

Nuclear, Missile & Space Digest

Volume 11, Number 01

A Fortnightly Newsletter from the Indian Pugwash Society

January 15, 2019

**Convener (Interim)
&
Editor**

Dr Rajiv Nayan

Executive Council

**Lt Gen (Dr) B S Malik,
PVSM, AVSM (Retd)**

Prof Amitav Mallik

Prof Rajesh Rajagopalan

Shri M V Rappai

Prof Varun Sahni

Contents

A. India

- Status of Work in GCNEP
- Neutrino Observatory
- GSLV-F11 successfully launches GSAT-7A
- 'Aware Of Pak Expanding Nuclear Weapons Capability': Defence Minister, NDTV
- Reusable Rocket Technology
- Space Technology Based Tools
- India Plans to Pay Five Iran Banks for Oil Purchases
- RM Launches Web Page on 'Drone Olympics' event at Aero India - 2019
- Cabinet apprised of Framework Agreement between India and Sao Tome & Principe for Cooperation in the Exploration and Uses of Outer Space for Peaceful Purposes
- Boost to India's Space Program- Cabinet approves Indian Human Spaceflight Initiative: Gaganyaan Programme
- '15,000 tonnes of uranium needed to achieve supply security of fuel for nuclear plants'
- 2018: Landmark year for DRDO, New Indian Express
- How defence sector boosted India's firepower in 2018, India Today
- Govt exempts rupee payments for Iran oil from hefty taxes, Livemint
- Indo-US 2+2 Dialogue
- Progress In Production of Tejas

B. US & Europe

- EDF extends outages at British nuclear plant where cracks were found
- Exclusive: U.S. to offer 'black box' nuclear waste tech to other nations
- Retiring U.S. coal, nuclear plants pose reliability challenges -NERC
- Interview With Steve and Ted in the Morning of KNSS Radio
- Interview With Bryce Dolan of 550 KFRM-AM
- Interview With Brian Grimmett of KMUW Wichita Public Radio
- Interview With Steve Inskeep of NPR
- Congress Passes Bipartisan Nuclear Energy Bill Critical for Industry Reform



Indian Pugwash Society

No.1, Development Enclave,
Rao Tula Ram Marg, Near USI, Delhi-110010
Email: indianpugwashsociety@gmail.com

Tel. No (91-11) 2671-7983

Fax No. (91-11)2615-4192

- Germany would oppose new nuclear missiles in Europe: Foreign Minister
- New Tor-M2 battery starts to guard Belarus' nuclear power plant
- Czechs not looking at Hungary-type deal to build nuclear power plants: PM

C. Russia & Central Asia

- Vladimir Putin on nuclear war: U.S. is pushing world 'closer to a very dangerous line'
- Uzbek lawmakers learn about Russian nuclear power, World Nuclear News
- Russia warns of global conflict over nuclear pact collapse
- Finnish-Russian nuclear reactor pushed back to 2028
- Russia Begins Testing Nuclear Weapon That Can Travel Underwater And 'Nothing' Can Stop It, Report Says, Newsweek
- Putin says Russia is ready to deploy new hypersonic nuclear missile
- Russia's Rosatom tells Chile it can help boost lithium output

D. China

- World-class Hualong One nuclear power plant: Learning from experience
- Popular Chinese drone CH-4 to upgrade engine
- Ultrafast anti-ship missiles offered for sale
- China on the way to becoming a major space power
- 100th Wing Loong armed reconnaissance drone to be delivered to international client

E. East, South & South-East Asia

- World's only floating nuclear power plant gets ready to connect to Russian grid
- IAEA Reviews the Philippines' Nuclear Power Infrastructure Development
- NK says US blocking 'path'
- Hitachi has not given up yet on UK nuclear project - exec
- Outcome of ROK-Russia Meeting of Head Delegates to Six-Party Talks
- Reactor at third nuclear power plant shut down: Taipower
- Hopes dwindle for nuclear plant exports as growth strategy
- North Korea rejects denuclearization unless U.S. 'nuclear threat' is eliminated
- U.S. envoy on N. Korea visits border village amid stalemate
- North Korea media says denuclearization includes ending 'U.S. nuclear threat'
- Denuclearization needs 'complete removal' of US threat: North Korea
- Japan accuses South Korea of 'extremely dangerous' radar lock on plane
- Japan Inc exit from nuclear exports would leave field to Russia, China
- ROK-Japan Meeting of Top Negotiators on North Korean Nuclear Issue Takes Place
- JAEA: Closing 79 nuclear facilities will cost at least 1.9 trillion yen
- Japan's two strategic documents cross the exclusive defense policy bottom line
- No picture showing its nuclear weapons or military developments in the ongoing North Korean photo exhibition in Beijing

F. Iran

- French police's handling of protests 'unacceptable': Tehran
- JCPOA an asset for regional peace: Rouhani aide
- Zarif: Sanctions only hurt ordinary Iranians but fail to change Tehran's policy
- The West 'parrots' Netanyahu's whines about Iran's conventional missiles, Zarif regrets
- Araqchi meets Finnish officials in Helsinki
- Mogherini: JCPOA has opened new channels to engage with Iran
- Iran won't keep silent about JCPOA violations: Kharrazi
- Mogherini: JCPOA has opened new channels to engage with Iran
- Iran's Persian rug-makers suffer as US unravels nuclear deal
- Trump: 'US is not the Middle East's policeman
- US aircraft carrier enters Arabian Gulf after long absence
- Iran, Turkey express dismay over regional impacts of sanctions
- Diplomat calls Iran, Russia reliable partners
- IRGC holds military drills in Persian Gulf
- Iran's Guard launches drill near Strait of Hormuz
- Turkey Expects Extension of Iran Sanctions Waiver, Minister Says
- IRGC plans to develop speed boats with stealth technology

G. West Asia & Africa

- U.S. lawmakers seek oversight over any Saudi nuclear power deal

H. Pakistan

- China's 'Belt and Road' Plan in Pakistan Takes a Military Turn
- Pakistan notifies revised control lists under the Export Control Act of 2004, The Express Tribune
- US set aside its nuclear proliferation concerns of Pakistan for support in Afghanistan, The Indian Express
- Soviet era documents show US helped Pakistan build its nuclear bomb in lieu of support in Afghanistan, Firstpost
- Afghan war helped Pakistan keep nuclear option: US papers, Dawn
- PML-N makes Pakistan nuclear power: Amir Muqam,
- Pakistan is a responsible nuclear state: President Alvi, The Express Tribune

I. Misc/Global/Opinion/Reports

- What to do with used nuclear fuel, from Illinois to California
- Delicate Footwork: Security and Diplomacy on the Korean Peninsula
- How 1971 war Brought Pakistan Closer to Nuclear Bomb, Modern Diplomacy
- Robert Oppenheimer: The myth and the mystery
- When Kim Jong-un Speaks, the United States Should Listen Carefully
- Iranian missiles: Hypocrisy and paradox

- Anatomy of Iran's Deception and How Iran Benefited
- The Nuclear Energy Debate: The Climate is Changing
- Will tech revolution overwhelm global system?
- Viewpoint: The logic of nuclear power for Central Asia, World Nuclear News
- What I learned at work this year
- Don't play on public sentiment
- Independent European army: A dream which will never come true
- Additive Manufacturing in 2040: Powerful Enabler, Disruptive Threat

A. India

Status of Work in GCNEP *DAE, PIB, December 19, 2018*

Phase-I of the project titled "Establishment of Global Centre for Nuclear Energy Partnership (GCNEP)" at Kheri Jasaur, near Bahadurgarh, Haryana has been completed.

30th September 2020 is the date of Phase -II of the project.

Rs.142 crore for Phase - I, which has been completed in March, 2017. Total sanctioned cost for completion of Phase -II is Rs. 811 crore.

The details of CSR activities started/planned at Jasaur Kheri or nearby areas are as follows:-

As a part of CSR activities, DAE has agreed to make a contribution of Rs. 10 crore.

As a part of the above commitments, DAE has so far released the following funds:-

Rs. 1 crore for Government Girls College at Jasaur Kheri (Jhajjar).

Rs. 1 crore for two Computer Training Centres, one at Bahadurgarh and other at Islamgarh (Chhuchhakwas).

Rs. 20 lakh for two Common Service Centre, one at Mini Secretariat, Bahadurgarh and other at Mini Secretariat, Beri.

This was stated by the Minister of State in Ministry of Personnel, PG & Pension and in the Prime Minister's Office, Dr. Jitendra Singh in a written reply to question in the Lok Sabha today.

<http://www.pib.nic.in/newsite/erelease.aspx>

Neutrino Observatory *DAE, PIB, 19-December, 2018*

Environmental Clearance has been obtained on 27.03.2018. India based Neutrino Observatory (INO) has applied for Wildlife Clearance to the Govt. of Tamil Nadu in early 2018, as also building clearances for the Inter Institutional Centre for High Energy Physics (ICHEP), Madurai and INO, Pottipuram sites. Clearance from the Tamil

Nadu Pollution Control Board (PCB) has to be applied after obtaining above clearances.

The Madurai bench of the Hon'ble Madras High Court had in its order of March 2015 said that no scientific work can start at the underground site before getting clearance from the Tamil Nadu PCB. On the other hand the Environmental Clearance obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) in March 2018 was challenged in the National Green Tribunal (NGT) and has been upheld.

There have been some complaints regarding access to a temple and grazing for cattle from the residents of nearby villages. INO authorities have taken up outreach programme in the matter.

This was stated by the Minister of State in Ministry of Personnel, PG & Pension and in the Prime Minister's Office, Dr. Jitendra Singh in a written reply to question in the Lok Sabha today.

<http://www.pib.nic.in/newsite/erelease.aspx>

GSLV-F11 successfully launches GSAT-7A *PIB, December 19, 2018*

Indian Space Research Organisation's (ISRO) Geosynchronous Satellite Launch Vehicle (GSLV-F11) successfully launched the communication satellite GSAT-7A from the Satish Dhawan Space Centre (SDSC) in Sriharikota today.

The GSLV-F11 lifted off from the Second Launch Pad at SDSC at 04:10 pm IST, carrying 2250 kg GSAT-7A and about 19 minutes later, injected GSAT-7A into a Geosynchronous Transfer Orbit (GTO) of 170.8 km x 39127 km which is very close to the intended orbit.

An ISRO team lead by Chairman Dr K Sivan, Vikram Sarabhai Space Centre (VSSC) S Somanath, U R Rao Satellite Centre (URSC) Director P Kunhikrishnan, Space Applications Centre (SAC) Director D K Das, SDSC Director S Pandian, Liquid Propulsion Systems Centre (LPSC) Dr V

Narayanan and ISRO Propulsion Complex (IPRC) Director T Mookiah witnessed the launch.

Mission Director Mohan M and Satellite Director Killedar Pankaj Damodar oversaw the launch proceedings.

Soon after the separation of the satellite, ISRO's Master Control Facility (MCF) at Hassan in Karnataka took over the command and control of GSAT-7A. The satellite's health parameters are normal.

In the next few days, scientists at MCF will perform various orbit-raising manoeuvres, using GSAT-7A's onboard propulsion system, to place the satellite in its final geostationary orbit.

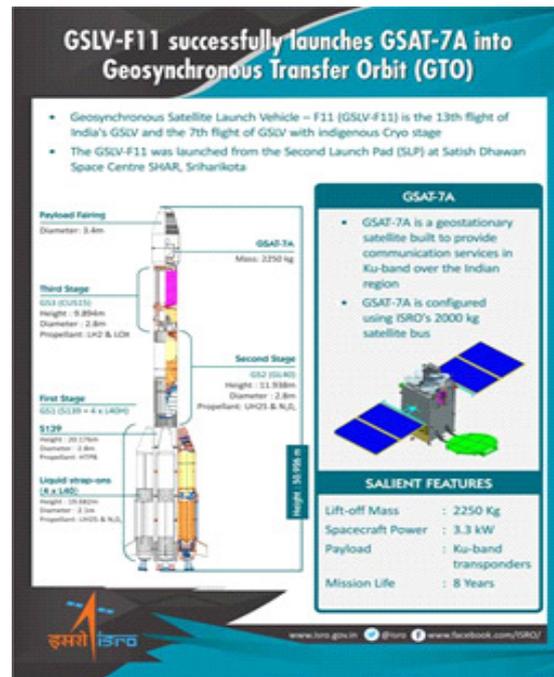
In his post-launch address, Dr Sivan said the team has achieved another spectacular milestone by launching GSAT-7A.

"In the last 35 days, ISRO has successfully launched three missions from SDSC starting with GSLV MkIII-D2 on November 14, PSLV-C43 on November 29 and finally GSLV-F11 today. GSLV has successfully injected GSAT-7A into a super synchronous transfer orbit," Dr Sivan said.

He said GSAT-7A is the heaviest satellite being launched by GSLV with an indigenously developed cryogenic stage.

"The cryogenic stage of this vehicle has been modified to increase the thrust rate. GSAT-7A is an advanced communication satellite with a Gregorian Antenna and many other new technologies. The testing and realisation of this satellite has been carried out meticulously by ISRO team. We have signed off year 2018 on a high and positive note," Dr Sivan added.

GSLV is ISRO's fourth generation launch vehicle with three stages. The four liquid strap-ons and a solid rocket motor at the core form the first stage. The second stage is equipped with a high thrust engine using liquid fuel. The cryogenic upper stage forms the third and final stage of the vehicle. GSLV-F11 was the seventh flight carrying indigenously developed cryogenic upper stage.



GSAT-7A is the 39th Indian communication satellite of ISRO to provide services to the users in Ku-band over the Indian region. Most of the functional requirements of the communication payloads and the other systems have been derived from ISRO's earlier geostationary INSAT/GSAT satellites.

Today's launch was the 7th mission of ISRO from SDSC in the year 2018. This was the 13th flight of GSLV-MkII.

<http://pib.nic.in/PressReleaseDetail.aspx?PRID=1556692>

Aware of Pak Expanding Nuclear Weapons Capability: Defence Minister NDTV, December 19, 2018

The government on Wednesday said it was aware of reports on expansion of Pakistan's capability for production of fissile material for nuclear weapons and asserted that it was committed to take all necessary steps to respond to any threat "suitably". Defence Minister Nirmala Sitharaman, replying to a question in Lok Sabha, said the government continues to monitor developments in this regard.

"Government is aware of reports on the expansion of Pakistan's capability for fissile material production for nuclear weapons, the expansion in its delivery capabilities

and purported development of tactical nuclear weapons," she said. The minister said the government was "committed to take all necessary steps to safeguard national security and respond to any threat suitably and adequately".

To a separate question on whether India has lost any territory as a result of international agreement and wars since independence or whether the country has gained any foreign territory through global pacts or wars during the period, she said the information is being collected from the ministries concerned.

<https://www.ndtv.com/india-news/defence-minister-nirmala-sitharaman-says-aware-of-pak-expanding-nuclear-weapons-capability-1965294>

Reusable Rocket Technology PIB, *December 19, 2018*

ISRO is working on reusable technology for reducing the cost of access to space including the development of a winged body unmanned reusable launch vehicle for launching payloads into low earth orbits. ISRO has successfully developed a scaled down (1:5) technology demonstration version of Reusable Launch Vehicle - Technology Demonstrator (RLV-TD) vehicle and successfully carried out the first experimental mission on May 23, 2016 from Satish Dhawan Space Centre, Sriharikota. In this mission, critical technologies such as autonomous navigation, guidance & control and reusable thermal protection system have been successfully demonstrated.

Development of Reusable Launch Vehicles is a technical challenge and it involves the development of many cutting edge technologies. A series of technology demonstration missions would be required to validate these technologies. In the next phase, an autonomous runway landing experiment is planned releasing the RLV-TD vehicle from a helicopter to demonstrate the runway approach and landing capability. This will be followed by an end-to-end orbital re-entry mission demonstration using a Technology Demonstration Vehicle boosted by propulsion systems.

ISRO has undertaken the development &

qualification of Semi-Cryogenic engine. Further development activities are planned to realise a Semi-cryogenic stage and uprated version of the high thrust GSLV Mk III cryogenic stage, in order to increase the payload capacity of GSLV Mk III from 4 tonnes to 6.5 tonnes. This was stated by the Minister of State in Ministry of Personnel, PG & Pension, Dr. Jitendra Singh in a written reply to question in the Lok Sabha today.

<http://pib.nic.in/PressReleaseDetail.aspx?PRID=1556702>

Space Technology Based Tools PIB, *December 19, 2018*

Department of Space (DOS) has interacted with 60 Central Ministries/Departments on various themes and joint action plans on space applications were prepared. 158 Space Application projects were identified across nine basic themes.

Out of 158 identified projects, 94 projects have been completed, 35 projects are in progress and 29 projects were withdrawn by the respective Ministries/Departments. The current status of implementation, theme-wise, is as under:

| Themes | Total No of Projects | Completed | Ongoing |
|-------------------------------|----------------------|-----------|---------|
| Agriculture | 15 | 9 | 6 |
| Energy and Environment | 32 | 20 | 7 |
| Infrastructure Planning | 17 | 13 | 1 |
| Water Resources | 12 | 8 | 3 |
| Technology Diffusion | 14 | 6 | 3 |
| Developmental Planning | 17 | 8 | 4 |
| Communication and Navigation | 23 | 12 | 2 |
| Weather & Disaster Management | 7 | 5 | 2 |
| Health & Education | 21 | 13 | 7 |

2019 and the remaining to be completed by December, 2021. The details of funds spent are given below:

| Themes | Fund Spent (Rs in Crores) |
|------------------------------|------------------------------|
| Agriculture | 2.1 (for 8 projects) |
| Energy and Environment | 8.02 (for 9 projects) |
| Infrastructure Planning | 1.53 (for 1 project) |
| Water Resources | 12.8 (for 4 projects) |
| Technology Diffusion | 1.37 (for 3 projects) |
| Developmental Planning | 15.29 (for 6 projects) |
| Communication and Navigation | 2.5 (for 1 project) |
| Health & Education | 14.78 (for 3 projects) |

Remaining projects are carried out as part of internal activities of DOS/ISRO.

This was stated by the Minister of State in Ministry of Personnel, PG & Pension and in Prime Minister's Office, Dr. Jitendra Singh in a written reply to question in the Lok Sabha today.

<http://pib.nic.in/PressReleaseDetail.aspx?PRID=1556703>

India Plans to Pay Five Iran Banks for Oil Purchases *Santosh Kumar, Debjit Chakraborty, and Pradipta Mukherjee, Bloomberg, December 19, 2018*

India will use escrow accounts of five Iranian banks held with UCO Bank Ltd. to deposit money for oil purchases from the Middle East producer to overcome U.S. sanctions, according to people with knowledge of the matter.

Iran will use part of the deposits for purchasing essential goods from India and to meet expenditure incurred by its diplomatic missions in the South Asian nation, the people said, asking not to be identified because the information isn't public. All spending will be in Indian rupees.

Continued supplies is crucial for India, a country that imports nearly 80 percent of

its annual crude requirement, as Tehran offers better credit terms than other Middle East oil producers and, in the past, has accepted payments in Indian rupees, rather than U.S. dollars. The south Asian nation purchased crude worth about \$9 billion from Iran in the financial year ended March 31.

https://www.bloomberg.com/news/articles/2018-12-18/india-is-said-to-plan-paying-five-iran-banks-for-oil-purchases?utm_source=Eye%20on%20Iran%3A%20Iran%20Stays%20Export%20To%20Defend%20Rial%20Against%20U.S.%20Sanctions&utm_campaign=eye-on-iran&utm_medium=email

RM Launches Web Page on 'Drone Olympics' event at Aero India - 2019 *PIB, December 28, 2018*

Raksha Mantri Smt Nirmala Sitharaman launched a newly designed web page here today for 'Drone Olympics' (<https://aeroindia.gov.in/Drone>), scheduled to be held at Aero India - 2019 at Air Force Station, Yelahanka, Bengaluru. The web page is open for registration of UAV players interested in taking part in the maiden event of the Aero India.

It will not only encourage the UAV manufacturing in the country but also provide an opportunity to the Armed Forces to assess the capabilities that exist in the world. The UAV market is one of the fastest growing fields in the world. Role of UAVs in defence sector is ever-increasing on account of new additionalities being added to them making them fit for intelligence, surveillance, reconnaissance, electronic warfare and strike missions.

'Drone Olympics' is open to both Indian and international players. Three categories of the event, planned during the competition are Surveillance Challenge with four sub-categories which will determine the surveillance capability of the UAVs. Supply Drop Challenge to assess weight dropping capability and Formation Flying Challenge demonstrating different shapes with group of UAVs. The winners will be honoured with medals and a cash prize of Rs. 38

lakhs to top three winners of each competition. Last date of registration to participate in event is January 26, 2019.

<http://pib.nic.in/PressReleaseDetail.aspx?PRID=1557696>

Cabinet apprised of Framework Agreement between India and Sao Tome & Principe for Cooperation in the Exploration and Uses of Outer Space for Peaceful Purposes *PIB,*

December 28, 2018

The Union Cabinet chaired by Prime Minister Shri Narendra Modi has been apprised of Framework Agreement between India and Sao Tome & Principe on Cooperation in the Exploration and Uses of Outer Space for Peaceful Purposes. The Framework Agreement was signed in New Delhi, on 7th September 2018.

The Framework Agreement will provide impetus to explore newer research activities and application possibilities in the field of remote sensing of the earth; satellite communication; satellite navigation; space science and exploration of outer space. This Framework Agreement would lead to develop a host of joint activities in the field of application of space technologies for the benefit of humanity. Thus all sections and regions of both the countries are benefited.

The Framework Agreement will provide impetus to explore newer research activities and application possibilities in the field of remote sensing of the earth; satellite communication; satellite navigation; space science and exploration of outer space. It would lead to develop a host of joint activities in the field of application of space technologies for the benefit of humanity. Thus all sections and regions of both the countries are benefited.

Subsequent to communications from the Ministry of External Affairs (Nov. 2017) and the National Security Council Secretariat - NSCS (Jan. 2018) seeking the views of Department of Space (DOS) on the Government of Democratic Republic of Sao-

Tome and Principe's interests for space cooperation with India including consideration of DoS setting up a satellite tracking station in Sao-Tome and Principe and its financial implications, ISRO carried out a preliminary study of the geographical location of Sao-Tome and Principe and conveyed to NSCS the suitability of Sao-Tome and Principe for an Indian Satellite Ground Station and the financial implications of establishing it.

<http://pib.nic.in/PressReleaseDetail.aspx?PRID=1557598>

Boost to India's Space Program Cabinet approves Indian Human Spaceflight Initiative: Gaganyaan Programme *PIB, December 28, 2018*

*Two unmanned & one manned flight planned
First manned flight in 40 months
Estimates for Phase-I expenditure- Rs 9023 Crores*

The Union Cabinet chaired by Prime Minister Shri Narendra Modi has approved the Gaganyaan Programme with demonstration of Indian Human Spaceflight capability to low earth orbit for a mission duration ranging from one orbital period to a maximum of seven days. A human rated GSLV Mk-III will be used to carry the orbital module which will have necessary provisions for sustaining a 3-member crew for the duration of the mission. The necessary infrastructure for crew training, realization of flight systems and ground infrastructure will be established to support the Gaganyaan Programme. ISRO will collaborate extensively with National agencies, laboratories, academia and industry to accomplish the Gaganyaan Programme objectives.

First human space flight demonstration is targeted to be completed within 40 months from the date of sanction. Prior to this, two unmanned flights in full complement will be carried out to gain confidence on the technology and mission management aspects. Human spaceflight programme

will provide a unique micro-gravity platform in space for conducting experiments and test bed for future technologies.

<http://pib.nic.in/PressReleaseDetail.aspx?PRID=1557588>

'15,000 tonnes of uranium needed to achieve supply security of fuel for nuclear plants', *The Economic Times*, December 30, 2018

A stockpile of 15,000 tonnes of uranium is required for achieving supply security of fuel for nuclear plants in the country, the Department of Atomic Energy (DAE), which manages atomic energy installations, has told a parliamentary panel.

The panel report, which was tabled before the Lok Sabha in the on-going Parliament session, also recommended that necessary steps should be taken to ensure new uranium mines are opened as soon as possible to reduce the dependence on the imported uranium.

Currently, a major portion of domestic production of uranium comes from the Jaduguda mines of Jharkhand, which are "old" and the ore is found at "great depths." Moreover, the high extraction cost makes it "unviable" as compared to imported uranium, the panel noted.

Besides the Jaduguda mines, the uranium is extracted from the Tummalapalle mines in Andhra Pradesh. Apart from Jaduguda, uranium reserves are available in Meghalaya, Andhra Pradesh, Rajasthan, Haryana, Karnataka and Tamil Nadu.

<https://economictimes.indiatimes.com/industry/energy/power/15000-tonnes-of-uranium-needed-to-achieve-supply-security-of-fuel-for-nuclear-plants/articleshow/67309739.cms>

2018: Landmark year for DRDO, *The New Indian Express*, December 31, 2018

2018 was a landmark year for the country's elite Defence Research and Development Organisation (DRDO) as it helped enhance the credibility of India's nuclear deterrence with most of the indigenously developed missiles and weapon systems tasting success during both experimental and user trials.

The DRDO and armed forces conducted tests of 20 missiles, including two newly developed systems and advanced version of Pinaka rocket. The missiles, which were put to tests, are Agni-I, Agni-II, Agni-IV, Agni-V, Prithvi-II, Dhanush, BrahMos, Prahar, Astra, Quick Reaction Surface-to-Air Missile (QRSAM), Stand off anti-tank (Sant) guided missile, AAD and PDV interceptors, anti-tank guided missile Helina, submarine-launched B-05 and Man-Portable Anti Tank Guided Missile (MPATGM).

Captive flight trials were also successfully conducted in September. Other developments Maiden flight of indigenously developed Automatic Flight Control System (AFCS) integrated on LCH has been conducted successfully by Hindustan Aeronautics Limited (HAL) on January 31. The flight was of 20 min duration and engagement of this system was flawless throughout the flight. Third submarine of the Scorpene/Project-75 (Karanj) was launched by Mazagon Dock Shipbuilders Limited on the same day.

Flying high

| Date | Name of Missile | Test facility | Result |
|-----------|--------------------------|------------------------|----------------------|
| Jan 18 | Agni-V | Kalam Island/Odisha | Successful |
| Feb 6 | Agni-I | Kalam Island | Successful |
| Feb 7 | Prithvi-II | Chandipur/Odisha | Successful |
| Feb 20 | Agni-II | Kalam Island | Successful |
| Feb 21 | Prithvi-II (night trial) | Chandipur | Successful |
| Feb 23 | Dhanush | Ship off Odisha coast | Successful |
| March 22 | BrahMos | Pokharan/Rajasthan | Successful |
| April 9 | QRSAM | Chandipur | Partially Successful |
| May 10-18 | Sant | Chandan/Rajasthan | Successful |
| May 21 | BrahMos | Chandipur | Successful |
| May 30 | SFDR | Chandipur | Successful |
| May-30-31 | Pinaka (MK-II) | Chandipur | Successful |
| June 3 | Agni-V | Kalam Island | Successful |
| July 16 | BrahMos | Chandipur | Successful |
| Aug 2 | AAD | Kalam Island | Successful |
| Aug 11-12 | B-05 | INS Arihant | Successful |
| Aug 16-18 | SAAW | Chandan | Successful |
| Aug 19 | Helina | Pokharan | Successful |
| Sep 15-16 | MPATGM | Ahmednagar/Maharashtra | Successful |
| Sep 20 | Prahar | Chandipur | Successful |
| Sep 23 | PDV (night trial) | Kalam Island | Successful |
| Sep 26 | Astra | Su-30MKI | Successful |
| Oct 6 | Prithvi-II (night trial) | Chandipur | Successful |
| Oct 8 | QRSAM | Chandipur | Successful |
| Oct 30 | Agni-I (night trial) | Kalam Island | Successful |
| Nov 9 | Dhanush | Ship off Odisha coast | Successful |
| Nov 24 | Sant | Pokharan | Successful |
| Dec 5 - 8 | Akash, Spyder | Suryalanka/AP | Successful |
| Dec 10 | Agni-V | Kalam Island | Successful |
| Dec 23 | Agni-IV | Kalam Island | Successful |

<http://www.newindianexpress.com/nation/2018/dec/31/2018-landmark-year-for-drdo-1918538.html>

How defence sector boosted India's firepower in 2018, Manjeet Singh Negi, *India Today*, December 31, 2018

Defence sector got massive attention as the Rafale fighter jets deal became a political controversy this year. Here's a hard look back and examines what lies ahead.

India and Russia signed Rs 39,000 crore deal

for acquiring five regiments of the Russian S-400 air defence missile during the two-day visit of Russian President Vladimir Putin in Oct. It gave the defence force a much needed force multiplier against enemy aircraft and missiles.

The missile system can take down enemy missiles and aircraft over a range of 380 km maximum, and can also shoot down

planes at smaller distances up to 100 km. China acquired the S-400 system but its striking range is lower.

After the successful launch of BrahMos, the Akash-S1 surface-to air missile was developed to counter-attack missiles and drones released to hit India. The Akash-S1 is made-in-India equipment which gives it the capability to strike down enemy fighter jets and drones very effectively and accurately.

<https://www.indiatoday.in/mail-today/story/how-defence-sector-boosted-india-s-firepower-in-2018-1420275-2018-12-31>

Govt exempts rupee payments for Iran oil from hefty taxes, Nidhi Verma, LiveMint, December 31, 2018

Finance ministry has exempted rupee payments made to the National Iranian Oil Co (NIOC) for crude oil imports from a steep withholding tax, according to a government order reviewed by Reuters. The exemption, put in place December 28 but backdated to November 5, will allow Indian refiners to settle about \$1.5 billion of outstanding payments to NIOC. Those have been building up since Tehran was put under stringent US sanctions in early November.

The two countries on Nov. 2 signed a bilateral agreement to settle oil trades through an Indian government-owned bank, UCO Bank, in the Indian currency, which is not freely traded on international markets. However, the income of a foreign company that is deposited in an Indian bank account is subject to a withholding tax of 40 % plus other levies, leading to a total take by the authorities of 42.5 %. That made the agreement unworkable for Iran and led to the freeze in payments by the refiners until the exemption could be introduced.

<https://www.livemint.com/Politics/Z7nG4XYSKGOh8o5l7YICGN/Govt-exempts-rupee-payments-for-Iran-oil-from-hefty-taxes.html>

Indo-US 2+2 Dialogue PIB, December 31, 2018

Joint statement on the inaugural India-U.S 2+2 Ministerial dialogue: Minister of

External Affairs Smt Sushma Swaraj and Minister of Defence Smt Nirmala Sitharaman welcomed Secretary of State Michael R. Pompeo and Secretary of Defense James N. Mattis to India on September 6, 2018 for the inaugural India-U.S. Ministerial 2+2 Dialogue. They welcomed the launch of the 2+2 Dialogue as a reflection of the shared commitment by Prime Minister Modi and President Trump to provide a positive, forward-looking vision for the India-U.S. strategic partnership and to promote synergy in their diplomatic and security efforts. They resolved to continue meetings in this format on an annual basis.

They welcomed the inclusion of India by the United States among the top tier of countries entitled to license-free exports, re-exports, and transfers under License Exception Strategic Trade Authorization (STA-1) and also committed to explore other means to support further expansion in two-way trade in defense items and defense manufacturing supply chain linkages. They welcomed the signing of a Communications Compatibility and Security Agreement (COMCASA) that will facilitate access to advanced defense systems and enable India to optimally utilize its existing U.S.-origin platforms. The Ministers also announced their readiness to begin negotiations on an Industrial Security Annex (ISA) that would support closer defense industry cooperation and collaboration.

<http://pib.nic.in/PressReleaseDetail.aspx?PRID=1557922>

Progress In Production of Tejas PIB, December 31, 2018

Light Combat Aircraft Tejas has already achieved Initial Operational Clearance (IOC) in December 2013 for fighter version of aircraft and 10 fighter version aircraft have been delivered to Indian Air Force. These aircraft are equipped with various combat equipment as envisaged for IOC version of aircraft.

Final Operational Clearance (FOC) was initially planned by Aeronautical

Development Agency (ADA) for December 2012. However the same has not yet been achieved by ADA.

Delays in attaining FOC have been mainly due to delay in finalization of Air to Air Refuelling contract; challenges faced in integration of Air to Air Refuelling probe and associated major hardware (structural modification) and software (Flight control software) modification & flight testing etc.

Two contracts were signed between Indian Air Force (IAF) and Hindustan Aeronautics Ltd., (HAL) for procurement of (i) 20 Initial Operational Clearance (IOC) standard aircraft, including 16 IOC fighters and 04 trainers on 31st March 2006 to be completed in December 2011 and (ii) 20 Final Operational Clearance (FOC) standard aircraft including 16 FOC fighters and four trainers on 23rd December 2010 to be completed by December 2016.

<http://pib.nic.in/PressReleaseDetail.aspx?PRID=1557921>

B. US & Europe

EDF extends outages at British nuclear plant where cracks were found *REUTERS, December 18, 2018*

EDF Energy has extended by several weeks outages at its Hunterston nuclear plant in Britain, while the company seeks to prove it is safe for the more than 40-year-old plant to restart after cracks were discovered this year.

Reactors 3 and 4 have been offline since March and October respectively after cracks were found during routine inspections at the plant, which can produce enough electricity to power more than 1.7 million homes.

Before EDF is allowed to restart the reactors it must show they can operate safely. It must present safety cases to Britain's nuclear regulator, the Office for Nuclear Regulation.

<https://uk.reuters.com/article/uk-britain-nuclear/edf-extends-outages-at-british-nuclear-plant-where-cracks-were-found-idUKKBN1OH1HR>

Exclusive: U.S. to offer 'black box' nuclear waste tech to other nations

REUTERS, December 19, 2018

The U.S. Department of Energy's nuclear security office is developing a project to help other countries handle nuclear waste, an effort to keep the United States competitive against global rivals in disposal technology, according to two sources familiar with the matter. The push comes as the United States struggles to find a solution for its own mounting nuclear waste inventories amid political opposition to a permanent dump site in Nevada, proposed decades ago, and concerns about the cost and security of recycling the waste back into fuel.

The National Nuclear Security Administration is considering helping other countries by using technologies that could involve techniques such as crushing, heating and sending a current through the waste to reduce its volume, the sources said. The machinery would be encased in a "black box" the size of a shipping container and sent to other countries with nuclear energy programs, but be owned and operated by the United States, according to the sources, who asked not to be named because of the sensitivity of the matter.

<https://www.reuters.com/article/us-usa-coal-epa/u-s-limits-on-coal-plant-mercury-emissions-too-costly-trumps-epa-idUSKCN1OR1BU>

Retiring U.S. coal, nuclear plants pose reliability challenges -NERC

REUTERS, December 20, 2018

Changes in the North American generation mix from coal and nuclear to natural gas and renewables could threaten power system reliability in some areas over the next decade, the organization responsible for the region's grid said. "With proper planning and considerations that address the changing characteristics of our generation supply, industry will successfully navigate the unique set of reliability challenges that flow

from an evolving resource mix," John Moura, director of Reliability Assessment at NERC, said in a release.

This is the second report by NERC that could help the Trump administration justify its plan to subsidize continued operation of coal and nuclear plants, which are being hurt by low gas prices and growing use of renewables. U.S. President Donald Trump has been advocating for steps to stem a surge in coal and nuclear retirements in recent years, arguing that more shutdowns would leave the country less able to bounce back from disruptions caused by storms, physical attacks, and hackers.

<https://uk.reuters.com/article/usa-nerc-power/retiring-u-s-coal-nuclear-plants-pose-reliability-challenges-nerc-idUKL1N1YP183>

Interview With Steve and Ted in the Morning of KNSS Radio *Michael R. Pompeo, U.S. Department of State, December 20, 2018*

QUESTION: Just fine. And we certainly are able to keep track of you these days. You are front and center. This is - could you please, first of all, update us on what's happening between the U.S. and North Korea these days?

SECRETARY POMPEO: You bet. So, Ted, first of all, thanks for giving me a few minutes to come back on the show. I have great memories of doing this when I was a member of Congress. And now I got this privilege where I get to represent the United States as its senior diplomat in places like North Korea. And we have - we still are working through the execution of Chairman Kim's commitment to denuclearize. I've traveled there now, oh goodness, three or four times. We'll continue to have meetings, and we are hopeful that in the new year President Trump and Chairman Kim will get together not too long after the first of the year and make even further progress on taking this threat to the United States away from us.

QUESTION: In a better situation with them than we were a year ago, obviously?

SECRETARY POMPEO: Undoubtedly. No

more missiles being tested, no more nuclear testing. We're in a better place today.

<https://www.state.gov/secretary/remarks/2018/12/288218.htm>

Interview With Bryce Dolan of 550 KFRM-AM *Michael R. Pompeo, U.S. Department of State, December 20, 2018*

QUESTION: Secretary, I know we don't have a lot of time and we could really spend hours talking about each of these questions. But as briefly as you could, could you explain the status of U.S.-Russia relations?

SECRETARY POMPEO: So it's been a real challenge during our time. President Trump very much understands that this is a nuclear-armed state and to the extent we can find places where we can cooperate and work together, that benefits America. But they have proven not to be reliable partners across almost every front. What they did in Ukraine, the actions they took against our elections - all of these things create risk for the American people and President Trump has been very strong in communicating to the Russians that this kind of behavior is simply unacceptable and we've done all that we can to deter it.

<https://www.state.gov/secretary/remarks/2018/12/288240.htm>

Interview With Brian Grimmett of KMUW Wichita Public Radio *Michael R. Pompeo, U.S. Department of State, December 20, 2018*

QUESTION: Just lastly, because our time is running short, what are the next steps in talks or plans for talks with North Korea? And do you think that they are living up to some of the agreements that President Trump made the last time that he met with Kim Jong-un?

SECRETARY POMPEO: So I never talk about the actual discussions we're having, because they're private conversations on how to work our pathway forward toward the denuclearization of the Korean Peninsula. We're very hopeful that we can

make a significant step. The next public objective is that Chairman Kim and President Trump have both indicated that they want to have a summit, and I am hopeful that not too long after the first of the year we can get the two of them together and make another substantial step along the way towards creating a reduced threat to the United States from North Korea's nuclear weapons arsenal.

<https://www.state.gov/secretary/remarks/2018/12/288239.htm>

Interview With Steve Inskeep of NPR *Michael R. Pompeo, U.S. Department of State, December 21, 2018*

QUESTION: Let me ask about another subject. Has North Korea's Kim Jong-un let you down?

SECRETARY POMPEO: We've known from the very first trip that I took when I was in a previous role that the challenge of denuclearizing North Korea was not one that would be something that would be easy or without bumps in the road or would occur in a way that was like instant pudding. The world doesn't quite work that way.

We have diplomatically, relentlessly worked to support the President's mission statement, which is to denuclearize North Korea. We got the commitment from Chairman Kim. We've made some progress. There remains a long ways to go, but we are hard at even today.

QUESTION: But they haven't agreed to give an accounting of their nuclear weapons, which is something you wanted, and as time passes they're beginning to get concessions. North and South Korea are talking about reopening roads and railroads. The United States is working to loosen travel restrictions. North Korea is getting benefits without giving things up.

SECRETARY POMPEO: The North Koreans have not suffered an economic sanctions regime like the one that the Trump administration has imposed and continues to impose ever.

QUESTION: I think it is fair to say they, however, have been evasive. They've been canceling meetings with your diplomats. Has Kim Jong-un let you down?

SECRETARY POMPEO: It's been a great process. They're not firing rockets. They're not conducting nuclear tests. We have a ways to go, and we will continue to achieve - to work to achieve the President's agenda.

<https://www.state.gov/secretary/remarks/2018/12/288249.htm>

Congress Passes Bipartisan Nuclear Energy Bill Critical for Industry Reform *Nuclear Energy Institute, December 21, 2018*

The Nuclear Energy Innovation and Modernization Act (NEIMA) is a significant, positive step toward reform of the U.S. Nuclear Regulatory Commission fee collection process. This legislation establishes a more equitable and transparent funding structure which will benefit all operating reactors and future licensees. The bill also reaffirms Congress's support for nuclear innovation by working to establish an efficient and stable regulatory structure that is prepared to license the advanced reactors of the future.

<https://www.nei.org/news/2018/congress-bipartisan-bill-for-nuclear-energy-reform>

Germany would oppose new nuclear missiles in Europe: Foreign Minister *REUTERS, December 27, 2018*

Germany would strongly oppose any move to station new medium-range nuclear missiles in Europe if a key Cold War-era arms control treaty is scrapped, German Foreign Minister Heiko Maas told DPA. "Under no circumstances should Europe become a stage for a rearmament debate," the German news agency quoted him as saying in an interview published on Wednesday.

"Stationing of new medium-range missiles would be met with broad resistance in

Germany," he said. The United States has threatened to pull out of the 1987 Intermediate-range Nuclear Forces Treaty, which bans Moscow and Washington from stationing short- and intermediate-range, land-based missiles in Europe.

Russia has said it was planning for a U.S. deployment of new nuclear missiles in Europe following Washington's planned withdrawal from the treaty. Germany's Maas said: "Nuclear rearmament is most certainly the wrong answer."

<https://www.reuters.com/article/us-usa-russia-treaty-germany/germany-would-oppose-new-nuclear-missiles-in-europe-foreign-minister-idUSKCN1OQ0BN>

New Tor-M2 battery starts to guard Belarus' nuclear power plant *Global Times, December 28, 2018*

A new battery of Tor-M2 air defense missile systems has entered service to protect a nuclear power plant under construction in Belarus, the Belarusian Defense Ministry said. Belarusian Defense Minister Andrei Ravkov said combat capabilities of the air force will be strengthened and the air defense system of the nuclear power plant will also be enhanced.

Tor-M2 is an all-weather air defense system designed for air and missile defense at a distance of 15 km and at an altitude of 10 km. The Belarusian nuclear power plant is being built near Ostrovets town, Grodno region, with the help of Russia.

<http://www.globaltimes.cn/content/1133931.shtml>

Czechs not looking at Hungary-type deal to build nuclear power plants: *PM REUTERS, November 30, 2018*

The Czech government is not considering an intergovernmental deal to help build new nuclear power units in the country, Prime Minister Andrej Babis said on Friday. "We are not considering a similar agreement like Hungary has," Babis said at a news conference with Hungarian Prime Minister Viktor Orban when asked about a model

Budapest agreed with Russia in 2014 for building new reactors.

Babis said he had called on majority state-owned electricity producer CEZ to start working on a new project and believed it was commercially beneficial. The government has been discussing the best financing model for the new power station.

<https://www.reuters.com/article/us-czech-nuclear/czechs-not-looking-at-hungary-type-deal-to-build-nuclear-power-plants-pm-idUSKCN1NZ1DX>

C. Russia & Central Asia

Vladimir Putin on nuclear war: U.S. is pushing world 'closer to a very dangerous line' *Yuliya Talmazan and Alexander Smith, NBC News, December 20, 2018*

Russian President Vladimir Putin warned Thursday that the world is underestimating the threat of nuclear war and blamed the U.S. for risking a collapse in global arms controls. The U.S. is threatening to suspend a Cold War treaty limiting medium-range missiles because it says one of Russia's weapons violates the agreement.

During his annual marathon news conference Thursday, Putin insisted that Washington was to blame. "Now they are leaving the treaty on eliminating the short and middle-range missiles," Putin said referring to the Trump administration. "What's next? It's hard to imagine how the situation will evolve. What if those missiles appear in Europe? What do we do then?"

Putin also said there "have not been any negotiations" with the U.S. to extend New START, a separate treaty that caps arsenals of intercontinental ballistic missiles and other weapons. It expires in 2021. "Not interested? Don't need it? Fine," he said. And he warned that nuclear war could "lead to extermination of the whole civilization."

Putin added: "We know how to secure our safety. But, in general, it's very bad for

humanity as it takes us closer to a very dangerous line. It is a very serious question and it is a shame it is being underestimated ... We are now witnessing the collapse of the international system of nuclear containment."

https://www.nbcnews.com/news/world/vladimir-putin-faces-questions-annual-press-conference-n950226?utm_source=AM+Nukes+Roundup&utm_campaign=d10c5802bf-EMAIL_CAMPAIGN_2018_07_25_12_19_COPY_01&utm_medium=email&utm_term=0_547ee518ec-d10c5802bf-391847513

Uzbek lawmakers learn about Russian nuclear power, World Nuclear News *WNN, December 20, 2018*

The legislative chamber of Uzbekistan's parliament met with a delegation from Russian state nuclear corporation Rosatom on 18 December and discussed the Central Asian country's plan to build its first nuclear power plant. Uzbek deputies visited the Novovoronezh nuclear power plant in Russia between 12 and 14 December as part of this ambition, which was unveiled on 19 October by Uzbek and Russian presidents, Shavkat Mirziyoyev and Vladimir Putin. Uzbekistan is the world's seventh-ranking uranium supplier and has one operating research reactor, the WWR-SM, but it has no nuclear power plant. According to a Rosatom statement, the deputy speaker of the legislative chamber, Boris Alikhanov, said a new stage of cooperation had begun between the two countries, and that this included the nuclear power sector.

The visit had included an introduction to unit 1 of Novovoronezh II plant, Russia's first VVER-1200 reactor, was connected to the grid in August 2016. Rosatom said that Novovoronezh II-1 is the reference unit for reactors that will be built at the proposed nuclear power plant in Uzbekistan. "We visited the Novovoronezh nuclear power plant, where we got acquainted with its high-level professionals and technological progress there, and the sixth power unit - a Generation 3+ VVER-1200 reactor. It seemed to us that the priority of the new technology used in this reactor is, above all safety,

including environmental safety," Alikhanov said. The Uzbek delegation had also met with Novovoronezh City Council, which discussed the social and economic development of the city, he said.

<http://www.world-nuclear-news.org/Articles/Uzbek-lawmakers-learn-about-Russian-nuclear-power>

Russia warns of global conflict over nuclear pact collapse

REUTERS, December 22, 2018

Russia said on Saturday that the scrapping of a Cold War era nuclear pact may lead to an arms race and direct confrontation between several global regions, after a proposal by Moscow was rejected in a United Nations vote. Moscow had put forward a resolution in support of the 1987 Intermediate-range Nuclear Forces Treaty (INF) which bans Moscow and Washington from stationing short- and intermediate-range, land-based missiles in Europe.

Russia's foreign ministry said in a statement that the UN had failed to vote in favour of the proposal. "A new blow has been dealt on the global architecture of security and stability. Now, with the collapse of the INF treaty, several global regions could be plunged into the arms race or even into a direct confrontation," it said.

<https://in.reuters.com/article/russia-nuclear-usa/russia-warns-of-global-conflict-over-nuclear-pact-collapse-idINKCN1OL079>

Finnish-Russian nuclear reactor pushed back to 2028 *REUTERS,*

December 23, 2018

The planned start-up of a proposed Finnish-Russian nuclear reactor in western Finland has been pushed back by four years to 2028 as more time is needed to secure the project's licenses.

"The goal is to receive the construction license and to start the construction of the plant in 2021. Accordingly, the commercial operation of the plant would

begin in 2028," the consortium behind the project, Fennovoima, said in a statement.

<https://in.reuters.com/article/finland-nuclear-fennovoima/finnish-russian-nuclear-reactor-pushed-back-to-2028-idINKCN1OM0BM>

Russia Begins Testing Nuclear Weapon That Can Travel Underwater And 'Nothing' Can Stop It, Report Says, Tom O'Connor

News Week, December 25, 2018

Moscow has reportedly begun testing an underwater nuclear weapon that has been touted as invincible by Russian President Vladimir Putin. The Poseidon, previously known as the Status-6 Oceanic Multipurpose System and dubbed Canyon by the U.S.-led NATO Western military alliance, is a state-of-the-art nuclear-capable drone being developed by the Russian armed forces. Citing a defense industry source, the state-run Tass Russian News Agency reported Tuesday that the Russian navy had begun trials for the weapon at sea.

"In the sea area protected from a potential enemy's reconnaissance means, the underwater trials of the nuclear propulsion unit of the Poseidon drone are underway," the source said, according to the official outlet. "We have developed unmanned submersible vehicles that can move at great depths (I would say extreme depths) intercontinentally, at a speed multiple times higher than the speed of submarines, cutting-edge torpedoes and all kinds of surface vessels, including some of the fastest," Putin told his federal assembly in March. "It is really fantastic. They are quiet, highly maneuverable and have hardly any vulnerabilities for the enemy to exploit. There is simply nothing in the world capable of withstanding them."

The Poseidon received its name later that month after the Russian Defense Ministry held a poll in which users also dubbed the Peresvet laser weapon system and 9M730 Burevestnik nuclear-powered cruise missile. A number of reports have claimed that the weapon may be capable of producing massive, radioactive tsunamis that would

pose a threat to major cities. Some experts have corroborated this theory, although they have questioned the tactical effectiveness of this strategy.

<https://www.newsweek.com/russia-test-nuclear-weapons-underwater-report-1271224>

Putin says Russia is ready to deploy new hypersonic nuclear missile *REUTERS, December 26, 2018*

President Vladimir Putin said on Wednesday that Russia would deploy its first regiment of hypersonic nuclear-capable missiles next year, saying the move meant his country now had a new type of strategic weapon. Putin was speaking after overseeing what the Kremlin said was a pre-deployment test of the new missile system, called Avangard.

"This test, which has just finished, ended with complete success," Putin told a government meeting. "From next year, 2019, Russia's armed forces will get the new intercontinental strategic system Avangard ... It's a big moment in the life of the armed forces and in the life of the country. Russia has obtained a new type of strategic weapon." Russia has said the new missile system, one of several new weapons Putin announced in March, is highly maneuverable, allowing it to easily evade missile defense systems.

<https://www.reuters.com/article/us-russia-putin-nuclear/putin-says-russia-is-ready-to-deploy-new-hypersonic-nuclear-missile-idUSKCN1OP0NZ>

Russia's Rosatom tells Chile it can help boost lithium output

REUTERS, December 28, 2018

Russia's state-owned nuclear power company Rosatom has offered Chile's government technology it says can boost output of lithium, a key ingredient in electric vehicle batteries, according to lobbyist transparency filings reviewed by Reuters.

In separate meetings in late November, lobbyists for the Uranium One Group, a

wholly owned subsidiary of Rosatom, told officials at two Chilean agencies they could sustainably boost extraction rates of the ultralight battery metal from brine, improve its quality and net more money in royalties for Chilean coffers.

<https://www.reuters.com/article/us-egypt-blast/bomb-kills-three-vietnamese-tourists-egyptian-guide-near-pyramids-officials-idUSKCN1OR1DK>

D. China

World-class Hualong One nuclear power plant: Learning from experience *Leng Shumei, Global Times, December 17, 2018*

Mao Xidao, the 41-year-old chief engineer of Hualong One, China's self-developed third-generation reactor, told the Global Times that his love for the industry grew as he got to know more and more about it. He noted that although lacked its own standard for nuclear power industry in early 80's, China has reached world leading level in the industry now with the birth of Hualong One. The reactor made fully use of advanced nuclear technology at home and abroad. It combined active and passive safeguards together based on the country's over thirty years' experience in building and operating nuclear power plants.

Such kind of safeguard system is developed after the Fukushima Nuclear Power Plant accident in 2011, according to Mao, who was be appointed as the leader to improve all ongoing CNNC projects after the accident. "In fact, we were ready to start the construction of Hualong One at that time, but could only suspend and go back to review the design again after the historic accident occurred," Mao said. It took about three years to improve the design and complete verification before Hualong One's first pilot project was launched in May 2015 in Southeast China's Fujian Province, which is estimated to be put into operation in 2020.

<http://www.globaltimes.cn/content/1132221.shtml>

Popular Chinese drone CH-4 to upgrade engine *Liu Xuanzun, Global Times, December 18, 2018*

The Chinese CH-4, one of the best-selling armed reconnaissance drones on the international market, will be fitted with a new and stronger engine that would allow it to fly higher than the world's highest peak. The CH-4 will soon see its old piston engine that burns gasoline replaced with a domestically made next-generation heavy-fuel engine that burns kerosene, a spokesperson of the Chinese Academy of Aerospace and Aerodynamics (CAAA) under the China Aerospace Science and Technology Corp (CASC), the drone's manufacturer, told the Global Times on Tuesday.

The exact date for the upgrade and the new designation for the new version will be announced at a later date, the CAAA spokesperson said. The heavy-fuel engine will allow the drone to reach a height of 9,000 meters, according to a Monday report on the WeChat public account of Ordnance Industry Science Technology, a Xi'an-based periodical on national defense industries and technologies. That is even higher than Mount Qomolangma, known in the West as Mount Everest, which is 8,844 meters high. With the old piston engine, the CH-4 can only reach 7,200 meters high, the report said.

Being able to fly higher means the drone is less likely to be detected and hit by a surface-to-air missile and more capable of combat in plateau regions, military experts said. Fu Qianshao, a Chinese air defense expert, told the Global Times on Tuesday that by switching from gasoline to kerosene, the new engine will open the door for the CH-4 to operate on large vessels.

<http://www.globaltimes.cn/content/1132443.shtml>

Ultrafast anti-ship missiles offered for sale *Editor Yao Jianing, China Daily, December 25, 2018*

China is promoting an ultrafast anti-ship ballistic missile, said to be the first of its kind in the international market, to buyers seeking a reliable and affordable deterrence against threats from the sea. China Aerospace Science and Industry Corp, the nation's largest maker of missiles, has brought the CM-401 supersonic anti-ship ballistic missile to market, saying it is capable of making rapid, precision strikes against medium-sized or large vessels, or against land targets.

It said the weapon uses a "near-space trajectory", which means it flies between 20 and 100 kilometers above the earth, and that it maneuvers at hypersonic speeds throughout its flight. The missile will ascend to a certain altitude until its target is acquired. It will then enter an ultrafast terminal dive toward the target, according to CASIC. The company said the CM-401 features strong destructive power, good penetration capability and a mix of trajectories. It added that the missile can be mounted on various platforms, such as ships or land-based launch vehicles.

<http://usa.chinadaily.com.cn/a/201812/25/WS5c21853fa3107d4c3a002a1b.html>

China on the way to becoming a major space power *Li Qiaoyi, Global Times, December, 27, 2018*

Editor's Note: While commercialization has become a common noun in a world that's being propelled by business innovation, its usage in the space sector remains something new, which is especially true with China's space missions. Nonetheless, with the country's Long March carrier rocket series and an array of space start-ups gaining increased global attention, space commercialization is springing into a high frequency phrase. In an exclusive interview with Global Times reporter Li Qiaoyi (GT) earlier in December in Zhuhai, Yang Yiqiang (Yang), the first commander-in-chief of the Long March 11 solid-fuel carrier rockets project, described policy priorities and to-

do lists toward turning China into a major space power.

GT: How do you look at Chinese carrier rockets' outreach into the global market thus far? What do you think might be the obstacles in the path of Chinese carrier rockets taking on their global counterparts?

Yang: It's been a dream for several generations of China's space industry participants to go out to the world. A most notable example is a group visit to the US in 1980s led by Huang Zuoyi, then a Long March rocket engineer. Huang hand-drew a rocket model known as the Long March 2E, proposing to send US satellites aloft atop the rocket equipped with four liquid-fuel strap-on boosters. We put forward plans to get it done in 18 months and the US side didn't quite believe it. But in the late 1980s and early 1990s, we pulled it off completing the relevant contract within 18 months.

Thereafter the Long March rockets carried into orbit Australia's Optus B1 satellite and Motorola's Iridium satellites, setting off our journey into the world of space programs. But I would say the US still takes a jaundiced view of China's space missions, especially after the Report of the Select Committee on US National Security and Military/Commercial Concerns with China, commonly known as the Cox Report after Representative Christopher Cox, was published in 1999.

The main obstacle to Chinese space program's overseas outreach is the US International Traffic in Arms Regulations (ITAR), under which some chip products or even some unimportant items are banned from being carried by Chinese rockets. The ITAR mechanism also stipulates that some of the equipment used in rocket research and manufacturing is not allowed to be sold to China. It is hoped that China and the US could hold high-level talks regarding the issue.

We are now walking a different path, having launched telecommunications satellites for developing countries such as

the Laos, Bolivia and Belarus. In this way the country's space missions are integrated into the Belt and Road initiative, thereby reaching out to the global market. It's inevitable that China's space program would gain a global foothold. I hope the US industry peers and government can be fair-minded and unprejudiced toward China's space missions.

GT: Chinese launch start-ups such as OneSpace and iSpace see growing activities over recent years. How would you describe the role they play in China's space ambitions?

Yang: These companies are truly engaged with the space sector, working on rocket manufacturing. It is rather difficult for a combination of some people with experience in the space sector, students majoring in relevant disciplines, and several investors to explore the industry with high entry barriers. It is by no means an easy mission, considering a lack of technological knowledge and test facilities. Other than the entry barrier issue, they are also faced with a problem of the sharing of intellectual property rights.

Take Elon Musk's SpaceX. Before 2010, industry watchers were not bullish on the US aerospace manufacturer. The situation has changed quite a bit since then, thanks to talent mobility. NASA's space shuttle program came to an end with the Atlantis' Space Shuttle launch in 2011, and SpaceX succeeded in poaching a lot of the talent. The company's rising to prominence is also attributed to shared intellectual property. The use of intellectual property, which is certainly not free, is enabled through a set of regulations. Beyond that, the US government and military continued to grant contracts and advance funding to the company when its space attempts failed several times. That is unimaginable to us.

The commercialization of the space sector also creates enormous benefits for the US government and military. The United Launch Alliance including Lockheed Martin Space Systems and Boeing Defense provides spacecraft launch services to the US

government, resulting in substantially lower prices for many significant projects.

There certainly needs to be support for talent mobility and shared intellectual property. But that is supposed to be put under the purview of rules and guidance. The so-called national team which includes China Aerospace Science and Technology Corporation, the main contractor for China's space program, is also a collection of companies that shoulder social responsibilities as well as strive to prove commercially viable. Therefore, efforts are envisioned in the pipeline to devise a mechanism to protect the national team's interests while ensuring their intellectual property are converted to social benefits. The creation of the mechanism will be dependent upon government efforts.

GT: China's maiden private attempt in late October to send a satellite carrying rocket into space by Beijing-based start-up LandSpace failed to reach orbit after liftoff. Is it a warning sign that perhaps a private space commercialization bubble is brewing in China?

Yang: The rocket was launched at 4pm on October 27. I took a close look at it because many of the company's launch team previously worked with me. I knew them well. Despite the failure, the team was respectable, with the launch of the three-stage rocket lifting off without a hitch in the first and second stage. It can't be said that the failed mission was doomed, but that has something to do with investor demands. I personally consider that it was a publicity stunt rocket. The launch of the rocket, if successful, would have shown the public and investors that the company is capable of making rockets, while the rocket was not genuinely intended to be put into use. A successful launch would help the company win more points while a failed mission would risk resulting in a substantial reputational loss.

<http://www.globaltimes.cn/content/1133887.shtml>

100th Wing Loong armed reconnaissance drone to be delivered to international client

Editor Yao Jianing, China Military Online, December 27, 2018

China's State-owned arms company Aviation Industry Corporation of China (AVIC) announced on Tuesday that it is about to deliver the 100th made-for-export Wing Loong drone, as the company expects to produce 100 high-end drones per year by 2025. AVIC also announced it has established a new subsidiary focusing on the drone business, which Chinese military experts said will help AVIC become even more competitive on the international market.

The subsidiary, AVIC (Chengdu) Unmanned Aerial Vehicle System Company, was based in Chengdu, capital of Southwest China's Sichuan Province, according to a statement AVIC released on its WeChat account on Tuesday. The subsidiary will operate under a new organizational structure that will see the integration of AVIC's strengths in research and development, manufacture, supply chain and international market channels, the statement said.

http://english.chinamil.com.cn/view/2018-12/27/content_9389500.htm

E. East, South & South-East Asia

World's only floating nuclear power plant gets ready to connect to Russian grid, Energy Bangla

Energy Bangla, December 17, 2018

World's only floating nuclear power plant (FNPP)-AkademikLomonosov is expected to start injecting electricity to Russia's power grid next year, ushering a new era in global nuclear power industry. Built by Russia's Rosatom State Atomic Energy Corporation Reactor of Unit-1 has successfully gone through the first stage of its power start-up, last week (December 10) in Murmansk of Russia.

Power start-up is a series of functional and safety tests to be conducted on

AkademikLomonosov's reactors, before connection to the grid. At the first stage the reactor was tested at 1-10% of its capacity and at the final stage it will be tested at 110%. During each stage, various operation modes are tested in order to ensure the safety of the power plant.

"The floating nuclear power plant is an ideal solution for power supply to remote areas. We consider this project as a new product, which is of interest not only for the grid-isolated Russian Arctic regions, but also for a number of countries around the world." said Alexey Likhachev, CEO of Rosatom State Atomic Energy Corporation.

<http://energybangla.com/worlds-only-floating-nuclear-power-plant-gets-ready-to-connect-to-russian-grid/>

IAEA Reviews the Philippines' Nuclear Power Infrastructure Development IAEA,

December 17, 2018

An International Atomic Energy Agency (IAEA) team of experts has concluded an eight-day mission to the Republic of the Philippines to review its development of infrastructure for nuclear power. The Integrated Nuclear Infrastructure Review (INIR), which ended on 17 December, was conducted at the invitation of the Government of the Philippines.

The INIR team reviewed the status of nuclear infrastructure development using the Phase 1 criteria of the IAEA's Milestones Approach, which provides detailed guidance across three phases (consider, prepare, construct) of development. The end of Phase 1 marks the readiness of a country to make a knowledgeable commitment to a nuclear power programme. The team was hosted by the Philippines' Nuclear Energy Programme Implementing Organization (NEPIO), which was established by the Department of Energy in 2016 at the direction of Secretary of Energy Alfonso Cusi.

<https://www.iaea.org/newscenter/pressreleases/iaea-reviews-the-philippines-nuclear-power-infrastructure-development>

NK says US blocking 'path' *Global*

Times, December 17, 2018

North Korea condemned the US over its latest sanctions measures, warning Washington's approach could "block the path to denuclearization on the Korean Peninsula forever." After a rapid diplomatic rapprochement this year that culminated in the Singapore summit in June between North Korean leader Kim Jong-un and US President Donald Trump, progress has stalled in talks on Pyongyang's nuclear arsenal.

In Singapore the two men signed a vaguely-worded statement on denuclearization, but have since disagreed on what it means. Now Pyongyang is demanding sanctions relief and condemning US insistence on its nuclear disarmament as "gangster-like," while Washington is pushing to maintain the measures against the North until its "final, fully verified denuclearization." Washington last week added three senior North Korean officials to those subject to sanctions over human rights abuses, including Choe Ryong-hae, who has been considered a right-hand man to Kim.

<http://www.globaltimes.cn/content/1132318.shtml>

Hitachi has not given up yet on UK nuclear project - exec *REUTERS,*

December 17, 2018

Hitachi Ltd has not given up yet on its nuclear project in Britain, a senior executive said on Monday, denying recent media reports that it was considering scrapping the 3 trillion yen (\$26.61 billion) project. "Britain and Japan are both making efforts," Executive Vice President and Executive Officer Toshikazu Nishino said at a briefing on Hitachi's acquisition of ABB's power grid business.

"It's not an easy negotiation, but we haven't given up and are still working on it," he said. The comments come after Japan's TV Asahi reported the firm is considering scrapping the project in Britain due to projections of further increases in construction costs.

<https://in.reuters.com/article/hitachi-nuclear/hitachi-has-not-given-up-yet-on-uk-nuclear-project-exec-idINKBN1OG0S2>

Outcome of ROK-Russia Meeting of Head Delegates to Six-Party Talks *Ministry of Foreign Affairs,*

Republic of Korea, December 18, 2018

Special Representative for Korean Peninsula Peace and Security Affairs Lee Do-hoon, together with Deputy Foreign Minister of the Russian Federation Igor Morgulov, held a meeting in Seoul on December 18 in their capacity as the Republic of Korea and Russian head delegates to the Six-Party Talks. In the meeting, the two senior diplomats shared with each other assessments of the current situation on the Korean Peninsula and discussed possible next steps.

Special Representative Lee explained in detail the outcome of the summit between the United States and the Democratic People's Republic of Korea on June 12 and the 2018 Inter-Korean Summit Pyeongyang in September as well as other developments on the Korean Peninsula since the ROK-Russia meeting in Moscow on June 5. The Russian delegation, calling a complete denuclearization and the establishment of peace on the Korean Peninsula a goal shared by the ROK and Russia, reaffirmed strong support for the ROK government's efforts to that end.

The two sides shared with each other the results of recent consultations among countries concerned; drew a common understanding that it was important for US-DPRK dialogue to be resumed and produce tangible progress toward a complete denuclearization; and agreed to work closely with countries concerned.

The two sides, taking note of close ROK-Russia communication at all levels, including at the two bilateral summits in 2018, agreed to remain highly communicative with each other at various levels.

http://www.mofa.go.kr/eng/brd/m_5475/view.do?seq=319706&srchFr=&srchTo=&srchVnt=&srchTp=&multi_itm_seq=0&itm_seq_1=0&itm_seq_2=0&company_at=&company_nm=&page=1&titleNm=

Reactor at third nuclear power plant shut down: Taipower

Tsai Fan-min, Pan Tzu-yu and William Yen, China Post, December 18, 2018

The number one reactor at Taiwan's third nuclear power plant was shut down Monday for maintenance after an alarm went off indicating that lubricant oil levels for the reactor's cooling pump motor were too low. The reactor was turned off for maintenance as a safety precaution even though the temperature of the reactor's cooling pump motor was within an acceptable range for safe operation, according to state-run utility Taiwan Power Company (Taipower).

The oil was responsible for lubricating and cooling down motor bearings, Taipower said. There were no radioactive-related abnormalities, Taipower spokesman Hsu Tsao-hua (???) said, and the shutdown will not have any impact on power availability because power usage is relatively low during cooler winter months.

<https://chinapost.nownews.com/20181218-480552>

Hopes dwindle for nuclear plant exports as growth strategy

THE ASAHI SHIMBUN, December 18, 2018

The Abe administration's last hope of nuclear plant technology exports being a pillar of economic growth appears to be at a crossroads, and the signs are not good. Hitachi Ltd.'s disclosure that it may have to ditch plans to build a nuclear reactor in Wales appears to throw a fatal wrench in the works. Hiroaki Nakanishi, chairman of Hitachi, told reporters Dec. 17 that his company could proceed no further with the project on the island of Anglesey, citing ballooning costs. Asked about the apparently bleak future for such exports, Chief Cabinet Secretary Yoshihide Suga put on a brave face at a news conference held the same day.

He noted that a number of nations had expressed strong interest in Japan's nuclear energy technology, adding, "We will fulfill our responsibility in dealing with the issue of climate change as well as the peaceful use

of nuclear energy in the world." Nakanishi told reporters that Hitachi was finding it increasingly difficult to raise the necessary funds for the costly project. The admission comes after reports earlier this month that Mitsubishi Heavy Industries Ltd. was leaning toward abandoning plans to construct a nuclear plant in Turkey.

<http://www.asahi.com/ajw/articles/AJ201812180033.html>

North Korea rejects denuclearization unless U.S. 'nuclear threat' is eliminated

Min Joo Kim, Washington Post, December 20, 2018

North Korea will not give up its nuclear arms unless the "U.S. nuclear threat to Korea" is eliminated, North Korean state media. The statement carried by North Korea's official Korean Central News Agency was a particularly blunt indication that the two countries are still far apart on their ideas of what "denuclearization" means on the Korean Peninsula.

https://www.washingtonpost.com/world/asia_pacific/north-korea-rejects-denuclearization-unless-us-nuclear-threat-is-eliminated/2018/12/20/fcf642a2-0438-11e9-b5df-5d3874f1ac36_story.html?utm_term=.dc9e67d4e994

U.S. envoy on N. Korea visits border village amid stalemate

THE ASSOCIATED PRESS, December 20, 2018

SEOUL--A U.S. special envoy for North Korea on Thursday visited a border village the rival Koreas has been demilitarizing as part of steps to reduce military tensions amid a larger diplomatic push to resolve the nuclear crisis. The U.S. Embassy in Seoul did not provide details about Stephen Biegun's visit to Panmunjom. He wasn't expected to meet with North Korean officials at the village, which is often used for diplomacy between the allies and North Korea.

Biegun said after arriving in South Korea on Wednesday that Washington was

reviewing easing travel restrictions on North Korea to facilitate humanitarian shipments to help resolve an impasse in nuclear negotiations. North Korea hasn't responded to Biegun's comments. The North's state media recently warned that the United States' continued commitment to sanctions and criticism about the North's human rights record could "block the path to denuclearization on the Korean Peninsula forever."

<http://www.asahi.com/ajw/articles/AJ201812200025.html>

North Korea media says denuclearization includes ending 'U.S. nuclear threat' *Jeongmin Kim, Josh Smith, REUTERS, December 20, 2018*

Any deal for North Korea to give up its nuclear arsenal must include "completely removing the nuclear threats of the U.S.", North Korean state media said on Thursday, in one of the clearest explanations of how North Korea sees denuclearization. "When we refer to the Korean peninsula, they include both the area of the DPRK and the area of south Korea where aggression troops including the nuclear weapons of the U.S. are deployed," the North's state-run KCNA news agency said in a commentary, using the initials of North Korea's official name, the Democratic People's Republic of Korea.

"When we refer to the denuclearization of the Korean peninsula, it, therefore, means removing all elements of nuclear threats from the areas of both the north and the south of Korea and also from surrounding areas from where the Korean peninsula is targeted."

<https://www.reuters.com/article/us-northkorea-usa-denuclearisation-idUSKCN1OJ0J1>

Denuclearization needs 'complete removal' of US threat: North Korea *Global Times, December 20, 2018*

North Korea said its commitment to denuclearization of the Korean Peninsula was bound up with a "complete removal of US nuclear threats." Now Pyongyang is

demanding sanctions relief and has condemned US insistence on its nuclear disarmament as "gangster-like," while Washington is pushing to maintain the measures against the North until its "final, fully verified denuclearization."

Thursday's commentary released by the North's official Korean Central News Agency (KCNA) asserted that the commitment was a mutual rather than unilateral undertaking.

"It must be clearly understood that the denuclearization of the Korean Peninsula means the removal of all nuclear threats - not only those from the North and the South but those aiming at the Korean Peninsula from surrounding areas as well," it said. It urged the US to give up the "delusion" of forcing the North to give up its nuclear arsenal "unilaterally" through "pressure and coercion." Washington last week added three senior North Korean officials to those subject to sanctions over human rights abuses, including Choe Ryong-hae, who has been considered a right-hand man to Kim.

Pyongyang condemned the move, warning Washington's approach could "block the path to denuclearization on the Korean Peninsula forever."

<http://www.globaltimes.cn/content/1132982.shtml>

Japan accuses South Korea of 'extremely dangerous' radar lock on plane *Tetsushi Kajimoto, Hyunhee Shin, Reuters, December 21, 2018*

Japanese Defence Minister Takeshi Iwaya "strongly protested" to South Korea on Friday after a South Korean destroyer allegedly locked its targeting radar on a Japanese surveillance plane. Iwaya, speaking to reporters at his ministry, described the action as "extremely dangerous that could cause an unexpected situation".

The incident came at a time when greater coordination is called for between the two

Asian neighbors to tackle issues including North Korea's nuclear and missile programs, maritime security and natural disasters, he said. "It's extremely regrettable that the incident of this time happened," Iwaya said. "We will urge South Korea to prevent a recurrence."

<https://www.reuters.com/article/us-japan-defence-southkorea/japan-accuses-south-korea-of-extremely-dangerous-radar-lock-on-plane-idUSKCN1OK110>

Japan Inc exit from nuclear exports would leave field to Russia, China

Makiko Yamazaki, Geert De Clercq, REUTERS, December 21, 2018

The possible withdrawal of Japanese conglomerates from nuclear export projects in Britain and Turkey would leave the nuclear newbuild industry open to Russian and Chinese state-owned companies as Western private firms struggle to compete.

Japanese media reported this month that Mitsubishi Heavy Industries (MHI) (7011.T) was set to scrap the Sinop nuclear project in Turkey as cost estimates had nearly doubled to around 5 trillion yen (\$44 billion).

Last week, Hitachi (6501.T) was reported to be considering whether to scrap its 3 trillion yen Horizon nuclear project in Britain as cost estimates had risen, while Toshiba (6502.T) liquidated its UK project this year. A source involved in the Turkish project told Reuters MHI had effectively abandoned it.

<https://www.reuters.com/article/us-japan-nuclearpower-russia-focus/japan-inc-exit-from-nuclear-exports-would-leave-field-to-russia-china-idUSKCN1OK148>

ROK-Japan Meeting of Top Negotiators on North Korean Nuclear Issue Takes Place *Ministry of Foreign Affairs, Republic of Korea, December 24, 2018*

After his meetings with his counterparts from the Russian Federation and the United States on December 18 and on December 19-21, respectively, Special Representative for

Korean Peninsula Peace and Security Affairs Lee Do-hoon met with Director-General of the Asian and Oceanian Affairs Bureau of the Japanese Ministry of Foreign Affairs Kenji Kanasugi on December 24 for an in-depth discussion on nuclear and other issues concerning the Democratic People's Republic of Korea. Director-General Kanasugi was on a visit to the Republic of Korea.

The two sides shared with each other results of recent, relevant consultations with the US and other related countries; and discussed various ways to seek tangible progress toward denuclearization and peace, including diplomatic efforts and ROK-Japan cooperation to resume US-DPRK follow-up negotiations.

The two sides agreed to continue close communication and cooperation with each other by building on the outcome of the meeting.

http://www.mofa.go.kr/eng/brd/m_5475/view.do?seq=319707&srchFr=&srchTo=&srchWnt=&srchFlp=&srchMltiNm=0&srchMnSeq=1&srchMnSeq2=0&srchCompanyAt=&srchCompanyNm=&page=1&titleNm=

JAEA: Closing 79 nuclear facilities will cost at least 1.9 trillion yen

Yusuke Ogawa and Toshio Kawada, THE ASAHI SHIMBUN, December 27, 2018

At least 1.9 trillion yen (\$17.12 billion) will be needed for the planned scrapping of 79 nuclear facilities, including the failed Monju prototype fast-breeder reactor, according to the Japan Atomic Energy Agency (JAEA). However, the JAEA's estimate, released on Dec. 26, does not include maintenance expenses for the facilities nor costs to deal with leftover uranium and plutonium, meaning the actual tally could increase by hundreds of billions of yen.

State subsidies account for the bulk of the JAEA's budget, so taxpayers will likely foot most of the bill. The agency plans to shut down 79 of its 89 nuclear facilities, including research reactors and test buildings, over 60 to 70 years due to aging and the huge costs needed for their

continued operations under stricter safety standards.

According to the JAEA's estimate, the cost to decommission the Tokai spent nuclear fuel reprocessing plant in Ibaraki Prefecture will be 770 billion yen. But the overall cost would reach nearly 1 trillion yen if expenses on dealing with highly radioactive liquid waste, which is left after plutonium is extracted from spent fuel rods at the plant, are included. The problem-plagued Monju prototype fast-breeder reactor in Tsuruga, Fukui Prefecture, cost taxpayers more than 1 trillion yen (\$8.82 billion) despite running for only 250 days during its two-decade operation.

<http://www.asahi.com/ajw/articles/AJ201812270034.html>

Japan's two strategic documents cross the exclusive defense policy

bottom line *Liu Shigang and Xue Jun, China Military Online, December 28, 2018*

First, the New Guidelines emphasizes the complex and variable forms of war in the future. Second, defense spending will increase sharply in the next five years. Third, the new strategy is closely related to the concept of "cross-domain joint operations". According to the New Guidelines, the JSDF will develop cross-domain joint operations capability.

The so-called "cross-domain" mainly adds space, network and electromagnetic space operations beyond the traditional land, sea and air combat space. According to the new concept, the JSDF will emphasize seamless combat readiness and full-domain and multi-field joint operations. It also calls for cross-service and cross-domain cooperation in implementation. The new strategy highlights the importance and urgency of combat in new areas.

Fourth, the future development of weapons and equipment will be high-end, intelligent, network-based and offensive. New equipment and technology will be more advanced and subversive.

For example, Japan will purchase joint standoff missiles for the F-35A joint attack

aircraft being deployed in 2019. This will allow Japan to have air-to-ship and air-to-ground fire strike capability with a range of more than 500 km for the first time. The JSDF will also upgrade the F-15 fighter jet so it can have the capability to launch the missile. The precision-guided, multi-mission joint standoff missile is co-developed by the US and Norway. It is expected to be in combat power form in about 2021. The missile will pose a serious threat to military installations and surface ships of Japan's neighboring countries.

Fifth, Japan is set to develop light aircraft carriers and carrier-based aircraft to further enhance its air defense and anti-missile combat capabilities. According to the New Program, the JSDF will transform two existing Izumo-class helicopter destroyers with a standard displacement of 19,500 tons into light aircraft carriers to carry the F-35B fighter aircraft introduced from the US. With this, Japan will break the policy restrictions of "no aircraft carrier" implemented by previous governments.

In general, the introduction of the New Guidelines and the New Program shows that Japan's defense policy has once again undergone major adjustments. Japan has taken a further step toward its goal of becoming a military power and we cannot neglect the effect on the regional and international security situation.

http://english.chinamil.com.cn/view/2018-12/28/content_9390933.htm

No picture showing its nuclear weapons or military developments in the ongoing North Korean photo exhibition in Beijing

Global Times, December 29, 2018

A North Korean photo exhibition in Beijing conveys a message that North Korea's leader is changing his focus from the military to diplomatic and economic affairs, as well as improving ties with China.

The exhibition in the 798 Art District in eastern Beijing marking the 7th anniversary of Kim Jong-un's inauguration

as supreme commander of the armed forces, does not include pictures of nuclear weapons or military developments in North Korea.

Instead, it showcases North Korea's economic developments and the livelihood of local people, as well as high-level exchanges with China. Of 30 photos on display, 10 feature the North Korean leader's visit to China in 2018 and his interactions with his Chinese counterpart, reflecting warming ties between the two countries.

<http://www.globaltimes.cn/content/1134012.shtml>

F. Iran

French police's handling of protests 'unacceptable': Tehran *Tehran Times*, December 17, 2018

Answering a question about the special purpose vehicle (SPV), which the European Union is developing to save the 2015 nuclear deal, Qassemi said the SPV is not just for supplying medicine and foodstuff on Iran, but includes a variety of items. If implemented, other countries can also benefit from the SPV, which includes a variety of fields including investment, industry and technology, he stated.

On Iran's missile program, Qassemi said there's a difference of opinion between Tehran and some European countries, whose concerns about Iran's missile program "stem from the efforts of those who want to wage a tough psychological war against Iran." Iran's missile-related activities are part of its national defense security, he said. In an open reference to Saddam Hussein's invasion of Iran in the 1980 and bombardment of civilian areas and Israel's repeated military threats against Iran, Qassemi said, "Because of its historical experiences and its regional location, Iran has to follow such policy." The spokesman further said the Islamic Republic would not allow others to limit its missile program, but meanwhile it continues to act under the international law and regulations.

"We have talked about our [missile] policies with different countries for the sake of

transparency, but will not hold negotiations about these policies," he emphasized. "We cannot sacrifice our security for these kinds of stances and comments," Qassemi remarked, pointing to certain foreign officials like U.S. Secretary of State Mike Pompeo who claim Iran's missiles are designed to carry nuclear warheads.

<https://www.tehrantimes.com/news/430787/French-police-s-handling-of-protests-unacceptable-Tehran>

JCPOA an asset for regional peace: Rouhani aide *Tehran Times*, December 17, 2018

Barjam (Farsi acronym for the deal) managed to disprove the accusation that Iran had been trying to attain nuclear weapons," Ashna said, IRNA reported.

He emphasized that Iran's peace-making efforts are not restricted to the nuclear pact, pointing to Tehran's efforts that prevented the collapse and disintegration of Syria.

Iran does not tolerate the overthrow of regional political systems through violence and foreign intervention, he added.

<https://www.tehrantimes.com/news/430792/JCPOA-an-asset-for-regional-peace-Rouhani-aide>

Zarif: Sanctions only hurt ordinary Iranians but fail to change Tehran's policy *Tehran Times*, December 17, 2018

In a post on his official Twitter account, Zarif pointed to his attendance at the Doha Forum on Saturday, saying he had told the conference that "sanctions have never worked". "They (sanctions) hurt ordinary Iranians but don't change policy," Zarif remarked.

In an open reference to the Trump administration, Zarif said instead of withdrawing from the nuclear deal, the new American government had better settle its disputes with Iran at the

negotiating table like what the Obama administration did, which led to the start of nuclear talks. "It was U-turn on part of U.S., which allowed #IranTalks to proceed. Same dynamic today," the chief diplomat suggested.

<https://www.tehrantimes.com/news/430783/Zarif-Sanctions-only-hurt-ordinary-Iranians-but-fail-to-change>

The West 'parrots' Netanyahu's whines about Iran's conventional missiles, Zarif regrets *Tehran Times, December 18, 2018*

Zarif said the irony is that at the same time Netanyahu is whining about Tehran's "deterrent and defensive missiles". "First, Netanyahu stands next to nuclear BOMB factory and threatens Iran with annihilation. Now, he openly boasts about his 'OFFENSIVE' missiles that can reach anywhere," Zarif said in a tweet.

Zarif was reacting to Netanyahu's comments, who said a day earlier that Israel was developing missiles capable of hitting any target in the Middle East. Netanyahu also said the regime was working on weapons systems with "special capabilities that no other country has." He added, "This is the offensive power of Israel which is very important for us in all sectors." Foreign Minister Zarif was in fact referring to Netanyahu's visit in August to the secretive Dimona nuclear weapons facility, from where he threatened Iran with a nuclear attack.

<https://www.tehrantimes.com/news/430844/The-West-parrots-Netanyahu-s-whines-about-Iran-s-conventional>

Araqchi meets Finnish officials in Helsinki *Tehran Times, December 19, 2018*

On Tuesday, Araqchi met Finnish Secretary of State for the Ministry of Foreign Affairs Matti Anttonen and Under-Secretary of State Anne Sipilainen. He also held talks with Pertti Salolainen, the vice chairperson of the Finnish Parliament Foreign Affairs

Committee, who is also the head of Finland-Iran parliamentary friendship group.

During the meetings, the two sides conferred on the latest developments regarding the 2015 Iran nuclear deal, regional issues, and mutual cooperation between Tehran and Helsinki. The Finnish officials underlined Helsinki's full support for the nuclear agreement, officially known as Joint Comprehensive Plan of Action (JCPOA), describing it as a great political, diplomatic, multilateral, and security achievement.

<https://www.tehrantimes.com/news/430879/Araqchi-meets-Finnish-officials-in-Helsinki>

Mogherini: JCPOA has opened new channels to engage with Iran *Tehran Times, December 19, 2018*

"Thanks to the nuclear deal, we now have new channels to engage in a constructive manner as some recent developments in Yemen have shown with Iran to discuss regional issues and to discuss also the security matters," Mogherini said, according to IRNA.

"As the European Union, we want to definitely address Iran's ballistic missiles and we want to address the arms proliferation in the region but to do so we need the nuclear deal to be preserved," she remarked.

<https://www.tehrantimes.com/news/430902/Mogherini-JCPOA-has-opened-new-channels-to-engage-with-Iran>

Iran won't keep silent about JCPOA violations: Kharrazi *Tehran Times, December 19, 2018*

In an interview with ISNA published on Wednesday, Kharrazi said implementation of the special purpose vehicle (SPV) will depend on European countries' determination. "They have taken some steps in this regard and in the dialectic and political arena they have done good things," he said. "But these steps will

be deemed notable only when the [SPV] is implemented."

The U.S. reimposed economic sanctions on Iran after it unilaterally withdrew from the Joint Comprehensive Plan of Action (JCPOA) in May. The sanctions affect Iran's oil exports and most other trade in addition to banking transactions. As a result, major European countries have promised Iran to set up the SPV to allow trade on a barter model, rather than using normal banking transactions.

European officials have said that the SPV can be implemented by the end of 2018. However, so far Europe has been unable to find a country to host the mechanism.

<https://www.tehrantimes.com/news/430894/Iran-won-t-keep-silent-about-JCPOA-violations-Kharrazi>

Mogherini: JCPOA has opened new channels to engage with Iran *Tehran*

Times, December 19, 2018

The Iran nuclear deal has created new channels for engagement with Iran, EU foreign policy chief Federica Mogherini said on Tuesday, addressing a meeting with members of the EU Non-Proliferation and Disarmament Consortium.

"Thanks to the nuclear deal, we now have new channels to engage in a constructive manner as some recent developments in Yemen have shown with Iran to discuss regional issues and to discuss also the security matters," Mogherini said, according to IRNA. "As the European Union, we want to definitely address Iran's ballistic missiles and we want to address the arms proliferation in the region but to do so we need the nuclear deal to be preserved," she remarked.

<https://www.tehrantimes.com/news/430902/Mogherini-JCPOA-has-opened-new-channels-to-engage-with-Iran>

Iran's Persian rug-makers suffer as US unravels nuclear deal *Arab*

News, December 20, 2018

As the Trump administration works to unravel Iran's 2015 nuclear deal with word powers, the producers of the country's famed Persian carpets fear they will lose vital markets. Before the US withdrew from the deal and began restoring crippling sanctions earlier this year, the \$425 million a year industry preserved an ancient tradition while providing much-needed income to Iranians as well as Afghan refugees, who create much of the more luxurious hand-woven pieces. Iran produces some 400 tons of carpets a year and exports 80 percent of them.

Despite the decades of mutual hostility stemming from the 1979 Islamic Revolution, the United States is one of the biggest markets for Persian rugs, accounting for more than a quarter of all exports.

But that is set to change as the US imposes what it says are the toughest sanctions in history, aimed at persuading Iran to dramatically change its policies in the region, including its support for militant groups and its involvement in Syria and other conflicts. The impact of the renewed sanctions is being felt in the grand bazaar of Kashan, an ancient city in one of Iran's main carpet-weaving regions, known for its rich red, blue and yellow designs. On a recent day, many of the shops were closed and there were few shoppers. The sanctions have fueled an economic crisis in Iran, where the currency has plummeted in recent months, wiping out people's life savings and sending prices soaring. The few tourists who visit Iran cannot use foreign credit cards because of US sanctions on banking, making big purchases difficult.

<http://www.arabnews.com/node/1423341/middle-east>

Trump: 'US is not the Middle East's policeman *Arab News, December 21, 2018*

The US will not police the Middle East and it was time for Russia, Iran and the Assad regime in Syria to play a greater role in fighting Daesh, Donald Trump said hours before his defense secretary quit, citing policy differences. The US president was expanding on his decision to withdraw America's 2,000 remaining troops from northern Syria, where they have been combating the militant group alongside an alliance of Kurdish militias.

In a letter to Trump on Thursday, Pentagon chief Jim Mattis said his political outlook, which cherishes traditional alliances, could no longer be reconciled with that of the president, who has poured scorn on longstanding partnerships and repeatedly sought closer ties with Russia. Trump's announcement on Wednesday took US allies, politicians and military chiefs by surprise, but he said on Thursday it had been his aim since he was elected two years ago.

<http://www.arabnews.com/node/1423666/middle-east>

US aircraft carrier enters Arabian Gulf after long absence *Arab News, December 21, 2018*

ABOARD THE USS JOHN C. STENNIS IN THE PERSIAN GULF: A US aircraft carrier sailed into the Arabian Gulf on Friday, becoming the first since America's withdrawal from the Iran nuclear deal and breaking the longest carrier absence in the volatile region since at least the Sept. 11 terror attacks.

The arrival of the USS John C. Stennis comes as Iranian officials have returned to repeatedly threatening to close off the Strait of Hormuz, the narrow mouth of the Arabian Gulf through which a third of all oil traded by sea passes. Iranian Revolutionary Guard vessels shadowed the Stennis and its strike group, at one point launching rockets away from it and flying a drone nearby.

The long absence of a carrier, however, could become a standard practice here as now-

outgoing Defense Secretary Jim Mattis sought to shake up naval operations and American air bases spanning the region that can scramble fighter jets and drones. "We are trying to be more operationally unpredictable," said Lt. Chloe Morgan, a spokeswoman for US' Bahrain-based 5th Fleet. "Now we're switching it up because our adversaries are watching closely. We want to be operationally unpredictable to our enemies, but strategically predictable to our partners." The Navy invited journalists to ride on the nuclear-powered Stennis, whose homeport is Bremerton, Washington, as it transited the Strait of Hormuz. The strait at its narrowest point is 33 kilometers (21 miles) wide, in the waters between Iran and Oman.

<http://www.arabnews.com/node/1424216/middle-east>

Iran, Turkey express dismay over regional impacts of sanctions

Tehran Times, December 21, 2018

They said Washington's decision will negatively influence economic relations between regional countries. The statement was issued at the end of the High Council for Iran-Turkey Strategic Cooperation in Ankara chaired by Iranian President Hassan Rouhani and his Turkish counterpart Recep Tayyip Erdogan. Despite the sanctions, the two countries agreed to boost their trade and economic ties to the target goal of \$30 billion per year.

During a joint press conference with Erdogan, Rouhani said that no third country can harm relations between Tehran and Ankara. "Nobody, no power and no country is able to harm Tehran-Ankara friendly and brotherly ties," he said. He praised the Turkish government's firm stance in supporting Tehran in the face of "illegal" and "cruel sanctions" by the United States.

<https://www.tehrantimes.com/news/430926/Iran-Turkey-express-dismay-over-regional-impacts-of-sanctions>

Diplomat calls Iran, Russia reliable partners

Tehran Times, December 21, 2018

"I totally agree that Iran and Russia are reliable partners," TASS quoted Araqchi as saying during a meeting in Moscow with Sergei Ryabkov, the Russian deputy foreign minister. "Our cooperation concerning the regional and international agenda has been very honest, we have similar positions on many regional and global issues," Araqchi remarked.

Araqchi also thanked Russia for its position on the 2015 nuclear deal - the Joint Comprehensive Plan of Action - after the U.S. exited the multilateral agreement. "We are very pleased to see Moscow maintain a logical, just and balanced position. I would like to thank Russia for its position on the Joint Comprehensive Plan of Action," he said.

<https://www.tehrantimes.com/news/430931/Diplomat-calls-Iran-Russia-reliable-partners>

IRGC holds military drills in Persian Gulf

Tehran Times, December 22, 2018

The drills were last stage of the 12th Payambar-e Azam military exercises the first stage of which had started on December 15 in the central parts of Iran with participation of rapid reaction units, airborne units, demolition and combat units, mid-range missiles, commandos and special forces. The drills took on Qeshm Island, just off the coast of southern Hormozgan province and in the Strait of Hormuz, where roughly one-third of the world's oil passes through.

Anti-helicopter mines (AHM) were tested in the drills for the first time. The anti-armored units of the IRGC Ground Force exercised operations to regain the regions occupied by the mock enemy.

<https://www.tehrantimes.com/news/430974/IRGC-holds-military-drills-in-Persian-Gulf>

Iran's Guard launches drill near Strait of Hormuz

Arab News, December 22, 2018

TEHRAN, Iran: State TV is reporting that Iran's Revolutionary Guard ground force has

launched a drill near the strategic Strait of Hormuz, the passageway for nearly a third of all oil traded by sea.

The report Saturday said the guard's forces will use combat helicopters and drones around Qeshm Island at the mouth of the straight.

The annual war game dubbed "The Great Prophet" came a day after the USS John C. Stennis, a US aircraft carrier, sailed into the Arabian Gulf on Friday. The Guard's vessels trailed the Stennis and launched a drone to film the American ship.

Tehran feels increasingly under pressure after President Donald Trump in November renewed sanctions that the US had lifted under a 2015 nuclear deal. The US pulled out of the deal in May.

<http://www.arabnews.com/node/1424281/middle-east>

Turkey Expects Extension of Iran Sanctions Waiver, Minister Says

Taylan Bilgic, Bloomberg, December 27, 2018

Turkey expects the U.S. to extend its sanctions waiver on importing Iranian oil, Trade Minister Ruhsar Pekcan said. "We expect an extension of Turkey's exemption" from sanctions, Pekcan said in an interview with NTV in Ankara. She was referring to the temporary waiver that allowed Turkey to continue buying Iranian oil for six months.

U.S. sanctions on Iran have "endangered the security and stability of the region," President Recep Tayyip Erdogan said in Ankara on Dec. 20, speaking at a press conference with Iranian President Hassan Rouhani. The two nations are working to minimize the impact of sanctions on bilateral trade, he said.

Pekcan also expects a removal of additional tariffs the U.S. imposed on some Turkish products. "We've been receiving positive signals in our talks," she said, without elaborating.

<https://www.bloomberg.com/news/articles/2018-12-27/turkey-expects-extension-of-iran-sanctions-waiver-minister-says>

IRGC plans to develop speed boats with stealth technology *Tehran Times, December 31, 2018*

"We are trying to increase the agility of the Guards' speed boats and equip them with stealth technology to facilitate their operations," Alireza Tangsiri, the IRGC Naval Force chief, was quoted as saying by IRNA. Tangsiri also said the speed boats will be equipped with new missiles, and their speed will reach 80 knots per hour.

The IRGC last week launched war games in the Persian Gulf, where third of the world's sea-borne oil passes through, and warned that its forces were ready to respond to any hostile U.S. action. A U.S.-Iranian war of words has escalated since U.S. President Donald Trump took Washington out of a world powers' nuclear deal with Iran in May, and reimposed sanctions on its banking and energy sectors.

Iran's President Hassan Rouhani recently warned that if the country cannot sell its oil due to U.S. pressure, then no other regional country will be allowed to do so either, a threat which many have taken as meaning to block the strategic Strait of Hormuz in the Persian Gulf.

<https://www.tehrantimes.com/news/431345/IRGC-plans-to-develop-speed-boats-with-stealth-technology>

G. West Asia & Africa

U.S. lawmakers seek oversight over any Saudi nuclear power deal *REUTERS, December 20, 2018*

Lawmakers from both U.S. parties introduced legislation on Wednesday to give Congress more say in any deal on civil nuclear power cooperation between the United States and Saudi Arabia.

The Trump administration is eager to strike a deal with Saudi Arabia to share nuclear power technology with the kingdom, as the domestic industry struggles to compete with lower-priced power sources such as natural gas. But the talks have come under scrutiny since the killing of columnist Jamal

Khashoggi in the Saudi consulate in Istanbul in October.

<https://www.reuters.com/article/us-usa-saudi-nuclear-congress/u-s-lawmakers-seek-oversight-over-any-saudi-nuclear-power-deal-idUSKCN1O12IM>

H. Pakistan

China's 'Belt and Road' Plan in Pakistan Takes a Military Turn

Maria Abi-Habib, New York Times, December 19, 2018

Under a program China insisted was peaceful, Pakistan is cooperating on distinctly defense-related projects, including a secret plan to build new fighter jets.

According to the undisclosed proposal drawn up by the Pakistani Air Force and Chinese officials at the start of the year, a special economic zone under CPEC would be created in Pakistan to produce a new generation of fighter jets. For the first time, navigation systems, radar systems and onboard weapons would be built jointly by the countries at factories in Pakistan.

The proposal, confirmed by officials at the Ministry of Planning and Development, would expand China and Pakistan's current cooperation on the JF-17 fighter jet, which is assembled at Pakistan's military-run Kamra Aeronautical Complex in Punjab Province. The Chinese-designed jets have given Pakistan an alternative to the American-built F-16 fighters that have become more difficult to obtain as Islamabad's relationship with Washington frays.

The plans are in the final stages of approval, but the current government is expected to rubber stamp the project, officials in Islamabad say. For China, Pakistan could become a showcase for other countries seeking to shift their militaries away from American equipment and toward Chinese arms, Western diplomats said. And because China is not averse to selling such advanced weaponry as ballistic missiles - which the United

States will not sell to allies like Saudi Arabia - the deal with Pakistan could be a steppingstone to a bigger market for Chinese weapons in the Muslim world.

For years, some of the most important military coordination between China and Pakistan has been going on in space. Just months before Beijing unveiled the Belt and Road project in 2013, it signed an agreement with Pakistan to build a network of satellite stations inside the South Asian country to establish the Beidou Navigation System as an alternative to the American GPS network.

Beidou quickly became a core component of Belt and Road, with the Chinese government calling the satellite network part of an "information Silk Road" in a 2015 white paper. Like GPS, Beidou has a civilian function and a military one. If its trial with Pakistan goes well, Beijing could offer Beidou's military service to other countries, creating a bloc of nations whose military actions would be more difficult for the United States to monitor.

By 2020, all 35 satellites for the system will be launched in collaboration with other Belt and Road countries, completing Beidou.

"Beidou, whatever any users use it for - whether it's a civilian navigating their way to the grocery store or a government using it to coordinate their rocket launches - those are all things that China can track," said Ms. Moriuchi, of the research group Recorded Future.

<https://www.nytimes.com/2018/12/19/world/asia/pakistan-china-belt-road-military.html>

Pakistan notifies revised control lists under the Export Control Act of 2004, The Express Tribune *The Express Tribune, December 20, 2018*

The government has notified the revised control lists of goods, technologies, material and equipment, which are subject to SECDIV license for export under the Export Control Act of 2004. According to a statement released by Foreign Office, the act enables the government to control export,

re-export, trans-shipment and transit of goods, technologies, material and equipment related to nuclear and biological weapons and their delivery systems.

As part of the regular review process, the Strategic Export Control Division (SECDIV) of the Ministry of Foreign Affairs has revised and updated the control lists, in consultation with other relevant ministries and departments.

"The revised control lists are harmonised with the standards and lists of international export control regimes i.e. the Nuclear Suppliers Group, the Missile Technology Control Regimes and the Australia Group, and also incorporates the latest changes made by these export control regimes." The notification signifies the continuing resolve and policy of Pakistan as a responsible nuclear state to advance the shared goals of non-proliferation and strictly adhere to its commitments.

<https://tribune.com.pk/story/1871131/1-pakistan-notifies-revised-control-lists-export-control-act-2004/>

US set aside its nuclear proliferation concerns of Pakistan for support in Afghanistan, The Indian Express *Indian Express, December 21, 2018*

The voluminous document indicates that both Zia and Deng successfully convinced the then Carter administration that India under former Prime Minister Indira Gandhi would be pro-Soviet. The US acceded to Pakistan's demand, supported by China, to "set aside" its concerns over Islamabad's secretive nuclear weapons programme in the immediate aftermath of the Soviet invasion of Afghanistan, according to the latest documents declassified from the era.

The documents, which were released by the State Department, reveal that then Pakistani dictator General Zia-ul Haq and Chinese Vice Premier Deng Xiaoping were successful in extracting this price from the US in lieu of Islamabad's support to

America against the Soviet invasion of Afghanistan. In addition to the US turning a blind eye to Pakistan's nuclear weapons programme, Deng also convinced the US to start giving more military and financial aid to Pakistan, according to the US Foreign Relations 1977-1980 volume on Afghanistan.

The voluminous document indicates that both Zia and Deng successfully convinced the then Carter administration that India under former Prime Minister Indira Gandhi would be pro-Soviet. "There are limits on our ability to aid Pakistan because of their nuclear explosive programme. Although we still object to their doing so, we will now set that aside for the time being, to facilitate strengthening Pakistan against potential Soviet action," the then US Defense Secretary Harold Brown said in a January 8, 1980 meeting with Deng.

<https://indianexpress.com/article/world/us-nuclear-proliferation-concerns-of-pakistan-for-support-in-afghanistan-5503032/>

Soviet era documents show US helped Pakistan build its nuclear bomb in lieu of support in Afghanistan, Firstpost *First Post, December 21, 2018*

The US acceded to Pakistan's demand, supported by China, to "set aside" its concerns over Islamabad's secretive nuclear weapons programme in the immediate aftermath of the Soviet invasion of Afghanistan, according to the latest documents declassified from the era. The documents, which were released by the State Department, reveal that then Pakistani dictator General Zia-ul Haq and Chinese vice premier Deng Xiaoping were successful in extracting this price from the US in lieu of Islamabad's support to America against the Soviet invasion of Afghanistan.

In addition to the US turning a blind eye to Pakistan's nuclear weapons programme, Deng also convinced the US to start giving more military and financial aid to Pakistan, according to the US Foreign Relations 1977-1980 volume on Afghanistan. The voluminous document indicates that both

Zia and Deng successfully convinced the then Carter administration that India under former prime minister Indira Gandhi would be pro-Soviet. "There are limits on our ability to aid Pakistan because of their nuclear explosive programme. Although we still object to their doing so, we will now set that aside for the time being, to facilitate strengthening Pakistan against potential Soviet action," the then US Defense Secretary Harold Brown said in a January 8, 1980 meeting with Deng.

<https://www.firstpost.com/world/soviet-era-documents-show-us-helped-pakistan-build-its-nuclear-bomb-in-lieu-of-support-in-afghanistan-5768551.html>

Afghan war helped Pakistan keep nuclear option: US papers, Anwar Iqbal, Dawn, December 23, 2018

The document notes that the development forced Washington to make "a stark choice" between: (1) Acquiescing in Pakistan's nuclear activities and thus incurring almost certain Congressional action against US security assistance to Pakistan, the possibility of an Indian preemptive strike against the Pakistani nuclear facilities, and seriously undermining the credibility of US global non-proliferation policy. (2) Terminating the US-Pakistan security relationship, thereby imperilling the Afghan resistance to Soviet occupation, doing grave and long-term harm to US political and security interests in Southwest Asia and with China, and convincing Pakistan it had nothing further to lose by building nuclear weapons or even conducting a nuclear test.

"Either outcome would constitute a serious foreign policy defeat," the report warns. It notes that Washington concluded a \$3.2 billion, six-year security and development assistance package with Pakistan to obtain its restraint in the nuclear area. Washington also hoped that a security relationship with the US would "eventually convince Pakistan, that it could forego a nuclear weapons option". Other documents show that Deng Xiaoping not

only convinced Washington to tolerate Pakistan's nuclear programme but also persuaded it to start giving more military and financial aid to Islamabad. Deng worked closely with Zia to convince the then Jimmy Carter administration that India under Prime Minister Indira Gandhi would be pro-Soviet.

<https://www.dawn.com/news/1453065>

PML-N makes Pakistan nuclear power: Amir Muqam, *Business Recorder*, December 30, 2018

President of PML-N Khyber Pakhtunkhwa Engr Ameer Muqam Sunday claimed that the Pakistan Muslim League-Nawaz (PML-N) had made the country a nuclear power and an economic giant. Pakistan came into being due to the struggle of Muslim League leaders and the PML-N would protect it from any foreign aggression, he said while addressing the foundation day ceremony of the party here.

Muqam said the last PML-N government had completed scores of mega projects in the country and established peace in Karachi. Some 12,000 megawatt electricity was added to the national grid during its tenure from 2013-18, he added. The PML-N leader alleged that the ruling party leaders were for leveling baseless accusations against their opponents. Their government had restricted the US dollar to Rs102 for five years, he added.

He said there should be fair and transparent accountability. The last PTI government in KP had abolished the Ehtisab Commission, he added. He said the PML-N would be reorganized from the grassroots level in 2019.

<https://www.brecorder.com/2018/12/30/462210/pml-n-makes-pakistan-nuclear-power-amir-muqam/>

Pakistan is a responsible nuclear state: President Alvi, *The Express Tribune*, December 31, 2018

President Arif Alvi reiterated that Pakistan is a responsible nuclear state and clarified

that the country's atomic weapon arsenal is for peace, reported Al Jazeera. "Pakistan has been a very responsible nuclear state," said the president.

When asked if Pakistan ever planned to use its nuclear weapons, he responded by saying "Pakistan's nuclear weapons are for peace, Pakistan has kept them as a deterrent". Pakistan in February assured the International Atomic Energy Agency it voluntarily implements the Guideline and Code of Conduct on the Import and Export of Radioactive Sources and has been since 2005. The Code of Conduct seeks to help countries ensure that radioactive sources are used in a manner consistent with the highest standards of safety and security.

<https://tribune.com.pk/story/1878384/1-pakistan-responsible-nuclear-state-president-alvi/>

I. Misc/Global/Op-ed/Reports

What to do with used nuclear fuel, from Illinois to California *Jeff Terry*, *Bulletin of Atomic Scientists*, December 14, 2018

The largest operator of nuclear power plants in the United States, Exelon, closed two nuclear reactors in the city of Zion, Illinois in 1998 because of low demand, which in turn led to poor operating economics. Ever since, these two pressurized water reactors have sat unused on the Lake Michigan shoreline just north of Chicago. Exelon contracted the company EnergySolutions to decontaminate and decommission the site, and this fall it announced it was nearly done, with demolition of the two structures almost complete.

These two closed reactors have been a thorn in Zion's side since they shut down 20 years ago. The city lost \$18 million in annual property tax revenue when the plants closed, and the shortfall had to be made up by local businesses and residents. Beyond the financial loss, the city can't use the site for parkland, redevelopment, or anything else. But now that decontamination and decommissioning

are nearly complete, Zion should be able to reclaim the land and convert it to beneficial use-right?

https://thebulletin.org/2018/12/what-to-do-with-unused-nuclear-fuel-from-illinois-to-california/?utm_source=Bulletin%20Newsletter&utm_medium=Content%20Email&utm_campaign=UnusedNuclearFuel_12142018

Delicate Footwork: Security and Diplomacy on the Korean Peninsula

Cristina Varriale, The Royal United Services Institute (RUSI), December 17, 2018

Diplomacy has been the flavour of the year with North Korea in 2018, and efforts have cultivated a two-track approach. The South Korean administration has been the instigator, putting peace and security initiatives at the heart of engagement with the Democratic People's Republic of Korea (DPRK). But this track has been largely separated from the US-DPRK engagement that has been primarily tasked with denuclearisation.

In an attempt to contribute to efforts to reduce military tension and support the opening of diplomacy, US President Donald Trump suspended the large-scale combined military exercises between the US and South Korea, following his Singapore summit with North Korean leader Kim Jong-un in June. The suspension of the combined military exercises has created expectations for the context of diplomacy that will likely be considered the status quo for ongoing diplomatic efforts, especially from the North Korea perspective. The sustainment of this, however, is still unclear. US Defense Secretary James Mattis alluded last month to the possibility that the US-Republic of Korea (ROK) exercise suspension would not apply to the 2019 version of Foal Eagle, a combined field-training exercise conducted annually, with a suggestion that these exercises would go ahead but with alterations. Yet this was closely followed by media reports that Foal Eagle as a combined exercise will actually be cancelled, with ROK forces carrying out their own training at a reduced scale, and without US troop participation.

Although sanctions relief, economic engagement and cultural engagement all play roles in diplomacy, measures related to peace, security and military confidence-building have been fundamental to the initial stages of engagement in both the inter-Korean track and the US-DPRK track. Steps to this end include the absence of long-range missile and nuclear tests on the part of the DPRK, and a suspension of the large-scale combined US-ROK military exercises, coupled with a series of conventional military confidence-building and risk-reduction measures between the two Koreas.

<https://rusi.org/commentary/delicate-footwork-security-and-diplomacy-korean-peninsula>

How 1971 war Brought Pakistan Closer to Nuclear Bomb, Qura tul ain Hafeez, Modern Diplomacy, December 17, 2018

Ever since its independence Pakistan is a neighbor of shrewd enemy who always tried nothing better than to undo and divide Pakistan into pieces like what it did in the war of 1971. So it was necessary for Pakistan to acquire a security mechanism that can balance the power equation in the region. It's pertinent to flash back in the history to answer the question that why after the war of 1971 it was necessary for Pakistan to acquire nuclear weapon. It was not the first time when India entered into to direct full-fledged war with Pakistan in 1971.

<https://moderndiplomacy.eu/2018/12/17/how-1971-war-brought-pakistan-closer-to-nuclear-bomb/>

Robert Oppenheimer: The myth and the mystery *Richard Rhodes, Bulletin of Atomic Scientists, December 18, 2018*

The Manhattan Project is fading into myth. The last of its first-rank leaders, Hans Bethe, died at Ithaca in 2005. The letter from Einstein to Roosevelt eclipses the British MAUD Report on the feasibility of making the Bomb. Los Alamos, a laboratory on a mesa surrounded by a

wilderness, a small coterie of scientists witching historic transmutations, eclipses armies of workers and vast factories at Hanford and Oak Ridge. Hiroshima eclipses Nagasaki, poor Nagasaki, even as the war in Europe with its epic D-Day extravaganza eclipses the longer and crueler Pacific War. And to our point here today, Robert Oppenheimer, a century and a decade after his birth on April 22, 1904, has eclipsed General Leslie Groves and half a hundred others as the shining talent, the indispensable leader of the project, the Prospero or the Faust of the tragic epic that the story of the first atomic bombs has become.

The true history, as we all know, is far otherwise: The MAUD Report and three successive National Academy of Sciences reports won Franklin Roosevelt's commitment; the first atomic bombs were designed and built at Los Alamos, to be sure, but the armies of workers and the vast factories produced their rare materials. Nagasaki suffered equally with Hiroshima for the Japanese leadership's refusal to surrender. Russian sacrifice, the allied lend-lease program and invasion achieved victory in Europe, but it needed atomic bombs to end the Pacific War. And no one who was part of the Manhattan Project, even within the close, intense community here in New Mexico, doubted that General Groves was in charge. Nor did the project lack for other colorful characters, larger than life-sized: Bethe, Glenn Seaborg, Edward Teller, Ernest Lawrence, Enrico Fermi, Vannevar Bush, Arthur Compton, Leo Szilard, Harold Urey, Luis Alvarez, Emilio Segre, Eugene Wigner, Crawford Greenewalt, Paul Tibbets, Ken Bainbridge, I. I. Rabi, George Kistiakowsky, Deke Parsons, and of course Klaus Fuchs and many others—people whom I and many of you here knew in person, though I was not so fortunate as to meet Oppenheimer before his early death from throat cancer in 1967, at 63.

https://thebulletin.org/2018/12/robert-oppenheimer-the-myth-and-the-mystery/?utm_source=Bulletin%20Newsletter&utm_medium=iContact%20email&utm_campaign=Oppenheimer_Dec18

When Kim Jong-un Speaks, the United States Should Listen Carefully *TOBY DALTON, Carnegie Endowment for International Peace, DECEMBER 19, 2018*

Is North Korean Supreme Leader Kim Jong-un a man of his word when it comes to nuclear weapons? The prevailing wisdom in Washington is that he will lie and cheat on any promises he makes. But lately Kim has been making good on his public commitments, both negative and positive. The big question heading into 2019 is whether the United States and North Korea can agree on a next step that will sustain diplomacy. The answer may well come from Kim himself when he gives his annual New Year's address on January 1.

Kim's words matter, both at home and abroad. Although he doesn't have to worry about a future election, he clearly is sensitive to perceived domestic threats to his regime and the level of support for his rule among military and political elites. Accordingly, he has been very careful to make promises he thinks he can keep.

In this sense, Kim's words send signals that may be more costly to him than physical actions, such as closing a missile test site. His words aren't absolutely binding, of course. But unlike an easily reversed freeze on activities at a remote nuclear site hidden from public view, his words create public expectations among key constituencies that, if broken, could have repercussions.

<HTTPS://CARNEGIEENDOWMENT.ORG/2018/12/19/WHEN-KIM-JONG-UN-SPEAKS-UNITED-STATES-SHOULD-LISTEN-CAREFULLY-PUB-78001>

Iranian missiles: Hypocrisy and paradox *Peter Jenkins, Tehran Times, December 19, 2018*

The claim suggests the existence of some kind of agreed international norm that can be used to assess whether or not a weapon system is justified as a defensive tool. But no such norm exists. And we can imagine how the British government would react

if some UN member were to opine that British possession of a nuclear deterrent goes beyond what is "justified for national defence".

The claim also seems unreasonable. Israel, a possessor of medium-range missiles and an open enemy of Iran—especially under the leadership of Benjamin Netanyahu—is located well beyond the range of Iranian short-range missiles. Is Iran not justified in acquiring missiles capable of reaching Israel in order to create the "balance of terror" on which mutual deterrence rests? Another feature of Mr. Hunt's statement was the omission of any mention of Saudi Arabia and Israel. If one is concerned for regional stability in the Middle East, one should not single out Iran's medium-range missiles as uniquely destabilising, as Mr. Hunt did. Saudi medium-range missiles and Israeli possession not only of such missiles but also of nuclear and chemical weapons deserve places in the picture. They too have a bearing on stability.

In reality Iran's missile-related activity may not be as destabilising as the UK and France believe. It is possible that over the next decade Iran's missiles will gain in accuracy and reliability, and that the explosive force of their conventional payloads will increase. This is a trend that has been apparent in the United States and Russia, for instance. It has created potential for conventional missile strikes on strategic targets that can reduce the salience of nuclear weapons in strategic calculations.

<https://www.tehrantimes.com/news/430852/Iranian-missiles-Hypocrisy-and-paradox>

Anatomy of Iran's Deception and How Iran Benefited *David Albright, Olli Heinonen, Frank Pabian, Andrea Stricker, Foundation for Defense and Democracies, December 19, 2018*

Iran's Nuclear Archive contains considerable new information about its past nuclear weapons program including documentary evidence showing Iran's deceptions in its declarations to the International Atomic Energy Agency

(IAEA) about its past military nuclear activities. This report illustrates one case of deception and the value of the new documentary information, when combined with other existing public documentation, by considering the Gchine uranium mine and yellowcake production plant, or "mill," located in southern Iran near Bandar Abbas. The product of Gchine, or alternatively called the Bandar or Bandar Abbas Project, was uranium ore concentrate or yellowcake. Gchine represented key nuclear source material toward Iran's production of highly enriched uranium (HEU) for nuclear weapons. New documents, not available to the IAEA prior to the seizure of the Nuclear Archive, or alternatively called the Atomic Archive, show concretely that Gchine was originally part of Iran's covert nuclear fuel cycle aimed at the production of nuclear weapons and directly contradict Iran's multiple declarations to the IAEA. Moreover, these documents allow a deeper understanding of how Iran carried out its deception.

Contrary to Iran's claims to the IAEA to date, the archive materials show that before 2003, Gchine was under the control of the Iranian Ministry of Defense and Armed Forces Logistics (MODAFL) and part of the AMAD1 Plan for nuclear weapons development. These documents make clear that Iran lied to the IAEA about the original ownership and intent of the Gchine mine and mill, and that Iran deliberately deceived the IAEA through providing incorrect statements and incomplete documentation. Its action directly contradicted its 2003 statement that it was providing "a full disclosure of Iran's past and present nuclear activities," as announced by Hassan Rouhani, then Secretary of the Supreme National Security Council of Iran and now President of Iran.² Rouhani, importantly, also expressed Iran's readiness to act "with a policy of full transparency."³ The transparency policy was included at the IAEA's insistence in October 2003, and just prior to Iran's provisional implementation of the Additional Protocol in December

2003, because uranium mining is not subject to the comprehensive safeguards agreement, e.g. the agreement does not require Iran to provide a full history of the operations of uranium mines and mills in its initial declaration to the IAEA. But the special transparency policy undertaken by Iran would apply to uranium mining and milling activities.

<https://www.fdd.org/analysis/2018/12/19/anatomy-of-irans-deception-and-how-iran-benefited/>

The Nuclear Energy Debate: The Climate is Changing *Matt Wald,*

Nuclear Energy Institute, December 20, 2018

Our hyperlinked world presents us with a day-to-day flood of events, so fast that we sometimes miss the patterns. But here's one worth watching: organizations that in the past did not say nice things about nuclear energy are chiming in lately to recognize its value: to clean air, climate, preservation of fragile wilderness environments and national security.

The way nuclear power plants generate energy has not changed, although the plants have modernized and are running more efficiently than ever. What has changed are market forces in the broader economy that threaten the continued operation of some plants, combined with ever-increasing concerns about climate.

Worry over climate is becoming acute. Leading scientists now give us a shorter timeline to prevent even greater impacts from climate change. The United Nations' Intergovernmental Panel on Climate Change issued a dire update in October, predicting severe effects by 2030. It identified nuclear as one of the key technologies necessary to hold global warming to 1.5 degrees Celsius.

That's why the Union of Concerned Scientists, whose most prominent statements on nuclear power are usually about technical issues, said in a report in November that "our ability to fight climate

change will become much weaker" if nuclear power plants are replaced with natural gas or coal plants. UCS President Ken Kimmel added that it's important that "we keep an open mind about all of the tools in the emissions reductions tool box—even ones that are not our personal favorites."

<https://www.nei.org/news/2018/the-nuclear-energy-debate-the-climate-is-changing>

Will tech revolution overwhelm global system? *By Robert A. Manning,* *Global Times, December 25, 2018*

When He Jiankui, a Chinese scientist, claimed to have used CRISPR, an advanced gene-editing technique to remove a gene causing HIV from a newborn baby, the world - including China's medical establishment - was shocked, denouncing such efforts as "playing God."

Over the coming two decades, the world will see more technological change than that of the rise of the internet and the app economy of the previous two decades. What has been called the "4th Industrial Revolution" is the digital convergence of AI/Big Data/Robotics, 3D printing, biotech, and new materials and it will drive economic growth in the next decade and beyond. It will change the very nature of work, how we fight wars, live, and interact.

We are entering a world of self-driving electric vehicles, of billions of connected sensors and devices in an Internet of Things, of autonomous weapons, digitized trade, medical labs on chips, 3D printed houses, and precision agriculture, to name a few. But the danger is accentuating. This technological transformation is unfolding at a time when the entire international economic and political system that has underpinned global trade, finance and political stability is eroding.

<http://www.globaltimes.cn/content/1133505.shtml>

Viewpoint: The logic of nuclear power for Central Asia, World

Nuclear News, WNN, 27 December 2018

Many observers were surprised this year when Uzbekistan announced its decision to build a nuclear power station, which will be the first in Central Asia in the last 30 years, writes Jurabek Mirzakhmudov, director general of UzAtom, the state nuclear agency which was established in July.

Why, we were asked, would a leading gas producer opt to go nuclear when we could easily increase our gas-fired electricity production? We are doing so largely because of growth. Uzbekistan, Central Asia's most populous nation, has one of the fastest growing economies in the world. The World Bank is forecasting GDP growth of about 5% this year and next, and 5.5% in 2020. Current projections indicate that, to match these trends and consumer demand, we will need to double electricity output by 2030.

We could of course do this by burning our ample supplies of natural gas, but we have chosen a different course. Our parliament recently ratified the Paris Agreement on Climate Change, having signed the accord in April last year. We are committed to dramatically reducing our consumption of natural gas for power generation to free it for other higher-value purposes, including in particular the petrochemicals industry.

<http://www.world-nuclear-news.org/Articles/Viewpoint-The-logic-of-nuclear-power-for-Central-A?feed=feed>

What I learned at work this year

Bill Gates, Gatesnotes blog, December 29, 2018

The U.S. needs to regain its leading role in nuclear power research. Nuclear is ideal for dealing with climate change, because it is the only carbon-free, scalable energy source that's available 24 hours a day. The problems with today's reactors, such as the risk of accidents, can be solved through innovation.

The United States is uniquely suited to create these advances with its world-class

scientists, entrepreneurs, and investment capital. Unfortunately, America is no longer the global leader on nuclear energy that it was 50 years ago. To regain this position, it will need to commit new funding, update regulations, and show investors that it's serious.

There are several promising ideas in advanced nuclear that should be explored if we get over these obstacles. TerraPower, the company I started 10 years ago, uses an approach called a traveling wave reactor that is safe, prevents proliferation, and produces very little waste. We had hoped to build a pilot project in China, but recent policy changes here in the U.S. have made that unlikely. We may be able to build it in the United States if the funding and regulatory changes that I mentioned earlier happen. The world needs to be working on lots of solutions to stop climate change. Advanced nuclear is one, and I hope to persuade U.S. leaders to get into the game.

<https://www.gatesnotes.com/About-Bill-Gates/Year-in-Review-2018>

Don't play on public sentiment,

Song Jong Ho, Pyongyang Times, December 29, 2018

On December 13, the Liberal Korea Party in south Korea made public a new north policy. The policy, called a "peace plan of liberal Korea", includes three goals, three principles, seven-point keynote and priority tasks. What is absurd is that the LKP used such words as "peace without nukes", "economic cooperation" and "common prosperity" for the first time, which it has never mentioned even inside the party.

The LKP talked about the declarations of termination of war and peace based on denuclearization first, saying they "will propel the declarations when irreversible denuclearization is provided", and about the inter-Korean economic cooperation "accompanied by firm security". They advertise the new policy shows that the LKP is a political party with a blueprint for peace on the Korean peninsula.

Such moves are nothing but a trick to win public favour by making a feint of relaxing or changing some provisions of the north policy for fear that they would be more isolated and rejected if they persist in the conservative and cold-war-era north policy while running counter to the amicable circumstances provided by the historic north-south summit meeting and talks and the changed public sentiment.

<http://www.pyongyangtimes.com.kp/?bbs=28647>

Independent European army: A dream which will never come true

Mohammad Ghaderi, Tehran Times, December 30, 2018

Countries like Germany, France, and Spain supported this idea, and, on the contrary, Britain, Denmark and the Netherlands have strongly opposed it. However, the evidences suggest that such this idea has an abstract nature, and it is merely a minimal and periodic reaction by Macron and Merkel against unilateral measures taken by the U.S. President. Meanwhile, Germany and France spent 1.2 percent and 1.8 percent of their gross domestic product (GDP) on defense spending under the NATO pact.

Trump called on German and French officials to increase this amount to 2 percent. Britain and four other countries (out of the 29 NATO member states) have so far been willing to devote 2% of their GDP on NATO defense spending, and 24 other countries have not yet responded to this request. This is a sign of a continuous conflict between the United States and other NATO members which will last for a long time, even after Trump's leaving the White House!

Accordingly, we should pay attention to the thorough opposition of British officials to the idea of forming a "True European Army", as it was previously raised by Merkel. Speaking about the prospect of a European army, Gevin Williamson, the British Defense Secretary, told the Daily Mail: 'You can absolutely rest assured that Britain will never become part of a European army on my watch.

<https://www.tehrantimes.com/news/431265/Independent-European-army-A-dream-which-will-never-come-true>

Additive Manufacturing in 2040: Powerful Enabler, Disruptive

Threat *Trevor Johnston, Troy D. Smith & J. Luke Irwin, The RAND Corporation, December 2018.*

Additive manufacturing (AM)-colloquially known as three-dimensional, or 3D, printing-is an emerging technology with potential local and international security implications in the near and long terms. This Perspective- part of a series examining critical security challenges in 2040-offers a new framework for exploring the disruptive dimensions of AM technology, helping to inform which sectors and industries might be the most affected in the future. To better understand the security implications, a RAND research team briefly reviewed the existing literature, conducted interviews with stakeholders and subject-matter experts, and convened a workshop with technology and security experts. Two overarching security threats emerged: the proliferation of weapons and economic insecurity. This Perspective explores each of these security threats and offers a series of mitigation strategies and policy recommendations to help manage and regulate the negative impacts of this technology.

Additive manufacturing (AM) describes types of advanced manufacturing that are used to create three dimensional structures out of plastics, metals, polymers, and other materials that can be sprayed through a nozzle or aggregated in a vat.¹ These constructs are added layer by layer in real time based on a digital design. The simplicity and low cost of AM machines, combined with the scope of their potential creations, could profoundly alter global and local economies and affect international security.

<https://www.rand.org/pubs/perspectives/PE283.html>

Contribute Articles

Indian Pugwash Society welcomes research articles from students, researchers and faculties on Space, Missile, nuclear technology, WMD proliferation, arms control, disarmament, export controls and other related issues. Articles should be crisply written and should address contemporary debates in the policy arena. Manuscripts submitted for the consideration of the Indian Pugwash Society should be original contributions and should not have been submitted for consideration anywhere else. For further assistance, please contact us at : indianpugwashsociety@gmail.com

The Indian Pugwash Society aims to promote the study, discussion, and knowledge of and to stimulate general interest in, and to diffuse knowledge in regards to problems relating on WMD proliferation, arms control, disarmament, space security, export controls, nuclear technology and other related issues. This newsletter is part of the project "Emerging Nuclear Order in Asia: Implications for India" sanctioned to us by Department of Atomic Energy-Board of Research in Nuclear Sciences (DAE-BRNS).

Disclaimer:

Data included in this newsletter is only for educational purpose and wider dissemination. All liabilities and rights belong to respective writers & authors.

Prepared by :

**Ms Deepika Sharma
Ms Diya Deep Singh
Ms Raj Rajeshwari Singh**

Indian Pugwash Society

No.1, Development Enclave,
Rao Tula Ram Marg, Near USI, Delhi-110010
Tel. No (91-11) 2671-7983
Fax No. (91-11)2615-4192
Email: indianpugwashsociety@gmail.com