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DRDO scientist's herbal drug to treat leucoderma soon

Based on a better understanding of how herbal drug Lukoskin has helped in managing vitiligo, or leukoderma in which skin develops white patches, scientists at DRDO's Pithoragarh lab Defence Institute of Bio-energy Research (DIBER) have now developed a more effective and promising version of the herbal product which was launched in market a few years ago.

"The new version will soon be available for the benefit of patients," said Dr Hemant Pande, senior DRDO scientist who last month won prestigious 'Science Award' on National Technology Day for developing Lukoskin. Presently, the herbal drug is being sold and marketed by Delhi-based AIMIL Pharma Ltd and is getting good response.

Pandey said in fact it was only after we got positive results for Lukoskin, we started working on its advanced version which is formulation of over 18 herbs and is more effective with results delivering in short duration treatment. The remedy has shown promising results in mice as well as in people, said Dr Pandey, who presently heads Herbal Medicine Division of DIBER.

He pointed out that while various remedies of vitiligo viz., allopathic, surgical and adjunctive were available, none of them were very effective or without side effects.

"Moreover, these are either costly or single molecule based, with very low level of efficacy and develop side-effects like blister, edema, irritation in the skin with the result most of the patients discontinue the treatment," said Pandey, a recipient of several prestigious awards for his contribution in herbal medicine field. In fact, in 2015, Lukoskin helped him bag Agri-Innovation Award.

"Hence, we focused on the causes of disease (aetiology) and researched out a comprehensive formulation for the management of leucoderma from Himalayan herbs by exhaustive scientific studies. We all know while allopathy masks the disease, ayurveda ensures rooting out the disease," said Dr Pandey.

Lukoskin is available in the form of ointment and oral liquid. The ointment has seven herbal ingredients having properties such as skin photo sensitizer, anti-blister, anti-irritation, anti-septic, wound healing and copper supplementing properties while the oral dose has been formulated to check the emergence of new spots, added Dr Nitika Kohli, an Ayurveda expert.

The world wide incidence of leucoderma has been reported 1-2 per cent. In India, its incidence is around 4-5 per cent in some parts of Rajasthan and Gujarat it is very high more than 5-8 per cent.

A team of international dermatologists too after reviewing various studies said in their review 'Herbal Compounds for the Treatment of Vitiligo: A Review' published last year that some herbal compounds may be considered as valid therapeutic tools for the treatment of vitiligo.

Madhubala, Director, DIBER added that the lab has been encouraging scientifically validated herbal drugs to ensure their domestic as well as global acceptance.

<https://www.dailypioneer.com/2019/india/drdo-scientist---s-herbal-drug-to-treat-leucoderma-soon.html>

"Can't wish away" Russia defence ties, say sources before Pompeo visit

Diplomatic sources in India say all issues are on the table, and there is no structured agenda for the discussions, in which Foreign Minister S Jaishankar will host a working lunch for Mike Pompeo

By Nidhi Razdan

New Delhi: India, which plans to push ahead with an \$5 billion air-defence missile deal with Russia despite the threat of US sanctions, will point out that the US has a law that offers a way out, sources said. New Delhi's stance will be made clear to US Secretary of State Mike Pompeo, who would reach New Delhi tonight, sources said.

"We have a longstanding defence relationship with Russia which we cannot wish away," a person with direct knowledge of the matter told NDTV.

India has been buying military hardware from Russia for decades, and mass manufacturing them as well under licence. The \$5 billion deal is for the S-400 Triumf long-range missile, which the US considers a threat. The S400 Triumf can hit targets up to 400 km, making it one of the world's most lethal surface-to-air missiles.

The US wants India to cancel the purchase of the missiles, citing a law that imposes sanctions on any country that has "significant transactions" with Iran, North Korea or Russia.

The US Congress, however, has passed another law that could give countries like India a waiver from the sanctions, but that is yet to be signed by President Donald Trump.

"We have eased the process and granted India Strategic Trade Authorization Tier-1 status that gives them the same license-free access to defence articles as our NATO allies, Japan, South Korea and Australia. So I think this is the time where we will be encouraging India to look at alternatives," a US State Department official told reporters last week.

Indian diplomatic sources say discussions with Russia for the S-400 missiles have been on for a decade and the "US is aware of the reasons India wants this".

"As far as sanctions go, if you look at the US law, it's very clear as to under what circumstances a waiver can be given by the administration, which we feel that we meet. From a purely legal view, India fulfils those requirements. This will have to be a combination of legal and the political stand of the US government, keeping in mind US-India ties," a person familiar with the matter said.

A US State Department official told reporters last week that the US was "urging all of our allies and partners, India included, to forego transactions with Russia that risk triggering the CAATSA sanctions". In September 2018, the US imposed sanctions on China for purchasing the same missile system from Russia.

Diplomatic sources in India say all issues are on the table, and there is no structured agenda for the discussions, in which Foreign Minister S Jaishankar will host a working lunch for Mr Pompeo.

The US Secretary of State will also meet with Prime Minister Narendra Modi in his first visit to India after the PM was re-elected to a second term.

Another major issue expected to come up in the discussion is the US tension with Iran. While Indian oil companies have stopped imports to avoid sanctions, diplomatic sources say an official decision has to be taken and that India will discuss the alternative sources of oil in tomorrow talks.

<https://www.ndtv.com/india-news/cant-wish-away-russia-defence-ties-say-sources-before-mike-pompeos-visit-to-india-2058894>

India keen to seal sanction waiver on S-400 during Mike Pompeo's visit

India believes it meets the criteria for a waiver from US sanctions on the \$5.2-billion deal with Russia for the S-400 missile defence system and New Delhi cannot "wish away" its long-standing defence relations with Moscow, according to people familiar with the developments

By Shishir Gupta and Rezaul H Laskar

New Delhi: India believes it meets the criteria for a waiver from US sanctions on the \$5.2-billion deal with Russia for the S-400 missile defence system and New Delhi cannot "wish away" its long-standing defence relations with Moscow, according to people familiar with the developments.

The S-400 deal, threatened with sanctions by the US, is expected to figure in talks on Wednesday between external affairs minister S Jaishankar and US secretary of state Mike Pompeo, who arrived in New Delhi late on Tuesday night.

Terrorism, trade-related differences and US-Iran tensions, too, are expected to be on the agenda for Pompeo's meetings with his Indian interlocutors. Though there is no structured agenda for the talks between Pompeo and Jaishankar and the entire spectrum of India-US ties will be on the table, the people cited above said the Indo-Pacific is also expected to come up, with the Indian side expected to push for an inclusive policy that averts confrontations in the region.

The US has already acted against Turkey and China for acquiring the S-400 system and sanctions under the Countering America's Adversaries Through Sanctions Act (CAATSA) are expected to kick in once India makes the first payment to Russia.

However, the people said there have been private and public discussions with the US regarding the circumstances that compelled India to acquire the S-400 system and the American side is well aware of India's requirements.

"CAATSA is very clear as to the circumstances under which a waiver can be given by the US administration... If you look at it from the legal point of view, it is our assessment that India fulfils those requirements and the US administration has enough flexibility to give us the waiver," one of the people cited above said on Tuesday.

India's belief that it is entitled to a waiver is derived from a "combination of legal provisions in the US law and the political-strategic assessment by the US government keeping in mind the importance of the strategic partnership between India and the US", the person said.

"We have to realise that we have a long-standing defence relationship with Russia which we cannot wish away," the person added.

An official, who declined to be named, said India had been buying Russian weapons even before CAATSA was enacted and there were indications from the Pentagon and the US state department that a waiver would be given by the US. India, the official said, is taking adequate steps to address US concerns that the S-400 system could gather the electronic signatures of American military hardware used by India.

"Also, there is the fear that Russia could start selling weapons to Pakistan if India stops buying them. Let's not forget that during the aerial engagement with Pakistan on February 27, it was an American missile that was fired at Indian jets," the official said.

As India diversifies its defence procurements, it will remain committed to acquiring state-of-the-art US weapons systems, the people said.

The people described the increased tensions between the US and Iran in the Persian Gulf as a “matter of great concern”, especially because more than 8 million Indians live and work in the region and 60% of India’s energy supplies come from the region. “We have a strong and legitimate interest in maintaining peace and stability in the region,” a person said.

“We have been talking to both Iran and the US and asking both sides to de-escalate and to refrain from actions that affect peace and stability,” the person added.

Indian companies are not looking to further Iranian oil imports because of US sanctions that affect their operations in other parts of the world, the Indian side is expected to raise with Pompeo ways the US can help India find alternative energy supplies, the people said.

On the Indo-Pacific, the official cited above said India’s position is more in line with that of members of the Association of South East Asian Nations (Asean) and favours an inclusive approach that ensures freedom of navigation and makes the Indian Ocean a zone free of confrontation. All lanes of communication used for trade, especially the Malacca Strait, should be kept open and not affected by the tensions seen in the Persian Gulf or the South China Sea, the official added.

The issues of combating terrorism and the fast-moving developments in Afghanistan are also expected to figure in the talks and will be “very high” on the minds of the two ministers, the people said.

With trade expected to figure in the talks, the people said there had been substantial progress as trade has grown by double digits in the past three years while the deficit had also gone down by double digits in the same period, the people said. The issue of India’s tariffs is “misunderstood” and the country’s policy is in line with those of other developing countries, they added.

The US withdrew duty-free benefits for Indian exports under its Generalised System of Preferences (GSP) from June 5, and New Delhi retaliated by slapping tariffs on 29 American products. The US has also been irked by India’s planned rules for multinational firms to store private data of users locally. The people said they hoped there will be some “give and take” as the two sides discussed such issues.

The people said the two countries were at an advanced stage in negotiations on the “Industrial Security Annex” that will allow the transfer of defence technology. The Indian side has got the text from the US side and the systems on both sides are broadly in alignment to conclude the agreement.

Pompeo will have a working lunch with Jaishankar and call on Prime Minister Narendra Modi. He will meet Indian and US businesses at a roundtable and deliver a policy speech at the India International Centre.

Jaishankar, speaking to reporters in Gandhinagar after filing his nomination papers for the Rajya Sabha poll, said India will try to find common ground on trade issues during the discussions.

“We will be meeting with a positive attitude,” he said. “The meeting with Mike Pompeo will be an important one. We will definitely discuss issues related to trade between the two countries,” he said.

“Both countries are having their own interests and it is natural to have some conflicts because of that. We will find a common ground using diplomacy.”

<https://www.hindustantimes.com/india-news/mike-pompeo-arrives-india-keen-to-seal-sanction-waiver-on-s-400/story-3fmyppjjBuY14RxtJgXRuUK.html>

Vetting process for next Army Chief begins

Lt Gen Naravane the senior most, Northern commander Lt Gen Ranbir also in race

By Manu Pubby

New Delhi: The vetting process for selection of the next Army Chief has begun, with a list of five top officers being considered for the post after the retirement of incumbent General Bipin Rawat at the end of the year.

The government faces a tough choice for what has now become a selection process where the old convention of seniority no longer applies. At the top of the list are the Northern and Eastern Army commanders -- both of whom have rich operational and command experience and a good track record when it comes to anti-insurgency operations. Lt Gen Mukund Naravane, who is currently the Eastern Army Commander, would be the seniormost officer of the Indian Army when General Rawat retires in December end. The Sikh Light Infantry officer has commanded a Rashtriya Rifles battalion in Kashmir, has served in the Assam Rifles and has been posted as the defence attache to Myanmar.

His posting as the head of the Army's Training Command in December 2017 had raised eyebrows as it is considered a backwater that carries no operational experience. However, in September 2018, a game of musical chairs was played with the top brass of the Army that saw him shifted to the operationally sensitive Eastern Command that has delivered several Army Chiefs in the past. The Northern Army Commander Lt Gen Ranbir Singh, who became the face of the surgical strikes when he announced operations along Myanmar and in Pakistan Occupied Kashmir (PoK), also has an enviable career record. The government broke from tradition by choosing him as the Director General of Military Operations (DGMO) in 2016 despite him being approved to command a Corps level formation.

The officer, who belongs to the Dogra regiment, was a Major General in the military operations department when surgical strikes were planned in 2015 and had personally briefed the top leadership of the country on the planned operations as well as the post action report. While the selection process will look into the service record of both officers, there's also speculation that the much delayed restructuring of the top military brass may also be in the offing in the coming months.

<https://economictimes.indiatimes.com/news/defence/vetting-process-for-next-army-chief-begins/articleshow/69951737.cms>

Air Forces of India, France to participate in joint drill from July 1-12

New Delhi: An Indian Air Force contingent comprising over 100 warriors departed for France on Tuesday to participate in a two-week exercise with the French air force.

This 'Garuda VI' is being planned at the French Air Force Base, Mont-de-Marsan, the IAF said.

The previous edition of the exercise, 'Garuda V', was held in India at the Jodhpur Air Force Station in June 2014.

The Indian contingent, which left from the air bases of Agra and Bareilly, comprises 120 air warriors and four Sukhoi 30 MKI, along with an IL-78 flight refuelling aircraft. C-17 strategic lift aircraft will provide the logistic support to the contingent during the induction and de-induction phase.

"This is one of the biggest air exercises that is being planned between the two Air Forces. The Indian Air Force's Su-30 MKI will be operating in a simulated operational war fighting scenario along with French Air Force's multirole Rafale aircraft. This will enhance understanding of interoperability during mutual operations between the two Air Forces and provide an opportunity to learn from each others best practices, " the IAF said.

The exercise will also promote professional interaction, experience exchange and operational knowledge, besides strengthening bilateral relations between the two air forces, it added.

<https://timesofindia.indiatimes.com/india/air-forces-of-india-france-to-participate-in-joint-drill-from-july-1-12/articleshow/69947701.cms>

The Telegraph

Wed, 26 June 2019

India's strategic challenges in the near future will be naval, not continental

The government needs to come up with a substantial naval doctrine based on changing geopolitical realities

By Rohan Choudhary

The 2019 general elections have been won by Narendra Modi but in a different strategic context. In 2014, Modi's campaign relied primarily on domestic issues. But in 2019, Modi won the battle by emphasizing on national security. The broader strategic challenges India is likely to face in the near future would be maritime and not continental. This needs consideration.

China's naval modernization and the emergence of a coalition in maritime countries like Japan, Australia, the United States of America and India under the umbrella of the Indo-Pacific show that conflict and competition in Asia are turning towards the sea. How India responds to these shifts and challenges will be significant not only for the Indian navy but also for India as it claims to be a stakeholder in Asia.

Enhancing maritime consciousness is an important challenge in this respect. The maritime issue in India has been neglected since Independence on account of two factors: excessive concentration on continental threats emanating from the north and northwestern frontiers; the distance between maritime boundaries and New Delhi. China's naval modernization in the Indian Ocean, the US's 'pivot to Asia', along with India's 'Look East' and 'Act East' policies have stoked maritime consciousness in India's strategic thought.

Traditionally, the Indian navy has been the neglected branch of the armed forces. An evaluation of the naval budget pie would reveal declining trends. This in spite of the fact that the Standing Committee on Defence (2017-18) categorically mentions that the challenges in the maritime domain require a capable and modern navy and that this would necessitate the infusion of adequate funds. At present, 90 per cent of India's trade by volume and 77 per cent by value are seaborne. Furthermore, China's dependence on seaborne trade and imported energy and its strategic vulnerability in the Strait of Malacca are likely to raise India's concern. The improvement of maritime infrastructure for both operational capability and security of sea lanes is one of the biggest challenges confronting the new government.

What is India's maritime doctrine? The much debated *Indian Maritime Doctrine* 2009 highlights three components: the conceptual framework for understanding role and scope; application of military power; buttressing the formulation of military strategy. A number of developments have taken place since the publication of the document, especially the emergence of the Chinese naval doctrine that prioritized the strategies of anti-access (A2) and area-denial (AD). The doctrine apparently aims to deter US intervention in Taiwan; but its applicability in the Indian Ocean region cannot be ruled out. The principal concern for India is its navy's ability to counter China's A2AD. These challenges are changing the nature of naval competition and warfare. To address this rapidly changing security environment, the government must accord to the navy the strategic importance that is necessary.

One option could be the introduction of the Indian version of A2AD. China is confronted with its 'Malacca dilemma'. Beijing's intensive use of the Malacca and Lombok/Makassar straits in Southeast Asia is the source of this concern. India can apply this counter A2AD doctrine to deter China in the Indian Ocean. A second approach would be to converge India's maritime interests *vis-à-vis* the US. The technologically advanced US navy could strengthen India's maritime doctrine. However, the viability of the doctrine would depend on the government's ability to kindle maritime consciousness in foreign policy and build on India's maritime infrastructure.

It is imperative that the Indian government comes up with a substantial naval doctrine based on changing geopolitical realities in maritime Asia. Hopefully the Narendra Modi government will be able to deal with the choppy waters.

<https://www.telegraphindia.com/opinion/india-s-strategic-challenges-in-the-near-future-will-be-naval-not-continental/cid/1693096>

THE ASIAN AGE

Wed, 26 June 2019

Navy teams board ships for safe passage in Gulf

Move comes after increase in attacks on oil carriers

By Pawan Bali

New Delhi: Armed teams of the Indian Navy are mounting Indian crude oil carriers that pass through the sensitive Strait of Hormuz to ensure their safe passage as part of Operation Sankalp.

The Indian Navy till Tuesday evening escorted five crude oil carriers bringing fuel to the country while passing the Strait of Hormuz through which the Middle East's crude and gas flow to international markets.

The area has become crucial from the security point of view after attacks on oil tankers in the region and the downing of a US spy drone by Iran.

"More ships carrying crude will be secured by highly-armed Indian Navy teams in the coming days. However, the owners of the carriers will have to give their consent or request for the security," said top naval sources. Sources said that all ships carrying Indian flags will be secured by the Indian Navy.

The strait is strategic as third of the world's liquefied natural gas and almost 20 per cent of total global oil consumption passes through it. It connects the Persian Gulf to the Indian Ocean.

The US has blamed Iran for suspected attacks on oil tankers. During the "Tanker War" in 1987 and 1988, Iran was said to have used mines to attack oil tankers in the region after which the US Navy was forced to escort the ships.

In addition, aerial surveillance by Navy aircraft is also being undertaken in the area. The Information Fusion Centre — Indian Ocean Region, which was launched by the Navy in December 2018 in Gurgaon, is also keeping a close watch on the movement of ships in the Gulf region.

DG Shipping had issued two advisories on June 13 and June 16 to all Indian-flagged vessels operating in the Strait of Hormuz and Persian/ Arabian Gulf Region to undertake appropriate protection measures.

<https://www.asianage.com/india/all-india/260619/navy-teams-board-ships-for-safe-passage-in-gulf.html>

MailOnline

Wed, 26 June 2019

Would you fly in a 1,100MPH jet with no front window? Pilots controlling NASA's 'silent' supersonic plane dubbed the 'son of concord' will use cameras and a 4K TV screen to navigate the skies

- *X-59 Quiet Supersonic Transport (QueSST) is scheduled for test flights in 2021*
- *It has an elongated nose and will not have a front window for the pilots to use*
- *A system of cameras will feed live data back to the cockpit via a 4K screen*

NASA is currently working on a supersonic plane shaped like a pencil which doesn't have a front-facing window for the pilot to look out of.

This seemingly flawed concept will be mitigated by the installation of a 4K ultra high resolution TV screen showing a live feed from two cameras mounted on the front of the plane.

The system is called the eXternal Visibility System (XVS) and will combine terrain data and visual input to create a comprehensive image of the plane's location.

Known formally as the X-59 Quiet Supersonic Transport (QueSST), it has garnered the nickname 'son of concord' and could be ready for test flights by 2021 and could one day fly from London to New York in just three hours.

NASA revealed the design quirk in a statement, and it states: 'The 4K monitor, which is part of the aircraft's eXternal Visibility System, or XVS, displays stitched images from two cameras outside the aircraft combined with terrain data from an advanced computing system.

'The two portals and traditional canopy are real windows however, and help the pilot see the horizon. The displays below the XVS will provide a variety of aircraft systems and trajectory data for the pilot to safely fly.

The XVS is one of several innovative solutions to help ensure the X-59's design shape reduces a sonic boom to a gentle thump heard by people on the ground.

'Though not intended to ever carry passengers, the X-59 boom-suppressing technology and community response data could help lift current bans on supersonic flight over land and enable a new generation of quiet supersonic commercial aircraft.'

Nasa began supersonic tests in November on its next-generation passenger airliner, dubbed the 'Son of Concorde' by aviation fans.

WHAT IS NASA'S 'SON OF CONCORDE' X-PLANE?

Nasa is developing a 1,100mph (1,770kph) aircraft that has been dubbed the 'son of Concorde'.

The vehicle is the first in a series of aircraft Nasa is developing with Lockheed Martin in a quest to build a commercially viable supersonic jet.

It is designed to fly at Mach 1.4 (1,100mph / 1,700 kph) at an altitude of 55,000 feet (10 miles).

Dubbed the X-59 Quiet Supersonic Transport (QueSST), the research craft aims to cut out the sonic booms associated with supersonic travel.

The aircraft is shaped to separate the shocks and expansions associated with supersonic flight to reduce the volume of the shaped signature, and was developed by Lockheed's Skunk Works over 20 years. The team is hoping to achieve a sonic boom 60 dBA lower than other supersonic aircraft, such as Concorde.

Recent research has shown it is possible for a supersonic airplane to be shaped in such a way that the shock waves it forms when flying faster than the speed of sound can generate a sound at ground level so quiet it will hardly be noticed by the public, if at all.

The plane, officially known as the X-59 Quiet Supersonic Transport (QueSST), will fire off 'quiet' sonic booms. The first flight of the X-59, which could one day fly from London to New York in just three hours without giving off a loud sonic boom, is scheduled for 2021.

The craft could become the first commercial supersonic aircraft to carry passengers since iconic Anglo-French jet Concorde was decommissioned 15 years ago.

Ahead of this the space agency will use a modified combat jet to check the 'acoustic signature' of the engines to be used in the airliner, by sending it into a series of dives.

It has recruited 500 people on the ground to then answer surveys about the noise generated by the the F/A-18 Hornet, to ensure the flight is quiet as it flies over Texas.

Before the aircraft takes to the skies, NASA is investigating whether members of the public are put off by the noise produced by X-59 when it breaks the sound barrier.

Tests scheduled for November will see an F-18 fighter jet conduct dive manoeuvres off the shores of Galveston, Texas - an island city near Houston.

The plane will rapidly descend from almost 50,000 feet (15,200 metres), briefly going supersonic and firing off the sound likely to come from X-59 aircraft.

The noise, which Nasa calls a 'sonic thump', should sound more like a car door slamming as opposed to the booms produced by existing supersonic aircraft.

The agency will measure the sounds using sensors on the ground while gathering public reaction through a series of surveys.

Alexandra Loubeau, Nasa's team lead for sonic boom community response research at Langley, said in July: 'We'll never know exactly what everyone heard.

We won't have a noise monitor on their shoulder inside their home.

'But we'd like to at least have an estimate of the range of noise levels that they actually heard.'

X-59, which Nasa is developing with Lockheed Martin's aeronautics branch, is scheduled to make its first flight in 2022. Originally named the Low-Flight Flight Demonstrator by Nasa, the agency announced in June that the aircraft was to be called X-59 QueSST going forward.

The US Air Force made the name change in-part as a hat tip American X-plane history, which began in 1947 with the world's first supersonic plane, the the Bell X-1.

'For everyone working on this important project, this is great news and we're thrilled with the designation,' Jaiwon Shin, associate administrator for Nasa's Aeronautics Research Mission Directorate, said in a statement in June.

The X-59 project aims to cut out the noisy sonic booms that echoed above cities in the era of Concorde, while travelling at speeds of 1,100mph (Mach 1.4 / 1,700 km/h).

The loud booms that rang out whenever a Concorde broke the sound barrier were often described as 'unsettling' by members of the public, which ultimately limited the aircraft to flights over the Atlantic when it began carrying passengers in 1976.

X-59 is designed to stop shockwaves triggered by the movement of air particles when an aircraft breaks the sound barrier from merging - a phenomenon that gives off the telltale sonic boom of supersonic aircraft.

Nasa hopes to reduce the sound of the sonic boom to a quiet thud, similar to the sound of thunder rumbling in the distance or a neighbour closing their door.

'With the X-59 you're still going to have multiple shockwaves because of the wings on the aircraft that create lift and the volume of the plane,' said Ed Haering, a Nasa aerospace engineer at NASA's Armstrong Flight Research Center in California.

'But the airplane's shape is carefully tailored such that those shockwaves do not combine.

'Instead of getting a loud boom-boom, you're going to get at least two quiet thump-thump sounds, if you even hear them at all.'

<https://www.dailymail.co.uk/sciencetech/article-7174391/NASAs-newest-supersonic-jet-NOT-window.html>

The Indian EXPRESS

Wed, 26 June 2019

Atomic clock, green fuel, ashes: what's aboard Falcon Heavy, what for

Among the various reasons which make the mission important, one is its huge payload — 24 satellites from various organisations, including government agencies

New Delhi: On Tuesday, Elon Musk's SpaceX launched its Falcon Heavy spacecraft on its third mission, and the most complex one yet by the company. Among the various reasons which make the mission important, one is its huge payload — 24 satellites from various organisations, including government agencies. These will be launched in three different orbits. What are these satellites for?

* Deep Space Atomic Clock. Sent by NASA and collaborators on one of the 24 satellites, DSAC is incredibly precise and compact, and the size of a toaster. Accurate timekeeping is crucial to the performance of GPS, and atomic clocks work by observing the behaviour of atoms as precisely as possible. The NASA website says DSAC is expected to be stable to better than one microsecond per decade (one second per 10 million years), which would be about 50 times more accurate than atomic clocks already aboard GPS satellites. At present, satellites rely on an exchange of signals with Earth, where atomic clocks calculate the time it takes for the signals to arrive. The new technology targets aims at helping spacecraft navigate by themselves, relying on the new atomic clock in space. The DSAC project will perform a year-long demonstration in space.

* ASCENT green fuel. One of the satellites will be a test spacecraft for a safer rocket fuel. The traditional fuel used in satellites is hydrazine, which is extremely toxic to humans as well as the environment. The new alternative is called ASCENT (Advanced Spacecraft Energetic Non-toxic Propellant), formerly called AF-M315E, which is a hydroxyl ammonium nitrate fuel/oxidiser blend. First developed by the US Air Force and now launched as part of a NASA-led collaboration, ASCENT is described as a fuel with significantly reduced toxicity levels compared to hydrazine, and potentially shorter launch processing times, resulting in lower costs.

* Solar-powered sail. LightSail 2 is a crowd-funded solar sail project from the Planetary Society. It seeks to become the first orbiting spacecraft to be propelled solely by sunlight. In 2005, the Planetary Society launched the world's first solar sailing spacecraft, Cosmos 1, which was lost due to a rocket failure. In 2015, LightSail 1 spacecraft successfully completed a test flight. LightSail 2, which is

aimed to go into orbit, is enclosed within Prox-1, a small satellite built by Georgia Tech students, which is scheduled to deploy the sail on July 2, the Planetary Society website says.

* Ashes of the dead. Falcon Heavy's payload includes the ashes of over 150 deceased persons, one of those being astronaut Bill Pogue, who flew on Skylab in the 1970s and died in 2014. Among other items aboard, the US Air Force Research Laboratory had space weather experiments, while the National Oceanic and Atmospheric Administration has six small atmospheric experimental satellites for weather forecasting.

(Source: NASA, Planetary Society, Reuters)

<https://indianexpress.com/article/explained/nasa-spacex-atomic-clock-green-fuel-ashes-whats-aboard-falcon-heavy-5799793/>



Wed, 26 June 2019

Space station astronauts return to earth tonight:

Touchdown is scheduled for 10:47 p.m. ET

By Hanneke Weitering

Three Expedition 59 crewmembers are returning to Earth today (June 24) after spending more than six months at the International Space Station.

NASA astronaut Anne McClain, Russian cosmonaut Oleg Kononenko and Canadian Space Agency astronaut David Saint-Jacques will depart the space station in their Soyuz MS-11 spacecraft at 7:25 p.m. EDT (2325 GMT).

About three and a half hours later, they will parachute down to the steppe of Kazakhstan and touch down southeast of the town of Dzhezkazgan at approximately 10:47 p.m. EDT, or 8:47 a.m. local time (0247 GMT) on June 25. You can watch their departure and landing live here on Space.com, courtesy of NASA TV.

Before the crew climbs into the Soyuz, they will say farewell to the three remaining astronauts on board: NASA astronauts Nick Hague and Christina Koch, and Russian cosmonaut Alexey Ovchinin. Live coverage of their farewells will begin at 3:30 p.m. EDT (1930 GMT), and the crew is scheduled to close the hatch to the Soyuz at 4:10 p.m. EDT (2010 GMT).

After the crew gets situated inside their vessel, live coverage of the undocking will begin at 7 p.m. EDT (2300 GMT), or 25 minutes before the spacecraft is scheduled to depart the orbiting laboratory. The Soyuz will continue to orbit Earth while drifting farther from the station for about 2 hours and 30 minutes before the deorbit burn begins. At that time, the Soyuz will fire its engines and begin the plunge into Earth's atmosphere. The deorbit burn begins at 9:55 p.m. EDT (0155 GMT on June 25), or 53 minutes before the scheduled landing.

McClain, Kononenko and Saint-Jacques launched to the space station together on Dec. 3 and will return in the same spacecraft in which they launched. At the time, they had joined the Expedition 58 mission, but they transitioned to Expedition 59 in March after the arrival of the Soyuz MS-12 that brought up Hague, Koch and Ovchinin.

McClain, Kononenko and Saint-Jacques will have spent a total of 204 days in space, during which they went around the Earth 3,264 times and covered a distance of about 86.4 million miles (139 million kilometers).

<https://www.space.com/space-station-expedition-59-crew-landing-webcast.html>