

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 ऑटोमेटेड 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



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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/>

