

1. U.S. nod for air Defence System Sale to India

Prelims Level: Science and Technology – Defence systems

Mains Level: GS-III Achievements of Indians in Science & Technology; Indigenization of Technology and Developing New Technology.

Why in News?

- The US has approved the sale of an Integrated Air Defence Weapon System (IADWS) to India at an estimated cost of \$1.9 billion.
- The objective of the deal is to modernise India's armed forces and to expand its existing air defence architecture to counter threats posed by Air Attacks.

About Integrated Air Defence Weapon System:

- **Objective:**
 - ✓ IADWS will be used along with indigenous, Russian and Israeli systems to erect an ambitious **Multi-layered missile shield** (Consisting of 5 layers) over the National Capital Territory (NCT) of Delhi against aerial threats.
- The Integrated Air Defence Weapon System (IADWS) is also called as the **National Advanced Surface to Air Missile System (NASAMS-II)**.
- It is an upgraded version of the NASAMS developed by the **US firm in partnership with Norway**.
- It includes launchers, targeting and guidance systems, advanced medium-range air-to-air missile (**AMRAAM**) and **Stinger missiles**, 3D Sentinel radars, fire-distribution centres and command-and-control units.
- It comes amidst the massive military modernisation by China which is also flexing its military muscles in the strategic Indo-Pacific region.

About Multi-layered Air Defence System:

- India is developing a multi-layered air defence system for its cities besides air defence system for tactical battle areas.
- The layered approach focuses on developing protection depending on
 - ✓ Origin of the threat (range of missiles)
 - ✓ Capabilities for Interception (altitude).

5th Layer: NASAMS (National Advanced Surface to Air Missile System):

- This constitutes the inner-most layer of air defence plan for Delhi.

- It will be deployed to protect vital assets and people in the National Capital region of Delhi including President's house, Parliament etc.
- It renders quick-reaction 3-dimensional protection at low altitudes of 5 km to various types of aerial threats ranging from drones to ballistic missiles.
- **Components:** 12 multi-missile launchers to launch both advanced medium-range air-to-air missiles AMRAAMs and Stinger surface-air-missiles

4th Layer: Akash medium-range Surface to Air Missile System:

- India has 2 regiments of the indigenous Akash systems which are capable of multi-target engagement.
- It can strike targets up to a range of 25km and altitude of 18,000m.

3rd Layer: Barak-8 long and Medium Range SAM:

- Barak-8 is a medium-range surface-to-air missile system being developed jointly by India and Israel.
- It will have an interception range of 70-100 km.

2nd Layer: S-400 layered Defence System:

- In October 2018, India signed a deal with Russia to acquire S-400 Triumf multi-layered air Defence System.
- This is despite US opposition to the deal through CAATSA, a law that requires sanctioning those countries that have significant defence cooperation with Russia.
- On the other hand, USA is offering THAAD and Patriot as alternative to S-400 to India.
- S-400 layered defence system can intercept all types of aerial targets including aircraft, unmanned aerial vehicles (UAV), and ballistic and cruise missiles up to the range of 400km, at an altitude of up to 30km.

1st layer: 2-tier Ballistic Missile Defence System:

- The 1st layer comprises of outermost layer of protection aimed at intercepting aerial threat from ballistic missiles that have ranges upto 5000km.(ICBMs)
- DRDO is developing a 2-tier ballistic missile defence system that can intercept ballistic missiles at altitudes both outside (exo) and inside (endo) the atmosphere.

1st layer: Endo:

- The single stage solid rocket-propelled Advanced Air Defence (AAD) low-altitude interceptor missile. (Ashwin)

- The AAD interceptor missile is primarily designed to intercept enemy missiles in the endo-atmosphere at altitudes of 20-40 kilometers.

2nd layer: Exo:

- Prithvi Air Defense Vehicle known as **Pradyumna Ballistic Missile Interceptor** is designed to destroy missiles with ranges 300-2000 km at exo-atmosphere (about 80km altitude).
- For higher altitudes upto 150 km, Agni-V-based ballistic interceptors would be used. (because of 5000km range)

Other Relevant Facts:

1. Advanced Medium-Range Air-to-Air Missile:

- ✓ Advanced Medium-Range Air-to-Air Missile (AMRAAM) is an American beyond-visual-range air-to-air missile capable of all-weather day-and-night operations.
- ✓ Manufactured by Raytheon, more than 30 countries are using the AMRAAM.

2. Stinger Missiles:

- ✓ Stinger is a shoulder-fired Man-Portable Air Defense System (MANPADS) developed by the United States.
- ✓ It is a fire-and-forget, lightweight (15kg) weapon with the reusable launcher.
- ✓ Stinger missile is an extremely effective weapon for shooting down aircraft