

# समाचार पत्रों से चयित अंश Newspapers Clippings

दैनिक सामयिक अभिज्ञता सेवा  
A Daily Current Awareness Service

Vol. 44 No. 241 14-16 December 2019



रक्षा विज्ञान पुस्तकालय  
Defence Science Library  
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केन्द्र  
Defence Scientific Information & Documentation Centre  
मैटकॉफ हाऊस, दिल्ली - 110 054  
Metcalf House, Delhi - 110 054

## Rs 26k-crore order for building Tejas Mark 1A to open door for Mark 2

*The first of a two-part series focuses on how Tejas Mark 1A will act as a bridge between the Tejas Mark 1 and the Mark 2 fighter*

*By Ajai Shukla*

New Delhi: After months of negotiations, the Indian Air Force (IAF) and Hindustan Aeronautics Ltd (HAL) have fixed the price of the Tejas Mark 1A light combat aircraft (LCA) at about Rs 310 crore per fighter, say Ministry of Defence (MoD) sources involved in the negotiations.

Now HAL is awaiting a formal contract, worth some Rs 26,000 crore for building 83 Tejas Mark 1A fighters that the MoD has already green-lighted for purchase. According to the agreed schedule, delivery of the Mark 1A will begin 36 months after the contract date. If the order is placed at the start of 2020, Tejas Mark 1A deliveries will start in 2023. With 16 fighters to be delivered each year it would take another five years to deliver all 83 fighters – that is by 2028.



“We should be signing the contract very soon”, IAF boss, Air Chief Marshal RKS Bhadauria, had said on October 4. That is now imminent.

Girish Deodhare, Chief of the Aeronautical Development Agency (ADA) – the Defence R&D Organisation (DRDO) agency responsible for the Tejas programme – spoke exclusively to Business Standard about the Tejas Mark 1A fighter. He described it as a bridge between the current Tejas Mark 1 and the Mark 2 fighter that ADA is developing. He says the latter will be, from the standpoint of size, sophistication and capability, far superior to the Mark 1 fighter.

While the Mark 1A light fighter will have the same fuselage and General Electric (GE) F-404 engine as the Mark 1, the Mark 2 will be a significantly larger medium fighter with the more powerful GE F-414 engine.

“Initially the Tejas Mark 2 was planned to be just a re-engined Mark 1 (with a more powerful engine). However, with the advent of the Mark 1A, it was decided that Tejas Mark 2 would be configured with significantly higher capabilities. While the ‘all up weight’ (maximum take-off weight, with fuel and weapons) of Tejas Mark 1 is 13.5 tonnes, the Mark 2 will be 17.5 tonnes, taking it into the medium weight category. It will also carry an 85 per cent higher weapons load,” said Deodhare.

While ADA is developing the Mark 2 fighter, HAL is building the Mark 1A, with ADA contributing its expertise in avionics, flight controls, aerodynamics and structural analysis. While the Tejas Mark 2 will be almost a generation ahead of the Mark 1 fighter, even the interim Tejas Mark 1A will be far more capable.

The IAF has demanded five new capabilities in the Mark 1A, including “active electronic scanned array” (AESA) radar, with multi-tasking capability that would give it a clear combat edge over Pakistan’s entire fighter fleet, and most of China’s as well.

“The initial batches of the Tejas Mark 1A mayfield an imported AESA radar, but the DRDO is developing its indigenous Uttam AESA radar. As soon as it is proven, the Uttam will start equipping the Tejas Mark 1A,” said Deodhare.

The Uttam AESA radar is already flying on a Tejas prototype and has completed 11 successful test flights. “We need to do a couple of more years of flight testing before it is certified and ready for production. Thereafter, all Tejas Mark 1A will incorporate the indigenous radar”, he said.

This incremental approach is also evident in the “digital flight control computer” (DFCC) – a fighter aircraft’s brain – that ADA has designed and qualified for the Tejas Mark 2. The upgraded DFCC is ready and qualified, but it could not go into the Mark 1A because it was built bigger to allow easier maintenance access in the larger Mark 2 fighter.

“We took the upgraded cards from the Tejas Mark 2’s DFCC and installed them into the smaller Mark 1 DFCC chassis, effectively upgrading it for the Mark IA. The new Mark 1A DFCC will have significantly higher processing power allows us to add many more advanced capabilities in the FCS,” said Deodhare.

In addition, the Tejas Mark IA is being upgraded with a “self-protection jammer” (SPJ), also supplied by Elta, which the IAF has demanded in order to confuse incoming missiles. Each Mark 1A fighter will carry a SPJ on a pod under its wing, sharing a mounting station with an air-to-air missile.

Giving the Tejas Mark 2 the contemporary look of the Rafale and Eurofighter, it will be built with canards on the front of the fuselage. These fin-like structures serve to make the aircraft unstable, and therefore more manoeuvrable. Deodhare says ADA decided to fit canards after discovering that increasing the Mark 2’s internal fuel capacity to 3300 kilogrammes (from 2400 kg in the Mark1) made the fighter excessively stable. Designing canards near the nose of the aircraft regained its manoeuvrability.

“We are targeting the first flight of the Tejas Mark 2 by 2023. We are confident of this since most of the technologies that will go into it are already matured through LCA Mark 1,” said Deodhare.

#### **eaching new heights**

- Delivery of Tejas Mark 1A will begin 36 months after the contract date
- If the order is placed at the start of 2020, Mark IA deliveries will start in 2023
- Tejas Mark 2 fighter to fly by 2023
- First flight of the Mark 2 is being targeted by 2023: Girish Deodhare, ADA chief

[https://www.business-standard.com/article/economy-policy/rs-26k-cr-order-for-tejas-mark-1a-to-open-door-for-mark-2-119121600021\\_1.html](https://www.business-standard.com/article/economy-policy/rs-26k-cr-order-for-tejas-mark-1a-to-open-door-for-mark-2-119121600021_1.html)

## The man behind India's 'Star Wars'

*In fact, he is considered the architect of advanced missile technologies and smart guided weapons technologies in India*

*By Swati Sharma*

He's known as India's 'Missile Man' but Dr G. Satheesh Reddy, chairman of Defence Research and Development Organisation (DRDO) is not someone who will rest on his past laurels. Dr Satheesh played a pivotal role in the development of systems that guide a missile, travelling at hypersonic velocity, to a satellite 300 km away. Known for his vision and capability to develop indigenous technologies, Dr Satheesh, owes a lot to the resilience and unimaginable dedication of his parents.

"My father would sow the seeds in the field and water them daily. He would nurture them for months before we could see any visible results. We knew the importance of perseverance and hard work. Sometimes the missions would fail and missiles would crash but each failure was a learning experience. Once a path is decided, one has to walk on it. There is no looking back," says Dr Satheesh, who was recently awarded with the Honorary Fellowship by the Royal Aeronautical Society. It is the world's highest distinction for achievement in aerospace domain.



While studying in a small village in Andhra Pradesh, he never knew anything about England or that he had to prove his mettle in the field of aeronautics. It was a combination of perseverance, dedication and patience throughout his life that got him this far. "After completing my engineering, I was very clear that I wanted to work for the nation – at ISRO or DAE or DRDO. As an electronics engineer, when all my classmates were moving to the US, I wanted to be at the forefront of science and technology in India. In those days we were inspired by India's progress in atomic energy and rockets. It was inspiring to read about the SLV launches. I was first selected to join DRDO and since then it has been my life," says Dr Satheesh, who is the Secretary Defence R&D.

In fact, he is considered the architect of advanced missile technologies and smart guided weapons technologies in India.

It is a known fact that science and research is a hard subject. The difference of a single millimetre or gram can mar an endeavour. "Each success leads to more work as does each failure. The recent success of Mission Shakti gives me immense satisfaction as a leader. You can imagine the precision needed to hit a target with centimetre accuracy at 300 km altitude in space," explains Dr Satheesh. He was born and bred in Mahimalur near Athmakur of Nellore district in Andhra Pradesh.

Reminiscing his childhood days and early struggles in life, Dr Satheesh says that his parents were extremely hard working. In fact his father would be working in the fields by 4 am, while his mother would tend the cattle by sunrise. "Their work would continue even after sundown. We were naturally inspired to work hard like them. We would sleep in our teacher's house regularly. We had no electricity in our house till I was in Class 7. We studied under lantern lights," says Dr Satheesh.

He was also the first scientist from India to receive the Silver Medal from the Royal Aeronautical Society, London.

According to him, science and research teaches one to be humble and respect other's opinions and views. He attributes his humility to his humble rural background. Not many know that Dr Satheesh considers former president Late Dr APJ Abdul Kalam as a source of inspiration. "Power has no place in science," he says. The DRDO is working tirelessly for the nation. When the organisation is going through such exciting times, how on earth does he fit all this into his personal life? "My wife Padma is very supportive. My two children understand that long hours in office means I love them more. I owe them a lot for their unconditional support," says the scientist, who feels blissful when he visits places of worship with his family.

<http://www.indiandefensenews.in/2019/12/the-man-behind-indias-star-wars.html>

## DRDO allows free patent access

In a commendable move, the Defence Research & Development Organisation (DRDO) has recently announced its royalty free and zero fee license access to its 400+ patents to provide a helping hand to the indigenous creators in India. This initiative is to grant free access to the patented technology of DRDO to local manufacturers free of cost (no licensing fee or royalty charge) to give a boost to the 'Make in India' initiative.

The patents include a varied range of technological resources such as technology for: missile development; aeronautics; combat engineering; arms and ammunition; communication systems; general electronics, to name a few. The companies that can benefit from this shift in the patent policy of DRDO are any state-owned or privately owned defence equipment / material manufacturer including small and medium sized enterprises and even start-ups. This benefit though can only be used under 2 distinct conditions:

- The company must submit annual commercial reports to DRDO
- The company must be equipped to absorb the technology in question, along with infrastructure to manage quality of the production as well as production capability based on the technology.

The above two conditions are put so that DRDO can keep a tab on the distribution and usage of such technology as well as make sure that the quality of the manufactured goods are in line with prescribed technological integrity and standards.

This shift in policy is a welcome change as the former licensing and royalty fee would go as high as a several lakhs to over a crore rupees based on the kind of technology licensed, the expenditure on such technical projects along with the baseline price and post production sales to non defence sectors. Under the new policy regime, only a processing fee of rupees one thousand is to be charged.

<https://www.lexology.com/library/detail.aspx?g=0955e238-6086-4e2d-9be8-1f2b3977b524>

## DRDO revives handheld device project

A DECADE ago, the Indian Army callously shelved a project to develop handheld computers for its soldiers.

Project Beta, in collaboration with Indian industry, had fielded prototypes of what was a breakthrough in the pre-smartphone era. A solar-powered Situational Awareness and Tactical Handheld Interface (SATHI) handset (*In photo*) plotted a soldier's position on a GIS map, and allowed him to securely communicate through voice and text with other soldiers. Over the last few weeks, meetings between the original project team and the DRDO's Centre for Artificial Intelligence and Robotics have seen the project stirring to life. Its original developers from Bengaluru's IT industry are confident they can rapidly develop a 'Sathi 2.0'.

A project report submitted recently calls for a handset equipped with a range of features not available 15 years ago. These will be powered by the indigenous Shakti micro-processor developed last year by IIT-Madras. The prototypes will go for user trials by mid-2020. The only dark cloud is that this project is not being driven by the Indian Army. Judging by history that might not be such a bad thing.



## ‘Make in India has failed in defence sector’ — experts highlight importance of self-reliance

*Experts at the Military Literature Festival in Chandigarh list why Modi gov't's flagship Make in India programme has failed to take off in the defence sector*

*By Amrita Nayak Dutta*

Chandigarh: Absence of a clear policy, lack of accountability for defence public sector units and a perennial fund crunch — these are the reasons listed by experts as to why Narendra Modi government's flagship ‘Make in India’ programme failed to take off in the defence sector.

Former Army chief General (retired) V.P. Malik, Lieutenant General (retired) Arun Sahni and former financial adviser in the defence ministry Amit Cowshish were speaking at a session on ‘Make in India and the Nation's Security’ at the third edition of the Military Literature Festival organised by the Punjab government in Chandigarh. The festival began Friday and will continue until Sunday.

Talking about being self-reliant in defence, General Malik, who headed the Army during the Kargil war in 1999, said self-reliance was one of the most important lessons India learnt from the conflict.

“Unless we become adequately self-reliant, our national security remains vulnerable,” Malik said.

Giving an example of the importance of self-reliance, Malik said during the Kargil conflict, the Army had ordered for a purchase of two regiments of 155 mm Denel guns from South Africa, but when the weapons were to be delivered, they said they don't have them.

The former Army chief also gave the example of satellite imagery, which when bought at a huge cost from another country, turned out to be three years old and futile for the forces.

Malik also spoke about weapon-locating radars, which the Army had to buy in 2003 at double the cost of the initial price, but ultimately it did not purchase them after the DRDO promised to develop the radars.

“I don't think we have adequate accountability in some of our defence organisations like the DRDO (Defence Research Development Organisation),” he said.

“When you give protection to your defence PSUs and do not give adequate assurance to the private sector, it will be discouraged...Then everyone is working in silos and as a result, there is no interaction,” he said, adding that it is a “crucial reason why Make in India has failed to make progress in the defence sector”. He further said the armed forces are always blamed for supporting imports, but added that they have no other alternatives.

### **‘Make in India started off as a slogan’**

Cowshish highlighted the policy lacunae when it comes to implementing ‘Make in India’ in defence.

“There is no clear policy on ‘Make in India’ in defence. Talking about indigenisation, what is it? Is it cost-saving or import-substitution or innovation? We are not clear,” he said.

Sahni, meanwhile, said ‘Make in India’ started off as a slogan and “you can have slogans for social causes. But it needed processes and procedures to be rectified. It needs to be opened up.”

Sahni also said more funds needed to be allocated for the upgrade of military warfare. “We need a more serious approach where accountability is fixed for producing unusable products at the public sector institutions working in the sphere,” he said.

<https://theprint.in/defence/make-in-india-has-failed-in-defence-sector-experts-highlight-importance-of-self-reliance/334995/>



## This means drama: Indian missile defense is raising tensions with Pakistan

*A defensive effort that is making war more likely*

*By Michael Peck*

***Key point: India has a long way to go until its defenses are ready, but Pakistan will not wait.***

India says it has successfully tested an interceptor capable of shooting down ballistic missiles.

But could this trigger a nuclear war with Pakistan?

On August 2, the Defense Research Development Organization (DRDO) -- India's equivalent of the Pentagon's DARPA research agency -- launched an Advanced Area Defense (AAD) missile from Abdul Kalam island off India's eastern coast.

"The endo-atmospheric missile, capable of intercepting incoming targets at an altitude of 15 to 25 kilometers [9 to 16 miles] was launched against multiple simulated targets of 1,500 kilometer [932 mile]-class ballistic missiles," according to the DRDO announcement.

"One target among simultaneously incoming multiple targets was selected on real time, the weapon system radars tracked the target and the missile locked on to it and intercepted the target with a high degree of accuracy. The complete event including the engagement and interception was tracked by a number of electro-optical tracking systems, radars and telemetry stations. All the mission objectives were successfully met."

India's missile defense program is a two-tiered system: the Prithvi missile (derived from the Prithvi tactical ballistic missile) for exo-atmospheric intercepts in outer space, before they near the target, and the Advanced Area Defense missile for endo-atmospheric intercepts within the Earth's atmosphere, in the terminal phase when the target warhead is making its final descent.

In that sense, it is similar to the 1960s U.S. Anti-Ballistic Missile System, which used Safeguard and Sprint missiles, or any integrated air defense system. A long-range interceptor to take out the incoming missile far from the target, and a short-range point defense weapon to destroy any missile that penetrates the long-range screen.

Previous tests of Indian interceptors targeted short-range Prithvi ballistic missiles on a trajectory that mimicked medium-range missiles. The Diplomat magazine suggests that the dummy target this time could have been an Agni, an intermediate-range missile capable of carrying nuclear warheads.

Indian press trumpeted that India's missile defense is a homegrown program developed by India, rather than imported from Russia and America as are so many Indian weapons such as jet fighters and tanks. That's no small point of pride for the world's second most-populous nation, once the poster child for poverty, and now the world's sixth-largest economy.

Interestingly, while India boasts of developing its own missile defense system, it is also buying Russian S-400 air defense missiles capable of intercepting missiles as well as aircraft.

"The S-400 acquisition, which has some utility for missile defense, suggests that India is interested in the capability and not merely letting DRDO have a science project," Christopher Clary, a professor of international relations at State University of New York Albany, told *The National Interest*.

But there is another danger with Indian missile defense, as history shows. When America and the Soviet Union developed anti-missile systems in the 1960s, the opposing superpower either built more missiles, or increased the number of warheads on existing missiles, to saturate enemy defenses.

So what will Pakistan do?

India and Pakistan "are already in an arms race for all intents and purposes and have been so for some time," Georgetown University professor C. Christine Fair, who has written on the Pakistani military, told *The National Interest*.

"There is, of course more nuance: Pakistan has the world's fast growing nuclear weapons program. India has chosen not to reciprocate in growing its stockpiles. Pakistan has and is trying to acquire tactical nuclear weapons while India has demurred."

"Pakistan will field more warheads on more delivery vehicles than it would in the absence of BMD [ballistic missile defense], Clary says.

"Pakistan could develop multiple warheads for its current ballistic missiles, or develop short-range tactical nuclear weapons and cruise missiles that are harder to intercept."

In turn, a Pakistani buildup might prompt an India buildup, sparking a vicious cycle reminiscent of the Cold War.

Ironically, India is notorious for developing home-grown weapons, such as aircraft and tanks, that take much longer to develop than expected, and are plagued with problems when they are fielded. But as always with nuclear weapons and missile defense, perception is everything.

"The biggest problem from India's side is that it all too frequently announced that it has a capability which mobilizes Pakistan to innovate when in fact India is a long way from achieving the stated capability but Pakistan has already developed a counter measure," Fair warns.

<https://nationalinterest.org/blog/buzz/means-drama-indian-missile-defense-raising-tensions-pakistan-104992>

## Experts want CDS empowered

Chandigarh: Welcoming the government's decision to finally appoint a Chief of Defence Staff (CDS), experts at the Military Literature Festival today stressed that the post should be suitably empowered and the charter of duties clearly defined to meet the required objections of civil-military integration for policy planning, operations and procurements.

Former General Officer Commanding-in-Chief Lt Gen Aditya Singh said challenges of the 21st century required not just jointness among the services but a deep level of integration between the armed forces and the civilian leadership. The CDS would act as a single-point advisor to the Centre on all matters related to the three services.

Stating that India could not afford to work in silos, former Defence Secretary Shekhar Dutt said while the post of CDS was absolutely necessary in the Indian context not just for logistics but also for operations, creating the post of CDS alone was not enough. It required transformation and remodeling of the higher defence establishment.

Dutt stressed the post of CDS has been created as it is necessary to have a professional body of the highest standing to facilitate 'jointmanship' and render single-point military advice to the government on matters of national security. He said that this post has been created by keeping in mind the present day needs and the first CDS would be appointed in few days from now.

Air Vice Marshal Manmohan Bahadur (ret'd) said the CDS should be able to merge the capabilities which the services required with the procedures that the MoD required and the country's higher defence organisation should be reformed with greater military presence in the ministry.

<https://m.tribuneindia.com/news/experts-want-cds-empowered-11433>

## India on way to making own arms system: Badnore

Chandigarh: Envisaging that India would become self-reliant on manufacturing its own defence equipment in the near future, Punjab Governor VP Singh Badnore today said the nation had come a long way since Independence.

Inaugurating the third edition of the Military Literature Festival, organised by the Punjab Government and the Western Command here, he said India was no longer dependent on food or aid from abroad, but continued to rely on war material from other countries.

“Slowly, we aim to become self-reliant in making our own weapon systems with cutting edge technology and already Rs 3,000 crore worth of defence equipment is being made in India. Very soon, we shall be securing our nation with indigenously designed and manufactured weapons and equipment.”

Pointing out that India had exhibited its competence in reaching targets far out in space and was evolving its own global positioning system and had the ability to watch its frontiers and beyond with satellite systems, Badnore said: "We are now in the process of making the Indian Ocean militarily safe for our country and securing our island territories as well as maritime traffic."

Reminding the audience that the year marked the 20th anniversary of Kargil War and today was the day that terrorists had attacked Parliament in 2001, the Governor said India was capable enough of dealing with any kind of insurgency threatening peace, unity and integrity from within or across borders. “Our Armed Forces have demonstrated this with surgical strike in the mountains across the Line of Control and airstrike deep in Pakistan’s Khyber-Pakhtunkhwa Province,” he said.

General Officer Commanding-in-Chief, Western Command, Lt Gen RP Singh said that the festival provided an ideal opportunity for exposure to geopolitical issues and matters of national importance. Badnore also participated in a session on the Battle of Haldighati fought between Maharana Pratap of Mewar and the forces of Mughal emperor Akbar in Rajasthan.

Prominent amongst those present were former Chief of Army Staff Gen VP Malik, former Chief of Air Staff Air Chief Marshal BS Dhanoa, former Chief of Naval Staff Admiral Sunil Lanba, British Deputy High Commissioner in Chandigarh Andrew Ayre and Canadian Consulate General Mia Yen. Apart from a delegation from the UK and Canada, a number of serving and retired defence officers, military analysts, historians, authors and students are attending the festival.

### **Prominent faces**

Prominent amongst those present on the inaugural day of the festival were former Chief of Army Staff Gen VP Malik, former Chief of Air Staff Air Chief Marshal BS Dhanoa, former Chief of Naval Staff Admiral Sunil Lanba, British Deputy High Commissioner in Chandigarh Andrew Ayre and Canadian Consulate General Mia Yen.

<https://www.tribuneindia.com/news/india-on-way-to-making-own-arms-system-badnore-10667>

## **Army to set up more than dozen integrated battle groups by 2020**

*IBGs were first proposed in one of the four studies regarding the reorganising of the Army, which was commissioned last year by Army chief General Bipin Rawat*

*Krishn Kaushik*

New Delhi: Preparing for the changing character of warfare across the world, the Indian Army will be ready with more than a dozen Integrated Battle Groups (IBGs) by next year. Senior sources in the defence establishment told The Indian Express that four each of the IBGs will come up facing China and Pakistan, while the Mountain Strike Corps will also be converted into IBGs.

A top source said the Mountain Strike Corps “has become too huge, a bit of an elephant” and will be “divided into five to six IBGs”.

IBGs were first proposed in one of the four studies regarding the reorganising of the Army, which was commissioned last year by Army chief General Bipin Rawat. The proposal to establish the IBGs has already gone to the government and the Army is waiting for approval, the source said.

According to the source, the unit “has to be terrain specific”, and moving ahead, the Army cannot have a one-size-fits-all formula. “Difference in formations should depend on the terrain,” the source said, adding that the Army has to go ahead “with smaller forces, this is what we are calling the IBGs”.

It will also include a signal company, a field company and engineering and ordnance will be “merged to become the logistics unit”. Each formation has to be given equipment depending upon what they are, the source said.

“Think of them as oversized brigades,” the source explained.

There will be four IBGs in Sikkim and another four in the Jammu-Sialkot sector facing Pakistan. The IBGs will have the capacity to 10-15 km deep into enemy territory without requiring support.

The source said in modern warfare, attacking a significant city can lead to a severe-counter attack, leading to a pyrrhic victory. The source said that “either you can go deep into the enemy’s territory” or “you can capture a similar territory linearly along the border”.

“Rather than going deeper, to capture the same territory linearly” the forces may not require Strike Corps and can be done by the IBGs, the source said. “But you do not want to not have the capacity to go deeper,” the source said, adding that this was why the Army needs to retain the Strike Corps as well.

The source said that after these initial IBGs are set up, more will come up. The transition to IBGs and to modernise the forces has to happen “gradually” as you cannot have the Army in “turmoil”, the source said.

Three new tri-services agencies are also being built up – a Cyber Agency, a Space Agency and an Armed Forces Special Operations Division. These three agencies will have a joint command, the top source said.

The source said the Cyber Agency is looking at a strength of around 1,000, which will include defence and civilian personnel. “It is being raised for the last two years,” the source said. “The Navy will lead the Cyber Agency and the personnel are being trained with the National Technical Research Organisation.”

The forces are “focusing on creating cyber assets” with both, offensive as well as defensive capability. “You have to save assets and neutralize attacks” first, and then build offensive capacity “as a deterrent”.

The source said the “cyber agency should become a national agency”. While the military can look after defending assets, the offensive aspect should be handled by a national agency.

The top source also stated that General Rawat, as the Chairman of the Chiefs of Staff Committee, has conveyed to the government the expectations of the services for the proposed post of Chief of Defence Staff (CDS). The source said the services want an “empowered” CDS who has “direct access or channel of communication to the Defence Minister at least in the matters of operations”.

Also, the CDS will be a four-starred officer like the chiefs of the three services, the source said. However, the CDS will be a first among equals. Because the ranks of Field Marshal, or the Marshal of the Air Force are five-starred, the CDS cannot be given five stars, the source said.

## **EXPLAINED**

### **Significant changes to streamline Army**

As General Bipin Rawat is set to retire this month, he is one of the top contenders to become India’s first CDS. In his three-year term as Army Chief, Rawat has initiated major changes in the Army that will see fruition. Trimming the flab at the Army Headquarters for more streamlined decision-making is one. But the other significant change is the formation of the IBGs, which will be quicker, flexible and self-sustainable combat units as the Army readies itself for future warfare.

<https://indianexpress.com/article/india/army-to-set-up-more-than-dozen-integrated-battle-groups-by-2020-6165980/>

# Battle rifles in the field

*GEN. BIPIN RAWAT can retire from the Army a contented man this month. His aggressive push for a replacement for the Indian Army's problematic INSAS assault rifle, is now a reality.*

*This month, the Indian Army has begun issuing its new SiG 716 battle rifles to troops along the LoC. The SIGs, a fast-track purchase from the US last year is the Army's first new battle rifle in over 20 years.*

*The Indo-Russian Rifles that will mass produce the AK-203 assault rifles for the bulk of the Army, is expected to be signed shortly. The Gulf sheikhdom, of course, has formidable diplomatic clout*

**U.S.A.**



*SiG 716  
Battle Rifle*

**Russia**



*AK-203  
Assault Rifle*

**U.A.E.**



*CAR 816  
Carbine*

*in New Delhi. Meanwhile, one hears that the DRDO has lifted objections to the import of carbines from a state-owned firm in UAE clearing the way for the CQB carbines for the Army.*

## 15 साल के इंतजार के बाद चीन-पाकिस्तान बॉर्डर पर तैनात सैनिकों को मिलेंगे असॉल्ट राइफल्स

*आधुनिक असॉल्ट राइफल्स के लिए भारतीय सेना को 15 साल इंतजार करना पड़ा।*

*इस लंबे इंतजार के बाद आखिरकार सेना को ये राइफल्स मिलने जा रहे हैं।*

*आधुनिक तकनीक वाले ये राइफल्स 500 मीटर की रेंज तक मार कर सकने में सक्षम हैं।*

नई दिल्ली: चीन और पाकिस्तान की सीमा पर तैनात भारतीय सैनिकों को अब देश की सुरक्षा के लिए आधुनिक [असॉल्ट राइफल्स](#) मिलने जा रहे हैं। असॉल्ट राइफल्स की मांग सेना ने 15 साल पहले की थी और डेढ़ दशक के इंतजार के बाद अब यह राइफल्स सेना को मिलेंगे। अमेरिका के इन असॉल्ट राइफल्स की खासियत है इनकी लंबी दूरी तक मार कर सकने की क्षमता। हालांकि, यह आधुनिक राइफल्स सिर्फ पहली पंक्ति में लड़नेवाले सैनिकों को ही मिलेंगे। बाकी सीमा पर मौजूद सैनिकों को रूस के क्लाशनिकोव राइफल से ही काम चलाना होगा।

### पहली खेप में मिलेंगे 10,000 राइफल्स

सूत्रों ने हमारे सहयोगी अखबार टाइम्स ऑफ इंडिया को बताया कि पहली खेप में सेना को 10,000 राइफल्स की सप्लाई की जा चुकी है। हालांकि, भारत ने कुल 72,400 राइफल्स ऑर्डर किया है। केंद्र सरकार ने यूएस फर्म सिग साँअर को इसके लिए 638 करोड़ रुपये का ऑर्डर दिया है। इस साल फरवरी में फास्ट ट्रेक प्रॉक्यूरमेंट (एफटीपी) के तहत यह आर्डर किया गया।

### वायु सेना को भी दिए जाएंगे राइफल्स

एक वरिष्ठ सूत्र ने बताया कि 7.62x51mm कैलिबर वाले राइफल की रेंज 500 मीटर तक होगी। सूत्र के अनुसार, 'राइफल्स की आपूर्ति 2020 के शुरुआत में की जाएगी। 66,400 राइफल्स सेना को मिलेंगी और 4,000 वायु सेना को। इसके साथ ही नौसेना को भी 2,000 राइफल्स की आपूर्ति की जाएगी। ये हथियार बहुत मजबूत, आसानी से फील्ड में प्रयोग किए जा सकनेवाले और आधुनिक तकनीक से बने हैं। सैन्य आपरेशनों में इनका प्रयोग बहुत आसानी से किया जा सकेगा।'

### रूस के साथ करीब 8 लाख राइफल्स तैयार किए जाएंगे

इसके साथ ही उत्तर प्रदेश के कोरवा हथियार फैक्ट्री में 7,45,000 क्लाशनिकोव राइफल्स तैयार किए जाएंगे। क्लाशनिकोव AK-203 राइफल्स का निर्माण रूस के साथ संयुक्त वेंचर में किया जाएगा। इन हथियारों के निर्माण के लिए 12,000 करोड़ रुपये खर्च होंगे। इन राइफल्स में से एक हिस्सा पुलिस विभाग को भी दिया जाएगा। 7.62x39mm कैलिबर वाले AK-203 राइफल्स को लोकप्रिय AK-47 की आधुनिक कड़ी कहा जा सकता है। इन राइफल्स की खासियत है कि यह बहुत प्रभावशाली होते हैं और इनसे 300 मीटर की दूरी तक मार किया जा सकता है।

<https://navbharattimes.indiatimes.com/india/after-15-year-wait-indian-army-to-get-new-assault-rifles-from-america/articleshow/72586570.cms>



## The AI War

*AI-enabled weapons may offer superhuman speed and precision. But they also have the potential to upset the balance of power. In order to gain a military advantage, the temptation for armies will be to allow them not only to recommend decision-making but also to give orders. Able to think faster than humans, an AI-enabled command system might cue up missile strikes on aircraft carriers and airbases at a pace that leaves no time for diplomacy and in ways that are not fully understood by its operators*

*By PK Vasudeva*

New Delhi: In today's world, the emergence of Artificial Intelligence (AI) has been phenomenal. It will in future become a major part of human life. In certain spheres, it is performing better than humans. Future wars, based on AI, will have disastrous results and must, therefore, be curbed. In computer science, AI sometimes called 'machine intelligence' is actually intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans. Colloquially, the term "artificial intelligence" is often used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem solving" like computer science, information engineering, mathematics, psychology, linguistics, philosophy and many other fields.

There is nothing new about artificial intelligence. The ancient Hindu scriptures have mentioned in Bhagwata Purana about Pushpak Vimana, Saubha Vimana, Sudarshan Chakra, Agni Bann, Brahma Astra and so on. These have been used since the days of the Ramayana and Mahabharata. The sages have said, "What can be achieved in 100 years in Satya/Krita Yuga, takes 10 years in Treta Yuga, takes one year in Dvarpara Yuga, and one day in Kali Yuga". One can clearly see it happening now. One of the most alarming and least understood features is the race towards artificial-intelligence-enabled warfare.

Two super powers, America and China are investing huge sums in militarised artificial intelligence, from autonomous robots to software that gives Generals rapid tactical advice in the heat of battle. China frets that America has an edge thanks to the breakthroughs of Western companies, such as their successes in sophisticated strategic games. America fears that China's autocrats have free access to copious data and can enlist local tech firms on national service. Both sides are engaged in a rat race. AI-enabled weapons may offer superhuman speed and precision. But they also have the potential to upset the balance of power. In order to gain a military advantage, the temptation for armies will be to allow them not only to recommend decision making but also to give orders.

That could have worrying consequences. Able to think faster than humans, an AI-enabled command system might cue up missile strikes on aircraft carriers and airbases at a pace that leaves no time for diplomacy and in ways that are not fully understood by its operators. On top of that, AI systems can be hacked, and tricked with manipulated data. During the 20th century the world eventually found a way to manage a paradigm shift in military technology, the emergence of the nuclear bomb. A global disaster was avoided through a combination of three approaches: deterrence, arms control and safety measures. Many are looking to this template for AI. Unfortunately it is only of limited use, and not just because the technology is new.

The principles that these rules must embody are straightforward. AI will have to reflect human values, such as fairness, and be resilient to attempts to fool it. Crucially, to be safe, AI weapons will have to be as open to explanation as possible so that humans can understand how they take decisions.

Many Western companies developing AI for commercial purposes, including self-driven cars and facial-recognition software, are already testing their AI systems to ensure that they exhibit some of these characteristics. The stakes are higher in the military sphere, where deception is routine and the pace is frenzied.

Amidst a confrontation between the world's two big powers, the temptation will be to cut corners for temporary advantage. So far there is little sign that the dangers have been taken seriously enough, although the Pentagon's AI centre is hiring an ethicist. Leaving warfare to computers will make the world more dangerous place. There could be no more consequential decision than launching atomic weapons and possibly triggering a nuclear holocaust. President John F. Kennedy faced just such a moment during the Cuban Missile Crisis of 1962 and, after envisioning the catastrophic outcome of a US-Soviet nuclear exchange, he came to the conclusion that the atomic powers should impose tough barriers on the precipitous use of such weaponry.

Among the measures he and other global leaders adopted were guidelines requiring that senior officials, not just military personnel, have a role in any nuclear-launch decision. As the Pentagon and the military commands of the other great powers look to the future, what they see is a highly contested battlefield. Some have called it a "hyperwar" environment, where vast swarms of AI-guided robotic weapons will fight each other at speeds far exceeding the ability of human commanders to follow the course of a battle. At such a time, commanders might increasingly be forced to rely on ever more intelligent machines to make decisions on what weaponry to employ when and where. At first, this may not extend to nuclear weapons, but as the speed of battle increases and the "firebreak" between them and conventional weaponry shrinks, it may prove impossible to prevent the creeping automatization of even nuclear launch decision-making.

Such an outcome can only grow more likely as the US military completes a top-to-bottom realignment intended to transform it from a fundamentally small-war, counter-terrorist organization back into one focused on peer-against-peer combat with China and Russia. This shift was mandated by the Department of Defence in its December 2017 National Security Strategy. Rather than focusing mainly on weaponry and tactics aimed at combating poorly armed insurgents in never-ending small-scale conflicts, the American military is now being redesigned to fight increasingly well-equipped Chinese and Russian forces in multi-dimensional (air, sea, land, space, cyberspace) engagements involving multiple attack systems (tanks, planes, missiles, rockets) operating with minimal human oversight.

"The major effect/result of all these capabilities coming together will be an innovation warfare has never seen before: the minimization of human decision-making in the vast majority of processes traditionally required to wage war," observed retired Marine General John Allen and AI entrepreneur Amir Hussain. That "minimization of human decision-making" will have profound implications for the future of combat. Ordinarily, national leaders seek to control the pace and direction of battle to ensure the best possible outcome, even if that means halting the fighting to avoid greater losses or prevent humanitarian disaster.

In a bid to increase coastal security near the sea border with Pakistan, the Indian Navy commissioned its 4th generation Dornier aircraft Squadron 314 (Raptors) in strategically located Porbandar, Gujarat on 29 November. The Dorniers are deployed for maritime surveillance, pollution prevention, troop transport, aerial survey, search and rescue, evacuation of casualties, and cargo and logistics support. It has also deployed K-4 nuclear capable Intermediate-range submarine-launched ballistic missile under development by Defence Research and Development Organisation to arm the Arihant-class submarines. These are part of AI.

*(The writer is a defence analyst and commentator)*

<https://www.thestatesman.com/opinion/the-ai-war-1502833500.html>

# India likely to face questions about Russian arms deals at talks in DC

*Amidst India and the US expecting to sign a vital defence technology sharing pact, there is an evident resentment by US over the lack of any major deal in the recent past. India has signed up multi-billion dollar deals with Russia, including the \$...*

**By Manu Pubby**

New Delhi: India is likely to face questions about several major defence deals inked with Russia at the upcoming 2-plus-2 dialogue in Washington, with experts pointing out several high-value purchases from the US that have remained pending amid budgetary constraints.

While India and the US are expected to sign a vital defence technology sharing pact, there is a sense of resentment in Washington over the lack of any major defence deal being signed in the past three years. Even on the technology sharing pact, last-minute consultations are still on.

Experts are pointing to big-ticket contracts with Russia, where despite financial sanctions in place, special arrangements have been made to route money through and several big-ticket items on the agenda from the US where apparently, budgetary constraints have resulted in a goslow.



The last big deals signed with the US were in 2016, with the Foreign Military Sales (FMS) route being used. The Indian Army had then placed orders worth \$700 million for 145 of the M 777 Ultra-Light Howitzers that have since being inducted and are suitable for mountain warfare. Besides, the Navy had placed an order worth \$1 billion for P8I maritime aircraft.

While the US has given clearance for a variety of defence items, orders have not been placed by the services. Officials pointed out that in this period, India has signed up multi-billion dollar deals with Russia, including the \$5.4-billion deal for S 400 air defence missiles, the \$2.1-billion deal for four frigates and the \$3-billion contract to lease a nuclear submarine for the Navy.

“There is a sense of wonder as the message coming out from the services has been that the budget is strained but on the other hand, we see the money heading to Russia,” an expert said. Over the past

three years, India has navigated through tough US regulations to gain permissions to buy advanced equipment like the armed Sea Guardian drone for the three services: defence, defence technology, foreign military,

While the case for purchase of 30 drones – 10 each for the three services – has moved through the US system, there seems to be reluctance among the Indian armed forces to proceed. Though the Navy has been keen to proceed with the program, the Air Force and Army have their budgets tied up in existing plans, leaving little scope to go ahead on the program.

The two deals that are close to getting inked are the Poseidon P8I maritime aircraft valued at over \$3 billion and the \$ 2.6 billion deal for 24 naval multi-role MH-60 ‘Romeo’ helicopters, both being channeled through the FMS route.

<https://economictimes.indiatimes.com/news/defence/india-likely-to-face-questions-about-russian-arms-deals-at-talks-in-dc/articleshow/72724338.cms>

## PLA Navy spy ships in our strategic backyard

**W**HAT was a Chinese “scientific research vessel” doing in India’s

Exclusive Economic Zone (EEZ) in the Andaman Sea recently? Navy Chief Admiral Karambir Singh said the Shiyan-1 (Research-1), a catamaran-hulled vessel, had been asked to leave the Indian EEZ where it had been spotted in September.

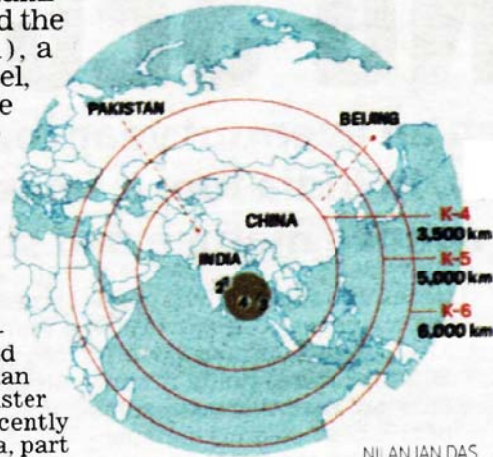
“Our stand is that if you do anything in our region, you have to notify us and seek permission,” he told the media recently. The Chinese ship had presumably done neither. And there is of course more than meets the eye here. Its sister ship, the Shiyan-3 was recently spotted in the Arabian Sea, part of an increased PLAN presence in the Indian Ocean Region. The presence of spy ships in the BoB would be of great concern to India’s strategic community. The third leg of India’s ‘triad’ of ballistic missile firing submarines (SSBNs) are based on India’s east coast because submarines can sail out submerged into their patrol areas in the Bay of Bengal (the Arabian Sea coast is too shallow).

While the missiles carried by the first two Arihant-class submarines do not have the range to cover both of India’s potential nuclear-armed adversaries, it will change dramatically in the coming decade. The arrival of the third and fourth ‘stretched Arihant’ SSBNs—the S4 and S4\* with their 5000-km range K5 missiles will allow Indian SSBNs to cover both Pakistan and parts of China. These ranges will further be improved when the 6000-km K6 are introduced on board the larger ‘S5’ class SSBNs over a decade from now.

Indian analysts are concerned about China’s sale of submarines in the region and a Chinese foothold in the region. China recently sold two older Ming class conventional submarines to Bangladesh. The worry, not without reason, is that the Bangladesh Navy’s sub-

marine base being built with Chinese assistance near Cox’s Bazar on the shores of the Andaman Sea. This explains why the Indian Navy, already facing a submarine shortage of its own, transferred the INS Sindhuvir to the Myanmar Navy recently.

*The writer is Executive Editor, India Today.*



### WHY THE BAY MATTERS

- **Visakhapatnam:** N-sub fleet assembly centre
- **Rambilli:** base for india’s N-sub fleet
- **Andaman & Nicobar Islands:** Naval missile test range
- **Patrol area:** From where an SSBN can cover all its adversaries

## India, Maldives review security & def ties, to boost connectivity

*By Sachin Parashar*

New Delhi: India and the Maldives on Friday reviewed their defence and security cooperation in the 6th joint commission meeting with focus also on improving connectivity in the archipelago. The meeting chaired by foreign minister S Jaishankar and his counterpart Abdulla Shahid saw the two countries signing three agreements including one for cooperation in financial intelligence.

“We had a fruitful discussion covering a range of issues. Main focus was on the implementation of the US \$1.4 billion economic package (announced earlier by India),” Shahid told TOI after the meeting.

“Our two sides agreed to partner in the Greater Male Area Connectivity project that will connect the islands in the west of Male with the capital. We also agreed to work more to increase Indian investments and tourists to Maldives,” he added. The two countries said in a joint statement that ongoing cooperation in security and defence partnership was reviewed.

“India-Maldives defence cooperation includes key infrastructure projects such as construction of the Composite Training Centre (CTC) for the MNDF, and Ministry of Defence Building, and the setting up of the Coastal Surveillance Radar System (CSRS), as well as training programmes for MNDF officials in India, joint exercises, medical camps, etc. The Maldivian side acknowledged the usefulness of CGS Kaamiyaab gifted by the Government of India for the enhancement of its maritime security,” said the statement.

Both ministers also emphasised the nurturing of a strong bilateral partnership in the maritime domain given the shared interests and common challenges in the Indian Ocean Region.

The government said in another statement that PM Modi reiterated in a meeting with Shahid, India’s commitment to partner Maldives for a strong, democratic, prosperous and peaceful Maldives.

<https://timesofindia.indiatimes.com/india/india-maldives-review-security-def-ties-to-boost-connectivity/articleshow/72569744.cms>

## North Korea conducts another test at long-range rocket site

*"Another crucial test was successfully conducted at the Sohae Satellite Launching Ground from 22:41 to 22:48 on December 13," a spokesman for the North's National Academy of Defence Science said in a statement. The announcement comes after the Uni..*

Seoul: North Korea said Saturday it successfully performed another "crucial test" at its long-range rocket launch site that would further strengthen its nuclear deterrent.

The test possibly involved technologies to improve intercontinental ballistic missiles that could potentially reach the continental United States.

The announcement comes as North Korea continues to pressure the Trump administration for major concessions as it approaches an end-of-year deadline set by leader Kim Jong Un to salvage faltering nuclear negotiations.

North Korea's Academy of Defense Science did not specify what was tested on Friday. Just days earlier, the North said it conducted a "very important test" at the site on the country's northwestern coast, prompting speculation that it involved a new engine for either an ICBM or a space launch vehicle.

The announcement suggests that the country is preparing to do something to provoke the United States if Washington doesn't back down and make concessions to ease sanctions and pressure on Pyongyang in deadlocked nuclear negotiations.

An unnamed spokesman for the academy said scientists received warm congratulations from members from the ruling Workers' Party of Korea Central Committee who attended the test that was conducted from 10:41 to 10:48 p.m. Friday at the Sohae Satellite Launching Ground, where the North has conducted satellite launches and liquid-fuel missile engine tests in recent years.

The spokesman said the successful outcome of the latest test, in addition to the one last Saturday, "will be applied to further bolster up the reliable strategic nuclear deterrent of the Democratic People's Republic of Korea," referring to North Korea's formal name.

During a provocative run in weapons tests in 2017, Kim conducted three flight tests of ICBMs that demonstrated potential range to reach deep into the U.S. mainland, raising tensions and triggering verbal warfare with President Donald Trump as they exchanged crude insults and threats of nuclear annihilation. Experts say that the North still needs to improve the missiles, such as ensuring that their warheads survive the harsh conditions of atmospheric reentry, for them to be considered as a viable threat.

Relations between Kim and Trump became cozier in 2018 after Kim initiated diplomacy that led to their first summit in June that year in Singapore where they issued a vague statement on a nuclear-free Korean Peninsula, without describing when and how it would occur.

But negotiations faltered after the United States rejected North Korean demands for broad sanctions relief in exchange for a partial surrender of the North's nuclear capabilities at Kim's second summit with Trump in Vietnam in February.

Trump and Kim met for a third time in June at the border between North and South Korea and agreed to resume talks. But an October working-level meeting in Sweden broke down over what the North Koreans described as the Americans' "old stance and attitude."

Kim, who unilaterally suspended nuclear and intercontinental ballistic missile tests last year during talks with Washington and Seoul, has said North Korea could seek a "new path" if the United States persists with sanctions and pressure against the North. North Korea has also conducted 13 rounds of ballistic missile and rocket artillery tests since May, and has hinted at lifting its moratorium on nuclear and long-range missile tests if the Trump administration fails to make substantial concessions before the new year.

Some experts doubt that Kim would revive the tensions of 2017 by restarting nuclear and ICBM tests, which would cross a metaphorical "red line" and risk shattering his hard-won diplomacy with Washington. They say Kim is likely to pressure Trump with military activities that pose less of a direct threat to the U.S. and by bolstering a united front with Beijing and Moscow. Both are the North's allies and have called for the U.N. Security Council to consider easing sanctions on Pyongyang to help nuclear negotiations move forward.

Saturday's news of the test came after U.S. Ambassador Kelly Craft on Wednesday criticized the North's ballistic testing activity during a U.N. Security Council meeting, saying that the tests were "deeply counterproductive" and risk closing the door on prospects for negotiating peace.

She also cited North Korean hints of "a resumption of serious provocations," which she said would mean they could launch space vehicles using long-range ballistic missile technology or test ICBMs, "which are designed to attack the continental United States with nuclear weapons."

While Craft said that the Trump administration is "prepared to be flexible" and take concrete, parallel steps toward an agreement on resuming talks, North Korea described her comments as a "hostile provocation" and warned that Washington may have squandered its chance at salvaging the fragile nuclear diplomacy.

<https://economictimes.indiatimes.com/news/defence/north-korea-conducts-another-crucial-test-at-sohae-launch-site-kcna/articleshow/72592041.cms?from=mdr>



## अमेरिका ने किया मध्यम दूरी की बैलिस्टिक

### मिसाइल का परीक्षण, रूस ने जताई चिंता

*अमेरिकी वायुसेना ने गुरुवार सुबह 8:30 बजे वांडेनबर्ग एयरफोर्स*

*स्टेशन से बैलिस्टिक मिसाइल का परीक्षण किया।*

**वाशिंगटन:** अमेरिकी सेना ने जमीन से हवा में मार करने वाली मध्यम दूरी की बैलिस्टिक मिसाइल का परीक्षण किया है। रूस के साथ आइएनएफ संधि के तहत इस तरह की मिसाइलों के परीक्षण पर रोक लगी थी। लेकिन हाल में दोनों देश इस संधि से अलग हो गए थे। इस परीक्षण पर रूस ने कहा है कि वह भविष्य में इससे सतर्क रहेगा।

अमेरिकी रक्षा विभाग पेंटागन ने बताया कि वायुसेना ने गुरुवार सुबह 8:30 बजे वांडेनबर्ग एयरफोर्स स्टेशन से बैलिस्टिक मिसाइल का परीक्षण किया। शिन्हुआ समाचार एजेंसी के अनुसार, समुद्र में गिरने से पहले मिसाइल ने खुले आकाश में 500 किमी से अधिक की उड़ान भरी।

पेंटागन ने कहा है कि इस परीक्षण से प्राप्त डाटा का उपयोग भविष्य में होने वाले परीक्षणों में किया जाएगा। आइएनएफ (इंटरमीडियट रेंज न्यूक्लियर फोर्सिस ट्रीटी) संधि से हटने के बाद अमेरिका द्वारा किया गया यह दूसरा मिसाइल परीक्षण है। अमेरिकी सेना ने इससे पहले गत अगस्त में नौसेना के लिए टॉमहॉक क्रूज मिसाइल का परीक्षण किया था।

#### क्या है आइएनएफ संधि

शीत युद्ध के दौरान तत्कालीन सोवियत संघ ने यूरोपीय देशों को निशाना बनाने के मकसद से अपने सीमावर्ती इलाकों में सैकड़ों मिसाइलें तैनात कर दी थीं। मध्यम दूरी की ये मिसाइलें परमाणु हथियार ले जाने में सक्षम थीं। वर्ष 1987 में शीत युद्ध की स्थिति को खत्म करने के लिए अमेरिका के तत्कालीन राष्ट्रपति रोनाल्ड रीगन और अंतिम सोवियत नेता मिखाइल गोर्बाचोव ने एक संधि की थी। इसे ही आइएनएफ संधि नाम दिया गया। इस संधि के तहत परमाणु हथियार ले जाने में सक्षम जमीन से 500 से 5500 किलोमीटर तक मार करने वाली मिसाइलों के निर्माण पर रोक थी। इस संधि से पश्चिमी देशों पर सोवियत संघ के परमाणु हमले का खतरा खत्म हो गया था। लेकिन इस साल अगस्त में अमेरिका और रूस एक-दूसरे पर संधि के उल्लंघन का आरोप लगाते हुए इससे अलग हो गए थे।

<https://www.jagran.com/world/america-russia-raises-concerns-over-new-us-ballistic-missile-test-over-pacific-19841018.html>

## Next for ISRO: A mobile launchpad

By Chethan Kumar

Bengaluru: The next decade will be a compilation of milestones if everything goes as per plan for ISRO, which, among many big ticket programmes in its pipeline, will also build a mobile launchpad for the proposed small satellite launch vehicle (SSLV) class of vehicles.

Just last week, China demonstrated its ability to do this by using mobile launchers developed for its military to put into space seven civilian satellites. But Isro chairman K Sivan told TOI that that the agency won't be using military technology for its proposed mobile launchpads.

From a mission to Sun (Aditya) to Chandrayaan-3, and from Gaganyaan (human spaceflight mission) to NISAR, a joint project with US' NASA, ISRO has a string of big tickets projects it hopes to execute in the next decade.

The Chinese satellites were, on Saturday, launched using KZ-1As rockets, a lightweight solid fuel projectile developed by the China Aerospace Science & Industry Corporation (CASIC), using technology initially for use by the military, state broadcaster CCTV reported.

The Defence Research and Development Organisation (DRDO), which on March 27, 2019, showed off India's capabilities of hitting a satellite in space using a missile will also have the ability to turn around the technology and spin it off as a mobile launcher.

Sivan, however, said: "We won't be working with DRDO. As of now the focus is on developing the second spaceport in Tamil Nadu, but we are also working on building mobile launchpads." Isro has already requested for Rs 120 crore for a new launchpad for SSLV, which will be part of the new spaceport being proposed in Kulasekarapattinam, a town in the Tamil Nadu's Tuticorin.

ISRO will need more than 2,000 acres of land in Kulasekarapattinam, the process to acquire which has already begun.

ISRO, at present, carries out all its launches from the Satish Dhawan Space Centre (SDSC), in Andhra Pradesh's Sriharikota, about 100km from Chennai. Set up in 1971, SDSC will continue to serve the space agency with PSLV and GSLV launches even in the future. "For the Gaganyaan mission, we will require some changes to be made and those modifications will be carried out at Sriharikota," Sivan had told TOI.

ISRO, which has planned at least two experimental flights of SSLV in the coming year, will also look at involving private players for development of future rockets. The space agency has been opening up opportunities for the private sector with the first official expression of interest (EOI) inviting private consortiums to build as many as five PSLVs issued in August this year.

While Isro had earlier allowed private players to assemble satellites, an EOI for launch vehicles was a major shift in the way Isro has been working over the decades. According to a senior official from the Vikram Sarabhai Space Centre (VSSC), the cost of one fully integrated PSLV launch vehicle is Rs 200 crore. This means that the value of the deal Isro is offering private industry—to build five PSLVs—is at least Rs 1,000 crore.

<https://timesofindia.indiatimes.com/india/next-for-isro-a-mobile-launchpad/articleshow/72689240.cms>

# एसएसएलवी के लिए इसरो को 11.97 करोड़ रुपए

नई दिल्ली, 15 दिसंबर (भाषा)।

भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) लघु उपग्रह प्रक्षेपण यान (एसएसएलवी) का विकास कर रहा है और इस परियोजना के लिए सरकार को संसद से 11.97 करोड़ रुपए के प्रस्ताव पर मंजूरी मिल गई है। अनुदान की पूरक मांग संबंधी दस्तावेज से यह जानकारी मिली है।

वित्त मंत्री निर्मला सीतारमण द्वारा संसद के शीतकालीन सत्र के दौरान पेश 2019-20 की अनुदान की पूरक मांगों के पहले बैच के दस्तावेज के अनुसार, 'लघु उपग्रह प्रक्षेपण यान (एसएसएलवी) के विकास के लिए 11.97 करोड़ रुपए का प्रस्ताव किया गया है।' संसद में अनुदान की पूरक मांगों पर चर्चा के बाद इसे मंजूरी मिल गई।

एसएसएलवी का विकास छोटे वाणिज्यिक उपग्रहों को पृथ्वी की निचली कक्षा में स्थापित करने के मकसद

से किया जा रहा है। इसकी अनुमानित लागत 30 करोड़ रुपए है। इसकी पहली उड़ान अगले साल के प्रारंभ में होने की संभावना है। इसरो की वेबसाइट से प्राप्त जानकारी के अनुसार, भारतीय अंतरिक्ष अनुसंधान संगठन ने अब तक 33 देशों के 319 उपग्रहों को अंतरिक्ष में भेजा है। इन देशों में अमेरिका, ब्रिटेन, फ्रांस, कोरिया, कनाडा, जर्मनी, बेल्जियम, इटली, फिनलैंड, इजराइल जैसे देश शामिल हैं।

इंस्टीट्यूट आफ डिफेंस रिसर्च एंड एनालिसिस के वरिष्ठ फेलो कैप्टन अजय लेले ने बताया कि इसरो अपने अधिकतर उपभोक्ताओं के उपग्रहों का प्रक्षेपण ध्रुवीय उपग्रह प्रक्षेपण यान के जरिये करता है। हालांकि घरेलू प्रतिबद्धताओं एवं विभिन्न प्रकार के उपग्रहों को अंतरिक्ष में भेजने की योजना को आगे बढ़ाने के क्रम में इस पर भार बढ़ता है। उन्होंने कहा कि कई बार नैनो उपग्रहों को भी पीएसएलवी के माध्यम से ही प्रक्षेपित किया जाता है।