

July  
2022

# समाचार पत्रों से चयित अंश Newspapers Clippings

A Daily service to keep DRDO Fraternity abreast with DRDO  
Technologies, Defence Technologies, Defence Policies,  
International Relations and Science & Technology

खंड : 47 अंक: 126 05 जुलाई 2022

Vol.: 47 Issue: 126 05 July 2022



रक्षा विज्ञान पुस्तकालय

Defence Science Library

रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र

Defence Scientific Information & Documentation Centre

मेटकॉफ हाउस, दिल्ली - 110 054

Metcalfe House, Delhi - 110 054

# CONTENTS

S. No.	TITLE	Page No.
<b>DRDO News</b>		<b>1-7</b>
<b>DRDO Technology News</b>		<b>1-7</b>
1.	Autonomous Flying Wing Technology Demonstrator: All you need to know about its specifications	<i>News Nine</i> 1
2.	DRDO Abhyas: A Step Ahead of its Predecessors	<i>WION</i> 2
3.	Indigenously-Developed Laser-Guided ATGM Successfully Tested by DRDO	<i>Financial Express</i> 4
4.	DRDO Scientists Conceive New Technique to Detect Malware on Mobile Phones	<i>The Tribune</i> 5
5.	Short-Range Missiles Added to India's Air Defence Shield; Navy Gets More Muscle	<i>Indian Defence News</i> 6
<b>Defence News</b>		<b>7-20</b>
<b>Defence Strategic: National/International</b>		<b>7-20</b>
6.	विशाखापत्तनम में एएलएच स्क्वाड्रन आईएनएस 324 कमीशन किया गया	<i>Press Information Bureau</i> 7
7.	Indian Navy Commissions the First ALH Squadron INAS 324	<i>Financial Express</i> 8
8.	Atmanirbhar Bharat in Defence: Indian Navy Plans to Induct 75 Indigenous Tech and Products in Service	<i>Financial Express</i> 9
9.	Navy to Develop, Induct About 75 New Indigenous Technologies, Products In Coming Year	<i>Indian Defence News</i> 10
10.	French Safran to Set-Up Engine MRO in India, Offers to Partner AMCA Project	<i>Hindustan Times</i> 11
11.	French Engine Maker Safran Set to Open Shop in India and More	<i>Asianet Newsable</i> 12
12.	India Calls for Effective Execution of UN Instrument to Prevent Illicit Trade in Small Arms, Light Weapons to Deal With Terrorism	<i>Financial Express</i> 13
13.	India Beyond Earth: India's Status in Space Military Race	<i>Financial Express</i> 14
14.	Australia May Not Accept India's G2G Tejas-Lift Trainer Deal	<i>Indian Defence News</i> 17
15.	Russia to Supply More CKD Kits for Sukhoi-30MKI	<i>Financial Express</i> 18
<b>Science &amp; Technology</b>		<b>20-25</b>
16.	नासा का उपग्रह पृथ्वी की कक्षा से अलग हुआ, चंद्रमा की ओर बढ़ा	<i>Navbharat Times</i> 20
17.	Google's Powerful Artificial Intelligence Spotlights a Human Cognitive Glitch	<i>SciTechDaily</i> 21
18.	Explained: What is the Large Hadron Collider, now readying to seek answers to fundamental questions of particle physics?	<i>The Indian Express</i> 24



*Mon, 04 Jul 2022*

### **Autonomous Flying Wing Technology Demonstrator: All you need to know about its specifications**

Adding a step toward self-reliance in Defence, the Defence Research and Development Organisation (DRDO) successfully conducted the maiden test flight of a new Unmanned Aerial Vehicle (UAV), an autonomous Flying Wing Technology Demonstrator, recently from the Aeronautical Test Range in Karnataka's Chitradurga. Unveiling the successful achievement of the technology, a DRDO official said, "In a major success towards developing unmanned combat aircraft, the maiden flight of the Autonomous Flying Wing Technology Demonstrator was carried out successfully from the Aeronautical Test Range, Chitradurga, Karnataka on Friday, July 1."

What's special about the demonstrator  
The technology demonstrator is a tailless fixed-wing aircraft which houses its payload and fuel in its main wings and does not have a defined fuselage-like structure found in conventional aircraft. The design of the demonstrator makes it capable of



delivering high fuel efficiency and stealth, if executed with precision, as demonstrated by some of the advanced bombers in the USA's arsenal like B-2 bomber.

The demonstrator is equipped with low reflective cross-sections which results in low radar signature, that means it cannot be detected easily. This feature of the vehicle makes it a stealth machine. The aircraft also has very low drag or air resistance because of the shape. However, this unique design has some drawbacks related to its stability and thus requires additional systems. The airframe, the basic mechanical structure of the aircraft and the undercarriage, the landing gear used for take-off and landing and the entire flight control along with avionics systems used for the demonstrator have been developed indigenously. The Unmanned Aerial Vehicle is powered by a small turbofan engine, which is an airbreathing type jet engine. According to some reports, the UCAV will be named Ghatak (deadly) or Autonomous Unmanned Research Aircraft, however, the agency has not disclosed the name of the

demonstrator so far. Demonstrators role in future building According to DRDO scientists, this technology demonstration will go through additional testing to look at various technologies for the creation of future combat drones. Tests would also be conducted on the scale and capability of the vehicle. According to sources, the demonstrator is a precursor to an autonomous stealth Unmanned Combat Air Vehicle (UCAV) being developed by the DRDO. It is also said that a deck-launched version for the Indian Navy is in the pipeline. The UCAV will be capable of launching missiles and precision-guided munitions.

About the developer of the Aerial Vehicle The recently tested demonstrator has been designed by the Aeronautical Development Establishment (ADE), a Bengaluru-based facility of the DRDO. ADE is a key Aeronautical Systems Design House involved in the design and development of the state-of-the-art Unmanned Aerial Vehicles, flight simulators, pilotless target aircraft, flight control systems and air weapons. The organisation has designed several Unmanned Aerial Vehicle including Nishant, a multi-mission Unmanned Aerial Vehicle launched using a Mobile Hydro pneumatic Launcher with Day/Night capability. Defence Minister Rajnath Singh applauded the achievement of DRDO and termed it a major step toward making India a self-reliant nation in terms of critical military systems. "Congratulations to @DRDO\_India on successful maiden flight of the Autonomous Flying Wing Technology Demonstrator from Chitradurga ATR. It is a major achievement towards autonomous aircrafts which will pave the way for Aatmanirbhar Bharat in terms of critical military systems," Singh tweeted.

<https://www.news9live.com/knowledge/autonomous-flying-wing-technology-demonstrator-all-you-need-to-know-about-its-specifications-180425>



*Mon, 04 Jul 2022*

## **DRDO Abhyas: A Step Ahead of its Predecessors**

**By Girish Linganna**

Earlier this week, India successfully tested an indigenously-designed High-speed Expendable Aerial Target (HEAT) called Abhyas in Odisha. The trial, which took place from the Integrated Test Range (ITR) in Chandipur beach, was carried out by the Defence Research and Development Organisation (DRDO). During the demonstration, this aircraft was launched using twin under-slung boosters, which provided the initial acceleration. A ground-based controller flew the target air vehicle in a pre-designated low-altitude flight path. ITR deployed various tracking sensors (including an electro-optical targeting system and radar) to monitor the target. This particular test flight demonstrated the aircraft's performance at low altitudes. During this trial, Abhyas also showcased a high subsonic speed trajectory with high endurance in addition to sustained level and high manoeuvrability.

### **What is DRDO Abhyas?**

Abhyas is a 2.3 metres long 75-kg drone developed by DRDO, with eminent contributions by the Bengaluru-based laboratory- Aeronautical Development Establishment (ADE). The drone is

made to be used as a target for different missile systems. It is capable of reaching an altitude of more than five kilometres at half the speed of sound. To sustain it during endurance flights at high subsonic speeds, it is equipped with a small gas turbine engine.

Abhyas, the country's first locally developed system, is designed to present a realistic threat scenario weapon systems' practice. However, the aircraft is more than just an aerial target built for training purposes. People in the know have claimed that it will also serve other purposes. While these purposes have not been disclosed, the possible use of Abhyas as a decoy aircraft is quite clear. Official sources suggest that the military can launch the aerial vehicle with the help of a laptop anywhere.

It is also interesting to note that the air vehicle is programmed for a completely autonomous flight. This means that Abhyas can fly under the control of automatic systems and does not require intervention from a human pilot. It is equipped with a micro-electromechanical systems-based inertial navigation system and also sports a flight control computer for guidance and control. In addition to this, DRDO Abhyas is also equipped with a radio altimeter for very low-altitude flight and a data link for encrypted communication.

### **Features And Uses**

Reports suggest that Abhyas features an adjustable simulated radar cross-section (RCS) for live-fire exercises and other drills. The aircraft makes use of a Luneburg lens in the nose cone to improve its radar reflectiveness. Its RCS can be increased to 50 times its size in order to let it imitate a fighter jet. As the recent test has already shown, it can also be used to imitate a high-speed subsonic missile. Furthermore, Abhyas has been claimed to have abilities that allow its use as an effective jammer platform.



It is believed that the target drone also features sensors, including acoustic missile distance indicators, which allow DRDO engineers to collect information on live-fire trials. Yet another important feature of the system is that all of its systems come from Indian industries.

Scientists and other officials involved with the project have shed light on the purposes of the aerial vehicle over the course of the past three years. The primary purpose of Abhyas is to sharpen the existing air-defence mechanism. Targets imitating fighter aircraft to assist in training are peacetime operations to hone the skills of military personnel.

Target missiles and drones such as this one play a crucial part in the development of a range of interceptors, including surface-to-air systems. Systems such as this recently tested one also contribute to the development of cruise and ballistic missile defense systems. Abhyas is designed to simulate aircraft for air-to-air exercises, as well as endoatmospheric (referring to lower atmosphere- about 100 km above the Earth's surface) surface-to-air interception tests.

Abhyas can also carry warheads- an ability that the system, in its present form, is not meant for. However, sources believe that this capability has the potential to be used in the near future based on the requirements of the services.

## **Better Than Predecessors**

Abhyas' predecessor target drones include Fluffy, Ulka, and Lakshya. DRDO developed Fluffy in the early 1970s for the Indian military. This model could only be launched up to a little over 9100 metres and had a maximum endurance of five minutes. DRDO Fluffy's production was discontinued in favour of a simpler, more economical model.

DRDO also designed and developed Ulka- the target drone that is supposed to be launched from subsonic or supersonic aircraft using an ejector release unit. Ulka can reach a maximum altitude of 13,000 m at speeds ranging from 0.7 to 1.4 Mach. It can not only simulate the speed and altitude characteristics of a variety of aircraft, but can also use false radar signatures.

Third, DRDO developed Lakshya. This aircraft is a cost-effective, re-usable aerial target system that can reach high subsonic levels. DRDO's website claims that this aerial vehicle is powered by a gas turbine engine and can be launched either from land or from a ship. It carries two tow targets, each with a tow length of 1.5 km, possessing radar.

However, the Abhyas system, with its sensors, altitude ceiling and its multifunctional abilities, takes an edge over its predecessors. Given its ability to perform multiple roles, this system can cause immense damage to an adversary.

<https://www.wionews.com/drdo-abhyas-a-step-ahead-of-its-predecessors-494306>



*Mon, 04 Jul 2022*

## **Indigenously-Developed Laser-Guided ATGM Successfully Tested by DRDO**

Indigenously-developed Laser-Guided Anti-Tank Guided Missile (ATGM) was successfully test-fired from Main Battle Tank (MBT) Arjun by Defence Research and Development Organisation (DRDO) and Indian Army at KK Ranges with support of Armoured Corps Centre & School (ACC&S) Ahmednagar on June 28, 2022. According to the DRDO, the ATGM hit the bull's eye with textbook precision and successfully defeated the target at minimum ranges. Telemetry systems recorded the satisfactory flight performance of the missile. Evaluation of medium and long range missiles requires physical parameters of sub-systems as well as navigational data acquired and recorded through telemetry. The telemetry systems deployed at the launch site ensure data reception requirements of launch and mid-course phases of flight path. The all-indigenous ATGM employs a tandem High Explosive Anti-Tank (HEAT) warhead to defeat Explosive Reactive Armour (ERA) protected armoured vehicles. The ATGM has been developed with multi-platform launch capability and is currently undergoing technical evaluation trials from 120 mm rifled gun of MBT Arjun. The Laser Guided ATGM has the capability to defeat the protected armoured vehicles in ranges from 1.5 to 5 kilometre. Engaging the targets at lower ranges is a challenge due to the dimensional constraints of tank launched ATGMs, which has been successfully accomplished by the ATGM for MBT Arjun. With the trial, the ATGM's capability to

engage targets from minimum to maximum range has been established. Earlier the trials have been successful for maximum range.

### **Laser-Guided Anti-Tank Guided Missiles (ATGM)**

Laser -Guided Anti Tank Guided Missiles is different from the prevalent ATGM. ATGM is a medium or long-range missile whose primary objective is to destroy tanks and other armoured vehicles. ATGMS can be launched from aircraft or land vehicles or by infantry. It can also be used against fortified positions or low-speed aircraft. It works on different guidance systems like laser guiding, television camera, or wire guiding. DRDO has already flight-tested ATMG Helina from helicopters successfully. But Laser-Guided ATGM is designed to be fired from tanks and it is planned for the India's Main Battle Tank (MBT) Arjun. It employs a HEAT warhead to defeat Explosive Reactive Armour (ERA) protected armoured vehicles in ranges from 1.5 to 5 km. It locks and tracks the targets based on laser designation to precisely strike the target. After these series of validation tests, the system will be ready for the inducted by the Army.

Laser Guided ATGM has been developed primarily by the two wings of the DRDO's Armament and Combat Engineering (ACE) Cluster — the Armament Research and Development Establishment (ARDE) and High Energy Materials Research Laboratory (HEMRL). Secretary, Department of Defence R&D and Chairman DRDO G Satheesh Reddy said the successful development of laser guided ATGM will enhance the fire power of the MBT Arjun.

<https://www.financialexpress.com/defence/indigenously-developed-laser-guided-atgm-successfully-tested-by-drdo/2582112/>

# **The Tribune**

*Mon, 04 Jul 2022*

## **DRDO Scientists Conceive New Technique to Detect Malware on Mobile Phones**

Amid rising instances of cyber crime across the world, scientists at the Defence Research and Development Organisation (DRDO) have proposed a new technique to detect malicious applications in mobile phones. A novel network traffic analysis-based framework has been conceived by experts at DRDO's Scientific Analysis Group (SAG) and Delhi Technological University (DTU) that exploits cellular traffic features to detect malware. Research into ways to counter cyber crime is a priority area in view of the ever-increasing use of digital media and smartphones in day-to-day life. According to government data, 3,377 cybercrime cases were reported in India during 2012, which went up to 50,035 in 2020.

According to the researchers, the operating systems of smartphones are prone to numerous attackers and malware designers who are constantly trying to elicit confidential information by a plethora of attacks through specially created malwares. Detection of such malwares to protect digital devices is the core function of smartphone security analysis. "The robustness of the suggested framework, when evaluated on the standard datasets, outperforms contemporary techniques to achieve an average accuracy of 98.74 percent," the researchers have claimed in a paper published by the DRDO on July 1. "A comparison of the evaluation matrices of the

suggested framework with other contemporary approaches reveals better detection accuracy,” they added.

Two widely used malware detection methods pivot around static and dynamic analysis. Static investigation techniques failed to detect apps having code obfuscation, while conventional dynamic investigation needs are quite cumbersome. The framework conceived by three researchers, two from SAG and one from DTU, consists of four blocks called traffic feature fusion, classifier score-fusion, decision criteria and reference apps update to detect malicious applications. Transmission Control Protocol (TCP), which is impervious to encrypted traffic unlike the Hypertext Transfer Protocol (HTTP), was used.

Mobile devices account for about 55 per cent of the global Internet traffic and analysing this traffic leads to incredible results in detecting malicious applications, the paper states. Analysing traffic is accomplished by studying the patterns in the network traffic for its identification and segregation for further investigation, the paper states.

<https://www.tribuneindia.com/news/science-technology/drdo-scientists-conceive-new-technique-to-detect-malware-on-mobile-phones-409441>



Mon, 04 Jul 2022

## Short-Range Missiles Added to India's Air Defence Shield; Navy Gets More Muscle

India's efforts to bolster the country's missile defence shield have recently led to successful test-firing of short-range missiles. The Vertical Launch Short Range Surface to Air Missile was successfully flight-tested by Defence Research and Development Organisation (DRDO) and the Navy at Integrated Test Range at Chandipur off the coast of Odisha on June 24.



The VLSRAM was successfully flight-tested by DRDO and the Navy at Integrated Test Range at Chandipur off the coast of Odisha on June 24

The MoD said it is a ship-borne weapons system, meant for neutralising aerial threats at close ranges including sea-skimming targets. Also, a successful training launch of a Short-Range Ballistic Missile, Prithvi-II, was carried out on June 15. The Ministry of Defence (MoD) said Prithvi-II “is a proven system and is capable of striking targets with a very high degree of precision.” The user training launch successfully validated all operational and technical parameters of the missile. “With time, we have succeeded in producing complex offensive and defensive missile systems on our own.

The country's missile technology has acquired the capability of the reliable pin-pointed strike on enemy's sensitive targets,” defence analyst Lt-Gen VK Chaturvedi (Retd) said. Between August 2020 and April 2022, the MoD has released three lists of 310 military equipment and systems,



including various types of missiles which, in phases, will be developed indigenously. In addition, the government has set a target of touching defence exports worth \$5 billion by 2024. In the process, India has got a contract of \$374.96 million (Rs 2,700 crore) from the Philippines for three batteries of the BrahMos cruise missile.

<http://www.indiandefensenews.in/2022/07/short-range-missiles-added-to-indias.html>

## Defence News

### Defence Strategic: National/International



पत्र सूचना कार्यालय  
भारत सरकार

रक्षा मंत्रालय

सोमवार, 04 जुलाई 2022 4:20PM अपराह्न

## विशाखापत्तनम में एएलएच स्क्वाड्रन आईएनएस 324 कमीशन किया गया

4 जुलाई 2022 को इंडियन नेवल एयर स्क्वाड्रन 324 को पूर्वी नौसेना कमान के फ्लैग ऑफिसर कमांडिंग-इन-चीफ वाइस एडमिरल बिस्वजीत दासगुप्ता, एवीएसएम, वाईएसएम, वीएसएम की उपस्थिति में आईएनएस डेगा, विशाखापत्तनम में आयोजित एक प्रभावशाली कमीशनिंग समारोह में भारतीय नौसेना में शामिल किया गया। यह यूनिट पूर्वी समुद्र तट पर स्वदेशी रूप से डिजाइन और निर्मित उन्नत हल्के हेलीकाप्टर (एएलएच) एमके III (एमआर) हेलीकाप्टरों का संचालन करने वाली नौसेना की पहली स्क्वाड्रन है।



आईएनएस 324 को "केस्ट्रेल्स" नाम दिया गया है जो शिकारी पक्षी हैं और इनमें अच्छी संवेदी क्षमताएं हैं जो एयरक्राफ्ट एवं इस एयर स्क्वाड्रन की इच्छित भूमिका का प्रतीक हैं। स्क्वाड्रन का प्रतीक चिन्ह एक 'केस्ट्रेल' को दर्शाता है जो विशाल नीली और सफेद समुद्री लहरों पर खोज कर रहा है, जो इस स्क्वाड्रन की अभिन्न समुद्री टोही (एमआर) तथा खोजबीन एवं बचाव (एसएआर) भूमिका को दर्शाता है।

एएलएच एमके III हेलीकॉप्टर अत्याधुनिक उपकरणों से सुसज्जित हैं जिनमें आधुनिक निगरानी रडार और इलेक्ट्रो-ऑप्टिकल सेंसर शामिल हैं। इन फ्लाइटिंग मशीनों को शामिल किया जाना भारत सरकार की 'आत्मनिर्भर भारत' पहल के अनुरूप है, क्योंकि इन्हें हिंदुस्तान एयरोनॉटिक्स लिमिटेड (एचएएल) द्वारा विकसित व निर्मित किया गया है। समुद्री टोही (एमआर) तथा खोजबीन एवं बचाव (एसएआर) की अपनी मुख्य भूमिकाओं के अलावा इन हेलीकॉप्टरों को मानवीय सहायता एवं आपदा राहत (एचएडीआर) संचालन के साथ-साथ समुद्री कमांडो के साथ स्पेशल ऑपरेशन्स के लिए भी तैनात किया जा सकता है। गंभीर रूप से बीमार रोगियों की चिकित्सा संबंधी निकासी की सुविधा के लिए हेलीकॉप्टर में एयर एम्बुलेंस भूमिका में उपयोग के लिए एक हवाई चिकित्सा गहन देखभाल इकाई (एमआईसीयू) भी है।

सभा को संबोधित करते हुए वाइस एडमिरल बिस्वजीत दासगुप्ता ने कहा कि पूर्वी नौसेना कमान में पहली एएलएच एमके III स्क्वाड्रन के चालू होने से पूर्वी समुद्र तट पर निगरानी क्षमता में वृद्धि होगी।

आईएनएएस 324 की कमान कमांडर एसएस डैश द्वारा संभाली गई है, जो सैन्य अभियान के अपने व्यापक अनुभव के साथ एक कुशल और अत्यधिक अनुभवी एएलएच क्वालिफाइड फ्लाइटिंग इंस्ट्रक्टर हैं।

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1839174>



Mon, 04 Jul 2022

## Indian Navy Commissions the First ALH Squadron INAS 324

In line with Atmanirbhar Bharat initiative of the government, the first Indian Naval Air Squadron (INAS) 324 on the Eastern Seaboard operating the Advanced Light Helicopter MK III was commissioned today. These helicopters are indigenously designed and built by state-owned Hindustan Aeronautics Limited (HAL). According to an official statement, Indian Naval Air Squadron 324 was commissioned in the presence of Vice Admiral Biswajit Dasgupta, Flag Officer Commanding-in-Chief, Eastern Naval Command. At a ceremony held at INS Dega, Visakhapatnam on Monday (July 4, 2022), INAS 324 has been named "KESTRELS". These are birds of prey and



The Squadron insignia depicts a 'KESTREL' which is searching over vast blue and white sea waves.

have good sensory capabilities. The name symbolizes the envisaged role of the aircraft and the Air Squadron of the Navy. The Squadron insignia depicts a 'KESTREL' which is searching over vast blue and white sea waves. This according to the Navy signifies the main role of the Squadron — Maritime Reconnaissance (MR) and Search and Rescue (SAR).

### **More about ALH MK III**

These helicopters are fitted with state-of-the-art equipment. They come equipped with electro-optical sensors and modern surveillance radar.

Besides being deployed for Humanitarian Assistance and Disaster Relief (HADR) Operations, they can be used in Special Operations with Marine Commandos.

Also, these helicopters which have an airborne Medical Intensive Care Unit (MICU) can be used as Air Ambulance and will be playing a very important role to help in the medical evacuation of critically ill patients.

In his address Vice Admiral Biswajit Dasgupta stated that ALH MK III Squadron in the Eastern Naval Command will help in strengthening the surveillance capability on the Eastern Seaboard.

The INAS 324 Squadron is being commanded by Commander SS Dash, who is a highly experienced ALH Qualified Flying Instructor and has extensive operational experience.

<https://www.financialexpress.com/defence/indian-navy-commissions-the-first-alh-squadron-inas-324/2582447/lite/>



*Mon, 04 Jul 2022*

## **Atmanirbhar Bharat in Defence: Indian Navy Plans to Induct 75 Indigenous Tech and Products in Service**

In the coming year the Indian Navy plans to develop and induct around 75 new indigenous technologies and products into the service. The number 75 is to celebrate 75 years of India's independence. In conjunction with Defence Innovation Organisation (DIO) the Indian Navy will be unveiling the problem statements for Indian Industries as part of iDEX (SPRINT) (Supporting Pole-Vaulting in R&D through iDEX, NIIO and TDAC).

This will be done during the NIIO Seminar 'Swavlamban 2022' scheduled to take place in New Delhi from July 18-19. According to an official statement by the Indian Navy, a MoU has been signed between the DIO and the NIIO. Under this the two bodies will work on a joint project named \*SPRINT\* (Supporting Pole-Vaulting in R&D through



**Technology Development Acceleration Cell is a dedicated organisation which is focused on innovation**

iDEX, NIO and TDAC).

And the purpose of the forthcoming seminar is, according to the navy, to engage the Indian Industry and Academia towards achieving ‘Self-reliance in Defence Sector’.

### **More about NIO**

‘Naval Innovation & Indigenisation Organisation’ (NIO) was launched in 2020 on August 13 by the defence minister Rajnath Singh under Defence Acquisition Policy (DAP 2020). The DAP 2020 envisages creation of ‘Innovation & Indigenisation Organisations (IIOs)’ within Service Headquarters.

It is a three-tiered mechanism and is headed by the Vice Chief of Naval Staff. At the top level, the Naval Technology Acceleration Council (NTAC) has been set up. NTAC will bring together two aspects of innovation and indigenisation and to enhance war-fighting capabilities help in speeding up induction of disruptive combat technology into the Navy.

This body since its inception meets every six months and gives apex-level directives.

### **Who is part of this?**

Ex-officio members, nominated members of proven technical expertise and standing – from among civilians, scientists, from industry and from the Indian Navy.

### **Naval Innovation & Indigenisation Organisation Working Group (NIO WG)**

Every two months this body meets to ensure seamless interactions between the Navy and the Ministry of Defence (MoD) in line with DAP.

NIO WG also functions as the Working Level Committee of the NTAC and the meeting of the working group is co-chaired by ACNS (SR)/ ACOM (MoD) as the lead sponsors of combat capability development.

### **Technology Development Acceleration Cell**

This is a dedicated organisation which is focused on innovation. Its role is to interact with industry and academia and to channel in-house innovations by naval personnel.

<https://www.financialexpress.com/defence/atmanirbhar-bharat-in-defence-indian-navy-plans-to-induct-75-indigenous-tech-and-products-in-service/2582472/lite/>



*Tue, 05 Jul 2022*

## **Navy to Develop, Induct About 75 New Indigenous Technologies, Products In Coming Year**

To celebrate the 75th year of independence, the Navy has proposed to develop and induct at least 75 new indigenous technologies and products in the coming year. An MoU has been signed between the Defence Innovation Organisation (DIO) and Naval Innovation and Indigenisation Organisation (NIO) to work on a collaborative project named "SPRINT" (Supporting Pole-Vaulting in R&D through iDEX, NIO and TDAC).

"The Indian Navy in conjunction with DIO shall be unveiling the problem statements for Indian industries as part of iDEX (SPRINT) during the NIIO seminar 'Swavlamban 2022' scheduled on July 18 and 19 at Dr Ambedkar International Centre," said Navy officials. The purpose of the seminar is to engage domestic Industry and academia, commented Navy officials, towards achieving self-reliance in the defence sector. The Navy has accepted the of Atmanirbhar Bharat challenge and reinvested over 64 per cent of its capital budget into the country's economy.

The NIIO was launched two years ago to realise Defence Acquisition Policy (DAP 2020) objectives which envisage creation of 'Innovation and Indigenisation Organisations (IIOs)' within service headquarters (SHQs).

Eastern Naval Command Gets First Air Squadron Indian Naval Air Squadron 324 was commissioned into the Navy in the presence of Vice Admiral Biswajit Dasgupta, Flag Officer Commanding-in-Chief, Eastern Naval Command, at a ceremony held at INS Dega, Visakhapatnam on Monday. The unit is the first naval squadron on the eastern seaboard operating the indigenously designed and built Advanced Light Helicopter (ALH) DHRUV MK-III (MR) helicopters. The INAS 324 has been named "KESTRELS" which are birds of prey and have superior sensory capabilities symbolising the envisaged role of the aircraft and the air squadron, said the defence ministry in a statement. The insignia of the squadron depicts a 'KESTREL' searching over blue and white sea waves, signifying the integral maritime reconnaissance (MR), and search and rescue (SAR) role of the squadron.

The helicopters are fitted with state-of-the-art equipment which includes modern surveillance radars and electro-optical sensors, added the ministry.

<http://www.indiandefensenews.in/2022/07/navy-to-develop-induct-about-75-new.html?m=1>



*Mon, 04 Jul 2022*

## **French Safran to Set-Up Engine MRO in India, Offers to Partner AMCA Project**

French aircraft engine major Safran is all set to announce a maintenance repair and overhaul (MRO) facility for leading edge aviation propulsion (LEAP) commercial aircraft engines in India as part of its offset commitments. The MRO facility, said to be based either in Hyderabad or Bengaluru, will apparently be announced tomorrow when Safran CEO Olivier Andres meets Indian Civil Aviation Minister Jyotiraditya Scindia. The MRO state-of-the-art facility will be set up through a 100 per cent Indian subsidiary route that will not only service some 330 engines used by Indian commercial carriers but also Safran-GE joint venture engines from other countries in South Asia, West Asia, and Africa. For the facility, SAFRAN is bringing in USD 150 million foreign direct investment with plans of moving into MRO of military engines used in Indian Air Force Rafale and Mirage 2000 fighters in the future to push the "Atmanirbhar Bharat" initiative. The French company is the supplier of M88 engines for IAF's recently acquired 26 Rafale multi-role fighters and is also the number one helicopter engine supplier to India.

Apart from the MRO facility, the French company has also submitted a proposal to the Indian government to co-develop with DRDO's Gas Turbine Research Establishment (GTRE) a new state-of-the-art 110 kilo newton thrust engine for India's futuristic advanced medium combat aircraft twin-engine AMCA fighter project. The cost per engine for 400 engines will work out to 10-12 million euros, which is what we pay for engines today, said a defence expert. That will be for 400 engines, which is what we would need for twin engine AMCAs if we have 6-7 squadrons. Will probably need more, the expert added.

The Safran offer is not subject to International Traffic in Arms Regulations (ITAR), a US regulatory regime to restrict and control the export of defence and military-related technologies to safeguard US national security and further US foreign policy objectives. This means that the proposed Safran-GTRE joint venture will be exporting military engines to third countries without being subjected to restrictive regimes. The French company believes that the new 110 KN engine could be certified by 2035, provided the co-development process gets a green signal this year. The full cost of co-development of the 110 KN engine will be around five to six billion euros.

While the DRDO is also looking at GE-414 engine to power the AMCA project as an alternative, the Safran offer contains performance guarantee, and transfer all required technology for design, development, production and support besides creating a robust industrial aero-engine ecosystem in India. The GTRE has been trying to develop the Kaveri aero-engine since 1996 and was originally developed to power Tejas LCA fighters. However, the engine was delinked from the Tejas program with the LCA now powered by GE-404 engines.

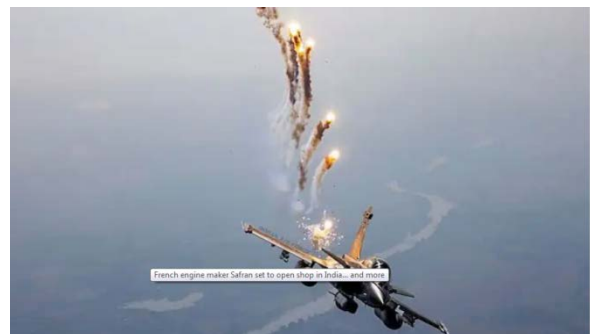
<https://www.hindustantimes.com/india-news/french-safran-to-set-up-engine-mro-in-india-offers-to-partner-amca-project-101656903652304.html>



*Mon, 04 Jul 2022*

## **French Engine Maker Safran Set to Open Shop in India and More**

"Other than the joint venture, the two sides will also discuss several projects that are in pipelines," sources in the HAL said. As per the reports, Safran will invest \$150 million in setting up the facility. Giving a further boost to the government's ambitious 'Aatmanirbhar Bharat' campaign, a team from French engine-maker Safran would fly to India to forge a joint venture with state-owned Hindustan Aeronautics Limited to set up a Maintenance Repair and Overhaul facility for leading-edge aviation propulsion (LEAP) commercial aircraft engines, this weekend. "Other than the joint venture, the two sides will also discuss several projects that are in pipelines," sources in the HAL said.



The MRO facility will be set up by the company as part of its offset commitments. As per the reports, Safran will invest \$150 million in setting up the facility.

At this facility, the company will also service engines from other Asian countries and Africa. It should be noted that the 36 Rafale fighter jets that the Indian Air Force acquired from France in readymade condition are equipped with Safran's M88 engines.

Besides, choppers like Dhruv and Rudra are also fitted with Safran's Indian variant of Shakti engines. In 2019, the French engine maker had given a proposal to the DRDO to co-develop with DRDO's Gas Turbine Research Establishment a 125kn thrust engine for the fifth-generation advanced medium combat aircraft twin-engine (AMCA) fighter project.

The project was discussed between External Affairs Minister S Jaishankar with French Defence Minister Florence Parly during his visit to Paris in February this year. In December 2021, Defence Minister Rajnath Singh announced that a major French engine-making company will invest in India to make the engine in strategic partnership with an Indian company. The announcement was made when his French counterpart Florence Parly was on an India visit.

The AMCA project, which is being designed and developed by the Aeronautical Development Agency, will be a 25-ton jet with an internal carriage of 1,500 kg of payload and a 5,500 kg external payload with 6,500 kg of internal fuel.

As per the reports, the Critical Design Review will be completed by end of this year and has been planned to roll out in 2024 with the first flight in 2025.

<https://newsable.asianetnews.com/india-defence/french-engine-maker-safran-set-to-open-shop-in-india-and-more-rehz37>



*Mon, 04 Jul 2022*

## **India Calls for Effective Execution of UN Instrument to Prevent Illicit Trade in Small Arms, Light Weapons to Deal With Terrorism**

India has emphasized the importance of full and effective implementation of the UN action plan to prevent illicit trade in small arms and light weapons, particularly their significance in dealing with the threat of terrorism as an important global challenge. Participating at the eighth biennial meeting of States on the implementation of the UN Programme of Action to prevent, combat and eradicate the illicit trade in Small Arms and Light Weapons (SALW) and the International Tracing Instrument for illicit SALW that was held recently, India also underlined the importance of international cooperation and assistance, particularly support to developing countries, in implementation of these instruments.

The meeting adopted an outcome document aimed at strengthening the implementation of the programme of action as well as the International Tracing Instrument against illicit trafficking of SALW, a statement issued by the Ministry of External Affairs said on Monday. India has urged strengthening the implementation of these instruments, including through improved national efforts in controlling and developing a mechanism for tracing illicit SALW, to make it more effective.

India also underlined the importance of international cooperation and assistance, particularly support to developing countries in the implementation of these instruments and a fellowship programme for them, the statement said. “During the meeting, India emphasized the importance of full and effective implementation of the UN Programme of Action and the International Tracing Instrument, particularly their significance in dealing with the threat of terrorism as an important global challenge”, the ministry said. The outcome document of the meeting recognised the adverse effects of the illicit arms trade in exacerbating terrorism and emphasized the role of these UN instruments in addressing the threat posed by terrorism, it said.

It also affirmed the resolve of states to enforce and apply adequate national controls to the entire lifecycle of SALW, the statement said. States also agreed to strengthen tracing measures for illicit small arms and explore means for enhancing international cooperation in tracing them with the involvement of the UN, it said. The meeting considered the implications of recent technological developments in the field of SALW, illicit trafficking concerns and ways to address their aggravating effects on the instruments. Towards the fourth review conference in 2024, the outcome document agreed on a comprehensive analysis of trends, challenges and opportunities in the implementation of these two UN instruments and consider recommendations on their effective implementation, the MEA said. The meeting was held in New York from June 27 to July 1, 2022.

<https://www.financialexpress.com/defence/india-calls-for-effective-execution-of-un-instrument-to-prevent-illicit-trade-in-small-arms-light-weapons-to-deal-with-terrorism/2582345/lite/>



*Mon, 04 Jul 2022*

## **India Beyond Earth: India’s Status in Space Military Race**

*By Vaibhav Agrawal*

The Indian defence establishment has historically been plagued by various interrelated issues, such as a sluggish procurement system, poor civil-military relations, and challenging inter-service integration. Space warfare requires a solid foundation of collaboration between military and civilian institutions, but if done well, it can enable close integration and even fusion between military and intelligence services. India’s efforts to acquire space capabilities should therefore be closely examined. Since the 1960s, India’s military and civilian space activities have been coordinated by the Indian Space Research Organization (ISRO), a civilian organization. However, India made significant institutional and scientific progress in 2019 toward assembling a globally competitive space warfare capability.

In March 2019, India successfully tested an anti-satellite weapon. There were some 400 fragments left after the satellite was destroyed, many of which stayed in low earth orbit for some time, despite the Indian government’s efforts to reduce the size of the debris field. In fielding an effective anti-satellite capability, the test put India in the same league as China, Russia, and the United States.



Perhaps more significantly, India established two new space agencies in 2019: the Defense Space Agency (DSA) and the Defense Space Research Organization (DSRO) (DSA). While the latter performs duties akin to those of a fighter command in the United States, integrating space assets from the army, navy, and air force and developing strategy, the former is a research organization geared toward facilitating the development of civilian space technology for military purposes. The Defense Satellite Agency (DSA), headed by an air force commander, assumed control of several existing military organizations, such as the Defense Imagery Processing and Analysis Center and the Defense Satellite Control Center, and started out with a staff of 200 officers from the three services.

In July 2019, all military members participated in India's first combined space warfare exercise. The exercise demonstrated an evident appreciation of the importance of having access to space by focusing on leveraging communications and reconnaissance satellites to integrate intelligence and firepower across the range of Indian military capabilities.



Some in the Indian defence community have advocated for more drastic changes, such as creating a military space service akin to the Space Force in the United States. This would make protecting India's expanding satellite network easier and set the stage for coercive measures against adversary networks. India is still well-positioned to benefit from its positive relations with Russia and the United States, the two most developed space powers in the world, even though it is still unclear whether India has the long-term technological and financial foundations required to support a separate space force.

### **India's Prime Time Concern Beyond Earth**

India's worries are centered on the Indian Ocean region, where China has been gaining power, and its Himalayan boundaries with China, where boundary disputes between the two countries have triggered military confrontations.

India claimed that Chinese troops had invaded its territory in a remote mountain region of Ladakh in the western Himalayas during the winter, when the ice-covered area was virtually inaccessible, leading to a months-long military confrontation between New Delhi and Beijing in 2020. Analysts in New Delhi had questioned why India had not previously been able to identify the purported Chinese incursions through satellite photography.

India's military services have just recently received communication and reconnaissance satellites; the first one went to the navy, tasked with protecting a vast coastline. There is a need to improve the military's space assets, mainly as China develops more advanced anti-space capabilities like cyber warfare. According to experts, India has a reasonably simple satellite programme. Additionally, compared to nations like China and the United States, it has few satellites. Therefore, the military would want to be able to quickly replace satellites in a situation where they could be destroyed or neutralized. Budget constraints, however, mean that India's defence-related space capabilities are still in their infancy.

India has had significant resource limitations. The country's defence spending has been falling behind its GDP in recent years. India is a minor actor compared to nations like China, the US, and Russia.

Space & Defence expert Omkar Nikam says that the world is looking toward the Indian space program because there is a strategic approach to developing space resources. As opposed to investing heavily in diverse fields, India has taken a bottom-to-top approach, where we first saw the launch segment strengthening the country's global position. With the recent developments in the privatization of the Indian space sector, there will be more rapid developments in civil, commercial, and defence programs. Though everything is progressing very well, in the coming years, India needs to strengthen its position in space applications for defence, as it is one of the verticals that require more attention from a strategic point of view.

### **How Beijing Consolidates Its Space Position**

China's ambitious space programme, which has a budget of \$8 billion, aims to build a permanent space station by 2022, a lunar research base by 2036, a solar power satellite (SPS) transmission capability from geostationary orbit (GEO) by 2050, and a global space leader by that same year.

Since 2007, Beijing has been testing an anti-satellite system as part of efforts to expand its military power beyond Earth. Without worrying that the United States will halt navigation services, it may autonomously direct missiles and bombs into set targets.

Before the People's Liberation Army Space Force was established, media sources indicated that China had institutionalized a separate space service (PLASSF). For the first time, the PLASSF unites China's expanding military space assets under a single organization with the goal of domination across the air, space, and cyber spheres.

Omkar opines that China's space approach can be described as RAPID, ACTIONABLE, and STRATEGIC. Looking back at history, China has single-handedly developed complex space capabilities, and within a decade (China privatized its space industry in 2015), the country has rapidly expanded the reach of its commercial space technologies. Though there are still several hurdles to cross, China has established a strong presence in the space domain by successfully launching its own navigation system, BeiDou. The Chinese space industry is evolving rapidly compared to others, and in the coming years, we might observe China's Belt Road Initiative (BRI) member nations joining or contributing to the Chinese space sector.

### **Latest Positive News for India**

Long-awaited was the defence ministry's decision to award the Army an Acceptance of Necessity (AoN) in March to acquire the domestic satellite GSAT 7B. Simply said, it arrived too late. The lengthy and arduous defence procurement process, which may or may not result in an order, begins with the AoN. This will be the first-ever dedicated communications satellite for the 13 lakh-strong Indian Army if and when the final order is placed. The Indian Space Research Organisation launched GSAT 7A for the Indian Air Military (IAF) in 2018, although the force lacked a dedicated satellite of its own and instead shared its services with that satellite (ISRO).

GSAT 7, the navy's primary communication satellite, was launched in 2013. As a replacement for the current GSAT 7, the navy has already placed an order to purchase the GSAT 7R satellite. In November of last year, the proposal to acquire the GSAT 7C satellite for the IAF was accepted by the Defence Acquisition Council (DAC). Nevertheless, even if one avoids drawing

comparisons with China—which has spent substantially over the past 20 years to develop space dominance—it is high time that India’s space reforms pick up speed.

This is due to India’s desire to better utilize space for purposes such as navigation, ballistic missile alerts, enhanced intelligence, surveillance, and reconnaissance (ISR) capabilities while remaining sufficiently self-sufficient for these.

While these capabilities will help India’s troops if they participate in a conventional military operation, it is equally crucial for the nation to have the capacity to stop its enemies’ coercive space acts that could be harmful to its interests.

### **Need For India to Augment Space Capabilities**

Currently, India possesses more than a dozen military satellites. The Indian military also uses a variety of commercial satellites and those run by friendly foreign nations in its operations.

Many of these are prohibitively expensive and carry the danger of service interruption in the event of emergencies. It is crucial to aggressively improve defence space capabilities as part of the “militarization of space” as India works to reduce defence spending and achieve self-reliance in the field. This includes launching more satellites into orbit, acquiring better sensors, high-speed communication, and practical and reusable ones, along with connected infrastructure.

Additionally, India must purchase sophisticated jammers for rogue satellites and safeguard its spacecraft from electronic assaults. The country is working to increase its military capabilities in the space domain to assert itself as a potent regional power in the future while pursuing its goal of becoming a global power. This is because India concentrates on cutting military spending, establishing self-reliance in defence, and developing deterrence against China’s growing space assets. However, the investments—whether financial or policy reforms—must be made because space is a high-expenditure industry, meaning that any returns would be gradual, incremental, and steady.

<https://www.financialexpress.com/defence/india-beyond-earth-indias-status-in-space-military-race/2582187/>



*Tue, 05 Jul 2022*

## **Australia May Not Accept India's G2G Tejas-Lift Trainer Deal**

Australia may not accept India’s government-to-government (G2G) defence deal offer for the supply of home-built Light Combat Aircraft (LCA) twin-seat Lead-In Fighter Trainer (LIFT) aircraft. India had offered to sell 35 TEJAS-LIFT aircraft to Australia through a G2G deal. Sources said that the Australian Deputy Prime Minister and Minister for Defence Richard Marles, who held talks with defence minister Rajnath Singh on June 22 in New Delhi, informally indicated Australia’s lack of interest in the Indian offer.

According to sources, India had made a formal offer for the TEJAS-LIFT G2G deal during the India-Australia bilateral defence talks in New Delhi on September 10, 2021. India wanted to

supply TEJAS-LIFT, which is to be built by state-owned Hindustan Aeronautics Ltd (HAL), for the Royal Australian Air Force. The deal was reportedly worth over US \$1 billion with a unit cost of around \$40 million. The Royal Australian Air Force had on June 2, 2021 issued a Request for Information (RFI) for procurement of future LIFT aircraft for replacement of its existing trainers. Boeing of US, BAE Systems of the UK, , Leonardo SpA of Italy, Hindustan Aeronautics Ltd of India and Korea Aerospace Industries of South Korea have responded to the RFI.



**HAL built trainer during a training sortie**

Boeing has offered its T-7A Red Hawk, BAE Systems has offered its upgraded Hawk, Leonardo has offered M-346 trainers, Korea Aerospace Industries has offered its T-50 advanced jet trainer, while Hindustan Aeronautics Ltd has offered its TEJAS-LIFT aircraft. HAL's LIFT aircraft will be utilised for fighter training after the advanced jet training stage and before the induction of pilots into a front-line fighter squadron. On LIFT, trainee pilots will get exposed to new technologies such as Helmet Mounted Display, Beyond Visual Range Missile, an advanced Active Electronically Scanned Array Radar, in-flight refuelling, etc. HAL Is expected to roll out its first TEJAS-LIFT aircraft in 2025.

<http://www.indiandefensenews.in/2022/07/australia-may-not-accept-indias-g2g.html?m=1>



*Mon, 04 Jul 2022*

## **Russia to Supply More CKD Kits for Sukhoi-30MKI**

In the backdrop of the ongoing Russia-Ukraine situation, Rosoboronexport of Russia, within the framework of the “Make in India programme”, is ready to supply additional completely knocked down kits for the assembly of the Su-30MKI. The Russian export agency is also ready to carry out joint work on the modernization, including the integration of the latest air weapons, avionics, etc., on the Su-30 MKI.

The Su-30 MKI which is the backbone of the Indian Air Force is being manufactured in India under license at state owned Hindustan Aeronautics Limited (HAL). And under the existing portfolio of aviation projects, the Russian company is also involved in developing technological cooperation in a broad range of areas.

The 2022 year marks the 45th anniversary of the maiden flight of the Su-27 fighter prototype which has been developed by the Sukhoi Experimental Design Bureau and that's how the family of Su-27/Su-30 fighter jets emerged. **More about Su-27/Su-30**

The aircraft has been designed by Pavel Osipovich Sukhoi personally and his team of the Design Bureau. He and his team managed to get a perfect technical formula which made the Sukhoi brand a global success. According to an official note from Rosoboronexport, in the 21st century, this fighter jet has become one of the most in-demand fighters in the world.



The aircraft has been designed by Pavel Osipovich Sukhoi personally and his team of the Design Bureau

Its global customers include: India, Indonesia, Kazakhstan, China, Angola, Belarus, Venezuela, Vietnam, Uganda, Malaysia and others. From the Sukhoi family: The Su-30, Su-34 and Su-35, are the mainstay of the Russian Aerospace Forces. These fighter aircraft have successfully completed several important missions under adverse conditions.

According to Vladimir Artyakov, First Deputy Director General of Rostec State Corporation, "Air superiority is a key factor in any confrontation and that is the reason why we pay great attention to developing new advanced platforms."

Adding, "The Su-27 at one time had become a technologically breakthrough machine and the progenitor of a whole family of outstanding aircraft."

### **For Exports**

Su-30SME, Su-34E and Su-35 4+/4++ generation aircraft are for exports to air forces across the globe. Since 2000, the company has so far delivered about 700 Su-27/Su-30 combat aircraft globally. And the avionics, engines, systems, weapons, and components in this aircraft are all made in Russia. "Over the past 10 years, the share of aircraft supplies in Russia's total arms exports has stood at 40-50%, and even exceeds this figure today," said Alexander Mikheev, Director General of Rosoboronexport. Because of an open architecture of avionics and weapons systems, the foreign customers are able to integrate locally made air-launched weapons and also systems to customize the fighters as per their requirement.



### **Su-30SM and Su-35 aircraft**

According to the Russian Ministry of Defense these have the capability to effectively intercept air targets and also attack military installations with precision-guided weapons from low,

medium and high altitudes. The Su-35 is a powerful 4++ generation aircraft system and it incorporates fifth-generation fighter technologies. The airborne equipment enables the use of air weapons with maximum accuracy. It has the capability to handle the entire range of fighter missions over a wide altitude and speed envelope. And because it has a large number of hard points, 12 medium-range air-to-air guided missiles or 6 air-to-surface missiles can be used in one sortie. It can also act as an AWACS aircraft.

<https://www.financialexpress.com/defence/russia-to-supply-more-ckd-kits-for-sukhoi-30mki/2582410/lite/>

## Science & Technology News

# नवभारत टाइम्स

सोमवार, 04 जुलाई 2022

## नासा का उपग्रह पृथ्वी की कक्षा से अलग हुआ, चंद्रमा की ओर बढ़ा

वेलिंगटन, चार जुलाई (एपी) पृथ्वी की कक्षा में चक्कर लगा रहा माइक्रोवेव ओवन के आकार वाला नासा का एक उपग्रह सोमवार को सफलतापूर्वक कक्षा से अलग हो गया और अब यह चंद्रमा की तरफ बढ़ रहा है। चंद्रमा पर एक बार फिर अंतरिक्ष यात्री भेजने की योजना के तहत नासा (नेशनल एरोनॉटिक्स एंड स्पेस एडमिनिस्ट्रेशन) का यह नवीनतम कदम है। 'कैप्स्टन' उपग्रह का सफर पहले से ही कई मायने में असामान्य रहा है। इस उपग्रह को छह दिन पहले न्यूजीलैंड के माहिआ प्रायद्वीप से प्रक्षेपित किया गया था। इसे रॉकेट लैब कंपनी ने अपने छोटे से इलेक्ट्रॉन रॉकेट से प्रक्षेपित किया था।

इस उपग्रह को अब चांद पर पहुंचने में चार महीने और लगेंगे। फिलहाल यह उपग्रह कम से कम ऊर्जा का उपभोग करते हुए अकेले ही चांद की ओर बढ़ रहा है। रॉकेट लैब के संस्थापक पीटर बेक ने 'द एसोसिएटेड प्रेस' से कहा कि उनके लिए अपने उत्साह को शब्दों में बयां कर पाना कठिन है।

बेक ने कहा, "इस परियोजना पर हमने दो-ढाई साल का समय लगाया। इसका क्रियान्वयन बहुत ही कठिन था।" बेक ने कहा कि सापेक्षिक दृष्टि से कम लागत वाला यह अभियान अंतरिक्ष अभियान की दिशा में नये युग की शुरुआत करेगा। नासा ने इस पर 3.27 करोड़ अमेरिकी डॉलर खर्च किये हैं।

बेक ने कहा कि अब कुछ करोड़ अमेरिकी डॉलर में आप के पास रॉकेट और अंतरिक्षयान होंगे, जो आप को सीधे चंद्रमा, क्षुद्रग्रहों और शुक्र तथा मंगल ग्रह पर ले जाएंगे। उन्होंने कहा कि यदि आगे का अभियान सफल रहता है, तो कैप्स्टन उपग्रह अहम सूचनाएं महीनों तक भेजता रहेगा। नासा की योजना कक्षीय मार्ग में एक गेटवे नामक अंतरिक्ष केंद्र स्थापित करने की है, जहां से अंतरिक्ष यात्री इसके अर्टेमिस कार्यक्रम के

तहत चंद्रमा की सतर पर उतर सकेंगे। बेक के मुताबिक नई कक्षा का महत्व यह है कि इससे ईंधन का इस्तेमाल कम हो जाता है, और यह उपग्रह या अंतरिक्ष स्टेशन को धरती के लगातार संपर्क में रखती है।

न्यूजीलैंड से 28 जून को प्रक्षेपित किया गया इलेक्ट्रॉन रॉकेट अपने साथ 'फोटोन' नामक एक दूसरा अंतरिक्ष यान ले जा रहा था।

अंतरिक्ष यान के इंजन के सोमवार को समय-समय पर चलने पर 'फोटोन' पृथ्वी के गुरुत्वाकर्षण खिंचाव से अलग हो गया और इसने उपग्रह को उसके रास्ते पर भेज दिया।

<https://navbharattimes.indiatimes.com/india/nasa-satellite-detaches-from-earths-orbit-and-moves-towards-moon/articleshow/92658039.cms>



*Mon, 04 Jul 2022*

## **Google's Powerful Artificial Intelligence Spotlights a Human Cognitive Glitch**

**By Kyle Mahowald and Anna A. Ivanova**

It is easy for people to mistake fluent speech for fluent thought. When you read a sentence like this one, your past experience leads you to believe that it's written by a thinking, feeling human. And, in this instance, there is indeed a human typing these words: [Hi, there!] But these days, some sentences that appear remarkably humanlike are actually generated by AI systems that have been trained on massive amounts of human text.

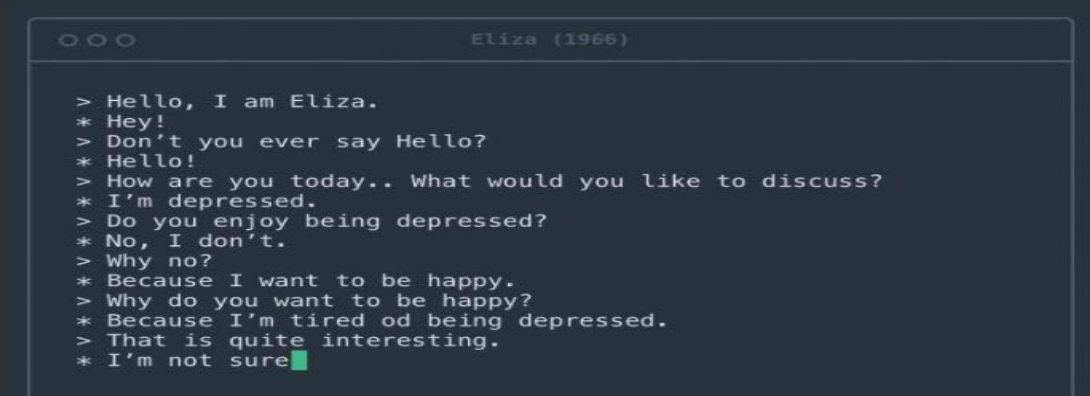
People are so accustomed to presuming that fluent language comes from a thinking, feeling human that evidence to the contrary can be difficult to comprehend. How are people likely to navigate this relatively uncharted territory? Because of a persistent tendency to associate fluent expression with fluent thought, it is natural – but potentially misleading – to think that if an artificial intelligence model can express itself fluently, that means it also thinks and feels just like humans do.

As a result, it is perhaps unsurprising that a former Google engineer recently claimed that Google's AI system LaMDA has a sense of self because it can eloquently generate text about its purported feelings. This event and the subsequent media coverage led to a number of rightly skeptical articles and posts about the claim that computational models of human language are sentient, meaning capable of thinking, feeling, and experiencing.

The question of what it would mean for an AI model to be sentient is actually quite complicated (see, for instance, our colleague's take), and our goal in this article is not to settle it. But as language researchers, we can use our work in cognitive science and linguistics to explain why it is all too easy for humans to fall into the cognitive trap of assuming that an entity that can use language fluently is sentient, conscious, or intelligent.

## Using AI to generate human-like language

Text generated by models like Google’s LaMDA can be hard to distinguish from text written by humans. This impressive achievement is a result of a decadeslong program to build models that generate grammatical, meaningful language.



```
ELIZA (1966)
> Hello, I am Eliza.
* Hey!
> Don't you ever say Hello?
* Hello!
> How are you today.. What would you like to discuss?
* I'm depressed.
> Do you enjoy being depressed?
* No, I don't.
> Why no?
* Because I want to be happy.
> Why do you want to be happy?
* Because I'm tired od being depressed.
> That is quite interesting.
* I'm not sure
```

The first computer system to engage people in dialogue was psychotherapy software called Eliza, built more than half a century ago. Credit: Rosenfeld Media/Flickr. [CC BY](#)

Early versions dating back to at least the 1950s, known as n-gram models, simply counted up occurrences of specific phrases and used them to guess what words were likely to occur in particular contexts. For instance, it’s easy to know that “peanut butter and jelly” is a more likely phrase than “peanut butter and pineapples.” If you have enough English text, you will see the phrase “peanut butter and jelly” again and again but might never see the phrase “peanut butter and pineapples.” Today’s models, sets of data and rules that approximate human language, differ from these early attempts in several important ways. First, they are trained on essentially the entire internet. Second, they can learn relationships between words that are far apart, not just words that are neighbors. Third, they are tuned by a huge number of internal “knobs” – so many that it is hard for even the engineers who design them to understand why they generate one sequence of words rather than another. The models’ task, however, remains the same as in the 1950s: determine which word is likely to come next. Today, they are so good at this task that almost all sentences they generate seem fluid and grammatical.

### Peanut butter and pineapples?

We asked a large language model, GPT-3, to complete the sentence “Peanut butter and pineapples\_\_\_”. It said: “Peanut butter and pineapples are a great combination. The sweet and savory flavors of peanut butter and pineapple complement each other perfectly.” If a person said this, one might infer that they had tried peanut butter and pineapple together, formed an opinion and shared it with the reader.

But how did GPT-3 come up with this paragraph? By generating a word that fit the context we provided. And then another one. And then another one. The model never saw, touched or tasted pineapples – it just processed all the texts on the internet that mention them. And yet reading this paragraph can lead the human mind – even that of a Google engineer – to imagine GPT-3 as an intelligent being that can reason about peanut butter and pineapple dishes. Large AI language models can engage in fluent conversation. However, they have no overall message to communicate, so their phrases often follow common literary tropes, extracted from the texts they were trained on. For instance, if prompted with the topic “the nature of love,” the



model might generate sentences about believing that love conquers all. The human brain primes the viewer to interpret these words as the model's opinion on the topic, but they are simply a plausible sequence of words. The human brain is hardwired to infer intentions behind words. Every time you engage in conversation, your mind automatically constructs a mental model of your conversation partner. You then use the words they say to fill in the model with that person's goals, feelings and beliefs. The process of jumping from words to the mental model is seamless, getting triggered every time you receive a fully fledged sentence. This cognitive process saves you a lot of time and effort in everyday life, greatly facilitating your social interactions.

However, in the case of AI systems, it misfires – building a mental model out of thin air. A little more probing can reveal the severity of this misfire. Consider the following prompt: “Peanut butter and feathers taste great together because\_\_\_”. GPT-3 continued: “Peanut butter and feathers taste great together because they both have a nutty flavor. Peanut butter is also smooth and creamy, which helps to offset the feather's texture.” The text in this case is as fluent as our example with pineapples, but this time the model is saying something decidedly less sensible. One begins to suspect that GPT-3 has never actually tried peanut butter and feathers.

### **Ascribing intelligence to machines, denying it to humans**

A sad irony is that the same cognitive bias that makes people ascribe humanity to GPT-3 can cause them to treat actual humans in inhumane ways. Sociocultural linguistics – the study of language in its social and cultural context – shows that assuming an overly tight link between fluent expression and fluent thinking can lead to bias against people who speak differently. For instance, people with a foreign accent are often perceived as less intelligent and are less likely to get the jobs they are qualified for. Similar biases exist against speakers of dialects that are not considered prestigious, such as Southern English in the U.S., against deaf people using sign languages, and against people with speech impediments such as stuttering.

These biases are deeply harmful, often lead to racist and sexist assumptions, and have been shown again and again to be unfounded.

### **Fluent language alone does not imply humanity**

Will AI ever become sentient? This question requires deep consideration, and indeed philosophers have pondered it for decades. What researchers have determined, however, is that you cannot simply trust a language model when it tells you how it feels. Words can be misleading, and it is all too easy to mistake fluent speech for fluent thought.

<https://scitechdaily.com/googles-powerful-artificial-intelligence-spotlights-a-human-cognitive-glitch/amp/>

## **Explained: What is the Large Hadron Collider, now readying to seek answers to fundamental questions of particle physics?**

The world's most powerful particle collider, the Large Hadron Collider (LHC), will begin smashing protons into each other at unprecedented levels of energy beginning July 5.

Scientists will record and analyse the data, which are expected to throw up evidence of “new physics” — or physics beyond the Standard Model of Particle Physics, which explains how the basic building blocks of matter interact, governed by four fundamental forces.



Structurally, the LHC is a 27-km-long track-loop buried 100m underground on the Swiss-French border.

### **The LHC**

The Large Hadron Collider is a giant, complex machine built to study particles that are the smallest known building blocks of all things. Structurally, it is a 27-km-long track-loop buried 100 metres underground on the Swiss-French border. In its operational state, it fires two beams of protons almost at the speed of light in opposite directions inside a ring of superconducting electromagnets.

The magnetic field created by the superconducting electromagnets keeps the protons in a tight beam and guides them along the way as they travel through beam pipes and finally collide.

“Just prior to collision, another type of magnet is used to ‘squeeze’ the particles closer together to increase the chances of collisions. The particles are so tiny that the task of making them collide is akin to firing two needles 10 km apart with such precision that they meet halfway,” according to the European Organisation for Nuclear Research (originally Conseil Européen pour la Recherche Nucléaire, or CERN, in French), which runs the particle accelerator complex that houses the LHC. Since the LHC’s powerful electromagnets carry almost as much current as a bolt of lightning, they must be kept chilled. The LHC uses a distribution system of liquid helium to keep its critical components ultracold at minus 271.3 degrees Celsius, which is colder than interstellar space. Given these requirements, it is not easy to warm up or cool down the gigantic machine.

### **Latest upgrade**

Three years after it shut down for maintenance and upgrades, the collider was switched back on this April. This is the LHC’s third run, and from Tuesday, it will operate round-the-clock for four years at unprecedented energy levels of 13 tera electron volts. (A TeV is 100 billion, or 10-to-the-power-of-12, electron volts. An electron volt is the energy given to an electron by accelerating it through 1 volt of electric potential difference.)

“We aim to be delivering 1.6 billion proton-proton collisions per second” for the ATLAS and CMS experiments, CERN’s head of accelerators and technology Mike Lamont said, according to an AFP report. This time, the proton beams will be narrowed to less than 10 microns — a human hair is around 70 microns thick — to increase the collision rate, he said. (ATLAS is the largest general purpose particle detector experiment at the LHC; the Compact Muon Solenoid (CMS) experiment is one of the largest international scientific collaborations in history, with the same goals as ATLAS, but which uses a different magnet-system design.)

### **Previous runs & ‘God Particle’ discovery**

Ten years ago, on July 4, 2012, scientists at CERN had announced to the world the discovery of the Higgs boson or the ‘God Particle’ during the LHC’s first run. The discovery concluded the decades-long quest for the ‘force-carrying’ subatomic particle, and proved the existence of the Higgs mechanism, a theory put forth in the mid-sixties. This led to Peter Higgs and his collaborator François Englert being awarded the Nobel Prize for physics in 2013. The Higgs boson and its related energy field are believed to have played a vital role in the creation of the universe. The LHC’s second run (Run 2) began in 2015 and lasted till 2018. The second season of data taking produced five times more data than Run 1. The third run will see 20 times more collisions as compared to Run 1.

### **‘New Physics’**

After the discovery of the Higgs boson, scientists have started using the data collected as a tool to look beyond the Standard Model, which is currently the best theory of the most elementary building blocks of the universe and their interactions. Scientists at CERN say they don’t know what Run 3 will reveal; the hope is to use the collisions to further the understanding of so-called “dark matter”. This hard-to-detect, hoped-for particle is believed to make up most of the universe, but is completely invisible as it does not absorb, reflect, or emit light.

<https://indianexpress.com/article/explained/everyday-explainers/explained-what-is-the-large-hadron-collider-answers-fundamental-questions-particle-physics-8008780/>

