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समाचार पत्रों से चयित अंश Newspapers Clippings

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TBRL produces full face shields for healthcare workers in PGIMER and Chandigarh Police

Besides these face shields, acrylic enclosures for examining infected persons are being produced by the TBRL for PGIMER.

BY Harpreet Bajwa

Chandigarh: The Terminal Ballistics Research Laboratory (TBRL) has developed full face protective shields and handed it to them to the Postgraduate Institute of Medical Education and Research (PGIMER) and Chandigarh Police.

These face shields are light in weight are produced by using A-4 size transparency sheets, used in overhead projectors, that are being used as visors and the holding frame is manufactured through Fused Deposition Modeling (FDM).

Dr Manjit Singh Director of TBRL said, "TBRL is producing 10,000 full face protective shields for examining infected persons for the PGIMER and has already handed over 2000 face protective shields to the hospital and another 5000 will be provided to them in next five to six days. We have also handed over 700 full face protective shields to Chandigarh Police."

Singh stressed that the face shields are single-use as well as multiple-use even its shielding sheet can be replaced easily if required. "In addition, the TBRL is also acting as a facilitator for the procurement of bio-suits developed by another DRDO lab for use by health care service providers," he said.

Director General of Police Sanjay Beniwal lauded the role of TBRL in providing PPE, sanitizers and face shield to the police.

He appreciated that the TBRL designed and manufactured face shields are very much useful and able to provide full face protection to jawans, police officers on duty.

Besides these face shields, acrylic enclosures for examining infected persons are being produced by the TBRL for PGIMER. These enclosures are being made at the request of the Department of Anaesthesia and Intensive Care Unit of the hospital. They will act as the first level of protection for doctors and medical staff during the intubation of coronavirus patients.

These transparent enclosures are made of perspex sheets are in a cuboid shape which covers the patient's face and upper chest, with two holes on one side through which a doctor can insert his arms to work.

The doctors and health workers are at elevated levels of risk of infection as coronavirus particles can become aerosolized during intubation.

An important DRDO establishment based in Chandigarh, the TBRL is involved in the development, production, processing and characterization of different high explosive compositions, fragmentation studies of warheads, captive flight testing of bombs, missiles and airborne systems and ballistics evaluation of protective system like body armour, vehicle armour and helmets.

<https://www.newindianexpress.com/nation/2020/apr/22/tbri-produces-full-face-shields-for-healthcare-workers-in-pgimer-and-chandigarh-police-2133680.html>

कोवीड-19 मरीजों की निगरानी के लिए डीआरडीओ का 'संपर्क'

निर्देशों का उलंघन करने पर तुरंत पकड़े जायेंगे मरीज
राजीव मिश्रा

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के वैज्ञानिकों ने एक ऐसा सॉफ्टवेयर (ऐप) तैयार किया है जो कोविड-19 मरीजों को ट्रैक करेगा। डीआरडीओ की बेंगलूरु आधारित एक प्रयोगशाला सेंटर फॉर आर्टिफिशियल इंटेलिजेंस एंड रोबोटिक्स (सीएआइआर) द्वारा विकसित इस सॉफ्टवेयर की मांग कई राज्य सरकारों ने की है।

सीएआइआर के 20 युवा वैज्ञानिकों की टीम ने इस ऐप का विकास किया जिसका नाम 'संपर्क' (एसएएमपीएआरसी, यानी स्मार्ट ऑटोमेटेड मैनेजमेंट ऑफ पेशेंट एंड रिस्क फॉर कोविड-19) रखा गया है। दरअसल, संपर्क एक सॉफ्टवेयर है जिसमें ऐप शामिल है। इसे कोविड-19 मरीजों के स्मार्ट फोन में इंस्टॉल कर दिया जाता है। यह एक सर्वर-साइड एप्लिकेशन है जिसका उपयोग राज्य के अधिकारियों द्वारा मरीजों को ट्रैक करने के लिए किया जाएगा। विशेष रूप से राज्य सरकारों के उपयोग के लिए तैयार इस सॉफ्टवेयर और ऐप के विकास में वैज्ञानिकों को लगभग तीन सप्ताह लग गए। यह ऐप पहली बार अप्रैल के पहले सप्ताह में तैयार हुआ और उत्तर प्रदेश सरकार ने इसका उपयोग शुरू किया। यूजर के फीडबैक के आधार पर इसके नवीनतम संस्करण भी तैयार हुए और अब महाराष्ट्र सहित कई राज्य सरकारें भी इसका उपयोग करने को तैयार हैं।

डीआरडीओ के एक अधिकारी ने बताया कि इस ऐप के शुरुआती संस्करणों का उपयोग उत्तर प्रदेश, महाराष्ट्र और नागालैंड की सरकारों ने किया। उनसे मिले फीडबैक के आधार पर इसे और बेहतर बनाया गया और उसमें कई चीजें जोड़ी गई हैं। भविष्य में इसका बड़े पैमाने पर उपयोग होने की संभावना है। गौरतलब है कि सीएआइआर डीआरडीओ की एक ऐसी संवेदनशील प्रयोगशाला है जो हमेशा निगाह में रहती है। एक अधिकारी ने कहा कि संपर्क ऐप के उपयोग के लिए रोगी से किसी भी तरह की निजी सूचना नहीं मांगी जाती। इसमें केवल कोविड-19 मरीज की वर्तमान लोकेशन और उसके फोटोग्राफ्स की जरूरत है। यह रोगियों के लोकेशन की जानकारी राज्य सरकार के अधिकारियों को रंगीन-कोड में उपलब्ध कराएगा। मानचित्र पर इन सूचनाओं के आधार पर हॉट-स्पॉट क्षेत्र या किसी सीमा को सील किए जाने की जरूरत आदि समझी जा सकती है। इससे होम क्वारंटाइन का उल्लंघन करने वालों का तुरंत पता लगाया जा सकेगा।

डीआरडीओ टीम ने बनाया

रंगीन कोड से मरीजों पर नजर रखता है 'संपर्क' ऐप

बेंगलूरु. रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) की सेंटर फॉर आर्टिफिशियल इंटेलिजेंस एंड रोबोटिक्स (सीएआइआर) के 20 युवा वैज्ञानिकों की टीम ने एक ऐसा ऐप तैयार किया है जो कोविड-19 मरीजों को ट्रैक करेगा।

इसका नाम 'संपर्क' (एसएएमपीएआरसी, यानी स्मार्ट ऑटोमैटेड मैनेजमेंट ऑफ पेशेंट एंड रिस्क फॉर कोविड-19) रखा गया है। संपर्क एक सॉफ्टवेयर (ऐप) है जिसे कोविड-19 मरीजों के स्मार्ट



फोन में इंस्टॉल कर दिया जाता है। इसमें केवल मरीज की वर्तमान लोकेशन और उसके फोटोग्राफ्स की जरूरत है। यह रंगीन कोड के जरिए

रोगियों की लोकेशन बताता है। इससे होम क्वारेंटाइन का उल्लंघन करने वालों का तुरंत पता लगाया जा सकेगा। मानचित्र पर इन सूचनाओं के आधार पर हॉट-स्पॉट क्षेत्र या किसी सीमा को सील किए जाने की जरूरत आदि समझी जा सकती है। अप्रैल के पहले सप्ताह में तैयार ऐप का उत्तर प्रदेश सरकार ने उपयोग शुरू किया। अच्छे फीडबैक के बाद महाराष्ट्र सहित कई राज्यों ने इसकी मांग की है। ऐप के लिए रोगी की कोई निजी सूचना नहीं ली जाती है।

hindustantimes

Thu, 23 April 2020

DRDO lab develops 10,000 face shields for PGI, Chandigarh

Terminal Ballistics Research Laboratory has given 700 protective shields to Chandigarh Police

Chandigarh: The Terminal Ballistics Research Laboratory (TBRL) here is developing 10,000 full face protective shields for examining infected Covid-19 patients for the Post-Graduate Institute of Medical Education and Research (PGIMER), an official said on Wednesday.

“TBRL is producing 10,000 full face protective shields for the PGI. A total of 2,000 face protective shields have been handed over to the PGI and 5,000 will be provided in five days,” says TBRL director Manjit Singh said in a statement.

TBRL is a lab of the Defence Research and Development Organisation (DRDO).

He said more than 700 protective shields were given to the Chandigarh Police on Tuesday.

Director General of Police Sanjay Beniwal lauded the TBRL for providing PPE, sanitisers and face shield to the police.

The director said that the face shields are single-use and multiple-use, while its shielding sheet could be replaced easily if required.

In addition, the TBRL is also acting as a facilitator for the procurement of bio-suits developed by another DRDO lab for use by healthcare service providers.



The face shields for frontline workers are single-use and multiple-use, while the shielding sheet can be replaced easily if required. (Reuters)

An important DRDO establishment based in Chandigarh, the TBRL, is involved in development, production, processing and characterisation of different explosive compositions, fragmentation studies of warheads, captive flight testing of bombs, missiles and airborne systems and ballistics evaluation of protective system such as body armour, vehicle armour and helmets.

<https://www.hindustantimes.com/cities/drdo-lab-develops-10-000-face-shields-for-pgi-chandigarh/story-A7OgBarWm0Y1e7IRBv1S9O.html>

Business Standard

Thu, 23 April 2020

India battles supply snags, labour shortages to make affordable ventilators

Nocca is in talks with several large manufacturers to start production once its prototypes clear tests by early May

Bengaluru:: Indian medical device makers, racing to churn out ventilators as domestic Covid-19 cases spike, have been beset by supply bottlenecks, cost overruns and labour shortages that are delaying their efforts to produce an affordable device.

Ventilators help patients breathe and are seen as critical given severe Covid-19 can lead to pneumonia and lung damage. Experts warn India may run out of devices as it has fewer than 50,000 and may need 20 times that in a peak infection scenario.

Companies, including Bengaluru-based Dynamatic, startup Nocca Robotics and New Delhi's AgVa Healthcare, are rushing to fill the expected supply gap with stripped-down ventilators, priced between \$33 and \$7,000.

Top-end ventilators can cost up to \$16,000 in India.

But with many countries boosting output and India forced into a lockdown, components and labour are in short supply, leading to production delays of up to two weeks.



"We require components that are extremely hard to procure," said Amitabha Bandyopadhyay, a professor at the Indian Institute of Technology, Kanpur, who is collaborating with Nocca.

Nocca has been set back by two weeks and now aims to make 30,000 ventilators by mid-May, as it struggles to import high-capacity pumps and flow sensors that help regulate air in ventilators, Bandyopadhyay added.

"These materials are so rare now in the international market that there has been a 50%-75% increase in prices in the last one month," he said. This has doubled the estimated price of Nocca's devices to 150,000 rupees (\$1,950).

Nocca is in talks with several large manufacturers to start production once its prototypes clear tests by early May.

Most Indian medical device executives said they were making ventilators for domestic use. Bandyopadhyay said exports would depend on government curbs and economic viability.

Costs Skyrocket

India has ordered its 1.3 billion people indoors until May 3 so its modest public health system does not collapse under the weight of infections that are nearing 19,000. Over 600 people have died due to the coronavirus in the country.

Most of those numbers are from this month.

"If 10% of our population is infected and only 1% of them need ventilators, even then we are way behind," said Subhrojyoti Bhowmick, clinical director, academics and research department, at Peerless Hospital in the eastern city of Kolkata.

Before the pandemic, hospitals invested less in ventilators as they are expensive and the devices were available mainly in some hospitals in bigger Indian cities, Bhowmick added.

But companies are now pushing to make affordable devices.

Dynamatic Technologies is making a \$33 ventilator that does not need electricity to function, while AgVa is aiming to make 10,000 ventilators by mid-May, priced under \$2,000.

AgVa is collaborating with automaker Maruti Suzuki and state-run Bharat Electronics to make parts.

But it is facing labour shortages and higher costs as it sources controllers and microprocessors from Germany, the United States and China, AgVa co-founder Diwakar Vaish said.

"The overall costs have ... doubled, maybe even tripled," prompting AgVa to rope in five or six suppliers for some components from just two or three earlier, Vaish said.

Lockdown: Serious Disabler

To speed up production, India's government is helping with sourcing components and easing bottlenecks. State-run HLL Lifecare Ltd has floated a tender to procure 20,000 ventilators.

India's drugs regulator has also allowed firms to make ventilators without a manufacturing licence, according to an email from the agency's chief seen by Reuters.

Defence Research and Development Organisation (DRDO), a government agency, is collaborating with Skanray, a medical device player based in the southern city of Mysuru.

DRDO is making on a "war footing" components such as sensors that are typically imported to aid ventilator production, Skanray Managing Director Vishwaprasad Alva said.

Skanray ventilators cost around \$7,000.

But for manufacturers, "the lockdown is a serious disabler", Dynamatic CEO Udayant Malhoutra said. "The challenge is huge, because the whole ecosystem of suppliers is shut down."

Supply issues are causing a delay of 3-4 days in the 30-day manufacturing cycle, he said. "In a 10-month development cycle, that means you are off by a month."

https://www.business-standard.com/article/companies/india-battles-supply-snags-labour-shortages-to-make-affordable-ventilators-120042201153_1.html



BHARAT SHAKTI
Self-Reliance in Defence

ज्ञान प्रसार एवम् विस्तार

10 वर्ष

Thu, 23 April 2020

Highlights: Ministry of Defence's fight against Covid-19

As India battles the Chinese virus pandemic, various wings of Ministry of Defence, is contributing its resources in the best possible way to combat the unprecedented situation.

Following are the details of the efforts and initiatives of Ministry of Defence (MoD):

Armed Forces

- Armed Forces running six quarantine facilities at Mumbai, Jaisalmer, Jodhpur, Hindon, Manesar and Chennai.
- Total Evacuees received so far – Over 1,740 (including Medical team and air crew)
- One thousand seven hundred forty persons quarantined, of which 402 released so far. Four positive COVID cases referred to Hospitals.



- Total dedicated Army Hospital to COVID-19 Patients- 13
- Total COVID-19 Bed Capacity with Army Hospitals -9,000
- Fifteen other facilities are being kept ready as standby for use, if required.
- Dedicated COVID-19 facilities including High Dependency Units, Intensive Care Unit beds are being prepared in 51 hospitals of the Armed Forces across the country.
- Five viral testing labs at Armed Forces hospitals made part of national grid. Six more hospitals are being equipped shortly with the resources to begin COVID-19 testing.

Indian Air Force

- Two evacuation missions by C-17 aircraft, first on 26/27 February where 15 T medical assistance was taken to Wuhan and 112 Indians and citizens of friendly foreign countries were flown back. Second aircraft flew to Tehran on 10 March and flew back with 58 Indian citizens.
- Two quarantine facilities are operational, first at Air Force Station Hindon which is looking after 58 people ex Tehran and at AF Station Tambram which is looking after 113 citizens ex Malaysia. Seven other quarantine facilities have been kept in a state of readiness in Bhatinda, Devlali, Dundigal, Chakeri, Agra, Gorakhpur and Bangalore. Air Force Hospital Jaisalmer is the reporting hospital for the Army quarantine facility at Jaisalmer.
- Air Force Command Hospital Bangalore is carrying out COVID testing. Air Force aircraft are being used to fly back samples from Leh for COVID testing at Delhi and Chandigarh regularly. 3 doctors from PGI Chandigarh were also flown in to Leh by IAF aircraft.
- Medical assistance to friendly foreign countries were airlifted on two occasions. On 30 March, 1 T medical load was positioned at Gorakhpur by Dornier aircraft and Mi17 Helicopters and thereafter taken by road to Nepal. On 02 April, 6. 2T medical load was flown to Male by C 130 ac.
- Medical load is being regularly flown in support of State Governments as and when required. Load has been flown in to Leh, Srinagar, Prayagraj, Dibrugarh, Mohanbari, Bareilly, Agra, Guwahati, Port Blair etc in aid of the Govts of UP, Assam, Nagaland, Manipur, Arunachal Pradesh, Jammu and Kashmir, Ladakh and Andaman and Nicobar islands. C 17, C130, An 32, Avro, Dornier and Mi17 aircraft have been used for this purpose. Around 250 Tonne load has been airlifted for this purpose till date. Load for DRDO (fabric) was also airlifted to help them in making masks. 26 medium and heavy lift aircraft and 23 medium and heavy lift helicopters have been kept in readiness for any contingency.
- IAF airlifted essential medical supplies and commodities from nodal points to Manipur, Nagaland and Gangtok in North Eastern region; and the Union Territories of J&K and Ladakh. In addition, An-32 aircraft, on 06 Apr 2020, airlifted personnel and 3500 kg of medical equipment of ICMR from Chennai to Bhubaneswar for setting up of testing labs and facilities in Odisha.

Indian Navy

- Quarantine Facilities (Wellness/Corona Care Centres) have been set up in all three Commands (Capacity of approx 1500 personnel).
- Mumbai (Ghatkopar) already functioning with 44 Indians brought back from Iran.
- Vizag and Kochi are also ready when required.
- In the process of setting up isolation facilities in all the commands including outlying units.
- Teams of Battle Field Nursing Assistants (BFNA), comprising of non-medical personnel have been readied to help medical staff should the situation become overwhelming. Training of Indian Navy personnel is in progress.
- Jawans of the Defence Security Corps (DSC) and Indian Naval personnel from INS Hansa distributed food at several locations in Vasco, Goa for stranded migrant labourers, rag pickers and low income families, struggling to feed themselves in the prevailing lockdown conditions. 320 people were provided cooked food at Vasco Railway Station, Bogda and Ram Mandir at Goa.

Defence Research and Development Organisation (DRDO)

- DRDO developed a bio suit to keep the medical, paramedical and other personnel to manage and evacuate the casualties in the event of radiological emergencies. Each suit costs Rs 7,000.
- Developed Portable Backpack Area Sanitisation Equipment and Trolley Mounted Large Area Sanitisation Equipment for effective sanitisation of public spaces.
- Developed In-house hand sanitizer and provided nearly 73,000 litres to Indian Armed forces, Armed Forces Medical Corps, Defence Security Corps, MoD, Parliament, and to various security establishments and high offices. The cost of sanitiser is less than Rs 12/litre (including GST).
- Provided 20,000 three ply masks to Delhi Police.
- Innovation on to create 'Multi patient ventilator' wherein several patients can be supported by a single ventilator. Around 5,000 ventilators will be produced in the first month and 10,000 subsequently.
- Developed five layer N99 masks with two layers of nano mesh with Capacity to make 10,000 N99 masks per day.
- Developed Body Suits for medical and paramedical staff
- Society for Biomedical Technology (SBMT) – A DRDO funded and managed initiative) & DEBEL, Bangalore have developed a ventilator and technology is transferred to Industry. Defence PSU, M/s BEL has joined the efforts for large scale production of ventilators.
- DEBEL, Bangalore has undertaken the initiative to develop the critical components of the ventilators which are not available in the country. These will be produced with the help of industry.
- Two laboratories of DRDO are ready to function as test centers for detection of Covid19. Once approved, these laboratories can undertake 700 tests per day.

Cantonment Boards

- Sixty two Cantonment Boards spread over 19 States/Union Territories, across the country, with a population of approx. 21 lakh (including military and civil) geared up to the challenge posed by Novel Coronavirus
- Instructions issued to all the Cantonment Boards to identify beds in hospitals/health centres and guest houses for any eventuality.

DPSUs/Ordnance Factory Board

- Ordnance Factory Board designated 285 beds for isolation wards in handling COVID-19 cases.
- The OFB has manufactured and dispatched 50 specialised tents for COVID-19 patients to Government of Arunachal Pradesh at a short notice.
- Hindustan Aeronautics Limited (HAL) Bengaluru, has isolation ward facility with three beds in Intensive Care Unit and 30 beds in wards. In addition, a building having 30 rooms was readied. In all, 93 persons can be accommodated at HAL facility.
- Bharat Electronics Limited (BEL) has stepped in to manufacture and supply 30,000 ventilators designed DRDO within the next two months.
- Ordnance Equipment Factories located at Kanpur, Shahjahanpur, Hazratpur (Firozabad) and Chennai are engaged in developing coverall and masks. They have also arranged special heat sealing machines for manufacture of these garments at a very short notice. Commenced bulk production of coveralls up to 5,000 to 6,000 pieces per week.
- Development and production of hand sanitizer as per WHO standards have been undertaken in the factories of OFB. So far various units of OFB have produced 83,000 litres of sanitizer, 2, 86,000 masks, 7,000 PPEs and supplied to HLL Lifecare Limited (HLL), the nodal agency appointed by Government of India for centralised procurement.

NCC

- Offered its volunteer cadets for national duty to fight COVID-19 under 'Ex NCC Yogdan'. Up to April 20, approx 6000 cadets have been employed countrywide in all States/UT's mainly to assist the district administration in works like traffic management, distribution of food and essential items, management of queues, supply chain management, sensitization of public about social distancing and lockdown, manning CCTV control rooms and preparation and packaging of food items.

Ex-Servicemen Welfare

- Department of Ex-Servicemen welfare (ESW) took the initiative to mobilise services of Ex-Servicemen (ESM) community to assist the State and District administration, wherever required.
- Ex-Servicemen have started playing their part in providing succour to people in their fight against COVID-19 in the States of Karnataka, Andhra Pradesh, Uttar Pradesh, Punjab, Chhattisgarh, Jharkhand, Haryana, Uttarakhand and North East.

Ministry Of Defence (Mod)

MoD employees from various wings, including Army, Navy, Air Force, Defence PSUs and others, will contribute one day salary to PM-CARES Fund; Rs 500 crore contribution expected.

Raksha Mantri Shri Rajnath Singh

- Raksha Mantri Shri Rajnath Singh provided the guidance and leadership in steering MoD's assistance to the civilian authorities to fight COVID-19.
- Raksha Mantri held series of review meetings with various arms/ services / DPSUs to review their respective action plans, to gear up preparedness and provide all required assistance to civilian authorities.
- Raksha Mantri chaired GoM Meetings on 25th March and 1st, 3rd and 7th, 18th, 21st April 2020.

International Cooperation

- Six naval ships are kept ready for assistance to neighbouring countries. Five medical teams are also on standby for deployment in Maldives, Sri Lanka, Bangladesh, Nepal, Bhutan and Afghanistan.
- Special flights of Indian Air Force evacuated people and carried medical supplies. A C-17 Globemaster III comprising of crew, medical team and support staff has carried 15 tonnes of medical supplies to China and airlifted 125 persons on its return.
- The C-17 Globemaster III made another journey, this time to Iran and brought back 58 stranded Indians. The aircraft also brought 529 samples for COVID-19 investigation.
- The C-130J Super Hercules aircraft has ferried around 6.2 tonnes of medicines to Maldives. An Army Medical Corps team consisted of five doctors, two nursing officers and seven paramedics was deployed in Maldives for capacity building measures and assist in setting up their own testing, treatment and quarantine facilities between March 13-21, 2020.

<https://bharatshakti.in/highlights-ministry-of-defences-fight-against-covid-19/>



Thu, 23 April 2020

Does mysterious SURYA ICBM program alive?

- According to a 1995 report published in The Nonproliferation Review, Surya (meaning the Sun in Sanskrit and many Indian languages) is the codename for one of the Intercontinental ballistic missiles that India is reported to be developing.
- The DRDO is believed to have begun the project in 1994. This report has not been confirmed by any other sources until 2010. Officials of the Indian government have not confirmed the existence of the project
- The Surya is speculated to have a range between 12,000 to 16,000 kilometers
- According to a 2013 report by The New Indian Express, Surya missile is being developed confidentiality under the code-name of Agni-VI.
- Well DRDO or Indian Government never confirmed or denied the existence of such ICBM but the Surya ICBM due to media coverage attended mythical status even though over the years Agni missile family created long-range missile which was capable of hitting both target deep in Pakistan and China.

Our Opinion:

- In our opinion scale model as seen in the picture, looks like a three-stage rocket and it looks like the scaled model of Surya was that of a submarine-launched ballistic missile (SLBM) but without any exact specifications it is too much speculation.
- opr ,may be DRDO working on Agni 6 ICBM under the name of SURYA. but it just a scale model and at last it still just a speculation and no one can say confirmly until DRDO officials reveal anything about it.

Does India really need Surya ICBM or Agni-6?

India needs an ICBM that can reach every major country on the planet; that is, a missile with a range of at least 12,000 kilometre. We should not fear US and Europe as their economy is growing at 7-8% they will not put restriction on us as they also want access to larger market.

Now there are many people on the other side of the debate who question whether ICBMs are such a big deal. Their reasoning is that India's furthest rival is China so there's no need for a missile that travels further than that country. Plus, they argue, the US and Europe aren't inimical to India so why provoke their ire by developing missiles that could potentially target these benign fellows?

Such thinking ignores a basic precept of defence – a nation must forever wage peace but keep its powder dry. ICBMs are strategic weapons and without a global-range missile, India will be unable to break out of its regional context. It's as simple as that.

The ICBM is the doomsday weapon that separates the men from the boys in the global slugfest. While it is true that economic strength plays a key role in shaping international power equations,



strategic missiles alone can guarantee fail-safe national security. As the Federation of American Scientists says, “Regardless of the origin of a conflict, a country may involve the entire world simply by threatening to spread the war with an ICBM.”

The supposedly horrendous cost of building and maintaining ICBMs is also touted as a reason why nations should avoid them. However, for decades China has strutted on the global stage on the strength of just 20 silo-based ICBMs. Today, of course, it has nuclear armed submarines and road mobile ICBMs, but those 20 venerable missiles have given it strategic parity with the US and Russia who both possess hundreds of missiles.

Clearly, strategic missiles are one reason (the other being the permanent seat at the U N Security Council) why regional chipmunks like France and Britain continue to talk big whereas Germany and Japan despite their massive economies remain fringe players.

<https://www.defenceaviationpost.com/2020/04/does-mysterious-surya-icbm-program-alive/>

COVID-19: Defence Forces Contribution

 THE FINANCIAL EXPRESS

Thu, 23 April 2020

Coronavirus: Armed forces’ response to the COVID-19 pandemic in India

India has been fortunate to have been spared the horrific toll that the virus has taken in vast swathes of countries across Europe and North America

By Dr (Lt Gen) CS Narayanan

The ferocity with which the COVID-19 pandemic has struck has left almost all countries in the world struggling to cope.

The first case in India was reported on 30th January 2020, in a student returning to Thrissur, Kerala from China. As of 21 April 2020, the Ministry of Health and Family Welfare has confirmed a total of 18,601 cases, 3,252 recoveries and 590 deaths in the country.

India has been fortunate to have been spared the horrific toll that the virus has taken in vast swathes of countries across Europe and North America.

The Government of India has been resolute in its response putting in place a host of measures, including a nation-wide lockdown since 25 March 2020. The Armed Forces, which have always played a pivotal and proactive role in Humanitarian Assistance and Disaster Relief (HADR), have been an integral part of the unprecedented response to this biologic calamity.

The top leadership of the Indian Army, Navy and Air Force have been working round the clock with key stakeholders including the Armed Forces Medical Services (AFMS), Defence Research and Development Organisation (DRDO), Defence Public Sector Undertakings, Ordnance Factory Board, Indian Coast Guard, Cantonment Boards, and the National Cadet Corps in putting swift and co-ordinated mechanisms in place to thwart the virus.

The Integrated Defence Staff which advises the Chief of Defence Staff is an organization especially suited to bring in synergy and jointness in the current rapidly evolving scenario.

The National Crisis Management Committee (NCMC) has been overseeing the Command, Control and Coordination of the Crisis Management Group (CMG) of various wings of the Government and Armed Forces.

The very first tasks assigned to the Armed Forces were two missions to evacuate Indians stranded in foreign lands which had become hotspots for COVID-19.

112 Indian citizens and citizens of friendly foreign countries were flown back from Wuhan on 27 Feb 2020 in a C-17 Globemaster and 58 Indians were evacuated from Tehran on 10 March 2020.

These evacuees were quarantined in six facilities across the nation including Manesar, Jaisalmer, Jodhpur, Chennai, Hindan and Mumbai. Seven other Air Force quarantine facilities have been kept in a state of readiness in Bhatinda, Devlali, Dundigal, Chakeri, Agra, Gorakhpur and Bangalore. The Indian Navy has set up quarantine centres at its bases in Visakhapatnam and Kochi.

Three COVID positive cases from these Quarantine centres were transferred to a Referral Hospital in the Capital.

Indians evacuated from Iran have been hosted in an Army Wellness Facility at Jodhpur under 'Operation Namaste'. These centres provide holistic facilities for medical treatment, as also their physical and mental wellbeing.

The Army has taken over a civil quarantine centre at Narela. Gen Bipin Rawat, Chief of Defence Staff visited the camp recently to take stock of the situation and to interact with doctors from the Army Medical Corps (AMC) and the armed security personnel deployed there.

In case of further escalation of the crisis, various Army Schools have also been tasked to be on standby as quarantine facilities.

The Armed Forces Medical Services (AFMS) is the backbone of the Armed Forces response to the pandemic. More than 8,500 doctors, 50,000 paramedical personnel and the vast infrastructure of the AFMS have been placed at the disposal of the nation. Twenty-eight service hospitals have been earmarked purely for coronavirus cases, according to Lt Gen Anup Banerji, Director General Armed Forces Medical Services (DGAFMS), who chaired a meeting with medical chiefs of the Army, Navy and Air Force. These hospitals will cater not only to military personnel, but also to civilian patients transferred from state health facilities. High Dependency Care Units (HDUs) and Intensive Care Unit Units (ICUs) are being readied in 51 service hospitals to receive patients.

General MM Naravane, Chief of Army Staff said that Field hospitals across the country have been instructed to set-up a 45-bed isolation facility and create a 10-bedded intensive care unit exclusively for COVID-19 patients.

Quick-reaction medical teams (QRMTs) and Battlefield Nursing Assistants (BFNA) will augment resources at short notice wherever required.

Five Armed Forces hospitals, including Army Hospital Research and Referral, Delhi and Armed Forces Medical College, Pune have begun testing for SARS-CoV-2, the virus responsible for causing COVID-19 illness in humans.

The Defence Research and Development Organization (DRDO) and the various agencies under its ambit have taken on the responsibility of augmenting vital equipment and resources needed by medical personnel.

Bharat Electronics Ltd (BEL) has been tasked to manufacture ventilators and the Ordnance Factory Board has scaled up production of hand-sanitizers, masks and Personal Protective Equipment (PPE)

The Indian Air Force has done a commendable job in transporting men and material to the remotest locations in the country using heavy lift transport aircraft.

Commanders are all too aware that Personnel of the Armed Forces are also vulnerable to rapid transmission and spread of the virus in view of their living conditions and deployment in hazardous operational areas like forward posts and battleships. Commanders at all levels are taking steps to prevent such an eventuality while performing their assigned task.

In a laudable move, our men in Uniform have decided to contribute one day's salary to PM-CARES Fund amounting to about Rs 500 crore.

Twenty-five thousand cadets of the National Cadet Corps (NCC) are being mobilised to assist the civil administration in traffic management, supply chain management, sensitization of the public about social distancing and other essential measures.

While the Armed Forces have responded with speed and efficiency to the on-going pandemic, the Chief of Army Staff has assured the nation that this will in no way affect their core duty of protecting the nation from external aggression and defending our borders.

(The author is Former Deputy Chief of Integrated Defence Staff (Medical). Views expressed are personal.)

<https://www.financialexpress.com/defence/coronavirus-armed-forces-response-to-the-covid-19-pandemic-in-india/1936604/>

नवभारत टाइम्स

Thu, 23 April 2020

लॉकडाउन में रुक गया भारत, देखें क्या कर रही है इंडियन आर्मी

भारतीय सेना (Indian army) सिर्फ युद्ध ही नहीं हर वक्त देश के लिए लड़ रही है।

कोरोना वायरस (Coronavirus) के खतरे के दौरान एक बार फिर से सेना के

जवान साबित कर रहे हैं कि वह देश के सच्चे सपूत हैं।

कोरोना वायरस (Coronavirus) के खतरे के बीच देशभर में लॉकडाउन जारी है। इस बीच देशभर के स्वास्थ्यकर्मियों (Health Workers during lockdown) के साथ-साथ सेना के जवान भी जुटे हुए हैं। भारतीय सेना (Army) के जवान लॉकडाउन के बीच सीमा की सुरक्षा करने के साथ-साथ कोरोना (Covid-19) के खिलाफ जंग में भी पूरी तरह से लगे हुए हैं। बॉर्डर रोड ऑर्गनाइजेशन (बीआरओ) ने अरुणाचल प्रदेश में चीन की सीमा तक पुल बना दिया है। आतंकियों को लगातार मार गिरा रहे हैं। कोरोना के कारण लॉकडाउन में फंसे लोगों की मदद कर रहे हैं और उन्हें खाना खिला रहे हैं। सेना के अधिकारियों से लेकर जवान तक रक्तदान (Blood Donation) करके स्वास्थ्यकर्मियों का हौसला बढ़ा रहे हैं। इतना ही पंजाब में दूर-दराज के इलाके में सेना के जवानों ने पुल बनाकर मुख्य इलाके से उस दूरस्थ इलाके को भी जोड़ दिया है। इसके अलावा जहां-तहां सेना की मदद से जरूरी सामानों की आपूर्ति की जा रही है। सेना के जवान हेलिकॉप्टर और अपनी गाड़ियों से दुर्लभ इलाकों में भी मौजूद लोगों की मदद कर रहे हैं। जोजिला दर्रे को खोलकर कश्मीर के लिए खाने-पीने की चीजों और अन्य जरूरी सामानों की आपूर्ति सुनिश्चित कर दी गई है। इसके अलावा जहां कहीं भी सेना की मदद मांगी जा रही है, वहां सेना के जवान और अधिकारी जी जान से जुटे हुए हैं। आइए देखते हैं, सेना के जवान किस प्रकार कोरोना काल में देश की सेवा कर रहे हैं।

27 दिन में चीन की सीमा के पास पुल बनाया

सेना के बॉर्डर रोड ऑर्गनाइजेशन ने सिर्फ 27 दिन में 430 फीट लंबा यह पुल बनाकर तैयार कर दिया है। इससे 40 टन वजन वाले वाहन भी भारत-चीन सीमा तक पहुंच सकेंगे। साथ ही लगभग 450 गांव के लोगों को इसका फायदा मिलेगा। विवादित क्षेत्र होने के कारण यहां पुल बनाना आसान काम नहीं था लेकिन सेना के जवानों ने बिना डरे, बिना रुके 24 घंटे 7 दिन काम किया और देश को यह पुल समर्पित किया।

रावी नदी पर बना दिया 484 मीटर लंबा पुल:

कोरोना के खतरे के बीच सेना के जवान 'हर काम देश के नाम' को सार्थक कर रहे हैं। पंजाब के कोसवाल इलाके को मुख्य इलाके से जोड़ने के लिए रावी



नदी पर सेना की ओर से 484 मीटर लंबा पुल बना दिया गया है।

रक्तदान महादान

देशभर के ब्लड बैंकों में खून की कमी की खबरें आईं तो सेना के जवान एकबार फिर से आगे आए। अहमदाबाद और जामनगर के मिलिट्री हॉस्पिटल में ब्लड डोनेशन कैंप आयोजित किए गए, जहां सेना के जवानों ने जमकर रक्तदान किया और यह संदेश दिया कि सेना के जवान खून बहाना ही नहीं खून बचाना भी जानते हैं।



कोई भूखा ना रहे

कोरोना के कारण जारी लॉकडाउन के बीच प्रधानमंत्री मोदी ने सभी अधिकारियों से अपील की है कि देश में कहीं कोई भूखा ना रहे। सेना के जवान इस काम को बखूबी निभा रहे हैं। देश के कोने-कोने में जहां भी सेना मौजूद है, वहां गरीबों और जरूरतमंदों को खाना-खिलाने के लिए लंगर लगाए जा रहे हैं। यहां पर भी सेना की ओर से साफ-सफाई और सोशल डिस्टेंसिंग का पूरा ध्यान रखा जा रहा है।

हर वक्त मदद को तैयार

सेना के जवान कोरोना का खतरा समझते हैं। इसके बावजूद वे अपने कर्तव्यों से पीछे नहीं हट रहे हैं। जम्मू-कश्मीर में खराब मौसम के बीच सड़क पर फंसी और सड़क से फिसली गाड़ियों को हटाने और बचाने का काम सेना के जवान पूरी मुस्तैदी से कर रहे हैं।

कोरोना वॉरियर्स को दी सलामी

प्रधानमंत्री नरेंद्र मोदी ने पूरे देश से अपील की एक साथ 9 मिनट तक दीये, मोमबत्ती या टॉर्च जलाकर कोरोना के खिलाफ जंग लड़ रहे लोगों को सम्मान दिया जाए। इस मौके पर सेना के जवानों ने कश्मीर की बर्फीली वादियों में भी टॉर्च जलाकर कोरोना वॉरियर्स को सम्मान दिया।



जोजिला खुला, लेह तक पहुंचा जरूरी सामान

श्रीनगर से लेह को जोड़ने वाला रास्ता हर साल बर्फ से ढका रहता है। कोरोना के खतरे के बीच भी सेना ने जोजिला दर्रे को खोलकर लेह तक जरूरी सामानों की आपूर्त सुनिश्चित की है।

<https://navbharattimes.indiatimes.com/india/here-is-what-indian-army-is-doing-during-lockdown-and-coronavirus-threat/articleshow/75293290.cms?story=6>

Indian Navy set to open up its ‘men-only’ police branch to women officers, seeks volunteers

Provost is a non-sea-going cadre, so compulsory sea service will not be a criterion for promotions as in the case of other executive branches

By Amrita Nayak Dutta

New Delhi: The Indian Navy has sought volunteers for its police branch, Provost, from among its women officers. The branch has so far been an exclusive preserve of male officers.

The Navy has sought applications from officers, men and women, by May, according to sources in the force.

The move has come within weeks of the Supreme Court’s ruling to grant permanent commission to women officers in the Navy. On 17 March, the court upheld a 2015 verdict of the Delhi High Court and outlawed gender discrimination towards women officers during the grant of permanent commission in the Indian Navy.



At present, women officers commissioned in the Navy are not given sea-going appointments. The Navy also does not have women in the ranks akin to the Army.

Last year, the Corps of Military Police in the Army had recruited 100 women.

More opportunities opening up

According to sources, the Navy’s latest move may be the first step to open up more branches to women officers.

“Moreover, Provost is a non-sea-going cadre and therefore compulsory sea service will not be a criterion for promotions as in the case of other executive branches,” a senior naval officer told ThePrint on the condition of anonymity.

Regulations restricting sea service, which is compulsory in certain branches for promotions to the rank of Captain (Colonel equivalent in the Army) and above, put women in the Navy at a disadvantage against male colleagues when it comes to career progression.

The officer said the move is seen as another step towards grant of permanent commission to women officers across branches, including consequent promotions, as provost officers have the opportunity to perform well and attain promotion up to the rank of a Commodore.

Provost appointments

Unlike primary branches, the recruitment of Naval Provost officers is not advertised. Existing commissioned officers are selected on a volunteer basis for a specialised course at INS Mandovi, the Provost training school. After the completion of the course, the officers are appointed to the Provost at various bases of the Navy.

The women volunteers for the Provost, if any, will be Short Service Commission (SSC) officers.

SSC women officers can also serve in the musician cadre and sports cadre, a second Navy officer said.

At present, women officers in the Navy serve in many cadres, including three where they have the option for choosing permanent commission. Last year, a woman officer graduated the pilot's course to be the first woman pilot of Dornier.

Women officers also serve in operational appointments as 'Observers' in the Navy's maritime reconnaissance aircraft like P8i, IL-38 and Dornier.

There are over 639 women personnel in the Navy, including 148 medical officers and two dental officers.

<https://theprint.in/defence/indian-navy-set-to-open-up-its-men-only-pilot-branch-to-women-officers-seeks-volunteers/406750/>



Thu, 23 April 2020

India develops unique model to hit enemy targets without positioning error

Due to the unavailability of a reliable model to predict the electron density of the ionosphere, navigation errors remain, creating technological hurdles. A new model developed by Indian researchers has potential applications in calculating these Global Navigation Satellite System (GNSS) positioning errors.

In a major development that could have a wider impact, ranging from accurate aiming on enemy targets to scientific research in space weather, scientists from the Indian Institute of Geomagnetism (IIG), have developed a global model to predict ionospheric electron density with larger data coverage. The ionosphere is a major source of error in GPS/GNSS-based positioning and navigation networks.



“Better ionospheric modelling will

yield better accuracy of positioning in satellite based navigation. The current ionospheric model accuracy is significantly better compared to other ionospheric models used in single frequency GPS users,” said Dr. S. Tulasiram from IIG, one of the two primary researchers, to Sputnik.

Named as an ‘Artificial Neural Networks-based global Ionospheric Model’ (ANNIM), the development uses long-term ionospheric observations to predict electron density and peak parameters of the ionised part of the Earth’s upper atmosphere, between 46-621 miles above the surface. The model successfully reproduced large-scale anomalies in the ionosphere caused by solar and cosmic radiation.

“This model can be applied for all kinds of GNSS based positioning, aviation and navigation applications,” Tulasiram noted, when asked whether this model will be beneficial for armed forces in aiming at enemy targets.

The development is crucial for armed forces as, over the past few years, Indian armed forces have, like all militaries, sought pinpoint accuracy to minimise collateral damage in targeting enemy positions.

<https://www.defenceaviationpost.com/2020/04/india-develops-unique-model-to-hit-enemy-targets-without-positioning-error/>

Prominent Indian-American defence expert Vivek Lall part ways with Lockheed Martin

Lall, 50, is currently posted as vice president of Aeronautics Strategy and Business Development at Lockheed Martin, an American security and aerospace giant.

The company on Tuesday confirmed that Lall is leaving the company

Washington: Vivek Lall, a prominent Indian-American aerospace and defence expert, who played key roles in some of the major defence deals between India and the US, has resigned from Lockheed Martin “to spend more time with family”. Mr Lall, 50, is currently posted as vice president of Aeronautics Strategy and Business Development at Lockheed Martin, an American security and aerospace giant.

The company on Tuesday confirmed that Mr Lall is leaving the company. “We would like to extend our sincere appreciation to Dr Vivek Lall for representing Lockheed Martin and strengthening our commitment to international partners,” a spokesperson of Lockheed Martin told PTI.

“We thank Vivek for his thought leadership and the many contributions he made to our team. We wish Vivek and his family all the best,” the spokesperson said.



Known as the industry architect of US-India defence relationship because of his involvement in major defence deals between the two countries, Mr Lall expressed his “utmost gratitude” to Lockheed Martin for the unique opportunity to lead their aeronautics strategy and business development activities in international markets, including India.

“I thank them for understanding my decision to spend more time with my family,” Mr Lall told PTI.

“Lockheed Martin is truly shaping the future with world-leading advanced technologies and customer solutions. I firmly believe the F-21 is the best solution for India’s national security, Make in India industry partnerships advancing indigenous manufacturing, and India’s strategic relationship with the US,” he said.

Mr Lall, who was born in Jakarta, the Indonesian capital, for over a decade has been instrumental in major US-India defence deals worth around USD 18 billion. The latest was the procurement of 24 MH-60R multi-role helicopters from Lockheed Martin for the Indian Navy. The USD 2.6 billion agreement was signed during President Donald Trump’s visit to India in February.

In 2017, Mr Lall was the Chief Executive of Strategic Development at General Atomics during which he played a key role in the path breaking agreement by the White House to release category-1 unmanned aerial vehicles (UAVs) to India, a non-NATO country.

The UAVs that can carry missiles fall under the category-1 classification.

Mr Lall in his capacity as vice-president and India country head for Boeing Defence Space and Security in late 2000 was also instrumental in several multi-billion bilateral defence deals.

Prominent among them were 10 C-17 strategic lift military transport aircraft worth USD 4 billion, P-8I anti-submarine warfare aircraft worth USD 3 billion, 28 apache helicopters and 15 chinooks worth USD 5 billion and 22 harpoon missiles worth USD 200 million.

Appointed to the US Federal Aviation Advisory Committee two years ago, Mr Lall has overseen multiple campaigns as well as pan-India strategic industrial tie-ups. Mr Lall had also served as the founding co-chair of the US-CHECK-India Aviation Cooperation Programme launched in 2005.

<https://economictimes.indiatimes.com/news/defence/prominent-indian-american-defence-expert-vivek-lall-part-ways-with-lockheed-martin/articleshow/75290810.cms>

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COVID-19 and Nuclear Issues

By Rajiv Nayan

Summary:

The issue brief examines the relationship of the pandemic with the global nuclear order and its arrangements. The pandemic, COVID-19, has not only destabilised but also brought the whole world to a standstill. A major virus proliferation has affected more than two million people and took lives of more than 170,000 people, though the strategic community is still uncertain about the weaponisation of the virus. COVID-19 could have some serious implications for the nuclear order which has responded to the challenges thrown at it quite well. Nuclear industry has had a mixed impact so far and nuclear institutions are trying to temporarily manage the pandemic.

SARS-CoV-2 (severe acute respiratory syndrome coronavirus-2), popularly known as coronavirus, is wreaking havoc across the world through a disease called COVID-19. Its origin in China is still shrouded in controversy. The world is not ready to accept the Chinese explanation and information. The pandemic has locked the whole world in with countries discussing not only its origins and solutions but also implications.

Biology and physics represent two different streams of science. Depending on the perspective and the problem, a connect or disconnect between the two may be discovered. Similarly, nuclear and virus – two seemingly distinct issues – may have a connection if explored. Nicholas A. Christakis, a Harvard Professor, remarked that “the Chinese Government has essentially used a social nuclear weapon in its efforts” though he defined social nuclear weapon as a ‘collectivist culture’ of an authoritarian government.¹

Quite significantly, during the corona crisis, a highly respected science journal highlighted an old discovery made by the Central Intelligence Agency (CIA) and the United States (US) Army when they had “searched the offices of Sultan Bashiruddin Mahmood – a Pakistani nuclear scientist and an associate of Osama bin Laden” in the aftermath of the 9/11 attacks. They had found a “file of information on anthrax vaccines and a diagram of a balloon intended to release anthrax spores into the atmosphere”.² These links remained a cause of worry and comprised an important element of emerging threat perceptions.

The current crisis has demonstrated that two phenomena which seem very distinct can affect each other. In this context, COVID-19 appears to have affected the nuclear order and its arrangements which have in turn responded to the crisis in a unique way. This issue brief explores the evolving relationship between the two.

A Killer Virus or Weapon of Mass Destruction

When a virus or nuclear science is weaponised and used as a weapon of warfare, the international community considers it as a Weapon of Mass Destruction (WMD). When COVID-19 emerged in China, a debate began about the origin of the virus – whether it was from a hidden weapons lab or transmitted from an animal/bird. A section of the media maintained that a bio-weapon lab in Wuhan in the Hubei Province – which was the initial epicentre of the pandemic – had created the virus.³

In fact, a school of thought and also some writings claimed that China had been operating a biological weapons complex despite being a signatory to the Biological and Toxin Weapons Convention (BTWC).⁴ In general, however, the Western media has debunked the thesis of virus emerging from a lab though the debate does not dwell into the details of the secret biological weapons complex operated by China.

Most of the commentators hold the view that the trait of the virus, notwithstanding its origin or the intentions of China, is that of a WMD. Some have drawn a parallel with nuclear weapons while others have compared it with nuclear incidents such as Fukushima and Chernobyl. Notably, radiation too has the danger of a 'bystander effect'. However, this phenomenon is hardly as contagious as the SARS-CoV-2 virus. While it is true that both the virus and the radiation are invisible yet the key difference lies in the result/estimate of a nuclear weapon attack being realised immediately, depending upon the yield and place of use. Today, the impact of COVID-19 is seemingly difficult to measure, even months after its outbreak.

Safety and Security

As of April 21, 2020, approximately 170,479 people have died while 57,348 remain critical. The virus is still spreading its tentacles with more than two million people having tested positive for COVID-19.⁵ The virus has arguably stunned the whole world. Notably, the pace of the spread of the virus, while initially growing at a gradual speed, increases exponentially when it reaches the stage of community transmission in a country.

Given the threats posed by COVID-19 – a mass killer – the global network of policy community has advised countries to consult, if not fully adopt, the safety and security practices devised for tackling nuclear dangers.

In this context, the nuclear security summits have been a productive exercise for mutual learning and experience sharing. A small group of countries had earlier taken the campaign to the larger international and regional bodies. As the focus and priority of the international community in recent years has been on averting nuclear terrorism and nuclear accidents, the nuclear experience of synergising safety and security can be highly useful in combating threats like COVID-19. Enhanced communication and information sharing to alert each other about existing dangers and adoption of best practices can be useful in tackling this pandemic.

Nuclear Preparedness and Command and Control

The US nuclear-powered aircraft carrier - USS Roosevelt - had several of its crew affected by SARS-CoV-2 while sailing. The news became public leading to a clarification by President Donald Trump. Interestingly, the American President argued that in future the virus will not expose the limitations of the US forces, including the nuclear services, to the world. This clarification, however, raised concerns among others about the transparency of nuclear forces of great powers. Even America's allies like Australia were part of the group that voiced their apprehensions. Questions were raised about the safety and even preparedness of nuclear weapons and nuclear forces of countries affected by the pandemic.

Notably, the US officials had in March 2020 assured its stakeholders that the virus had not affected the American nuclear preparedness.⁶ In fact, this assurance received criticism from within the US for paying too much attention to a nuclear war instead of tackling the pandemic.⁷ Meanwhile, a few American citizens reminded their government about a key component of the US deterrence which involves nuclear retaliation in the face of biological weapons being used against the US and its allies.⁸ It is likely that other nuclear weapons countries may have also secured their nuclear arsenals while keeping them in a state of readiness for any eventuality, though these countries did not follow the US in explicitly pronouncing their initiatives. However, the indisposition of British Prime Minister Boris Johnson drew some media attention about the command and control of British nuclear weapons.

Nuclear Disarmament and Non-Proliferation

The COVID-19 pandemic is seen as an opportunity to strive for nuclear disarmament. Political writers like Noam Chomsky and others consider nuclear disarmament a far more serious issue for

the world than COVID-19, which they perceive only as a temporary phenomenon.⁹ Although Chomsky criticised President Trump for overlooking the corona problem yet he himself belittled the fight against COVID-19 by making an untimely allusion to nuclear disarmament and climate change. Indeed, while nuclear disarmament or no first use needs serious attention but it can be campaigned for at an appropriate time. Raising it at the time of this pandemic is unlikely to be of much help.

For years, the world has ignored serious issues relating to viruses and the BTWC. It has, instead, largely focused its energy and resources on the campaign for combating nuclear dangers. This campaign has had some success, particularly in the fields of nuclear security and safety. However, this success has come at the cost of a pandemic like coronavirus. Unfortunately, people like Chomsky have not grasped the mass destructive nature of COVID-19 and continue to be obsessed with nuclear disarmament. Today, COVID-19 has demonstrated that despite having signed a disarmament convention/treaty, a country can still deceive or mismanage its problems and push the world towards a global disaster. The fight against WMD is complex and it ought not to be approached in a simplistic and naïve manner.

NPT Review Conference

On March 27, 2020, Gustavo Zlauvinen, the President-designate of the 2020 Review Conference of the Non-Proliferation Treaty (NPT), issued a letter informing all members and Permanent Observers of NPT about the postponement of the Tenth Review Conference. This event will, however, be held before April 2021.¹⁰ It is quite apparent that the conference was postponed due to the prevailing COVID-19 situation in the world, particularly in the host city New York. Notably, the year 2020 marks the dual anniversaries of NPT - the golden jubilee of its entry into force and the silver jubilee of its indefinite extension.

Arguably, the postponement of the event is likely to have brought respite from a potential embarrassment for the Tenth Review Conference. In fact, as rightly pointed out by the president of the 2005 Review Conference, the “nine quinquennial treaty review conferences held since the treaty’s inception have failed to produce a consensus final document on the status of treaty implementation.”¹¹ Notably, two of the last three review conferences failed to produce any consensus document. It has also been observed that most of the member states remain unhappy over the non-implementation of the consensus documents agreed in 2000 and 2010.

Iranian Sanctions

Iran was one of the first countries after China to be seriously affected by coronavirus. As of April 21, there have been more than 5,209 casualties while 3,389 people continue to remain critical. More than 83,505 people have been infected.¹² The pandemic has put Iran under enormous pressure. The Iranian leaders and officials have appealed to the international community to ease the existing sanctions and permit the country to trade on humanitarian grounds.¹³ Tehran has argued that the continuation of extra-territorial sanctions is inhumane.

Several countries, including European states, have supported the idea of relaxing sanctions and trade restrictions on Iran.¹⁴ A few elements in the US have also supported a humanitarian approach towards Iran though the US Government appears unmoved.¹⁵ However, American officials, including President Trump, have denied ever hindering humanitarian assistance to Iran.¹⁶ President Trump was, in fact, emphatic in expressing relaxation for ‘medical goods.’

Notably, Iran’s nuclear energy production too has come under pressure. Iran has insisted on continuing its enrichment “unless the European Union gives objective guarantees to honour its commitments to Iran in the context of the Joint Comprehensive Plan of Action”.¹⁷ Meanwhile, a section of Arab and Israeli writers have kept raising red flags about the Iranian nuclear programme.¹⁸ These writers, along with a section of the Western non-proliferation community, suspect Iran of continuing with its bomb manufacturing in a hidden facility.¹⁹ In this context, the Shahid Mahallati Plant is the main target of these sceptics. In March 2020, even the International Atomic Energy Agency (IAEA) called upon Iran to immediately cooperate with the agency by providing its inspectors access to sites which Iran had denied in the past.²⁰

Nuclear Industry in Lockdown?

The world, in general, has suffered economically because of the lockdown. While production and delivery of essential items have been relaxed yet the industries have largely not functioned, given the restrictions on the movement of people.

The lockdowns, however, have had a mixed impact on the global nuclear industry. Notably, today, this industry meets several needs of the mankind. This includes treatment of cancer and generation of electricity. Since nuclear power plants usually have a reservoir of fuel load for a few years (normally three years),²¹ they are insulated from disruptions to the supply of fuel needed for running the reactors. In comparison, the functioning of coal and gas-based power plants is interrupted on account of disruption in the transportation of fuel supply.

The nuclear power plant operators use a set of guidelines issued by the competent authorities for the operation of their nuclear facilities. Today, the operating countries have prepared themselves to the dangers of the pandemic. The gap in time, from the outbreak in Wuhan to the disease becoming a global pandemic, has seemingly helped the nuclear operators to develop industry specific guidelines. These include social distancing, shrunken staffing, telecommuting, systematic medical screening of employees, sterilisation of work areas, availability of personal protective equipment, travel restrictions, self-isolation, and assembly restrictions, among others. Notably, it has been alleged that China has a contingency plan to evacuate critical infrastructure including nuclear plants with the help of its specialised military units.²²

While the nuclear guidelines are normally issued by the national authority yet national governments often consult relevant international organisations and nuclear industry associations. However, it is likely that in case of non-availability of the required staff, a nuclear facility may temporarily suspend its operations. Notably, several nuclear units have continued their operations. Rosatom State Atomic Energy Corporation has assured India that the outbreak of COVID-19 will not stop it from completing Kudankulam 3 and 4 reactors on time.²³

Nevertheless, a diverse set of problems have surfaced. Construction activities have been stopped at new sites in countries like China. Interestingly, in countries like South Africa, nuclear power units have been shut down due to a fall in demand for electricity caused by the lockdown. The UK has stopped work at a nuclear fuel reprocessing site located at Sellafield while France has revised its nuclear energy generation and distribution target. The Bulgarian Government has delayed its nuclear power plant bidding process. Meanwhile, the Rooppur nuclear power plant in Bangladesh has continued the construction activities albeit at a slower pace. The danger to nuclear personnel is highlighted by the incidents in a few power plants where the workers contracted the virus from fellow employees.²⁴ Interestingly, in Japan, raincoats were made available, to workers to protect themselves from the virus. Not surprisingly, the protection offered by them was found to be inadequate.

Like the nuclear power industry, the uranium industry too has had its unique share of experience in dealing with COVID-19. The Canadian uranium company Cameco has suspended its uranium mining operations because of the threat of contagion among its workers.²⁵ Other uranium companies operating in the country have expressed apprehensions about operating uranium mines amidst the looming shadow of the virus. Similarly, in Africa, Namibia, which is a leading supplier of uranium to China, has stopped mining uranium.²⁶

Other leading uranium producers, including Kazakhstan, while expressing apprehensions about the invisible threat of the virus and maintaining certain precautions, have decided to continue operations till the time the threat reaches their shores.²⁷ Quite significantly, the uranium industry is bucking the global trend of an economic decline. There has been a spurt in prices anchored in the closure of several mines. Notably, as a pre-coronavirus induced crisis, the prices of uranium had been on a steadily declining curve since the Fukushima incident.

The global uranium market is largely controlled by six mines which produce two-thirds of the global supply. The price of uranium has increased by 14 per cent in the last two weeks of March 2020 “to \$27 per pound, breaking out of the \$24 to \$26 range it had held for almost a year.”²⁸ The

price further increased to \$28.70 when the Kazakh Government forced Kazatomprom to reduce its projected output for 2020.²⁹

Interlinking Institutions

The pandemic has resulted in a selective institutional de-linking – a term coined by the 19th-century German economist Friedrich List – leading to enhanced institutional linkages. The weakness of specialised health institutions to meet the challenge of COVID-19 has prompted other institutions to adapt their roles in tackling growing emergencies at the national and international levels. Needless to say, the common and collective goal is to defeat the danger posed by the virus.

Interestingly, the non-health and at times pure commercial organisations have entered the collective response theatre aimed at tackling the virus. For example, sanitisers and face masks are being manufactured by bodies with unrelated areas of interest. Similarly, non-scientific organisations are contributing towards the business of health science research. Their area of activity is only partially overlapping. These institutions have at times even suspended their core specialised operations to produce equipment needed to tackle the pandemic.

Since the real battle is being fought by the national governments, these initiatives are likely to be more visible at the national level.

India too is roping in its scientific institutions to meet the challenge posed by the coronavirus. It has permitted both public and private labs to carry out COVID-19 tests. Similarly, the Department of Atomic Energy will make available its laboratories for COVID-19 tests.³⁰ Interestingly, the department has for a long time been associated with other therapeutic activities.

At the international arena, the IAEA – an institution dealing with nuclear science and technology – has shared its expertise with the global community. Its Incident and Emergency Centre based in Vienna has offered its knowledge base to the global endeavour of tackling the disease. The IAEA along with Food and Agriculture Office (FAO) has also sought to advance the idea of real-time reverse transcription-polymerase chain reaction (RT-PCR). This chain reaction is considered highly effective, given the precise laboratory technique deployed in “detecting, tracking, and studying the coronavirus”.³¹

The RT-PCR was originally used in nuclear labs as “radioactive isotope markers to detect targeted genetic materials”.³² Later, the technique was refined and the advanced version of RT-PCR replaced the isotopic tagging with special marking - mostly fluorescent - thereby enabling to procure instant results. Now, scientists can detect the definite presence of genetic materials in any pathogen, including virus. While the IAEA has offered this technique to all its members yet several of these countries apparently do not have sufficient training and, therefore, need to be trained.

The RT-PCR takes three hours to deliver the result. In comparison, the traditional techniques - used by majority of the countries - take seven to eight hours to detect the virus. Notably, the pandemic has propelled countries to invent better equipment that give more accurate results in a shorter timeframe. South Korean and American techniques now provide results in minutes. Even Indian instruments have started to provide quick results. However, IAEA’s offer, given the ability of its processes to effectively detect, track and study the virus, can perhaps be the most vital force multiplier in the battle against COVID-19.

In this context, 14 countries in Africa, Asia, Latin America and the Caribbean have sought this nuclear-derived technique of detection, which IAEA claims to be the only certain tool to detect the virus.³³ The agency also received requests from 90 countries for the supply of test kits, protective equipment and tools. From April 1, 2020, the IAEA has begun despatching its nuclear-derived tools. The agency is relying on its own resources apart from the extra-budgetary funds it has received from countries such as the US, Canada, Netherlands and Australia. Interestingly, China has offered its support in the fight against a virus which it had unleashed all over the world.

Arguably, this institutional creativity has become a much-desired necessity at the international level. While this difficult period has prevented the establishment of an alternative institution, yet it is likely that a distinctive one, clustered separately, will emerge post the period of crisis.

Nevertheless, it is also possible that the mitigated yet persistent situation may lead to the establishment of a new, precise and a more effective institution to deal with the emergent situation. Till then, the IAEA remains at the forefront of fostering effective international cooperation and global governance.

Conclusion

The COVID-19 pandemic has shaken the world. It has adversely affected not only normal businesses but also severely strained established structures and institutions. In this difficult period, the proverbial silver lining in the form of mutual learning and sharing of experience is heartening.

Like the rest of the sectors, the nuclear field too is dealing with the fallout of COVID-19. Innovative flexibility and openness in the rules of jurisdiction of partially overlapping and non-hierarchical institutions, operating in a particular issue-area, are the new emerging developments. While these institutions may have a partial corrective path yet their inextricably entangled self-interests have led to creative changes without any hidden agendas or inappropriate interventions.

(Rajiv Nayan is Senior Research Associate at the Manohar Parrikar Institute for Defence Studies and Analyses, New Delhi. Views expressed are of the author and do not necessarily reflect the views of the Manohar Parrikar IDSA or of the Government of India)

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Thu, 23 April 2020

Why India rejected Russia’s Su-57 Stealth Fighter

According to Indian air force officials, the Su-57 was too expensive, poorly engineered and powered by old and unreliable engines. Was that true?

By David Axe

Ten years after Russia’s Su-57 stealth fighter flew for the first time, plane-maker Sukhoi finally is gearing up to deliver the first of up to 76 of the fighters for front-line use.

Sukhoi originally planned to hand over the first production-standard Su-57s in late 2019. But the December 2019 crash of one of the twin-engine jets compelled the company to halt work on the program.

The Su-57’s halting development could have turned out differently. As recently as early 2018, India was co-developing the stealth fighter with Russia, lending cash and commercial viability to the troubled design.



But New Delhi pulled out of the co-development deal in April 2018. According to Indian air force officials, the Su-57 was too expensive, poorly engineered and powered by old and unreliable engines.

The Indians' complaints illustrated the yawning gulf between stealth-warplane design and the actual production of radar-evading jets. It's one thing to sketch an advanced warplane on paper. It's quite another to build one and get it to work.

All new aerospace development is difficult and many planes get poor reviews early in testing. But the gripes coming out of New Delhi were particularly worrisome for the Russians.

Sukhoi at the time was working on two variants of the Su-57—one for Russian use and another for the Indians. The Indian air force had ambitions to purchase 144 of the stealth jets, and the future revenue from this sale underpinned the entire Su-57 development effort. New Delhi was also kicking in \$6 billion for design work.

The Russian version of the Su-57 reportedly is simpler than the Indian version was. The latter included Indian avionics and compatibility with a wider range of weapons. But the Indian fighter existed only on paper. And progress on the Russian version wasn't encouraging, from New Delhi's point of view.

According to transcripts of December and January 2014 meetings obtained by *Business Standard*, Indian air force and defense ministry officials listed at least four "shortfalls ... in terms of performance and other technical features":

The AL-41F engines fitted to the Su-57 were unreliable. The radar was inadequate. The airframe was poorly built, with serious implications for the jet's stealth profile. And in light of these defects, \$6 billion was too much to pay up front.

According to *Business Standard*, Russian officials countered, saying the AL-41F engines were a temporary fit until brand-new and more powerful motors could be developed. The radar, too, was temporary—pending new sensors being developed specifically for the Indian version of the warplane.

But the allegations of sloppy construction appeared to be particularly serious. Besides posing an accident risk, low-quality construction can result in gaps and mismatched angles that elevate a plane's radar signature.

As early as 2013 it was apparent Sukhoi was having problems with quality control on the Su-57. At least one of the prototypes needed patches on its wings to keep from falling apart during high-stress maneuvers.

All the same, *Business Standard* speculated that the Indian complaints might have been somewhat politically motivated, as New Delhi *also* was planning to buy 126 new Rafale fighters from France for an eye-watering total price of \$18 billion. Scrapping the Su-57 helped India pay for the French jets.

<https://nationalinterest.org/blog/buzz/why-india-rejected-russia%E2%80%99s-su-57-stealth-fighter-146771>



Thu, 23 April 2020

Chinese weapons for Arakan Army through Bangladesh

*Definite evidence has surfaced that the consignment
had a trouble-free landing at the Monakhali beach*

By Subir Bhaumik

The separatist Arakan Army (AA) fighting Myanmar troops in an intensified conflict in the coastal province of Rakhine and the neighbouring state of Chin has managed to land and bring in a huge consignment of weapons and ammunition through Bangladesh's Chittagong Hill Tracts.

The consignment containing 500 assault rifles, 30 Universal Machine Guns, 70000 rounds of ammunition and a huge stock of grenades was brought in by sea and offloaded at the Monakhali beach not far from the coastal junction of Myanmar and Bangladesh in the third week of February.

Definite evidence has surfaced that the consignment had a trouble-free landing at the Monakhali beach near Whaikyang (Wyakuang in Burmese) on February 21 night. Nearly 150 Rakhine porters drawn from various villages of Chittagong Hill Tracts in Bangladesh and accompanied by 50 fighters of Arakan Army carried this consignment on foot and mules through Gundum and Rejupara, Uhalapaloh and Paglirara crisscrossing the very hilly border region. Skirting the Matamuhuri-Sangua wildlife sanctuary, the column skirted Singpa and reached the Arakan Army camp at Sandak (Mro) near Thanchi on March 2.

The nearest Bangladesh army camps hardly send out patrols in these hilly terrain and the cantonment of Alikadam is far away.

Bangladesh army and navy have not conducted any operation against the Arakan Army in recent years and it was not surprising that the AA consignment could be landed without an interception.

"It seems the Bangladesh forces in the area look the other way and do not disturb the AA both because it is a strong force and also because it is creating a huge problem for the Myanmar forces that generals and admirals in Dhaka and Chittagong may not be very unhappy about," one top source in Cox's Bazar said. He was unwilling to be named for fear of harassment by security forces who resent sensitive disclosures.

Myanmar-Bangladesh relations have worsened in recent years over the Burmese pushout of nearly one million Muslim Rohingyas that Bangladesh has been forced to shelter.

So unlike the Indian army attacking AA bases in southern Mizoram and even conducting 'Operation Sunrise' last year in a bid to get their Kaladan Multimodal project operationalised, Bangladesh can afford to look the other way because it has no stake in Rakhine.

Another top source in Chittagong says that Bangladesh intelligence has received unconfirmed reports that the Burmese military is trying to develop close links with the former rebels of Shanti Bahini in the Chittagong Hill Tracts to use them in the area against the Arakanese and Rohingya rebels.

"Bangladesh intelligence closely follows any possible effort to revive the Shanti Bahini and they realise that in view of strong Delhi-Dhaka relations, only the Burmese could use these Buddhist tribal insurgents in future," the source said.

After carrying the huge consignment to Sandak (Mro), the AA has smuggled the arms into Rakhine using the Parva corridor in South Mizoram here the local Khumi villagers are friendly to the insurgents.

The Assam Rifles which guards this frontier has thin deployment in the Parva area because Mizoram is a peaceful state and there is no local insurgency. So after mobilising additional troops for 'Operation Sunrise' in which some AA bases in South Mizoram were demolished, the Assam

Rifles had to pull back most of them for deployment in other insurgency affected states of Northeast India.

Top sources in Assam Rifles confirmed that they have 'credible reports' of movement of an arms consignment of Arakan Army through the Parva corridor in the Mizoram-CHT-Chin trijunction in March. "But our estimates are the consignment consisted of 200 rifles and about 40000 rounds of ammunition," a top AR official said.

It is possible that AR's intelligence cell would have picked the smuggling of the consignment in the later stages of Arakan Army effort and missed out on the actual scale.

A top expert on Asia's arms trafficking based in Bangkok told this writer that the Chinese state-owned ordnance company Norinco supplies non-state actors like Arakan Army using some fronts. They have done these for northeast Indian rebels in the past. The expert did not wish to be identified because of possible Chinese counter-measures resenting the disclosure.

He said TCL, a Norinco front, loaded the consignment on a ship at Heibe, a small fishing port in South China in the early part of February, even when the Corona pandemic was raging in China. A TCL manager Lin who also goes by the name of Yuthna was instrumental in loading the cargo on the ship. It is not clear whether the AA has paid TCL or whether the Chinese intelligence would have organised covert payment.

The AA is said to have strong links with China since its formation in Kachin in 2009. Its spokesman Khaine Tukkha recently said "China recognises us while India does not" which explains why AA does not disturb the Chinese deep seaport at Kyaukphyu but kidnaps and badgers Indian construction workers involved in the Kaladan project.

After the consignment was carried into the Sandak (Mro) base near Thanchi, it was taken in small batches on the Thanchi-Naikhong-Farua-Parva-Paletwa route. That the AA has concentrated much strength in Paletwa which is in Chin state bordering Mizoran is perhaps because it is easier to reach arms consignments brought by sea to Paletwa rather than across the Rakhine coast where the Burmese navy is active.

One Rakhine source close to AA said that the consignment brought by AA includes "one of two" F-6 Chinese Manpads capable of shooting down helicopters, drones and combat aircraft that the Burmese army Tatmadaw is now using against the AA formations in both Rakhine and Chin. The Chinese have earlier supplied Manpads to the United Wa State Army, which is so strong that the Tatmadaw does not dare attack it.

The TCL connection has earlier figured in a successful NIA case investigating an attempt by the rebels of the National Socialist Council of Nagaland (Issam-Muivah) to bring in a huge consignment of weapons by the same Monakhali-Wyakaung route in 2010. NIA arrested NSCN 'chief of procurement' Anthony alias Nikkhang Shimray and secured the extradition of Chinese-Thai descent arms smuggler Willy Naruenartwanich alias Willy Narue to stand trial in India.

But under pressure from NSCN(I-M) whose negotiations with the Indian government is now in its final stages, Delhi released Shimray, who had been earlier been picked by Indian intelligence at Kathmandu airport and booked under NSA. Willy also had to be let off and the case practically closed down.

"Willy had told Thai police and then the NIA that the arms consignment for the NSCN was to start from Beihei port in South China Sea near Vietnam to Cox's Bazar in Bangladesh. On the high seas, the consignment was to be shifted to small fishing trawlers to reach Bangladesh, and then to the Northeast," said a top NIA official, but again wishing to remain anonymous.

The NIA had extracted crucial information about Willy's contacts and their bases in Bangladesh and had pushed the Bangladesh government to break the supply chain of arms for the Northeast rebel groups. Willy, of Thai-Chinese origin, was one of the four accused chargesheeted by the NIA in its case number RC-01.

The case was registered by the agency in 2010 in connection with the alleged conspiracy by NSCN (I-M) leaders Anthony Shimray, T.R. Cavlin and Hangshi Ramson, to procure arms and

ammunition from China. They were, however, forced to abort their plan following Shimray's arrest in September 2010. The other two NSCN (I-M) leaders are still absconding.

According to the NIA, a middleman introduced Shimray to Willy, who runs a spa and a restaurant in Bangkok. "Shimray told Willy he wanted to procure 1,000 firearms. Willy introduced Shimray to Yuthna, who is a representative of a Chinese firm called TCL in 2007. TCL is a front for Chinese arms manufacturing giant Norinco and through TCL they have planned to procure the arms and ammunition," the NIA official told Easternlink when it tried to seek background information on the Chinese link with arms trafficking to Northeast India through the Bangladesh route that is now being used by the Arakan Army.

"Shimray had told Yuthna that the NSCN (I-M) wants to procure arms for \$1million (approximately Rs 60 crore), including AK-series automatic rifles, light machine guns, rocket launchers, rocket-propelled grenades and five lakh rounds of ammunition," the official said.

According to him, Shimray had paid \$700,000 to TCL through Willy in May, 2009. He said the NIA has emails exchanged between Shimray and Willy and electronic receipts sent to Shimray for the payment.

Shimray had also paid \$100,000 to shipping agent Kittichai of Intermarine Shipping Company of Bangkok.

The source said the payment was made to the Chinese firm through normal banking channels via a leading private bank's branch in an African country.

"Willy had also allegedly helped Shimray to get an end-user certificate from Laos, which needs to be submitted to the arms manufacturing companies before the purchase and later to the shipping companies for shipment," he said.

In April-May 1995, the Indian army had intercepted a group of Naga, Manipuri and Assamese rebels which was carrying into Northeast a huge consignment of weapons that had been landed at Wyakaung. 38 rebels were killed and 110 arrested by the 57th Division of the Indian army in "Operation Golden Bird" which this writer, then the BBC's East-Northeast India bureau chief, had extensively reported on.

The AA rebels now seem to be using the same route inside Bangladesh (Wyakaung beach to Thanchi to Parva in Mizoram) that the northeastern rebels have used before.

<https://nenow.in/neighbour/bangladesh/chinese-weapons-for-arakan-army-through-bangladesh.html>

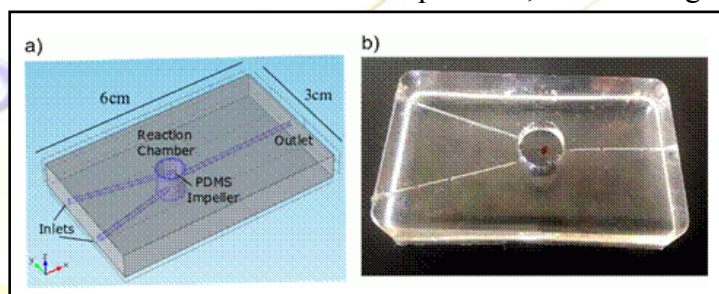
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Thu, 23 April 2020

Microreactor developed by ARI produces uniform size of nanoparticles — a major requirement in biomedical technology

New Delhi: Scientists from Pune based Agharkar Research Institute (ARI), an autonomous institute under the Department of Science & Technology (DST), Govt. of India have developed a microreactor that can produce large quantities of uniform size of nanoparticles, thus serving a major requirement in biomedical technology.

The device could synthesize metal, semiconductor, and polymer nanoparticles by continuous flow active microreactor. Dr Dhananjay Bodas and his team from ARI who put together this microreactor on the basis of their earlier



studies published in the journals Materials Science and Engineering and ACS Applied Materials and Interface also discovered that the parameters such as concentration of reactants, flow rate, agitation, reaction temperature as well as time, determined the size of nanoparticles and their distribution.

They further derived a mathematical equation using dimensional analysis to predict process parameters accurately for achieving true monodispersity (maintaining a uniform size of nanoparticles), and succeeded in synthesizing uniform size of nanoparticles in continuous flow active microreactors (a device in which chemical reactions take place in a confinement with dimensions below 1 mm) with support from SERB, DST.

Nanoparticles possess unique size-dependent properties, which make them useful in biomedical technology but difference in their sizes which arises due to conventional methods of synthesizing them, reduces their efficiency. Maintaining a uniform size of the nanoparticles is a challenge faced by the biomedical industry. Besides, these methods use multiple reagents, are time consuming and produce toxic by-products.

“Using this method, we have now been able to produce gold and silver, cadmium-telluride, chitosan, alginate and hyaluronic acid nanoparticles of any size with coefficient of variation below five percent,” asserted Dr Bodas.

Figure a) Schematic of the microreactor Figure b) Optical image microreactor

“We have observed that monodispersed silver nanoparticles show significant improvement in effectivity as an antimicrobial agent. Monodispersed chitosan and alginate nanoparticles display very high drug entrapment, sustained-release rate, and are biocompatible. They could be passively internalized in the cells due to the uniform and small size. Polymer coated cadmium-telluride quantum dots possess size-tunable fluorescence, high quantum efficiency, and biocompatibility required for multiplexed bioimaging,” said Dr Bodas.

The researchers said the new approach in resolving the monodispersity paradox could be of immense value to researchers working in the field of nanoscience and nanotechnology and the

technique may be applied to other chemical reactions where stringent control on the reaction dynamics is vital.

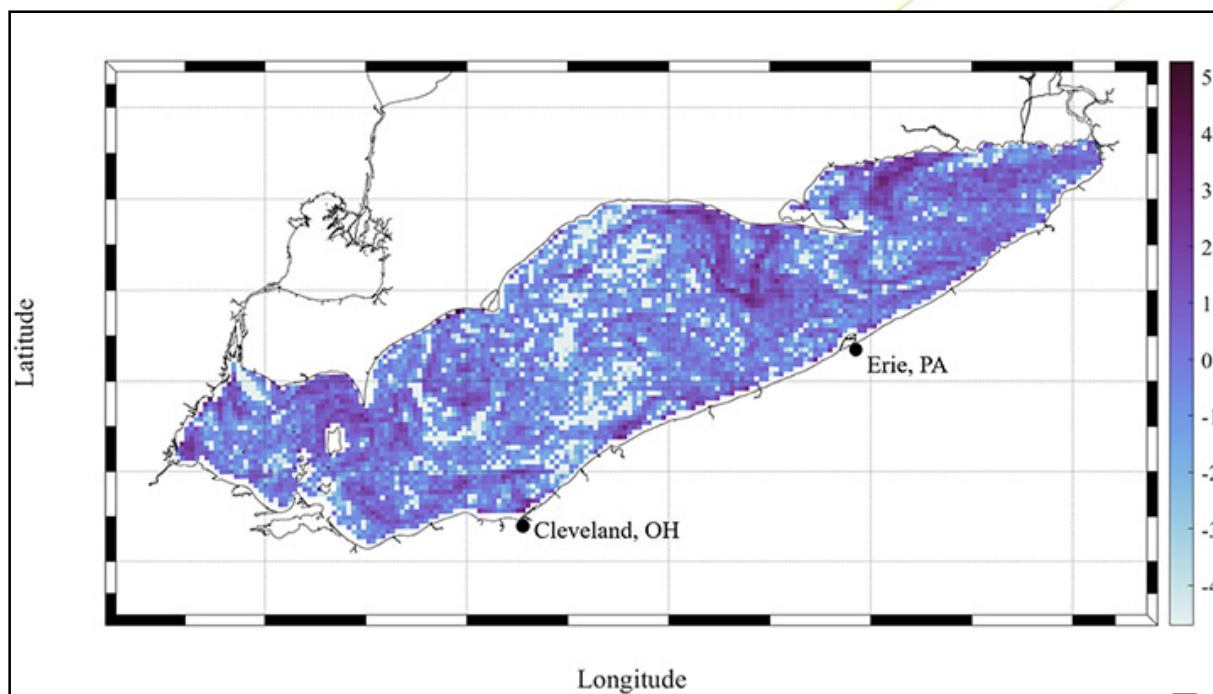
<https://indiaeducationdiary.in/microreactor-developed-by-ari-produces-uniform-size-of-nanoparticles-a-major-requirement-in-biomedical-technology/>

Thu, 23 April 2020

RIT scientists develop first 3D mass estimate of microplastic pollution in Lake Erie

Study shows different types of plastics accumulating in different portions of the lake

Rochester Institute of Technology scientists have developed the first three-dimensional mass estimate to show where microplastic pollution is collecting in Lake Erie. The study examines nine different types of polymers that are believed to account for 75 percent of the world's plastic waste.



RIT scientists developed the first three-dimensional model to show where microplastic pollution is collecting in Lake Erie. This figure is the result of a half-year model simulation of particle count distribution in the lake's open water.

Plastic behaves differently in lakes than in oceans; previous studies on both have indicated the levels of plastic pollution found on the surface are lower than expected based on how much is entering the water. While massive floating “islands” of accumulated plastic waste have been found in oceans, previous studies have indicated the levels of plastic pollution found on the surface of Lake Erie are lower than expected based on how much is entering the water.

The new RIT estimate for the 3D mass—381 metric tons—is more than 50 times greater than the previous estimates at the surface. The study also generated the first estimate of how much plastic is deposited on the bottom of the lake. It accounts for the unique properties of different types of plastics and shows that the three polymers with the lowest density—polyethylene, polypropylene and expanded polystyrene—accumulate on the surface of the lake while the other six polymers were concentrated in the sediment.

“Previously there was a focus on plastics modeled as neutrally buoyant for the most part in the beginning of plastics modeling,” said Juliette Daily, a mathematical modeling Ph.D. student and

author of the study. “In reality, plastic is probably almost never neutrally buoyant. It’s probably always positively or negatively buoyant, which really changes how the particles behave.”

The study shows other interesting patterns, such as plastic particles accumulating more heavily on the eastern shore of the lake, perhaps from the current moving predominantly east to west. This means that pollution could be pushed disproportionately to areas like Buffalo, N.Y. The authors hope other researchers will continue to build on this research and explore how factors like beaching can further explain where plastic particles end up.

“Trying to understand where plastic is going is important for people looking at mitigation or prevention and will be important for understanding what the most likely impacted areas are,” said Matthew Hoffman, associate professor in the School of Mathematical Sciences and co-author of the paper. “Looking at things in the sediment or getting an idea of what is down in the lower levels of the lake will give us a better idea of what concentrations there are and what possible exposure levels are to this eco system.”

The study is to be published in the May 2020 edition of the Marine Pollution Bulletin.

<https://www.rit.edu/science/news/rit-scientists-develop-first-3d-mass-estimate-microplastic-pollution-lake-erie>



Thu, 23 April 2020

Race for space wealth

The asteroid belt is brimming with metals – everything from iron and silver to gold and platinum. It is estimated there is at least \$700 billion worth of mineral wealth in the belt and companies are being set up all around the world to plunder these resources in a gold rush for the 21st century.

Space is undeniably a challenging place for commercial activity. It will play a critical role in allowing humanity to venture away from the planet on a regular basis. The first objective is to obtain elements that are critical for basic sustenance on Earth. Second is to haul precious minerals and cargo raw materials to Earth to fuel its fast depleting resources. Third, asteroids, give humans the potential



to create tools in space, since iron, nickel and cobalt are in abundance. Fourth, many nations are looking at space to diversify out of the earthly benefits of fossil fuel. Fifth, countries like India and China are looking to mine the moon for extracting Helium-3 – this isotope could provide safer nuclear energy. Lastly, the water available in outer space could be used to make rocket propellants.

New mines in space could also provide a new source of rare elements to help create the tools we need to alleviate the current environmental crisis. Solar panels, electric cars and energy-saving light bulbs all rely on elements that are increasingly rare on Earth such as platinum.

In 2019, the Japanese spacecraft Hayabusa-2 successfully collected samples from the asteroid Ryugu, which is approximately 300 million km from Earth. They are expected to arrive on Earth in December.

Australia is also a party to the 1979 Moon Agreement, which allows mineral and other space resources to be used for scientific purposes.

Given the scale of the required investment, companies need legal assurances. In 2015, the US Commercial Space Launch Competitiveness Act asserted the right of US companies to own and sell resources mined in space “obtained in accordance with applicable law, including the international obligations of the United States.”

Some private companies have said they were working on asteroid mining. They included Planetoid Mines Corporation, NEO Resource Atlas, Deep Space Industries, Planetary Resources and Asteroid Mining Corporation Ltd, UK.

Space ventures are high risk with long lead times and heavy capital investment and that is no different for asteroid-mining projects. Some of the categories are – research and development costs, exploration and prospecting costs, construction and infrastructure costs, operational and engineering costs, environmental costs, time costs, etc.

<https://idr.w.org/race-for-space-wealth/#more-225691>

COVID-19 Research

The
Weather
Channel

Wed, 22 April 2020

Oxford University to Begin Human Trials of 'Frontrunner' COVID-19 Vaccine from Thursday

The UK government on Tuesday announced that the human trials of a potential COVID-19 candidate vaccine are being developed by researchers at University of Oxford will begin from Thursday, April 23.

Scientists at the University of Oxford last week promised a super-fast vaccine during a virtual press conference, saying the vaccine will be available by September. According to lead researcher Professor Sarah Gilbert, their 'ChAdOx1' vaccine can work against the coronavirus called SARS-CoV-2.

UK Health Secretary Matt Hancock, during the daily press conference at 10 Downing Street, said the government will provide 20 million pounds to the Oxford research team to help fund their clinical trials, with a further 22.5 million pounds for researchers at Imperial College London, reports The Independent.

"The team have accelerated that trials process, working with the regulator the MHRA (Medicines and Healthcare Regulatory Agency), who have been brilliant. As a result, I can announce that the vaccine from the Oxford project will be trialled on people from this Thursday," said Hancock.

In normal course of time, a vaccine takes anytime between 12-18 months.

What probably separates ChAdOx1—known as recombinant viral vector vaccine—from the rest is the time it promises to take in order to deliver mass quantities.

Professor Andrew Pollard, a member of the Oxford team, told Sky News: "If you had a sailing wind and absolutely nothing goes wrong in all of that complex technical process and you have all the facilities available, you could have millions of doses by the autumn of this year."

In late March, Professor Gilbert received 2.2 million pounds as funding from the UK government for vaccine development and trials.

Researchers enrolled over 500 healthy volunteers to test if their vaccine can prevent the novel coronavirus.

The vaccine is an adenovirus vaccine vector and was developed at Oxford's Jenner Institute. Adenoviral vectors are a very well-studied vaccine type, having been used safely in thousands of participants, from 1 week to 90 years of age, in vaccines targeting over 10 different diseases.

According to Hancock, in the long run, "the best way to defeat coronavirus is through a vaccine".

"This is a new disease, this is uncertain science, but I'm certain that we will throw everything we've got at developing a vaccine," he added.

The Indian Council of Medical Research (ICMR) also pitched for the Oxford vaccine on Sunday, saying 'ChAdOX1' is the frontrunner in the race to take on the deadly COVID-19.

<https://weather.com/en-IN/india/coronavirus/news/2020-04-22-oxford-university-human-trials-frontrunner-covid-19-vaccine>



Thu, 23 April 2020

रिसर्च रिपोर्ट: चीन में कोरोनावायरस का सबसे खतरनाक रूप मिला, यह खुद को और संक्रमण फैलाने का तरीका तेजी से बदल रहा

- खोजकर्ता प्रो. लांजुआन पहले वैज्ञानिक थे जिन्होंने बताया कि कोरोनावायरस वुहान से दुनियाभर में फैल सकता है।
- शोधकर्ताओं की टीम के मुताबिक - कोरोना का यह खतरनाक रूप यूरोप में मिले वायरस के स्ट्रेन की ही तरह है।

वुहान: चीन की झेजियांग यूनिवर्सिटी ने शोधकर्ता प्रो. लांजुआन का दावा है कि उन्होंने कोरोनावायरस का सबसे खतरनाक स्ट्रेन खोजा है। उनका कहना है कि कोरोनावायरस में खुद को तेजी से बदलने (म्यूटेट) की क्षमता है, अब तक इसकी इस खासियत को कमतर आंका गया है। चीन में 11 मरीजों पर हुई स्टडी में इस वायरस का सबसे खतरनाक रूप मिला है। प्रो. लांजुआन चीन के जाने माने वैज्ञानिक हैं। वे पहले वैज्ञानिक हैं जिन्होंने बताया था वुहान से दुनियाभर में महामारी फैल सकती है और यहां लॉकडाउन करना सबसे जरूरी है।

रिसर्च की 4 बड़ी बातें:-

- **चीन के मरीजों में मिला खतरनाक स्ट्रेन:** प्रो. लांजुआन के मुताबिक, लैब में जो कोरोनावायरस के रूप देखे गए, वे अब तक खोजे गए इसके दूसरे स्ट्रेन से खतरनाक हैं। कोरोनावायरस खुद को तेजी से बदलता है और संक्रमण का तरीका भी। शोधकर्ताओं को इस बात की जानकारी तब मिली जब वे चीन के हॉन्गझाउ प्रांत कोरोना से संक्रमित मरीजों पर शोध कर रहे थे।
- **नया स्ट्रेन यूरोप में मिले कोरोना जैसा :** शोधकर्ताओं ने मरीजों के शरीर से कोशिकाएं लीं और उस पर वायरस के नए स्ट्रेन का असर देखा। उन्होंने पाया कि वायरस का यह स्ट्रेन संक्रमण के अलावा मौत की वजह भी बन सकता है। शोध में शामिल 11 मरीजों में वायरस का जो स्ट्रेन मिला है यह यूरोप में मिले कोरोना के स्ट्रेन जैसा ही है। एक

और स्ट्रेन मिला है जो कम खतरनाक है। यह अमेरिका के कोरोना के सबसे कम संक्रमित क्षेत्र में पाया जाने वाले स्ट्रेन जैसा है।

- **वैक्सीन और स्ट्रेन दोनों को समझना जरूरी :** रिसर्च टीम का कहना है कि जितना जरूरी है वैक्सीन तैयार करना उतना ही अहम है उसके बदलते रूपों के कारण पड़ने वाले असर को समझना। दुनियाभर में इस वायरस का सबसे बुरा असर अमेरिका, ब्रिटेन, इटली और स्पेन में हुआ है। जर्मनी और न्यूजीलैंड उन देशों में शामिल हैं जहां संक्रमण के मामले कम मिले। वहीं स्वीडन में संक्रमण और मौत दोनों के ही मामले कम रहे हैं।
- **कोरोना के 30 अलग-अलग रूप विकसित हुए :** प्रो लांजुआन और उनकी टीम के मुताबिक, कोरोनावायरस ने अपने 30 रूप विकसित किए हैं। इसकी दवा न विकसित हो पाने की एक वजह यह भी कि शोधकर्ताओं ने इसके रूप (म्यूटेट) बदलने की क्षमता को नजरअंदाज किया है। रिसर्च के दौरान इस बात पर ध्यान ही नहीं दिया गया।

भारत में कोरोनावायरस सिंगल म्यूटेशन में

काउंसिल ऑफ साइंटिफिक एंड इंडस्ट्रियल रिसर्च के विशेषज्ञ डॉ. सीएच मोहन राव के मुताबिक, भारत में कोरोनावायरस सिंगल म्यूटेशन में है। इसका मतलब है कोरोनावायरस अपना रूप नहीं बदल पा रहा है। अगर ये सिंगल म्यूटेशन में रहेगा तो जल्दी खत्म होने की संभावना है। अगर वायरस का म्यूटेशन बदलता है तो खतरा बढ़ेगा और वैक्सीन खोजने में भी परेशानी होगी।

कैम्ब्रिज यूनिवर्सिटी के शोधकर्ताओं ने खोजे कोरोना के तीन स्ट्रेन

चीन से पहले कैम्ब्रिज यूनिवर्सिटी के शोधकर्ताओं ने कोरोनावायरस के ऐसे 3 स्ट्रेन्स का पता लगाया जिसने पूरी दुनिया में संक्रमण फैलाया। इन्हें टाइप-ए, बी और सी नाम दिया गया है। शोधकर्ताओं ने संक्रमित हुए इंसानों में से वायरस के 160 जीनोम सीक्वेंस की स्टडी की। ये सीक्वेंस अमेरिका और ऑस्ट्रेलिया में फैले कोरोनावायरस से काफी हद तक मिलते-जुलते थे, न कि वुहान से। ये वायरस के वो स्ट्रेन थे जो चमगादड़ से फैले कोरोनावायरस से मिलते थे। रिसर्च टीम ने 24 दिसम्बर 2019 से 4 मार्च 2020 के बीच दुनियाभर से सैम्पल लेकर डाटा तैयार किया। नए कोरोनावायरस के तीन ऐसे प्रकार मिले जो एक-दूसरे जैसे होने के बावजूद अलग थे।

- **टाइप-ए:** यह कोरोनावायरस का वास्तविक जीनोम था, जो वुहान में मौजूद वायरस में है। इसका म्यूटेशन हुआ और उनमें पहुंचा जो अमेरिकन वुहान में रह रहे थे। यहां से लौटने वाले अमेरिकी और ऑस्ट्रेलिया के लोगों में यही वायरस उनके देशों में पहुंचकर फैला।
- **टाइप-बी :** पूर्वी एशियाई देशों में कोरोनावायरस का यह स्ट्रेन सबसे फैला। हालांकि, यह स्ट्रेन एशिया से निकलकर दूसरे देशों में अधिक नहीं पहुंचा।
- **टाइप-सी:** यह स्ट्रेन खासतौर पर यूरोपीय देशों पाया गया। इसके शुरुआती मरीज फ्रांस, इटली, स्वीडन और इंग्लैंड में मिले थे। रिसर्च के मुताबिक, इटली में यह वायरस जर्मनी से पहुंचा और जर्मनी में इसका संक्रमण सिंगापुर के लोगों के जरिए हुआ।

<https://www.bhaskar.com/coronavirus/news/china-coronavirus-covid-19-research-latest-update-on-deadliest-strain-127214180.html>