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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

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Ministry of Defence

Tue, 22 Sept 2020 5:38PM

Successful flight test of ABHYAS

Successful flight test of ABHYAS - High-speed Expendable Aerial Target (HEAT) was today conducted by Defence Research and Development Organisation (DRDO) from the Interim Test Range, Balasore in Odisha. During the trials, two demonstrator vehicles were successfully test flown. The vehicle can be used as target for evaluation of various missile systems.

Abhyas is designed & developed by Aeronautical Development Establishment (ADE), DRDO. The air vehicle is launched using twin underslung booster. It is powered by a small gas turbine engine and has MEMS based Inertial Navigation System (INS) for navigation along with the Flight Control Computer (FCC) for guidance and control. The vehicle is programmed for fully autonomous flight. The check out of air vehicle is done using laptop based Ground Control Station (GCS).

During the test campaign, the user requirement of 5 km flying altitude, vehicle speed of 0.5 mach, endurance of 30 minutes and 2g turn capability of the test vehicle were successfully achieved.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1657786>



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रक्षा मंत्रालय

Tue, 22 Sept 2020 5:38PM

‘अभ्यास’ का सफल उड़ान परीक्षण

रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) हाई-स्पीड एक्सपेंडेबल एरियल टारगेट (हीट) का सफल उड़ान परीक्षण आज ओडिशा के अंतरिम परीक्षण रेंज, बालासोर से किया गया। परीक्षणों के दौरान, दो प्रदर्शनकारी वाहनों का सफलतापूर्वक परीक्षण किया गया। वाहन का उपयोग विभिन्न मिसाइल प्रणालियों के मूल्यांकन के लिए लक्ष्य के रूप में किया जा सकता है।

अभ्यास को वैमानिकी विकास प्रतिष्ठान (एडीई), डीआरडीओ द्वारा डिजाइन और विकसित किया गया है। एयर वाहन को ट्विन अंडरस्लैंग बूस्टर का उपयोग करके लॉन्च किया गया है। यह एक छोटे गैस टरबाइन इंजन द्वारा संचालित है और इसमें मार्गदर्शन और नियंत्रण के लिए उड़ान नियंत्रण कंप्यूटर (एफसीसी) के साथ नेविगेशन के लिए एमईएमएस आधारित इनरट्रियल नेविगेशन सिस्टम (आईएनएस) है। वाहन को पूरी तरह से स्वायत्त उड़ान के लिए

क्रमादेशित किया गया है। एयर व्हीकल की जांच लैपटॉप आधारित ग्राउंड कंट्रोल स्टेशन (जीसीएस) का उपयोग करके की जाती है।

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రక్షణ మంత్రిత్వ శాఖ

Tue, 22 Sept 2020 5:38PM

అభ్యాస్ విమాన పరీక్ష విజయవంతం

బడిశాలోని బాలసోర్ మధ్యంతర పరీక్షా శ్రేణి క్షేత్రం నుంచి 'రక్షణ పరిశోధన మరియు అభివృద్ధి సంస్థ' (డీఆర్డీఓ) అభ్యాస్ విమాన పరీక్ష- 'హై-స్పీడ్ ఎక్స్‌పెండబుల్ ఏరియల్ టార్గెట్'ను (హీట్) ఈ రోజు విజయవంతంగా నిర్వహించింది. హీట్ ట్రయల్స్ సమయంలో రెండు ప్రదర్శన వాహనాలు విజయవంతంగా పరీక్షించబడ్డాయి. ఈ వాహనాన్ని వివిధ క్షిపణి వ్యవస్థల మూల్యాంకనం లక్ష్యంగా ఉపయోగించవచ్చు. అభ్యాస్‌ను డీఆర్డీఓకు చెందిన

'ఏరోనాటికల్ డెవలప్‌మెంట్ ఎస్టాబ్లిష్‌మెంట్' (ఎడీఈ) రూపొందించి అభివృద్ధి చేసింది. ట్విన్ అండర్‌లంగ్ బూస్టర్ ఉపయోగించి ఎయిర్ వెహికల్ లాంచ్ చేశారు. ఇది ఒక చిన్న గ్యాస్ టర్బైన్ ఇంజిన్‌తో పనిచేస్తుంది. మార్గదర్శకత్వం మరియు నియంత్రణ కోసం 'ప్లేట్ కంట్రోల్ కంప్యూటర్ (ఎఫ్‌సీసీ) తో పాటు నావిగేషన్ కోసం ఎంఎస్‌ఎంఈ ఆధారిత జడత్వ నావిగేషన్ సిస్టమ్ (ఐఎన్‌ఎస్) ను కలిగి ఉంది. ఈ వాహనం పూర్తిగా స్వయంప్రతిపత్త విమాన ప్రయాణానికి తగ్గట్టుగా ప్రోగ్రామ్ చేయబడింది. ల్యాండ్‌ఆఫ్ ఆధారిత గ్రౌండ్ కంట్రోల్ స్టేషన్ (జీసీఎస్) ఉపయోగించి ఎయిర్ వెహికల్ చెక్ అవుట్ జరుగుతుంది. పరీక్ష సందర్భంగా టెస్ట్ వెహికల్ 5 కిలోమీటర్ల ఎత్తులో ఎగరడం, వాహన వేగం 0.5 మాక్, 30 నిమిషాల ఎండ్యూరెన్స్ (ఓర్ను) మరియు 2 జి టర్న్ సామర్థ్యం.. విజయవంతంగా సాధించబడ్డాయి.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1657901>

ABHYAS successfully flight-tested | Here's how the indigenous drone will help defence forces

India's premier defence research institute DRDO on Tuesday successfully conducted the flight test of ABHYAS - High-speed Expendable Aerial Target (HEAT) in Odisha's Balashore

New Delhi: India's premier defence research institute DRDO on Tuesday successfully conducted the flight test of ABHYAS - High-speed Expendable Aerial Target (HEAT) in Odisha's Balashore. For the uninitiated, Abhyas is a drone that can be used as a target for evaluation of various Missile systems. It offers a realistic threat scenario for practice of weapon systems. Besides, it is country's first locally developed system. These drones can as decoy aircraft to test the defence mechanism of the enemy.

Two demonstrator vehicles were successfully test flown, during the test campaign. The user requirement of 5 km flying altitude, vehicle speed of 0.5 mach, endurance of 30 minutes and 2g turn capability of the test vehicle were successfully achieved

The vehicle can be used as target for evaluation of various missile systems. Defence Minister congratulated the agency for its achievement and said, it could be used as a target for evaluation of various Missile systems

"The DRDO achieved a milestone today with the successful flight test of ABHYAS - High Speed Expandable Aerial Target from ITR Balasore. This can be used as a target for evaluation of various Missile systems. Congratulations to @DRDO_India & other stakeholders for this achievement," he wrote on Twitter.

Design

'ABHYAS' is designed on an in-line small gas turbine engine and it uses indigenously developed micro-electro-mechanical systems-based system for navigation and guidance. It is tracked by various radars and electro-optic systems and proves its performance in fully autonomous waypoint navigation mode.

How ABHYAS operates?

The air vehicle is launched using twin underslung booster. It is powered by a small gas turbine engine and has MEMS based Inertial Navigation System (INS) for navigation along with the Flight Control Computer (FCC) for guidance and control. The vehicle is programmed for fully autonomous flight. The check out of air vehicle is done using laptop based Ground Control Station (GCS).

<https://english.jagran.com/india/india-successfully-conducts-test-flight-of-abhyas-all-you-need-to-know-10017083>



बालासोर में DRDO ने किया 'अभ्यास' का सफल परीक्षण, भारत की रक्षा प्रणाली को ऐसे मजबूती देगा लड़ाकू ड्रोन

डीआरडीओ ने ओडिशा के बालासोर में लड़ाकू ड्रोन अभ्यास का सफल परीक्षण किया।

सूत्रों ने बताया कि परीक्षण के दौरान इसकी परफॉर्मंस पूरी तरह से सही रही।

ट्रायल के दौरान दो अन्य प्रदर्शनकारी वाहनों का सफल परीक्षण किया गया।

By Raghavendra Shukla

बालासोर: ओडिशा के बालासोर में भारत ने अभ्यास लड़ाकू ड्रोन का सफल परीक्षण किया। डीआरडीओ की ओर से अभ्यास का फ्लाइंग टेस्ट मंगलवार को किया गया। इस दौरान इसे विभिन्न प्रकार के रडार और इलेक्ट्रो ऑप्टिक सिस्टम से ट्रैक किया गया। सूत्रों ने बताया कि ड्रोन ने पूरी तरह से ऑटोनॉमस वेपॉइंट नेविगेशन मोड में अपनी परफॉर्मंस को सफलतापूर्वक साबित किया है।

अभ्यास का परीक्षण डीआरडीओ (रक्षा अनुसंधान और विकास संगठन) की ओर से चांदीपुर के पास इंटीग्रेटेड टेस्ट रीजन (आईटीआर) से किया गया। ट्रायल के दौरान दो प्रदर्शनकारी वाहनों का भी सफलतापूर्वक परीक्षण किया गया। डीआरडीओ के सूत्रों ने बताया कि इन वाहनों का इस्तेमाल विभिन्न मिसाइल सिस्टम्स के मूल्यांकन में लक्ष्य के तौर पर किया जा सकेगा। उन्होंने बताया कि अभ्यास को डीआरडीओ के एयरोनॉटिकल डिवेलपमेंट इस्टैब्लिशमेंट

(एडीई) द्वारा डिजाइन और विकसित किया गया है।

क्या है 'अभ्यास'?

'अभ्यास' एक हाई-स्पीड एक्सपेंडेबल एरियल टार्गेट (HEAT) है, जिसे एडीई में विकसित किया गया है। डीआरडीओ के मुताबिक, यह हथियार प्रणालियों को परीक्षण के लिए एक रियलिस्टिक खतरा सीनेरियो देता है, जिसकी मदद से विभिन्न मिसाइलों या हवा में मार करने वाले हथियारों का परीक्षण किया जा सकता है। अभ्यास लड़ाकू ड्रोन को ऑटोपायलट की मदद से स्वायत्त उड़ान के लिए तैयार किया गया है।

मंगलवार को इसे जुड़वा अंडरस्लंग बूस्टर्स का उपयोग करते हुए लॉन्च किया गया। यह एक छोटे गैस टरबाइन इंजन द्वारा संचालित किया गया था। गाइडेंस और कंट्रोल के लिए इसमें फ्लाइंग कंट्रोल कंप्यूटर (एफसीसी) के साथ-साथ इनर्शियल नेविगेशन सिस्टम (आईएनएस) भी लगाया गया है। वेहिकल को पूरी तरह से स्वायत्त उड़ान के लिए प्रोग्राम किया गया है। इस एयर वेहिकल की जांच लैपटॉप पर आधारित ग्राउंड कंट्रोल सिस्टम (जीसीएस) का इस्तेमाल करते हुए की गई है।



अभ्यास का सफल परीक्षण



लॉन्चिंग पैड पर 'अभ्यास'

रक्षामंत्री ने दी बधाई

बताया गया कि परीक्षण के दौरान 'अभ्यास' को 5 किमी की ऊंचाई, 0.5 माक की स्पीड, 30 मिनट की स्थिरता और 2जी टर्न कैपेबिलिटी की दरकार थी, जिसे उसने सफलतापूर्वक हासिल किया। वाहन के इस सफल परीक्षण पर रक्षामंत्री ने डीआरडीओ को बधाई दी है। उन्होंने ट्वीट कर कहा कि अभ्यास के सफल फ्लाइट टेस्ट के साथ डीआरडीओ ने आज एक माइलस्टोन हासिल किया है। इसे अनेक मिसाइलों के मूल्यांकन में लक्ष्य के तौर पर इस्तेमाल किया जा सकेगा। उन्होंने डीआरडीओ और इसे बनाने वाले सभी साझेदारों को बधाई दी है।

<https://navbharattimes.indiatimes.com/state/other-states/other-cities/india-conducts-successful-flight-test-of-abhyas-from-odisha/articleshow/78259879.cms>

दैनिक भास्कर

Wed, 23 Sept 2020

DRDO: भारत ने स्वदेशी एरियल टारगेट ABHYAS ड्रोन का सफल परीक्षण किया

हाईलाइट

- परीक्षण के दौरान दो प्रदर्शक यानों की सफलतापूर्वक परीक्षण उड़ान संचालित की गई
- मील का पत्थर हासिल होगा: रक्षा मंत्री राजनाथ सिंह

बालासोर: भारत ने मंगलवार को ओडिशा के एक परीक्षण रेंज से स्वदेशी ABHYAS - हाई-स्पीड एक्सपेंडेबल एरियल टारगेट ड्रोन का सफलत परीक्षण किया। यह परीक्षण रक्षा अनुसंधान एवं विकास संगठन (DRDO) ने यहां पास में चांदीपुर स्थित एकीकृत परीक्षण रेंज (ITR) से किया। इस पर विभिन्न राडारों और इलेक्ट्रो-ऑप्टिक प्रणालियों से नजर रखी गई। DRDO सूत्रों के अनुसार परीक्षण के दौरान दो प्रदर्शक यानों की सफलतापूर्वक परीक्षण उड़ान संचालित की गई। बता दें कि अभ्यास हाई-स्पीड ड्रोन है जिसे हथियार प्रणालियों के अभ्यास के दौरान मिसाइलों द्वारा टारगेट किया जा सकता है।

रक्षा मंत्री राजनाथ सिंह ने मंगलवार को कहा कि रक्षा अनुसंधान और विकास संगठन (DRDO) ने ओडिशा के बालासोर में इंटीग्रेटेड टेस्ट रेंज (ITR) से अभ्यास- हाई स्पीड एक्सपेंडेबल एरियल टारगेट के सफल उड़ान परीक्षण किया, जो मील का पत्थर हासिल होगा। सिंह ने कहा कि इसका इस्तेमाल विभिन्न मिसाइल प्रणालियों के मूल्यांकन के लिए एक लक्ष्य के रूप में किया जा सकता है। इस उपलब्धि के लिए DRDO और अन्य हितधारकों को ढेरों बधाई।



एक रक्षा बयान में कहा गया कि यान का इस्तेमाल विभिन्न मिसाइल प्रणालियों के मूल्यांकन के लिए एक लक्ष्य के तौर पर किया जा सकता है। एबीएचवाईएस को DRDO के एयरोनॉटिकल डेवलपमेंट इस्टैब्लिशमेंट (ADE) द्वारा डिजाइन एवं विकसित किया गया है। वायु यान को दो 'अंडरस्लैंग बूस्टर' का इस्तेमाल करते हुए उड़ाया गया।

यह एक छोटे गैस टरबाइन इंजन द्वारा संचालित है और इसमें मार्गदर्शन और नियंत्रण के लिए उड़ान नियंत्रण कंप्यूटर (FCC) के साथ नेविगेशन के लिए MEMS आधारित इनरट्रियल नेविगेशन सिस्टम (INS) है। वाहन को पूरी तरह से स्वायत्त उड़ान के लिए क्रमादेशित किया गया है। एयर व्हीकल की जांच लैपटॉप आधारित ग्राउंड कंट्रोल स्टेशन

(GCS) का उपयोग करके की जाती है। परीक्षण अभियान के दौरान, 5 किमी उड़ान की ऊंचाई, 0.5 मैक की वाहन गति, 30 मिनट की धीरज और परीक्षण वाहन की 2 जी टर्न क्षमता की उपयोगकर्ता की आवश्यकता को सफलतापूर्वक प्राप्त किया गया था।

<https://www.bhaskarhindi.com/national/news/drdo-india-successfully-tests-indigenous-aerial-target-abhyas-drone-165152>



Wed, 23 Sept 2020

India conducts successful flight test of ABHYAS from Odisha test range

During the trials, two demonstrator vehicles were successfully test flown, DRDO sources said

Balasore: India on Tuesday successfully conducted the flight test of ABHYAS - High-speed Expendable Aerial Target (HEAT) vehicles from a test range in Odisha, defence sources said.

The trial, carried out by the Defence Research and Development Organisation (DRDO) from the Integrated Test Range (ITR) at Chandipur near here, was tracked by various radars and electro-optic systems, the sources said.

Congratulating DRDO on its achievement, Defence Minister Rajnath Singh said ABHYAS can be used as a target for evaluation of missile systems.

"The DRDO achieved a milestone today with the successful flight test of ABHYAS - High Speed Expendable Aerial Target from ITR Balasore. This can be used as a target for evaluation of various Missile systems.

Congratulations to @DRDO_India & other stakeholders for this achievement," he tweeted.

During the trial on Tuesday, two demonstrator vehicles were successfully test-flown, DRDO sources said.

ABHYAS has been designed and developed by the Aeronautical Development Establishment (ADE) of the DRDO.

The air vehicle is launched using twin underslung boosters.

It is powered by a small gas turbine engine and has an Inertial Navigation System (INS) along with a Flight Control Computer (FCC) for guidance and control.

The vehicle has been programmed for fully autonomous flight.

The check out of the vehicle is done using laptop-based Ground Control Station (GCS), a defence statement said.

During the test campaign, the user requirement of 5 km flying altitude, vehicle speed of 0.5 mach, endurance of 30 minutes and 2g turn capability of the test vehicle were successfully achieved, it said.

"It proved its performance in a fully autonomous waypoint navigation mode," a DRDO source added.

<https://www.newindianexpress.com/nation/2020/sep/22/india-conducts-successful-flight-test-of-abhyas-from-odisha-test-range-2200470.html>



ABHYAS - High-speed Expendable Aerial Target HEAT (Photo | PTI)

DRDO conducts successful flight test of ABHYAS, Defence Minister Rajnath Singh calls it milestone

Union Defence Minister Rajnath Singh lauded the successful flight test of ABHYAS

Edited By Ananya Das

Highlights

- 1. In yet another milestone for India, the DRDO on Tuesday conducted the successful flight test of ABHYAS--High-speed Expendable Aerial Target (HEAT).**
- 2. The flight test was done from the Interim Test Range, Balasore in Odisha.**
- 3. Union Defence Minister Rajnath Singh lauded the successful flight test of ABHYAS.**

In yet another milestone for India, the Defence Research and Development Organisation (DRDO) on Tuesday conducted the successful flight test of ABHYAS--High-speed Expendable Aerial Target (HEAT). The flight test was done from the Interim Test Range, Balasore in Odisha.

Union Defence Minister Rajnath Singh lauded the successful flight test of ABHYAS. Taking to micro-blogging site Twitter, Singh said that this can be used as a target for evaluation of various Missile systems.

He tweeted, "The DRDO achieved a milestone today with the successful flight test of ABHYAS - High-Speed Expandable Aerial Target from ITR Balasore. This can be used as a target for evaluation of various Missile systems. Congratulations to DRDO & other stakeholders for this achievement."

During the trials, two demonstrator vehicles were successfully test flown. The vehicle can be used as a target for evaluation of various missile systems. During the test campaign, the user requirement of 5 km flying altitude, vehicle speed of 0.5 mach, endurance of 30 minutes and 2g turn capability of the test vehicle were successfully achieved.

Abhyas is designed and developed by Aeronautical Development Establishment (ADE), DRDO. The air vehicle is launched using twin underslung booster. It is powered by a small gas turbine engine and has MEMS based Inertial Navigation System (INS) for navigation along with the Flight Control Computer (FCC) for guidance and control. The vehicle is programmed for fully autonomous flight. The check out of air vehicle is done using laptop based Ground Control Station (GCS).

<https://zeenews.india.com/india/drdo-conducts-successful-flight-test-of-abhyas-defence-minister-rajnath-singh-calls-it-milestone-2311567.html>





Mon, 21 Sept 2020

Is Private R&D a panacea? Dumping DRDO and OFB is it a solution?

C. Srikumar, General Secretary of AIDEF responds to an article published in a Defence Magazine

Government and the Yes Masters of the Government wanted to destroy the Government Industries and PSUs. Government will announce something in this regard. Immediately mushrooms of Articles supporting the Government's decision in this regard. Whether it is Privatisation of Railways, LIC, Public Sector Banks or even the Defence Industry. Many such articles favouring the decision of the Government to Corporatise the OFB has been written and I have countered all these Articles. Now it has become the turn of retired Generals to write Articles against DRDO. One Such Articles was published in Defence News Journal under the title "Time to end DRDO's monopoly on Defence Research". According to him the move to Corporatise the Ordnance Factories is a move in the right directions. What is that right direction he has not bothered to inform his reader. He has also written in his article that that time has now come to end the DRDO Monopoly in Research in the field of Armament.

Has anybody stopped Private Industries to undertake Research in Defence R&D? Is it that capability of DRDO is raising eyesore of some segment, as it might help the public sector?

The author must know there is no license required by Private Sector to conduct R&D. Who stops them to score over DRDO in R&D?

The statement of monopoly is used in market context, not in a context of Public Actions. Do we make a statement that Govt monopoly should end over providing Services to people? It is unfortunate that some self-styled intellectuals arise due to their service tag and make some statements to catch the headline.

R & D Spending

Over 80% of the R&D spending in India merely comes from Marquee Research Agencies like DRDO, ISRO, ICAR, Department of Atomic Energy, CSIR etc. Does the author suggest that even that should be closed down when India spends less than 1% of its GDP towards R&D? Israel and Korea are the biggest spenders on R&D at 4.21% and 4.15% of GDP respectively. Japan, Finland and Sweden complete the top 5. World-over a large chunk of the total R&D spent is done by the government and there is a vacuum in private investment. There is no credible evidence of R&D by private sector. FICII has stated its report; there is an immense opportunity for the private sector to enhance its investments in the R&D sector in India.

My Suggestion to the General that, you should have kept the heading, When the poor Track record of Private Sector will end? That way, you would have spoken the truth.

Funding for Indian Industry:

It can be seen that the author might be hinting that finding to be diverted to private industry. MOD has notified 'Make' Procedure of capital procurement, in which there is a provision for funding of 90% of development cost by the Government to Indian industry under Make-I category. What stops Private sector to avail this opportunity? The dominant logic is that by killing everything public, only private sector can gain.

Efficiency vs Effectiveness

Is it the efficiency of DRDO that is of concern or effectiveness? The author says, efficiency is the problem area. India R&D is one of the most efficient. That is the reason; many MNCs are putting their R&D base in India. The issue at stake is Effectiveness of Project Management.

When you are planning to choke the DRDO and Public R&D, what you are trying to do is more imports. Is the author suggesting opening the flood gate of imports, as he wants to stop monopoly of DRDO?

Illogical arguments -

I think, the author lacks the clarity as the confusion prevails in the Policy makers, who are more guided by making the right noise than to make a difference.

- By stopping importing, which any way India was not doing, will the Self Reliance go up?
- By stopping the public sector R&D, will the Technology Development get a boost?

This is part of a narrative, everything about the public is bad and every solution lies in solution from private sector for the vested interest, which dramatically is increasing after the retirement of many Generals.

Celebrated ban on imported weapons:

There is a crooked logic; ban on imported weapons can help as a spur to indigenous research and development, provided there is an order by Government, there is a budget by Government to make the purchase and there is a capability of Industry to develop the technology. It may be noted that in DPP 2016, the offset threshold was increased from Rs 300 Crore to Rs 2000 crore, as Indian Industry did not have the capability even to absorb the offset. In such scenario, such high sounding statements may lead to degradation of capability of Indian Armed Forces and in case of failure by Indian Industry; it will lead to a better justification of imports. The sincerity of pronouncement of Government need to be examined, if there is systematic plan for development of technology rather than a blanket ban on imports. A blanket ban on imports only gives a feel good feeling to the Government.

Young Minds can generate new technology?

What a simplistic solution that young minds can generate new technological solutions to the problems faced by the defence forces. Nobody stopped the young talents to contribute in the country. There was no ban on their contribution either.

The foreign OEMs would not be so foolish to set up R&D and incur huge expenditure, had it been so easy to develop the technology. Defence sector works at the front end of fuzzy technology and draws from multiple disciplines, which is beyond the scope of a young researcher.

It may be noted that a platform of iDEX has been created for creation of an ecosystem to foster innovation and technology development in Defence and Aerospace by engaging Industries including MSMEs, Start-ups, Individual Innovators, R&D institutes and Academia and provide them grants/funding and other support to carry out R&D which has potential for future adoption for Indian defence and aerospace needs. Under the iDEX scheme, a maximum of Rs 1.5 crore funding is available to a participant for development of a prototype. More than 700 start-ups participated in 18 problem statements pertaining to National Defence requirements, launched under 3 rounds of Defence India Start-up Challenges (DISC).

58 winners were announced after rigorous evaluation of applications by the High-Powered Selection Committees. Contracts have already been signed with several winners followed by release of tranches for several cases for prototype/ technology development. It seems with retirement, the General has lost touch with reality and staying with his past.

Contribution of the author needed

The author has commented that there is the formidable inertia in the bureaucracies (both civil and military) that neither of these simple suggestions reached anywhere. He should only note that his ideas are foolish.

Let us ask with so many years of Service, how many technologies have been developed by the so called Lt General Eric Vas, and how many patents have been filed? Blaming others is the easiest thing to do. I wish the retired Generals should lead the show by their actions than making such cheap comments.

No problem as alleged with OFB and DRDO

There is no problem in improving efficiency either of DRDO or that of OFB. But, Corporatisation is not a pragmatic consideration, as the nation has to maintain the capability of large life span of defence equipment, spanning for 30-40 years, for which no private sector will be giving continued support. If The Armed Forces would like to get the stretch during the Wars without associated increase in profit margins, if the Armed Forces would like to get the Spares without the minimum Order quantity for commercial consideration, then OFB as a department is the answer.

It has become trendy for many retired Service Officers to think so after their retirement. It is time to examine contribution of so called thinkers about their contribution to technology development during service careers.

Learning from the world

Let us give some academic inputs from a paper titled "Public funding of R&D and its effect on the composition of business R&D expenditure" from BRQ Business Research Quarterly, Volume 17, Issue 1, January–March 2014, Pages 22-30) to validate our arguments that Public sector Role is far more important than the private sector.

- Public subsidies are, together with tax incentives, one of the most used tools for technology policy to stimulate R&D private expenditure
- Public funding, regardless the level of Government grants, positively stimulates R&D expenditure.
- External knowledge acquisition is more likely in those companies that have a higher level of specific assets for the acquisition and assimilation of foreign technology

Private R&D spending is complementary and thus "additional" to public R&D spending, or it is not substitute for Public R&D, which undertakes the Basic Research and leads to development of better scientific base for development of technology.

The argument is DRDO monopoly and consequent reducing its role is Malafide. The diatribe against OFB is unfounded.

As Private sector Spend is very less, it cannot lead the quest for Self-Reliance. Moreover, if the IPR has to remain with Public Sector, it can only ensure Self Reliance. Let Private Sector show its capability in both R&D and manufacturing, but not at the cost of killing or pruning DRDO and OFB.

My request to the Author, for sake of making news or publicity, please refrain from making such cheap statements.

In Armed Forces, if you give a marching order or a firing order, there will be some vivid action on the field, not so in R&D or manufacturing. Your expertise better be limited to your fields in the national interest.

Please think of the larger interest of the nation. Please stay connected with reality. Please stop making loose comments. Thank you General, as it forced me to write, as it will send signals many other Generals of your category.

(The views expressed here are those of C.Srikumar, General Secretary of All India Defence Employees Federation and the Convener of AITUC, Public Sector Unions.)

<https://www.indianpsu.com/news/232/is-private-r-d-a-panacea-dumping-drdo-and-ofb-is-it-a-solution>

India conducts successful flight test of high-speed expendable aerial target

New Delhi, Sept. 22 (Xinhua) -- Indian Defence Research and Development Organisation (DRDO) on Tuesday successfully flight-tested Abhyas, a high-speed expendable aerial target (HEAT), officials said.

The test was carried out from the Interim Test Range (ITR) off Chandipur coast in Balasore district, about 208 km northeast of Bhubaneswar, the capital city of Odisha.

According to the ministry, the vehicle can be used as a target for the evaluation of various missile systems.

Abhyas is designed and developed by the Aeronautical Development Establishment (ADE) of DRDO.

During the test campaign, officials said the user requirement of five km flying altitude, vehicle speed of 0.5 mach, an endurance of 30 minutes and 2g turn capability of the test vehicle were achieved. Enditem

http://www.china.org.cn/world/Off_the_Wire/2020-09/22/content_76730030.htm



Newest details of DRDO's next generation AD-1 & AD-2 ABM Emerge

Use of modern weapon systems has revolutionised the concept of warfare. Technology as a force multiplier, provides the competitive and cutting edge. The technology of guided missiles encompasses the multiple streams of engineering, technology and applied sciences. A number of factors are responsible for the successful launch of missiles. These involve coordination of a variety of subsystems.



Newest details of India's next generation AD-1 & AD-2 ABMs are out. AD-1 will be able to intercept MRBM class of Ballistic Missiles while AD-2 will have the capability to intercept IRBM class of Ballistic Missiles as per a Tweet by Nextoft Alam.

Missile defence can take place either inside (Endo-atmospheric) or outside (Exo-atmospheric) the Earth's atmosphere. The trajectory of most ballistic missiles lies inside and outside the Earth's atmosphere and interception is possible in both segments. There are advantages and disadvantages to either intercept technique. Endo-atmospheric interceptions require lighter ABMs with inherently greater mobility. As range is limited, ABMs need to be deployed in larger numbers. Decision time is

considerably reduced and there is danger of nuclear fallout over own territory. Exo-atmospheric interceptions provide greater decision time and larger areas can be defended by fewer ABMs.

In Jan 2020 media reports emerged that India's indigenous Ballistic Missile Defence (BMD) program was complete, and the IAF & DRDO were working on a proposal to seek the government's nod to install the missile shield for the national capital. The BMD, along with the Russian S-400 Triumf air defence system, aims to secure the country from all kinds of incoming missiles, including nuclear, and flying objects.

All tests carried so far have been successful, including the radars and missiles. The IAF, which is responsible for the country's air defence, and the DRDO, which has developed the system, will now move a joint proposal for the government's clearance. The successful test of the anti-satellite (A-SAT) missile in March 2019 was a big boost to the BMD program. India's leap in space with the A-SAT test is especially significant because intercontinental ballistic missiles like China's Dongfeng series travel through space before re-entering Earth's atmosphere to hit the target. On the other hand, the Pakistani ballistic missiles are based on obsolete Soviet era technologies supplied by both China and North Korea. Contrary to the popular belief in Pakistan, China hasn't supplied the latest hi-tech systems. The restraint to share critical technologies with the Islamic Republic is understandable given China's persistent predisposition of brutally containing its sizeable Muslim population in the occupied territory of Xinjian, and the repercussions that could follow if there is a fallout between Sino-Pakistani relations in the near future. India's multi-tier BMD system is capable of handling the current batch of Pakistani ballistic missiles.

<http://www.indiandefensenews.in/2020/09/newest-details-of-drdo-next-generation.html>

Business Standard

Wed, 23 Sept 2020

DRDO working on cultivating vegetables under intense winters for Army

The research for the same is being done by DRDO's Defence Institute of High Altitude Research

Leh (Ladakh): As the troops are set to spend harsh winters at the China border, the Defence Research and Development Organisation (DRDO) is working on cultivating vegetables in the tough conditions here, for the Indian Army, with the technologies like passive greenhouse technology, zero energy-based technique storage, and microgreens.

The research for the same is being done by DRDO's Defence Institute of High Altitude Research (DIHAR).

While speaking to ANI, DIHAR's Director Dr. Om Prakash Chaurasia said that the focus is now on to augment the availability of fresh vegetables in winters like summers.

"With DRDO technology and hill council, all vegetables can be grown in summer but now our focus is on winters that how to augment the availability of fresh items in winters. There are two approaches, one is to standardise the greenhouse technology. This (Leh) place has high intercity of solar even during peak winter period so we are working on a passive greenhouse. We will be able to grow cabbage, cauliflower, and even tomato even in the month of January where the temperature drops till -25 degrees. We have an underground greenhouse as well. Another approach is to develop the storage of vegetables grown in summers. It is zero energy-based storage technology. Potato, cabbage, cauliflower, Raddish, carrot can be stored for 4-5 months," said Chaurasia.

Chaurasia also highlighted that DISAR is also cultivating superfoods like Quinoa, chia seed, seabuckthorn, and Goji Berries which are exclusively grown in Leh.

"Oxygen level is low and under stress condition in this area. So, we require foods which are enriched with nutrition. We are cultivating a superfood which is a food which you consume less

and it is more effective. We are cultivating foods like Quinoa, chia seed, seabuckthorn, and Goji Berries," he added.

In August last year, Prime Minister Narendra Modi mentioned a special plant named 'solo' which is also known as the Sanjeevani herb that is found in Ladakh.

Describing the utilities of solo herb which is known as Sanjeevani, Dr Chaurasia said, "Himalaya is a treasure of herbs. Sanjeevani is one of the herbs found in the Himalayas. Its scientific name is Rhodiola. It cures fatigue, mountain sickness, and works on memory boosting. The roots of Sanjeevani have the fragrance of a rose. DRDO is working with UT administration for mass cultivation of it."

DIHAR has worked on the microgreen plant which will help jawans grow plants in harsh conditions and can be grown in 10-15 days. The product can be used as a seasoning for farmers.

Talking about microgreens, Dr Dorjee, a scientist in DIHAR said, "In the far area, Army is deployed in harsh conditions and there is no availability of substrate or soil to grow vegetables. Through technology, we will be able to provide these microgreen plants to army jawan when he is having lunch or breakfast in those areas."

"To grow these plants, we have to ensure that ingredients need to remain minimum like cocopeat, and after 10-15 days, these plants are ready for consumption. It can be used for seasoning too," he added.

Dorjee further said that around 20 vegetables can be grown in this medium and it is rich in vitamins, minerals, and antioxidants.

(Only the headline and picture of this report may have been reworked by the Business Standard staff; the rest of the content is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/current-affairs/drdo-working-on-cultivating-vegetables-under-intense-winters-for-army-120092200842_1.html



Wed, 23 Sept 2020

जवानों को कड़ाके की ठंड में मिलेंगी ताजा सब्जियां और पौष्टिक भोजन, DRDO ने विकसित की खास तकनीक

लेह-लद्दाख (Ladakh) में चीन (China) से लोहा ले रही भारतीय सेना (Indian Army)

आने वाले दिनों में यहां पड़ने वाली कड़ाके की लंबी सर्दी के लिए तैयारियां कर रही है

लेह-लद्दाख (Ladakh) में चीन (China) से लोहा ले रही भारतीय सेना (Indian Army) आने वाले दिनों में यहां पड़ने वाली कड़ाके की लंबी सर्दी के लिए तैयारियां कर रही है। वहीं रक्षा अनुसंधान एवं विकास संगठन (DRDO) ने लेह और आस-पास के ठंडे इलाकों में भारतीय सेना के लिए सब्जी उगाने का काम शुरू किया है। जिन्हें आने वाली सर्दियों के मौसम में भारत-चीन सीमा पर तैनात सैनिकों के लिए उपयोग किया जा सके।

सब्जी उगाने के लिए डीआरडीओ माइक्रोग्रीन तकनीक का इस्तेमाल कर रही है। इसके लिए लेह (Leh) में DRDO के यूनिट डिफेंस इंस्टीट्यूट ऑफ हाई एल्टीट्यूड रिसर्च किसानों और आर्मी यूनिट्स को ट्रेनिंग दे रहा है।



इस तकनीक से सेना के जवानों को मिलेगा ताजा और पोषिक भोजन

डिफेंस इंस्टीट्यूट ऑफ हाई एल्टीट्यूड रिसर्च (डीहार) के वैज्ञानिक डॉ. दोर्जी ने बताया कि थल सेना बहुत कठिन इलाकों में तैनात है। उन क्षेत्रों में पौधों के विकास के लिए उपयुक्त पर्यावरण मिलना मुश्किल है। इस माइक्रोग्रीन तकनीक से हमारे जवानों को ताजा और पोषिक भोजन मिल सकेगा।

वहीं डीहार निदेशक, डॉ.ओपी चौरसिया ने कहा कि हमारे पास भूमिगत ग्रीनहाउस भी हैं। हमारा मकसद सर्दियों में सब्जियों के भंडारण तंत्र को विकसित करने का है। यह एक शून्य ऊर्जा-आधारित भंडारण तकनीक है, जो 4-5 महीनों के लिए आलू, फूलगोभी और गाजर को स्टोर करने में मदद करेगी।

एलएसी पर भारत का चीन के साथ गतिरोध जारी है। दोनों देशों के करीब एक लाख सैनिक सीमा पर तैनात हैं। डीआरडीओ का यह कदम भारतीय सेना के लिए बेहद खास है। क्योंकि जब लद्दाख में तापमान माइनस 30 और 40 डिग्री तक चला जाता है तब यहां सब्जियां उगाना बेहद मुश्किल हो जाता है। लद्दाख में भारी बर्फबारी के बाद अक्सर रास्ते बंद हो जाते हैं। तब ताजा सब्जी मिलना बहुत मुश्किल भरा काम हो जाता है।

<https://www.tv9bharatvarsh.com/india/drdo-working-on-cultivating-vegetables-under-intense-winters-for-indian-army-294438.html>

अमर उजाला

Wed, 23 Sept 2020

चीन सीमा पर तैनात सैनिकों के खाने के लिए डीआरडीओ ने विकसित की तकनीक

जम्मू: भारतीय सेना एलएसी पर लंबी सर्दियों की तैयारी कर रही है। वहीं डीआरडीओ जवानों के लिए सब्जियों की खेती पर काम कर रहा है। जिन्हें आने वाले सर्दियों के मौसम में भारत-चीन सीमा पर तैनात सैनिकों के लिए उपयोग किया जा सकता है। इसके लिए डीआरडीओ माइक्रोग्रीन तकनीक का इस्तेमाल कर रही है।

डिफेंस इंस्टीट्यूट ऑफ हाई एल्टीट्यूड रिसर्च (डीहार) के वैज्ञानिक डॉ. दोर्जी ने बताया कि थल सेना बहुत कठोर स्थानों पर तैनात है। जहां पौधों के विकास के लिए उपयुक्त पर्यावरण मिलना मुश्किल है। इस माइक्रोग्रीन तकनीक से हमारे जवानों को ताजा और पोषिक भोजन मिल सकेगा।

वहीं डीहार के निदेशक, डॉ. ओपी चौरसिया ने कहा कि हमारे पास भूमिगत ग्रीनहाउस भी हैं। एक दृष्टिकोण सर्दियों में सब्जियों के भंडारण तंत्र विकसित करने का है। यह एक शून्य ऊर्जा-आधारित भंडारण तकनीक है। जो 4-5 महीनों के लिए आलू, फूलगोभी और गाजर को स्टोर करने में मदद करेगी।



सर्दियों में एलएसी पर तैनात सैनिकों के लिए सब्जियां उगाने के लिए डीआरडीओ ने विकसित की तकनीक - फोटो : ANI

डीहार के निदेशक डॉ. ओम प्रकाश चौरसिया ने बताया कि यहां गर्मियों में डीआरडीओ हिल काउंसिल की मदद से सब्जियां उगाई जा सकती हैं। मगर अब हमारा मकसद सर्दियों में यहां सब्जियां उपलब्ध करना है। जिसके दो तरीके हैं,

एक यहां ग्रीन हाउस तकनीक से खेती की जा सके। जिससे यहां जनवरी के महीने में भी टमाटर, फूल गोभी और आलू उगा सकेंगे।

उन्होंने बताया कि यहां जीरो एनर्जी बेस्ड स्टोरेज तकनीक के जरिए गोभी, मूली गाजर को चार-पांच महीनों के लिए सुरक्षित रखा जा सकता है।

उन्होंने बताया कि यहां ऑक्सीजन का लेवल भी कम है और मौसम संबंधित कई परेशानियां हैं। जिसके चलते हमें ज्यादा पोषक सब्जियां और खाने की जरूरत है। हम ऐसी फसल की तैयारी कर रहे हैं जिसे आप कम खाएं लेकिन उसमें पोषक तत्व हो और यह ऊर्जा से भरपूर हो।

पिछले साल अगस्त में प्रधानमंत्री नरेंद्र मोदी ने एक पौधे का जिक्र किया था, जो लेह इलाके में मिला था, इसका नाम 'सोलो' है। जिसे संजीवनी के नाम से भी जाना जाता है। डॉ. चौरसिया ने बताया कि हिमालय जड़ी बूटियों का खजाना है। संजीवनी इन्हीं जड़ी बूटियों में से एक है। डीहार माइक्रोग्रीन पौधे पर काम कर रहा है जिसकी मदद से यहां के मौसम में भी खेती संभव होगी। डीहार की कोशिश है कि यहां 10-15 दिनों में फसल तैयार की जा सके।

<https://www.amarujala.com/jammu/as-army-prepares-for-long-winter-at-lac-drdo-works-on-developing-vegetables-under-intense-weather>

THEWEEK

Wed, 23 Sept 2020

HAL to ramp up Tejas fighter tests after pandemic pause

Two FOC-standard aircraft are likely to take to the skies in the coming days

By Anantha Krishnan M

Two fighters from the Tejas Final Operational Clearance (FOC) block—SP-22 and SP-23—are likely to take to the skies in the coming days, signalling the resumption of flight activities that were halted for a while.

An official from Hindustan Aeronautics Ltd (HAL) told *Onmanorama* that the flight trials of these two fighters will be completed by the end of this month.

The low- and high-speed taxi trials of both fighters have been completed. The LCA-Tejas Division of HAL is currently finishing the activities ahead of their first flights. SP-23 is manufactured by HAL's Aircraft Division.



An FOC-standard Tejas | Via onmanorama

“The FOC variants getting ready for delivery/flight are loaded with updated software to meet the operational requirements of Indian Air Force (IAF). The production rate has been enhanced at LCA and Aircraft Divisions. Structural works are in advanced stages,” the official told *Onmanorama*.

HAL hopes that by the end of this production year, the fuselages of the remaining FOC fighters will be loaded on to their respective jigs. An IAF official overseeing the Tejas production activities told *Onmanorama* that to avoid further delays, HAL has been told to ensure similar build standards for all FOC variants, especially SP-21, SP-22 and SP-23, to start with.

“This would meet our operational and maintenance requirements,” the top official said.

A team consisting of representatives from IAF, HAL, Aeronautical Development Agency, Centre for Military Airworthiness and Certification, Regional Centre for Military Airworthiness and

Regional Director, Aeronautical Quality Assurance, is looking into all aspects of the FOC variants, ahead of clearing them for flights.

Production rate

HAL is working towards delivering the FOC aircraft to IAF without having any pending concessions. The production rate is expected to be enhanced, once the vendors start delivering major assemblies.

“With the lessons from the production of 16 IOC (initial operational clearance) fighters, lots of improvements have been made during the initial build of the FOC structures,” the official said.

SP-21, the first Tejas FOC fighter that flew in March this year, was produced by HAL in a record time of 12 months, post release of the documents.

The aircraft was subsequently delivered to the IAF in May and is currently undergoing software upgrade and post-delivery checks. It is expected to be with its Indian Air Force squadron by the end of this month.

HAL has put in reinforced efforts to meet the demands of IAF with the manufacturing of detailed parts of all FOC fighters almost completed.

“Now, the focus is on the completion of structural build of aircraft, which are planned to be produced during this financial year. The first three aircraft are in advanced stage of delivery and another three (SP-24, SP-25, SP-26) are in various stages of equipping,” the official added.

Pandemic pause

The COVID-19 lockdown and associated delays have dented the production plans of HAL.

“The pandemic has affected our plans and even hit some of the supply chain logistics. But we never took shelter under these excuses and have provided uninterrupted support to IAF, even during complete lockdown period. We deputed multiple teams to support Tejas fleet and are further improving the serviceability through reducing the turnaround time and ensuring spare stocks in surplus,” the official added.

COVID-19 has impacted the supply chain, slowing down some of the production activities considerably. HAL is now gearing up to meet the financial year targets through innovations such as flexible time approach and dynamically balancing the production lines.

“We are planning to maximise the deliveries despite the lockdown-induced slowdown in supply chain. The target is to produce eight aircraft by end of this FY and this could be enhanced if the supplies from our business partners improve,” the official added.

On the measures being put in place to improve the supply chain management, the official said efforts are on to bring back normalcy. “The foreign supply chain is the worst hit. Since LCA-Tejas Division follows the integrator model, any supply chain disruption will bring in risk for timelines. We are working closely with our partners to tide over the current situation. We are supporting them financially and technically to come out of the current situation. We have given relief to our business partners for the delay caused due to COVID-19-related lockdown,” the official added.

Meanwhile, detailed part manufacturing work is currently under way for manufacturing of eight Tejas FOC trainer aircraft. The jigs are being calibrated for structural assembly and if HAL sticks to the current plan, the first trainer will fly out by end of next year.

(The writer is an independent aerospace and defence journalist, who blogs at Tarmak007 and tweets @writetake.)

<https://www.theweek.in/news/india/2020/09/22/hal-to-ramp-up-tejas-fighter-tests-after-pandemic-pause.html>

IAF's lethal flying machines that give India an 'edge' over Pakistan, China

By Ritesh K Srivastava

1. IAF's 'game-changing' lethal flying machines

Amid heightened tensions between Indian and China since the Galwan Valley clashes in eastern Ladakh, the armed forces of the two nuclear-powered countries are in the highest alert mode. While the Indian Army has increased deployment of its troops near the Line of Actual Control, the Indian Air Force has also increased surveillance and patrolling in the high-altitude regions in Ladakh.

The IAF has seven commands including Western, Eastern, Central, South Western, Southern, Training, and Maintenance. The active-duty force of the IAF is approximately 140,000. The IAF which operates more than 1,700 aircraft, including approximately 900 combat aircraft, has recently inducted several lethal flying machines, which give an edge to India over Pakistan and China in case of a war. Let's have a look at them –



2. Apache:

The recently inducted Boeing AH-64E Apache attack helicopters enable the IAF to perform day/night, all-weather attack missions especially in rugged mountain regions of Indo-China borders. They are stealthy, versatile machines, designed for all kinds of missions.

It comes equipped with laser and infrared systems for day-night operations and armed with air-to-surface Hellfire missiles, 70 mm rockets and an automatic cannon. The Apache will replace the Russian Mi 35 that IAF has been operating for years and are due to retire. AH-64 Apache has a twin turbo-shaft engine with a tail wheel-type landing gear and a tandem two-crew cockpit. It has a nose-mounted sensor suite for target acquisition and night vision systems.

3. IAF's Light Combat Aircraft (LCA) Tejas

LCH & Rudra: Hindustan Aeronautics Limited's indigenously Light Combat Helicopters (LCH) and HAL Rudra attack helicopters are dedicated for combat missions. In a significant achievement for the indigenous fighter aircraft programme, the IAF has deployed the home-grown Light Combat Aircraft (LCA) Tejas on the western front along the Pakistan border in view of the tensions with China on the Ladakh front.

4. Chinook- IAF's multi-mission helicopter

Chinook: India has an advanced rotorcraft fleet making it a strong contender to China. The IAF's CH-47F Chinook, Mil Mi-26, Mil Mi-8, Mil Mi-17, Mi-17 1V, and Mi-17V 5 are intended for heavy and medium-lift strategic and utility roles.

5. C-17 Globemaster III:

India's state-of-the-art strategic air lifters, including the C-17 and C-130J, ensure rapid transfer of equipment and supplies to airbases near the LAC, which is the need of the hour for ground forces on the battlefield. The C-17 Globemaster III, C-130J-30, Ilyushin Il-76, Antonov An-32, and Dornier Do 228 aircraft form part of the IAF's transport aircraft inventory.

6. IAF's anti-drone system developed by DRDO

DRDO's Anti-Drone System: An anti-drone system developed by the Defence Research and Development Organisation (DRDO) can detect and jam micro drones up to 3 kilometres and use laser to bring down a target up to 1-2.5 kilometres depending on the wattage of laser weapon. The DRDO system can detect and identify drone threats at a moment's instance and terminate them. Unmanned aerial vehicles, mostly of small size, are called drones. It can be an effective counter to increased drone-based activity in the western and northern sectors of the country.

7. DRDO-developed AEW&C system

AEW&C system: The IAF currently operates indigenously developed DRDO's AEW&C system, which is based on the Embraer ERJ 145 aircraft, and the EL/W-2090 Phalcon AEW&C installed on the Beriev A-50 platform.

8. IAF's AN-32 transport aircraft

AN-32 transport aircraft: As compared to China, the IAF owns AN-32 transport aircraft and multi-role fighters for crucial bombing missions.

9. MiG-29 multi-role aircraft & Jaguar all-weather attack aircraft

MiG-29 & Jaguars: The IAF fleet also includes all-weather MiG-29 multi-role aircraft and Jaguar all-weather attack aircraft.

10. Sukhoi Su-30 MKI:

Sukhoi Su-30MKI serves the IAF as the primary air superiority fighter with the capability to perform air-to-ground strike missions. The IAF operates more than 270 Su-30MKIs and is fielding HAL-developed Tejas fourth-generation multi-role light fighters to replace its ageing fleet of MiG-21 interceptor aircraft.

11. IAF's nuclear-powered Rafales

Rafale: As compared to China's Chengdu J-20, which is a 5th generation combat jet, the performance of Rafale has already been witnessed in Afghanistan, Libya, and Mali. While the difference and the combat capacity of Pakistan's F-16 and India's Rafale are quite similar, the Rafale has been customized according to India's warfare experience and is nuclear-capable fighter jets which lack in Pakistan's F-16. This provides it an edge over the adversaries and strengthens the airpower of India which is extremely required under the present circumstances.

12. IAF's 'game-changers' Rafale multi-role combat fighters

Rafale: Projected as 'game-changers', the recent induction of Rafale multi-combat fighters jets from France has certainly added more firepower to the IAF and enabled it to maintain its air superiority over China's J10, J11, and Su-27 fighter jets. Armed with Meteor very long-range and MICA beyond visual range (BVR) air-to-air missiles, the Rafale fighters are believed to pose a significant threat to Chinese aerial assets.

<https://zeenews.india.com/photos/india/iaf-s-lethal-flying-machines-that-give-india-an-edge-over-pakistan-china-2311493/iafs-game-changers-rafale-multi-role-combat-fighters-2311494>

Business Standard

Wed, 23 Sept 2020

China links troop pull back with Indian withdrawal from Kailash Range

On August 30, after the PLA began expanding its territorial hold south of the Pangong Tso, the Indian Army occupied "blocking positions" on the Kailash Range on August 30

By Ajai Shukla

New Delhi: Late on Tuesday evening, a full day after the conclusion of the 6th round of talks between Indian and Chinese military commanders, the two sides issued a joint statement that agreed to “earnestly implement the important consensus reached by the leaders of the two countries, strengthen communication on the ground, avoid misunderstandings, stop sending more troops to the frontline, refrain from unilaterally changing the situation on the ground and avoid taking any action that might complicate the situation.”

Notably, the statement made no mention of any of India’s core concerns: a troop pull-back by China and a reversion to the status quo ante of April.

Senior government sources say that, during Monday’s talks, China’s People’s Liberation Army (PLA) hardened its stance, conveying to the Indian Army that it must vacate 5-6 tactically dominating heights it occupied south of the Pangong Tso lake. Only after that would the PLA consider any further withdrawal from areas that the Chinese have occupied.

On August 30, after the PLA began expanding its territorial hold south of the Pangong Tso, the Indian Army occupied “blocking positions” on the Kailash Range on August 30, in its first offensive action since the PLA trespassed across the Line of Actual Control (LAC) in May.

These mountaintops are strung out, north-to-south, on the Kailash Range. They include the tactically vital Point 5167, Bump, Magar Hill, Rezang La, Reching La and Mukhpari.

By occupying these features, the Indian Army can observe Chinese activities across Pangong Lake, in the Spanggur Gap and on PLA-held features such as Helmet and Black Top. Indian control of these heights makes it difficult for the PLA to consider any westward advance into the India-held Chushul Bowl.

Indian military officers in Monday’s talks, including the outgoing commander of the Leh corps, Lieutenant General Harinder Singh, and his designated successor, Lieutenant General PGK Menon, flatly refused to withdraw from their advantageous positions, pointing out that these heights were all on territory that India had traditionally controlled and patrolled.

The Indian delegation, which also included the Ministry of External Affairs’ official in charge of the China desk, demanded the PLA withdraw from points of intrusion such as Pangong Tso,



Indian control of these heights makes it difficult for the PLA to consider any westward advance into the India-held Chushul Bowl

Gogra-Hot Springs and the approaches to Chushul. It is unclear whether the Indian side has also demanded a Chinese withdrawal from Depsang, where PLA troops have penetrated about 15 kilometres into India – the deepest point of intrusion.

Given this disagreement, the PLA delegation led by the South Xinjiang Military District chief, Major General Liu Lin, declined to discuss any pull back by Chinese troops.

With that, there remains little to show for the apparent consensus between the two foreign ministers – S Jaishankar and Wang Yi – who met in Moscow on September 10. In a five-point joint statement they agreed “the current situation in the border areas is not in the interests of either side... [and] that the border troops of both sides should continue their dialogue, quickly disengage, maintain proper distance and ease tensions.”

Instead of disengagement, the two sides have deployed an estimated 35,000 to 40,000 soldiers each along the LAC.

In the north, in the Depsang area, Indian planners say there are about 5,000 soldiers on the Indian side of the LAC, backed by another 5,000 on the Chinese side, equipped with tanks and air defence guns. Over time, the PLA has built roads and tracks to supply the troops that have crossed the LAC.

To the south of Depsang, the PLA has pulled out of the Galwan River valley but remains poised on the LAC with an estimated 8,000-9,000 soldiers along India’s Patrolling Point (PP) 14, PP 15, PP-17 and PP-17A (Gogra Post).

Another 2,000-3,000 Chinese soldiers are deployed across the LAC from PP-18 to PP-23 in the Ane Le area.

South of Ane La, on the north bank of Pangong Tso, where the PLA has pushed the LAC westwards by about eight kilometres, Indian officials estimate there are about 2,500 Chinese soldiers on the north bank and another 10,000 on the south bank, facing off against Indian soldiers on the Ladakh Range.

Finally, there is a major build up of about 250 tanks and other armoured vehicles in the Spanggur Lake area.

In a worrying development for the Indian Air Force (IAF), Indian planners are evaluating the veracity of reports that the PLA has already deployed a regiment of state-of-the-art S-400 air defence missiles opposite the Chumar area; and another regiment is being moved into the Depsang sector.

The Russian S-400 missile regiments, which can accurately strike Indian aircraft at ranges up to 400 kilometres, would allow the PLA to substantially neutralise the IAF’s advantage in air power.

The joint statement left the path for dialogue open, mentioning that the two sides agreed to hold the 7th round of Military Commander-Level Meetings as soon as possible.” No date has been fixed for the talks.

https://www.business-standard.com/article/defence/china-links-troop-pull-back-with-indian-withdrawal-from-kailash-range-120092201577_1.html

भारत और चीन अग्रिम मोर्चे पर और अधिक सैनिक

न भेजने पर सहमत: सेनाओं का संयुक्त बयान

नयी दिल्ली: पूर्वी लद्दाख में तनाव कम करने के मद्देनजर भारत और चीन मंगलवार को अग्रिम मोर्चे पर और अधिक सैनिक नहीं भेजने, जमीनी स्थिति को एकतरफा ढंग से न बदलने एवं मामले को और जटिल बनाने वाले कदमों से बचने पर राजी हुए। इन निर्णयों की घोषणा मंगलवार देर शाम को भारतीय सेना और चीनी सेना के एक संयुक्त बयान में की गयी। इसे चार महीने से अधिक समय से जारी सीमा गतिरोध को सुलझाने की दिशा में एक प्रयास के रूप में देखा जा रहा है। एक दिन पहले ही भारत और चीन के सैन्य कमांडरों के बीच हुई छठे दौर की वार्ता 14घंटे तक चली थी।

हालांकि ऐसा जान पड़ता है कि वास्तविक नियंत्रण रेखा पर टकराव के क्षेत्रों से सैनिकों की वापसी पर बात आगे नहीं बढ़ी। बयान में कहा गया कि दोनों सेनाएं जमीनी स्तर पर आपस में संपर्क मजबूत करने और गलतफहमी तथा गलत निर्णय से बचने और दोनों देशों के नेताओं के बीच बनी महत्वपूर्ण सहमति के ईमानदारी से क्रियान्वयन पर भी सहमत हुईं। बयान में कहा गया है कि दोनों पक्ष समस्याओं को उचित ढंग से सुलझाने, सीमावर्ती क्षेत्रों में संयुक्त रूप से शांति सुनिश्चित करने के लिए व्यावहारिक कदम उठाने पर भी राजी हुए। बयान में कहा गया कि दोनों पक्ष जल्द से जल्द सैन्य कमांडर स्तर की सातवें दौर की वार्ता करने पर सहमत हुए।

नयी दिल्ली और बीजिंग में एक साथ जारी किये गये समान बयान में इन निर्णयों का एलान किया गया है। भारतीय सेना के बयान के अनुसार वास्तविक नियंत्रण रेखा (एलएसी) पर स्थिति को स्थिर करने के मुद्दे पर दोनों पक्षों ने गहराई से विचारों का अदान-प्रदान किया गया। यह पहली बार है कि पूर्वी लद्दाख में गतिरोध को समाप्त करने के उद्देश्य से दोनों देशों की सेनाओं ने स्पष्ट कदमों की घोषणा की है। मई के टकराव के बाद दोनों देशों की सेनाओं ने अपने हजारों सैनिकों और हथियारों का नियंत्रण रेखा पर संवेदनशील क्षेत्रों में जमावड़ा लगा दिया है। इस बीच चीन के राष्ट्रपति शी चिनफिंग ने कहा कि चीन वार्ता के जरिए दूसरों के साथ मतभेद कम करेगा और विवादों को सुलझाएगा। उनका यह बयान लद्दाख गतिरोध के बीच आया है।

संयुक्त राष्ट्र महासभा की 75 वीं बैठक में शी ने कहा, “ हम वार्ता और संवाद के माध्यम से अन्य के साथ मतभेद घटायेंगे और विवादों को सुलझाते रहेंगे। ” उन्होंने कहा, “हम कभी आधिपत्य, विस्तार या प्रभावक्षेत्र बढ़ाने का प्रयास नहीं करेंगे। हमारी मंशा किसी भी देश के साथ शीतयुद्ध या गर्मयुद्ध की नहीं है।” उनका यह भाषण पूर्व रिकार्डेड वीडियो संदेश में था। पंद्रह जून को गलवान घाटी में हिंसक झड़प में 20 भारतीय जवानों के शहीद होने के बाद लद्दाख में स्थिति बहुत बिगड़ गयी। इसमें चीनी सेना को भी नुकसान हुआ परंतु उसने ब्योरा नहीं दिया। स्थिति तब और बिगड़ी जब चीन की पीपुल्स लिबरेशन आर्मी (पीएलए) ने बीते तीन हफ्तों में पैंगोंग झील के दक्षिणी और उत्तरी तट पर भारतीय सैनिकों को “धमकाने” की कम से कम तीन बार कोशिश की है।

यहां तक कि वास्तविक नियंत्रण रेखा पर 45 साल में पहली बार हवा में गोलियां चलाई गई हैं। सोमवार की सैन्य स्तर की वार्ता में दोनों देशों के प्रतिनिधिमंडलों ने सीमा पर मई की शुरुआत से जारी टकराव को खत्म करने के लिए भारत एवं चीन के बीच 10 सितंबर को हुए पांचसूत्री द्विपक्षीय समझौते के क्रियान्वयन पर विस्तार से विचार-विमर्श किया। ऐसा समझा जाता है कि भारतीय प्रतिनिधिमंडल ने 10 सितंबर को मास्को में शंघाई सहयोग संगठन (एससीओ) की बैठक के इतर विदेश मंत्री एस जयशंकर तथा उनके चीनी समकक्ष वांग यी के बीच हुए समझौते को निश्चित समय-सीमा में लागू करने पर जोर दिया। सूत्रों ने बताया कि वार्ता का एजेंडा पांच सूत्री समझौते के क्रियान्वयन की निश्चित समयसीमा तय करना था। समझौते का लक्ष्य तनावपूर्ण गतिरोध को खत्म करना है, जिसके

तहत सैनिकों को शीघ्र वापस बुलाना, तनाव बढ़ाने वाली कार्रवाइयों से बचना, सीमा प्रबंधन संबंधी सभी समझौतों और प्रोटोकॉल का पालन करना तथा वास्तविक नियंत्रण रेखा (एलएसी) पर शांति बहाली के लिए कदम उठाना जैसे उपाय शामिल हैं।

सैन्य वार्ता के लिए भारतीय प्रतिनिधिमंडल में पहली बार विदेश मंत्रालय के किसी वरिष्ठ अधिकारी को शामिल किया गया। विदेश मंत्रालय में संयुक्त सचिव नवीन श्रीवास्तव इस प्रतिनिधिमंडल का हिस्सा थे। वह सीमा विषयक परामर्श एवं समन्वय कार्य प्रणाली (डब्ल्यूएमसीसी) की रूपरेखा के तहत चीन के साथ सीमा विवाद को लेकर राजनयिक वार्ता में शामिल रहे हैं।

(डिस्कलेमर: यह आर्टिकल एजेंसी फीड से ऑटो-अपलोड हुआ है। इसे नवभारतटाइम्स.कॉम की टीम ने एडिट नहीं किया है।)

<https://navbharattimes.indiatimes.com/metro/delhi/other-news/joint-statement-of-armies-agreeing-not-to-send-more-troops-to-india-front/articleshow/78265543.cms>

The Indian EXPRESS

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Women in armed forces: new strides, miles to go

The Indian Navy announced on Monday that for the first time, two women officers will operate flying missions from warships. A look at what these developments mean for women in the Navy, how the situation has evolved and the road ahead

By Sushant Kulkarni

Pune: The Indian Navy on Monday announced selection of two women officers as Observers in the helicopter stream, making them first women airborne combatants who would be operating from warships. In another significant development in March, the Supreme Court had upheld that the women Short Service Commission officers in the Navy were eligible for Permanent Commission. The Navy had also inducted the first woman pilot in December last year. A look at what these developments mean for women in the Navy, how the situation has evolved and the road ahead.

Women in Indian Navy

Prior to 1992, women officers were inducted in the Navy only in the medical stream from the Armed Forces Medical Service. From July 1992, the Navy started inducting women, initially through a special entry scheme and later through the Short Service Commission, in only select branches of the Navy. Over the years, various branches were added to the list, and currently women officers can join the Navy in the streams of Air Traffic Control, Observers, Law, Logistics, Education, Naval Architecture, Pilots in Maritime Reconnaissance Stream only and the Naval Armament Inspectorate. It needs to be noted like in the Army and the Air Force, women are currently only inducted as Commissioned Officers and not in Other Ranks which are of categories of Junior Commissioned Officers and Non-Commissioned Officers.

In the early 2000s women officers from the Medical and Logistics stream were deployed on board Naval ships. While these deployments went on only for four-five years, they were discontinued for various reasons.



Sub Lieutenant (SLt) Kumudini Tyagi and SLt Riti Singh would, in effect, be the first set of women airborne tacticians in India who would operate from the deck of warships. (PTI)

Women officers in new streams

Last December, the Navy announced the induction of a woman officer as pilot of Dornier aircraft, which are fixed wing aircraft operating from ashore establishments. On Monday, the Navy announced induction of two women officers as observers for the helicopter stream. Observers are airborne tacticians who fly on board helicopters or fixed-wing aircraft operated by the Navy. Till now women were inducted as observers for fixed wing aircraft which take off and land ashore. Entry in the helicopter stream means that women officers can now be deployed on frontline warships from which helicopters can operate.

In terms of various challenges towards deployment of women onboard warships, the logistics part is not as challenging as one would imagine, especially as most of the large warships of the Navy do have basic living arrangements that can be allocated for women. The question of mindset and gender sensitization, on the other hand, is something many believe would require concerted efforts, and concrete steps are being taken in that direction.

Serving and retired women officers from Armed forces in general and Navy in particular, sound a precautionary note against the celebrations about latest developments. They believe that the developments will have to actually result in more women coming into operational streams and new streams being opened for women in coming days. Some are also concerned that too much media and public attention on these new entrants can put unwanted pressure on them.

While women officers appreciate the support of many male military leaders in these processes, they also highlight the resistance from the system as a whole.

Permanent Commission and the road ahead

In yet another milestone for women in the Navy, the Supreme Court in March this year upheld the right of serving women officers from the Short Service Commission in the Navy to be eligible for the getting permanent commission (PC). Short service Commission tenures in the Armed forces are of 10 years, extendable by four years after which officers can be eligible for permanent commission.

In the said ruling in the matter of case Union of India & Others Vs Annie Nagaraja & Others, Apex Court bench of Justices DY Chandrachud and Ajay Rastogi have said, “The battle for gender equality is about confronting the battles of the mind. History is replete with examples where women have been denied their just entitlements under law and the right to fair and equal treatment in the workplace.

In the context of the Armed Forces, specious reasons have been advanced by decision makers and administrators. They range from physiology, motherhood and physical attributes to the male dominated hierarchies. A hundred and one excuses are no answer to the constitutional entitlement to dignity, which attaches to every individual irrespective of gender, to fair and equal conditions of work and to a level playing field. A level playing field ensures that women have the opportunity to overcome their histories of discrimination with the surest of responses based on their competence, ability and performance.”

Women officers hope that these developments would result in them being posted at commanding positions on the ships which are a key for career advancements in the operational streams and also some day lead to women being deployed for most challenging of the deployments including that in the submarines.

<https://indianexpress.com/article/explained/explained-the-role-of-women-in-the-indian-navy-6606065/>

Indian Navy to undertake passage exercise with Australian Navy

This exercise being conducted in the East Indian Ocean Region, reflects the growing strength of Indo-Australian bilateral relations as comprehensive strategic partners, particularly in defence cooperation in the maritime domain

By Manjeet Singh Negi

New Delhi: The Indian Navy (IN) is scheduled to undertake a Passage Exercise (PASSEX) with Royal Australian Navy (RAN) in the East Indian Ocean Region (IOR) from 23 to 24 September, 2020.

The exercise would involve participation of HMAS Hobart from the Australian side and Indian Naval Ships Sahyadri and Karmuk. In addition, an Indian MPA and helicopters from both sides would be participating in the exercise.

The exercise, aimed at enhancing interoperability, improving understanding and imbibing best practices from each other, would involve advanced surface and anti-air exercises including weapon firings, seamanship exercises, naval manoeuvres and Cross Deck Flying Operations.

PASSEXs are regularly conducted by Indian Navy with units of friendly foreign navies, whilst visiting each other's ports or during a rendezvous at sea. This exercise being conducted in the East Indian Ocean Region, reflects the growing strength of Indo-Australian bilateral relations as comprehensive strategic partners, particularly in defence cooperation in the maritime domain.

The exercise, which is in keeping with the strong bond shared by the two navies, would be another step towards strengthening Indo-Australia defence relations and the continued efforts of both governments to work closely to enhance safety and security of the global commons in accordance with international regulations.

The two navies have built a robust relationship through regular exercises such as AUSINDEX conducted biennially.

In the backdrop of the Covid-19 pandemic, the exercise would be conducted strictly as a 'non-contact activity' and would not involve any physical contact between the participating personnel of the two navies.

<https://www.indiatoday.in/india/story/indian-navy-to-undertake-passage-exercise-with-australian-navy-1724395-2020-09-23>



The exercise would be conducted strictly as a 'non-contact activity' and would not involve any physical contact between the participating personnel of the two navies. (File photo: Reuters)

Kineco flags-off India's first commercial Sonar Dome for Indian Navy

Panjim: Goa-based Kineco Limited, a leading composite technology provider for defence, aerospace, railway and industrial sectors, flagged off India's first-ever commercial Sonar Dome, at the hands of Chief Minister, Pramod Sawant on Tuesday.

The Sonar Dome is a critical component of a warship as it houses the Sonar (Sonar Navigation and Ranging) Array - which is used for detection, navigation, and ranging. The Sonar Dome, manufactured by Kineco was flagged off to its esteemed customer Mazagon Dock Shipbuilders Limited Mumbai (MDL), where it will be mounted on the Indian Navy's P15 Alpha Warship.

The ceremony was attended virtually by Scientific Advisor to Chief of Naval Staff, Bhaskar Burman, Director Ship building of MDL, RAdm A K Saxena, (IN Retd), GM and project superintendent (P17A Frigate) of MDL, Biju George, scientist and Director General - Armament and Combat Engineering Systems (ACE), Pravin K Mehta, Scientist- Director of Research & Development Establishment (Engrs), a premier systems engineering laboratory of Defence Research and Development Organization (DRDO) V V Parlikar and CMDE Adhikesh Vasudevan – (Warship Production Superintendent) and CMDE Sanjay Chhabra (Additional Warship Production Superintendent) of the Indian Navy. The event was also graced by Aditya Reddy, Joint MD and Subramanyam M from Indo National Limited, a publicly listed company and its majority shareholder.



Chief Minister Sawant said, "It is a proud moment for me being the CM of the state of Goa to flag off of the country's first indigenous Sonar Dome, which is in line with the PM's 'Make In India' vision in the defence sector and the Atmanirbhar initiatives. It is also a proud moment for all Goans that a Goan company has been nominated for the supply of the country's first Sonar Dome, which is a very important component of the Indian warships for the Indian Navy.

Kineco's founder and MD, Shekhar Sardesai said, "It has been a privilege for Kineco to be a part of and significantly contribute towards the success of India's first indigenous Sonar Dome Project. We are truly grateful to R&DE Engineers (DRDO), Mazagon Dock Shipbuilders Limited and Indian Navy, without whose support this extraordinary success would not have been possible. It is a gratifying moment for the entire Team Kineco to see all our efforts translate into a milestone success for the Nation. Kineco shall always endeavor to make many such noteworthy contributions to India's journey towards self-reliance in defence."

He added, "Today, my entire team and I would like to remember and pay a tribute to a departed son of the soil, our former Defence Minister of India and our ex-Chief Minister, late Manohar Parrikar, who has been an ardent source of inspiration and guidance to many industrial establishments in Goa, such as ours. He was also a great supporter of Make in India in defence vision which he articulated in Defence Procurement Policy 2016 during his tenure as Defence Minister of India. Today, Kineco commits to abide by his high principles of putting Nation above everything."

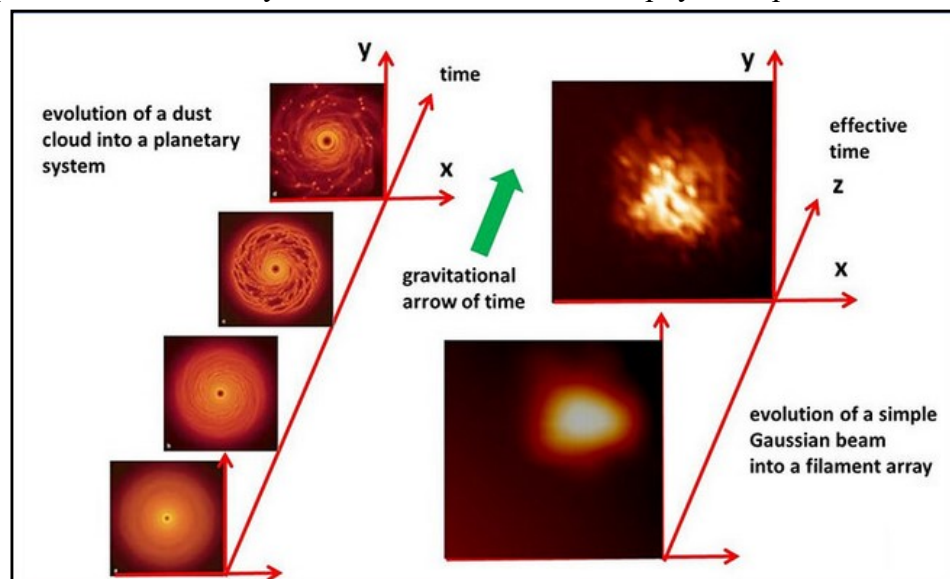
<https://www.heraldgoa.in/Business/Kineco-flags-off-India%E2%80%99s-first-commercial-Sonar-Dome-for-Indian-Navy/165585>

Hyperbolic metamaterials exhibit physics with two spatial and two temporal dimensions

By Renae Keep

Metamaterials—nanoengineered structures designed for precise control and manipulation of electromagnetic waves—have enabled such innovations as invisibility cloaks and super-resolution microscopes. Using transformation optics, these novel devices operate by manipulating light propagation in "optical spacetime," which may be different from the actual physical spacetime.

Igor Smolyaninov of the University of Maryland says, "One of the more unusual applications of metamaterials was a theoretical proposal to construct a physical system that would exhibit two-time physics behavior on small scales." That proposal was recently realized experimentally by demonstration of



two-time (2T) behavior in ferro-fluid-based hyperbolic metamaterials by Smolyaninov and a team of researchers from Towson University, led by Vera Smolyaninova. The observed 2T behavior has potential for use in ultrafast all-optical hypercomputing.

Comparison of gravitational and optical behavior. Credit: V. Smolyaninova et al., doi 10.1117/1.AP.2.5.056001

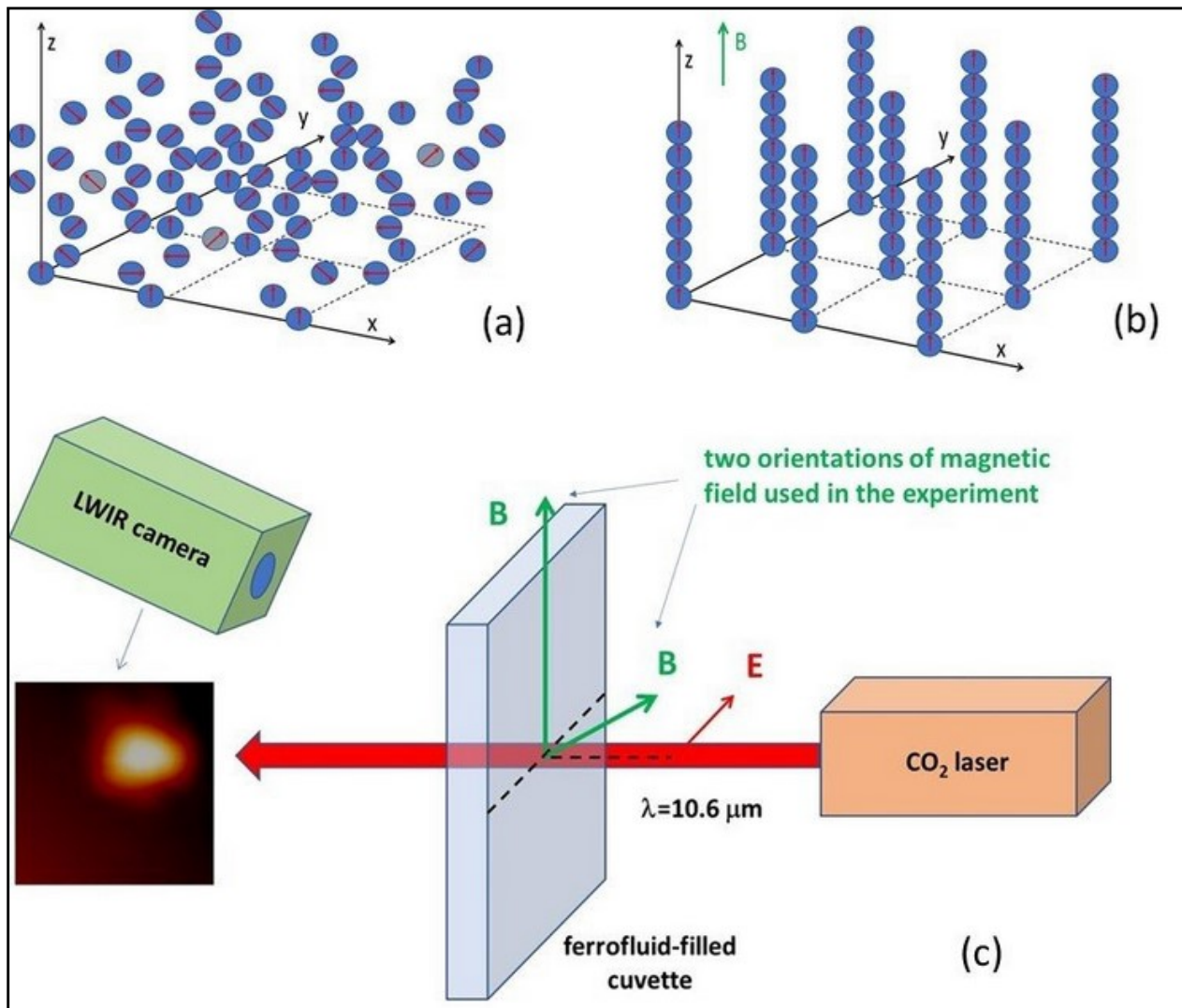
2T physics

The familiar three spatial dimensions and one temporal dimension of conventional spacetime find an alternative paradigm in 2T physics, which has two spatial and two temporal dimensions. Pioneered through theoretical investigation and modeling by physicists Paul Dirac and Andrei Sakharov in the 1960s, 2T space-time was more recently explored by Smolyaninov with Evgenii Narimanov of Purdue University. Their theoretical model predicted that light waves might exhibit 2T behavior in hyperbolic metamaterials.

Nonlinear hyperbolic metamaterials for precision light control

Hyperbolic metamaterials are extremely anisotropic, behaving like a metal in one direction and like a dielectric in the orthogonal direction. Originally introduced to improve optical imaging, hyperbolic metamaterials demonstrate a number of novel phenomena, such as very low reflectivity, extreme thermal conductivity, high temperature superconductivity, and interesting gravity theory analogs.

Smolyaninov explains that the gravity analogs are a coincidental mathematical parallel: the mathematical equations that describe propagation of light in hyperbolic metamaterials also describe particle propagation in the physical, or Minkowski, spacetime in which one of the spatial coordinates behaves as a "time-like variable."



(a) In the absence of external magnetic field, cobalt nanoparticles are randomly distributed within the ferrofluid, and their magnetic moments (which are shown by the red arrows) have no preferred spatial orientation. (b) Application of external magnetic field leads to formation of nanocolumns (made of nanoparticles) which are aligned along the field direction. Propagation of light in such a metamaterial is mathematically described by two time-like variables. (c) Schematic diagram of the experimental geometry. A thermal camera is used to study CO₂ laser beam propagation through the ferrofluid subjected to external DC magnetic field. The inset shows the measured beam shape in the absence of the ferrofluid sample. Two orientations of the external magnetic field B used in our experiments are shown by green arrows. The red arrow shows laser light polarization. Credit: V. Smolyaninova et al., doi 10.1117/1.AP.2.5.056001

Smolyaninov explains further that nonlinear optical effects "bend" this flat Minkowski spacetime, resulting in "effective gravitational force between extraordinary photons." According to Smolyaninov, experimental observation of the effective gravity in such a system should enable observation of the emergence of the gravitational arrow of time along a spatial direction. Together with conventional physical time, the two time-like variables guide evolution of the light field in a hyperbolic metamaterial.

Experimental progress in this exciting field has been relatively slow until recently, due to difficulties associated with the 3-D nanofabrication techniques necessary to produce large-volume 3-D nonlinear hyperbolic metamaterials. The research team developed an alternative way to fabricate large-volume 3-D nonlinear hyperbolic metamaterials using self-assembly of magnetic metallic nanoparticles in a ferrofluid subjected to external magnetic field. Smolyaninov explains, "Due to nonlinear optical Kerr effect in the strong optical field of a CO₂ laser, light propagating

inside the ferrofluid indeed exhibits pronounced gravity-like effects, leading to emergence of the gravitational arrow of time."

As predicted by the earlier theoretical work, the experimentally observed dynamics of self-focused light filaments may indeed be described mathematically using the 2T physics model.

Ultrafast all-optical hypercomputing

According to Smolyaninov, ultrafast all-optical hypercomputing involves mapping a computation performed during a given period of time onto a much faster computation performed using a given spatial volume of a hyperbolic metamaterial—a possibility enabled by the observed 2T behavior. Smolyaninov notes that hypercomputing schemes may be useful in time-sensitive applications, such as real-time computing, flight control, or target recognition.

More information: Vera N. Smolyaninova et al, Experimental observation of effective gravity and two-time physics in ferrofluid-based hyperbolic metamaterials, *Advanced Photonics* (2020). DOI: [10.1117/1.AP.2.5.056001](https://doi.org/10.1117/1.AP.2.5.056001)

<https://phys.org/news/2020-09-hyperbolic-metamaterials-physics-spatial-temporal.html>



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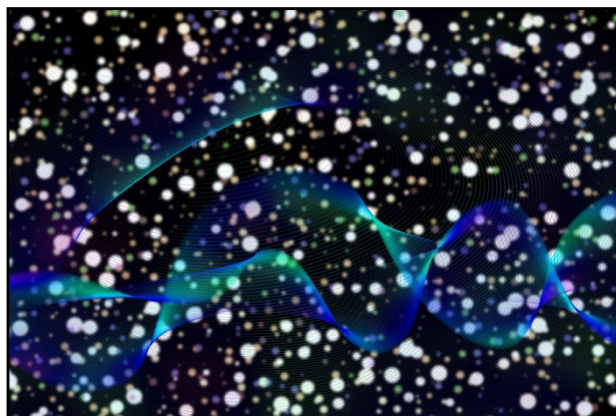
Physicists create turnstile for photons

Physicists from Germany, Denmark, and Austria have succeeded in creating a kind of turnstile for light in glass fibers that allows the light particles to only pass through one at a time

Glass fibers, which guide laser light, are the backbone of today's modern information society. If you think of laser light as a stream of light particles, so-called photons, then these are completely independent of each other and their exact arrival time is left to chance. In particular, two photons may arrive at the receiver simultaneously. For many applications, however, it is desirable that one photon is registered after the other, i.e. that the light particles are lined up like a string of pearls.

Such isolated photons are, for example, a basic requirement for quantum communication, where one can communicate in a fundamentally tap-proof way. Until now, single quantum emitters such as a single atom or a single molecule have typically acted as sources for such streams of individual photons. If the quantum emitter is excited with laser light and fluoresces, it will always emit exactly one photon with each quantum leap. For this type of source, it is then still a challenge to efficiently "feed" the emitted photons into a glass fiber in order to send as many of them as possible to the receiver.

Scientists from Germany, Denmark and Austria have now succeeded for the first time in directly converting laser light in optical fibers into a stream of isolated photons by means of a novel effect. The proposal for the experiment came from theoretical physicists Dr. Sahand Mahmoodian and Prof. Klemens Hammerer at the Leibniz University Hannover and colleagues from the University of Copenhagen. It was then carried out in the research group of Prof. Dr. Arno Rauschenbeutel at Humboldt University of Berlin. For this purpose, the researchers used a powerful atom-light interface, in which atoms are trapped near a so-called optical nanofiber and coupled in a controlled way to the light guided in the nanofiber.



Credit: CC0 Public Domain

These special glass fibers are one hundred times thinner than a human hair and the atoms are held in place at 0.2 micrometers from the glass fiber surface using tweezers made of laser light. At the same time, they are cooled by laser light to a temperature of a few millionths of a degree above absolute zero. This system enabled the researchers to precisely control the number of atoms along the laser beam. In the experiment, the researchers then analyzed how often the photons came out of the fiber individually or in pairs.

When about 150 atoms were trapped near the nanofiber, it turned out that the transmitted light consisted practically only of isolated photons. So, collectively, the atoms acted for the photons like a turnstile that regulates a stream of people. Surprisingly, the effect was the opposite when the number of atoms was increased: Then the atoms let the photons pass preferably in pairs.

This discovery opens up a completely new way to realize bright, fiber-integrated single-photon sources. At the same time, the working principle demonstrated by the researchers can be applied to wide ranges of the electromagnetic spectrum (microwaves to X-rays). This opens up the possibility of generating single photons in spectral ranges for which no sources are available so far. The researchers have already submitted a patent application for this technology.

More information: Adarsh S. Prasad et al. Correlating photons using the collective nonlinear response of atoms weakly coupled to an optical mode, *Nature Photonics* (2020). DOI: [10.1038/s41566-020-0692-z](https://doi.org/10.1038/s41566-020-0692-z)

Journal information: *Nature Photonics*
<https://phys.org/news/2020-09-physicists-turnstile-photons.html>

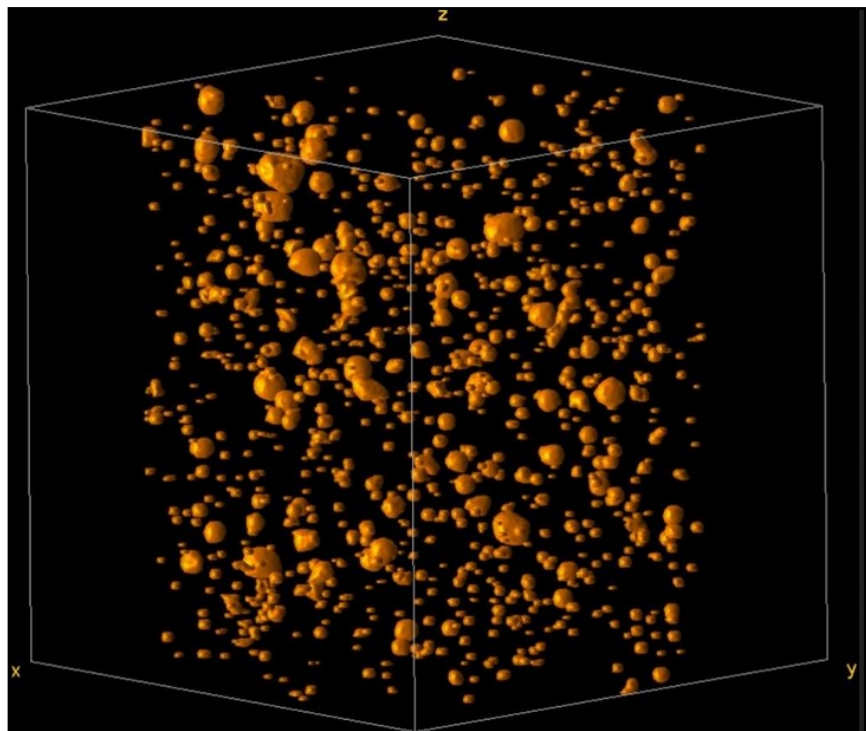


Wed, 23 Sept 2020

Researchers analyse how 3-D printed metals fracture

3-D-printed metals have been used since the 1980s to produce a wide range of parts for various industries. These materials often have tiny pores inside them (around dozens of micrometers in size), which can get bigger when a load is applied to them, due to their manufacturing process. The team of researchers has analyzed what happens to these "micro voids" when applying a load to them in order to understand how these ductile metals (capable of absorbing energy) fracture.

"For example, most of the structural elements in cars are made of ductile metal, so that they are able to absorb energy in the event of a collision. This means that security will be increased if a traffic accident occurs. So, understanding and predicting how ductile metals fracture is equal to optimizing the design



Tomography reconstruction of an aluminium alloy manufactured using 3D printing techniques (micro voids are coloured orange). Credit: Universidad Carlos III de Madrid

of energy absorbing structures in impacts in critical industrial sectors," says one of the study's authors, Guadalupe Vadillo from the Nonlinear Solid Mechanics research team in the UC3M's Department of Continuum Mechanics and Structural Analysis.

Her study was recently published in the *International Journal of Plasticity* and has identified two mechanisms which cause the failure of the material. Firstly, the appearance and growth of micro pores which cause the material to soften until it breaks, and secondly, coalescence, which occurs when several micro pores within the material join and interact with each other, accelerating the fracture.

"During this work, we have identified how the micro voids or intrinsic micro pores in the material grow, shrink and interact with each other by accelerating or delaying the fracture of this material, depending on the viscosity of the material (how quickly it deforms when a load is applied), the speed at which the load is applied to the material and the loading path (direction and other factors)," Guadalupe Vadillo says.

Advances in this field improve our understanding of how 3-D printed ductile metals behave and will help us design and manufacture sturdier parts and components in a variety of industries. These materials can be used in processes where energy absorption is important, such as in the manufacture of new fuselages in the aerospace industry, different car parts in the automotive industry or for developing implants in the biomedical industry.

More information: Javier Reboul et al. Influence of strain rate sensitivity on localization and void coalescence, *International Journal of Plasticity* (2019). DOI: [10.1016/j.ijplas.2019.09.007](https://doi.org/10.1016/j.ijplas.2019.09.007)
<https://phys.org/news/2020-09-analyse-d-metals-fracture.html>



Wed, 23 Sept 2020

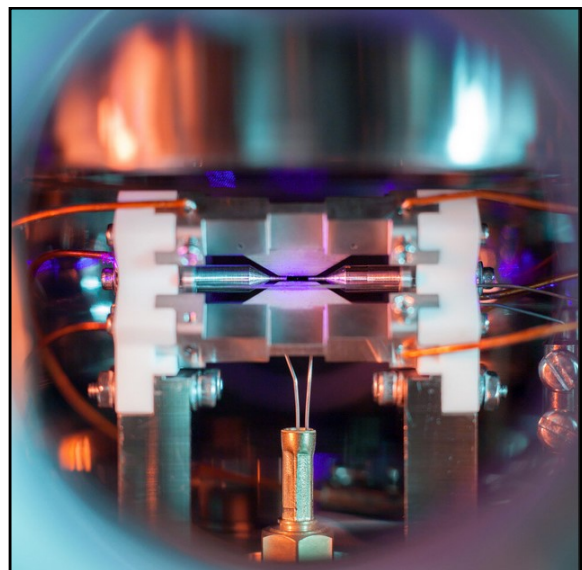
A new strategy to implement a high-fidelity mixed-species entangling gate

By Ingrid Fadelli

In recent years, research teams worldwide have been trying to create trapped ion quantum computers, which have so far proved to be among the most promising systems for practical quantum computing implementations. In these computers, trapped ions serve as quantum bits that are entangled in order to perform advanced computations.

On a quest to develop scalable trapped ion quantum computers, researchers at the University of Oxford have recently implemented a two-qubit entangling gate between two distinct atomic elements, calcium and strontium. In their study, featured in *Physical Review Letters*, they used a gate mechanism that requires only a single laser, which they had previously tested on two different calcium isotopes.

One of the greatest challenges in the development of trapped ion quantum computers is scalability (i.e., finding ways to apply approaches that achieved promising results on a few qubits to thousands or even millions of qubits). In fact, simply adding new qubits to a quantum computing system often results in a rapid decrease in



Credit: D. P. Nadlinger.

performance, as it introduces new errors and makes it harder to interact with a single qubit without affecting some of the others.

To overcome this challenge, the research team at University of Oxford used two methods known as modularization and optical networking. Essentially, their goal was to have ions in separate ion traps and vacuum systems, which are only connected through optical fibers.

This approach limits crosstalk between qubits, retaining only interactions that are desirable and can be controlled by the researchers. This means that once a system that works well is identified, more of the same can be added, as new ones will not impact the overall performance.

"For this approach, but also other strategies to improve scalability, using different ion species is very useful," Vera M. Schäfer, one of the researchers who carried out the study, told Phys.org. "First of all, because different ions have different strengths and weaknesses. For example, we use one ion species that is a very good memory and logic ion—that means it can store information for a very long time (50s compared to tens of milliseconds for 'normal' trapped ion qubits), and we get very small errors when performing calculations with this ion species; the other species is much better (and faster) at coupling to photons. Secondly, because a problem with trapped ions is that they slowly heat up over time. If we have two different species, we can use the second species to cool the ions during a calculation, which diminishes the heating problem."

To use different species for realizing trapped ion quantum computing applications, researchers should be able to transfer information between these species. This can be done by producing what is known as a two-qubit gate.

In one of their past studies, Schäfer, Amy Hughes and her colleagues successfully performed a two-qubit gate between different calcium isotopes. Implementing such a gate between entirely different atomic elements, however, would be far more useful. This is because different elements have very different characteristics and display distinct transition frequencies.

As a result, when performing an operation on one species using laser technology, the other species would remain entirely unaffected. Simultaneously, however, as the two elements may also have different masses, controlling their motion can be far more complicated.

"In our previous work, we performed the gate on two different isotopes of calcium with a single laser, which was quite a natural decision because most transition frequencies are still quite close in different isotopes," Schäfer said. "However, we noticed that for strontium, the element that is best suited to use together with calcium, the transition frequencies aren't that far apart, and [we thought] that maybe we could use the same scheme that worked for different isotopes for different elements."

The similarity between the transition frequencies of calcium and strontium greatly simplified the problem at hand, ultimately allowing the researchers to achieve higher fidelities than those attained when producing other mixed-element gates. Their successful implementation of a mixed species gate could be a significant step forward in the realization of large-scale quantum computing, while also allowing researchers to simultaneously leverage the properties of two different elements.

"The basic idea behind trapped ion entangling gates is to create a correlation between the ions' qubit states via their motion, which is strongly coupled as they repel each other due to their charge," Schäfer said. "Laser light can couple to the ions' motion and, for example, push them in a certain direction. We can apply laser light that couples differently to ions in opposite qubit states, e.g., it will push an ion in state $|1\rangle$, but pull an ion in state $|0\rangle$. Thus, for some qubit state combinations the common motion will be canceled and for others enhanced, and we can use that to create entanglement."

Many researchers who previously implemented mixed-species two-qubit entangling gates used different lasers to manipulate different elements. To do this, however, the researchers must ensure that the two lasers are well synchronized and calibrated so that they have a similar effect on the two different ion species.

Schäfer, Hughes and their colleagues, on the other hand, only used a single laser. This means that while they did not need to synchronize it in any particular way, they also had fewer degrees of

freedom available for calibration and had to identify a position that would allow it to couple both species in a similar way. As mixed-species crystals are more sensitive to particular external effects (e.g., stray electric fields), the researchers had to be more careful during the calibration than they would when implementing a single species gate.

"The gate was implemented using a pair of laser beams (at about 402 nm), that can couple to and excite the motion of both calcium and strontium simultaneously," Schäfer explained. "We used three different methods to characterize the gate performance: measuring the output state after a single gate and comparing it to the ideal output; running a sequence of gates similar to an algorithm with and without interleaving our gate and comparing the magnitude of errors between the two; and running sequences that enhance different types of errors to characterize the nature of our error sources."

To evaluate their gate's performance, the researchers used three methods known as partial-state tomography, randomized benchmarking and gate set tomography. Partial-state tomography consists of implementing a single gate and then measuring its output state.

"This is the simplest and most commonly used method," Schäfer said. "Because on average we only get an error in two out of 1,000 gates, we have to do this many times to get an accurate estimate of the gate error, and it is harder to distinguish between how many errors were caused by the gate itself and how many by the readout of the final state, compared to the second method we used."

Randomized benchmarking, the second evaluation strategy used by Schäfer, Hughes and their colleagues, entails the implementation of several consecutive gates while inserting different types of gates in between them to continuously change the input state, after which each gate is applied. Subsequently, the researchers compared the error between only this random sequence and a sequence where their gate was intermittently introduced between the random gates.

"Randomized benchmarking is better suited to measure very small errors, because we perform lots of gate operations before we read out the final state, and the result is more comparable to the expected performance in a real algorithm," Schäfer said.

Finally, gate set tomography, the last method used by the researchers to evaluate their gate, tries to quantify and characterize errors produced when a gate is implemented. To do this, it produces sequences that are designed to increase the effect of specific types of errors in order to quantify the total amount of error of each type. The information gained from using this technique is useful for theorists who are trying to develop more efficient error-correction schemes.

"I think that mixed-species work sometimes has the reputation of being quite complex and difficult and hard to do well," Schäfer said. "Our work showed that by choosing the right scheme, we can actually perform mixed species gates almost as well as single species gates. There are also a few things that one might worry about initially, that turned out to be completely irrelevant in this scheme."

The recent study carried out by Schäfer, Hughes and their colleagues could ultimately contribute to the creation of new trapped ion quantum computing approaches that are easier to scale up. In the future, it could also serve as an inspiration for other research groups who are trying to implement mixed species entangling gates, providing some guidance on how to best achieve this.

"We are now testing a different mixed species entangling gate mechanism, and want to compare their advantages, disadvantages and requirements to be able to choose the best scheme for given circumstances," Schäfer said. "We also want to implement this mixed species gate on our ion-photon entangling experiment, to demonstrate its use for building a scalable trapped ion quantum computer and use it to perform entanglement distillation."

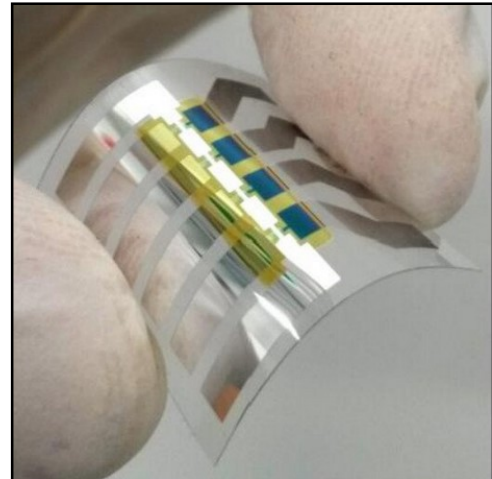
More information: Benchmarking a high-fidelity mixed-species entangling gate. *Physical Review Letters* (2020). DOI: [10.1103/PhysRevLett.125.080504](https://doi.org/10.1103/PhysRevLett.125.080504).

Journal information: [Physical Review Letters](https://phys.org/news/2020-09-strategy-high-fidelity-mixed-species-entangling-gate.html)
<https://phys.org/news/2020-09-strategy-high-fidelity-mixed-species-entangling-gate.html>

Physicists develop printable organic transistors

Scientists at the Institute of Applied Physics at TU Dresden have come a step closer to the vision of a broad application of flexible, printable electronics. The team around Dr. Hans Kleemann has succeeded for the first time in developing powerful vertical organic transistors with two independent control electrodes. The results have recently been published in the renowned online journal *Nature Communications*.

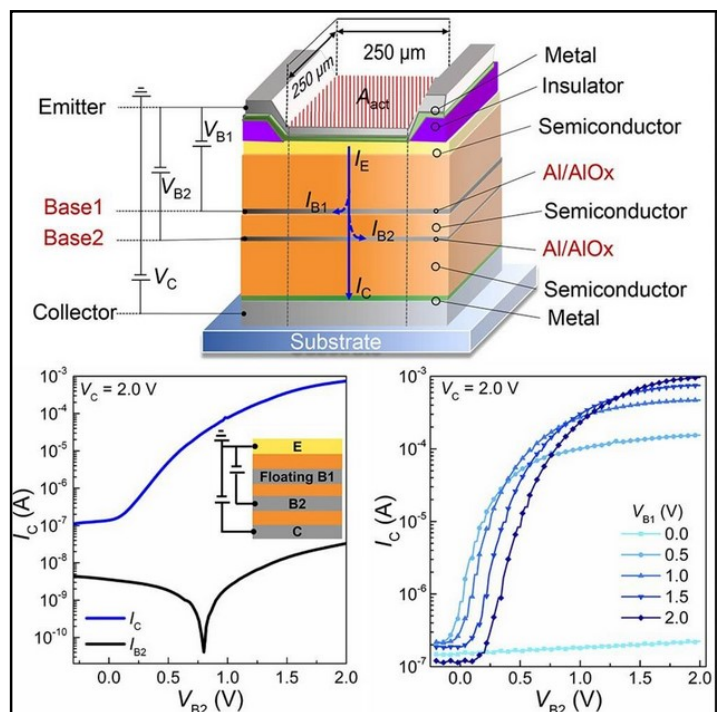
High-definition roll-up televisions or foldable smartphones may soon no longer be unaffordable luxury goods that can be admired at international electronics trade fairs. High-performance organic transistors are a key necessity for the mechanically flexible electronic circuits required for these applications. However, conventional horizontal organic thin-film transistors are very slow due to the hopping-transport in organic semiconductors, so they cannot be used for applications requiring high frequencies. Especially for logic circuits with low power consumption, such as those used for Radio Frequency Identification (RFID), it is mandatory to develop transistors enabling high operation frequency as well as adjustable device characteristics (i.e., threshold-voltage). The research group Organic Devices and Systems (ODS) at the Dresden Integrated Center for Applied Photophysics (IAPP) of the Institute of Applied Physics headed by Dr. Hans Kleemann has now succeeded in realizing such novel organic devices.



The team around Dr Hans Kleemann has succeeded for the first time in developing powerful vertical organic transistors with two independent control electrodes. Credit: IAPP

"Up to now, vertical organic transistors have been seen as lab curiosities which were thought too difficult to be integrated in an electronic circuit. However, as shown in our publication, vertical organic transistors with two independent control electrodes are perfectly suited to realize complex logic circuits while keeping the main benefit of vertical transistors devices, namely the high switching frequency," says Dr. Hans Kleemann.

The vertical organic transistors with two independent control electrodes are characterized by a high switching frequency (a few nanoseconds) and an adjustable threshold voltage. Thanks to these developments, even single transistors can be used to represent different logical states (AND, NOT, NAND). Furthermore, the adjustable threshold voltage ensures signal integrity (noise margin) and low power consumption.



Upper panel: Layer sequence of an vertical organic permeable base transistor with two independently tunable base electrodes. Lower panel, left: Transfer-characteristics of such a transistor. Right: Adjustability of the turning-on voltage using the second base electrode. Credit: Nature Publishing Group

With this, the research group has set a milestone with regard to the vision of flexible and printable electronics. In the future, these transistors could make it possible to realize even sophisticated electronic functions such as wireless communication (RFID) or high-resolution flexible displays completely with organic components, thus completely dispensing with silicon-based electronic components.

More information: Erjuan Guo et al. Vertical organic permeable dual-base transistors for logic circuits, *Nature Communications* (2020). DOI: [10.1038/s41467-020-18576-5](https://doi.org/10.1038/s41467-020-18576-5)

Journal information: [Nature Communications](https://phys.org/news/2020-09-physicists-printable-transistors.html)
<https://phys.org/news/2020-09-physicists-printable-transistors.html>

COVID-19 Research News



Wed, 23 Sept 2020

Researchers find diminished response by ‘killer’ T cells in elderly Covid-19 patients

Although people of any age can be infected with SARS-CoV-2, the virus that causes Covid-19, elderly patients face a higher risk of severity and death than younger patients

Washington: Although people of any age can be infected with SARS-CoV-2, the virus that causes Covid-19, elderly patients face a higher risk of severity and death than younger patients. New research, comparing the immune response among age groups, may help explain why.

Older patients with the disease have lower frequencies of the immune cells needed to expel the virus from the body, the researchers found. The study was published this week in *mBio*, an open-access journal of the American Society for Microbiology.

“Elderly people have more severe diseases compared to young people, and we found that the cytotoxic part of immune control is not as efficient to respond to the virus in older people,” said virologist Gennadiy Zelinsky, Ph.D., at the University Hospital Essen, in Germany, who also led the new study.

He and his colleagues analyzed blood samples from 30 people with mild cases of Covid-19 to observe how T cells, which are necessary for recognition and elimination of infected cells, respond during SARS-CoV-2 infection. Patient ages ranged from the mid-20s to the late 90s. In all patients, the investigators found that acute SARS-CoV-2 infections led to lower numbers of T cells in the blood of the patients, compared to healthy individuals.

This reduction has been one of many unwelcome surprises from Covid-19, said Zelinsky. Most viruses, once inside the body, trigger an uptick in the immune system’s expansion of T cells. These include “killer” T cells, which play a critical role in eradicating virus-infected cells. They produce cytotoxic molecules that destroy infected cells in the body. But if a person’s immune system produces fewer of these T cells, said Zelinsky, it will be less successful at fighting off a viral infection.

In the Covid-19 patient group studied by Zelinsky and his colleagues, the researchers similarly found that the number of CD8+ T cells producing cytotoxic molecules in response to virus



Older patients with the disease have lower frequencies of the immune cells needed to expel the virus from the body. (Unsplash)

diminished with increased age, and that reduction was significantly higher, on average, in patients over 80. Moreover, the “killer” T cells from patients aged 80-96 produced cytotoxic molecules at a lower frequency than similar cells from younger patients.

The SARS-CoV-2 virus attaches to cells in the nose or mouth. From there, it may spread to the lungs and move on to other organs, triggering a life-threatening infection. “Cytotoxic T cells really fight for control during this acute phase of infection,” Zelinsky said. If an elderly patient’s immune system produces fewer killer T cells, and these cells are inadequately armed, he said, they may be mounting an insufficient defence against SARS-CoV-2. The viral particles can continue to spread and, as a result, the infection worsens.

The new data suggest that cytotoxic T cells play a key role in the control of early infections, but Zelinsky cautioned that it’s too soon to know if that connection can be harnessed to design effective immunotherapy that uses these cells. In previous studies on viral infections in mice, his group found that a checkpoint inhibitor --immunotherapy that activates killer T cells and effectively releases the brakes on the immune system -- improved virus control at first but had the potential to later cause damage to the lungs and other organs. Further studies are warranted, he said, to better understand the potential risks and benefits of interfering with T cells as a way to control SARS-CoV-2 and other viruses.

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

<https://www.hindustantimes.com/health/researchers-find-diminished-response-by-killer-t-cells-in-elderly-covid-19-patients/story-NL8WzyB6hNuuIYdlCacZyJ.html>

ScienceDaily

Wed, 23 Sept 2020

UV-C light is effective for killing COVID-19 on N95s, study demonstrates

Summary:

Researchers have demonstrated that certain N95 respirators tainted with COVID-19 can be effectively and safely decontaminated for reuse using ultraviolet-C light (UV-C), a method commonly utilized for treating rare skin diseases.

Dermatology researchers at Henry Ford Health System, in collaboration with a team at the University of Michigan, have demonstrated that certain N95 respirators tainted with COVID-19 can be effectively and safely decontaminated for reuse using ultraviolet-C light (UV-C), a method commonly utilized for treating rare skin diseases.

Researchers say the outside and inside of the facemasks were decontaminated in a prototype phototherapy unit that dispenses a UV-C dosing level high enough to effectively kill the virus in less than two minutes while still preserving the facemask’s breathability, fit and overall integrity.

Of the five N95s used at Henry Ford and tested for the coronavirus in the study, the decontamination process worked best on two models -- facepieces on 3M 1860 and Moldex 1511 and straps on 3M 8210 and Moldex 1511. The effects of the dosage varied on the other tested models and their straps, suggesting that the UV-C radiation can degrade them. Researchers say wiping the straps with ethanol before decontamination would likely be required as an additional disinfection step in the process to maximize the wearer’s safety.

Researchers emphasized that fit testing be required each time a disinfected facemask is returned for use or a new model is being worn for the first time.

The research, conducted in partnership with the University of Michigan, is published in the *International Journal of Infectious Diseases*.

"Our findings reveal a practical, and viable option should hospitals encounter shortages of N95s in the future," says David Ozog, M.D., chair of Henry Ford's Department of Dermatology in Detroit and the study's lead author. "Using UV-C has been shown to be effective in killing other coronaviruses and the flu virus. We were able to replicate that sterilization effectiveness with COVID-19."

Ozog stressed that facemask sterilization should only be used in severe shortages of N95s.

Testing of the N95s for decontamination was performed at U-M's SARS-CoV-2 research lab in Ann Arbor.

"When Dr. Ozog approached us about helping to demonstrate the effectiveness of their UV sterilization procedure with live SARS-CoV-2 virus, we immediately agreed and understood that we could provide some confidence to their healthcare workers that this procedure was effective," says Jonathan Sexton, Ph.D., assistant professor of Internal Medicine and director of the U-M Center for Drug Repurposing and a study co-author.

The research culminated the work of a team of dermatologists and researchers who have devoted more than 400 hours since the pandemic hit Michigan to investigating how phototherapy -- a type of medical treatment used for treating certain skin conditions -- could serve a role in the global health emergency. The Henry Ford team includes Henry Lim, M.D., and Iltefat Hamzavi, M.D., both of whom are internationally recognized for their expertise using phototherapy for treating rare skin diseases like vitiligo and hidradenitis suppurativa.

The team's focus centered on the potential of decontaminating N95s for reuse by healthcare workers. They examined the reliability of the prototype unit and ultraviolet light, the minimum dosage needed for decontamination, the importance of fit testing post-decontamination and four common methods associated with facemask decontamination.

The pandemic exposed a critical flaw in the global PPE supply chain as the health care industry struggled to obtain supplies of N95s, other facemask types, gowns, gloves and face shields. As a result, decontaminating N95s to be reused safely became essential for many health care systems and providers until new shipments of supplies arrived. Henry Ford decontaminated thousands of N95s and returned them to their user for reuse in the first couple months of the pandemic.

"The beginning of the pandemic was physically and mentally overwhelming for everyone. We desperately wanted to help our front-line workers, who were crushed with COVID-19 cases at Henry Ford," Dr. Ozog says.

UV-C is one of the four methods considered for facemask decontamination. It is well known for its ability to penetrate the DNA of bacteria and microorganisms and prevent them from multiplying or replicating. Previous research has shown UV-C to be effective at killing the flu virus as well two other well-known coronaviruses: severe acute respiratory syndrome (SARS-CoV) and Middle East respiratory syndrome (MERS-CoV). Whether it could work on the novel COVID-19 virus was previously unknown.

Henry Ford's phototherapy unit was modified with the help of engineers at Daavlin Co., a phototherapy manufacturer based in Bryan, Ohio. It sits on a flat surface and is about five feet long. The decontamination field measures 15 inches deep by 45 inches long -- plenty room to treat up to 27 facemasks at one time. The ultraviolet light is powered by at least 10 but not more than 20 UV-C lamps.

For the study, five types of N95s used at Henry Ford were tested at the U-M BSL3 biosafety lab. The respirators were contaminated with four drops of the COVID-19 virus taken from viral stocks obtained from the federal government's Biodefense and Emergency Infections Research Resources Repository. The virus droplets were placed in four areas: nosepiece, apex, chin and strap.

The facemasks were kept dry in a biosafety cabinet at room temperature for 40 minutes. Then they were moved to the phototherapy unit for decontamination using a dose of 1.5 J/cm² ultraviolet light radiation -- at a wavelength of 254 nanometers -- to each side of the mask for about 60 seconds. Ultraviolet radiation is measured in three wavelengths: UV-C, UV-B and UV-A. UV-B

and UV-A are associated with skin cancer and are also used in the treatment of some dermatologic diseases such as vitiligo and psoriasis.

Indermeet Kohli, Ph.D, a Henry Ford dermatology physicist, developed a formula by which the UV-C dose delivered to the exterior and interior parts of the facemasks can be assessed for decontamination and safe use. She says the curvature of the facemask and the distance between its surface and the lamps are crucial factors in achieving the proper dosage.

"It is imperative that this type of assessment be performed to make sure that the decontamination process is done properly," Dr. Kohli says. "Failure to do so could result in catastrophic consequences for the front-line healthcare workers."

The effectiveness of decontamination was measured in analytical chemistry terms by the limit of detection (LOD) and no cytopathic effect (CPE). LOD is the minimum concentration of a component that can be reliably detected. CPE means the virus yielded no infectious properties.

All five facepieces had below LOD and no CPE but some had traces of the virus on their straps, according to the research.

Researchers cautioned that none of the N95s tested were visibly soiled. Most health systems including Henry Ford prohibit the reuse of soiled N95s.

In a Letter to the Editor published in *Photodermatology, Photoimmunology & Photomedicine*, Shanthi Narla, M.D., a Henry Ford dermatology fellow, urged caution about using UV-C decontamination due to the variety of N95s in use across the country. "This process should only be considered as a risk mitigation effort during severe shortages," she wrote.

In a demonstration of the prototype unit, the facemasks are placed on a stainless-steel tray, separated by autoclave tape to keep them from touching each other. Once one side of the facemask is treated, it's flipped over to perform a separate decontamination. Researchers say any visibly soiled masks should not be treated but rather properly disposed as medical waste.

"Considering that many healthcare providers are using substitutes for N95s that offer very limited degree of protection, using (UV-C) and repurposing phototherapy devices could be the best practical solution at this time," Dr. Hamzavi wrote in Letter to the Editor published online in *JAAD*.

Researchers stressed that not all N95s are created equal and may not withstand decontamination. Degrading may occur in the facemask's outer surface and the elasticity of the bands. Thus, researchers underscored the importance of fit-testing after decontamination in a study published in the *Journal of the American Academy of Dermatology*. Health care workers are fit-tested every year with their N95 to ensure a proper fit and no air can penetrate the outer edges.

UV-C is one of the four common methods used in health care to sterilize N95s. Hydrogen peroxide vaporization, microwave generated steaming and dry heating also have shown to be effective in varying degrees. UV-C and HPV are also commonly used for disinfecting patient care units, surgical suites and intensive care units in the health care setting. Only the UV-C method was used in the Henry Ford study.

Researchers strike a cautionary tone for N95 decontamination no matter the method.

"Given the current COVID-19 pandemic, extreme measures are needed to keep those on the front line protected," says Angela Torres, M.D., a Henry Ford dermatology fellow and lead author in a study published online in *Photochemical & Photobiological Sciences*. "These options are cost effective, quick to employ and have the potential to save many lives and valuable resources."

However, Dr. Torres says, discarding a contaminated disposable N95 after a single use is "still ideal."

Story Source:

[Materials](#) provided by [Henry Ford Health System](#). *Note: Content may be edited for style and length.*

Journal Reference:

1. David M. Ozog, Jonathan Z. Sexton, Shanthi Narla, Carla D. Pretto-Kernahan, Carmen Mirabelli, Henry W. Lim, Iltefat H. Hamzavi, Robert J. Tibbetts, Qing-Sheng Mi. **The Effect of Ultraviolet C**

Influenza vaccine does not increase Covid-19 risk: Study

The study found that influenza vaccination was not associated with increased Covid-19 incidence or disease severity, including risk for hospitalisation, admission to the intensive care unit or mortality

Washington: Receiving the influenza vaccine does not increase a person's risk for contracting Covid-19 or worsen associated conditions or mortality, according to a study.

The research, published in the *Journal of Clinical and Translational Science*, shows the flu vaccine is the single most important intervention to help stay healthy.

Seasonal flu activity is unpredictable, and otherwise healthy people are hospitalised due to serious respiratory infection each year, the researchers said.

It is even more important to receive the flu vaccination this year to help prevent a 'twindemic' of flu and Covid-19, they said. Researchers led by Joe Zein, a pulmonologist at Cleveland Clinic in the US, analysed over 13,000 patients tested for Covid-19 between early March and mid-April.

They compared those who had received unadjuvanted influenza vaccines in the fall or winter of 2019 (4,138 patients) with those who did not receive the vaccine (9,082 patients).

The study found that influenza vaccination was not associated with increased Covid-19 incidence or disease severity, including risk for hospitalisation, admission to the intensive care unit or mortality. "Our findings suggest that we should proceed as usual with our vaccination strategy for global influenza this flu season," said Zein. "Getting the annual flu vaccine remains the best safeguard against the influenza virus -- both for yourself and the people around you," he added.

The researchers noted that much is still unknown about the possible outcomes of concurrent SARS-CoV-2 -- the virus that causes Covid-19 -- and influenza infection, including disease pathology and burden to the healthcare system.

They believe that the population's adherence to widespread and early flu vaccination while researchers continue to collect data will help to mitigate the risk of simultaneous viral infections and pandemics. "We have already seen the stress that Covid-19 can put on our hospitals and resources," said Zein.

"While we're not yet sure how flu season will affect Covid-19 susceptibility and infections, we strongly advise people to get their influenza vaccines, both for their individual health and the collective health of our care systems," he said.

<https://www.hindustantimes.com/world-news/influenza-vaccine-does-not-increase-covid-19-risk-study/story-rqs84SBDVF9iYCqHXgtSaM.html>



The researchers noted that much is still unknown about the possible outcomes of concurrent SARS-CoV-2 and influenza infection, including disease pathology and burden to the healthcare system. (REUTERS)

Cats can get infected by Covid, develop antibodies to block virus, finds study

From how conspiracy theories can hinder efforts to stop coronavirus' spread, to a nanoparticle tool that can help screen for drugs, ThePrint brings you the latest on Covid-19

By Mohana Vasu

New Delhi: Research laboratories across the world have been trying to find new clues that will help fight the SARS-CoV-2 virus, even as global toll from Covid-19 continues to increase.

Here are some of the top scientific findings on the novel coronavirus.

Cats can get infected with Covid-19, develop antibodies

A study from Spain has found that cats can get infected with Covid-19 and develop antibodies which can bind with the virus to block it.



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In a paper published in the journal *Proceedings of the National Academy of Sciences* (PNAS), a team of scientists from the Institute of Agrifood Research and Technology (IRTA) has described the case of the first cat infected with SARS-CoV-2 in Spain.

The four-year-old cat named Negrito lives with a family who suffered from Covid-19. The animal presented severe respiratory difficulties and was taken to a veterinary hospital in Barcelona. The animal was diagnosed with a heart condition in which walls of the heart muscles become very thick.

The hospital decided to euthanize the cat due to its terminal condition.

An RT-PCR test confirmed that the animal had become infected with SARS-CoV-2 but the viral load was very low and the cat did not have any other symptoms compatible with the coronavirus infection.

Serological tests on Negrito and another cat that also lived in the same home, named Whisky, further showed that both animals had developed antibodies against SARS-CoV-2. The latter, however, did not have the Covid-19 illness.

The study concluded that immune system of cats can deal with SARS-CoV-2 and even protect them from developing symptoms in some cases.

Conspiracy theories can hinder efforts to stop Covid-19 spread

Widespread belief in conspiracy theories about the coronavirus pandemic can not only make people reluctant to accept a Covid-19 vaccine, when it becomes available, but also keep them from taking steps to prevent its spread.

In a study published in the journal *Social Science & Medicine*, researchers have said that pandemic conspiracy theories can become an obstacle to minimising the spread of Covid-19.

The team had found that belief in conspiracy theories during July was linked to increasing reluctance in adopting preventive behaviour, including actions such as mask-wearing and accepting a vaccine when it is available.

Conspiracy theories such as the Chinese government created the novel coronavirus as a bioweapon, the US Centers for Disease Control and Prevention (CDC) exaggerating the danger posed by the virus to damage Donald Trump's presidency, or that the pharma industry created the virus to increase sales of drugs and vaccines were prevalent throughout America.

The study also found that the proportion of people who believed in these theories increased between March and July. The team of researchers also said people who rely on social media for news are more likely to be misinformed.

The authors further said that conspiracy theories can be difficult to displace because they provide simple explanations for events that are not fully understood, such as the current pandemic.

These theories also play on people's distrust in the government and other powerful institutions, and involve accusations that cannot be easily fact-checked.

Small 'druggable pocket' in SARS-CoV-2 spike protein found

Scientists have discovered a pocket in the SARS-CoV-2 spike protein, which facilitates the virus' entry into cells, that can be targeted to fight Covid-19.

The study, published in the journal *Science*, has suggested developing small anti-viral drugs to target the pocket.

The team used a powerful imaging technique known as electron cryo-microscopy (cryo-EM), to analyse SARS-CoV-2 spike protein at near-atomic resolution. This led to the discovery of a small molecule, linoleic acid (LA), buried in a pocket within the spike protein.

LA plays a vital role in inflammation and immune modulation — both key elements of Covid-19 disease progression. According to the researchers, this molecule plays a key role in disarming the body's defenses against the virus.

Targeting this molecule may help fight Covid-19 infection.

Nanoparticle tool to help screen for drugs against Covid-19

Scientists in the US have developed a new nanoparticle tool, which mimics the behaviour of SARS-CoV-2, that may prove to be a valuable tool in drug research for Covid-19.

The fluorescent nanoparticle tool triggers the process by which the novel coronavirus enters a cell. The tool can be used in tests to gauge the ability of drugs and compounds to block the actual virus from infecting human cells, the researchers said.

Using the actual virus in such screening studies require special facilities.

The tool, described in the journal *ACS Nano*, can work as a screening system to find compounds that block SARS-CoV-2 from binding to cells and infecting them.

Screening asymptomatic people can reduce infections, deaths

Screening asymptomatic people every two weeks for Covid-19, once the pandemic starts slowing down, could be a cost-effective measure to reduce infections and deaths, a study has suggested.

As the pandemic surges, screening can be cost-effective when done more often, even if the costs of tests are high, according to a research published in *Clinical Infectious Diseases*.

The study used a mathematical model developed by the research team to analyse the outcomes anticipated from several different strategies for Covid-19 testing and screening in Massachusetts, US.

The study showed that repeated screening of the entire population will lead to the most favorable clinical outcomes — preventing the greatest number of infections, hospitalisations, and deaths.

Such a screening strategy can also be cost-effective, depending on prices of tests and the frequency of screening, the researchers have said.

<https://theprint.in/health/cats-can-get-infected-by-covid-develop-antibodies-to-block-virus-finds-study/508270/>

