Tsirkon Hypersonic Missile: Russia

Why in News

Recently, Russia has fired its **Tsirkon (Zircon) Hypersonic Cruise Missile** from a warship in the north of the country.

- Earlier, it was reported that **China tested a nuclear-capable hypersonic glide vehicle** that circled the globe before speeding towards its target.

Key Points

- **About:**
    - The **Tsirkon** Cruise Missile **will join Avangard glide vehicles and the air-launched Kinzhal (Dagger) missiles** in Russia's hypersonic arsenal.
        - Cruise missiles differ from **ballistic missiles** in that they fly towards their target at lower altitudes, remaining within the Earth's atmosphere throughout their trajectory.
    - It is one of the several missiles being developed in Russia that will arm up Russian submarines, frigates, and cruisers.
    - **Hypersonic Weapons** are **much harder to track and intercept** than traditional projectiles because they can travel **more than five times the speed of sound** and maneuver in mid-flight.
- **Hypersonic Technology:**
    - **Speed:** 5 or more times the Mach or speed of sound.
    - **Mach Number:** It describes an aircraft's speed compared with the speed of sound in air, with Mach 1 equating to the speed of sound i.e. 343 metre per second.
    - **Technology Used:** Most hypersonic vehicles primarily **use the** scramjet technology, which is a type of Air Breathing propulsion System.
        - This is extremely complex technology, which also needs to be able to handle high temperatures, making the hypersonic systems extremely costly.
    - **Types:**
        - **Hypersonic cruise missiles:** These are the ones that use rocket or jet propellant through their flight and are regarded as being just faster versions of existing cruise missiles.
        - **Hypersonic Glide Vehicle (HGV):** These missiles first go up into the atmosphere on a conventional rocket before being launched towards their target.
- **Development of Hypersonic Technology in India:**
    - India, too, is working on hypersonic technologies.
        - As far as space assets are concerned, India has already proved its capabilities through the test of **ASAT under Mission Shakti.**

- Hypersonic technology has been developed and tested by both **DRDO (Defence research and Development Organisation)** and **ISRO (Indian Space Research Organisation)**.
- Recently, DRDO has successfully flight-tested the **Hypersonic Technology Demonstrator Vehicle (HSTDV)**, with a capability to travel at 6 times the speed of sound.
- Also, a **Hypersonic Wind Tunnel (HWT)** test facility of the DRDO was inaugurated in Hyderabad. It is a pressure vacuum-driven, enclosed free jet facility that simulates Mach 5 to 12.