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समाचार पत्रों से चयित अंश Newspapers Clippings

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Wed, 03 Feb 2021

India today offers a unique opportunity in defence and aerospace manufacturing, says Rajnath Singh | Top points

Organised every two years, Aero India is a platform for aerospace enthusiasts, prospective defence industries, aspirant start-ups and other stakeholders to participate and witness the advances in global defence and aerospace fields and interact with delegations and industries from across the globe

New Delhi: Defence Minister Rajnath Singh on Wednesday attended the inaugural ceremony of Aero India show in Bengaluru.

The 13th edition of the Aero India international air show, organised by the Defence Research and Development Organisation (DRDO) will kickstart today at Air Force Station Yelahanka, Bengaluru.

Here is what he said:

I am happy to inform, that the reforms aimed at bringing ease in doing business, have shown good results. India has recorded a jump of 14 positions against its rank of 77 in 2019 to be placed now at 63rd rank among 190 countries assessed by the World Bank: RM

Over the years, the Government of India has facilitated establishment of wide-ranging production facilities, of various defence equipment through Defence Public Sector Undertakings and Ordnance Factories: RM

Newly introduced (Buy Global – Manufacture in India) category of capital procurement in DAP 2020 allows outright purchase of equipment from foreign vendors, followed by indigenous manufacture through its subsidiary in India or through a Joint Venture or through an Indian Agency: RM

The Government of India has enhanced FDI in Defence Sector up to 74% through the Automatic Route and 100% through the Government route, which would act as a catalyst for foreign players to invest in India:

We have taken many steps to strengthen our security apparatus recently. Domestic manufacturing of bigger and complex defence platforms has now become the focus of our policy under the “Atmanirbhar Bharat Abhiyan”. We plan to spend 130 Billion Dollar on military modernization: RM



India today offers a unique opportunity in defence and aerospace manufacturing. This opportunity comes as a “Sangam” of rising demand, greater innovation, conducive policies and maturing ecosystem in defence and aerospace manufacturing sector: RM

I have been informed that about 540 exhibitors including 80 foreign companies, Defence Ministers, Delegates, Service chiefs and officials from more than 55 nations are participating in the event. It reflects the growing optimism of the global community: RM

In order to maximize the reach and participation, the event is being conducted in a hybrid format with a concurrent Virtual Exhibition which will integrate the Seminars, B2B interactions etc. It will be not incorrect to say, that Aero India 21 has truly gone digital and global:RM

The Aero India 21 will display the vast potential of India, and the multifarious opportunities that our country offers in the field of defence and aerospace sector. It also promises to be the World’s First Ever Hybrid Aero & Defence exhibition: Raksha Mantri

Despite the constraints caused by the global pandemic, I am pleased to see such a large number of participants in this year’s event. It is coming from the world’s leading nations in the field of military and aviation: RM

India has endeavoured to bring out, not one but two indigenous vaccines and started the largest vaccine drive to inoculate 270 million people. Our concern extends to people across boundaries, under which India offers more than 20 million doses to friendly countries: RM

The year 2020 has been a challenging year for the entire world, and has adversely impacted the lives, livelihood, industrial growth, and economy of many countries: RM

In the universe of aviation, this show is one of the brightest galaxies, that is accompanied by a wide variety of options, solutions, partnerships and most importantly opportunities: RM

The existing supply chains, developed by aerospace and engineering firms, an investor friendly government, with simplified procedures & fast-track business approvals through single window mechanism, combine to make Karnataka a very attractive destination for the industry: RM

A hearty welcome to you all to Aero India 2021. I am delighted to see the Defence Ministers, senior defence officials and business leaders from around the world in this 13th edition of Aero India, the largest Aero show in Asia: Raksha Mantri

<https://newsroompost.com/india/aero-india-2021-india-today-offers-a-unique-opportunity-in-defence-and-aerospace-manufacturing-says-rajnath-singh/576135.html>

Aero India 2021: डिफेंस व एयरोस्पेस के क्षेत्र में विविध अवसरों को प्रदर्शित करेगा एयरो इंडिया - राजनाथ सिंह

देश की प्रमुख एयरो स्पेस और रक्षा प्रदर्शनी एयरो इंडिया-2021 के 13 वें संस्करण का आयोजन बेंगलुरु के येलहंका एयरफोर्स स्टेशन पर हो रहा है। इस दौरान रक्षा मंत्रालय ने 83 एलसीए तेजस लड़ाकू विमानों का अनुबंध एचएएल को सौंपा।

By Tanisk

बेंगलुरु: देश की प्रमुख एयरो स्पेस और रक्षा प्रदर्शनी एयरो इंडिया-2021 के 13 वें संस्करण का आयोजन बेंगलुरु के येलहंका एयरफोर्स स्टेशन पर हो रहा है। डिफेंस रिसर्च एंड डेवलपमेंट ऑर्गनाइजेशन (DRDO) इसका आयोजन कर रहा है। इस दौरान रक्षा मंत्री राजनाथ सिंह ने कहा कि वैश्विक महामारी के कारण उत्पन्न बाधाओं के बावजूद, इस वर्ष के आयोजन में इतनी बड़ी संख्या में प्रतिभागियों को देखकर प्रसन्नता हो रही है। एयरो इंडिया 2021 भारत की विशाल क्षमता और हमारे देश में डिफेंस और एयरोस्पेस के क्षेत्र में विविध अवसरों को प्रदर्शित करेगा। यह निवेश को बढ़ावा देगा, विनिर्माण का विस्तार करेगा, उद्यमों का समर्थन करेगा, प्रौद्योगिकी के स्तर की सराहना और वृद्धि करेगा और देश के लिए आर्थिक विकास को बढ़ावा देगा।

रक्षा मंत्री ने यह भी कहा, 'मुझे बहुत खुशी है कि एचएएल को 83 नए स्वदेशी लाइट कॉम्बैट एयरक्राफ्ट (LCA) के विकास के ऑर्डर मिले हैं। भारतीय वायु सेना से तेजस MK1A का मूल्य 48,000 करोड़ रुपये से अधिक है। यह अब तक का सबसे बड़ा 'मेक इन इंडिया' डिफेंस कॉन्ट्रैक्ट है।'



राजनाथ सिंह ने कहा, 'मुझे बताया गया है कि लगभग 80 विदेशी कंपनियों, रक्षा मंत्रियों, प्रतिनिधियों, सेवा प्रमुखों और 55 से अधिक देशों के अधिकारियों सहित लगभग 540 प्रदर्शक इस आयोजन में भाग ले रहे हैं। यह वैश्विक समुदाय के बढ़ते आशावाद को दर्शाता है।'

इससे पहले रक्षा मंत्रालय ने 83 एलसीए तेजस लड़ाकू विमानों का अनुबंध एचएएल को सौंपा। कर्नाटक मुख्यमंत्री बीएस येदियुरप्पा भी मौजूद हैं। प्रधानमंत्री नरेंद्र मोदी ने कहा कि भारत रक्षा और एयरोस्पेस में असीमित क्षमता प्रदान करता है। इन क्षेत्रों में सहयोग के लिए एयरो इंडिया एक अद्भुत मंच है। भारत सरकार ने इन क्षेत्रों में भविष्य के मद्देनजर सुधार लाए हैं।

बता दें कि आत्मनिर्भर भारत' और 'मेक इन इंडिया' अभियान को बल देने वाले इस हाईब्रिड एयर शो में फिजिकल और वर्चुअल प्रदर्शनी का पहली बार समावेश होगा। इस शो में भारत से रक्षा क्षेत्र में साझेदारी के इरादे से अमेरिकी सरकार का प्रतिनिधिमंडल और रक्षा उद्योग के अधिकारी भी शामिल होंगे। इस एयरोस्पेस शो में शामिल होने के लिए 31 जनवरी को कराए गए कोविड-19 के आरटी-पीसीआर टेस्ट में नेगेटिव आना जरूरी है। इस तीन दिवसीय एयरो शो में हर दिन तीन हजार लोग शामिल होंगे। प्रदर्शनी में कुल 601 कंपनियां शामिल हो रही हैं। इसमें से 523 भारतीय और 78 विदेशी कंपनी हैं। जबकि 14 देशों ने इसमें शामिल होने की पुष्टि कर दी है।

एक बयान के अनुसार, डीआरडीओ अपनी नवीनतम रक्षा तकनीकों और कई प्रणालियों का प्रदर्शन करेगा। एयरबोर्न अर्ली वार्निंग एंड कंट्रोल (AEW & C) सिस्टम, लाइट कॉम्बैट एयरक्राफ्ट (LCA) तेजस और एलसीए नेवी के फ्लाइट डिस्प्ले इसके प्रमुख आकर्षण होंगे। एयरो इंडिया का आयोजन हर दो साल में होता है। यह एयरोस्पेस में रुची रखने वाले, भावी रक्षा उद्योगों, स्टार्ट-अप और अन्य हितधारकों को मंच मुहैया करता है। इसमें शामिल होकर उन्हें वैश्विक रक्षा और एयरोस्पेस क्षेत्र की प्रगति के बारे में जानकारी मिलती है। इसके अलावा उन्हें दुनियाभर में प्रतिनिधिमंडल और उद्योगों के साथ बातचीत करने का भी मौका मिलता है।

आत्मनिर्भर भारत की दिशा में काम कर रहा डीआरडीओ

बयान में कहा गया है कि संगठन अपनी विशाल रक्षा डिजाइन और विकास क्षमता के साथ आत्मनिर्भर भारत की दिशा में काम कर रहा है। उसने क्षेत्र के सभी हितधारकों के साथ मिलकर काम करने के लिए कई नीतिगत पहल की है। एयरोनॉटिकल डेवलपमेंट से जुड़ी डीआरडीओ की तीस से अधिक प्रयोगशालाएं इस मेगा इवेंट में अपने उत्पादों और तकनीकी उपलब्धियों का प्रदर्शन करेंगी। रक्षा मंत्री राजनाथ सिंह ने मंगलवार को शहर में हिंदुस्तान एयरोनॉटिक्स लिमिटेड (HAL) की दूसरी लाइट कॉम्बैट एयरक्राफ्ट (LCA) प्रोडक्शन लाइन का उद्घाटन किया और कहा कि भारत अपनी सीमाओं की रक्षा के लिए अन्य देशों पर निर्भर नहीं रह सकता है।

अमेरिकी बमवर्षक बढ़ाएगा रोमांच

एयर शो में अमेरिकी बमवर्षक विमान बी-1बी लांसर लोगों का रोमांच बढ़ाएगा। ये विमान साउथ डकोटा स्थित एल्सवर्थ एयरफोर्स बेस की 28वीं विंग का हिस्सा हैं। लंबी उड़ान भरने वाले इस सुपरसोनिक विमान ने अपने स्थायी बेस से दुनिया के कोने-कोने तक जाकर अपने अभियानों को पूरा किया है।

<https://www.jagran.com/news/national-aero-india-show-13th-edition-will-be-inaugurated-defence-minister-rajnath-singh-21331907.html>

Hindustan Aeronautics, Indian Air Force to sign Rs 48,000 crore Tejas aircraft deal on Wednesday

The mega contract will be signed at the Aero India air show in Bengaluru in presence of Defence Minister Rajnath Singh, top brass of the IAF and senior officials of the Hindustan Aeronautics

New Delhi: The government is set to formally seal on February 3 the Rs 48,000 crore deal to procure 83 Tejas light combat aircraft from state-run aerospace major Hindustan Aeronautics Limited for the Indian Air Force, officials said on Wednesday.

The mega contract will be signed at the Aero India air show in Bengaluru in presence of Defence Minister Rajnath Singh, top brass of the IAF and senior officials of the Hindustan Aeronautics Limited (HAL), they said.

Tejas is a single engine and highly agile multi-role supersonic fighter capable of operating in high-threat air environments. The aircraft, manufactured by the HAL, is a potent platform for air combat and offensive air support with reconnaissance and anti-ship operations as its secondary roles.

The Cabinet Committee on Security (CCS) chaired by Prime Minister Narendra Modi on January 13 approved the deal for procurement of the 73 Tejas Mk-1A variant and 10 LCA Tejas Mk-1 trainer aircraft from the HAL to boost Indian Air Force's combat prowess.

The Tejas Mk-1A will be equipped with an active electronically scanned array radar, beyond visual range missile, electronic warfare suite and air-to-air refuelling system.

Hindustan Aeronautics CMD R Madhavan told PTI last month that the delivery of the Tejas aircraft to the IAF will begin from March 2024 and around 16 aircraft will be rolled out annually till completion of the total supply of 83 jets.

Madhavan said the basic price of the aircraft will be around Rs 25,000 crore while Rs 11,000 crore will be used for ground support equipment and other required infrastructure at the bases and around Rs 7,000 for basic customs duty and output GST.

The HAL chairman and managing director said the cost for each fighter version of the four-and-half generation aircraft will be Rs 309 crore and Rs 280 crore for the trainer version.

The total cost of Rs 48,000 crore includes design and development cost of Rs 2,500 crore to be given to Aeronautical Development Agency (ADA) and around Rs 2,250 crore set aside for variations in foreign currency exchange rate.

<https://www.newindianexpress.com/nation/2021/feb/02/hindustan-aeronautics-indian-air-force-to-sign-rs-48000-crore-tejas-aircraft-deal-on-wednesday-2258619.html>



Tejas aircraft (File photo| Nagaraja Gadekal/ EPS)

Aero India: 13th edition of international air show to begin today

Rajnath Singh will release the DRDO export compendium, a new Procedure for Design, Development and Production of Military Aircraft and Airborne Stores (DDPMAS) document and other documents

Karnataka: The 13th edition of the Aero India international air show, organised by the Defence Research and Development Organisation (DRDO) will kickstart today at Air Force Station Yelahanka, Bengaluru.

During the event, Defence Minister Rajnath Singh will release the DRDO export compendium, a new Procedure for Design, Development and Production of Military Aircraft and Airborne Stores (DDPMAS) document and other documents.

As per a statement, the DRDO will exhibit its latest defence technologies and demonstrate many systems. One of the DRDO's major attractions will include flying displays of Airborne Early Warning and Control (AEW&C) system, Light Combat Aircraft (LCA) Tejas and LCA Navy.



Spectators crowd the static display area during rehearsals ahead of Aero India 2021 at Yelahanka air base in Bengaluru. (AP)

Organised every two years, Aero India is a platform for aerospace enthusiasts, prospective defence industries, aspirant start-ups and other stakeholders to participate and witness the advances in global defence and aerospace fields and interact with delegations and industries from across the globe.

"The Organisation with its vast defence design and development capability has been working towards Atmanirbhar Bharat and has taken up many policy initiatives to work closely with all stakeholders of the ecosystem. More than thirty laboratories of DRDO connected to aeronautical development are exhibiting their products and technological achievements in this mega event," the statement said.

Over 300 products, technologies and innovations will be showcased in indoor, outdoor, static and flying displays at the biennial event.

Keeping in view the ongoing Covid-19 pandemic, multimedia-based presentations and product and technology brochures are being provided digitally for download based on QR code.

The DRDO has also planned an enriching experience of indigenous defence technologies and systems in a bid to integrate stakeholders of defence systems development in the country. As many as 30 first time models will be on display.

On Tuesday, the Defence Minister had inaugurated Hindustan Aeronautics Limited's (HAL) second Light Combat Aircraft (LCA) production line in the city and said India cannot remain dependent on other countries for defending their borders.

"We cannot remain dependent on other countries for the defence of our country," said Singh assuring that HAL will get new orders in future.

(This story has been published from a wire agency feed without modifications to the text. Only the headline has been changed.)

<https://www.hindustantimes.com/india-news/aero-india-13th-edition-of-international-air-show-to-begin-today-101612319773276.html>



Wed, 03 Feb 2021

COVID-19 impact: Lesser foreign presence at Aero India 2021, Made in India on full display

By Ajit Dubey

Bengaluru (Karnataka) [India], February 2 (ANI): As the COVID-19 has disrupted all events across the globe, the impact of the pandemic is also explicitly visible in the 2021 edition of the biennial Aero India-2021 air show as very few foreign planes or equipment were part of both static and flying displays at the venue.

On Tuesday, a day before when the event is set to start, the flying display was mainly dominated by the Indian Air Force fleet aircraft along with the ones under development by the Hindustan Aeronautics Limited (HAL) like the Light Utility Helicopters and the Light Combat Helicopter.

In the static display too, the only foreign aircraft that could be seen was a Ukrainian transport plane otherwise it was all Indian Air Force and HAL planes.

The static display includes almost all the fighter aircraft in the Indian Air Force including the Rafale in Indian colours which have come to an air show for the first time. Previously, the French had been bringing the omnirole plane to the Indian air show but this time, they have not come due to the COVID-19.

The DRDO pavilion in the open display area would be showcasing the latest and first anti-radiation missile in the country Rudram-1 which can strike enemy radars and air defence systems at 200 kilometres while the BrahMos missile could be seen in the coastal air defence role for the Indian navy along with the air-launched variant.

The HAL display area has a huge mock-up of the CATS WARRIOR unmanned combat drone which looks like a futuristic weapon system taking the armed forces towards unmanned warfare in a big way. (ANI)

<https://www.zee5.com/zee5news/covid-19-impact-lesser-foreign-presence-at-aero-india-2021-made-in-india-on-full-display>



Aero India 2021: Rehearsals give a peek into aerobatics at 3-day event

By Kiran Parashar

Bengaluru: The Covid-19 pandemic may have pushed the organisers of Aero India to embrace the new normal and conduct the show amid a range of restrictions, but if Tuesday's rehearsals were any indication, it may not be completely bereft of colour.

The integrated aerobatic show of Surya Kiran and Sarang received a jawdropping response from a select audience, while other regular flypasts too saw necks crane. For the first time, the Surya Kiran, flying the fixed-wing Hawks, and Sarang, flying the rotary-wing ALH (Advanced Light Helicopter), showed a glimpse of what will be in store in the next three days.

In 2019, a couple of days before Aero India, Surya Kiran aerobatics team collided mid-air and Wing Commander Sahil Gandhi succumbed to injuries. Surya Kiran had displayed the 'missing man formation' in memory of Gandhi during the show.

The rehearsal had limited audience such as families of defence personnel and state officers. The public outside Air Force Station, Yelahanka, stood for hours to watch the show.

Besides Surya Kiran and Sarang integration, many aircraft including the US B-1B Lancer heavy bomber, DRDO-developed multisensor airborne early warning and control (AEW&C) Dornier E145, were the highlights of the rehearsal.

While last-minute preparations were being carried out, the Yelahanka air base wore a new look to welcome guests. The simulators are likely to attract the public in large numbers.

The 13th edition of Aero India will start from Wednesday and end on Friday. This is also the first hybrid (physical and virtual) air show.

<https://timesofindia.indiatimes.com/city/bengaluru/aero-india-2021-rehearsals-give-a-peek-into-aerobatics-at-3-day-event/articleshow/80660811.cms>



Union defence minister Rajnath Singh and chief minister BS Yediyurappa at the curtain-raiser conference





Press Information Bureau
Government of India

Ministry of Defence

Tue, 02 Feb 2021 5:31PM

Chiefs of Air Staff (CAS) Conclave at Bengaluru to Promote Defence Cooperation

The Indian Air Force will host a Chiefs of Air Staff (CAS) Conclave on 3rd and 4th Feb 21 at Air Force Station Yelahanka.

The Conclave will be a unique one where Chiefs of Air Staff from various countries would brainstorm and synergize their thoughts on current issues related to aero space power strategy and technological developments.

In view of the COVID 19 situation, the Conclave has been planned in a Hybrid form with extensive use of digital media. The Conclave will be inaugurated by Hon'ble Raksha Mantri Shri Rajnath Singh on 03 Dec 21 at Air Force Station Yelahanka. It is expected to be attended by about 75 countries.

With the growing need for Nations to join hands in maintaining peace and harmony world over, the Air Chiefs Conclave will provide the much needed platform to discuss issues related to military aviation, space operations and aerospace strategy apart from giving them opportunities to learn about each others' best practices.

The Conclave will also be a perfect example of India's Defence Cooperation with other countries working as a diplomatic instrument, giving an opportunity for building bridges of friendship, mutual trust and capacities on a global basis. Promoting transparency in defence cooperation and building areas of common interests in military aviation will be focus areas of the CAS Conclave.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1694466>



IAF's indigenisation thrust in maintenance of aircraft fleet

Indian Air Force operates a variety of aircraft fleets of foreign origin ranging from legacy MiG-21 Bison to the state-of-the-art Rafale aircraft. For increased self-reliance and to meet sustenance requirements in product support of IAF aircraft and systems, indigenisation of aircraft as well as systems spares and setting up of indigenous Repair and Overhaul (ROH) facilities for aggregates are key focus areas of IAF.

There is immense scope for indigenisation in the IAF for a wide variety of spares and equipment ranging from aircraft general purpose spares, such as nuts, bolts, cables, gaskets, springs, etc to complex high technology spares, such as avionics equipment, aeroengine accessories, etc. Indigenisation of spares for maintenance of aircraft and systems is undertaken through Base Repair Depots (BROs) of IAF located in various parts of the country and No. 1 Central Indigenisation and Manufacturing Depot (CIMD), Nashik.

As part of IAF's focus on Self-Reliance and Atmanirbhar Bharat mission, IAF is giving impetus to fast tracking of indigenisation as well as enlarging the scope of involvement of Indian aerospace and defence industry especially, MSMEs. Towards this, IAF has already identified indigenisation requirements of approximately 4000 lines of spares. Critical requirements for indigenisation include aviation grade filters (fuel, hydraulic & pneumatic), aeroengine bearings, hydraulic and pneumatic hoses, multifunction displays, aviation grade circuit breakers, lamp filaments, spark plugs, etc to name a few. Enormous opportunities are available for the aerospace and defence industry partners in India including MSMEs to join hands with IAF in this vigorous indigenisation drive.

In addition to manufacture of spares and aggregates, another area of focus of IAF is to engage with the Industry to set up repair and overhaul (ROH) facilities within India for high value retables/repairables. In achieving this objective, IAF aims to accrue huge savings to the financial exchequer, besides developing and encouraging in-house MRO facilities, thereby leading to reduced timeframes for repair and enhanced operational availability of assets.

To facilitate dissemination of requirements for indigenisation, details of RFPs issued through CPPP portal by BROs/ CIMD are also being listed in the IAF website indianairforce.nic.in. In addition, a list of over 200 lines of high value ex-import spares (unit cost > Rs 10 lakh) has been hosted in the Ministry of Defence website srijandefence.gov.in.

IAF will be displaying a host of indigenisation requirements through their stall in Hall C, during Aero India. Representatives from various BROs will be available in the stall to interact with industry representatives for explaining the requirements for indigenisation and associated procedures.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1694464>



BEL to showcase about 30 products/systems developed as part of ‘Aatmanirbhar Bharat’ during Aero India 2021

Defence PSU, Bharat Electronics Limited (BEL) will showcase state-of-the-art products and systems spanning every domain of its business, at Aero India 2021 to be held from February 3-5, 2021 at Air Force Station, Yelahanka in Bengaluru. The products and systems are clustered as ‘Airborne & Space Application’, ‘Satellite and Space Application’, ‘Products and Systems for Self-Reliance (Aatmanirbhar Bharat)’, ‘High Performance Computing & Artificial Intelligence Systems’, ‘Land and Naval Products and Systems’, ‘Communication and Laser based Products’, ‘Non-Defence/Diversification and Outdoor Display Products’.

In addition, BEL will showcase its R&D capabilities by launching/demonstrating some of its new products and technologies. Some of the new products and technologies are in the area of Airborne & Space/Satellite Application include Self Protection Suite with DIRCM (with foreign ToT), Hand Held Field Signal Generator, Airborne & Ground Spread Spectrum Modem, Backpack Anti Drone System, BE NAVIC 705, Compact Time Reference Server (Airborne), VPX architecture based SDR for Air Borne platforms and Airborne Sonar.

In total, about 30 products and systems developed as part of the Aatmanirbhar Bharat initiative will be on display, including Airborne Missile Electronics, Receivers for EW Systems and many others such as 2KW Fuel Cell, FO Gyro based Sensor Packaged Unit, Athremal Laser Transmitter, IR Jammer, Call Manager & Media Gateway, C-Band Tropo Power Amplifier and IR Seekers Missiles.

Other Innovative Solutions and Artificial Intelligence Systems on display in the area of High Performance Computing & Artificial Intelligence Systems will include RRO (Software based solution), Secure Video Conferencing Solution, Generic Networking System, Imagery Solution for Defence and civilian application, Automatic Train Supervision System for DMRC and Maritime Rescue Co-ordination Center besides others.

BEL will showcase its Land and Naval Products and Systems comprising QRSAM Radars (BFMR and BSR), BFSR-XR AESA, DDR (FMCW), Coastal Surveillance System, GBMES, Single Combat Vehicle (QRSAM), Weapon Control System, etc.

BEL will also display Communication and Laser based products including MODEM for Troposcatter Communication System, Encryptors, Frequency Modulated Continuous- Wave (FMCW) Radar for Fog Vision and Drone Guard systems for Railways, 4G Secure Phone and 5G Tablet PC, High Power Fiber Laser, Li Fi High Speed Communication System and Software Defined Radio under Communication and Electro Optics segments.

Besides, products for non-applications like Ventilators and Dialysis Machine, Smart City platforms with IoT Components, etc. will also be showcased. The highlight of BEL’s outdoor display will be Mini Shelter based Mini C4I system, Atulya (ADFCR), CTFCR (X-APAR on 4 x 4), WLR (Mountain Version) and Anti Drone System. The entire set of state-of-art equipment on offer will be a force multiplier for any Defence force.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1694387>



Press Information Bureau
Government of India

Ministry of Defence

Tue, 02 Feb 2021 4:13PM

Union Budget proposes to set up 100 new Sainik Schools in partnership with NGOs/private schools/states

Union Budget for Financial Year 2021-22 has proposed to set up 100 new Sainik Schools in the country, in partnership with NGOs/private schools/state owned schools etc. Finance Minister Smt Nirmala Sitharaman had presented the Budget in Parliament on February 01, 2021. The endeavor is to provide schooling opportunities in 'CBSE Plus' type of educational environment by involving desirous Government/Private schools/NGOs to partner in establishing/aligning their system with Sainik Schools' ethos, value system and national pride. It envisages enrolling existing/upcoming schools to be run on the lines of Sainik Schools' curriculum.

All 100 schools are proposed to be affiliated to Sainik Schools Society. Such affiliated Sainik Schools will be provided with part financial support to incentivise the effort.

The aim of establishing Sainik Schools is to prepare children academically, physically and mentally for entry into the National Defence Academy and to develop qualities of body, mind and character which will enable the young boys to become good and useful citizens.

At present, there are 33 Sainik Schools functioning all over the country. From the academic session 2021-22, girl candidates are also eligible for admission to Class VI in all 33 Sainik Schools.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1694427>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 02 Feb 2021 4:13PM

केंद्रीय बजट में गैर सरकारी संगठनों, निजी और सरकारी स्कूलों की भागीदारी से 100 नए सैनिक स्कूल खोलने का प्रस्ताव

वित्त मंत्री श्रीमती निर्मला सीताराम द्वारा 01 फरवरी, 2021 को संसद में पेश किए गए वित्त वर्ष 2021-22 के आम बजट में गैर-सरकारी संगठनों, निजी स्कूलों और राज्यों के स्वामित्व वाले स्कूलों के सहयोग से देश में 100 नए सैनिक स्कूल खोलने का प्रस्ताव किया गया है। इसके तहत यह प्रयास किया जा रहा है कि सीबीएसई प्लस पाठ्यक्रम की तर्ज पर सरकारी, निजी और गैर सरकारी संगठनों की भागीदारी से सैनिक स्कूल खोले जाएं जिसमें लोकाचार, राष्ट्रीय गौरव और नैतिक मूल्यों पर जोर रहे। इसमें एक तरह से मौजूदा स्कूलों को काफी हद तक सैनिक स्कूलों का रूप देने की परिकल्पना की गई है।

इन सभी 100 स्कूलों को सैनिक स्कूल सोसायटी से संबद्ध करने का प्रस्ताव है। इस तरह के संबद्ध सैनिक स्कूलों को प्रोत्साहित करने के लिए आंशिक रूप से वित्तीय सहायता प्रदान की जाएगी।

सैनिक स्कूलों की स्थापना का उद्देश्य राष्ट्रीय रक्षा अकादमी में प्रवेश के लिए बच्चों को अकादमिक, शारीरिक और मानसिक रूप से तैयार करना और उनमें शारीरिक, मानसिक और चरित्र संबंधी गुण विकसित करना है जो उन्हें एक आदर्श और एक सजग नागरिक बनने में सक्षम बनाएंगे।

मौजूदा समय देश में ऐसे 33 सैनिक स्कूल कार्यरत हैं। शैक्षणिक सत्र 2021-22 से इन सभी 33 सैनिक स्कूलों में छठी कक्षा से लड़कियां भी प्रवेश ले सकेंगी।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1694529>



Press Information Bureau
Government of India

Ministry of Defence

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61st course of National Defence College commences with 110 participants

The 61st course of National Defence College (NDC) commenced on February 01, 2021 with 110 participants, an increase of 10 participants from the last course. The majority of the increased seats have been allocated to officers from friendly foreign countries. The officers from Uzbekistan, Tajikistan, Philippines and Maldives are participating after a considerable gap of time. The participants from the friendly countries are representatives of the country's regional as well as international diplomacy wherein NDC has accommodated participants from all continents except South America. However, there was a course participant from South America (Brazil) in the last NDC course.

The first NDC course was held in 1960. As on date, the college has 3,899 alumni, including 835 from 69 friendly foreign countries. There has been a marginal increase of two vacancies for Civil Services and the current strength of the Civil Services in the 61st NDC course is 19.

Welcoming the increased strength of foreign officers for the 61st course, NDC Commandant, Air Marshal D Choudhury expressed confidence that NDC would build on the challenges of previous years by converting them into opportunities. He added that 'President's Chair of Excellence on National Security' established recently will enhance the pursuit of academic excellence at NDC.

President Shri Ram Nath Kovind had approved the establishment of the chair on November 02, 2020 to commemorate the Diamond Jubilee Year of National Defence College. Air Vice Marshal (Dr) Arjun Subramaniam, AVSM (Retd.) has been designated as the first occupant of the prestigious chair.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1694416>

Aero India to kick off on Wednesday

By Chethan Kumar

Bengaluru: From a modest beginning in 1996, Aero India has come a long way to become Asia's largest defence and aerospace airshow over the years. With more than 600 exhibitors registered — 78 of them foreign firms — the show this time will be a Hybrid one.

“The event will connect experts, sectors, and industries and promote A&D businesses between world manufacturers most of whom are eager to be a part of the event. The most important factor has been to ensure that the event adapts to the health & safety guidelines and provides the right environment for people to meet,” the organisers say.

The event, which usually is a five-day affair — three business days and two public days — has been reduced to just three days this time. Only business visitors (exhibitors and the likes) will be allowed at the exhibition area and the general public will be restricted to ADVA (air display viewing area). While 15,000 people are allowed at the exhibition area, the cap is 3,000 for ADVA. In the last few years, Aero India used to record footfalls in multiple lakhs.



LCA Tejas

With the show ready to kick-off on Wednesday, here are some things you must know:

■ **A 1st: Surya Kirans, Sarangs' Joint Show**

In what will be a complicated flight envelope to plan and execute, two of Indian Air Force's (IAF) elite aerobatic squads — the Surya Kiran, flying the fixed wing Hawks and Sarang, flying the rotary-wing ALH (Advanced Light Helicopter) — will put up an integrated show for the first time this Aero India.

So far, the two teams have only performed individually and this is the first time ever that there will be an integrated display by both of them. Multiple sources in the IAF said that this may well be the first in the world where an aerobatics team flying a jet performs in tandem with a chopper aerobatics team.

■ **US Bomber & Jugalbandi**

Among the highlights of the show, a B-1B Lancer heavy bomber (see pic), of the US 28th Bomb Wing based out of Ellsworth Air Force Base in South Dakota, will perform a 'fly-by.'

The B-1B Lancer, a supersonic heavy bomber, is a truly remarkable aircraft, capable of carrying out missions worldwide from its bases in the US, as well as from forward deployed locations.

It carries the largest conventional payload of both guided and unguided weapons in the US Air Force and is considered the backbone of America's long-range bomber force,” the statement added. Also, in the spirit of bilateral support for India's first hybrid defence exhibition, the US Air Force Band of the Pacific based out of Hawaii will perform with Indian percussion (ghatam) artist Giridhar Udupa.

■ **The Metal Birds**

According To the IAF, 41 Indian aircraft will participate at the inaugural fly-past. The LCA Tejas and Rafale will be the highlights among the fixed wing aircraft other than the Su-30, while a host of choppers including LUH (light utility helicopter) will be flying.

The show is also likely to see the Chinook and Apache platforms can also fly.

There will be 63 static display aircraft, including a few civilian planes. At least 11 foreign aircraft had shown interest, but there's no final confirmation.

■ Flying Display

Scheduled between February 3 and 5, this edition of the show has been reduced to a three-day event from the five days owing to the pandemic with restrictions on the number of people participating as reported by the TOI earlier.

As per the official schedule, as of January 26, there will be only five flying display slots this edition, which is only 50% of the usual (10) slots. Usually, each day would have two displays, but this year, the last day has only one display slot scheduled.

■ Eyeing Foreign Shores

The pandemic may have rendered Aero India 2021 dull with limited participation by both domestic and foreign firms but it hasn't subdued the spirits of the organisers.

The ministry of defence (MoD), the principal organiser will be showcasing at least 76 defence platforms, being made by both government and private firms, that it believes can be exported.

The products and platforms range are divided into four major categories: Land, Naval, Air and Communication systems (see pics).

India, which is the world's second largest importer of defence equipment, behind only Saudi Arabia, ranks 23rd when it comes to exports. While MoD has been keen on doubling exports, official figures available publicly show that in 2018-19, India's defence export valued at Rs 10,746 crore and for the figure for 2019-20 (up to December 2019) stood at Rs 5,883 crore. According to the MoD, about 50 private Indian companies contribute to defence exports. Some of the major export destinations for defence products have been Italy, Maldives, Sri Lanka, Russia, France, Nepal, Mauritius, Sri Lanka, Israel, Egypt, UAE, Bhutan, Ethiopia, Saudi Arabia, Philippines, Poland, Spain and Chile etc.

■ HAL's Atmanirbhar Formation Flight

Defence PSU Hindustan Aeronautics Limited's (HAL) unique flying display of its indigenous platforms — both fixed and rotary wing — entitled 'Aatmanirbhar Formation Flight' will be part of the flying display at Aero India-2021.

HAL will showcase its prowess in defence and aerospace centered on the theme 'Conceive. Indigenise. Collaborate' at the world's first hybrid exhibition. The 'Aatmanirbhar Formation Flight' consisting LCA trainer, HTT-40, IJT, Advanced Hawk Mk 132 and Dornier-228, will fly in a special formation showcasing the spectrum of trainers and signifying self-sufficiency in the trainer segment.

Other than these aircraft, Su30-MKi, advanced light helicopter (ALH) Dhruv, light combat helicopter (LCH), light utility helicopter (LUH) will also take part in the flying display. Static displays will include Dornier-228, HTT-40 and LUH and ALH Mk III.

■ 300+ Products & Tech from DRDO

Defence Research & Development Organisation (DRDO) will exhibit its latest defence technologies and demonstrate many systems at the show.

With its vast defence design and development capability, DRDO has been working towards Atmanirbhar Bharat and has taken up many policy initiatives to work closely with all stakeholders of the ecosystem. More than 30 laboratories of DRDO connected to aeronautical development are exhibiting their products and technological achievements in this mega event.

More than 300 products, technologies and innovations are being presented in indoor, outdoor, static and flying displays. Defence Minister Rajnath Singh will release the DRDO export compendium, among other things.

The major attraction of DRDO's participation is the flying display of the Airborne Early Warning & Control (AEW&C) system, LCA Tejas and LCA-Navy. While the air display will show the aerodynamic capabilities of the aircraft, LCA-Navy will also be on the tarmac for static display.

The highlights of indoor systems include Combat Free Fall System, models of the advanced medium combat aircraft (AMCA), ABHYAS - High-speed Expendable Aerial Target, Twin Engine Deck Based Fighter (TEDBF), FCS System for LCA and Aerostat Systems.

Aside from this, the organisation will show off Nirbhay missile, P-16 Heavy Drop System, AWACS' India aircraft model, Pilotless Target Aircraft Engine (PTAE), etc. It will also showcase missiles, electronics and communication and other technologies and products, including ASTRA (missile).

■ Big Foreign COs Chant Atmanirbhar Mantra

In line with their ambitions of gaining a share in arguably the world's largest market for defence products, big foreign firms are chanting the 'Make-in-India' and 'Atmanirbhar Bharat' mantras ahead of Aero India, in line with the government of India's agenda.

From US' Boeing to Lockheed Martin, French Dassault and Airbus to UK's BAE Systems and Rolls-Royce and a host of Russian and Israeli firms, the air show will see participation from some of the world's largest defence and aerospace companies. There are companies from 13 countries, including Ukraine, Taiwan, Japan, Austria, Belarus and Bulgaria.

However, compared to Aero India 2019, foreign companies' participation in this year's edition has seen a dip of at least 53% as of January 28. Compared to 165 foreign firms in 2019, Aero India 2021 has 78 as on date.

■ Public Can Watch Show For Free Online

Owing to an overwhelming response and requests, The ministry of defence (MoD) last week did away with the fee — Rs 1,000 — the public needed to pay to watch the show earlier.

Now, the general public can register for free and watch the show, including seminars and exhibitions, for free. "Once they register on the portal, they will have access to various virtual exhibitions, inauguration and other aspects of the show online for free," one official said.

Not just the public, exhibitors, companies and other businesses can also participate online. However, they would be required to pay a stipulated fee to the organisers if they are exhibitors. It is Rs 20,000 for MSMEs and Rs 40,000 for others.

<https://timesofindia.indiatimes.com/india/aero-india-to-kick-off-on-wednesday/articleshow/80643782.cms>



Wed, 03 Feb 2021

BEL wins award for contributions to aerospace sector

BEL makes control systems for Rustom UAV. BEL provides Lifecycle Support to Airborne Early Warning Control Systems to CABS

New Delhi: Navratna Defence PSU Bharat Electronics Limited (BEL) has won the International Aerospace and Defence Award for its 'Outstanding Contribution to the Aerospace Industry'. Mr. Shivakumaran K M, Director (HR), received the award on behalf of BEL from Mr. P Jayapal, retired Chief Executive, CEMILAC, DRDO.

BEL has been supplying products and systems for aerospace applications, including Airborne Electronic Warfare (EW) and Avionics products for over two decades. BEL has been partnering with various DRDO labs like ADE, ADA, and DARE in the development and manufacturing of various avionics



systems for the prestigious Light Combat Aircraft (Tejas) programme since 1994.

Also, BEL is also collaborating with niche technology companies and foreign OEMs. BEL's airborne Electronic Warfare products include Radar Warning Receivers (RWR), light-weight RWR, and laser and missile warning capabilities. BEL makes control systems for Rustom UAV. BEL provides Lifecycle Support to Airborne Early Warning Control Systems to CABS.

BEL supplies to the Indian Air Force various strategic systems, including the Akash Weapon System, Radars, C4I, and Communication Systems. BEL is associated with ISRO for the AIT of satellites.

BEL has a well-established quality management system, which qualifies BEL to make safe and reliable systems for aerospace applications. BEL is also CEMILAC and AFQMS certified.

<https://www.psuconnect.in/news/bel-wins-award-for-contributions-to-aerospace-sector/26533>



Wed, 03 Feb 2021

IAF to host conclave of Air Force Chiefs to discuss current issues

The conclave will happen on Thursday and Friday, concurrently with the country's premier aerospace and defence exhibition Aero India 2021 that will start on Wednesday and end on Friday

The IAF will host a two-day conclave here of Air Force chiefs of various countries to discuss current issues related to "aero space power strategy and technological developments", the Defence Ministry said on Tuesday. The conclave will be inaugurated by Defence Minister Rajnath Singh at Yelahanka Air Force Station in Bengaluru on February 3.

It is expected to be attended by about 75 countries, the ministry said in a statement.

The conclave will happen on Thursday and Friday, concurrently with the country's premier aerospace and defence exhibition Aero India 2021 that will start on Wednesday and end on Friday.

The ministry said the conclave will provide a much needed platform to Air Force chiefs to discuss issues related to military aviation, space operations and aerospace strategy.

In view of the COVID-19 situation, the conclave has been planned in a "hybrid form" with extensive use of digital media, the ministry said.

"The conclave will be a unique one where chiefs of Air Staff from various countries would brainstorm and synergise their thoughts on current issues related to aero space power strategy and technological developments," it added.

<https://www.moneycontrol.com/news/india/iaf-to-host-conclave-of-air-force-chiefs-to-discuss-current-issues-6437791.html>



Drone highways are almost here

They're being readied at the second campus of the IISc in Challakere, 230 km from Bengaluru

By Hemanth CS

Drone highways in the sky are not a futuristic fantasy anymore. They're being readied at the second campus of the Indian Institute of Science (IISc) in Challakere, Chitradurga district, 230 km from Bengaluru.

The highways will be exclusive corridors for testing and flying both military and commercial drones.

Around 1373 acres of land for this corridor has been earmarked and it will have drone ports too.

“A massive drone corridor will be coming up in about 1373 acres of land at the campus where testing and flying of both military and commercial drones would be carried out in the future. Equipped with drone ports and air corridor systems, autonomous flying machines of all sizes including combat ones will be tested here,” Raejus Job a DGCA- NTRO, Remote Piloted Aircraft Systems instructor told Bangalore Mirror.

He added that the agencies involved in the Remote Piloted Aircraft Systems project have applied for the Green Zone Clearance from the Ministries of Defence and Civil Aviation.

“The Green Zone clearance may be given by the authorities concerned during the Aero India 2021,” he added.

According to India's drone regulations the air space has been partitioned into Red Zone (flying not permitted), Yellow Zone (controlled airspace) and Green Zone (automatic permission).

In other words, flying in Green Zones will require only intimation of the time and location of the flights via the Digital Sky portal or the App.

“The Research and Development for the autonomous projects has already been completed and the technology has also been created. We need clearance from the DGCA, Civil Aviation and Defence Ministers to test these systems in these proposed drone corridors,” said Prof Bharadwaj Amrutur, research head and director AI and Robotics Technology Park (ARTPARK).

ARTPARK is a joint initiative of IISc and AI Foundry and it was formed recently for promoting innovation in AI and Robotics in the country.

Further explaining the drone corridor, Amrutur said that these corridors would be highways in the skies for all autonomous drones, like highways for vehicles on the ground.

“For these autonomous drones the approach is different. On the ground, people are driving their vehicles themselves but here somebody is operating these drones from different places so we have to ensure that they do not interlock with each other and move around safely,” Amrutur said.

The IISc campus in Challakere has been set up on 1500 acres of land. Next to the campus DRDO, BARC and ISRO also have their facilities.

<https://bangaloremirror.indiatimes.com/bangalore/others/drone-highways-are-almost-here/articleshow/80656291.cms>



Beyond qubits: Team takes next big step to scale up quantum computing

Scientists and engineers at the University of Sydney and Microsoft Corporation have opened the next chapter in quantum technology with the invention of a single chip that can generate control signals for thousands of qubits, the building blocks of quantum computers.

"To realise the potential of quantum computing, machines will need to operate thousands if not millions of qubits," said Professor David Reilly, a designer of the chip who holds a joint position with Microsoft and the University of Sydney.

"The world's biggest quantum computers currently operate with just 50 or so qubits," he said. "This small scale is partly because of limits to the physical architecture that control the qubits."

"Our new chip puts an end to those limits."

The results have been published in *Nature Electronics*.

Most quantum systems require quantum bits, or qubits, to operate at temperatures close to absolute zero (-273.15 degrees). This is to prevent them losing their 'quantumness', the character of matter or light that quantum computers need to perform their specialised computations.

In order for quantum devices to do anything useful, they need instructions. That means sending and receiving electronic signals to and from the qubits. With current quantum architecture, that involves a lot of wires.

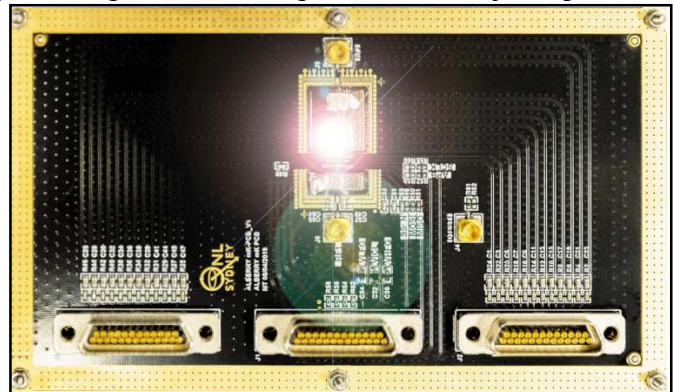
"Current machines create a beautiful array of wires to control the signals; they look like an inverted gilded birds' nest or chandelier. They're pretty, but fundamentally impractical. It means we can't scale the machines up to perform useful calculations. There is a real input-output bottleneck," said Professor Reilly, also a Chief Investigator at the ARC Centre for Engineered Quantum Systems (EQUS).

Microsoft Senior Hardware Engineer, Dr. Kushal Das, a joint inventor of the chip, said: "Our device does away with all those cables. With just two wires carrying information as input, it can generate control signals for thousands of qubits."

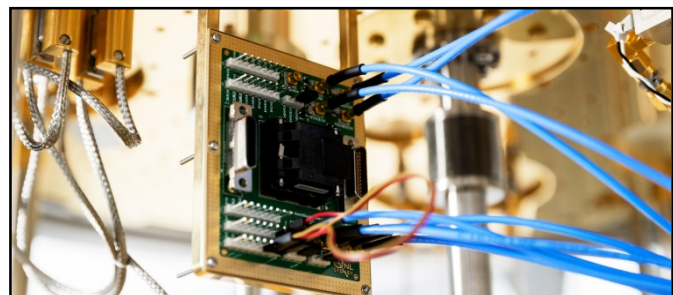
"This changes everything for quantum computing."

The control chip was developed at the Microsoft Quantum Laboratories at the University of Sydney, a unique industry-academic partnership that is changing the way scientists tackle engineering challenges.

"Building a quantum computer is perhaps the most challenging engineering task of the 21st century. This can't be achieved working with a small team in a university laboratory in a single country but needs the scale afforded by a global tech giant like Microsoft," Professor Reilly said.



The Cryogenic CMOS chip platform. The chip itself is just below the shining component, which houses the qubits. Credit: University of Sydney



The cryogenic chip platform in situ in a dilution fridge. The device can operate at 0.1 Kelvin. Credit: University of Sydney

"Through our partnership with Microsoft, we haven't just suggested a theoretical architecture to overcome the input-output bottleneck, we've built it.

"We have demonstrated this by designing a custom silicon chip and coupling it to a quantum system," he said. "I'm confident to say this is the most advanced integrated circuit ever built to operate at deep cryogenic temperatures."

If realised, quantum computers promise to revolutionise information technology by solving problems beyond the scope of classical computers in fields as diverse as cryptography, medicine, finance, artificial intelligence and logistics.

Power budget

Quantum computers are at a similar stage that classical computers were in the 1940s. Machines like ENIAC, the world's first electronic computer, required rooms of control systems to achieve any useful function.

It has taken decades to overcome the scientific and engineering challenges that now allows for billions of transistors to fit into your mobile phone.

"Our industry is facing perhaps even bigger challenges to take quantum computing beyond the ENIAC stage," Professor Reilly said.

"We need to engineer highly complex silicon chips that operate at 0.1 Kelvin," he said. "That's an environment 30 times colder than deep space".

Dr. Sebastian Pauka's doctoral research at the University of Sydney encompassed much of the work to interface quantum devices with the chip. He said: "Operating at such cold temperatures means we have an incredibly low power budget. If we try to put more power into the system, we overheat the whole thing."

In order to achieve their result, the scientists at Sydney and Microsoft built the most advanced integrated circuit to operate at cryogenic temperatures.

"We have done this by engineering a system that operates in close proximity to the qubits without disturbing their operations," Professor Reilly said.

"Current control systems for qubits are removed metres away from the action, so to speak. They exist mostly at room temperature.

"In our system we don't have to come off the cryogenic platform. The chip is right there with the qubits. This means lower power and higher speeds. It's a real control system for quantum technology."

Years of engineering

"Working out how to control these devices takes years of engineering development," Professor Reilly said. "For this device we started four years ago when the University of Sydney started its partnership with Microsoft, which represents the single biggest investment in quantum technology in Australia.

"We built lots of models and design libraries to capture the behaviour of transistors at deep cryogenic temperatures. Then we had to build devices, get them verified, characterised and finally connect them to qubits to see them work in practice."

Vice-Chancellor and Principal of the University of Sydney, Professor Stephen Garton, said: "The whole university community is proud of Professor Reilly's success and we look forward to many years of continued partnership with Microsoft."

Professor Reilly said the field has now fundamentally changed. "It's not just about 'here is my qubit'. It's about how you build all the layers and all the tech to build a real machine.

'Our partnership with Microsoft allows us to work with academic rigour, with the benefit of seeing our results quickly put into practice."

The Deputy Vice-Chancellor (Research), Professor Duncan Ivison, said: "Our partnership with Microsoft has been about realising David Reilly's inspired vision to enable quantum technology. It's great to see that vision becoming a reality."

Professor Reilly said: "If we had remained solely in academia this chip would never have been built."

The Australian scientist said he isn't stopping there.

"We are just getting started on this new wave of quantum innovation," he said. "The great thing about the partnership is we don't just publish a paper and move on. We can now continue with the blueprint to realise quantum technology at the industrial scale."

More information: S. J. Pauka et al, A cryogenic CMOS chip for generating control signals for multiple qubits, *Nature Electronics* (2021). DOI: [10.1038/s41928-020-00528-y](https://doi.org/10.1038/s41928-020-00528-y)

Journal information: [Nature Electronics](https://phys.org/news/2021-02-qubits-team-big-scale-quantum.html)
<https://phys.org/news/2021-02-qubits-team-big-scale-quantum.html>



Wed, 03 Feb 2021

Say goodbye to the dots and dashes to enhance optical storage media

Purdue University innovators have created technology aimed at replacing Morse code with colored "digital characters" to modernize optical storage. They are confident the advancement will help with the explosion of remote data storage during and after the COVID-19 pandemic.

Morse code has been around since the 1830s. The familiar dots and dashes system may seem antiquated given the amount of information needed to be acquired, digitally archived and rapidly accessed every day. But those same basic dots and dashes are still used in many optical media to aid in storage.

A new technology developed at Purdue is aimed at modernizing the optical digital storage technology. This advancement allows for more data to be stored and for that data to be read at a quicker rate. The research is published in *Laser & Photonics Reviews*.

Rather than using the traditional dots and dashes as commonly used in these technologies, the Purdue innovators encode information in the angular position of tiny antennas, allowing them to store more data per unit area.

"The storage capacity greatly increases because it is only defined by the resolution of the sensor by which you can determine the angular positions of antennas," said Alexander Kildishev, an associate professor of electrical and computer engineering in Purdue's College of Engineering. "We map the antenna angles into colors, and the colors are decoded."

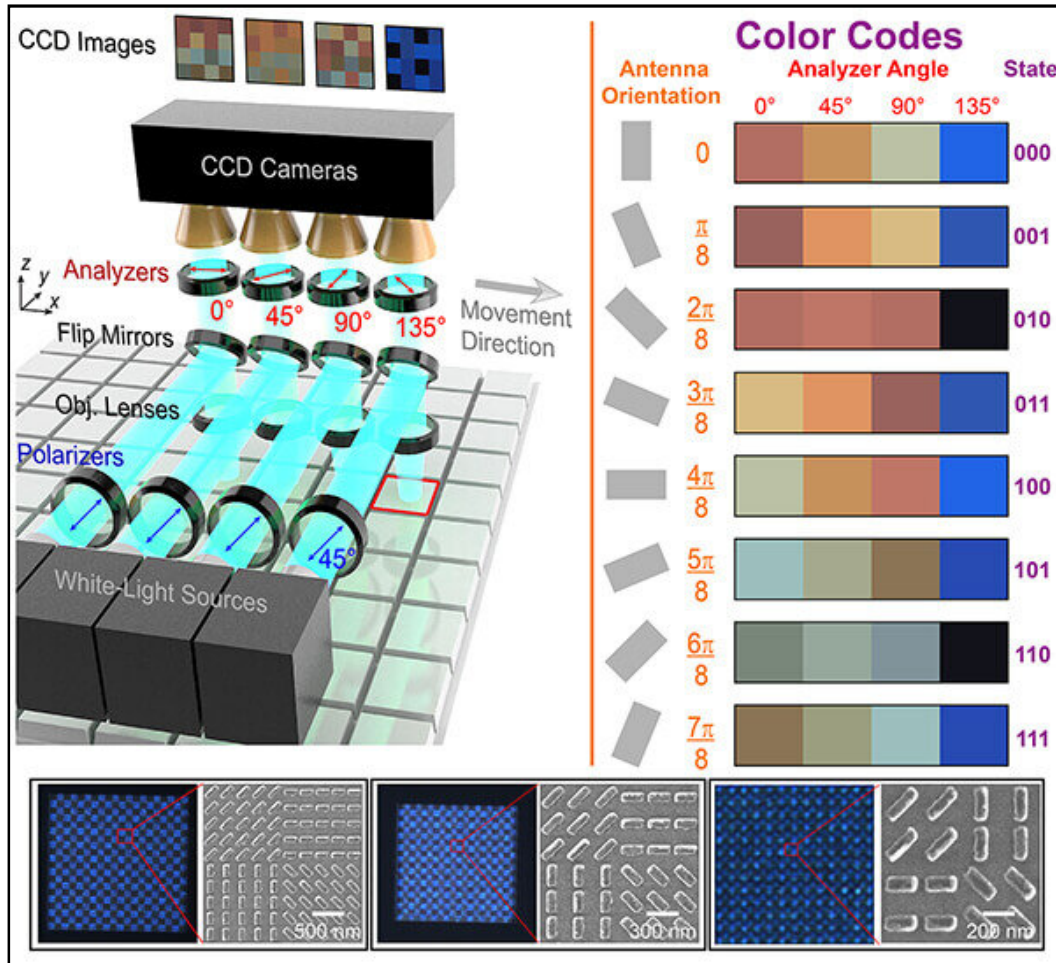
Technology has aided in increasing storage space availability in optical digital storage technologies. Not all optical data storage media needs to be laser-writable or rewritable.

The majority of CDs, DVDs, and Blu-Ray discs are "stamped" and not recordable at all. This class of optical media is an essential part of disposable cold storage with a rapid access rate, long-lasting shelf life, and excellent archival capabilities.

The making of a Blu-Ray disc is based on the pressing process, where the silicon stamper replicates the same dot-and-dashes format the final disc is getting. A thin nickel coating is then added to get a negative stamp. The Blu-Rays, as well as DVDs and CDs, are just mass-produced.

"Our metasurface-based 'optical storage' is just like that," said Di Wang, a former Ph.D. student who fabricated the prototype structure. "Whereas in our demo prototype, the information is 'burnt in' by electron-beam lithography, it could be replicated by a more scalable manufacturing process in the final product."

This new development not only allows for more information to be stored but also increases the readout rate.



The proposed anisotropic metasurface from Purdue University innovators has significant potential for high-density optical data storage, dynamic color image display, and encryption. Credit: Alexander Kildishev, Purdue University

"You can put four sensors nearby, and each sensor would read its own polarization of light," Kildishev said. "This helps increase the speed of readout of information compared to the use of a single sensor with dots and dashes."

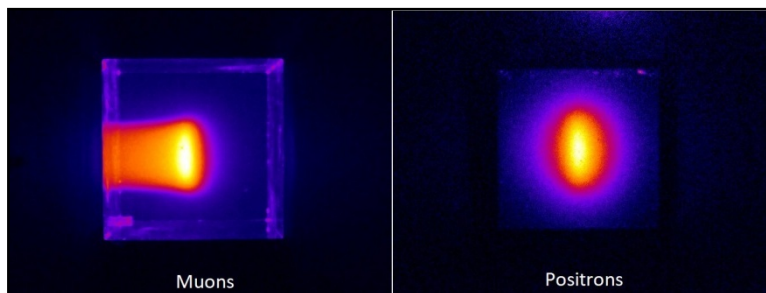
Future applications for this technology include security tagging and cryptography. To continue developing these capabilities, the team is looking to partner with interested parties in the industry.

More information: Maowen Song et al, Enabling Optical Steganography, Data Storage, and Encryption with Plasmonic Colors, *Laser & Photonics Reviews* (2021). DOI: [10.1002/lpor.202000343](https://doi.org/10.1002/lpor.202000343)
<https://phys.org/news/2021-02-goodbye-dots-dashes-optical-storage.html>

First images of muon beams

A new technique has taken the first images of muon particle beams. Nagoya University scientists designed the imaging technique with colleagues in Osaka University and KEK, Japan and describe it in the journal *Scientific Reports*. They plan to use it to assess the quality of these beams, which are being used more and more in advanced imaging applications.

Muons are charged particles that are 207 times the mass of electrons. They naturally form when cosmic rays strike atoms in the upper atmosphere, showering down onto every part of Earth's surface. They can penetrate through hundreds of meters of solids before being absorbed.



The scientists were able to use their technique to take images of muons and positrons as they passed through water and a plastic scintillator. Credit: Seichi Yamamoto

Scientists have used naturally occurring muon particles as a way to peek through huge solid structures. For example, in 2017 scientists announced they had found a hidden chamber inside the Khufu Pyramid of Giza by comparing the muon intensities measured by detectors located inside and outside the pyramid. Particle accelerator facilities can now also generate muon beams, which are used in a variety of applications, like non-destructive X-ray fluorescence spectroscopy. Muon beams are also expected to be adapted for cancer radiotherapy.

Nagoya University biomedical nuclear scientist Seichi Yamamoto and colleagues developed a new imaging technique that they say shows promise for quality assessment and research of muon beams, and should be of benefit for muon radiotherapy in the future.

The technique depends on a phenomenon that occurs when charged particles travel through transparent media, like water. Water slows light down relative to high-energy particles. Particles moving faster than light cause something similar to the sonic boom we hear when a jet plane breaks through the sound barrier. In the case of the particles, an 'optical boom,' called the Cherenkov effect, causes a brief flash.

Yamamoto and his colleagues imaged this effect with a special camera when a muon beam was directed through water or a plastic scintillator block. The technique allowed them to image muons and the positrons that form when muons decay. This helped them measure the beam's range through the water or plastic scintillator, and the deviation of its momentum, as well as clarify the direction of positron movement.

"The system is compact, low cost and easy to use, showing promise as a tool for quality assessment in muon beam facilities," says Yamamoto.

More information: Seichi Yamamoto et al. Optical imaging of muons, *Scientific Reports* (2020). DOI: [10.1038/s41598-020-76652-8](https://doi.org/10.1038/s41598-020-76652-8)

Journal information: [Scientific Reports](https://www.nature.com/scientificreports/)
<https://phys.org/news/2021-02-images-muon.html>

Covid-19 reinfection most common in young, healthy people: Study

The study said ‘antibodies induced by infection to SARS-CoV-2 are largely protective, they do not guarantee effective immunity against subsequent infection’

By Prashasti Awasthi

Mumbai: Young people are more likely to report Covid-19 reinfection, according to a study published in the preprint server MedRxiv.

The authors of the study, including those from Mount Sinai, the Naval Research Centre, examined 3,249 young, healthy, mostly male Marine recruits between the ages of 18-20 before they started basic training.

Of the 189 participants that tested positive for antibodies, 19 ended up testing positive for the virus six weeks later, according to the study.

“Our findings indicate that reinfection by SARS-CoV-2 in healthy young adults is common,” said Mount Sinai’s Dr Stuart Sealfon in a release.

The researchers noted that though “antibodies induced by infection to SARS-CoV-2 are largely protective, they do not guarantee effective immunity against subsequent infection.”

The results revealed that of the 19 recruits who were reinjected, 84.2 per cent, or 16 of them, didn’t show any symptoms at all.

Researchers noted that overall, many young people who contract the virus tend to be asymptomatic or have few symptoms. This can lead to a less robust immune memory response.

“This could lead to higher overall rates of re-infection among this population compared to other populations,” researchers wrote.

They added that those who are reinfected could “have a similar capacity” to transmit the infection as those who are infected the first time.

The researchers also pointed out that little is known about vaccine immunity and said it is “possible that both previously infected and vaccinated individuals may later become infected” again.

The researchers concluded that young adults “can be an important source of transmission to more vulnerable populations.”

<https://www.thehindubusinessline.com/news/science/covid-19-reinfection-most-common-in-young-healthy-people-study/article33727062.ece>



