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# Newspapers Clippings

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## A Daily Current Awareness Service

**Vol. 45 No. 06 08 January 2020**

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ThePrint

*Wed, 08 Jan 2020*

# India's ballistic missile shield ready, IAF & DRDO to seek govt nod to protect Delhi

***BMD programme envisaged for Delhi. This, along with the Russian S-400 Triumf air defence system, aims to secure India from all kinds of incoming missiles***

***By Snehesh Alex Philip***

New Delhi: India's indigenous Ballistic Missile Defence (BMD) programme is complete, and the Indian Air Force (IAF) and the Defence Research and Development Organisation (DRDO) are now working on a proposal to seek the government's nod to install the missile shield for the national capital, ThePrint has learnt.

The BMD, along with the Russian S-400 Triumf air defence system, aims to secure the country from all kinds of incoming missiles, including nuclear, and flying objects.

"The BMD programme has been completed. All tests carried so far have been successful, including the radars and missiles. The IAF, which is responsible for the country's air defence, and the DRDO, which has developed the system, will now move a joint proposal for the government's clearance," a top government official told ThePrint.

The official, however, didn't reveal much about other details of the programme.

The successful test of the anti-satellite (A-SAT) missile last March was a big boost to the BMD programme. India's leap in space with the A-SAT test is especially significant because inter-continental ballistic missiles like China's Dongfeng series travel through space before re-entering Earth's atmosphere to hit the target.

**'BMD is for Delhi'**

Asked whether the Ministry of Defence would be the nodal authority for approving the installation of the missile shield, a government source said the matter comes directly under the Prime Minister's Office.

Once the permission is granted, the source added, it will take three to four years to put the shield in place because production of the required systems would take time.

Asked if the shield is not meant for Mumbai, the country's financial capital, the top government official quoted above said, "BMD is for Delhi. It is up to the government to decide which other cities will get it."

The official added that the BMD programme was envisaged for the national capital only.

**What this BMD programme is all about**

India's BMD programme was launched in 1999 after Pakistan's maiden nuclear test in 1998 and China's leaps in this sphere.

The BMD works on two levels — endo-atmospheric (within Earth's atmosphere) and exo-atmospheric (the space stretching beyond Earth's atmosphere).

While phase one deals with destroying incoming missiles at endo-atmospheric level, phase two works on the same at exo-atmospheric level.

India's BMD arsenal consists of a Prithvi Air Defence (PAD) missile to intercept incoming missiles at a range of about 80 km in altitude and an Advanced Air Defence (AAD) missile for altitudes of 15-25 km.

Pakistan had last year claimed that it has the capabilities to counter the BMD.

Asked about this, another government source said the BMD is a state-of-the-art defence system with very unique features.

*https://theprint.in/defence/indias-ballistic-missile-shield-ready-iaf-drdo-to-seek-govt-nod-to-protect-delhi/345853/*

THE FINANCIAL EXPRESS

***Wed, 08 Jan 2020***

# Indian Army to add more firepower! Indigenous SPAD-GMS to replace obsolete guns

***When the Defence Acquisition Council (DAC) headed by defence minister Rajnath Singh meets in New Delhi next week, this issue will be on the table for discussions***

***By Huma Siddiqui***

India plans to get indigenous Self Propelled Air Defence Gun Missile System (SPAD-GMS) replace 1360 obsolete Bofors L 70 40mm single barrel and Soviet-era ZU-23-2 towed 23 mm twin-barrel weapon systems. “The Indian Army is keen on acquiring an indigenous system which is more efficient and was being developed simultaneously when the global tender was floated in 2013.” When the Defence Acquisition Council (DAC) headed by defence minister Rajnath Singh meets in New Delhi next week, this issue will be on the table for discussions.

While the upgraded Tunguska system fielded by Almaz Ante and Pantsir by KBP Tula systems both of Russia failed during trials, South Korea’s Hanwha Defense Systems — Hybrid Biho system was not fully compliant during the trials carried by the Indian Army.

A senior officer who wished to remain anonymous said that “The specifications laid down in the Request for Proposals (RfP) remain unfulfilled by both sides.” In fact, the Russian have been raising their concerns since 2018 at various meetings in the Ministry of Defence after the Korean company emerged as the sole qualifier during trials.

The Financial Express Online had reported in November last year that Russian side will raise the issue when defence minister Rajnath Singh had visited that country. “The qualification of the Hanwha System is being re-looked as there are some concerns that it is not fully compliant,” said the senior officer quoted above.

Several presentations have been made against the South Korean company to the Ministry of Defence (MoD) and issues related to the non-compliance has been pointed out.

**Issues likely to be discussed**

From the five initial bidders, Russian and the South Korean Company made it to the trials. But both Russian companies failed the trials. And, now it is a single vendor deal.

In the deal which is around $ 3 billion, according to sources the system being offered by the Korean company is one generation older and will need to be upgraded immediately.

The equipment being offered does not clearly meet all the requirements as mentioned in the RfP which clearly mandates that the guns need to be controlled by the radar.

"The bigger issue with the K-30 Biho (Flying Tiger) twin 30mm short-range mobile self-propelled anti-aircraft system of Hanwha System is that it does not have fire control radar as required in the RfP. And it can track targets only during the fair weather. And, not only is it outdated it is also a generation old."

However, the Russian Pantsir fielded by KBP Tula systems is new generation and come equipped with 3 D radar with the capability of picking up small objects including drones. But, it did not clear the 30-degree gradient test.

The global tender was floated in 2013 and the Indian Army had then shortlisted three companies including South Korean Hanwha Defense Systems –Hybrid Biho system, and two Russian companies: Almaz Ante's upgraded Tunguska system, and KBP Tula's Pantsir system.

**What does the Indian Army want?**

From the time it floated the global tender it was looking for both gun and missiles. These could either be mounted on either one or separate high mobility vehicles.

Both the gun, as well as the missile, should have the capability which will allow it to engage aerial targets with and without the fire control radar, either simultaneously or independently.

The plan is to procure five regiments. These will have 104 systems including of gun missiles systems. These will come with 4,928 missiles and 172,260 rounds of ammunition.

If and when the contract is inked, the company has to fully transfer the maintenance technology to the state-owned Ordnance Factory Board.

There is a need for day and night camera functionality and a built-in simulator.

While the gun should have the capability to engage a target at 350 rounds per second, the missile should have a range of five kilometres.

Should be able to operate up to 50 Kms on a single fuel tank up, and without refuelling last up to eight hours. There are plans to eventually indigenously develop under the Buy-and-Make (Indian) category of the Defence Procurement Procedures (DPP).

*https://www.financialexpress.com/defence/indian-army-to-add-more-firepower-indigenous-spad-gms-to-replace-obsolete-guns/1815848/*

THE WEEK

***Wed, 08 Jan 2020***

# India's plans for the Reaper drone and the Hellfire missile that killed Soleimani

***The IAF already has the Hellfire and is planning to acquire the Predator drone***

***By Prejomon Sunny***

The MQ-9 Reaper drone and the Hellfire missile: One a high-flying, silent and deadly unmanned aircraft that made its first appearance in 2001, the other a staple missile of US military aircraft since the 1980s.

The combination of the Reaper and the Hellfire is what reportedly killed Iranian general Qassem Soleimani on January 3. In a post-midnight operation, the remotely-piloted MQ-9 launched two Hellfire missiles at Soleimani's car and convoy, killing 10 in total.

The Reaper is no stranger to targeted assassination missions. In November 2015, it was used to kill ISIS member Mohammad Emwazi—otherwise known as 'Jihadi John'—while he was traveling in a vehicle in Raqqa, Syria.

Given the platform's proven capabilities, India has been in talks with the US for years now to acquire it. Most recently, in August, it was reported that India planned to tailor the UAV for use by all three services of the Indian Armed Forces.

In addition, the Hellfire missiles made their way into Indian armories after the acquisition of AH-64 Apache helicopters, whose primary munition is this missile.

The Reaper drone, developed by General Atomics Aeronautical Systems, is an unmanned aerial vehicle (UAV) capable of remotely controlled or autonomous flight operations. According to the US Air Force, the MQ-9 Reaper is an “armed, multi-mission, medium altitude, long-endurance” aircraft primarily designed for offensive strikes.

With a wingspan of 66 feet and the capability to cruise at roughly 230 mph (482 kph), the UAV can also conduct surveillance, and assist in search and rescue missions. An improvement over its predecessor, the MQ-1 Predator, in terms of size and robustness, Reaper drones have become the reliant carrier for launch munitions in order to annihilate targets. The US Air Force is in possession of 93 units of the Reaper drones.

India’s tryst with Reaper drones began way back in 2016—when news regarding India’s planned acquisition of Reapers first surfaced. Initially, India’s intention was to acquire 22 naval variants of the Predator B drone, called the Sea Guardian, for the Indian Navy. In 2019, a report in the *Breaking Defense* website claimed that the Pentagon and Indian Ministry of Defence were working together to “tailor” standardized versions of the Predator B Reaper drone for use by all three armed services. The Reaper drones could be the new addition to the line of drones operated by the Indian Army, which includes the Israeli Harop attack drone and the Heron surveillance drone.

The US’s designation of India as a Major Defence Partner has made it easier for India to facilitate faster negotiations for acquisitions of military equipment from the superpower. The goal of the designation was to create a tighter defence participation between India and the US and to promote better cooperation and coordination in the field of defence and security.

The AGM-114 Hellfire missiles are air-to-ground, laser-guided, subsonic missiles with significant anti-tank capacity. The Hellfire missiles have several variants, depending on its warhead, guidance system, and its physical variations. A latest and peculiar addition to the line of Hellfire missiles is the Hellfire R9X that uses pop-out sword blades to kill targets with minimal collateral damage—designed for targeted killings. According to Al Arabia, this may have been the variant of the Hellfire missile used to assassinate Soleimani.

In the US, the carriers of these missiles vary according to the armed services—the Air Force carries Hellfire missiles in its Predator and Reaper drones, while the Army carries it in its Apache helicopters.

In 2015, the IAF announced a deal for 22 Apache choppers, equipped with fire-and-forget Hellfire missiles, at a cost of $1.4 billion. The Army soon followed up with its own order for six aircraft in 2018, for $930 million. In late 2019, it was reported that India was set to sign a $930-million deal with the US government for six Apache attack helicopters, with the similar Hellfire missile variant, for the army, under the US foreign military sales programme. The induction process of these helicopters into the Air Force is currently in progress.

The induction of these drones and missiles into the Indian military, both systems being in line with the latest technological advancements in warfare and combat, signifies India’s progress towards modernising its military capabilities. The signing of COMCASA and the acquisition of Major Defence Partner status have also helped India acquire such technologies from the US.

*https://www.theweek.in/news/india/2020/01/07/indias-plans-for-the-reaper-drone-and-the-hellfire-missile-that-killed-soleimani.html*

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

*Wed, 08 Jan 2020*

# Adani buys unit in Gwalior to enter small arms business

***The Adani Group has entered the small arms business with the acquisition of a facility in Gwalior that will produce machine guns, carbines and other weapons for the local and export markets***

***By Manu Pubby***

New Delhi: The Adani Group has entered the small arms business with the acquisition of a facility in Gwalior that will produce machine guns, carbines and other weapons for the local and export markets.


The acquisition – through a joint venture in which Israeli manufacturer IWI holds a 49% stake – will help the group acquire capabilities ranging from UAVs to helicopter systems to major aero structures.

Sources said the transfer of ownership of PLR was done late last year after Punj Llyod sold its share to a third company that was then picked up by the Adani Group. “It is important to give an impetus to Make in India. We looked for what our customers need and there is an immediate requirement for small arms and ammunition,” Ashish Rajvanshi, Head of Adani Defence & Aerospace, told ET.

Sources said the entity is poised to pick up major orders from the defence ministry, with final discussions underway for 16,400 light machine guns for which IWI is the lead contender. The acquisition under the fast-track procedure is likely to be taken up by the Defence Acquisition Committee later this month while a larger competition for 41,000 guns is also underway. Besides, paramilitary forces and state police, too, have requirements for these small arms.

“Addressing the requirement of small arms for 1.2 million Army personnel, and a similar number for paramilitary and state police is essential for their self-reliance...,” Rajvanshi said.

The Gwalior facility was inaugurated in March 2017 and was the first Indian private sector company that started manufacturing small arms and ammunition.

The facility is designed to manufacture a range of weapons including the Tavor Assault Rifle (already in use by special forces), the X 95 Assault rifle, Galil sniper rifles, Negev LMGs and Uzi sub machine guns. The first set of Indian manufacture X 95 rifles were rolled out by the facility in October 2018.

The Adani Group said that is it looking at acquiring key technologies to manufacture small arms domestically. “We are moving the assembly line for some of the most critical parts of the guns to the Indian facility,” Rajvanshi said.

As reported by ET, the Adani group has strong plans for its defence business, starting with the acquisition of Bangalore-based Alpha Design Technologies and setting up of a new manufacturing facility in Hyderabad to make Hermes 900 drones in collaboration with Israel's Elbit Systems.

The company has already been shortlisted as a potential strategic partner for the Naval Utility Helicopter (NUH) contract and is also making a bid for the multibillion dollar project to build next generation conventional submarines in India under the P 75 (I) project.

*https://economictimes.indiatimes.com/news/defence/adani-buys-unit-in-gwalior-to-enter-small-arms-business/printarticle/73147568.cms*

THE TIMES OF INDIA

*Wed, 08 Jan 2020*

# 'CDS a positive development… next logical progression would be towards creating joint theatre commands'

***By Nalin Mehta***

General Bipin Rawat's appointment as India's first Chief of Defence Staff is a big reform in defence management. Anit Mukherjee, assistant professor at Nanyang Technological University and author of The Absent Dialogue: Politicians, Bureaucrats and the Military in India, talks to Nalin Mehta about it:

**To what extent will the CDS matter?**

The recently unveiled plans for the CDS, heading the newly created Department of Military Affairs (DMA) as well as the Integrated Defence Staff, and with a mandate to create joint theatre commands is a positive development as it suggests an empowered office. But I think the devil will be in the details, and so I will wait for more clarity on the staffing and responsibilities of this DMA which, to the best of my knowledge, would be unique to India. We should therefore give this experiment a year or so to get a better idea of what's working. I would urge the CDS to come up with a road map for reforms or a vision document within the first six months, as it would be important to set the agenda and keep up with the reform initiatives.

**What is the biggest problem for India's military effectiveness?**

Military effectiveness, in academic literature, is difficult to define or measure and is shaped by a variety of factors. While acknowledging these limitations my book focusses on the role of civil-military relations in shaping five factors most closely associated with military effectiveness: weapons procurement, jointness, professional military education, officer promotion policies and defence planning. I find that India's pattern of civil-military relations creates problems in each of these. For instance, a lack of informed civilian intervention has created problems in jointness, defence planning and in military education.

At the same time, the military is not as influential, especially in its interactions with the Department of Defence Production. Moreover, relations between civilian bureaucrats and military officers are often characterised by mistrust and downright hostility. In short, there is no single biggest problem with India's military effectiveness but a combination of factors across different bureaucracies so that the sum is less than its parts. Crucially, reforms are needed not only to professionalise the MoD, which is woefully short of military expertise, but also in the service headquarters.

**How does India's pattern of civil-military relations compare with other advanced liberal democracies?**

On the whole India's pattern is generally favourable as it has maintained a professional and apolitical military. The biggest difference is the dissonance, and the lack of trust, between civilians and the military. This is because of the 'us and them' sentiment that has seeped into the system because of the civilian dominated defence ministry seemingly lording over the military dominated service headquarters. I think addressing this issue, in conjunction with other reforms, has the potential to transform civil-military relations for the better.

**Why has tension between the military and bureaucracy persisted and what needs to change?**

These tensions persist because of three main factors. First, apart from a short period around the 1962 war, the political class does not think that India faces an existential threat. They are therefore comfortable with the current model of civilian control, despite its widely acknowledged deficiencies. Second, the intricacies of defence policies and civil-military relations have very low salience in electoral politics. Few politicians therefore invest the time, energy and resources to keep abreast of these matters and ask well-informed questions. Finally, the current pattern of civil-military relations is convenient to all and no one wants to change the status quo. Civilians are somewhat apprehensive that restructuring defence organisations may inadvertently empower the military. In turn, the military also enjoys significant autonomy within their institutions and are wary of civilian intervention.

In terms of what needs to change – fundamentally we need to rethink our approach towards national security. Apart from military crises, defence fetches sporadic attention. We need to move beyond political symbolism and grandstanding, which most parties indulge in – to a more reasoned dialogue on the strengths and the weaknesses of our current structures. To do so, however, we must have more information than what our bureaucracies share. Many analysts have incessantly argued about the need for declassification procedures, but sadly no one in our political class cares about it as much. A culture of openness will create conditions for a frank and well-informed dialogue.

**What reforms should follow?**

Now that the CDS is in place, the next logical progression would be towards creating joint theatre commands. In addition to changing the prevailing single service approach, professional military education requires serious attention, and the proposed National Defence University offers an opportunity. After that the focus should shift towards service specific reforms. For the army, one must accept that the current levels of manpower will not allow for military modernisation. The navy and air force need to build up their capital assets, but questions need to be asked about the desirability of capital-intensive platforms, like aircraft carriers, versus investing in drones and emergent technologies.

**What are the big differences in pay and allowances between the military and the civilian bureaucracy and why has this added to distrust?**

Since the report of the third pay commission in 1973, the military has felt let down by successive pay commissions. The 'anomalies', as the military terms it, relate not just to pay and allowances – which discriminate against the military vis-à-vis civilians, but also affect precedence. This therefore shapes the equivalence between civilian and military officials. As a result, in organisations where the two have to work together – like the Ministry of Defence, National Security Council Secretariat, etc. these is a confusion and some heartburn over equivalence, seniority, pay and allowances. These issues unfortunately accentuate the 'us and them' sentiment and the distrust between the two.

**Do we need greater integration between the military and paramilitary forces? Should soldiers be sidestepped after a certain age to police and paramilitary forces to keep the military young?**

The idea of integration and sidestepping of soldiers from the military to paramilitary organisations has been debated for a long time. In 2008 the Sixth Pay Commission specifically recommended 'lateral movement' from the military to Central Para

Military Forces (CPMFs). However this idea is unpopular with the CPMF's and they have successfully resisted its implementation. Instead of pitting the two bureaucracies, perhaps a more useful approach would be to sidestep soldiers to central and state police forces and other security

organisations. Not many know that Tukaram Omble – one of the heroes of 26/11 was a former Naik in the Indian army. It is beyond a measure of doubt that Indian army veterans have qualities that would stand out in jobs involving risk, discipline and service, and perhaps the government should undertake measures to make such a shift possible.

**What changes do we need in our weapons procurement procedures?**

There have been numerous attempts at writing Defence Procurement Procedures and there have been some improvement in a number of areas. Moreover there has been a welcome push towards embracing the logic of indigenisation, corporatisation (currently under consideration for Ordnance Factories) and private sector participation. However all three processes have not gone far enough. In addition, there are some recurring problems of duplication of functions and lack of qualified expertise in both the service headquarters and the defence ministry, complicated and cumbersome bureaucratic procedures and an absence of ownership. We need a closer, dispassionate scrutiny of the role, functioning and capabilities of all stakeholders involved in the procurement procedures. Without this there will be no end to endless finger-pointing and a passing of the buck with India and its military being the biggest losers in this process.

*https://timesofindia.indiatimes.com/blogs/the-interviews-blog/cds-a-positive-development-next-logical-progression-would-be-towards-creating-joint-theatre-commands/*

THE HINDU

***Wed, 08 Jan 2020***

# Army gets working on Government Owned Contractor Operated model to improve efficiency

***A Request For Information was issued to shortlist service providers with experience in "warehousing, logistics and supply chain management" for Central Ordnance Depot, Kanpur***

***By Dinakar Peri***

New Delhi: The Army has initiated the process of identifying potential industry partners to implement the Government Owned Contractor Operated (GOCO) model for its base workshops and ordnance depots intended to improve operational efficiency.

A Request For Information (RFI) was issued to shortlist service providers with experience in "warehousing, logistics and supply chain management" for Central Ordnance Depot (COD), Kanpur. Separately, the Army's Master General of Ordnance (MGO) began evaluating the GOCO model for Army Base Workshops (ABWs) to drive "higher operational efficiencies" and PricewaterhouseCoopers Pvt. Ltd. (PwC) hired as a consultant to run this engagement is scheduled to hold conferences and consultations with the industry.

"The agenda of these interactions would be to understand from interested industry participants their views on opportunities envisaged and issues/concerns if ABW(s) were to be run under GOCO model," a notice issued by the Army says and the last date to send responses is January 10.

The eight ABWs identified are located in Delhi, Jabalpur (Madhya Pradesh), Kankinara (West Bengal), Allahabad, Agra and Meerut (Uttar Pradesh**)**, Kirkee near Pune and Bengaluru.

The tasks undertaken by these workshops include depot level (D level) repairs and overhaul of T-72 and T-90, guns, mortars and small arms, vehicles, communication systems, radars, air defence systems, armoured personnel carriers and manufacture of spares (indigenisation) and overhaul of aviation rotables.

The GOCO model was one of the recommendations of the Lt. Gen. DB Shekatkar (Retd.) committee to “enhance combat capability and re-balancing defence expenditure.” Based on the recommendations, the government has “decided to disband two advance base workshops, one static workshop and four ordnance depots” and eight ABWs are recommended to be corporatised on GOCO model.

The RFI dated December 19, 2019 aims “to shortlist Service Providers of repute with experience in warehousing, logistics and supply chain management and the last date for submitting responses “will be six weeks from the date of posting of the RFI...”

“The selected Service Provider will take over present infrastructure and related services from COD Kanpur on “as-it-is-and-where-it-is basis”. Maintenance of complete infrastructure will be thereafter the responsibility of the service provider,” the RFI states.

The existing civilian manpower/workforce will have to be absorbed by the selected Service Provider, it added. The functions of COD Kanpur envisaged for outsourcing under the GOCO model include warehousing operations, transportation of stores and area maintenance.

The service provider should be an Indian registered company with at least 10 years of working experience in related domains and have an average annual turnover of ₹ 50 crore for each of the last three financial years.

The total range of inventory of COD Kanpur is about 4045 items and on an average holds approximately 70,000 tonnes of stores at any given point of time, the RFI states. It consists of different types of clothing, footwear, headgear and tentage items, camping items, kitchen equipment and supply dropping equipment.

*https://www.thehindu.com/news/national/army-gets-working-on-government-owned-contractor-operated-model-to-improve-efficiency/article30506622.ece*

TIMESNOWNEWS.COM

*Wed, 08 Jan 2020*

# ISRO to set up training facility at Challakere: Why is this small Karnataka town called India's science city?

***In 2009, the Indian government announced plans to allocate 10,000 acres in the small village towards the development of military, scientific and commercial infrastructure***

***KEY HIGHLIGHTS***

- ***The last decade has seen a slew of major infrastructural projects take place at Challakere. In 2009, the government had declared its intention to turn the town into a 'Science City'***
- ***The Indian Institute of Science campus at the village focuses predominantly on renewable energy research and rain water harvesting techniques***
- ***In 2015, representatives from the IISc campus announced that a solar research centre and a thermal power plant were already operational***

Chairman and Secretary of the Indian Space Research Organisation (ISRO) K. Sivan revealed plans, on 5 January, to build a world-class facility to train India's astronauts in the small village of Challakere in Karnataka's Chitradurga district. ISRO has put forward a master plan to create high-end training infrastructure worth Rs 2700 crore, that will serve as the site of its Human Space Flight Centre. The facility, according to Sivan, will be established within the next three years.

The last decade has seen a slew of major infrastructural projects take place at Challakere. In 2009, the government had declared its intention to turn the town into a 'Science City', diverting approximately 10,000 acres of land in the farming village towards the development of commercial, scientific and military facilities. Challakere is now home to a township that includes divisions of the ISRO, Defence Research and Development Organisation (DRDO), Indian Institute of Science, as well as the Bhabha Atomic Research Centre. It is also, reportedly, home to a private corporation called Sagitaur, working on the development of solar technology.

The DRDO has stationed two of its Unmanned Aerial Vehicles (UAVs) – the Rustom-1 and Rustm-2 TAPAS (Tactical Advanced Platform for Aerial Surveillance) – at its Aeronautical Test Range in Challakere. It was reported that once the ATR becomes fully operational, the DRDO will conduct tests to improve its air-to-ground weapons technology, electric warfare flares, aerostats, and parachutes. As per the National Green Tribunal, the DRDO has pledged not to conduct any ballistic tests or airline operations at the facility.

The Indian Institute of Science campus at the village focuses predominantly on renewable energy research and rainwater harvesting techniques, reportedly, conducted in tandem with the locals. In 2015, representatives from the IISc campus announced that a solar research centre and a thermal power plant were already operational. Two check dams for rainwater harvesting were also being constructed.

In 2018, an American foreign policy journal had also alleged that the BARC facility in Challakere was being used to carry out uranium enrichment operations. Officials from the Department of Atomic Energy in New Delhi were quick to allay fears though, stating that the Challakere campus was a “special material enrichment” facility housing only civilian nuclear plants.

*https://www.timesnownews.com/technology-science/article/isro-to-set-up-training-facility-at-challakere-why-is-this-small-karnataka-town-called-indias-science-city/536816*

hindustantimes

*Wed, 08 Jan 2020*

# India's first manned mission Gaganyaan may take 1 astronaut

***PM Modi announced the space mission from the ramparts of the Red Fort on August 15, 2018, saying that "an Indian son or daughter" will carry the national flag on the trip when the country celebrates its 75th year of Independence in 2022***

***By Anonna Dutt***

Bangaluru: Indian Space Research Organisation (ISRO) Chief K Sivan detailed the country's first manned mission to space on Tuesday, saying the four men shortlisted for the programme will receive physical fitness training in Russia for 11 months, but the first spaceflight in December 2021 may carry just one person.

Under the mission, named Gaganyaan and expected to cost ₹ 10,000 crore, India is expected to send astronauts, all Indian Air Force pilots, to the low earth orbit, an earth-centred orbit with an altitude of 2,000km where most of the manmade objects in outer space are placed.

Prime Minister Narendra Modi announced the space mission from the ramparts of the Red Fort on August 15, 2018, saying that "an Indian son or daughter" will carry the national flag on the trip when the country celebrates its 75th year of Independence in 2022.

Sivan, however, confirmed on Tuesday that all astronauts shortlisted for the trip were men. "I cannot reveal the identities of the four individuals shortlisted for the Gaganyaan mission, but all of them are men," the ISRO Chief told HT.

The astronauts will likely begin their training in Russia from the third week of January, the Indian space agency has said.

In Russia, the astronauts will receive physical fitness training in different types of environments to help them acclimatise to travelling in space. "The astronauts will undergo the physical fitness training in Russia for 11 months, after which they will receive module specific training in India. In that, they will train in the crew and service module designed by us, learn to operate it, work around it, do simulations," Sivan said.

The ISRO Chief said Mysuru-based Defence Food Research Laboratory (DFRL) was preparing a food menu for the mission. "The food for the astronauts is being developed by DFRL. Apart from that, a number of DRDO labs are helping with various aspects of the mission. The space suit is also being designed; Russian help is being taken for that," Sivan said.

News agency ANI tweeted that DFRL prepared food items including egg rolls, vegetarian rolls, idlis, moong dal halwa and pulao, along with a food heater. HT could not independently verify the list of food items being developed.

Sivan said that even though all four people will receive the complete training, it was likely that only one person would go to space during the first mission, which is scheduled for December 2021.

"We are designing the mission for three people to go to low earth orbit for seven days. However, whether we send two people or one person and whether they spend seven days in the orbit or one will be decided later on in the mission after the two unmanned flights. Usually, the first flight is very crucial and even countries such as the USA, Russia, and China sent only one person for the first time and for a very short time – one orbit, or one day, or even like the USA did only part of the orbit," said Sivan.

The design of the crew and the service module, which will together form the Gaganyaan spacecraft, has been also been completed, the ISRO chairperson said.

"The design for the launch vehicle that will be human-rated has also been completed. This is all on paper; the realisation hasn't started yet. Once the realisation starts, the first model will come and it will go for qualification then the flight model will be made most likely by December this year. When you are planning a mission with humans, all systems have to be more robust; failure rate has to be low," said Sivan.

India's heaviest launch vehicle, the GSLV Mark III, referred to as "Bahubali", will carry the module with astronauts to space. It has been redesigned to have a four-metre payload faring (the top of a launch vehicle where the spacecraft is housed).

The mission will take off from the second launch pad at the Satish Dhawan Space Centre at Sriharikota. The launch pad is also being remodelled to allow for human presence. Currently, no one is allowed beyond a distance of around 6km from the launch vehicle once the fuelling has taken place.

A committee of external experts has been set up to review the systems and check for robustness. "Usually, for other missions, the review is done by ISRO people, but since humans are involved in the mission, a committee of external experts will review the work," said Sivan.

A humanoid robot that will be sent on the unmanned flight is also taking shape. "This humanoid will basically mimic human functions, will record parameters such as blood pressure, heart rate, etc. This is getting ready. The two unmanned flights will let us ensure whether everything is working well, whether the environment in the modules are controlled, whether it is safe for humans. Like any programme, after two successful test flights, we will undertake the operational flight," said Sivan.

*https://www.hindustantimes.com/india-news/india-s-first-manned-mission-gaganyaan-may-take-1-astronaut/story-nh095IVken3trSu0V1wVnK.html*

The Indian EXPRESS

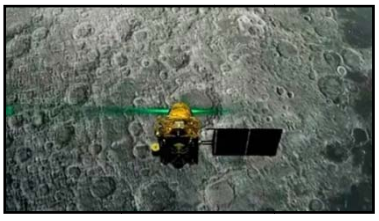
***Wed, 08 Jan 2020***

# Chandrayaan-2: Vikram lander spun out of control midway to landing site, ISRO could only watch

***With the communication system on the failed lander supplying data on its performance right up to 400 metres before crashing on the surface of the moon, ISRO is now confident that the errors that occurred will be corrected during Chandrayaan-3, which has been cleared for launch in 14-16 months***

***By Johnson T A***

The Chandrayaan-2's Vikram lander ended up spinning over 410 degrees, deviating from a calibrated spin of 55 degrees, and making a hard landing on the moon, according to ISRO scientists. The anomaly, which occurred during the second of four phases of the landing process, was reflected in the computer systems in the mission control room, but ISRO scientists could not intervene to correct it as the lander was on autonomous mode, using data already fed into its system before the start of the powered descent.



The Indian Space Research Organisation's maiden attempt at a soft landing on the moon failed on September 7, 2019, as it lost contact with the lander during its controlled descent.

With the communication system on the failed lander supplying data on its performance right up to 400 metres before crashing on the

surface of the moon, ISRO is now confident that the errors that occurred will be corrected during Chandrayaan-3, which has been cleared for launch in 14-16 months.

“There is a lot of data that we have been able to get from the analysis of the hard-landing of the Vikram lander, since data is available right upto 400 metres before the landing. This data is valuable for ensuring the success of the next mission,’’ said a senior ISRO scientist.

On January 1, in his first official statement on what caused the hard landing, ISRO Chairman K Sivan said it was the result of a less than optimal reduction in velocity of the lander during a second “camera coasting phase’’ for the soft landing.

“What really happened in Chandrayaan-2 was that in the powered descent phase. which contained four phases. everything went alright in the first rough braking phase, which is the major phase. In the second phase, which was the ‘camera coasting phase’, the velocity was not reduced to the amount it was supposed to be reduced, and so velocity was more than required,’’ Sivan said.

“The next ‘fine braking phase’ was not able to handle the large velocity… the velocity was beyond the designed limit of the navigation guidance and control system; it could not take care of the system and it finally ended up in a hard landing,’’ said Sivan.

The Vikram lander was equipped with five thrusters to regulate its landing process. Earlier, Minister of State in the Prime Minister’s Office Jitendra Singh had said, in a reply to a question in Lok Sabha, that a malfunction in the second phase of the landing had caused the hard landing.

“The first phase of descent was performed nominally from an altitude of 30 km to 7.4 km above the moon surface. The velocity was reduced from 1683 m/s to 146 m/s. During the second phase of descent, the reduction in velocity was more than the designed value. Due to this deviation, the initial conditions at the start of the fine braking phase were beyond the designed parameters. As a result, Vikram hard-landed within 500 m of the designated landing site,’’ he had said.

In September 2019, ISRO had said the lander “followed the planned descent trajectory from its orbit of 35 km to just below 2 km above the surface. All the systems and sensors of the lander functioned excellently until this point and proved many new technologies such as variable thrust propulsion technology used in the lander.’’

The frozen screens at the Chandrayaan mission control had, on September 7, 2019, shown that communication was lost when the lander was barely 335 metres from the surface of the moon, moving with a vertical velocity of 59 metres/sec or 212 km/hr and a horizontal velocity of 48.1 m/sec or 173 km/hr, around 1.09 km from the designated landing spot.

As per the original plan, the Vikram lander should have lost most of its velocity when it was 400 metres away from the moon’s surface, and should have been hovering over the intended landing site, but the data frozen at the mission control indicates it was still moving at speed despite crossing the threshold for a soft vertical descent at a “walking pace’’.

The 15-minute process of reducing the velocity of the Vikram lander from 1680 m/sec (about 6000 km/hr) to 0 m/sec to enable a soft landing was into its 12th minute when the screens at the mission control froze, with messages on the giant screens indicating loss of communication with the lander.

ISRO has now begun working on Chandrayaan-3, with the errors that occurred in the Chandrayaan-2 landing process identified and ready to be corrected. “The data we have got from Chandrayaan-2 mission, including the failed landing, is invaluable. Nobody will provide this kind of data for a space mission. It has been a great learning experience,’’ an ISRO scientist said.

“The activity on Chandrayaan-3 is going on very smoothly. The configuration of Chandrayaan-3 will be almost similar to Chandrayaan-2. The only difference is that in Chandrayaan-2, we had orbiter, lander and rover configuration. In Chandrayaan-3, the orbiter that is already functional from the Chandrayaan-2 project will be used. Chandrayaan-3 will have a lander and rover with a propulsion module. We have initiated this project,’’ Sivan said last week.

The cost of Chandrayaan-2 was Rs 978 crore (Rs 603 crore for the spacecraft, Rs 375 crore for the GSLV Mk III rocket launcher) while the cost of Chandrayaan-3 mission is estimated at Rs 250 crore.

*https://indianexpress.com/article/technology/science/chandrayaan-2-vikram-lander-landing-site-isro-k-sivan-6205269/*

THE TIMES OF INDIA

***Wed, 08 Jan 2020***

# NASA planet hunter finds Earth sized world in 'Goldilocks zone'

Washington: Nasa said Monday that its planet hunter satellite TESS had discovered an Earth-sized world within the habitable range of its star, which could allow the presence of liquid water.

The planet, named "TOI 700 d", is relatively close to Earth- only 100 light years away, NASA's Jet Propulsion Laboratory announced during the annual American Astronomical Society meeting in Honolulu, Hawaii.

TESS was designed and launched specifically to find Earth-sized planets orbiting nearby stars," said Paul Hertz, NASA astrophysics division director.

TESS initially misclassified the star, which meant the planets appeared larger and hotter than they actually are. But several amateur astronomers, including high school student Alton Spencer -- who works with members of the TESS team - identified the error.

"When we corrected the star's parameters, the sizes of its planets dropped, and we realized the outermost one was about the size of Earth and in the habitable zone," said Emily Gilbert, a graduate student at the University of Chicago.

The discovery was later confirmed by the Spitzer Space Telescope.

A few other similar planets have been discovered before, notably by the former Kepler Space Telescope, but this is the first discovered by TESS, which was launched in 2018.

TESS stabilizes on one area of the sky to detect whether objects- planets- pass in front of stars, which causes a temporary drop in the stars' luminosity. This allows TESS to infer the presence of a planet, its size and orbit.

Star TOI 700 is small, about 40 percent of our Sun's size and only about half as hot.

TESS discovered three planets in orbit, named TOI 700 b, c and d. Only "d" is in the so-called habitable zone, not too far from and not too close to the star, where the temperature could allow the presence of liquid water. It is about 20 percent larger than Earth and orbits its star in 37 days. "d" receives 86 percent of the energy that Earth receives from the Sun.

It remains to be seen what d is made of. Researchers have generated models based on the size and type of star in order to predict d's atmospheric composition and surface temperature.

In one simulation, NASA explained, the planet is covered in oceans with a "dense, carbon-dioxide-dominated atmosphere similar to what scientists suspect surrounded Mars when it was young. "

The planet is tidally locked to the star, meaning that one side always faces the star, as is the case with the Moon and Earth. This synchronous rotation meant that, in another model, one side of the planet was constantly covered in clouds. A third simulation predicted an all-land world, where winds flow from the planet's dark side to its light one.

Multiple astronomers will observe the planet with other instruments, in order to obtain new data that may match one of NASA'S models.

*https://timesofindia.indiatimes.com/home/science/nasa-planet-hunter-finds-earth-sized-world-in-goldilocks-zone/articleshow/73134670.cms*