Brahmos missile

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In news– India Successfully test fired an extended range sea-to-sea variant of the BrahMos supersonic cruise missile from the Indian Navy's newly commissioned INS Visakhapatnam (newest indigenously-built guided missile destroyer) recently.

About the Naval variant BrahMos missile-

- It has the capability to h**it sea-based targets beyond radar horizon.**
- It was deployed by the Navy on its warships first in 2005.
- It was **originally tested in October and December 2020** from the Navy's indigenously-built stealth destroyer INS Chennai and Rajput-class destroyer INS Ranvijay, respectively.
- This version was **designed to launch either in a vertical or a horizontal mode from moving/stationary assets to target both land and sea targets.**
- The missiles, fired at a speed of 2.8 Mach or nearly three times the speed of sound, significantly increase the capability of the ships in engaging long-range targets.
- **BrahMos missiles are designed and developed by BrahMos Aerospace**, a joint venture company set up by **Defence Research and Development Organisation (DRDO)** and Mashinostroyenia of Russia.
- Originally introduced in 2001, variations of these supersonic missiles can be launched from submarines, ships, aircraft, and land platforms.
- BrahMos missiles that fly almost three times the speed of sound at Mach 2.8, are being extended from the original 290-km to 350-400 km now.
- **India and Russia are also developing a new version of BrahMos with an 800-km strike range.**

Difference between cruise missile and ballistic missile-

- **Cruise missiles are unmanned vehicles that are self propelled by jet engines, much like an airplane.** They can be launched from ground, air, or sea platforms.
- **Ballistic missiles are powered initially by a rocket or series of rockets in stages**, but then follow an unpowered trajectory that arches upwards before descending to reach its intended target.
- A ballistic missile's flight path is like a large arc up and back down again(parabolic path).
- Ballistic missiles first came into use during World War II, when the Germans used a ballistic missile called the V-2 to attack London.

Table 1 – Key characteristics of ballistic and cruise missiles

Characteristics	Ballistic missiles	Cruise missiles
Range	From low to very high *Up to 15 000 km*	Mostly around 1 000 km *Up to 4 000 km*
Altitude	High *Easily detectable*	Low *Hard to detect*
Precision	Low – around a few hundred metres *Fit for large targets*	High – a few metres *Fit for small and mobile targets*
Speed	Up to 25 000 km/h at impact *Very hard to intercept*	Around 1 000 km/h *Possibility to intercept*

Data source: EPRS.

- **Ballistic missiles can cover large distances and are typically launched into a high suborbital spaceflight. And they have e three stages of flight:**
    - Boost Phase begins at launch.
    - Midcourse Phase begins after the rocket(s) stops firing.
    - Terminal Phase begins when the detached warhead(s) reenter the Earth's atmosphere and ends upon impact or detonation.
- Unlike the long arcing trajectory of a ballistic missile, **a cruise missile travels at lower altitudes and on far straighter trajectories.**
- Nearly all of the longer-range ballistic missiles and various types of cruise missiles carry nuclear warheads.
- Ballistic Missiles rely on earth for gravity targets, whereas cruise missiles don't rely on the earth.
- **Examples of India's Ballistic missiles**– Agni-I,II and

III), Prithvi-II and Danush.

- **Examples of India’s Cruise missiles-** Prahar, BrahMos(I & II), Nirbhay etc.

Further reading: https://journalsofindia.com/brahmos-missile/