DEFENCE

BrahMos, 21 and developing

On June 12, 2001, the BrahMos supersonic cruise missile was first tested from a land-based launcher in Chandipur. In the 21 years since, BrahMos has been upgraded several times, with versions tested on land, air and sea platforms.

Background and development

- Since the early 1980s, the Integrated Guided Missile Development Programme, conceived and led by Dr A P J Abdul Kalam, started developing a range of missiles including Prithvi, Agni, Trishul, Akash and Nag, with a wide spectrum of capabilities and ranges.
- In the early 1990s, India's strategic leadership felt the need for cruise missiles — guided missiles that traverse the majority of their flight path at almost constant speed and deliver large warheads over long distances with high precision. The need was felt primarily following the use of cruise missiles in the Gulf War.
- An Inter-Governmental Agreement was signed with Russia in Moscow in 1998 by Dr Kalam, who headed the Defence Research and Development Organisation (DRDO), and N V Mikhailov, Russia's then Deputy Defence Minister. This led to the formation of BrahMos Aerospace, a joint venture between DRDO and NPO Mashinostroyenia (NPOM), the Indian side holding 50.5% and the Russians 49.5%.
- In 1999, work on development of missiles began in labs of DRDO and NPOM after BrahMos Aerospace received funds from the two governments. The first successful test in 2001 was conducted from a specially designed land-based launcher. The missile system has since reached some key milestones, with the first major export order of $375 million received from the Philippines Navy in 2022.

Strategic significance

- BrahMos is a two-stage missile with a solid propellant booster engine. Its first stage brings the missile to supersonic speed and then gets separated.
- The liquid ramjet or the second stage then takes the missile closer to three times the speed of sound in cruise phase.
- The missile has a very low radar signature, making it stealthy, and can achieve a variety of trajectories. The 'fire and forget' type missile can achieve a cruising altitude of 15 km and a terminal altitude as low as 10 m to hit the target.
- Cruise missiles such as BrahMos, called "standoff range weapons", are fired from a range far enough to allow the attacker to evade defensive counter-fire. These are in the arsenal of most major militaries in the world.
- The BrahMos has three times the speed, 2.5 times flight range and higher range compared to subsonic cruise missiles. With missiles made available for export, the platform is also seen as a key asset in defence diplomacy.

MILESTONES

2001: Maiden launch from land-based launcher in anti-ship mode from ITR, Chandipur

2002: Launch in land-to-sea configuration from ITR

2003: Maiden launch from Naval warship

2005: Navy receives first batch of BrahMos

2007: BrahMos land system delivered to Indian Army

2013: Launch from a submerged platform in Bay of Bengal

2017: Cruise missile's maiden launch from Su-30MKI

2020: Su-30MKI equipped with BrahMos inducted in an IAF formation

2022: First mega export order from Philippines Navy

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

- An extended range version of the BrahMos air-launched missile was tested from a Sukhoi-30 MKI recently. On January 11, an advanced sea-to-sea variant of BrahMos was tested from the newly commissioned INS Visakhapatnam.
- The BrahMos is also said to have been involved in a recent controversy. Pakistan claimed that an unarmed Indian missile had landed in its territory on March 9, and the Ministry of Defence said a technical malfunction had led to accidental firing. While the government, which ordered a high-level court of enquiry, did not officially identify the missile, experts felt its trajectory suggested the signature of BrahMos.

Present and future

- According to DRDO scientists what makes the missile system unparalleled is its extreme accuracy and versatility. Land-based BrahMos formations along the borders, BrahMos-equipped Sukhoi-30s at bases in Northern theatre and and Southern peninsula, and BrahMos-capable ships and submarines deployed in sea together form a triad.
- With requirements evolving in multi-dimensional warfare, the BrahMos is undergoing a number of upgrades and work is on to develop versions with higher ranges, manoeuvrability and accuracy.
- Versions currently being tested include ranges up to 350 km, as compared to the original's 290 km. Versions with even higher ranges, up to 800 km, and with hypersonic speed are said to be on cards. Efforts are also on to reduce the size and signature of existing versions and augment its capabilities further.
- Versions deployed in all three Armed forces are still being tested regularly, and so are versions currently under development.
- **LAND-BASED:** The land-based BrahMos complex has four to six mobile autonomous launchers, each with three missiles on board that can be fired almost simultaneously. Batteries of the land-based systems have been deployed along India's land borders in various theatres.
- The upgraded land attack version, with capability of cruising at 2.8 Mach, can hit targets at a range up to 400 km with precision. Advanced versions of higher range and speed up to 5 Mach are said to be under development. The ground systems of BrahMos are described as 'tidy' as they have very few components.
- **SHIP-BASED:** The Navy began inducting BrahMos on its frontline warships from 2005. These have the capability to hit sea-based targets beyond the radar horizon. The Naval version has been successful in sea-to-sea and sea-to-land modes. The BrahMos can be launched as a single unit or in a salvo of up to eight missiles, separated by 2.5-second intervals. These can target a group of frigates with modern missile defence systems.
- **AIR-LAUNCHED:** On November 22, 2017, BrahMos was successfully flight-tested for the first time from a Sukhoi-30MKI against a sea-based target in the Bay of Bengal. It has since been successfully tested multiple times.
- BrahMos-equipped Sukhoi-30s, which have a range of 1,500 km at a stretch without mid-air refuelling, are considered key strategic deterrence for adversaries both along land borders and in the strategically important Indian Ocean Region. The IAF is said to be integrating BrahMos with 40 Sukhoi-30 fighter jets across the various bases.
- **SUBMARINE-LAUNCHED:** This version can be launched from around 50 m below the water surface. The canister-stored missile is launched vertically from the pressure hull of the submarine, and uses different settings for underwater and out-of-the-water flights. This version was successfully tested first in March 2013 from a submerged platform off the coast of Visakhapatnam.

PRELIMS

Web 5.0

- **Web 1.0 -** It is a read-only Internet made of static web-pages.

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

- **Web 2.0** – It is a read and write Internet. Users were able to communicate with servers and other users leading to the creation of the social web. This is the World Wide Web that we use today.
- It is more centralised and focused on user-created content. Eg Use of Facebook.
- **Web 3.0** is an evolving term. It refers to the next generation "**read-write-execute**" Internet with decentralization as its bedrock.
- It leverages the use of block chain technology where people can interact with each other without the need of an intermediary.
- Web 3.0 will be driven by Artificial Intelligence and machine learning where machines will be able to interpret information like humans.
- **Web 5.0** is Web 2.0 plus Web 3.0 that will allow users to 'own their identity' on the Internet and 'control their data'.
- It is being developed by former Twitter CEO Jack Dorsey's Bitcoin business unit, The Block Head.
- It aims at building an extra decentralized web that puts you in control of your data and identity.
- It is built with an aim to return "ownership of data and identity to individuals".
- **Difference between Web 3.0 and Web 5.0** – Both Web 3.0 and Web 5.0 envision an Internet without censorship from governments or big tech.

Web 3.0	Web 5.0
It isn't truly decentralized or owned by its users.	It is a truly decentralized.
No single entity owns the information (decentralization). The data is distributed across networks.	The data and identity is owned by the user.
Gives only control of your data.	Gives you control of your data as well as your identity.

IMCCS Report on Decarbonising Defence Agencies

The International Military Council on Climate and Security (IMCCS) has released a report on the need to decarbonise defence agencies across the world.

- The Russia-Ukraine war has re-exposed the risks and vulnerabilities and, the potential interventions that could be adopted for greener military operations.
- The risks posed by climate change towards security is realised by the security foreign policies body across the world.
- The world's defences are dominated by the **use of fossil fuels**, which serve as an efficient means to operate the forces across the world.
- Military fuel consumption pose a problem in terms of operations, and involves high expenses and dependence on external suppliers.
- The IMCCS panel recommended **high technology innovations** such as use of bio-fuel, could help to shift them to low-carbon alternatives thus evolving the modernisation process.
- Another recommendation comes to bring **hybrid vehicles** or **alternative fuel technologies** to reduce reliance on fossil energy.

International Military Council on Climate and Security

- The International Military Council on Climate and Security (IMCCS) is a group of senior military leaders, security experts from the governmental and nongovernmental sectors, and security institutions across the globe.
- It is dedicated to **anticipating, analyzing, and addressing the security risks of a changing climate**.

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

- It was launched in 2019 as a response to a growing demand from military professionals for sharing information and best practices on addressing the security and military dimensions of climate change.
- It was founded by
    1. The Center for Climate and Security (CCS), an institute of the Council on Strategic Risks,
    2. The French Institute for International and Strategic Affairs (IRIS),
    3. The Hague Centre for Strategic Studies (HCSS) and
    4. The Planetary Security Initiative of the Netherlands Institute of International Relations (Clingendael).
- **Governance** - The IMCCS is administered by the CCS.
- The IMCCS consists of three main entities - IMCCS Leadership, IMCCS Expert Group and IMCCS Institutional Partners.
- **Report** - The IMCCS Expert Group has been publishing an annual or biennial World Climate and Security Report since 2020.
- This report is a global assessment of the security risks of a changing climate and recommendations for addressing them.

Amyloidosis

Former Pakistan President General is suffering from Amyloidosis.

Amyloid is an abnormal protein, which is not normally found in the body. But it can be formed from several different types of proteins.

- Amyloidosis is a rare disease that occurs when **amyloid builds up in one's organs**, affecting their shape and functioning.
- Amyloid deposits can build up throughout one's body, or in just one area like in the heart, brain, kidneys, spleen and other parts of the body.
- **Nature** - Some types of Amyloidosis can develop as secondary to a different health condition.
- Some types of Amyloidosis can also develop as a primary condition, which may lead to life-threatening organ failure.
- **Causes** - Some types are hereditary or caused due to a gene mutation.
- But, others are caused by outside factors, such as inflammatory diseases or long-term dialysis.
- **Diagnosis** - Imaging procedures that look at the body's internal organs, such as an echocardiogram, nuclear heart test or liver ultrasound, are the normal tests to diagnose the condition.
- **Treatment** - Currently, there is no cure for amyloidosis. The amyloid deposits cannot be directly removed.
- The goals of amyloidosis treatment are to **slow the progression**, reduce the impact of symptoms, and prolong life.
- Actual therapy depends on the type of amyloidosis one has, like Chemotherapy, bone marrow transplant, stem cell transplant, etc.,
- Secondary amyloidosis is treated by controlling the underlying disorder and with powerful anti-inflammatory medicines.

Types of Amyloidosis

The type of protein and where it collects tell the type of amyloidosis one has.Bottom of Form

- **Light-chain (AL) amyloidosis** is the most common type in developed countries which can affect the kidneys, spleen, heart, and other organs.
- People with conditions such as multiple myeloma or a bone marrow illness are more likely to have AL amyloidosis.
- This starts in plasma cells within the bone marrow. Plasma cells create antibodies with both heavy chain and light chain proteins.

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

- If the plasma cells undergo abnormal changes, they produce excess light chain proteins that can end up in the bloodstream.
- These damaged protein bits can accumulate in the body's tissues and damage vital organs such as the heart.
- **AA amyloidosis or secondary amyloidosis** is a condition that is the result of another chronic infectious or inflammatory disease, such as rheumatoid arthritis, Crohn's disease, or ulcerative colitis.
- It mostly affects one's kidneys, digestive tract, liver, and heart.
- AA refers to the amyloid type A protein that causes it.
- **Dialysis-related amyloidosis** is more common in older adults and people who have been on dialysis for more than 5 years.
- This form of amyloidosis is caused by deposits of beta-2 microglobulin that build up in the blood.
- Deposits can build up in many different tissues, but it most commonly affects bones, joints, and tendons.
- **Transthyretin amyloidosis** can be inherited from a family member and is hence commonly referred to as familial amyloidosis.
- Transthyretin is a protein that is also known as prealbumin made in the liver.
- As such, this often affects the liver, nerves, heart, and kidneys and many genetic defects are linked to a higher chance of amyloid disease.

ANSWER WRITTIMG

Q. Industrialisation and colonisation complemented each other in establishing British supremacy across the globe. Analyse (150)

Introduction

Industrialisation refers to the emergence of machine based production using inanimate power resources like steam or electricity. Colonisation on the other hand, refers to the practice of acquiring colonies by conquest or other means and using them to serve its own economic and political interests.

The first wave of colonisation ,during the Age of Exploration, was dominated by countries like Spain and Portugal. But in the second wave, with pioneering start of the Industrial Revolution, Britain emerged as numero uno amongst colonisers. Industrialisation led to:

- Emergence of new ideas.
- Increase in scale of production.
- Development of modern equipment.
- Improvement in transportation and communication. All these provided disproportionate advantage to Britain over other colonising powers and led to expansion of its territories.
- With more colonies under its control, it was able to satiate the demand of raw material for its industries back at home.
- As industries grew, more and more raw materials were needed to feed those industries.
- India and Egypt were good sources of cotton, Congo and the East Indies, of rubber, other products needed were food grains, tea, coffee, indigo, tobacco and sugar.
- To obtain these, it was necessary to change the pattern of production in the countries where they could be grown.
- Thus, the colonists forced the cultivation of only one or two crops which they needed as raw materials for their industries.
- Later with an augmented scale of production, domestic markets got saturated and the surplus was diverted towards the colonies like India, turning them into markets.

  With inexorable pace of industrialization aided by the raw material, manpower for labour and army from the colonies, Britain established Pax Britannica.

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

Conclusion

This domination was not confined only to the political, economic and military sphere. British culture, language, educational and administrative structure too enjoyed global prominence, making Britain a veritable global colonial power.

MCQs

1. Arrange the following countries in the ascending order based on India‟s merchandise export to the respective countries:
1. The United States of America
2. China
3. The United Arab Emirates
4. Singapore
Select the correct answer using the code given below.
(a) 4-2-3-1
(b) 2-4-3-1
(c) 4-3-2-1
(d) 2-3-1-4.

2. India receives the highest FDI equity inflows from which one of the following countries?
(a) Singapore
(b) The United States of America
(c) Canada
(d) Mauritius

3. Which among the following subsides is/are considered to be part of Amber Box Subsidies under the Agreement on Agriculture (AoA)?
1. Minimum Support Price (MSP)
2. Income support through PM-KISAN (Pradhan Mantri Kisan Sammann Nidhi)
3. Financial Support for Agricultural Universities to enhance R&D.
Select the correct answer using the code given below:
(a) 1 only
(b) 1 and 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

4. Consider the following statements related to Indian Agriculture:
1. The Gross Capital Formation (GCF) in Indian Agriculture is much higher than the agricultural subsidies.
2. More than 90% of the GCF is done by the Government.
Which of the statements given above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

5. Which among the following agencies has recently published the "Digital Payments Index"?
(a) National Payment Corporation of India (NPCI)
(b) Reserve Bank of India
(c) Ministry of Finance
(d) Indian Banks Association

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com