2019

# DEFENCE DEVELOPMENTS

# Defence Technologies In News

## 1. INS Vela

- INS Vela is the Indian Navy's **Scorpene-class** submarine, which is made in India.
- This is the **fourth** submarine in the series of the six submarines being built at Mazagon Dock Ltd, Mumbai under **Project 75(I).**

**Features:**

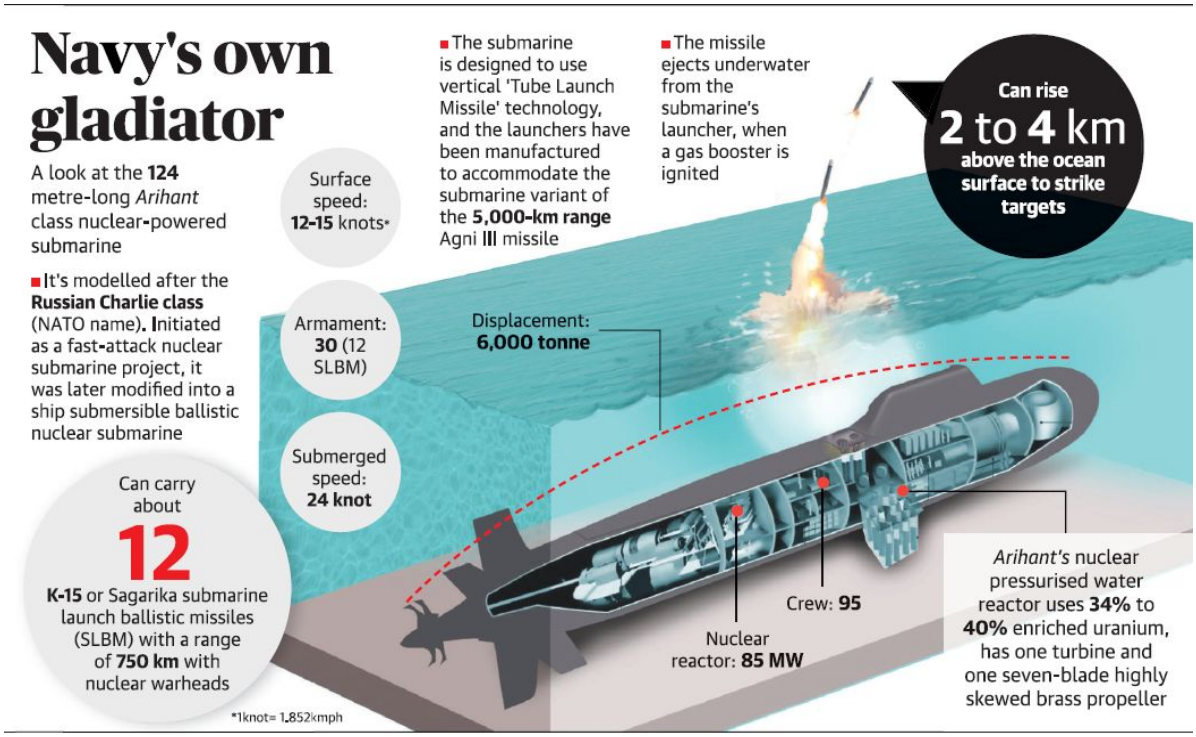
- It has State-of-the-art attacking capability, it can attack using **torpedoes** and tube launch **anti-ship missiles**, whilst on the surface or underwater.
- **superior stealth** of submarine gives it invulnerability and makes more difficult for the enemy to detect it.
- It can undertake missions such as anti-submarine warfare, anti-surface warfare, area surveillance, intelligence gathering, mine laying etc. and has the ability to launch crippling attack on enemy using precision guided weapon.

**What is scorpene class submarine?**

- The Scorpène-class submarines are a class of diesel-electric attack submarines jointly developed by the French Direction des Constructions Navales (DCN) and the Spanish company Navantia, and now by French naval defence company "The Naval Group". It features diesel propulsion and additional air-independent propulsion (AIP).
- **INS Kalvari**, the **first** submarine in Scorpene class, has already been commissioned, while others are at advanced level of trial and test. The **second INS Khanderi** launched in **january 2017,** The **third** in Scorpene series **INS Karan**j was launched in January 2019. The **fifth** Scorpene-class submarine **INS Vagir** and **sixth** Scorpene-class submarine **INS Vagsheer** are in the advanced stages of manufacturing on the assembly line and will be launched soon.

## 2. INS Arihant

- INS Arihant, India's first **indigenously developed nuclear submarine.**
- This submarine is a vital cog in India's quest in attaining a minimum deterrent **nuclear 'triad**' – the **ability to fire** nuclear-tipped missiles from **land, air and sea.**
- The vessel will be able to carry 12 Sagarika K 15 submarine launched ballistic missiles that have a range of over 700 km.
- Arihant , the country's only operational **Ship Submersible Ballistic Nuclear** (SSBN) asset, can stay undetected deep underwater for long periods, range far and wide. It is the most dependable platform for a second strike, given the country's "no first use" on nuclear weapons.




## 3. INS Kohassa

- INS Kohassa will be **India's fourth air base and the third naval air facility** in the Andamans that overlooks key sea lanes of communication and strategic points.
- These islands dominate the Bay of Bengal with more than 60,000 commercial vessels passing through each year.
- **INS Utkrosh** at Port Blair and **INS Baaz** at Campbell Bay are the first two Naval Air Base.
- With the addition of this airfield, the Andaman and Nicobar Command's ability to operate independently from all the areas of the Union Territory will get a great boost.
- It is named after a **White-Bellied Sea Eagle**, which is a large bird of prey endemic to Andaman and Nicobar Islands.

## 4. INS Imphal

- It's the third state-of-the-art guided missile destroyer warship built as part of **Project 15B**
- The navy launched **INS Vishakhapatnam,** the first Project 15B ship, in April 2015 and the second ship, **INS Mormugao**, was launched in September 2016.
- A contract for four destroyers under the Project 15B has signed.
- Ships built under **Project 15B** incorporate new design concepts for improved survivability, sea keeping, stealth and manoeuvrability. Enhanced stealth features have been achieved through shaping of hull and use of radar transparent deck fittings which make these ships difficult to detect. These ships will be equipped to carry and operate two multiple role helicopters.

## 5. Project 75(I)

- Project 75 India (P75I) envisages the construction of **six conventional submarines** with better sensors and weapons and the Air Independent Propulsion System (AIP).
- The project has been cleared under the **strategic partnership model.**
- The P75I project is part of a 30-year submarine building plan that ends in 2030.

- As part of this plan, India was to build **24 submarines** 18 conventional submarines and six nuclear-powered submarines (SSNs) as an effective deterrent against China and Pakistan.
- India's current arsenal consists of 14 conventional submarines and two nuclear-powered submarines.

**What is strategic partnership model?**

- Under the strategic partnership model, an Indian shipyard will be selected by the government, which will also nominate the foreign original equipment manufacturer (OEM) under the overall arch of 'Make in India'.

## 6. Ballistic Missile Interceptor AAD

- Recently DRDO conducted the successful test of the Ballistic Missile Interceptor Advanced Area Defence (AAD)

**Details of the test:**

- The endo-atmospheric missile, capable of intercepting incoming targets at an altitude of 15 to 25 kms was launched against multiple simulated targets of 1500 km class ballistic missile.

**What is AAD ballistic missile interceptor?**

- AAD is a single stage solid rocket propelled guided missile. It can intercept incoming ballistic missile at altitudes of up to 30km.
- It is equipped with an inertial navigation system, advanced computer and an electro-mechanical activator.

**What are Ballistic missile?**

- These are powered initially by a rocket, but then follow an unpowered trajectory that arches upwards before descending to reach its intended target.
- Since it depends on gravity to reach its target, it's called a ballistic missile.
- They can be launched from ground or sea platforms.
- It travels well outside the atmosphere and then the warhead detaches and falls back to earth.
  **Ex:** Agni series of Missiles

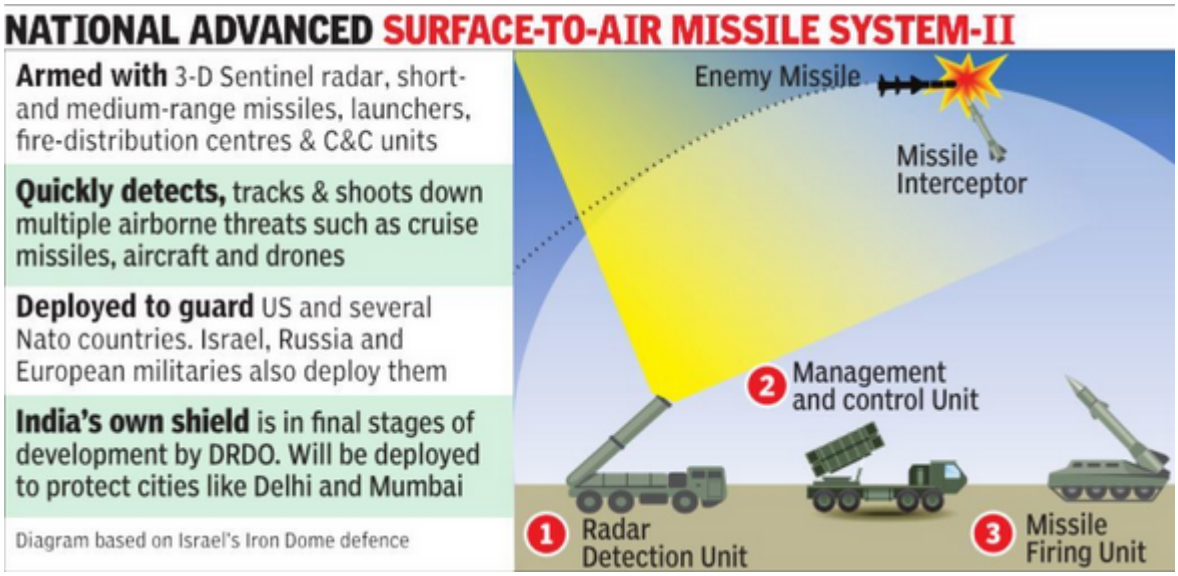
**What are Cruise missiles?**

- These vehicles that are propelled by jet engines, much like an airplane.
- They can be launched from ground, air, or sea platforms.
- Cruise missiles generally consist of a guidance system, payload, and aircraft propulsion system.
- Cruise missiles remain within the atmosphere for the duration of their flight and can fly as low as a few meters off the ground.

**Ex:** Brahmos and Nirbhay missiles.

## 7. National Advance Surface To Air Missile System-II

- The Indian Ministry of Defence (MoD) has approved the acquisition of the National Advanced Surface-to-Air Missile System-II (NASAMS-II) from **the US.**
- Built by Kongsberg Defence and Aerospace in collaboration with Raytheon National, the NASAMS-II system will **protect the National Capital Region** (NCR) from threats such as **hostile aircraft, cruise missiles and unmanned aerial vehicles (UAVs) or drones.**
- The acquisition of the new system will reportedly help supplement the two-tier ballistic missile defence (BMD) shield currently being indigenously developed by the Defence Research and Development Organisation (DRDO).




## 8. Pinaka-2

- The Pinaka-2 missile system is a guided version, with a navigation, guidance and control kit developed by the Research Centre, Imarat (RCI), Hyderabad.
- It has a range of more than 70km, where has pinaka-1 has 40km range.

## 9. MPATGM

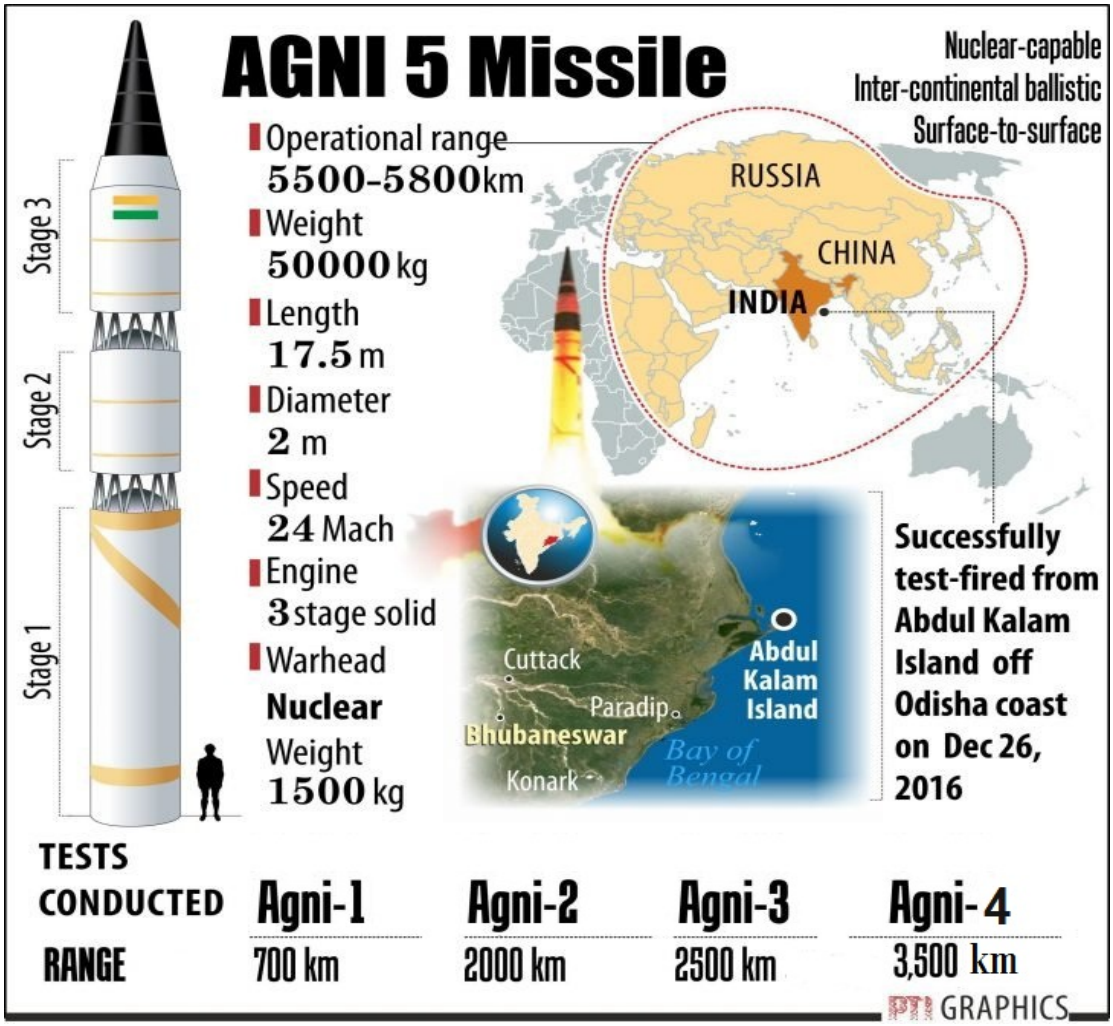
- **Man Portable Anti-Tank Guided Missile** (MPATGM) is the third-generation anti-tank guided missile (ATGM) indigenously developed by DRDO.
- It has strike **range of 2.5 km.**
- It is capable of being fired at a stationary and moving targets from the shoulder and can be used during the day and night.
- It works on **fire and forget principle**.

## 10. Artillery Gun 'Dhanush'

- Dhanush the India's **first indigenous,** long-range artillery gun has passed its final test at Pokhran, paving the way for its induction into the Army,
- It is also called as the **"desi Bofors"** and is a 155mm x 45mm calibre artillery gun.
- It has a strike **range of 38 kilometres**

## 11. Agni V

- India successfully test fired its **indigenously developed** nuclear capable long-range ballistic missile Agni-5 with a strike range of **5,000 kilometres.**
- It is the **surface-to-surface ballistic** missile.
- It can carry nuclear warhead weighing 1.5 tonnes to a distance of over 5,000 km and is the longest missile in India's arsenal.
- **Agni series :**
  1. Agni-1 with 700 km range
  2. Agni-2 with 2,000 km range
  3. Agni-3 with 2,500 km range
  4. Agni-4 with 3,500 km range
  5. Agni-6 under development



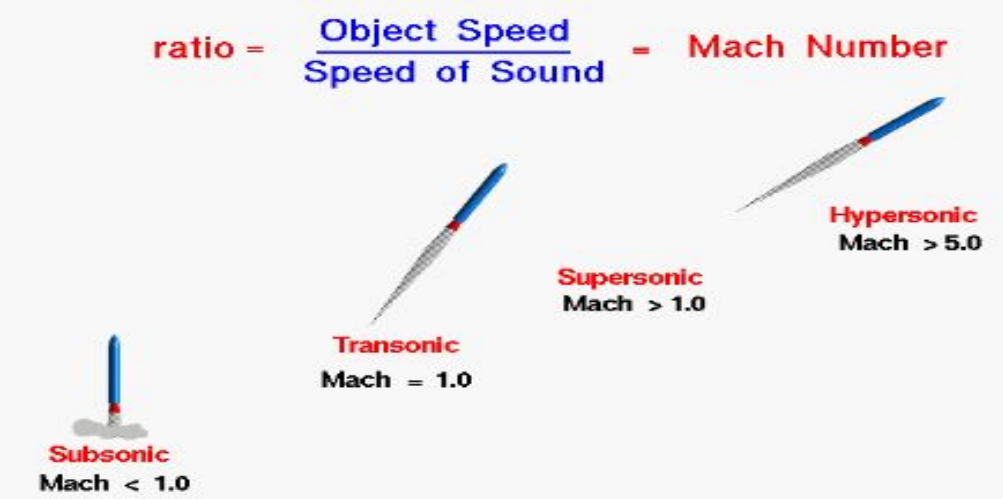
## 12. Nirbhay Missile.

- It is the first indigenously designed and developed long-range **subsonic** cruise missile.
- The missile uses a solid propellant booster motor that is jettisoned shortly after launch, switching over to a turbojet engine with a cruise speed of 0.65 Mach.
- Nirbhay has a range of 1000 km and can fly very low to the ground to avoid detection by enemy radar called **terrain hugging capability.**
- It is developed by **The Defence Research and Development Organisation (DRDO).**

**What are supersonic missiles?**

- A supersonic missile is a missile able to fly faster than the speed of sound (Mach number 1)

**Following diagram explains subsonic, transonic supersonic and hypersonic.**




## 13. QRSAM

- QRSAM stands for **Quick Reaction Surface-to-Air Missile (QRSAM).**
- The Defence Research and Development Organisation (DRDO) developed the missile for the armed forces and the missile, in particular, will be of use to the Indian army.
- The missile has a strike range of **30 km.**

## 14. Missile "Prahaar"

- The Prahaar is a **surface-to-surface, short-range**, solid propellant, road-mobile ballistic missile designed for tactical strikes against close range targets.
- 'Prahar', developed by the **Defence Research and Development Organisation** (DRDO), is capable of filling the gap between the multi-barrel rocket system 'Pinaka' and medium-range ballistic missile 'Prithvi'.
- It is a quick-reaction, all-weather, all-terrain, highly accurate battlefield support tactical weapon system.
- The missile can travel a range of 200 km

## 15. Milan-2T Anti-tank Missiles

- MILAN is a portable **medium-range**, anti-tank weapon manufactured by Euro missile, based in Fontenay-aux-Roses in **France.**
- India government has decided to purchase of 5,000 Milan 2T anti-tank guided missiles from France.

**What are anti-tank missiles?**

An anti-tank missile, anti-tank guided missile (ATGM), **anti-armour guided missile** or anti-tank guided weapon (ATGW) is a missile that is created **to destroy vehicles** that are **heavily armoured.**

- Following are the some of the indigenous anti-tank missiles that the DRDO is working which are at various stages of completion include NAG, HELINA, SANT (Stand-off Anti-Tank) Missile, Cannon-launched Laser Guided Missile (CLGM), SAMHO, AMOGHA-1, AMOGHA-2, AMOGHA-3.

## 16. Barak-8 Missile

- It is the **Israel's** advanced **surface-to-air missile** co-developed with India which will be deployed to secure vital offshore assets like gas fields.
- The missile is being jointly developed by the Defence Research & Development Organisation (DRDO), Israel Aerospace Industries (IAI), Israel's Administration for the Development of Weapons and Technological Infrastructure, Elta Systems, Rafael and other companies
- It has a range of **60 to 70km.**

## 17. Nag

- NAG is developed by **DRDO** under Integrated Guided Missile Development Programme (IGMDP) and is manufactured exclusively by Bharat Dynamics Limited (BDL)
- NAG comes in **five variants**- **HeliNa** (Helicopter-launched Nag), **Land version** (with mast-mounted missile launcher), **Man Portable NAG**, **Air-launched version** for tactical interdiction aircraft (upgraded version of Jaguar IS) and **NAMICA** (NAg MIssile Carrier), a tank destroyer variant built for the army.
- NAG has an operational range of 500meters to 4 km on land and when it is air-launched, it can operate anywhere between 7-10km.
- It is also known as a **fire-and-forget missile,** as it is locked to the particular target and only then, it is released to attack.
- DRDO's NAG missile is now ready for induction into the Indian Army.

## 18. Helina

- Helina, the **helicopter-launched version** of the Nag anti-tank guided missile with a hit range of 7-8 km.
- Developed by the Defence Research and Development Organisation (DRDO), it is one of the most-advanced anti-tank weapons in the world.
- It is guided by an infrared imaging seeker (IIR) operating in the lock-on before-launch mode.

## 19. Prithvi-II

- Prithvi-II Missile is a **Surface-to-Surface** Battlefield Missile.
- It is DRDO's indigenously developed nuclear capable missile
- It has a strike range of **350km.**

- Prithvi-II is the first missile to have been developed by the DRDO under the **Integrated Guided Missile Development Programme (IGMDP)**.

**What is IGMDP?**

- The Integrated Guided Missile Development Programme (IGMDP) was conceived by renowned scientist Dr. A P J Abdul Kalam to enable India attain self-sufficiency in the field of missile technology.
- Keeping in mind the requirements of various types of missiles by the defence forces. the team recommended development of five missile systems.

**The missites developed under the programme were:**

1. Short-range surface-to-surface ballistic missile **Prithvi**
2. Intem'|ediate-range surface-to-surface ballistic missile **Agni**
3. Short-range low-level surface-to-air missile **Trishul**
4. Medium-range surface-to-air missile **Akash**
5. Third generation anti-tank missile **Nag**

## 20. Astra Missile

- Astra is the indigenously developed **Beyond Visual Range Air-to-Air Missile** (BVRAAM).
- The Astra has an officially stated range of **75 kilometers.**
- It is developed **by DRDO.**

## 21. LCA Tejas

- The HAL Tejas is an Indian **single-engine**, delta wing, multirole light fighter designed by the **Aeronautical Development Agency (ADA)** and **Hindustan Aeronautics Limited (HAL)** for the Indian Air Force and Indian Navy.
- Tejas, which will replace Indian Air Force's (IAF) ageing MiG-21s, is India's indigenous Light Combat Aircraft (LCA).
- It is the **world's smallest single-seat, single-engine combat aircraft.** It is of tailless, compound delta-wing design.

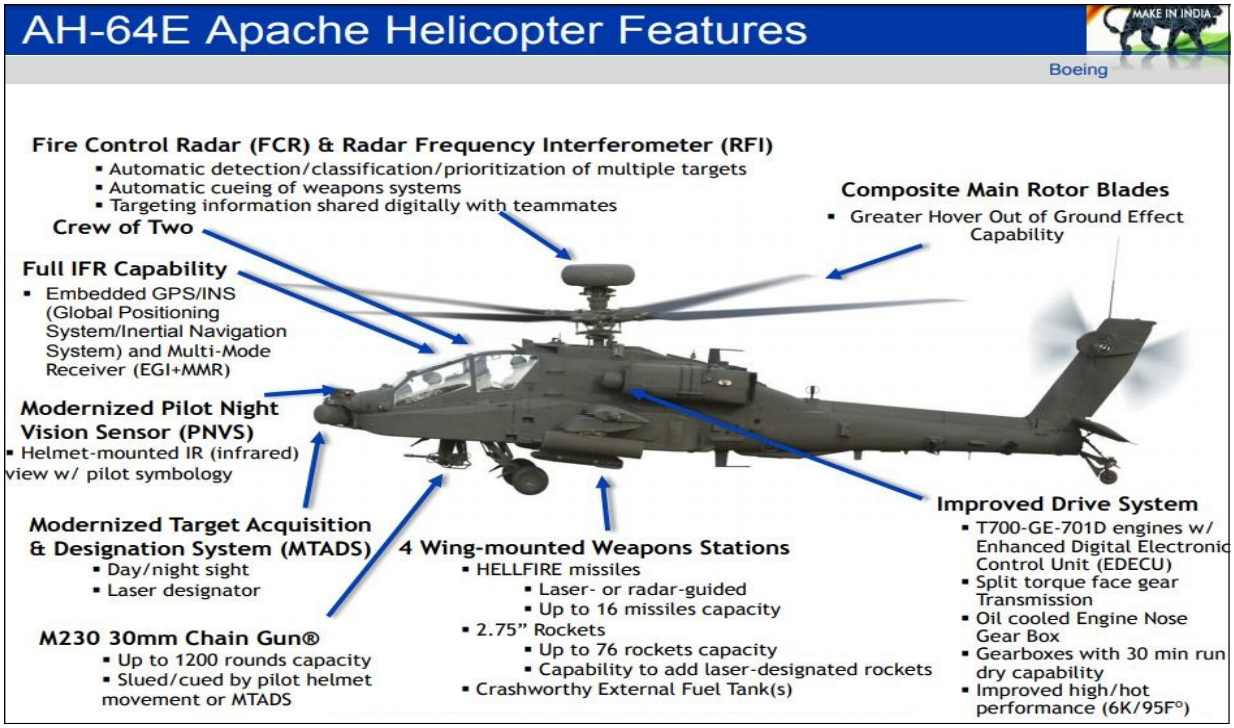
## 22. Chinook Helicopters

- Recently The IAF formally inducted the CH 47 F (I) - Chinook heavy lift helicopters into its inventory.
- It is a significant step towards modernisation of Indian Air Force's helicopter fleet.
- The helicopter has a fully integrated **digital cockpit** management system, advanced cargo handling capabilities and **electronic warfare suite** that complement the aircraft's performance.
- The helicopter is capable of airlifting diverse **military and non-military** loads into remote locations.
- It is designed and manufactured by Boeing Ltd of US.

## 23. Apache Helicopter

- Recently the first AH-64E Apache attack helicopter built for India was formally handed over to the Indian Air Force (IAF) at the **Boeing production** facility in the U.S.
- The Boeing AH-64 Apache is an American **twin-turboshaft attack helicopter** with a tailwheel-type landing gear arrangement and a tandem cockpit for a crew of two.
- It features a **nose-mounted sensor** suite for target acquisition and **night vision systems.**
- The helicopter has been customized to suit IAF's future requirements and would have significant capability in mountainous terrain.

- The helicopter has the capability to carry out precision attacks at standoff ranges and operate in hostile airspace with threats from ground.
- The ability of these helicopters, to transmit and receive the battlefield picture, to and from the weapon systems through data networking makes it a lethal acquisition.




## 24. Rustom-2 UAV

- Rustom-II MALE (medium-altitude, long-endurance ) **unmanned aerial vehicle** is the latest Rustom series of UAVs, which also include **Rustom-I, Rustom-H and Rustom-C**.
- It is intended for use by the Indian Armed Forces including army, navy and air force in intelligence, surveillance and reconnaissance (ISR) tasks.
- It is an unmanned combat aerial vehicle and features lightweight airframe. It has a length of 9.5m and an empty weight of 1,800kg.
- The UAV can fly at a maximum speed of **225km/h** and **endure for up to 24 hours.** It has the ability to operate at line of sight range of 250km. The drone's maximum flight altitude above the mean sea level is 35,000ft.

## 25. Bhabha Kavach

- **Bhabha Atomic Research Centre (BARC)** has developed new bullet proof jacket Bhabha Kavach.
- Which is more cheaper and light weight. Named after Dr.Homi Jahangir Bhabha father of Indian nuclear programme.

**Features :**

- Made of **boron carbide** and carbon nanotube polymer composite and weighs just 6.6 kg.
- **50% less weight** than presently used bullet proof jackets which weighs 10 to 17kg,

**About BARC:**

- The BARC is India's premier nuclear research facility based in Mumbai, Maharashtra. It is a multi-disciplinary research center with extensive infrastructure.

# 2018 RESULTS

**11 Ranks in Top 50** | **28 Ranks in Top 100** | **183 Ranks in Final List**


RANK 11
Pujya Priyadarshni


RANK 16
Dhodmise Trupti Ankush


RANK 21
Rahul Jain


RANK 24
Anuraj Jain


RANK 31
Mainak Ghosh


RANK 32
Sameer Saurabh


RANK 33
Awhale Manisha Manikrao


RANK 36
Deepesh Kedia


RANK 39
Patil Hemanta Keshav


RANK 41
Alok Kumar


RANK 43
Akshay Agrawal


RANK 52
Prateek Singh


RANK 53
Sumit Kumar


RANK 56
Dileep Mishra


RANK 59
Chahat Bajpai


RANK 60
Anya Das


RANK 61
Girdhar

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