Nov
2020

समाचार पत्रों से चयित अंश
Newspapers Clippings

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खंड : 45 अंक : 260 10 नवंबर 2020

Vol.: 45 Issue : 260 10 November 2020

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Raksha Mantri Shri Rajnath Singh Unveils A-Sat Missile Model in DRDO Bhawan

A model of Anti Satellite (A-SAT) Missile installed inside the DRDO Bhawan premises was unveiled today by Raksha Mantri Shri Rajnath Singh in the august presence of Minister for Road Transport and Highways, Shri Nitin Gadkari and Secretary DDR&D & Chairman DRDO, Dr G Satheesh Reddy.

'Mission Shakti' was country's first ever Anti-Satellite (ASAT) Missile Test successfully conducted on 27th March 2019 from Dr AP J Abdul Kalam Island in Odisha, where a fast-moving Indian orbiting target satellite in Low Earth Orbit (LEO) was neutralised with pinpoint accuracy. This was a highly complex mission, conducted at extremely high speed with remarkable precision.

The successful conduct of Mission Shakti made India the fourth nation in the world with the capability to defend its assets in outer space.

On this occasion, Raksha Mantri Shri Rajnath Singh appreciated the innovative accomplishment of the team of scientists.

Secretary DDR&D & Chairman DRDO, Dr G Satheesh Reddy stated that the installation of the A-SAT model will inspire the DRDO fraternity to take up many more such challenging missions in future.

Earlier Shri Rajnath Singh and Shri Nitin Gadkari witnessed the demonstration of Fire Detection and Suppression System (FDSS) for Passenger Buses. Demonstrations were given on Water Mist Based FDSS for Passenger Compartment and Aerosol Based FDSS for engine fire.

DRDO's Centre for Fire Explosive and Environment Safety (CFEES), Delhi has developed the technology, which can detect the fire in passenger compartment in less than 30 sec and then suppresses it in 60 sec thereby reducing the risk to life and property to a significant extent.

Shri Gadkari expressed satisfaction over the technology and wished to take it forward.

https://pib.gov.in/PressReleasePage.aspx?PRID=1671442

Press Information Bureau
Government of India

రక్షణ మంత్రిత్వ శాఖ

Mon, 09 Nov 2020 5:22PM

డిఆర్‌డిఒ భవన్‌లో ఎ-శాట్ మిసైల్ మోడల్‌ను ప్రారంభించిన కేంద్ర రక్షణ శాఖమంత్రి శ్రీరాజ్‌నాథ్ సింగ్

డి.ఆర్.డి.ఒ ప్రాంగణంలో ఏర్పాటు చేసిన ఉపగ్రహ వ్యతిరేక(ఎ-శాట్) క్షిపణి నమూనాను రక్షణ మంత్రి రాజ్‌నాథ్ సింగ్ ఈరోజు ఆవిష్కరించారు. కేంద్ర రోడ్డు రవాణా, జాతీయరహదారుల శాఖమంత్రి శ్రీ నితిన్‌గడ్కరి, డిడిఆర్ అండ్ డి కార్యదర్శి, డిఆర్‌డిఒ ఛైర్మన్ శ్రీ సతీష్ రెడ్డిల సమక్షంలో ఆయన దీనిని ఆవిష్కరించారు.

మనదేశం పరీక్షించిన తొలి ఉపగ్రహ వ్యతిరేక క్షిపణి (ఎ-శాట్) పరీక్ష పేరు మిషన్ శక్తి. ఈ పరీక్షను 2019 మార్చి 27న ఒడిషాలోని డాక్టర్ ఎపిజె అబ్దుల్ కలామ్ దీవులనుంచి ఈ పరీక్ష నిర్వహించారు. ఇందులో వేగంగా తిరుగుతున్న తక్కువ ఎత్తు భూ కక్ష్యలోని ఉపగ్రహాన్ని అత్యంత ఖచ్చితత్వంతో నిర్వీర్యం చేశారు. ఇది చాలా సంక్లిష్టమైన వ్యవహారం. దీనిని అత్యంత వేగంతో అత్యంత ఖచ్చితత్వంతో చేపట్టడం జరిగింది.

మిషన్ శక్తిని విజయవంతంగా నిర్వహించడంతో , అంతరిక్షానికి ఆవల ఆస్తుల సంరక్షణ సామర్థ్యాన్ని సంపాదించుకున్న దేశాలలో ప్రపంచంలోనే నాలుగోదేశంగా ఇండియా సమకూర్చుకున్నట్టయింది.

ఈ సందర్భంగా రక్షామంత్రి శ్రీ రాజ్‌నాథ్ సింగ్ ఈ వినూత్న విజయానికి కారకులైన శాస్త్రవేత్తల బృందాన్ని అభినందించారు.

డిడిఆర్,డి కార్యదర్శి, డిఆర్‌డిఒ ఛైర్మన్ డాక్టర్ జి.సతీష్‌రెడ్డి మాట్లాడుతూ, ఎ-శాట్ నమూనాను ఏర్పాటు, డిఆర్‌డిఒ సిబ్బందికి ప్రేరణగా నిలుస్తుందని, భవిష్యత్తులో ఇలాంటి మరిన్ని సవాళ్లతో కూడిన మిషన్‌లను చేపట్టడానికి ప్రేరణనిస్తుంద ని అన్నారు.

అంతకు ముందు శ్రీ రాజ్‌నాథ్ సింగ్, శ్రీ నితిన్ గడ్కరీలు ప్యాసింజర్ బస్సులలో అగ్ని ప్రమాదాన్ని గుర్తించి , మంట లు ఆర్పివేసే విధానాన్ని పరిశీలించారు. ఇంజిన్ మంటలే ఆర్పే విషయంయలో ఏరోసెల్ ఆధారిత ఎఫ్‌డిఎస్ ఎస్, పాసింజర్ కంపార్టమెంట్ ప్రమాదాలకు నీటి మంచు బిందువుల ఆధారిత ఎఫ్‌డిఎస్‌ఎస్‌లకు సంబంధించిన ప్రదర్శననను వారు తిలకించారు.

డిఆర్‌డిఒ కు చెందిన సెంటర్ ఫర్ ఫైర్ ఎక్స్‌ప్లోసివ్, ఎన్విరాన్‌మెంట్ సేఫ్టీ (సిఎఫ్ ఇఇఎస్) ఢిల్లీ, ఈ సాంకేతిక ప రిజ్ఞానాన్ని అభివృద్ధి చేసింది. పాసింజర్ బస్సులలో అగ్ని ప్రమాదాన్ని 30 సెకండ్ల వ్యవధిలోపలే ఇది ఇది గుర్తించి 60 సెకన్లలో మంటలను అదుపులోకి తెస్తుంది. దీనివల్ల ప్రాణ నష్టం ,ఆస్తినష్టం చెప్పుకోదగిన స్థాయిలో తగ్గించడానికి వీలు క లుగుతుంది. కేంద్ర మంత్రి నితిన్ గడ్కరీ ఈ సాంకేతిక పరిజ్ఞానంపట్ల సంతృప్తి వ్యక్తం చేసి, దీనిని మరింత ముందుకు తీసుకువెళ్లవలసిందిగా కోరారు.

https://pib.gov.in/PressReleasePage.aspx?PRID=1671505

Press Information Bureau
Government of India

Ministry of Road Transport & Highways

Mon, 09 Nov 2020 4:18PM

Raksha Mantri and Road Transport Ministers witnesses demonstration of DRDO Developed Fire Detection and Suppression System (FDSS) for Passenger Buses

Raksha Mantri Shri Rajnath Singh and Minister for Road Transport and Highways Shri Nitin Gadkari witnessed the demonstration of Fire Detection and Suppression System (FDSS) developed by DRDO for Passenger Buses at DRDO Bhawan here today 09 Nov 2020. Demonstrations were given on Water Mist Based FDSS for Passenger Compartment and Aerosol Based FDSS for engine fire. They were also briefed about the various other programs and systems.

DRDO's Centre for Fire Explosive and Environment Safety (CFEES), Delhi has developed the technology, which can detect the fire in passenger compartment in less than 30 sec and then suppresses it in 60 sec thereby reducing the risk to life and property to a significant extent. The FDSS for passenger compartment comprises of a water tank of 80 litre capacity, a 6.8 kg nitrogen cylinder pressurized to 200 bar installed at appropriate location in the bus and a network of tubing with 16 number of atomizers inside the passenger compartment. The FDSS for engine comprises of aerosol generator with which the fire suppression could be achieved within 5 sec of the system activation.

CFEES has unique competency in the areas of fire risk assessment, fire suppression using different extinguishing mediums, modelling and simulation. They have developed system for Battle tanks, ships and submarines. The active fire protection system has been developed by CFEES as a defence spin-off technology for providing a solution to the fire incidents in passenger buses. Although, the fire threat is present in all the vehicles, the highest concern emanates from special vehicles particularly the school buses and the sleeper coaches for long distance travel. As on date, only the engine fire is regulated for fire safety.

Raksha Mantri Shri Rajnath Singh appreciated the innovative accomplishment of the team of scientists.

Minister for Road Transport and Highways Shri Nitin Gadkari described the development of FDSS as a very significant step towards Bus Passenger Safety. He expressed satisfaction over the

fact that fire safety has drawn attention of DRDO and said that it would be very important to take forward the development.

Secretary DDR&D & Chairman DRDO Dr G Satheesh Reddy congratulated DRDO scientists for the endeavour.

https://pib.gov.in/PressReleasePage.aspx?PRID=1671417

पत्र सूचना कार्यालय
भारत सरकार

सड़क परिवहन एवं राजमार्ग मंत्रालय

Mon, 09 Nov 2020 4:18PM

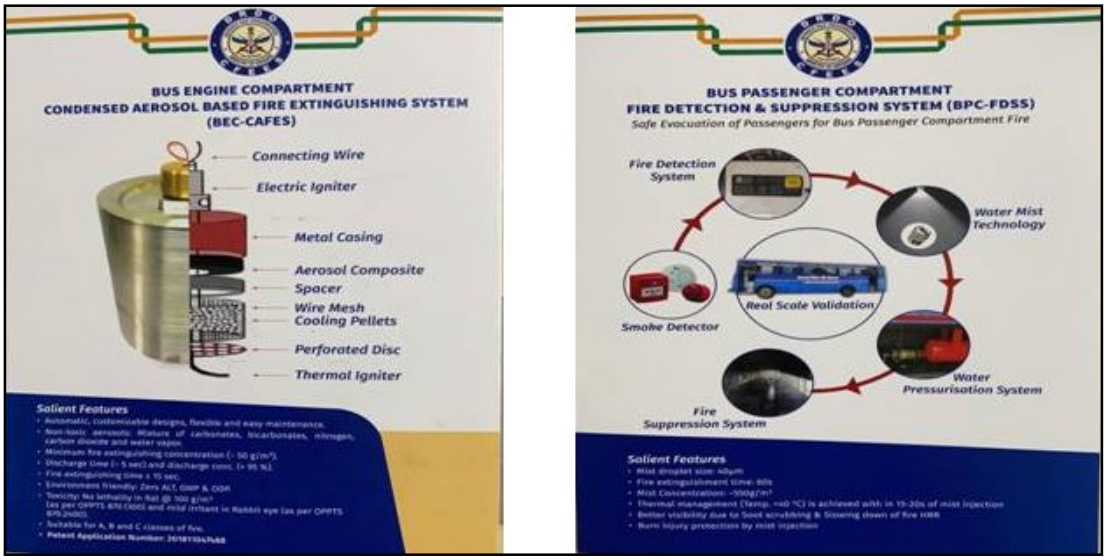
रक्षामंत्री और सड़क परिवहन एवं राजमार्ग मंत्री ने यात्री बसों में इस्तेमाल हेतु डीआरडीओ द्वारा विकसित आग का पता लगाने और उसे बुझाने वाले यंत्र (एफ़डीएसएस) का अवलोकन किया

रक्षामंत्री श्री राजनाथ सिंह और सड़क परिवहन एवं राजमार्ग मंत्री श्री नितिन गडकरी ने यात्री बसों में इस्तेमाल हेतु डीआरडीओ द्वारा विकसित आग का पता लगाने और उसे बुझाने वाले यंत्र (एफ़डीएसएस) का आज, 9 नवंबर, 2020 को डीआरडीओ भवन में अवलोकन किया। यात्री कम्पार्टमेंट में जल आधारित जबकि इंजन में लगने वाली आग पर ऐरोसॉल आधारित एफ़डीएसएस का प्रदर्शन किया गया। उन्हें विभिन्न अन्य कार्यक्रमों और प्रणालियों के बारे में भी जानकारी दी गई।

डीआरडीओ के दिल्ली स्थित अग्नि, विस्फोटक एवं पर्यावरण सुरक्षा केंद्र (सीएफईईएस) प्रयोगशाला द्वारा विकसित इस तकनीक की मदद से यात्री कम्पार्टमेंट में लगने वाली आग का महज़ 30 सेकेंड के भीतर पता लगाया जा सकता है और उसके 60 सेकेंड के भीतर उसे बुझाया जा सकता है। इससे जान और माल की बड़े पैमाने पर सुरक्षा की जा सकती है। यात्री कम्पार्टमेंट के लिए एफ़डीएसएस के अंतर्गत 80 लीटर

पानी की क्षमता वाला टैंक होगा और 200 बार तक दबाव क्षमता वाला 6.8 किलोग्राम का नाइट्रोजन सिलेंडर बस में उपयुक्त स्थान पर लगाया जाएगा, जो 16 स्वचालित बिन्दुओं वाले ट्यूब से जुड़ा रहेगा। इंजन के लिए एफ़डीएसएस ऐरोसॉल उत्पादित करेगा जो सक्रिय होने के महज़ 5 सेकेंड के भीतर ही आग को बुझाने में सक्षम होगा।

अग्नि, विस्फोटक एवं पर्यावरण सुरक्षा केंद (सीएफईईएस) प्रयोगशाला आग से जुड़े जोखिमों का आकलन और आग बुझाने के लिए विभिन्न तकनीक के संबंध में दक्षता रखता है। इस प्रयोगशाला ने युद्धक टैंक, जलपोतों और पनडुब्बियों के लिए भी अग्निशमन यंत्र विकसित किए हैं। यात्री बसों के लिए विकसित की गई तकनीक को भी रक्षा उद्देश्यों से बनाए जाने वाले यंत्र के स्तर का विकसित किया है। आग लगने की आशंका आमतौर पर सभी प्रकार के वाहनों में होती है लेकिन स्कूल बसों और लंबी दूरी वाली स्लीपर यात्री बसों में आग की दुर्घटनाएं बड़े पैमाने पर जान और माल के नुकसान का कारण बनती हैं इसलिए इन्हें लेकर विशेष चिंताएं व्यक्त की जाती रही हैं। अब तक इंजन में लगने वाली आग को ही अग्नि सुरक्षा नियामक दायरे में लाया गया है।



रक्षामंत्री श्री राजनाथ सिंह ने इन तकनीक के विकास के लिए वैज्ञानिकों के दल की सराहना की।

सड़क परिवहन और राजमार्ग मंत्री श्री नितिन गडकरी ने एफ़डीएसएस के विकास को यात्री बसों में सुरक्षा के लिए बहुत महत्वपूर्ण बताया। उन्होंने इस पर संतोष व्यक्त किया कि आग लगने की घटनाओं पर डीआरडीओ का भी ध्यान गया है। उन्होंने कहा कि इस विकसित तकनीक को आगे ले जाना भी बेहद महत्वपूर्ण है।

इस अवसर पर डीआरडीओ के अध्यक्ष और डीडीआर एंड डी सचिव डॉ. जी सतीश रेड्डी ने इस प्रयास के लिए डीआरडीओ के वैज्ञानिकों को बधाई दी।

https://www.pib.gov.in/PressReleseDetail.aspx?PRID=1671483

Tue, 10 Nov 2020

Defence Minister Rajnath Singh unveils Anti-Satellite Missile model in DRDO Bhawan

Rajnath Singh appreciated the innovative accomplishment of the team of scientists

Edited By Pushkar Tiwari

Highlights

- ***The 'Mission Shakti' was country's first-ever Anti-Satellite (ASAT) Missile Test successfully conducted on March 27, 2019, from Dr AP J Abdul Kalam Island in Odisha.***
- ***This was a highly complex mission, conducted at extremely high speed with remarkable precision.***
- ***Secretary DDR&D & Chairman DRDO, G Satheesh Reddy was also present and stated that the installation of the A-SAT model will inspire the DRDO fraternity to take up many more such challenging missions in future.***

New Delhi: A model of Anti Satellite (A-SAT) Missile installed inside the DRDO Bhawan premises was unveiled by Defence Minister Rajnath Singh in the presence of Minister for Road Transport and Highways, Nitin Gadkari on Monday (November 9, 2020).

Rajnath Singh appreciated the innovative accomplishment of the team of scientists.

File Photo

Secretary DDR&D & Chairman DRDO, G Satheesh Reddy was also present and stated that the installation of the A-SAT model will inspire the DRDO fraternity to take up many more such challenging missions in future.

This is to be noted that the 'Mission Shakti' was country's first-ever Anti-Satellite (ASAT) Missile Test successfully conducted on March 27, 2019, from Dr AP J Abdul Kalam Island in Odisha, where a fast-moving Indian orbiting target satellite in Low Earth Orbit (LEO) was neutralised with pinpoint accuracy. This was a highly complex mission, conducted at extremely high speed with remarkable precision.

The successful conduct of Mission Shakti made India the fourth nation in the world with the capability to defend its assets in outer space.

Earlier in the day, Rajnath Singh and Nitin Gadkari also witnessed the demonstration of Fire Detection and Suppression System (FDSS) for Passenger Buses. Demonstrations were given on Water Mist Based FDSS for Passenger Compartment and Aerosol Based FDSS for an engine fire.

The DRDO's Centre for Fire Explosive and Environment Safety (CFEES), Delhi has developed the technology, which can detect the fire in the passenger compartment in less than 30 sec and then suppresses it in 60 sec thereby reducing the risk to life and property to a significant extent.

Gadkari expressed satisfaction over the technology and wished to take it forward.

https://zeenews.india.com/india/defence-minister-rajnath-singh-unveils-anti-satellite-missile-model-in-drdo-bhawan-2323565.html

जागरण

Tue, 10 Nov 2020

राजनाथ सिंह और नितिन गडकरी ने एंटी सैटेलाइट मिसाइल सिस्टम के मॉडल का किया उद्घाटन

केंद्रीय रक्षा मंत्री राजनाथ सिंह और नितिन गडकरी ने रक्षा अनुसंधान एवं विकास संगठन (DRDO) मुख्यालय में एंटी सैटेलाइट मिसाइल सिस्टम के मॉडल का उद्घाटन किया जिसे राष्ट्रीय उन्नति के प्रतीक के रूप देखा जा रहा है

By Dhyanendra Singh

नई दिल्ली: रक्षा अनुसंधान एवं विकास संगठन (DRDO) ने यात्री बसों के लिए आग का पता लगाने वाली और आग बुझाने वाली प्रणाली (FDSS) विकसित की है। सड़क परिवहन एवं राजमार्ग मंत्रालय ने कहा कि केंद्रीय सड़क परिवहन मंत्री नितिन गडकरी और रक्षा मंत्री राजनाथ सिंह ने सोमवार को डीआरडीओ भवन में एफडीएसएस का प्रदर्शन देखा। यह एक ऐसी प्रणाली है, जो बसों में आग लगने का 30 सेकेंड से कम समय में पता लगा सकती है और इसे 60 सेकेंड में बुझा सकती है। इस तरह जानमाल के नुकसान के जोखिम को काफी हद तक कम किया जा सकता है।

केंद्रीय रक्षा मंत्री राजनाथ सिंह और नितिन गडकरी ने रक्षा अनुसंधान एवं विकास संगठन (DRDO) मुख्यालय में एंटी सैटेलाइट मिसाइल सिस्टम के मॉडल का उद्घाटन किया जिसे राष्ट्रीय उन्नति के प्रतीक के रूप देखा जा रहा है ।

मंत्रियों को अन्य कई कार्यक्रमों और प्रणालियों के बारे में भी जानकारी दी गई। गडकरी ने एफडीएसएस के विकास को बस यात्रियों की सुरक्षा की दिशा में अत्यंत महत्वपूर्ण कदम करार दिया। उन्होंने इस बात पर संतोष व्यक्त किया कि डीआरडीओ का ध्यान आग से सुरक्षा की ओर गया।

स्मार्ट कार्ड से सफर होगा और आसान

बता दें कि सरकार इन दिनों सड़क परिवहन और राजमार्ग मंत्रालय यातायात सुविधाओं पर तेजी से काम कर रही है। कुछ दिन पहले ही केंद्रीय मंत्री नितिन गडकरी ने परिवहन सेवा के लिए एक कार्ड के लिए तकनीक विकसित किए जाने की बात कही थी, जिसे अगले छह महीनें में लॉन्च कर दिया जाएगा। केंद्र सरकार स्मार्ट सफर को जल्द ही पूरे देश में लॉन्च किए जाने की योजना भी बना रही है। स्मार्ट सफर के साथ ही एक कार्ड के माध्यम से ही मेट्रो और बस पर आसानी से सफर किया जा सकेगा।

https://www.jagran.com/news/national-rajnath-singh-and-nitin-gadkari-inaugurates-model-of-anti-satellite-missile-system-at-drdo-headquarters-21045355.html

Outlook

Tue, 10 Nov 2020

DRDO develops fire detection and suppression system for passenger buses

New Delhi: The Defence Research and Development Organisation (DRDO) has developed for passenger buses a technology called "Fire Detection and Suppression System (FDSS)", a statement said.

Union Road Transport Minister Nitin Gadkari and Defence Minister Rajnath Singh on Monday witnessed here at the DRDO Bhawan the demonstration of FDSS -- a technology which can detect fire in buses in less than 30 seconds and extinguish it in 60 seconds, the Ministry of Road Transport and Highways said.

Demonstrations were given on water mist-based FDSS for passenger compartment and aerosol-based FDSS for engine fire, it said and added that the ministers were briefed about the various other programmes and systems.

"DRDO"s Centre for Fire Explosive and Environment Safety (CFEES), Delhi has developed the technology, which can detect the fire in passenger compartment in less than 30 seconds and then suppresses it in 60 seconds thereby reducing the risk to life and property to a significant extent," the statement said.

The FDSS for passenger compartment comprises a water tank of 80 litre capacity, a 6.8 kg nitrogen cylinder pressurised to 200 bar installed at appropriate location in the bus and a network of tubing with 16 number of atomizers inside the passenger compartment, the statement said.

The FDSS for engine comprises of aerosol generator with which the fire suppression could be achieved within 5 seconds of the system activation.

The statement said CFEES has unique competency in the areas of fire risk assessment, fire suppression using different extinguishing mediums, modelling and simulation.

It has developed system for battle tanks, ships and submarines.

The active fire protection system has been developed by CFEES as a defence spin-off technology for providing a solution to the fire incidents in passenger buses, it said.

Although, the fire threat is present in all the vehicles, the highest concern emanates from special vehicles particularly the school buses and the sleeper coaches for long distance travel, the statement said adding as on date, only the engine fire is regulated for fire safety.

Gadkari described the development of FDSS as a very significant step towards bus passenger safety.

He expressed satisfaction over the fact that fire safety has drawn attention of the DRDO and said that it would be very important to take forward the development.

(Disclaimer: This story has not been edited by Outlook staff and is auto-generated from news agency feeds. Source: PTI)

https://www.outlookindia.com/newsscroll/drdo-develops-fire-detection-and-suppression-system-for-passenger-buses/1972994

ANI
South Asia's Leading Multimedia News Agency

Tue, 10 Nov 2020

Rajnath, Gadkari witness demonstration of DRDO's FDSS for passenger bus safety

New Delhi: Defence Minister Rajnath Singh and Minister for Road Transport and Highways Nitin Gadkari witnessed the demonstration of the Fire Detection and Suppression System (FDSS) developed by the Defence Research and Development Organisation (DRDO) for passenger buses, at DRDO Bhawan on Monday.

Rajnath, Gadkari witness demonstration of DRDO's FDSS for passenger bus safety

Demonstrations were given on water mist based FDSS for the passenger compartment and aerosol-based FDSS for engine fire in front of the two Union Ministers.

The technology, which can detect the fire in the passenger compartment in less than 30 seconds and then suppresses it in 60 seconds thereby reducing the risk to life and property to a significant extent, has been developed by DRDO's Centre for Fire Explosive and Environment Safety (CFEES), Delhi.

The FDSS for the passenger compartment comprises of a water tank of 80 litre capacity, a 6.8 kg nitrogen cylinder pressurized to 200 bar installed at an appropriate location in the bus, and a network of tubing with 16 number of atomizers inside the passenger compartment. The FDSS for the engine comprises of the aerosol generator with which the fire suppression could be achieved within 5 sec of the system activation, as per the release.

While Singh appreciated the innovative accomplishment, Gadkari described its development as a significant step towards bus passenger safety. He also expressed satisfaction over the fact that fire safety has drawn the attention of DRDO and said that it would be very important to take forward the development.

Secretary DDR&D and Chairman DRDO, Dr G Satheesh Reddy also congratulated DRDO scientists for their success. (ANI)

https://www.aninews.in/news/national/general-news/rajnath-gadkari-witness-demonstration-of-drdos-fdss-for-passenger-bus-safety20201109202332/

livemint

Tue, 10 Nov 2020

Division within PAC delays Ladakh visit of parliamentarians

By Gyan Varma

- ***There are 22 members in the PAC including two vacant posts. Only 8 members expressed their willingness to visit Leh and also visit the DRDO facility. The senior members of the Indian Army were also supposed to brief the parliamentarians during the visit***

New Delhi: The divide between the ruling alliance and opposition in the prominent Public Accounts Committee (PAC) over the ongoing standoff between India and China has delayed the visit of parliamentarians to Ladakh as most of the members were not willing to visit Leh.

During a meeting of the PAC earlier last week, PAC chairperson Adhir Ranjan Chowdhury asked the 20 members of the parliamentary committee if they wanted to go to Ladakh to personally assess the preparedness of Indian army and other armed forces on the border standoff with China and winter wear availability to the personnel stationed there in severe conditions.

The members of the PAC had earlier planned to visit Ladakh in the last week of October but it got delayed due to recently concluded assembly polls in Bihar where some of the parliamentarians were involved in campaigning. File Photo: Mint

Out of the 20 members of PAC, only 8 members expressed their willingness to visit Leh and also visit the Defence Research and Development Organisation (DRDO) unitthere during the visit. The senior members of the Indian Army were also supposed to brief the parliamentarians during the visit.

“Out of the 22 members of the PAC, the ruling alliance along with like-minded parties is in a majority while two seats are vacant. The PAC chairperson has the right to decide these visits and his consultations with each member individually was a positive step of giving equal importance to members," said a person in the know of development.

The members of the PAC had earlier planned to visit Ladakh in the last week of October but it got delayed due to recently concluded assembly polls in Bihar where some of the parliamentarians were involved in campaigning. The visit was rescheduled for 7-8 November as the committee thought that more members would be willing to visit Ladakh after the polls were finished.

“The senior officers of Army have already briefed PAC members at least two-three times and have answered all the queries over the India China border dispute which has been going on since April. These briefing were supposed to continue in Leh during the visit of the PAC members. There was no visit planned to the forward areas or where the actual standoff is taking place," said a person in the know of development.

PAC members argue that the recent scrutiny over union government’s preparedness against the standoff with China started after the PAC took up a report of the Comptroller and Auditor General (CAG) on the preparedness of defence forces, especially availability of ration and winter clothing at heights.

“The CAG report had suggested lack of winter clothing and that is the trigger for the visit. Although members of the defence establishment have already made it clear that the army and all the other forces of defence are well equipped and prepared against China but the PAC chairperson expressed his desire to personally visit Ladakh and see these preparations first hand. The visit was cleared by the Army," said the person quoted above.

In the series of meetings that have taken place over the issue of India-China border standoff of the PAC, representatives of the defence ministry and senior officials of the Army have categorically stated that the forces are well prepared for the standoff and there was no question of lack of preparedness against any eventuality.

"This was not a pleasure trip that we wanted to visit Ladakh. PAC is one of the most important parliamentary committees and more discussions with Army was supposed to take place. The meeting was important but what can some members do if most of them are not willing to go," said a person in the know of development.

https://www.livemint.com/news/india/division-within-pac-delays-ladakh-visit-of-parliamentarians-11604894415713.html

Tue, 10 Nov 2020

DRDO की तकनीक 30 सेकेंड में यात्री बसों में आग का पता लगाएगी, 60 सेकेंड में बुझाएगी

DRDO ने 30 सेकेंड में यात्री बसों में आग का पता लगाने और 60 सेकेंड में बुझाने वाली तकनीक विकसित की है

नई दिल्ली: रक्षा अनुसंधान एवं विकास संगठन (DRDO) ने यात्री बसों के लिए आग का पता लगाने वाली और आग बुझाने वाली प्रणाली (FDSS) विकसित की है। यह जानकारी एक बयान में दी गई।

सड़क परिवहन एवं राजमार्ग मंत्रालय ने कहा कि केंद्रीय सड़क परिवहन मंत्री नितिन गडकरी (Nitin Gadkari) और रक्षा मंत्री Rajnath Singh ने सोमवार को डीआरडीओ भवन में एफडीएसएस का प्रदर्शन देखा। यह एक ऐसी तकनीक है जो बसों में आग लगने का 30 सेकंड से कम समय में पता लगा सकती है और इसे 60 सेकंड में बुझा सकती है।

बयान के मुताबिक मंत्रियों को अन्य कई कार्यक्रमों और प्रणालियों के बारे में भी जानकारी दी गई।

बयान में कहा गया कि, "डीआरडीओ के अग्नि, विस्फोटक और पर्यावरण सुरक्षा केंद्र (CFEES), दिल्ली ने प्रौद्योगिकी विकसित की है, जो यात्री डिब्बों में आग का 30 सेकंड से कम समय में पता लगा सकती है और इसे 60 सेकेंड में बुझा सकती है। इस तरह जानमाल के नुकसान के जोखिम को काफी हद तक कम किया जा सकता है।"

गडकरी ने एफडीएसएस के विकास को बस यात्रियों की सुरक्षा की दिशा में अत्यंत महत्वपूर्ण कदम करार दिया।

https://hindi.news18.com/news/nation/drdo-develops-fdss-for-passenger-buses-to-detect-fire-and-supress-it-3331647.html

Defence News

Defence Strategic: National/International

THE HINDU

Tue, 10 Nov 2020

LAC standoff | In Army talks, India and China exchanged disengagement proposals

Another round of talks likely this week to discuss them further

By Dinakar Peri

New Delhi: At the Corps Commander talks last week, India and China made broad proposals for disengagement in Eastern Ladakh and another round of talks is likely to take place later this week to discuss them further, an official source said on Monday.

An army convoy moves on Manali-Leh highway, in Manali. File | Photo Credit: PTI

"Broad proposals have been made by both sides and they will be discussed in another round of senior commander talks likely later this week," the source stated. Discussions were on to finalise the dates for the next round of talks.

The proposals are being discussed at the highest levels in the government, including the apex group on China policy, the China Study Group.

China has deployed around 50,000 troops along with tanks, armoured vehicles and air defences along the disputed boundary since the stand-off began in early May that has been matched by India.

Another official said there was an effort to pull back some of the vehicles and armoured components.

"The Chinese had suggested mutual withdrawal to certain distance behind, but that is not acceptable to us as it would put us in a disadvantage", a third source said.

Through harsh winter

With several rounds of military and diplomatic talks remaining inconclusive, both sides have built habitats and stocked up essentials to house the thousands of troops through the harsh winter. With passes still open, vehicle movement was still on and winter stocking was almost complete, but once the passes close, sustenance for forward areas would be only through air, the third source noted.

In addition, since the Indian Army occupied several dominating features that were lying vacant on the South Bank of Pangong Tso (lake) in August, China has been pressing for discussing South Bank first and other friction areas later. However, this has been rejected by India.

A joint statement stated that both sides agreed to "earnestly implement" the important consensus reached by leaders of the two countries, ensure their "front line troops to exercise restraint and avoid misunderstanding and miscalculation."

https://www.thehindu.com/news/national/lac-standoff-in-army-talks-india-and-china-exchanged-disengagement-proposals/article33059752.ece

Tue, 10 Nov 2020

Exclusive: China building new 'tunnels' for winter at border hotspot Doklam

China's intention to keep up access into Doklam comes at a time when India and China are in the middle of a stand-off in eastern Ladakh

By Vishnu som

New Delhi: China has stepped up its road construction activity in the Doklam plateau to ensure that all-weather access is maintained in the region, where India and China were involved in a nearly 70-day stand-off in 2017, indicates a satellite image accessed by NDTV.

China expanded 'tunnel' over its road into Doklam to ensure all-season access (Google Earth)

The August 2019 image here is of an over-ground 'tunnel' which shelters part of the key northern access route through the high-altitude Merug La pass.

A satellite image from October seen by this correspondent, indicates that Chinese construction workers have extended the length of the 'tunnel' on this stretch to 500 metres.

Army experts NDTV has spoken to, indicated that the goal is clear - to ensure that road access into the Doklam plateau is unrestricted through the winter months. The Doklam plateau is entirely snowed under during the winter months making access a challenge.

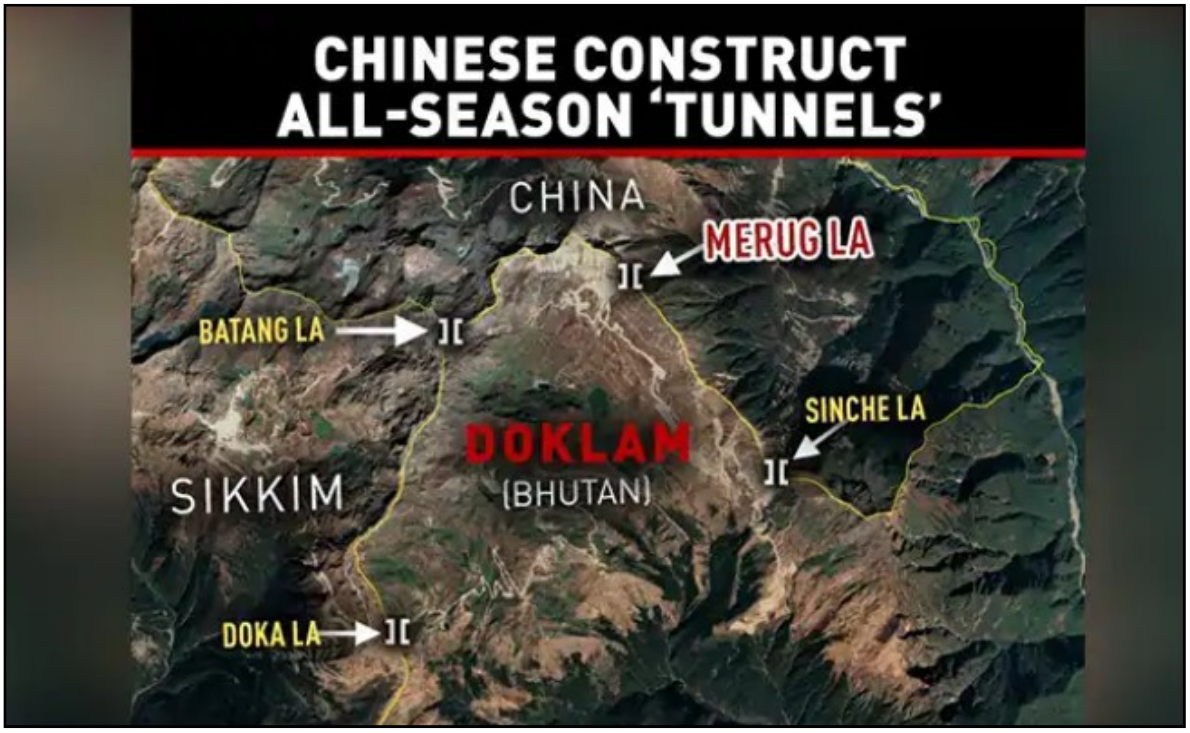
The Doklam plateau is claimed by both Beijing and Bhutan as their territory. India backs Bhutan's claim and in June 2017, Indian soldiers had crossed the Sikkim border to stop the construction of a Chinese road near the "Chicken's Neck", a thin strip that links India to its north-eastern states. The stand-off had continued for more than 70 days.

Since the 2017 India-China standoff, Beijing has tarred and reinforced its existing track in Doklam to make it an all-weather road. Courtesy: Google Earth

China's intention to keep up access to the disputed territory comes at a time when New Delhi and Beijing are in the middle of a stand-off in eastern Ladakh, where Chinese soldiers have made incursions at several stretches across the contested Line of Actual Control - the de facto border between the two countries.

Beijing has tarred and reinforced its existing track in Doklam. Courtesy: Google Earth

Despite eight rounds of military talks, there has been no comprehensive disengagement plan, which New Delhi and Beijing have agreed to and the unprecedented military stand-off appears set to continue through the winter months.



Access into Doklam, which is Bhutanese territory illegally claimed by Beijing comes through 4 key passes, Doka La, Batang La, Merug La and Sinche La. Courtesy: Google Earth

It is equally clear that China has surfaced and expanded its roadmap in the Doklam plateau, which lies between Sikkim and Bhutan.

What was mostly an all-weather track during the stand-off of 2017 has now been converted into a fully tarred road. India has also stepped up its road construction activity in the region, ensuring that its forces in the region can quickly be reinforced.

Over the last three years, China has more than doubled its total number of air bases, air defence positions and heliports near the Indian border, said a report by Stratfor, a leading global geopolitical intelligence platform.

"Once finished, this infrastructure will provide support for an even greater intensity of Chinese operations," the report said.

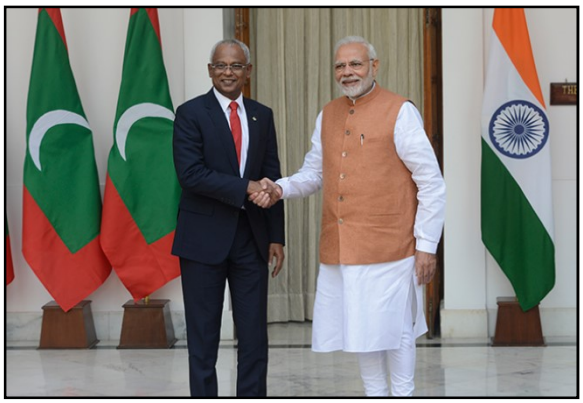
https://www.ndtv.com/india-news/exclusive-china-building-new-tunnels-for-winter-at-border-hotspot-doklam-2322890

Tue, 10 Nov 2020

‘Strategic comfort’ with the Maldives

By N Sathiya Moorthy

The visit of Foreign Secretary Harsh Vardhan Shringla to the Maldives is significant for taking forward bilateral relations. Under Maldivian President Ibrahim Solih, bilateral cooperation, especially on the economic front, has become a ‘model’ that New Delhi can adopt to make Prime Minister Narendra Modi’s ‘Neighbourhood First’ a sustained success.



India and the Maldives have had bilateral relations for centuries. Technology has made connectivity easier for everyday contact and exchanges. Maldivian students attend educational institutions in India and patients fly here for superspeciality healthcare, aided by a liberal visa-free regime extended by India.

Tourism is the mainstay of Maldivian economy. The country is now a major tourist destination for some Indians and a job destination for others. Given the geographical limitations imposed on the Maldives, India has exempted the nation from export curbs on essential commodities.

Through the decades, India has rushed emergency assistance to the Maldives, whenever sought. In 1988, when armed mercenaries attempted a coup against President Maumoon Abdul Gayoom, India sent paratroopers and Navy vessels and restored the legitimate leadership under Operation Cactus. The 2004 tsunami and the drinking water crisis in Male a decade later were other occasions when India rushed assistance. At the peak of the continuing COVID-19 disruption, India rushed $250 million aid in quick time. New Delhi also rushed medical supplies to the Maldives, started a new cargo ferry and also opened an air travel bubble, the first such in South Asia. It has promised more, as and when required.

Protests from the Yameen camp

Abdulla Yameen was in power when the water crisis occurred. Despite early strains in relations, India rushed help on a humanitarian basis. Now, the Yameen camp has launched an ‘India Out’ campaign against New Delhi’s massive developmental funding for creating physical, social and community infrastructure, and incumbent President Solih’s government retaining two India-gifted helicopters and their operational military personnel. Maldivian protesters recently converted their demand for early release of Mr. Yameen — sentenced to five years of imprisonment in a money laundering case, pending appeal — into one asking the Solih administration to ‘stop selling national assets to foreigners’, implying India. They forget that massive supplies of drinking water came only aboard Indian Navy vessels and the COVID-19 medicines were delivered aboard an Indian Air Force aircraft. Such assistance helps all Maldivians, including Mr. Yameen’s supporters. Likewise, the Yameen administration too had deployed the helicopters for humanitarian operations. It is against this background, given also Mr. Yameen’s tilt towards China and bias against India when in power, that the Solih administration’s no-nonsense approach towards trilateral equations provide ‘strategic comfort’ to India.

Some concerns

Yet, India should be concerned about the protests as well as the occasional rumblings within the ruling Maldivian Democratic Party (MDP) of Mr. Solih. Mohamed Nasheed, who was the nation’s first President elected under a multiparty democracy, now Parliament Speaker, continues to head the party, and had also named Mr. Solih as presidential candidate in 2018, but there are apparent strains between them. Mr. Nasheed’s going public on issues, including corruption charges against

ministers, that should have been raised at the highest-level could affect the MDP during the run-up to the 2023 presidential polls. Also, Mr. Nasheed's on-again-off-again call for a changeover to a 'parliamentary form of government' can polarise the over-politicised nation even more.

Despite this, India can take respite in the 'strategic comfort' of the 'India First' policy of the Solih government. Given this background and India's increasing geostrategic concerns in the shared seas, taking forward the multifaceted cooperation to the next stage quickly could also be at the focus of Mr. Shringla's visit.

https://www.orfonline.org/research/strategic-comfort-with-the-maldives/

The EurAsian Times

Tue, 10 Nov 2020

Russian Shipbuilder USC confirms interest to acquire Reliance Naval & Engineering Limited

Russia has confirmed that it is keenly looking forward to acquire the Indian shipbuilding company Reliance Naval and Engineering Limited (RNEL), which owns the Pipavav Shipyard in Gujarat. The Russian United Shipbuilding Corporation could finalize the deal this year only.

According to the defense news site Janes, the Russian embassy said in a statement that USC is currently auditing Mumbai-based RNEL and assessing potential investment opportunities.

"USC [has] passed the accreditation procedure, which provided access to electronic accounts with financial and economic documents related to the Indian company," said the embassy. "[USC] is currently conducting due diligence of RNEL's condition and assessing parameters of possible investments", added the embassy's statement.

Anil Ambani – Chairman RNEL. Via: Wikipedia

RNEL, which has a government permit to build warships, is being sold under the Insolvency and Bankruptcy Code (IBC) to recover unpaid dues of ₹43,587 crores.

Of this, the resolution professional (RP) has admitted ₹10,878 crores of dues of financial creditors while another ₹32,693 crore is under verification. Operational creditors have claimed another ₹1,922 crores from the company, of which only ₹485 crore has been admitted.

It has been reported in the past that the Russian United Shipbuilding Corporation is the only serious contender for the acquisition of RNEL. According to Janes, USC is anticipated to finalize its decision soon on whether to table a formal bid for the Indian naval shipbuilder.

"USC is expected to finalize its stance on further participation in the bidding procedure after completing the remote study of the documents provided by the debtor's trustee and the field review of the RNEL's assets by USC's specialists," it said.

In June 2010, PSL was awarded a ₹26 billion (US$360 million) contract to build five offshore patrol vessels for the Indian Navy. In July 2015, the Pipavav shipyard was chosen for a 'Make in India' naval frigate order. The order value exceeds more than USD 3 billion. This order is being termed as the private sector's biggest-ever warship-building project.

On 13 February 2017, Reliance Defence and Engineering Limited (RDEL) had signed the Master Ship Repair Agreement (MSRA) with the US Navy to maintain the vessels of its Seventh Fleet operating in the region, with the company estimating revenues of about Rs 15,000 crore ($2 billion) over next 3 –5 years.

The Seventh Fleet's area of responsibility includes the Western Pacific and the Indian Ocean and at any given time there are roughly 140 ships and submarines, 5070 aircraft, and approximately 20,000 sailors under its command. Currently, these vessels visit Singapore or Japan for such works.
https://eurasiantimes.com/russian-united-shipbuilding-to-acquire-major-indian-shipbuilding-firm/

The EurAsian Times

Tue, 10 Nov 2020

Faulty Chinese Military hardware is paving way for India to emerge as a global weapons exporter

By Rajesh Kumar Sinha

The world has long realized the limitation of Chinese goods and machinery, that there are question marks regarding the quality, durability, and overall performance of manufacturing in that country.

China has become the *global manufacturing hub*, mostly on account of its low-cost labor rather than any real qualitative or technological edge. However, new revelations regarding the trouble being faced by countries who have imported Chinese military equipment should really come as an eye-opener.

File Image: Chinese Amphibious Vessel Sinks

Recent reports have poured in from various parts of the world about countries being unhappy with the faulty Chinese military equipment, dumped by China under the garb of varied commercial defense deals with them.

From far away in Africa's Kenya that bought Chinese VN-4 Armoured Personnel Carriers (APC) reportedly had a number of mechanical defects, leading to the unfortunate death of some Kenyan army men while trying out a test firing.

Algeria witnessed a number of accidents involving Chinese CH-4 UCAV drones in the last six years. Jordan had even a much bitter experience as it was compelled to put on the Chinese CH-4 UCAV drones on sale after they failed all the required parameters of its military.

In Asia, Nepal bought six China-made Y12e and MA60 aircraft for its civil aviation sector. Interestingly, all such planes showed mechanical and operational defects and it was forced to put them in hanger lying unused for many months now.

Bangladesh, a country that is now getting extra attention from Xi Jinping in the aftermath of tensions with India, bought two 1970s Ming Class Type 035G submarines at a cost of US$ 100 million each, from China in 2017.

Rechristened as BNS Joyjatra and BNS Nobojatra, both developed defects and are lying unused. In 2020, it secured two Chinese 053H3 frigates, turned into BNS Umar Farooq and BNS Abu Ubaidah. Very soon, both faced issues like non-functioning navigation radar and gun systems.

Myanmar which has close politico-military relations with China too has expressed its displeasure on Chinese military equipment it has received. Its acceptance of the Indian naval submarine Sindhuvir, against Chinese wishes, should be seen in this larger context.

And not to forget the iron brother of China, Pakistan. It too has not escaped the Chinese machinations in terms of its commercial perfidy. The Pakistan Navy got refurbished Chinese frigates F22P but reportedly they have remained plagued with technical hitches.

Its army secured LY-80 LOMADS mobile missile systems from China but some of them have remained non-functional due to technical issues. Even in the civilian domain, the much-touted Lahore Metro Bus service that started in August this year, by a Chinese company, got technical glitches and issues like overheating of engines led to the suspension of its services for a few weeks.

And herein lies a lesson as well as an opportunity for India. The new India that is vying to become a self-reliant country with maximum goods and manufacturing being done indigenously, as part of *AtmaNirbhar India* is also looking towards creating a big, in-house niche defense industry that while catering to the nation's need will also export to other countries and earn a good amount of forex to help grow the national economy.

When that happens, it will be replicating the example of the Indian space sector led by ISRO that has not only become a big global space power but also is earning a lot of money by commercially launching satellites of many other countries.

Probably, a right thrust had been initiated when ISRO involved a number of big and small native companies in its space applications and development program. A separate commercial wing of *ISRO Antrix* has evolved to promote and market its products/services to global customers.

Following that example, recently the Indian government too has opened up the defense sector for private enterprises (wherein for many decades allowing private sector was a big taboo) for making different military equipment, machinery, vehicles by creating a new and innovation-driven defense policy.

Some of the very reputed Indian conglomerates who already are contributing to the hugely lucrative national defense manufacturing worth US $620 billion, are TATA, Mahindra & Mahindra, L&T, Hero Group, Bharat Forge besides, PSUs like HAL, BEL, BHEL, and a few start-ups.

There is no doubt that Indian companies, both the private sector as well as PSUs have much higher qualitative standards as against the Chinese companies. It is evident in the huge spurt in Indian armament exports recorded in recent years, a spectacular 700% growth from Rs 1,521 crore in 2016-17 to Rs 10,745 crore in 2018-19.

Though currently, major importers of Indian military hardware are Myanmar, Sri Lanka, and Mauritius, and a deft in diplomatic maneuvering and marketing could make the country securing important military contracts to nations like Vietnam, Mongolia, Philippines, Brazil, countries in Central Asia, and of course, many in Africa too.

A big focussed approach, backed by adequate government support, marketing, and diplomatic push could very well see Indian defense manufacturing making a big headway in the globally money-spinning security market and acquiring lucrative contracts.

That in turn, might also lead to greater political and diplomatic leverage for India in the global arena, helping it to secure its rightful place in the comity of nations. (*Views personal)*

https://eurasiantimes.com/faulty-chinese-military-hardware-is-paving-way-for-india-to-emerge-as-a-global-weapons-exporter/

Telangana Today

Tue, 10 Nov 2020

IIT-H professor's proposed Metals CO2 battery likely to come handy for Mars Mission

Sangareddy: An Indian Institute of Technology-Hyderabad (IIT-H) researcher's proposed work on Metals CO2 battery is likely to play a key role in Indian Mars Mission-2024.

Dr Chandra Shekhar Sharma, Associate Professor, Department of Chemical Engineering, has been awarded the prestigious Swarnajayanti Fellowship 2019-2020 for his proposed work on Metals CO2 battery. Dr Sharma will receive due support from DST (Department of Science and Technology) and SERB (Science and Engineering Research Board) to further develop this concept which can play a pivotal role in India's 2024 Mars Mission and fixing the CO2 emissions that cause global warming. The faculty member is also founder of Creative & Advanced Research Based On Nanomaterials (CARBON) Laboratory.

Congratulating Dr Chandra Shekhar Sharma on this notable recognition, Prof BS Murty, Director IIT-H said: "It is a proud moment for IITH. It is one of the most prestigious fellowships of the country and I am delighted the IIT-H has entered into the top league with this achievement of Dr Sharma. On behalf of the institute, I congratulate him for this achievement and wish him all the best in all his future endeavours. I am sure there are more such able faculty at the institute who can bring such laurels in near future."

This work chosen for this prestigious fellowship has two major aspects. First, an appropriate energy storage system especially suitable for the extreme environment which has always been a challenge for all space agencies including for the Next Mars mission planned for 2024. Since Mars atmosphere primarily consists of CO2, the broad objective of this concept is to scientifically explore and develop a working prototype of Metal (M)-CO2 battery technology to explore the feasibility of this technology in the Mars mission particularly for the surface landers and rovers by using the CO2 gas (95.32%) abundantly available in its atmosphere. Development of Metal-CO2 batteries will provide high specific energy density with the reduction in mass and volume which will help the reduction of payload mass and launch cost in planetary missions.

A real battery prototype will be developed as an outcome of this fellowship and organisations ISRO (Indian Space Research Organisation) and DRDO (Defense Research Development Organisation) will be brought on board in the early phase of the project for timely inputs for indigenous battery development for the Indian space mission.

The second important aspect of this work is to develop Metal-CO2 battery technology also as a promising clean strategy for restraining the climate effects of CO2 emissions on earth as we all know that it is one of the main reasons for global warming. For traditional CO2 fixation methods, large energy is required leading to more CO2 emissions. Metal-CO2 batteries have a great potential to offer significantly higher energy density than the currently used Li-ion batteries and provide a striking option to fix CO2 emissions & environmental protection also.

At the beginning of this year, Dr Sharma has proven the concept by using candle soot carbon as a cathode and tested the coin cell as assembled in a simulated Mars atmosphere. In this feasibility study, they observed that the cell performs significantly better in the Martian atmosphere as

compared to pure CO2 atmosphere. That's quite promising and encouraging. Based on these very initial results, he also filed an Indian patent in May this year. This is a technical breakthrough which shows for the very first time the feasibility of such a concept in Mars atmosphere and is just published in an International Journal, Materials Letters, as a featured Letter.

Talking about the motivation behind this proposed work, Dr Sharma who is also the Chairperson of Indian National Young Academy of Sciences (INYAS) said, "There are challenges for the success of Indian space mission to develop indigenous energy storage devices. Basic fundamental understanding of new materials and their chemistry for energy storage therefore becomes of paramount importance. An investment in basic fundamental research today will lead to new technology for the future energy security of the country and this research proposal is a small step towards that. The outcome of this project will not only utilize the CO2 atmosphere on Mars to develop more efficient energy storage systems for planetary missions but also facilitate in mitigating the global challenge of climate change".

https://telanganatoday.com/iit-h-professor-develops-metals-co2-battery-handy-for-indian-mars-mission-2024

PHYS.ORG

Tue, 10 Nov 2020

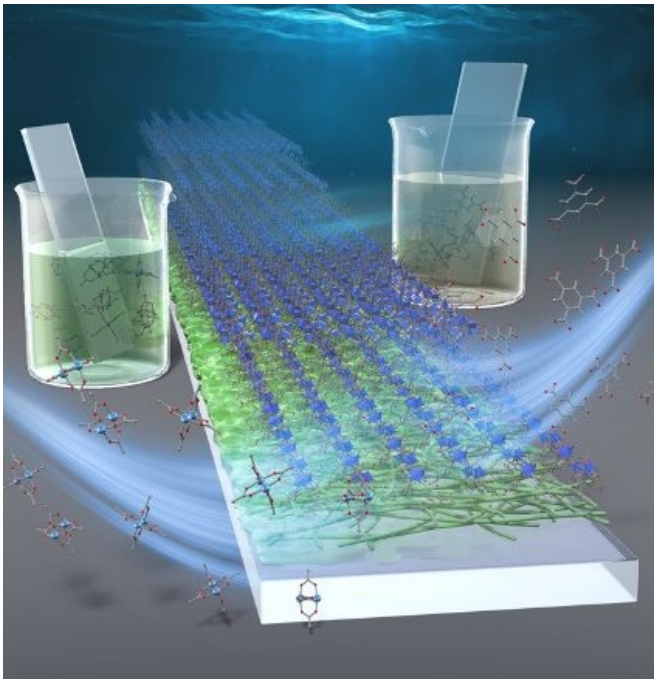
Coating plastics with porous nanofilm

Pore size in porous materials affects the property of the material. For example, small pores create more absorbent surface areas. Silica gel, which is often used in food packaging to soak up moisture, is one typical example.

Recent studies on porous materials have led to the development of new materials with designable pores, affording scientists with greater control over the properties of such materials.

MOF is a porous material made up of metal ions coordinated by organic linking molecules. Well-ordered nanopores in MOFs have potential applications in material science and pharmacology.

Despite a growing interest in MOFs, researchers have yet to establish an effective method for forming MOF into thin films. Most studies on MOF preparation focus exclusively on the powdered form. Forming MOF into thin films opens up its use for humidity sensing, gas sensing and resistive switching devices.



Credit: Tohoku University

Researchers from Tohoku University, Iwate University and the Japan Synchrotron Radiation Research Institute (JASRI) overcame this obstacle by controlling the growth of MOF into films. This involved a simple "layer-by-layer" method, which uses sequential immersing of substrates into ingredient solutions.

The research group chose four types of commonly used plastic materials as a substrate for MOF film growth. They cultivated the growth of MOF films on plastic materials such as nylon and acrylic resin.

"The facile and versatile fabrication techniques used in this study has opened up MOFs to new application fields such as sensors and memory devices," said Shunsuke Yamamoto, co-author of the study. "We hope our research serves as the starting point for using MOF films with electronic devices."

Further studies on the film growing mechanism are expected to provide important insights into the coating on flexible and transparent plastic substrates under ambient conditions.

More information: Hiroaki Ohara et al. Layer-by-Layer Growth Control of Metal-Organic Framework Thin Films Assembled on Polymer Films, *ACS Applied Materials & Interfaces* (2020). DOI: 10.1021/acsami.0c13016

Journal information: ACS Applied Materials and Interfaces

https://phys.org/news/2020-11-coating-plastics-porous-nanofilm.html

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Tue, 10 Nov 2020

Researchers propose source mask optimization technique in computational lithography

By Zhang Nannan

Recently, researchers from the Shanghai Institute of Optics and Fine Mechanics (SIOM) of the Chinese Academy of Sciences have proposed a source mask optimization (SMO) technique using the covariance matrix adaptation evolution strategy (CMA-ES) and a novel source representation method.

Simulation results implicate that the proposed technique is prior to similar SMO techniques in optimization capacity and convergence efficiency.

Lithography is one of the key technologies in the fabrication of very-large-scale integrated circuits. The lithographic resolution determines the critical dimension (CD) of the integrated circuits (ICs). With the continuous shrinking of CD of ICs, the significant optical proximity effects induced by the diffraction-limited property of the lithography systems degrade the lithographic imaging quality.

Computational lithography refers to the techniques that effectively improve the resolution and process window by optimizing the illumination source and mask pattern with mathematical models and optimization algorithms, without changing the hardware and software configurations of the lithography systems. Computational

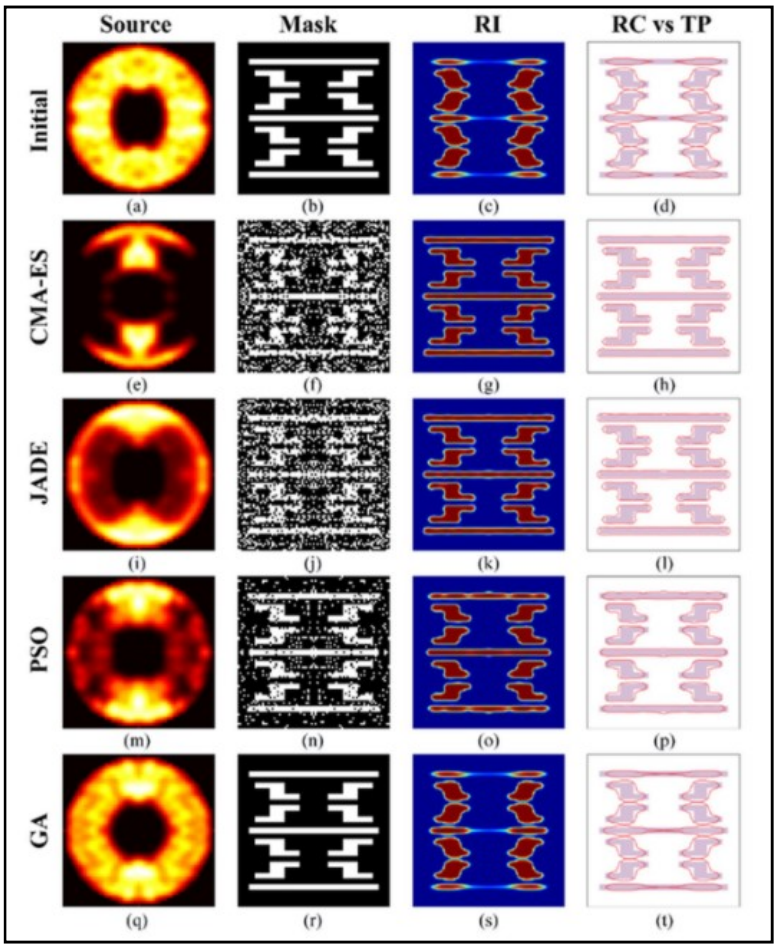

Fig.1. Comparison between the simulation results of different SMO techniques. Credit: SIOM

lithography is regarded as the new enabler of Moore's Law.

SMO optimizes the illumination source and mask pattern simultaneously to improve imaging quality. It has become one of the critical computational lithography techniques to implement the IC fabrication at 28nm technology node and beyond.

The researchers proposed a source mask optimization technique using the CMA-ES and a novel source representation method. In SMO based on CMA-ES, the covariance matrix indicating the solution search space distribution was adaptively adjusted with rank-1 and rank-μ mechanisms, enabling the superior solutions to reappear with larger probabilities in later generations.

Moreover, the range of the solution search space was updated through the control of the global search step size. The source was represented with a predetermined number of ideal point sources with unit-intensity and adjustable positions. Source optimization was realized by optimizing the point sources' positions.

The simulation results under different source representations and various mask patterns verified the superiority of the proposed technique in optimization capacity and convergence efficiency than SMO techniques based on heuristic algorithms.

More information: Guodong Chen et al. Source mask optimization using the covariance matrix adaptation evolution strategy, *Optics Express* (2020). DOI: 10.1364/OE.410032

Journal information: Optics Express

https://phys.org/news/2020-11-source-mask-optimization-technique-lithography.html

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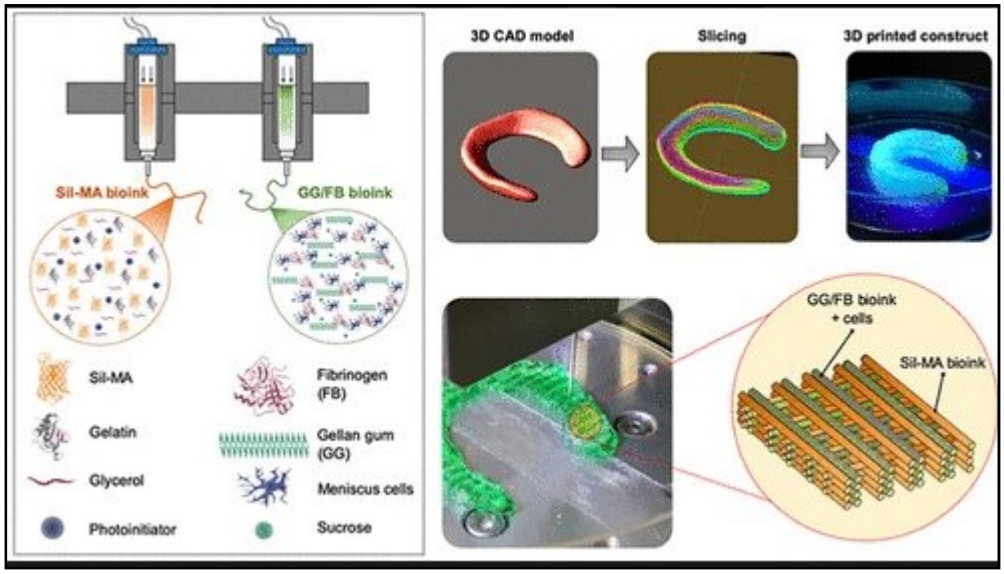
Tue, 10 Nov 2020

Scientists create hybrid tissue construct for cartilage regeneration

Wake Forest Institute for Regenerative Medicine scientists (WFIRM) have developed a method to bioprint a type of cartilage that could someday help restore knee function damaged by arthritis or injury.



A highly elastic hybrid construct for fibrocartilaginous regeneration is produced by coprinting a cell-laden gellan gum/fibrinogen composite bioink together with a silk fibroin methacrylate bioink in an interleaved crosshatch pattern. Credit: WFIRM

This cartilage, known as fibrocartilage, helps connect tendons or ligaments or bones and is primarily found in the meniscus in the knee. The meniscus is the tough, rubbery cartilage that acts as a shock absorber in the knee joint. Degeneration of the meniscus tissue affects millions of patients and arthroscopic partial meniscectomy is one of the most common orthopedic operations performed. Besides surgery, there is a lack of available treatment options.

In this latest proof-of-concept strategy, the scientists have been able to 3-D bioprint a hybrid tissue construct for cartilage regeneration by printing two specialized bioinks—hydrogels that contain the cells—together to create a new formulation that provides a cell-friendly microenvironment and structural integrity. This work is done with the Integrated Tissue and Organ Printing System, a 3-D bioprinter that was developed by WFIRM researchers over a 14-year period. The system deposits both biodegradable, plastic-like materials to form the tissue "shape" and bioinks that contain the cells to build new tissues and organs.

"In this study, we have been able to produce a highly elastic hybrid construct for advanced fibrocartilaginous regeneration," said Sang Jin Lee, Ph.D, associate professor at WFIRM and author of the paper recently published by *Chemistry of Materials* journal. "The results demonstrate that this bioprinted construct offers a versatile and promising alternative for the production of this type of tissue."

For the study, Lee and the WFIRM research team tested various formulations and measured response to applied forces or stresses, the swelling ratio and the material strength and flexibility. One provided the proper cellular microenvironment to maintain the cells and helping them grow while the other bioink offered excellent biomechanical behavior and structural integrity. The final formula of the two bioinks used were co-printed layer by layer to create a mesh-like pattern. The constructs were implanted into a small animal model for observation for 10 weeks and evaluated at intermittent time periods, showing proper function.

"A larger preclinical study will be needed to further examine the body's response and the functional recovery of the joint with use of this regenerative medicine treatment," said James Yoo, MD, Ph.D., professor at WFIRM.

"We have such a need for effective treatments and therapies to help patients deal with degenerative joint problems, especially the knee," said Anthony Atala, MD, director of WFIRM. "This proof-of-concept study helps point our work in the right direction to someday be able to engineer this crucial tissue that is so important for patients."

More information: João B. Costa et al, 3D Bioprinted Highly Elastic Hybrid Constructs for Advanced Fibrocartilaginous Tissue Regeneration, *Chemistry of Materials* (2020). DOI: 10.1021/acs.chemmater.0c03556

Journal information: Chemistry of Materials

https://phys.org/news/2020-11-scientists-hybrid-tissue-cartilage-regeneration.html

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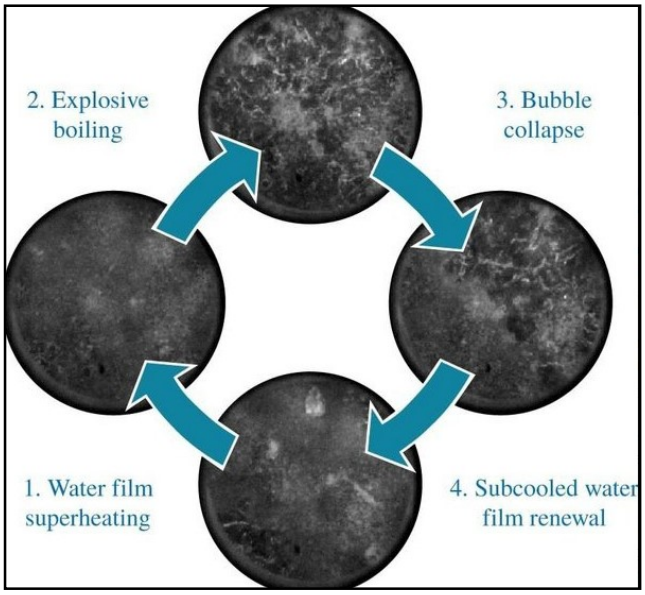
Tue, 10 Nov 2020

Cooling red-hot steel with warm water

Ph.D. student Camila Gomez mimicked the cooling process of Tata Steel's blast furnaces in the lab and found out that it's better to cool with warmer water.

Cooling red-hot steel after it has been flat-rolled into slabs of the desired thickness is a rather delicate operation. Ph.D. candidate Camila Gomez copied the cooling process of Tata Steel's blast furnaces in her lab, and learned that using warmer water can be better.



High-speed images of the cooling proces. Credit: Camila Gomez

In the blast furnaces at Tata Steel in IJmuiden, thick slabs of steel with a temperature of around 1200 degrees Celsius are flat-rolled in various stages from slabs with a thickness of approximately 20 centimeters to just a few centimeters. Within a few seconds, these slabs have to be cooled to such an extent that they can be rolled into something resembling a huge toilet paper roll.

In order to cool the steel, the slabs pass underneath water flowing at high speed, Camila Gomez explains. "The water that falls on the steel starts to boil and rapidly extracts heat from the material. The exact speed and uniformity with which the slab cools will determine the material's eventual characteristics, so it's a rather delicate process."

High speed

During the rolling process, the steel slabs grow in length from 20 to more than 200 meters, which is also why the speed at which they move increases ten-fold. "At the end, the steel passes through the jets of water at a speed of almost 80 kilometers per hour; since the cooling process thus takes place at an extremely high speed, it's difficult to study it at the factory."

Still, in order to better adjust the industrial process to the production of new types of steel, it's important to know exactly what happens to the cooling water near the steel's surface. So Gomez, who was born in Argentina and emigrated in Spain at the age of 10, was asked within a collaboration between the NWO, Tata Steel and TU/e to make a test setup to analyze in detail how the cooling water starts to boil once it comes into contact with hot steel.

"Until now, there had been only experiments using stationary and slow-moving setups," Gomez says. "We've now built a setup in the lab in Gemini that allows us to move a piece of hot steel underneath a jet of water at a speed of almost 30 kilometers per hour as we make recordings close to the surface using high-speed cameras." She used a so-called borescope for this, comparable to an endoscope for internal medical examination of the body, which she placed in the jets of water.

She found that the cooling water can come into contact with steel with a temperature of no less than 900 degrees. "That was a kind of mystery, because you would expect the water to heat up rapidly to 300 degrees, after which it evaporates in an explosive manner. We've now seen that vapor bubble formation does indeed occur locally, but that these bubbles subsequently implode because the cold water falls down on them. That occurs up to 40,000 times per second—a process you can detect only when you record at a high frame rate and study those images one by one."

That discovery is the greatest scientific result of her doctoral project, as far as she's concerned. However, on top of that, there is another discovery that might have serious practical implications.

When the surface does not cool uniformly due to constant local vapor explosions, it results in imperfections and steel of lesser quality. "Therefore, you want to cool the steel as evenly as possible. Our measurements show that warmer cooling water allows you to create a stable water vapor layer above the steel. Admittedly, that slows down the cooling process, but it does produce a better result."

When Gomez raised the water temperature from 25 to 60 degrees, she was able to cool the steel in her test setup a further 50 degrees without entering the unstable regime. This is knowledge that could be of high value to steel manufacturers, she says, since the water temperature can be easily adjusted without having to alter the entire production line.

Provided by Eindhoven University of Technology

https://phys.org/news/2020-11-cooling-red-hot-steel.html

COVID-19 Research News

THE HINDU

Tue, 10 Nov 2020

Pfizer says COVID-19 vaccine 90% effective in Phase 3 trial

Protection in patients was achieved seven days after the second of two doses, and 28 days after the first, according to preliminary findings

Paris: A vaccine jointly developed by Pfizer and BioNTech was 90% effective in preventing Covid-19 infections in ongoing Phase 3 trials, the companies announced Monday.

The statement was released as soaring coronavirus cases across the world have forced many millions of people back into lockdown, causing further damage to ravaged economies.

European stock markets and oil prices jumped on the announcement.

And US President Donald Trump, who lost last week's election in part over his administration's response to the pandemic, hailed the announcement as "such great news".

According to preliminary findings, protection in patients was achieved seven days after the second of two doses, and 28 days after the first.

Vials with a sticker reading, "COVID-19 / Coronavirus vaccine / Injection only" and a medical syringe are seen in front of a displayed Pfizer logo in this illustration taken October 31, 2020. | Photo Credit: Reuters

The companies said they expect to supply up to 50 million vaccine doses globally in 2020, and up to 1.3 billion doses in 2021.

"The first set of results from our Phase 3 Covid-19 vaccine trial provides the initial evidence of our vaccine's ability to prevent Covid-19," Pfizer chairman and CEO Albert Bourla said in a statement.

"We are a significant step closer to providing people around the world with a much-needed breakthrough to help bring an end to this global health crisis," he said.

"We are reaching this critical milestone in our vaccine development program at a time when the world needs it most."

Seeking emergency use authorisation

Across much of the globe, Covid-19 infections rates are hitting record highs, with hospital intensive care units filling up and death tolls mounting.

US biotech firm Moderna, several state-run Chinese labs, and a European project led by the University of Oxford and AstraZeneca are also thought to be closing in on potentially viable vaccines.

Two Russian Covid-19 vaccines have been registered for use even before clinical trials were completed, but have not been widely accepted outside of Russia.

The Phase 3 clinical trial -- the final stage -- of the new vaccine, BNT162b2, began in late July and has enrolled 43,538 participants to date, 90% of whom have received a second dose of the vaccine candidate as of November 8.

Pfizer said it is gathering two months of safety data following the final dose -- a requirement of the US Food and Drug Administration -- to qualify for Emergency Use Authorization, which it expects by the third week in November.

“We look forward to sharing additional efficacy and safety data generated from thousands of participants in the coming weeks,” Bourla said.

'Watershed moment'

While the Pfizer-BioNTech trial has yet to be peer-reviewed by experts, scientists reacted positively -- if cautiously to the results.

Michael Head, Senior Research Fellow in Global Health, University of Southampton, called it an “excellent result for a first generation vaccine”.

Peter Horby, Professor of Emerging Infectious Diseases and Global Health in the Nuffield Department of Medicine, University of Oxford, said Pfizer's announcement “feels to me like a watershed moment” in the pandemic.

But others pointed out that there would likely be significant logistical problems in getting the vaccine to everyone, especially given it must be kept super-cooled and currently requires two doses to bestow immunity.

Eleanor Riley, professor of Immunology and Infectious Disease at the University of Edinburgh, said for example that the Monday's results did not disclose the ages of participants.

“If a vaccine is to reduce severe disease and death, and thus enable the population at large to return to their normal day-to-day lives, it will need to be effective in older and elderly members of our society,” she said.

Dozens more candidates

The so-called messenger RNA, or mRNA, vaccine is a new approach to protecting against viral infection.

Unlike traditional vaccines, which work by training the body to recognise and kill proteins produced by pathogens, mRNA tricks the patient's immune system to produce viral proteins itself.

The proteins are harmless, but sufficient to provoke a robust immune response.

The study also will evaluate the potential for the vaccine candidate to provide protection against COVID-19 in those who have had prior exposure to SARS-CoV-2, as well as vaccine prevention against severe COVID-19 disease.

Pfizer and BioNTech plan to submit data from the full Phase 3 trial for scientific peer-review publication.

As of mid-October, the World Health Organization (WHO) has identified 42 “candidate vaccines” at the stage of clinical trials, up from 11 in mid-June.

Ten of them were at the most advanced phase 3 stage, in which a vaccine's effectiveness is tested on a large scale, generally tens of thousands of people across several continents.

https://www.thehindu.com/sci-tech/health/pfizer-says-covid-19-vaccine-90-effective-in-phase-3-trial/article33058765.ece