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Ministry of Defence

Wed, 13 Jan 2021 5:27PM

Cabinet approves procurement of 83 Light Combat Aircrafts (LCA) ‘Tejas’ from HAL for IAF

The Cabinet met under the Chairmanship of Prime Minister in New Delhi on 13 January and has approved procurement of 73 LCA Tejas Mk-1A fighter aircrafts and 10 LCA Tejas Mk-1 Trainer aircrafts at the cost of Rs. 45,696 Crore along with Design and Development of Infrastructure sanctions worth Rs.1,202 Crore.

Light Combat Aircraft Mk-1A variant is an indigenously designed, developed and manufactured state-of-the-art modern 4+ generation fighter aircraft. This aircraft is equipped with critical operational capabilities of Active Electronically Scanned Array (AESA) Radar, Beyond Visual Range (BVR) Missile, Electronic Warfare (EW) Suite and Air to Air Refuelling (AAR) would be a potent platform to meet the operational requirements of Indian Air Force, IAF. It is the first “Buy (Indian-Indigenously Designed, Developed and Manufactured)” category procurement of combat aircrafts with an indigenous content of 50% which will progressively reach 60% by the end of the programme.

The Cabinet has also approved infrastructure development by IAF under the project to enable them handle repairs or servicing at their base depot so that the turnaround time would get reduced for mission critical systems and would lead to increased availability of aircraft for operational exploitation. This would enable IAF to sustain the fleet more efficiently and effectively due to availability of repair infrastructure at respective bases.

Under the Atmanirbhar Bharat Abhiyaan, India is continuously growing in its power to indigenously design, develop and manufacture advanced cutting edge technologies and systems in the Defence Sector. The manufacturing of Light Combat Aircraft by Hindustan Aeronautics Limited, HAL will give a further push to Atmanirbhar Bharat initiative and boost indigenisation of defence production and the defence industry in the country. About 500 Indian companies including MSMEs in the design and manufacturing sectors will be working with HAL in this procurement. The programme would act as a catalyst for transforming the Indian aerospace manufacturing ecosystem into a vibrant Atmanirbhar-self-sustaining ecosystem.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1688289>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Wed, 13 Jan 2021 5:27PM

मंत्रिमंडल ने भारतीय वायु सेना के लिए हिंदुस्तान एयरोनॉटिक्स लिमिटेड (एचएएल) से 83 हल्के लड़ाकू विमान (एलसीए) 'तेजस' खरीदने की मंजूरी दी

प्रधानमंत्री श्री नरेन्द्र मोदी की अध्यक्षता में मंत्रिमंडल की 13 जनवरी को नई दिल्ली में बैठक हुई। बैठक में 45,696 करोड़ रुपये की लागत से 73 एलसीए तेजस एमके-1ए लड़ाकू विमान और 10 एलसीए तेजस एमके-1 ट्रेनर विमान की खरीद को मंजूरी दी गई। इसके साथ डिजाइन और बुनियादी ढांचे के विकास के लिए 1,202 करोड़ रुपये मंजूर किए गए।

हल्के लड़ाकू विमान एमके-1ए स्वदेश में डिजाइन, विकसित और निर्मित अत्याधुनिक आधुनिक 4+ पीढ़ी के लड़ाकू विमान हैं। यह विमान इलेक्ट्रॉनिक रूप से स्कैन किए गए सक्रिय एरे (एईएसए) रडार, बियॉन्ड विजुअल रेंज (बीवीआर) मिसाइल, इलेक्ट्रॉनिक वारफेयर (ईडब्ल्यू) सूट और एयर टू एयर रिफ्यूइंग (एएआर) की महत्वपूर्ण परिचालन क्षमताओं से लैस है, जो भारतीय वायु सेना (आईएएफ) की परिचालन आवश्यकताओं को पूरा करने के लिए एक शक्तिशाली प्लेटफॉर्म होगा। यह 50 प्रतिशत की स्वदेशी सामग्री के साथ लड़ाकू विमानों की श्रेणी की पहली "खरीद (भारतीय-स्वदेशी रूप से डिजाइन, विकसित और निर्मित)" है जो कार्यक्रम के अंत तक धीरे-धीरे 60 प्रतिशत तक पहुंच जाएगी।

मंत्रिमंडल ने परियोजना के तहत आईएएफ द्वारा बुनियादी ढांचे के विकास को भी मंजूरी दे दी है ताकि वे अपने बेस डिपो में मरम्मत या सर्विसिंग को सक्षम बना सकें ताकि मिशन क्रिटिकल सिस्टम के लिए विमान में माल लादने और उतारने का समय कम हो जाए और परिचालन उपयोग के लिए विमान की उपलब्धता बढ़े। यह आईएएफ को संबंधित अड्डों पर मरम्मत के बुनियादी ढांचे की उपलब्धता के कारण बेड़े को अधिक कुशलतापूर्वक और प्रभावी ढंग से बनाए रखने में सक्षम करेगा।

आत्मनिर्भर भारत अभियान के तहत, भारत लगातार रक्षा क्षेत्र में उन्नत अत्याधुनिक तकनीकों और प्रणालियों के डिजाइन, विकास और निर्माण स्वदेशी रूप से करने की अपनी शक्ति में वृद्धि कर रहा है। हिंदुस्तान एयरोनॉटिक्स लिमिटेड (एचएएल) द्वारा हल्के लड़ाकू विमान के निर्माण से आत्मनिर्भर भारत पहल को और अधिक बढ़ावा मिलेगा और देश में रक्षा उत्पादन और रक्षा उद्योग को बढ़ावा मिलेगा। इस खरीद में एचएएल के साथ डिजाइन और विनिर्माण क्षेत्रों में एमएसएमई सहित लगभग 500 भारतीय कंपनियां काम करेंगी। यह कार्यक्रम भारतीय एयरोस्पेस मैनुफैक्चरिंग इकोसिस्टम को एक जीवंत आत्मनिर्भर इकोसिस्टम में बदलने के लिए उत्प्रेरक का काम करेगा।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1688350>



ఐఎఎఫ్ కోసం 83 తేలికపాటి యుద్ధ విమానాల (ఎల్సీఎ)ను

హెచ్ఎఎల్ నుంచి సేకరించడానికి ఆమోదం తెలిపిన మంత్రిమండలి

ప్రధాన మంత్రి శ్రీ నరేంద్ర మోదీ అధ్యక్షతన ఈ రోజున న్యూ ఢిల్లీ లో సమావేశమైన మంత్రిమండలి 45,696 కోట్ల రూపాయల ఖర్చుతో 'తేజస్' ఎమ్కె-1ఎ యుద్ధ విమానాలు 73ని, 'తేజస్' ఎమ్కె-1 రకం శిక్షణ విమానాలు 10ని సేకరించడంతో పాటు, 1,202 కోట్ల రూపాయల విలువ కలిగిన మౌలిక సదుపాయాల ఆకృతి, అభివృద్ధిసంబంధ అనుమతులకు కూడా ఆమోదం తెలిపింది.

ఎమ్కె-1ఎ రకానికి చెందిన తేలికపాటి పోరాట విమానాన్ని దేశీయంగా రూపుదిద్ది, అభివృద్ధిపరచి అత్యాధునికమైన 4+ తరం యుద్ధ విమానంగా తయారు చేయడం జరిగింది. ఈ విమానానికి కీలకమైన యాక్టివ్ ఎలక్ట్రానిక్స్ స్కాన్స్ అర్డ్రే (ఎఐఎస్ఎ) రాడార్, బియాండ్ విజువల్ రేంజ్ (బివిఆర్) ఖిపణి, ఎలక్ట్రానిక్ వార్ఫేర్ (ఇడబ్ల్యు) స్యూట్, ఎయర్ టు ఎయర్ రిఫ్యూయలింగ్ (ఎఎఆర్) హంగులతో పాటు, భారతీయ వాయుసేన, ఐఎఎఫ్ తాలూకు కార్యకలాపాలకు అవసరం అయ్యే అన్ని ఏర్పాట్లు జతపరచి ఉన్నాయి. ఇవి 50 శాతం మేర దేశవాళీగా తీర్చిదిద్దిన సామగ్రిని కలిగి ఉండి, క్రమంగా 60 శాతం ఈ తరహా సామర్థ్యాన్ని సంతరించుకొనే పోరాట విమానాలలో మొట్టమొదటి "బియువై (Buy-Indian-Indigenously Designed, Developed and Manufactured)" కేటగిరీ సేకరణ గా నిలుస్తోంది.

మంత్రివర్గం ఐఎఎఫ్ ద్వారా మౌలిక సదుపాయాల అభివృద్ధికి కూడా ఆమోదం తెలిపింది. ఇది మరమ్మత్తులను గానీ లేదా సర్వీసింగును గానీ వారి బేస్ డిపో లో చేపట్టేందుకు వీలు కల్పిస్తుంది. దీని ద్వారా మిషన్ క్రిటికల్ సిస్టమ్స్ తాలూకు టర్న్ అరౌండ్ వ్యవధి తగ్గనుంది. అంతేకాదు, కార్యకలాపాలకు వినియోగించుకోవడం కోసం విమానం లభ్యత సైతం పెరగనుంది. ఇది ఐఎఎఫ్ కు తన విమానశ్రేణిని మరింత సమర్థంగా ఉపయోగించుకోవడానికి మార్గాన్ని సుగమం చేయనుంది.

'ఆత్మనిర్భర్ భారత్ అభియాన్' లో భాగంగా భారతదేశం రక్షణ రంగం లో అత్యాధునిక సాంకేతికతల ను, వ్యవస్థల ను దేశీయంగానే రూపకల్పన చేసి, అభివృద్ధి పరచి, ఉత్పత్తిని చేపట్టేందుకు కావలసిన శక్తిని నిరంతరాయంగా పెంపొందించుకోబోతోంది. హిందుస్తాన్ ఏరోనాటిక్స్ లిమిటెడ్, హెచ్ఎఎల్ తేలికపాటి పోరాట విమానాన్ని తయారు చేయడం 'ఆత్మనిర్భర్ భారత్' కార్యక్రమానికి మరింత ఊతాన్ని ఇవ్వనుంది. దీనితోపాటు, రక్షణ రంగ ఉత్పత్తి కి దేశీయతను చేకూర్చగలుగుతుంది. ఈ సేకరణ ప్రక్రియలో సుమారు 500 భారతీయ కంపెనీలు హెచ్ఎఎల్ తో కలసి పని చేయనున్నాయి. ఈ కార్యక్రమం భారతదేశ ఏరోస్పేస్ మాన్యుఫాక్చరింగ్ ఇకోసిస్టమ్ ను ఒక హుషారైనా 'ఆత్మనిర్భర్ లేదా స్వయం సమ్మర్థి' తో కూడిన వ్యవస్థ గా మార్పు చెందడంలో ఒక ఉత్తేజరకం వంటి పాత్రను పోషించనుంది.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1688322>

Decision to procure Tejas will strengthen movement for 'Aatmanirbhar Bharat': Modi

Synopsis

In a major decision aimed at boosting the domestic aerospace industry, India on Wednesday approved a much-awaited deal worth Rs 48,000 crore to procure 83 Tejas for the Indian Air Force.

New Delhi: Prime Minister Narendra Modi said on Wednesday that the Union Cabinet's nod to procure 83 indigenously-developed Light Combat Aircraft (LCA) Tejas for the Indian Air Force will strengthen the movement to create an 'Aatmanirbhar Bharat' (self-reliant India).

In a major decision aimed at boosting the domestic aerospace industry, India on Wednesday approved a much-awaited deal worth Rs 48,000 crore to procure 83 Tejas for the Indian Air Force.

The decision to procure the fleet was taken at a meeting of the Cabinet Committee on Security (CCS) chaired by Modi.

The prime minister tweeted, "Today's Cabinet decision will improve the capabilities of our armed forces, boost the indigenous defence industry and strengthen the movement to create an Aatmanirbhar Bharat."

<https://economictimes.indiatimes.com/news/defence/decision-to-procure-tejas-will-strengthen-movement-for-aatmanirbhar-bharat-modi/articleshow/80256592.cms?from=mdr>



Prime Minister Narendra Modi

LCA Tejas will be backbone of IAF fighter fleet: Rajnath Singh after Rs 48,000 crore deal

The jets to be ordered include 73 LCA Tejas Mk-1A fighter aircraft and 10 LCA Tejas Mk-1 trainer aircraft

By Kanishka Sarkar

The cabinet committee on security (CCS), chaired by Prime Minister Narendra Modi, has approved the “largest indigenous defence procurement deal” to strengthen Indian Air Force’s fleet of homegrown Tejas light combat aircraft, defence minister Rajnath Singh said on Wednesday.

“The LCA-Tejas is going to be the backbone of the IAF fighter fleet in years to come. LCA-Tejas incorporates a large number of new technologies many of which were never attempted in India. The indigenous content of LCA-Tejas is 50% in Mk1A variant which will be enhanced to 60%” the minister wrote on Twitter.

According to Singh, the deal of 83 LCA Mk-1A jets worth nearly Rs48,000 crore, will be a game changer for self reliance in the Indian defence manufacturing. The jets to be ordered include 73 LCA Tejas Mk-1A fighter aircraft and 10 LCA Tejas Mk-1 trainer aircraft at the cost of ₹45,696 crore, along with design and development of infrastructure sanctions worth Rs1,202 crore, the defence ministry said in a statement.

“The LCA-Tejas programme would act as a catalyst for transforming the indian aerospace manufacturing ecosystem into a vibrant Atmanirbhar-self-sustaining ecosystem,” Singh tweeted and thanked the Prime Minister for the landmark decision.

The Hindustan Aeronautics Limited (HAL) has already set-up second line manufacturing facilities at its Nasik and Bengaluru divisions, the defence minister said, adding, “Equipped with the augmented infrastructure the HAL will steer LCA-Mk1A production for timely deliveries to the IAF.”

LCATEjas’s procurement will considerably expand the current LCA ecosystem and help in creating new job opportunities, Singh wrote on the microblogging site. HAL follows a system integrator model in LCA Mk1A program and acts as an umbrella organisation, fostering manufacturing & design capabilities in pvt. Industry, he added.

<https://www.hindustantimes.com/india-news/lcatejas-will-be-backbone-of-iaf-fighter-fleet-rajnath-singh-after-rs48-000-crore-deal-101610540346838.html>



The Tejas light combat aircraft were moved from their home base in Sullur in Tamil Nadu.(PTI FILE PHOTO)

‘LCA तेजस सौदे को मंजूरी मिलना एक बड़ी उपलब्धि’, DRDO ने कहा-तीन दशकों की कड़ी मेहनत के बाद हुआ संभव

डीआरडीओ (DRDO) ने रक्षा खरीद सौदे को मंजूरी दिए जाने को भारतीय वैमानिकी वैज्ञानिक समुदाय और उद्योग के लिए एक बड़ा दिन बताया है। उन्होंने कहा कि यह तीन दशकों की बहुत ही कड़ी मेहनत से संभव हो सका है।

केंद्र (Central) द्वारा 83 एलसीए तेजस लड़ाकू विमान को मंजूरी दिए जाने के बाद डीआरडीओ (DRDO) ने इसे एक बड़ी उपलब्धि बताया है। रक्षा अनुसंधान और विकास संगठन (DRDO) के प्रमुख डॉ. जी सतेश रेड्डी ने बुधवार को कहा कि 48,000 करोड़ के रक्षा सौदे को केंद्रीय मंत्रिमंडल द्वारा मंजूरी (Approves) दे दी गई, इससे भारत में बहुत से एडवांस एयरक्राफ्ट सिस्टम (Aircraft System) को विकसित करने का रास्ता खुलेगा। सबसे बड़ी स्वदेशी रक्षा खरीद सौदे को मंजूरी देते हुए कैबिनेट कमेटी ने आज 83 एलसीए तेजस एमके -1 ए जेट विमानों की खरीद को मंजूरी दे दी है, ये तेजस वेरिएंट की टैली को 123 तक ले जाएगा।

डीआरडीओ (DRDO) ने रक्षा खरीद सौदे को मंजूरी दिए जाने को ‘भारतीय वैमानिकी वैज्ञानिक समुदाय और उद्योग के लिए एक बड़ा दिन’ (Big Day) बताया है। डॉ. रेड्डी ने न्यूज एजेंसी से कहा कि बड़ी तादाद में विमानों (Aircraft) की खरीद के आदेश के लिए अनुमोदन प्राप्त करना एक बड़ी उपलब्धि है। यह तीन दशकों की बहुत ही कड़ी मेहनत से संभव हो सका है। डीआरडीओ प्रमुख ने रक्षा खरीद को मंजूरी के लिए के लिए प्रधानमंत्री नरेंद्र मोदी को धन्यवाद दिया।



केंद्र द्वारा 83 एलसीए तेजस लड़ाकू विमान को मंजूरी दिए जाने के बाद डीआरडीओ ने इसे एक बड़ी उपलब्धि बताया है।

आने वाले दिनों में इस सौदे पर हिंदुस्तान एयरोनॉटिक्स लिमिटेड (एचएएल) के साथ डील साइन की जाएगी। इससे भारतीय वायु सेना को आगे बढ़ने में मदद मिलेगी। उन्होंने कहा कि इससे भारतीय वायुसेना के बेड़े के स्वदेशी फाइटर जेट एलसीए-तेजस और पूरी युद्धक क्षमता को मजबूती मिलेगी।

सभी जरूरी क्षमता से लैस तेजस विमान

एलसीए तेजस एमके -1 ए एक आधुनिक रूप से निर्मित, विकसित नई पीढ़ी का 4+ फाइटर जेट है। रक्षा मंत्रालय ने कहा है कि इस फाइटर जेट के जरिए वायुसेना की सभी ऑपरेशनल जरूरत पूरी होंगी। यह फाइटर जेट सक्रिय इलेक्ट्रॉनिकली स्कैनेड एरे (ईईएसए) रडार, बियाँन्ड विजुअल रेंज (बीवीआर) मिसाइल, इलेक्ट्रॉनिक वारफेयर (ईडब्ल्यू) सूट और एयर टू एयर रिफ्यूइलिंग (एएआर) की सभी जरूरी क्षमताओं से लैस है।

<https://www.tv9hindi.com/india/drdo-chief-says-big-achievement-central-approves-tejas-deal-468743.html>

‘Big achievement’, says DRDO Chief after centre approves LCA Tejas deal

The LCA Tejas Mk-1A is a domestically designed, developed and manufactured state of the art modern 4+ generation fighter jet. It will serve as a potent platform to meet the IAF’s operational requirements, the Union defence ministry said

Edited By Harshit Sabarwal

New Delhi: Defence Research and Development Organisation (DRDO) chief Dr G Satheesh Reddy said on Wednesday that the ₹48,000 crore defence deal, cleared by the Union Cabinet on Wednesday, would pave way for developing various advanced aircraft systems in India. Clearing the biggest indigenous defence procurement deal, the Cabinet Committee on Security (CCS) approved the purchase of 83 LCA (light combat aircraft) Tejas Mk-1A jets which will take the tally of Tejas variants ordered to 123.

Further terming the procurement deal as a ‘great day for the Indian aeronautical scientific community and industry’, Reddy told news agency ANI, “Getting approval for the order of the largest quantity of aircraft ever is a big achievement and is the culmination of hard work of three decades.” The DRDO chief also thanked Prime Minister Narendra Modi for giving a go ahead for this project.

The deal will be signed in the coming days with the Hindustan Aeronautics Limited (HAL). It will be a major boost for the Indian Air Force (IAF) as it would strengthen IAF’s fleet of homegrown fighter jet ‘LCA-Tejas’ and the overall combat capability.

The LCA Tejas Mk-1A is a domestically designed, developed and manufactured state of the art modern 4+ generation fighter jet. It will serve as a potent platform to meet the IAF’s operational requirements, the Union defence ministry said. The fighter jet is equipped with critical operational capabilities of Active Electronically Scanned Array (AESA) Radar, Beyond Visual Range (BVR) Missile, Electronic Warfare (EW) Suite and Air to Air Refuelling (AAR), it added.

The fighter jet is also the “Buy (Indian-Indigenously Designed, Developed and Manufactured)” procurement of combat aircraft with an indigenous content of 50 per cent which will progressively reach 60 per cent by the end of the programme, according to ANI.

Earlier, Union defence minister Rajnath Singh had said that the deal would be a game changer for Atmanirbhar (self-reliance) in the country’s defence manufacturing adding that it would considerably expand the current LCA ecosystem and help in creating new employment opportunities.

“The decision taken today will considerably expand the current LCA ecosystem and help in creating new job opportunities. HAL follows a system integrator model in LCA Mk1A program and acts as an umbrella organisation, fostering manufacturing & design capabilities in pvt. industry,” Singh had tweeted.

(With agency inputs)

<https://www.hindustantimes.com/india-news/big-achievement-says-drdo-chief-after-centre-approves-lca-tejas-deal-101610551093455.html>



The deal will be signed in the coming days with the Hindustan Aeronautics Limited (HAL). (PTI File Photo)

Govt clears purchase of 83 indigenous Tejas light combat aircraft

India's largest indigenous defence procurement deal is worth Rs 45,696 cr

By Ajai Shukla

New Delhi: Clearing the way for inducting another four squadrons of the indigenous Tejas light combat aircraft (LCA) into the Indian Air Force (IAF), the Union Cabinet, under the chairmanship of Prime Minister Narendra Modi, sanctioned the procurement of 83 fighters on Wednesday.

Hindustan Aeronautics Ltd (HAL) will act as the lead integrator for building the aircraft at a targeted rate of 16 fighters per year. The first aircraft will be delivered three years after HAL and the IAF sign a contract.

“(The Cabinet) has approved the procurement of 73 LCA Tejas Mark 1A fighter aircraft and 10 LCA Tejas Mark 1 trainer aircraft at a cost of Rs 45,696 crore, along with design and development of infrastructure sanctions worth Rs 1,202 crore,” the ministry of defence (MoD) said.

It has taken the MoD more than three years to negotiate this contract with HAL -- one of its own defence public sector undertakings. The ministry had accorded “acceptance of necessity” for 83 Tejas aircraft in December 2017, and HAL submitted technical and commercial bids in March 2018. Since then, the two sides have been negotiating technical issues and the price.

“It is the first ‘Buy (Indian – Indigenously Designed, Developed and Manufactured)’ category procurement of combat aircraft with an indigenous content of 50 per cent, which will progressively reach 60 per cent by the end of the programme,” announced the MoD.

The negotiated price amounts to about Rs 550 crore per Tejas Mark 1A fighter, which is significantly higher than the Rs 430 crore cost of each Sukhoi-30MKI that HAL builds.

The reasons for this high cost is the four major improvements the IAF has demanded over the current Tejas Mark 1 version. The most challenging involves equipping the Mark 1A fighter with active electronically scanned array (AESA) radar, in place of the current manually scanned Israeli Elta EL/M 2032 radar. The IAF has also demanded a “self-protection jammer” (SPJ), integrated on an external pod under the Tejas’ wing.

Two other upgrades are less complicated: Improving the “maintainability” of the fighter and fitting it with the capabilities and attachments for air-to-air refuelling (AAR).

Terming the Tejas Mark 1A a “fourth-plus generation fighter”, the MoD said it was “equipped with critical operational capabilities of AESA radar, beyond visual range (BVR) missile, electronic warfare (EW) suite and AAR”.



Hindustan Aeronautics Ltd (HAL) will act as the lead integrator for building the aircraft at a targeted rate of 16 fighters per year

FOURTH-PLUS GENERATION FIGHTER

- HAL had submitted technical and commercial bids in March 2018
- It took defence ministry three years to negotiate the contract
- Tejas is the first ‘Buy (Indian – Indigenously Designed, Developed and Manufactured)’ category procurement of combat aircraft
- Negotiated price is about ₹550 crore per Tejas Mark 1A fighter – significantly higher than the cost of each Sukhoi-30MKI at ₹430 crore
- HAL will build the fighter in partnership with a vendor base of about 500 Indian companies

The sanction of Rs 1,202 crore is for the IAF to develop repair and servicing infrastructure at their base depots “so that the turnaround time would get reduced for mission critical systems and would lead to increased availability of aircraft for operational exploitation”, said the MoD.

To ramp up production, HAL has set up a second production line in Bengaluru and resorted to outsourcing aerostructure assembly. On December 20, 2017, the defence minister told Parliament: “For ramping up production capacity from existing eight aircraft to 16 aircraft per annum, Government of India has sanctioned Rs 1,381.04 crore in March 2017.”

HAL will be building the Tejas Mark 1A in partnership with a vendor base of about 500 Indian companies, including micro, small and medium enterprises in the design and manufacturing sectors. “The programme would act as a catalyst for transforming the Indian aerospace manufacturing ecosystem into a vibrant ‘Atmanirbhar’, self-sustaining ecosystem,” stated the MoD.

Major assemblies of the Tejas fighter are manufactured by four major, Tier-1 suppliers and then integrated by HAL in Bengaluru into the fully-built fighter. The front fuselage is built by Dynamic Technologies Ltd; the centre fuselage by VEM Technologies, Hyderabad; the wings by Larsen & Toubro, Coimbatore; and the rear fuselage by Alpha Tokal, Bengaluru.

The IAF has already ordered two squadrons of the Tejas Mark 1 fighter. This order will take up the Tejas squadron numbers to six, after which the larger, more powerful Tejas Mark 2 fighter is slated to enter service.

https://www.business-standard.com/article/current-affairs/govt-clears-purchase-of-83-indigenous-tejas-light-combat-aircraft-121011400028_1.html

mint

Thu, 14 Jan 2021

₹45,700-cr deal: India clears purchase of 83 'Tejas' jets for IAF

Edited By Aparna Banerjee

- ***This deal will be a game-changer for self-reliance in the Indian defence manufacturing, said Defence Minister Rajnath Singh***
- ***About 500 Indian companies including MSMEs in the design and manufacturing sectors will be working with HAL in this procurement***

The Cabinet Committee on Security (CCS), led by Prime Minister Narendra Modi, on Wednesday procurement of 73 LCA Tejas Mk-1A fighter aircraft and 10 LCA Tejas Mk-1 Trainer aircraft at the cost of ₹45,696 crore along with design and development of infrastructure sanctions worth ₹1,202 crore.

“The CCS chaired by PM today approved the largest indigenous defence procurement deal worth about 48000 Crores to strengthen IAF’s fleet of homegrown fighter jet ‘LCA-Tejas’. This deal will be a game changer for self reliance in the Indian defence manufacturing,” Defence Minister Rajnath Singh tweeted on Wednesday evening.

The defence minister said Tejas is going to be the backbone of the fighter fleet of the Indian Air Force in years to come.

Around three years back, the IAF had issued an initial tender for procurement of 83 Tejas aircraft, a four-and-half generation combat jet.



Tejas Mk-1A fighter

"LCA-Tejas incorporates a large number of new technologies many of which were never attempted in India. The indigenous content of LCA-Tejas is 50 percent in Mk1A variant which will be enhanced to 60 percent,' Singh said.

The defence minister said that aircraft maker Hindustan Aeronautics Ltd (HAL) has already set up second-line manufacturing facilities at its Nasik and Bengaluru divisions.

"Equipped with the augmented infrastructure the HAL will steer LCA-Mk1A production for timely deliveries to the IAF," he said.

Singh said the Tejas programme would act as a catalyst for transforming the Indian aerospace manufacturing ecosystem into a vibrant, self-sustaining one.

"I thank the Prime Minister Shri @narendramodi for this historic decision taken by the CCS today, " the defence minister said.

Light Combat Aircraft Mk-1A variant is an indigenously designed, developed and manufactured 4+ generation fighter aircraft. This aircraft is equipped with critical operational capabilities of Active Electronically Scanned Array (AESA) Radar, Beyond Visual Range (BVR) Missile, Electronic Warfare (EW) Suite and Air to Air Refuelling (AAR) would be a potent platform to meet the operational requirements of Indian Air Force, IAF.

It is the first "Buy (Indian-Indigenously Designed, Developed and Manufactured)" category procurement of combat aircrafts with an indigenous content of 50% which will progressively reach 60% by the end of the programme, defence ministry said in a statement.

The Cabinet has also approved infrastructure development by IAF under the project to enable them handle repairs or servicing at their base depot so that the turnaround time would get reduced for mission critical systems and would lead to increased availability of aircraft for operational exploitation.

This would enable IAF to sustain the fleet more efficiently and effectively due to availability of repair infrastructure at respective bases.

Under the Atmanirbhar Bharat Abhiyaan, India is continuously growing in its power to indigenously design, develop and manufacture advanced cutting edge technologies and systems in the Defence Sector, the Ministry of Defence said in a statement.

The manufacturing of Light Combat Aircraft by Hindustan Aeronautics Limited, HAL will give a further push to Atmanirbhar Bharat initiative and boost indigenisation of defence production and the defence industry in the country. About 500 Indian companies including MSMEs in the design and manufacturing sectors will be working with HAL in this procurement.

The programme would act as a catalyst for transforming the Indian aerospace manufacturing ecosystem into a vibrant Atmanirbhar-self-sustaining ecosystem, the ministry added.

<https://www.livemint.com/news/india/rs-45-700-cr-deal-india-clears-purchase-of-83-tejas-jets-for-iaf-11610539505040.html>

LCA Tejas Mark 1A : Indian Air Force का शक्तिमान, दुश्मनों का करेगा काम-तमाम

एक साथ इंडियन एयरफोर्स को मिल रहे हैं 83 तेजस फाइटर जेट, जो दुश्मनों का काम तमाम करने की ताकत रखते हैं
तेजस की खासियत

इंडियन एयरफोर्स दुनिया की चौथी सबसे बड़ी एयरफोर्स मानी जाती है। लेकिन पिछले काफी समय से इंडियन एयरफोर्स की ताकत उसकी क्षमता से कम थी। हालांकि मोदी सरकार लगातार राफेल, मिग-29, सु-30 एमकेआई की खरीदी कर रही है, लेकिन अब मोदी सरकार ने एचएएल के बनाए फोर्थ जेनरेशन के सबसे खतरनाक फाइटर जेट की खरीदी की है। जी हां, एक साथ इंडियन एयरफोर्स को मिल रहे हैं 83 तेजस फाइटर जेट, जो दुश्मनों का काम तमाम करने की ताकत रखते हैं। आईए, जानते हैं तेजस के बारे में।

रडार को चकमा देने में सक्षम

एचएएल की ओर से विकसित [तेजस](#) को चौथी पीढ़ी (4+) के सबसे उन्नत और सबसे हल्के लड़ाकू विमानों में गिना जाता है। ये अपने मूल वैरिएंट में 43 बदलावों के बाद अप्रूव हुई है। एलसीए-तेजस कम ऊंचाई पर उड़ते हुए सुपरसोनिक स्पीड से दुश्मन पर हमला करने में सक्षम है। ऊंचाई कम होने की वजह से ये कई बार दुश्मन के रडार को भी चमका देने में कामयाब रहता है।



तेजस मल्टीरोल फाइटर जेट

तेजस मल्टीरोल फाइटर जेट है, जिसका इस्तेमाल एयर टू एयर, एयर टू ग्राउंड स्ट्राइक में किया जाता है। तेजस पर कई तरह की मिसाइलें तैनात की जा रही हैं, जो एयर टू एयर और एयर टू ग्राउंड अटैक के लिए होंगी। यही नहीं, तेजस का कॉकपिट 360 डिग्री विजिविलिटी और सबसे नए नेविगेशन सिस्टम से लैस है।

तेजस में एंटीशिप मिसाइल, बम और रॉकेट भी

तेजस में एक साथ 9 तरह के हथियार लोड और फायर किए जा सकते हैं। तेजस में एंटीशिप मिसाइल, बम और रॉकेट भी लगाए जा सकते हैं। तेजस विमान एक सुपर सोनिक फाइटर जेट है जो 15 किलोमीटर की ऊंचाई तक उड़ सकता है।

भारत तेजस का अगला वैरिएंट मार्क 2 भी बना रहा है

तेजस में जैमर-प्रोटक्शन तकनीक है ताकि दुश्मन की सीमा के करीब उसका कम्युनिकेशन बंद न हो। तेजस को 42 फीसदी कार्बन फाइबर, 43 फीसदी एल्यूमीनियम एलॉय और टाइटेनियम से बनाया गया है। जो इसे बाकी फाइटर जेट्स से अलग बनाया है। भारत तेजस का अगला वैरिएंट मार्क 2 भी बना रहा है, जो मीडियम वेट कैटेगिरी का होगा।

48,000 करोड़ रुपए में 83 तेजस

रक्षामंत्री राजनाथ सिंह ने कहा कि प्रधानमंत्री की अगुवाई में सीसीएस ने 48,000 करोड़ रुपए तेजस की खरीदी के लिए अप्रूव कर दिए हैं। ये डील भारतीय रक्षा विनिर्माण के क्षेत्र में मील का पत्थर साबित होगी।

<https://zeenews.india.com/hindi/india/photo-gallery-lca-tejas-mark-1a-specification-of-indian-multirole-fighter-jet-developed-by-hal/827394/%E0%A4%B0%E0%A4%A1%E0%A4%BE%E0%A4%B0-%E0%A4%95%E0%A5%8B-%E0%A4%9A%E0%A4%95%E0%A4%AE%E0%A4%BE-%E0%A4%A6%E0%A5%87%E0%A4%A8%E0%A5%87-%E0%A4%AE%E0%A5%87%E0%A4%82-%E0%A4%B8%E0%A4%95%E0%A5%8D%E0%A4%B7%E0%A4%AE-827399>

DRDO develops ASMI, India's first homegrown Uzi-style personal defence weapon

Lightweight machine pistol pitched as sidearm for tank crews, police, CRPF

Personal Defence Weapons (PDWs) like the Uzi have become ubiquitous among armed forces and police personnel across the world. Light, cheap and effective, they allow for an easy-to-handle compact small arm to be deployed at scale.

Now, the Defence Research and Development Organisation has developed India's first indigenously-made machine pistol, the ASMI—meaning price, self-respect and hard-work. A 9mm 3D-printed PDW, it packs a 33-round magazine and will have a likely production cost of under Rs 50,000 a unit.

The weapon was developed by Lt Col Prasad Bansod from Infantry School, Mhow with assistance from ARDE, Pune in a record time of four months. According to ANI, the weapon would be offered to replace the 9mm pistols currently in service.



The Asmi 9mm machine pistol | DRDO

It should be noted that the World War II-era British Sterling 9mm sub-machine gun remains in use by security personnel across India, though it is currently being phased out in favour of the Modern Sub Machine Carbine (MSMC) developed by ARDE.

A low-cost desi alternative to the Uzi, the ASMI sports an upper receiver made from aircraft-grade aluminium and a 3D-printed carbon fibre lower receiver. It features an 8-inch barrel and a 33-round high capacity magazine with an overall empty weight of under two kgs. The upper receiver has a full length integral picatinny rail capable of fitting modern scopes, optics and accessories, with M-Lok slots as well.

According to a release, DRDO sees the weapon as having huge potential as a personal weapon for heavy weapon detachments, commanders, tank and aircraft crews, drivers and dispatch riders, radio/radar operators, CQB, CI/CT Ops, VIP protection duties and policing.

“ASMI is likely to find huge employability within the Central Police Organisations and State Police services as well as huge potential for exports,” the release says.

<https://www.theweek.in/news/india/2021/01/13/drdo-develops-asmi-indias-first-homegrown-uzi-style-personal-defence-weapon.html>

India's first indigenous machine pistol ASMI displayed by Indian Army - Know its features

The machine pistol can fire at a range of 100 metres and is in the class of the Uzi series guns of Israel

New Delhi: India's first indigenous machine pistol developed jointly by Defence Research and Development Organisation (DRDO) and Indian Army was displayed at the Army's innovation display event. The 'Make in India' gun would be offered to replace the 9mm pistols in the defence forces.

The machine pistol can fire at a range of 100 metres and is in the class of the Uzi series guns of Israel. The prototype has fired over 300 rounds in the last four months of its development.

DRDO-designed sub-machine gun successfully undergoes user trials

Earlier, DRDO-designed sub-machine gun successfully underwent defence ministry's user trials in December. The 5.56x30 mm sub-machinegun designed by the DRDO has already successfully undergone the defence ministry's user trials and is all set to be inducted into the services. DGQA Directorate General of Quality Assurance

5.56x30 mm Protective Carbine is a gas-operated semi null-pup automatic weapon having more than 700 rpm rate of fire.

The particular gun will be very useful counter insurgency / counter terrorism operations by security agencies as the effective range of the carbine is more than 100 metre and weighs about 3.0 kg with key features like high reliability, low recoil, retractable Butt, ergonomic design, single hand firing capability, and multiple picatinny rails etc.

The carbine has been designed as per Indian Army's General Staff Qualitative Requirements (GSQR), by Armament Research and Development Establishment (ARDE), a Pune based laboratory of DRDO.

<https://www.timesnownews.com/india/article/india-s-first-indigenous-machine-pistol-asmi-displayed-by-indian-army-know-its-features/706727>



machine pistol ASMI | Photo Credit: ANI

स्वदेशी से मजबूत होगी सेना: सेना और DRDO ने बनाई स्वदेशी पिस्टल; बिल्डिंग में छिपे आतंकियों को भी ढूंढ निकालेगा माइक्रोकॉप्टर

इंडियन आर्मी और डिफेंस रिसर्च एंड डेवलपमेंट ऑर्गेनाइजेशन (DRDO) ने देश की पहली स्वदेशी मशीन पिस्टल ASMI तैयार की है। भारतीय सेना ने बुधवार को अपने इनोवेशन इवेंट में इस मशीन पिस्टल को सबके सामने रखा। इस पिस्टल को डिफेंस फोर्स की 9 एमएम पिस्टल की जगह इस्तेमाल में लाया जा सकता है।

वहीं, एक आर्मी ऑफिसर ने माइक्रोकॉप्टर तैयार किया है, जिससे बिल्डिंग या कमरे में छिपे आतंकियों पर भी निगरानी रखी जा सकेगी और उन्हें ढूंढ निकाला जा सकेगा। इसे लेफ्टिनेंट करनल जीवाईके रेड्डी ने डेवलप किया है।

पिस्टल की फायर रेंज 100 मीटर तक

न्यूज एजेंसी के मुताबिक, इस मशीन पिस्टल की फायर रेंज करीब 100 मीटर तक है। इसे इजराइल की यूजी सीरीज की गन की तर्ज पर तैयार किया गया है। सेना द्वारा दिखाई गई प्रोटोटाइप पिस्टल से 300 से ज्यादा राउंड फायर किए जा चुके हैं, जिसे करीब 4 महीने पहले तैयार किया गया था।



माइक्रोकॉप्टर का ट्रायल सफल

जम्मू-कश्मीर में पैरा स्पेशल फोर्स बटालियन ने इस माइक्रोकॉप्टर का ट्रायल किया। ट्रायल में यह माइक्रो ड्रोन पूरी तरह सफल साबित हुआ। न्यूज एजेंसी के मुताबिक, इसे बेहतर करने के लिए काम किया जा रहा है।

इंडियन आर्मी और डिफेंस रिसर्च एंड डेवलपमेंट ऑर्गेनाइजेशन (DRDO) द्वारा तैयार की गई स्वदेशी पिस्टल इजराइल की यूजी सीरीज की गन के तर्ज पर तैयार की गई है।

दुनिया का पहला यूनिवर्सल बुलेटप्रूफ जैकेट

भारतीय सेना के मेजर अनूप मिश्रा ने दुनिया का पहला यूनिवर्सल बुलेटप्रूफ जैकेट तैयार किया है। उन्होंने इस स्वदेशी जैकेट का नाम 'शक्ति' रखा है। इसे महिला या पुरुष कोई भी पहन सकता है। यह दुनिया का पहला फ्लेक्सिबल बॉडी आर्मर भी है।

हिमतापक हीटिंग डिवाइस भी तैयार की


इससे पहले DRDO ने जवानों के लिए हिमतापक हीटिंग डिवाइस तैयार की थी। इस डिवाइस के जरिए सेना का बंकर माइनस 40 डिग्री सेल्सियस तापमान में भी गर्म रहेगा। आर्मी ने इसके लिए 420 करोड़ का ऑर्डर भी DRDO को दे दिया है।

कार्बन डाई ऑक्साइड से भी जवानों को बचाएगी

यह हीटिंग डिवाइस बैक ब्लास्ट के दौरान निकलने वाली जहरीली गैस कार्बन डाई ऑक्साइड से भी जवानों को बचाएगी। इस जहरीली गैस से जवानों की मौत भी हो जाती है। जब कोई सैनिक लॉन्चर को कंधे या जमीन पर रखकर रॉकेट छोड़ता है तो उसके पीछे से जहरीली गैस निकलती है। उस एरिया को ही बैक ब्लास्ट एरिया कहते हैं। हिमतापक इस गैस को ऑब्जर्व कर लेगी।


<https://www.bhaskar.com/national/news/asmi-indias-first-indigenous-machine-pistol-develops-by-defence-research-drdo-and-indian-army-128119604.html>

DRDO on Twitter

 **Rajnath Singh** ✓
@rajnathsingh


The LCA-Tejas is going to be the backbone of the IAF fighter fleet in years to come. LCA-Tejas incorporates a large number of new technologies many of which were never attempted in India. The indigenous content of LCA-Tejas is 50% in Mk1A variant which will be enhanced to 60%.

4:59 PM · Jan 13, 2021

 **Rajnath Singh** ✓
@rajnathsingh

The CCS chaired by PM Sh. @narendramodi today approved the largest indigenous defence procurement deal worth about 48000 Crores to strengthen IAF's fleet of homegrown fighter jet 'LCA-Tejas'. This deal will be a game changer for self reliance in the Indian defence manufacturing.

4:59 PM · Jan 13, 2021

 **Rajnath Singh** ✓
@rajnathsingh

The LCA-Tejas programme would act as a catalyst for transforming the indian aerospace manufacturing ecosystem into a vibrant Atmanirbhar-self-sustaining ecosystem. I thank the Prime Minister Shri @narendramodi for this historic decision taken by the CCS today.

5:09 PM · Jan 13, 2021



It is a great day for the Indian aeronautical scientific community and industry. Getting approval for the order of the largest quantity of aircraft ever is a big achievement and is the culmination of hard work of three decades:
DRDO Chief Dr G Satheesh Reddy
(file photo)



ANI @ANI · 7h

India's first indigenous machine pistol ASMI developed jointly by DRDO (Defence Research and Development Organisation) and Indian Army displayed today at the Army's innovation display event. The gun would be offered to replace the 9mm pistols in the defence forces.



Thu, 14 Jan 2021

Centre allocates additional funds for Army to deal with Chinese aggression

The Army is prepared to hold its ground along the LAC 'as long as it takes'

By Pradip R Sagar

The Prime Minister Narendra Modi-led government has allocated an additional budget of Rs 8,500 crore to the Indian Army to deal with Chinese aggression in Eastern Ladakh sector. With no sign of disengagement, the Indian Army has prepared itself for the long haul on the icy heights of the Himalayan frontiers, where temperatures dip to minus 40 degree Celsius.

General Manoj Mukund Naravane on Tuesday made it clear that the Army is prepared to hold its ground along the Line of Actual Control—the de facto border with China—as long as it takes to achieve national objective. The Army has deployed over 50,000 troops in Eastern Ladakh in retaliation to the Chinese military's unprecedented mobilisation and forward concentration by its troops on multiple locations along the Eastern Ladakh sector.



[File] Army Chief General Manoj Mukund Naravane with troops in Ladakh last year | PTI

Additional allocation of budget came in the revised estimate (RE Budget) category. While Rs 6,000 crore has been given under the revenue allocation to meet the day-to-day needs of deployed troops, Rs 2,500 crore is being given for modernisation under the capital allocation category, according to a top source based in the South Block.

Ever since tensions erupted in May last year, the government has been supportive, conveying to the forces repeatedly that there will be no shortage for funds to deal with any misadventure by Chinese troops. And to meet the deficiencies in its armoury, the Army has been on fast-track mode for procuring varied material, especially assorted ammunition, missiles and ordnance. The Army has maintained that its 85 per cent of its procurement were done through Indian companies.

To keep a soldier deployed on the heights, winter clothing, tents, heating appliances, ration are among the material that are sent to forward locations. There are about 80 items stocked for soldiers, including vast amounts of kerosene, diesel and petrol, which provide heat and fuel vehicles.

The Army spends an estimated Rs 15 lakh a year to keep a soldier on heights ranging from 15,000ft to 18,000ft. The cost excludes weapon and ammunition, information on which is classified.

Military observers believe that massive deployment, up to three division-level strength on those heights through the winter, is incurring a huge cost. And if the situation does not improve, it will continue into the next year.

“It means, large scale deployment on the LAC will be a ‘new normal’ with the existing trust deficit between the two military,” said an official.

It is notable that the Chinese People's Liberation Army is learnt to have withdrawal close to 10,000 troops from the Tibet region, close to the Indian territory in Ladakh due to extreme weather conditions in the sector and difficulties in maintaining them at those high-altitude region.

<https://www.theweek.in/news/india/2021/01/13/centre-allocates-additional-funds-to-army-to-deal-with-chinese-aggression.html>

Thu, 14 Jan 2021

Synchronising efforts, says Afghanistan on NSA Ajit Doval's quiet Kabul visit

NSA Ajit Doval also met President Ashraf Ghani and "discussed cooperation in countering terrorism and strengthening a regional consensus on the Afghan peace process", Afghan chargé d'affaires Tahir Qadiry said on Twitter

By Rezaul H Laskar

India's National Security Adviser Ajit Doval on Wednesday made a previously unannounced visit to Afghanistan for talks on strategic issues with the leadership in Kabul against the backdrop of a spike in violence blamed on the Taliban.

The Afghan national security council said Doval and his counterpart Hamdullah Mohib held "extensive conversations on issues of strategic mutual interest, including on synchronising efforts to combat terrorism and build peace". It didn't give further details.

Doval, who is on a two-day visit, also met President Ashraf Ghani at the presidential palace in Kabul and "discussed cooperation in countering terrorism and strengthening a regional consensus on the Afghan peace process", Afghan chargé d'affaires Tahir Qadiry said on Twitter.



NSA Ajit Doval's visit to Kabul comes at a time the troubled Afghan peace process between the government and the Taliban is very delicately poised. (Hindustan Times/Vipin Kumar)

The visit comes at a time when the troubled Afghan peace process between the government and the Taliban is very delicately poised, especially in the wake of a sharp surge in violent attacks blamed on the militant group.

A growing number of civilians in influential positions and human rights activists have been assassinated across Afghanistan in recent weeks, and Kabul and other major cities have been witnessing almost daily bomb attacks. Countries in the region are closely watching the situation to see if the incoming Biden administration in the US makes any major changes in the approach to Afghanistan.

There was no official word from the Indian side on Doval's visit.

India has consistently backed an Afghan-led, Afghan-owned and Afghan-controlled peace process and said that the gains made in the war-torn country in the past two decades must be preserved. New Delhi has also said any solution in Kabul must ensure that Afghan territory isn't used for terrorism directed against India.

The Afghan NSA met US chargé d'affaires Ross Wilson on Tuesday and discussed the ongoing peace efforts, reforms in the Afghan National Defence and Security Forces and joint efforts related to the security situation.

Mohib has also been travelling to countries in the region to shore up support for Afghanistan in the peace process. Last month, he travelled to Azerbaijan and Iran for talks on the regional security situation.

While in Tehran, Mohib met his Iranian counterpart Ali Shamkhani and foreign minister Javad Zarif and held wide-ranging discussions about enhancing bilateral relations on security, trade, economic and transit issues. Mohib also told his Iranian interlocutors of the need to boost neighbourly relations and “combat common threats based on mutual confidence”.

<https://www.hindustantimes.com/india-news>



Thu, 14 Jan 2021

'Shakti': Indian Army major makes world's first flexible bulletproof vest for both male and female combatants

The flexible design means that the ballistic jacket will be able to absorb the impact and reduce or stop penetration to the torso from firearm-based projectiles and shrapnel from explosions

An Indian Army major has now indigenously developed the world's first bulletproof jacket, meant to be used by both male and female combatants. The ballistic vest, dubbed 'Shakti', made by Major Anoop Mishra is also the world's first flexible body armour.

News agency ANI on Wednesday (January 13) posted a notification of the same and informed that the vest is the world's first universal bulletproof jacket. The post also contained a photo of Major Anoop Mishra displaying the bullet-resistant vest worn by a fellow personnel of the armed forces.



"Indian Army's Major Anoop Mishra has indigenously developed world's first universal bulletproof jacket 'Shakti' which can be used by both male and female combatants. The jacket is also the world's first flexible body armour," the news agency tweeted.

In the photo, Major Anoop Mishra can be seen proudly displaying the ballistic jacket on his colleague.

The 'Shakti' flexible bulletproof vest is expected to be an incredibly useful addition to the inventory of body armours for the Indian Army. The flexible design means that the ballistic jacket will be able to absorb the impact and reduce or stop penetration to the torso from firearm-based projectiles and shrapnel from explosions.

The 'Shakti' armour is also unisex and universal, meaning that it can be worn by both male and female combatants anywhere, in any ranks of the armed forces, bringing in added protection against rifle ammunition or explosion shrapnels for the troops.

It is a good year for defence-related indigenous technology for India. In a related development, the Defence Research and Development Organisation (DRDO) developed India's first indigenous machine pistol ASMI.

These machine pistols are in the class of the Uzi series guns of Israel. They are capable of firing at a distance of 100 meters.

The machine pistol prototype, developed by the DRDO, has fired more than 300 rounds in the last four months of its development.

Earlier this month, Union Minister of State for Defence Shripad Naik had sworn that the central government will ensure that "the best of weapons and protective armour" are provided to the soldiers.

The minister had noted that these bullet-proof jackets are an indigenous product manufactured under the 'Make in India' initiative and that India is soon set to be a global hub for supply of such defence items.

The minister said the bulletproof jackets have been appreciated by Indian soldiers who are using them on the borders and in countering insurgency.

<https://www.freepressjournal.in/india/shakti-indian-army-major-makes-worlds-first-flexible-bulletproof-vest-for-both-male-and-female-combatants>



Thu, 14 Jan 2021

Indian Army officer develops 'microcopter' for tracking terrorists inside buildings

The microcopter has been developed by Lieutenant Colonel GYK Reddy.

New Delhi: An Indian Army officer has indigenously developed a 'microcopter' which can be used by the Army to carry out surveillance inside a building or room in which terrorists are hiding.

The microcopter has been developed by Lieutenant Colonel GYK Reddy.

The trials of the microcomputer have been successfully carried out by a Para Special Forces battalion in Jammu and Kashmir and further improvements are being carried out on the micro drone.

Indian Army has signed a contract for acquiring the Switch drone for surveillance along the borders. The vertical take off and landing drone has the capability to fly for two hours at a maximum altitude of 4,500 metres, according to Mohit Bansal, Idea Forge. The firm had also developed the Netra drone a few years ago with DRDO.

These were displayed at an event to showcase the internal innovation by the Indian army in Delhi.

<https://www.newindianexpress.com/nation/2021/jan/13/indian-army-officer-develops-microcopter-for-tracking-terrorists-inside-buildings-2249668.html>



For representative purposes only (Photo | Amit Bandre, Express Illustrations)



Thu, 14 Jan 2021

Indian Army to get Made-In-India Drones for Ladakh; will sign Rs 140 crore deal with IdeaForge for SWITCH UAVs

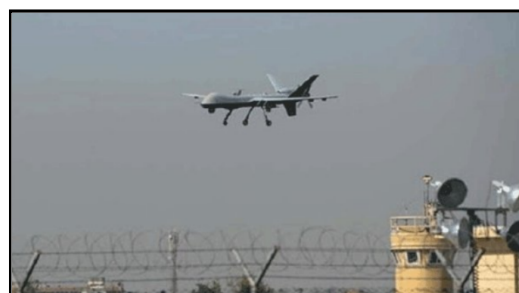
The Indian Army will sign a Rs 140 crore deal with the Navi Mumbai-based Indian company for SWITCH UAVs, Livefist reports, adding that the number of drones to be supplied as part of this deal is likely to be in hundreds.

The 6.5 kilogram SWITCH drone is capable of vertical take-off, has an endurance of around 2 hours and an operational range of 15 kilometers. The UAV can be launched from an altitude of up to 4,000 meters above mean sea level and has a maximum operating altitude of around 1,000 meters above ground level.

“IdeaForge...has perfected its drone along high-stakes military standards right from having high flight time...stability, automation, easy use and deployment, vertical take-off and landing, etc. It can be setup and put in the air from virtually anywhere (even at high altitudes). The entire Ground Control Station including the drone, fits in a single bag,” the company said in a blog post in March 2020.

To be built in Maharashtra, hundreds of these drones will be delivered to the Indian Army under fast-track protocols at a time when the security situation along the Line of Actual Control has forced the Indian Army to ramp up surveillance. According to Livefist, the order will be completed over the next year.

<https://www.defenceaviationpost.com/2021/01/indian-army-to-get-made-in-india-drones-for-ladakh-will-sign-rs-140-crore-deal-with-ideaforge-for-switch-uavs/>



ThePrint

Thu, 14 Jan 2021

Strike Corps reorientation comes for Ladakh but Army needs larger restructuring

At last the Army has recognised that it is China, and not Pakistan, that is the principal threat to India's national security

By Lt Gen H S Panag (Retd)

A crisis is an opportunity riding a dangerous wind' goes a Chinese proverb. The Chinese-perpetrated crisis in Eastern Ladakh seems to have inspired the Indian Army to seize the opportunity to initiate structural and organisational reforms. Without much ado, it has given directions for 1 Corps — one of the three mechanised forces, predominant Strike Corps focussed on Pakistan — to be restructured and reoriented as the second Mountain Strike Corps for Ladakh. 17 Mountain Strike Corps will now become the strategic reserve dedicated only to the Northeast, and it will be restructured into three-four Integrated Battle Groups, or IBGs.

This move signals that, at last, the Army has recognised that it is China, and not Pakistan, that is the principal threat to India's national security. However, it also allows the flexibility of using the Mountain Strike Corps against Pakistan in Jammu and Kashmir/Western Ladakh. One sincerely hopes that this does not remain a one-off change but becomes part of larger, holistic reforms for optimisation of the Army through restructuring and reorganisation. The Army is still based on World War-II organisations, living with incremental changes tailored to the wars of the 20th century. We need to come to terms with strategic compulsions that will influence the way we engage in future conflicts/wars.



Army Chief General M M Naravane addresses an annual press conference at the Manekshaw Centre in New Delhi on 12 January 2021 | Vijav Verma| PTI

The strategic compulsions

- Nuclear weapon armed States cannot engage in decisive conventional wars.
- Conflict/wars will be fought below the nuclear threshold, will be driven by high-technology and limited in time and space. For this type of conflict/war, agile and multi-capability formations are required.
- Indian economic compulsions do not permit any substantial increase in the defence budget in the near future. Currently, the bulk of the defence budget goes in sustaining a manpower-intensive army.

And this is why the restructuring of our mechanised and infantry formations becomes important.

Restructuring of mechanised and infantry formations

We are an infantry predominant army, organised in 17 Mountain Divisions (including three, otherwise designated as Infantry Divisions) and 18 Infantry Divisions (including 4-6 Reorganised Plains Infantry Divisions, or RAPID, which also have an armoured brigade in lieu of an infantry brigade). In addition, we have some Independent Infantry Brigades. The mechanised formations are organised into three Armoured Divisions, 18-20 Independent Armoured/Mechanised Brigades, including those part of RAPIDs. All Infantry Divisions operating in plains and two Mountain Divisions also have an armoured regiment. The divisions operate under 14 Corps, seven each for mountains and plains.

A decision has already been taken to reorganise the divisions into tailor-made Integrated Battle Groups, or IBGs, with varying numbers of combat arms and combat support units dictated by the mission and terrain. All modern armies have or are in an advanced stage of adaption to these organisations. The PLA has already implemented this concept in the form of Combined Arms Brigades. India's progress has been painfully slow and needs to be expedited. Unfortunately, the basic fighting units of the IBGs — armoured regiments and infantry battalions — continue to be organised as they were 80 years ago. We seem to have discounted our own war-fighting experience and the impact of technology. The organisations have become part of regimentation, and the fighting arms remain smug and revel in status quo.

An infantry battalion has four rifle companies of 120 soldiers each. In addition, it has specialist platoons for mortars and anti-tank guided missiles apart from a logistics subunit. Based on the World War experience, particularly causality rates, and the advent of modern technology, all modern armies have switched to a three, instead of four-rifle company system and provide armour protection with Infantry Combat Vehicles (ICV) or Armoured Personnel Carriers (APC). Our own experience supports this change.

In Kargil War, we suffered 527 killed (462 were due to actual combat) and 1,363 wounded. Thirty infantry battalions took part in the operations. Since 90 per cent of casualties are suffered by the infantry, mathematically, on an average, each battalion suffered 16 killed and 41 wounded, that is just 6 per cent of the unit strength of 800 personnel. As a defending and defeated army, Pakistan suffered approximately 453 killed and 665 wounded, out of nearly six infantry battalions in the battle, that is about 20 per cent of the total strength. These figures justify adopting the three-

company system. Modern weapon systems and reconnaissance/surveillance resources further reinforce the logic.

We have 390 infantry battalions (including 10 Scouts Battalions), nine Para Special Forces Battalions, five Para Battalions, 63 Rashtriya Rifles Battalions and 40 Assam Rifles Battalions. If all/most of these are reorganised on basis of three rifle companies, we can spare approximately 50,000 troops, giving us enough infantry battalions for at least 12-18 IBGs, with 4-6 Infantry Battalions each. Alternatively, this manpower could be utilised to meet other shortfalls or be simply reduced.

An armoured regiment in the Indian Army has 45 tanks since 1940, organised into three squadrons and four troops each, with 14 and 3 tanks respectively. Regimental Headquarters has three tanks and Squadron Headquarters two tanks each. Since those days, tank design has undergone revolutionary changes in terms of mobility, protection and firepower. Our war experience makes a very strong case for reducing the number of tanks to 31, that is 10 tanks per squadron with three troops of three tanks each, and one tank each for squadron commander and regimental commander. Infantry Combat Vehicles (ICVs)/Armoured Personnel Carriers (APCs) can be used for command and control by the regimental/squadron second-in-command and adjutant.

The maximum number of tanks lost by a regiment in 1965 or 1971 wars has been only 15. In the battle of Chawinda in 1965, out of 225 tanks in the battle, as part of five armoured regiments, we lost only 29 (we were on the offensive). Pakistan, out of its 150 tanks, lost 44. In the battle of Asal Uttar, 1965, (we were on the defensive) out of the 135 tanks, we lost only 10-14. Pakistan, out of its 220 tanks, lost 99, that is 20 tanks per regiment, primarily due to flawed tactics and boggy terrain. The biggest of tank battles of the 1971 War was at Basantar, where we lost 10-14 tanks and Pakistan 46, once again a higher number for Pakistan due to the flawed tactics adopted.

We have approximately 70 armoured regiments, including those that are being raised. If these are reorganised on the basis of 31 tanks, 980 tanks will be available, which is equivalent to 32 armoured regiments organised on 31-tank basis, enough for 16 IBGs at scale of two regiments per IBG.

Similarly, there is scope for reducing one ICV per ICV platoon in mechanised infantry battalions, that is 9 ICVs per battalion. With 50 mechanised infantry battalions, 450 ICVs will become available, enough for nine additional mechanised infantry battalions.

On a transparent battlefield, unprotected infantry cannot carry out any movement without incurring heavy casualties. Hence, in a gradual manner, all infantry battalions operating in the plains and relevant terrain of Ladakh and the Northeast must be equipped with a simple, cost-effective wheeled APC.

The above restructuring/reorganisation will enable us to switch to the IBG concept, fulfilling 100 per cent requirement of fighting arms, including the formations in Ladakh and the Northeast. A similar exercise can be carried out for combat support arms and combat support services. However, in respect of these, it is their need-based allotment as per mission and terrain which is relevant and not placing them under command.

It is time for the Army to get out of inertia and restructure, reorganise and modernise for wars of 21st century, and it can be done from within. Of course, modernisation must also continue. Concentration is a principle of war. In future battles/wars, what matters is agile and usable combat potential at the point of decision and not a huge elephantine mass per se.

(Lt Gen H S Panag PVSM, AVSM (R) served in the Indian Army for 40 years. He was GOC in C Northern Command and Central Command. Post retirement, he was Member of Armed Forces Tribunal. Views are personal.)

<https://theprint.in/opinion/strike-corps-reorientation-comes-for-ladakh-but-army-needs-larger-restructuring/584936/>

India is eager to deploy French Dassault Rafale Fighter Jets

New Delhi has confirmed that the delivery of the second batch of planes could take place in the next few weeks

By Peter Suci

Here's What You Need to Remember: New Delhi has been eager to acquire new fighters to replace the antiquated MiGs, and the Rafales have been seen as the clear cut winner at this point. The Rafale can perform air supremacy, interdiction, aerial reconnaissance, ground support, in-depth strike, anti-ship strike and nuclear deterrence missions.

Indian Air Force (IAF) officials headed last week to France to check on the progress of the second batch of Dassault Rafales jet fighters, which could soon be deployed to guard the country's northeastern border with China. India, which has ordered thirty-six of the twin-engine, canard delta wing, multirole fighter aircraft, received the first batch on Sept. 10 and immediately deployed those to the Ladakh region.



New Delhi has confirmed that the delivery of the second batch of planes could take place in the next few weeks, and the officials were sent to France to ensure that the IAF will be able to ramp up as both India and China continue to build up forces along the Line of Actual Control (LAC).

IAF Chief RKS Bhadauria told reporters that the additional three to four jets could arrive by the end of October or early in November, and added, "This will keep happening every three to four months," and further indicated that New Delhi might be interested in purchasing more of the aircraft.

"In terms of whether we go in for more Rafale or multirole fighter aircraft, it will be an open competition, as it is currently planned. We have received the RFI (Request for Information) responses. So this entire subject is under discussion and debate. And when this situation and the picture becomes clear and we finalize the way forward, we will share with you," Bhadauria said in an address to the media at the beginning of this month.

The entire batch of the original order of the thirty-six aircraft is expected to be operational by early 2023. This was the first major acquisition of fighter planes in some twenty-three years since the IAF imported Russian-built Sukhoi jets.

All in With the Rafale

The IAF had been considering other multirole fighter aircraft and the other candidates for the Indian tender included the Saab Gripen from Sweden, the European Eurofighter Typhoon, the MiG-35 from Russia and the Boeing F/A-18 Super Hornet from the United States.

The IAF, which has maintained just thirty fighter squadrons, has relied on aircraft that are often older than the pilots flying the planes – and many aren't what could be considered favored by those pilots. The IAF operates some 244 1960s-vintage MiG-21s and 84 MiG-27s that are only slightly younger. The MiG-21s are known to be quite "accident-prone," and since the first of 874 MiG-21s entered Indian service in 1963, around 490 have crashed, killing around 200 pilots.

New Delhi has been eager to acquire new fighters to replace the antiquated MiGs, and the Rafales have been seen as the clear cut winner at this point. The Rafale can perform air supremacy, interdiction, aerial reconnaissance, ground support, in-depth strike, anti-ship strike and nuclear deterrence missions. A group of IAF pilots is now undergoing training on the Rafale jets at the Saint-Dizier airbase in eastern France.

<https://nationalinterest.org/blog/reboot/india-eager-deploy-french-dassault-rafale-fighter-jets-176272>

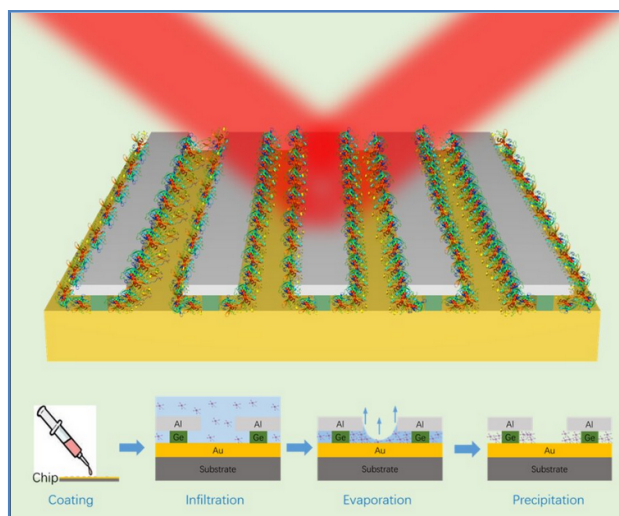
High-sensitivity nanophotonic sensors with passive trapping of analyte molecules in hot-spots

Optical sensors can quantitatively analyze chemical and biological samples by measuring and processing the optical signals produced by the samples. Optical sensors based on infrared absorption spectroscopy can achieve high sensitivity and selectivity in real time, and therefore play a crucial role in a variety of application areas such as environmental sensing, medical diagnostics, industrial process control and homeland security.

In a new paper published in *Light: Science & Applications*, a team of scientists, led by Dr. Peter Q. Liu from the Department of Electrical Engineering, the State University of New York at Buffalo, have demonstrated a new type of high-performance optical sensor which can utilize the surface tension of liquid to concentrate and trap analyte molecules at the most sensitive locations of the device structure, and hence significantly enhance the sensitivity performance. Based on a metal-insulator-metal sandwich structure which also features nanometer scale trenches, the sensor can passively retain and concentrate an analyte solution in these tiny trenches as the solution gradually evaporates on the sensor surface, and eventually trap the precipitated analyte molecules inside these trenches. As the light intensity is also highly enhanced in these trenches by design, the interaction between light and the trapped analyte molecules is drastically enhanced, leading to a readily detectable optical signal (i.e. changes in the light absorption spectrum) even at picogram level of analyte mass.

In general, different molecular species absorb infrared light at different frequencies, and therefore one can identify and quantify the detected molecules by analyzing the observed absorption lines in the spectrum. Although such molecular absorption is intrinsically weak, optical sensors can drastically enhance the molecular absorption by employing suitable nanostructures on the device surface to confine light into very small volumes (so called hot-spots), which leads to very large light intensity. In doing so, each molecule in the hot-spots can absorb much more light in a given time interval than a molecule outside the hot-spots, which makes it possible to measure very low quantity of chemical or biological substances with high reliability, if enough molecules are located in the hot-spots. This general approach is also called surface enhanced infrared absorption (SEIRA).

However, a key issue for most SEIRA optical sensors is that the hot-spots only occupy a tiny portion of the entire device surface area. On the other hand, the analyte molecules are usually randomly distributed on the device surface, and hence only a small fraction of all analyte molecules are located in the hot-spots and contribute to the enhanced light absorption. "The SEIRA



Top: schematic of the optical sensor design with trapped molecules. Bottom: schematic showing the process of concentrating and trapping molecules in a solution. Credit: Xianglong Miao, Lingyue Yan, Yun Wu and Peter Q. Liu

signal would be much larger if most of the analyte molecules can be delivered into the hot-spots of an optical sensor. This is the key motivation of our optical sensor design." Dr. Liu said.

"There are techniques, such as optical tweezers and dielectrophoresis, which can manipulate small particles or even molecules and deliver them to target locations such as the hot-spots. However, these techniques requires significant amount of energy input and are also complicated to utilize." Dr. Liu added, "What we set out to explore is a device structure that can trap analyte molecules precipitated out of a solution into the hot-spots in a passive (requiring no energy input) and effective way, and we realized that we can make use of the surface tension of liquid to achieve this goal."

In additional to the demonstration of high-sensitivity biomolecule sensing, the team also conducted another set of experiments, which showed that the same type of device structure also achieved effective trapping of liposome particles (~100nm characteristic dimension) in the tiny trenches. This means such optical sensors can be optimized for detecting and analyzing nano-objects such as viruses or exosomes, which have similar sizes as the liposomes used in the experiments.

The scientists believe that the demonstrated SEIRA optical sensor design strategy can be applied to other types of optical sensors as well. Besides sensing applications, such device structures can also be used for manipulating nanoscale objects including exosomes, viruses and quantum dots.

More information: Xianglong Miao et al, High-sensitivity nanophotonic sensors with passive trapping of analyte molecules in hot spots, *Light: Science & Applications* (2021). DOI: [10.1038/s41377-020-00449-7](https://doi.org/10.1038/s41377-020-00449-7)

Journal information: [Light: Science & Applications](https://phys.org/news/2021-01-high-sensitivity-nanophotonic-sensors-passive-analyte.html)
<https://phys.org/news/2021-01-high-sensitivity-nanophotonic-sensors-passive-analyte.html>



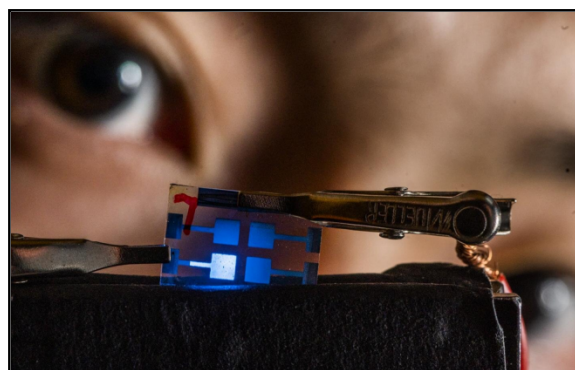
Thu, 14 Jan 2021

Blue light means big progress for perovskite-based LEDs

Researchers at Linköping University, Sweden, have developed efficient blue light-emitting diodes based on halide perovskites. "We are very excited about this breakthrough," says Feng Gao, professor at Linköping University. The new LEDs may open the way to cheap and energy-efficient illumination.

Illumination is responsible for approximately 20% of global electricity consumption, a figure that could be reduced to 5% if all light sources consisted of light-emitting diodes (LEDs). The blue-white LEDs currently in use, however, need complicated manufacturing methods and are expensive, which makes it more difficult to achieve a global transition.

LEDs manufactured from halide perovskites could be a cheaper and more eco-friendly alternative for both illumination and LED-based monitors. Perovskites are a family of semiconducting materials defined by their cubic crystal structure. They have good light-emitting properties and are easy to manufacture. Using elements from the halogen group, i.e. fluorine, chlorine, bromine and iodine, perovskites can be given properties that depend on the chemical composition of the crystal.



Researchers at Linköping University, Sweden, have developed efficient blue light-emitting diodes based on halide perovskites. Credit: Thor Balkhed

LEDs for green and red light have already been created with perovskites, but one color, blue, has so far been lacking, making it impossible to achieve white light.

"Blue light is the key to bringing light-emitting perovskites to practical applications. Our most recent breakthrough is one step on the way," says Feng Gao, professor at the Department of Physics, Chemistry and Biology at Linköping University.

Feng Gao's research group, in collaboration with colleagues in Lund, Great Britain, Germany, China and Denmark, has managed to create halide perovskites that give stable emission in the wavelength range 451-490 nanometres—corresponding to deep blue to sky blue colors. Max Karlsson is doctoral student at Linköping University and joint first author of the article now published in *Nature Communications*. He says:

"Metal-halide perovskites are easily color-tuneable over the whole visible spectrum by simple alloying. Unfortunately, and a blue LED turns green during operation. We have found a method that can prevent this color shift by controlling the film crystallization dynamics when creating the perovskite. These findings pave the way for stable perovskite alloys, not only for LEDs but also for solar cells."

The challenge of creating blue light in perovskites is that it requires a chemical composition with a large fraction of chloride, which makes the perovskite unstable. Blue perovskite-based LEDs have previously been created with using what is known as the "quantum confinement technique," which gives low-intensity LEDs with poor efficiency. However, stable perovskites with the desired amount of chloride can be created with the aid of the "vapor-assisted crystallization technique." Furthermore, the Linköping University researchers have achieved an energy efficiency of up to 11% for the blue perovskite-based LEDs.

"We have shown that blue light-emitting diodes based on halide perovskites can be both efficient and stable across a broad spectrum, without using quantum confinement. We have managed to create one of the most efficient blue perovskite-based LEDs so far known," says Weidong Xu, postdoc at Linköping University.

The science of perovskites is a relatively new research field that has aroused major international interest, since it offers a great potential for developing cheap and efficient materials. Feng Gao, however, is quick to point out that the work they have done is basic research, and applications are still some way off in future.

"Perovskite LEDs are a young technology and have some way to go before they see the light of day. Currently, the short lifetime and poor performance of blue LEDs are the main obstacles for perovskite light-emitting diodes before they can start to compete with existing technologies such as light-emitting diodes based on organic and inorganic semiconductors. We will keep working on that to make PeLEDs comparable to the other technologies," says Feng Gao.

More information: Max Karlsson et al, Mixed halide perovskites for spectrally stable and high-efficiency blue light-emitting diodes, *Nature Communications* (2021). [DOI: 10.1038/s41467-020-20582-6](https://doi.org/10.1038/s41467-020-20582-6)

Journal information: [Nature Communications](https://phys.org/news/2021-01-blue-big-perovskite-based.html)
<https://phys.org/news/2021-01-blue-big-perovskite-based.html>

Bound-charge engineering: A new strategy to develop nanowire transistors

By Ingrid Fadelli

In recent years, physicists and electronic engineers have been trying to identify materials that could be used to fabricate new types of electronic devices. One-dimensional (1-D) and two-dimensional (2-D) materials have been found to have particularly advantageous characteristics, particularly for the development of new generations of nanoelectronics (electronic components at the nano scale).

Such 1-D and 2-D materials, such as graphene, monolayer molybdenum disulfide, silicon nanowires and silicon nanosheets, could also play a crucial role within the semiconductor industry, as they could help to develop increasingly small transistors. Transistors are the basic building blocks of many modern electronic devices, which can store and control bits of binary information (i.e., zeroes and ones).

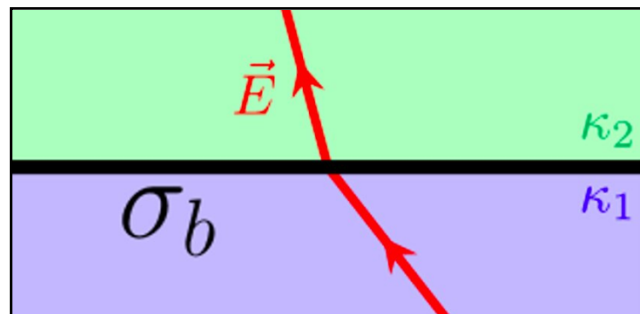
Despite their well-documented advantages, emerging low-dimensional materials can have a relatively small amount of so-called free charges compared to 3-D materials. In the context of electronic components, a free charge is an electron or hole (i.e., lack of an electron in an atomic lattice that acts as a positively charged electron) that is not tightly bound to the atomic lattice and is therefore able to move around freely throughout a material in response to external fields and applied voltages. Free charges have a number of important functions, one of which is their contribution to what is known as the screening effect.

In fact, free charges can redistribute themselves to create sharp electric potential profiles in both materials and devices, including in transistors. Therefore, the greater the number of free charges that material possesses, the sharper the resulting electric potential. This particular function is especially crucial for the development of tunnel field-effect transistors, which heavily rely on the quantum tunneling of electrons across junctions.

Researchers at McGill University and NanoAcademic Technologies have recently identified a strategy that could compensate for the lack of free charges observed in both 1-D and 2-D materials. In their paper, published in *Physical Review Letters*, they proposed the use of this strategy, which is based on the engineering of bound charges, to develop silicon nanowire transistors.

"The tunnel field-effect transistor has much lower power dissipations than conventional transistors, making it a promising candidate for low-power electronics," Raphaël Prentki, one of the researchers who carried out the study, told Phys.org. "For a tunnel field-effect transistor with sharper electric potential at the tunneling junction, the junction becomes more traversable, leading to improved device performance. We thus aimed to find a way to compensate for the lack of free charges in low-dimensional materials."

There are two types of charges in materials, namely free and bound charges. As their name suggests, free charges are loosely bound to atomic nuclei and free to move around, which makes them easy to manipulate with electric fields and voltages. In contrast, bound charges are tightly bound to atomic nuclei and can only move within atoms. While these charges have been identified



A simplified version of Fig. 1.(a) from the researchers' paper. Caption: When an electric field (\vec{E}) is incident on the interface (black line) between two materials (blue and green regions) with distinct permittivity values (κ_1 and κ_2), a surface bound charge (σ_b) forms on that interface. Credit: Prentki et al.

hundreds of years ago, they are not generally considered or applied when designing transistors or other electronic devices.

In their study, Prentki and his colleagues devised a method to engineer bound charges in electronic devices in an advantageous way. They refer to this design strategy as "bound-charge engineering."

"Specifically, using Maxwell's equations, it can be shown that when an electric field traverses the interface between two materials, bound charge forms on that interface," Prentki said. "Furthermore, the amount of bound charge is proportional to the magnitude of the electric field, as well as the difference between the permittivities of the two materials. Permittivity is a material property that quantifies how much a material polarizes in response to an external electric field."

Prentki and his colleagues showed that surface bound charges at the interface between two regions of an electronic device can be controlled by tuning the electric field and choosing materials with suitable permittivity values. To create better tunnel field-effect transistors, the researchers propose surrounding part of the tunneling junction with a low-permittivity oxide, as this enables the formation of bound charge. In their paper, they considered this strategy for fabricating a transistor made of silicon nanowire.

In existing state-of-the-art transistor designs, the silicon nanowire is surrounded by an oxide with a high permittivity, such as hafnium dioxide, which enables a high gate capacitance. Prentki and his colleagues, on the other hand, propose the idea of surrounding the region of the nanowire close to the tunneling junction using silicon dioxide, an insulator with a value of permittivity that is only 3.8 times greater than the permittivity of air.

"In our design, the bound charge at the nanowire-oxide interface complement free charges in the screening effect, resulting in a sharper tunneling junction," Prentki said. "This results in a bound-charge-assisted tunnel field-effect transistor with an on-state current over 10 times higher than non-bound-charge-assisted transistors, which could enable its practical application in computing devices at higher clock frequencies."

Prentki and his colleagues showed that bound-charge engineering can be used to control the size of depletion regions at the junction between two regions of field-effect transistors. This is particularly true for the place where the "source" and "channel," or "channel" and "drain" regions of a field-effect transistor meet. In other words, bound charges can be used to support free charges in enabling a stronger screening effect in transistors.

"Our work introduces a general method to engineer bound charges to our advantage in materials and devices," Prentki said. "This is especially useful in emerging one-dimensional and two-dimensional materials. For example, bound-charge engineering offers significant performance boosts in silicon nanowire tunnel field-effect transistors."

In their recent paper, the researchers proved that their strategy for controlling the size of depletion regions can be used to improve the performance of a specific type of low-power field-effect transistor, namely, a tunnel field-effect transistor. In their next studies, they will experimentally test the feasibility of their strategy, using it to realize a real tunnel field-effect transistor.

"Our investigation was purely simulation-based," Prentki explained. "Although we used a state-of-the-art simulation method, only a solid, real-world realization of the device can prove beyond doubt that the concept of bound-charge engineering really works."

In addition to proving the feasibility of bound-charge engineering for creating better performing tunnel field-effect transistors using nanowires, the researchers would now like to apply their strategy to other areas of nanoelectronics. For instance, they would like to test its effectiveness for downscaling specific types of transistors.

"Bound-charge engineering is a very general idea established by basic laws of electromagnetism," Prentki added. "Thus, in principle, it is not limited to applications in the fields of nanoelectronics and transistor design. Therefore, we would also like to apply this concept to

other fields of research where bound charge and screening may be important, such as molecular electronics, electrochemistry and artificial photosynthesis."

More information: Nanowire transistors with bound-charge engineering. *Physical Review Letters*(2020). DOI: [10.1103/PhysRevLett.125.247704](https://doi.org/10.1103/PhysRevLett.125.247704)

Journal information: [Physical Review Letters](https://phys.org/news/2021-01-bound-charge-strategy-nanowire-transistors.html)

<https://phys.org/news/2021-01-bound-charge-strategy-nanowire-transistors.html>



Thu, 14 Jan 2021

New cathode material for high-performing sodium ion batteries could benefit large scale energy storage

ANSTO contributed to a large international collaboration on advanced sodium ion batteries led by French researchers, which provides a direction for the design of high-performing sodium ion electrodes. Advanced sodium ion batteries could be used for large scale energy storage.

A new type of electrode material with a high energy density that is also moisture stable was synthesized and characterized by the researchers using a range of techniques. The material, $O_3\text{-NaLi}_{1/3}\text{Mn}_{2/3}\text{O}_2$, is a sodium-rich layered oxide that did not show voltage fading on cycling.



ANSTO Instrument scientist Dr. Max Avdeev, who is also affiliated with the University of Sydney, has expertise in the characterisation of materials for lithium and sodium ion batteries and other advanced energy materials, was a co-author of the paper published in *Nature Materials*.

Credit: Australian Nuclear Science and Technology Organisation (ANSTO)

Avdeev collected neutron diffraction data was collected using the Echidna high-resolution diffractometer operated at ANSTO's Australian Centre for Neutron Scattering to elucidate the distribution of metals in the structure. The data, which reveals the position of the metal atoms during cycling, was combined with other experimental and computational techniques.

"Neutron diffraction is highly sensitive to light elements, such as lithium and sodium, which provides crucial insights into crystal structure of functional materials," said Avdeev.

More information: Qing Wang et al. Unlocking anionic redox activity in O_3 -type sodium 3d layered oxides via Li substitution, *Nature Materials* (2021). DOI: [10.1038/s41563-020-00870-8](https://doi.org/10.1038/s41563-020-00870-8)

Journal information: [Nature Materials](https://phys.org/news/2021-01-cathode-material-high-performing-sodium-ion.html)

<https://phys.org/news/2021-01-cathode-material-high-performing-sodium-ion.html>

Coronavirus: Can COVID-19 increase risk of Alzheimers? Here's what research has to say

Can COVID-19 increase risk of Alzheimer's?

The novel coronavirus has been associated with many long term health issues, ranging from organ damage to prolonged and chronic diseases. While medical professionals and scientists are investigating every aspect of the deadly virus, a team of researchers has been establishing the link between COVID-19 and Alzheimer's.

Alzheimer's disease is a neurological disorder that causes the brain cells to die and results in memory loss. Over time, it can take over and destroy a person's thinking capabilities, leading to the inability to perform the simplest of tasks. That said, while COVID-19 has the potential to trigger brain dysfunctions, it is likely that it can also increase the possibilities of long term neurological problems such as Alzheimer's in people.



Impact of COVID-19 on brain and associated symptoms

As a result of COVID-19, patients suffered from mild to severe inflammations, strokes and seizures in the brain. Individuals who have recovered from the infection have also complained of experiencing mental confusion, headaches, dizziness and blurred vision during and after the course of their recovery. That said, the prevalence of neurological symptoms such as headache and mental confusion in COVID-19 patients can suggest a link between the SARs-COV-2 and Alzheimer's disease.

The link between COVID-19 and Alzheimer's

A review published in Alzheimer's & Dementia: the Journal of the Alzheimer's Association has tried establishing the possible link between COVID-19 and Alzheimer's. According to the researchers, the onset of the symptoms in people with the disease appears at or around the age of 60. Experts believe that the majority of people will survive the impact of COVID. However, in the long run, they might have to tackle various diseases such as dementia, disability and a poor quality of life.

What does research say?

In a bid to understand the long- and short-term implications of COVID-19 on the brain, representatives from over 30 countries and Alzheimer's association, along with a little help from the World Health Organization, have come together to investigate the link. They have also taken upon themselves to study the underlying causes of Alzheimer's and dementia in general.

While the coronavirus has the tendency to trigger various brain disorders, it also has the potential to cause serious inflammation in the brain, leading to dysfunctions that can destroy brain cells, hence leading to memory loss.

<https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/coronavirus-can-covid-19-increase-risk-of-alzheimers-heres-what-research-has-to-say/photostory/80247588.cms?picid=80247591>

