far completed. In terms of complexity and ambition, even the missions to the Moon (Chandrayaan) and Mars (Mangalyaan) are nowhere in comparison. For a manned mission, the

key distinguishing capabilities that ISRO has had to develop include the ability to bring the spacecraft back to Earth after flight, and to build a spacecraft in which astronauts can live in Earth-like conditions in space. Over the years, ISRO has successfully tested many of the technologies that are required, but many others are still to be developed and tested.

### **The rocket: GSLV Mk-III**

One of the most important requirements is the development of a launch vehicle that can carry heavy payloads into space. The spacecraft carrying human beings, called crew module, is likely to weigh in excess of 5 to 6 tonnes. ISRO's main launch vehicle, the PSLV (Polar Satellite Launch Vehicle), which carried the Chandrayaan and Mangalyaan missions too, can carry payloads that are barely up to 2 tonnes, and that too only to orbits at about 600 km altitude from the Earth's surface. That is why the development of GSLV Mk-III, a launch vehicle with capabilities to deliver much heavier payloads much deeper into space, was necessary.

After three decades of efforts, mainly concentrated at developing an indigenous cryogenic engine to power the rocket, ISRO successfully tested GSLV Mk-III, now called LVM-3 (Launch Vehicle Mark-3), in an experimental flight in December 2014. Then, in June last year, ISRO successfully launched the first "developmental" flight of LVM-3, which carried the GSAT-19 satellite into space.

The LVM-3 is the declared launch vehicle for taking the manned crew module into space. Over the next few years, many more flights of GSLV are scheduled. These will help ISRO in perfecting the cryogenic technology for sending up heavier and heavier payloads. In fact, only on June 6, the government approved the funding for the next 10 flights of GSLV Mk-III at an estimated cost of Rs 4,338.2 crore. This was supposed to take care of GSLV Mk-III missions till 2024.

### **Reentry & recovery tech**

The satellites normally launched by ISRO, like those for communication or remote sensing, are meant to remain in space, even when their life is over. Even Chandrayaan and Mangalyaan were not meant to return to Earth. Any manned spacecraft, however, needs to come back. This involves mastering of the highly complicated and dangerous reentry and recovery ability. While reentering Earth's atmosphere, the spacecraft needs to withstand very high temperatures, in excess of several thousand degrees, which is created due to friction. Also, the spacecraft needs to reenter the atmosphere at a very precise speed and angle, and even the slightest deviation could end in disaster.

The first successful experimental flight of GSLV Mk-III on December 18, 2014, also involved the successful testing of an experimental crew module that came back to Earth after being taken to an altitude of 126 km into space. Called the Crew module Atmospheric Reentry Experiment (CARE), the spacecraft reentered the atmosphere at about 80 km altitude and landed in the sea near the Andaman and Nicobar Islands, from where it was recovered by the Coast Guard. The external configuration of that crew module was the same as that to be used in the manned flight. Many more tests would be done over the next few years.

### **Crew Escape System**

This is a crucial safety technology, involving an emergency escape mechanism for the astronauts in case of a faulty launch. The mechanism ensures the crew module gets an advance warning of anything going wrong with the rocket, and pulls it away to a safe distance, after which it can be landed either on sea or on land with the help of attached parachutes.

Only on July 5, ISRO completed the first successful flight of the crew escape system. A simulated crew module weighing about 3.5 tonnes was launched from Sriharikota. It reached 2.7 km into space before unfurling its parachutes and floating back to the Earth's surface. The system is likely to undergo many more tests in the coming years.

### **Life support**

The Environmental Control & Life Support System (ECLSS) is meant to ensure that conditions inside the crew module are suitable for humans to live comfortably. The inside of the crew module is a twin-walled sealed structure that will recreate Earth-like conditions for

the astronauts. It would be designed to carry two or three astronauts. The ECLSS maintains a steady cabin pressure and air composition, removes carbon dioxide and other harmful gases, controls temperature and humidity, and manages parameters like fire detection and suppression, food and water management, and emergency support.

While the layout and design of the ECLSS has been finalised, its many individual components and systems are in the process of being tested. The design and configuration of the inside of the crew module have also been finalised. Ground testing will have to be followed by tests in the space orbit while simulating zero gravity and deep vacuum.

ISRO Chairman K Sivan told reporters in Bangalore Wednesday that the first manned mission would last at least seven days.

### **Astronaut training**

In the early part of the planning process, a proposal for setting up an astronaut training centre in Bangalore was floated. Initially targeted by 2012, it is yet to take off. While ISRO still plans to set up a permanent facility, the selected candidates for the first manned mission will most likely train at a foreign facility. Candidates will need to train for at least two years in living in zero gravity and dealing with a variety of unexpected experiences of living in space. Some training would also be imparted at the Institute of Aerospace Medicine of the Indian Air Force at Bengaluru. The process of selecting candidates has not yet begun.

### **Budget**

During the early years of planning, the cost of India's first manned space mission was estimated at about Rs 12,400 crore. But that was for a mission to be launched in 2015. On Wednesday, Sivan told reporters in Bengaluru that the mission would now be completed for less than Rs 10,000 crore.

### **From an idea to a plan**

**August 2004:** ISRO Policy Planning Committee recommends manned space mission

**November 2006:** National committee comprising 80 scientists and technocrats endorses proposal

**September 2007:** First public announcement of the human space programme

**February-March 2009:** Another committee, comprising Montek Singh Ahluwalia, R Chidambaram, Roddam Narasimha, M G K Menon, Yash Pal, M S Swaminathan and K Radhakrishnan, discusses the desirability and feasibility of the programme and expresses support

**April 2010:** Failure of GSLV-D3

**December 2010:** Failure of GSLV-F06

**December 18, 2014:** Successful testing of experimental flight of GSLV Mk-III; this also successfully tests an experimental crew module, demonstrating reentry capability

**June 2017:** First 'developmental' flight of GSLV Mk-III

**July 2018:** First successful flight of the crew escapes system

**August 15, 2018:** Prime Minister announces manned mission to take place before 2022.



## Navy's next-gen patrol vessels get govt nod; missile boats, frigates to follow

AJAI SHUKLA  
New Delhi, 15 August

The defence ministry on Monday cleared the acquisition of the first of its planned "next-generation" warships — six Next-Generation Offshore Patrol Vessels (NGOPVs) for an estimated cost of ₹4,941 crore (₹49.41 billion), or about ₹825 crore (₹8.25 billion) each.

These will be followed by "next-generation missile boats", "next-generation frigates" and "next-generation destroyers". All these vessels are currently being designed by the navy's internal design directorate.

"The NGOPVs will be built in indigenous shipyards and will be fitted with state-of-the-art sensor suite with increased endurance," said a defence ministry release. Tenders are likely to go out soon to public sector and private sector Indian shipyards. Each NGOPV will displace an estimated 2,500 tonnes, making this class of vessel significantly larger and more potent than the current OPVs in the navy and Coast Guard.

OPVs are large craft that carry a crew of

up to 80-90 sailors, but are much more lightly armed — and therefore much cheaper — than capital warships like corvettes, frigates or destroyers. For performing tasks that do not require heavy fighting, OPVs offer a far more economical option than using heavily armed capital warships. In contrast to the ₹825 crore (₹8.25 billion) cost of each NGOPV, each new frigate that will be built under the forthcoming Project 17A will cost ₹6,400 crore (₹64 billion). Seven Project 17A frigates are slated to be built at Mazagon Dock, Mumbai and Garden Reach Shipbuilders & Engineers, Kolkata.

An NGOPV contract would be a lifeline for private sector shipbuilders like L&T, which has successfully displayed its ability to build

OPVs for the Coast Guard at its Kattupalli facility, with the first two vessels delivered ahead of schedule.

Meanwhile, the Pipavav shipyard of Reliance Naval and Engineering has laboured unsuccessfully on an eight-year-old order for five naval OPVs. With delivery schedules long overdue, the first two

OPVs are still barely complete.

Under similar circumstances earlier, the navy had slapped cancellation orders on ABG, Bharti, and Alcock & Ashdown shipyards.

The navy believes private shipyards are not yet capable of building complex capital warships that incorporate and integrate complex "weapons-and-sensor-suites".

"These platforms will strengthen maritime security by undertaking a multitude of operational roles both in blue-water and littorals. These include seaward defence, protection of offshore assets, maritime interdiction operations and search & seizure operations, surveillance missions, mine warfare, anti-piracy missions, counter infiltration operations, anti-poaching/trafficking operations, humanitarian assistance and disaster relief, and search-and-rescue missions," said the defence ministry.

"The NGOPV will have an endurance of three-four months, compared to just 30-45 days that current OPVs can patrol for. It will have better seakeeping ability (ability to withstand bad weather) and have greatly improved facilities for crew living, given the longer patrols it will be deployed on," said a senior navy official.

**Each NGOPV will displace an estimated 2,500 tonnes, making this class of vessel significantly larger and more potent than the current OPVs in the navy and Coast Guard**



## Modi hails all women crew of Tarini vessel

By Sapna Singh

During his fifth consecutive address to the nation from the ramparts of historic Red Fort, Prime Minister Narendra Modi hailed the six women of Indian Navy team who circumnavigated the entire globe in seven months. Prime Minister hailed the achievement of women in various fields and praised the indomitable spirit of the women naval officers.

"The daughters of our country returned home after spreading the hues of the tri-colour across the oceans of the world, the Prime Minister said from the ramparts of the Red Fort here. The six-member crew, on board the INSV Tarini, spent 194 days at sea as part of a mission that began on September 10, 2017", the Prime Minister said. "My dear fellow Indians, we are today celebrating Independence Day at a time when our daughters from Uttarakhand, Himachal Pradesh, Manipur, Telangana and Andhra Pradesh have sailed the



seven seas and returned home after splashing the oceans with the hues of the tricolour,” Modi said. President Ram Nath Kovind has conferred Nao Sena (Gallantry) Medal for the six women crew members of the Indian Naval Sailing Vessel (INSV) Tarini, who circumnavigated the globe, braving treacherous seas and displaying raw courage.

Lieutenant Commander Vartika Joshi skippered the mission, traversing through the Indian, the Pacific and the Atlantic oceans, along with Lieutenant Commander Pratibha Jamwal and Lieutenant P Swathi, Lieutenant Vijaya Devi, Lt B Aishwarya and Lt Payal Gupta.

The first ever global circumnavigation was titled as 'Navika Sagar Parikrama' was flagged off by Defence Minister Nirmala Sitharaman near the Panaji coast in 2017 - Western Fleet of Indian Navy. The mission witnessed several gut-wrenching moments like when the INSV Tarini negotiated the choppy waters off the Cape Horn, often dubbed as 'the graveyard of ships' owing to the dangerous seas conditions in the Pacific Ocean in January, she was overtaken by a cold front with winds gusting up to 130 kilometres per hour. The turbulent weather caused 10 metre-high waves to come crashing down onto the boat, the Navy had said in a statement.

The expedition was covered in five legs, with stopovers at 4 ports -- Fremantle (Australia), Lyttleton (New Zealand), Port Stanley (Falklands), and Cape Town (South Africa).

Not only just the physical strength but with patience and strong determination, the all women member crew successfully completed circumnavigation and registered India's name in history. Accepting the tough challenge, team Tarini sailed the boat without engine for propulsion and avoided the canal routes. INSV Tarini is a 55-ft sailing vessel, which has been built indigenously, and inducted in the Indian Navy last year. In his speech, Modi also lauded the triumph of young tribals from India, who have successfully scaled Mount Everest.

## पंजाब कैसरी

Thu, 16 Aug 2018

# मानव अंतरिक्ष मिशन पर हर भारतीय को गर्व होगा : इसरो प्रमुख

नयी दिल्ली/ हैदराबाद/बेंगलुरु, (भाषा): इसरो अध्यक्ष के.सिवान ने आज कहा कि 2022 तक भारतीयों को भी अंतरिक्ष में भेजने में मदद करने वाली प्रौद्योगिकी विकसित की जा चुकी है। इससे पहले, प्रधानमंत्री नरेंद्र मोदी ने आज स्वतंत्रता दिवस पर अपने संबोधन में इस अभियान का जिक्र किया। सिवान ने कहा कि भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) किसी अनजान क्षेत्र में यह कोशिश नहीं करने जा रहा, बल्कि महत्वपूर्ण प्रौद्योगिकी पहले ही विकसित की जा चुकी है। उन्होंने बेंगलुरु में संवाददाताओं से कहा, “प्रधानमंत्री द्वारा निर्धारित समय सीमा में इसे पूरा करना मुमकिन है। इसकी समय सीमा अव्यवहारिक नहीं है। हम महत्वपूर्ण प्रौद्योगिकी पहले ही विकसित कर चुके हैं, जिस पर हमने कम से कम एक दशक पहले काम शुरू किया था।”



- 2022 तक भारतीयों को भी अंतरिक्ष में भेजने वाली प्रौद्योगिकी विकसित
- दशक पहले शुरू किया गया था योजना पर काम

इससे पहले, सिवान ने बताया, “हम क्रू मॉड्यूल, अंतरिक्ष यात्रियों को बचाने और पर्यावरण नियंत्रण तथा जान बचाने की प्रणाली जैसी प्रौद्योगिकी तथा ‘स्पेस सूट’ के साथ

- साथ जीएलएसवी मार्क-III (इस अभियान में इस्तेमाल होने वाला रॉकेट) पहले ही विकसित कर चुके हैं।” सिवान ने कहा कि 2022 में अंतरिक्ष यान को रवाना करने से

पहले भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) जीएलएसवी मार्क-III का इस्तेमाल करते हुए दो मानवरहित मिशन और यानों को भेजेगा। प्रधानमंत्री नरेंद्र मोदी के स्वतंत्रता दिवस संबोधन के बाद इसरो प्रमुख का यह बयान आया है। प्रधानमंत्री ने आज कहा कि 2022 तक “गगनयान” के जरिए भारतीय भी अंतरिक्ष में जायेंगे। प्रधानमंत्री की घोषणा से उत्साहित सिवान ने कहा, “राष्ट्र को प्रधानमंत्री की यह नायाब भेंट है।” उन्होंने कहा कि मानव अंतरिक्ष यान का कार्य देश को विज्ञान और प्रौद्योगिकी के क्षेत्र में बहुत ऊंचे स्तर पर ले जाएगा और युवा पीढ़ी इससे प्रेरित होगी तथा हर भारतीय इस पर गर्व कर सकेगा। इसरो के अध्यक्ष ने कहा कि परियोजना की लागत उतनी नहीं आएगी क्योंकि अधिकतर प्रौद्योगिकी पहले ही विकसित की जा चुकी है।