ESCAPADE Mission

Prelims: *Current events of national and international importance | Space*

Why in News?

Blue Origin's huge New Glenn rocket launches a NASA 'ESCAPADE' mission recently.

- The ESCAPADE mission (Escape and Plasma Acceleration and Dynamics Explorers) is a pair of ***NASA twin spacecraft*** sent to **orbit Mars** and study how the solar wind strips away the planet's atmosphere.
- **Launched on -** November 13, 2025, aboard a Blue Origin New Glenn rocket.
- It's part of ***NASA's SIMPLEx (Small Innovative Missions for Planetary Exploration) program.***
- **Trajectory ("Loiter" Strategy) -** Instead of direct transfer, ESCAPADE will first go to a "loiter" orbit around Earth-Sun Lagrange Point 2 (L2), ~1.5 million km from Earth.
- Once Mars and Earth align suitably (in 2026), the spacecraft will use Earth gravity assist (slingshot) to head to Mars.
- **Mars Arrival & Science Orbits -** Expected to arrive at Mars in September 2027.
- Initially, they'll go into a "capture" orbit, then adjust to two different science orbits
    - **String-of-pearls orbit -** Both spacecraft in the same orbit, one trailing the other.
    - **Divergent orbit phase -** After ~6 months, they will shift so one is closer to Mars, one is farther.
- **Mission Life -** The science mission is planned for 11 months.
- **Mission Objectives / Science Goals**
- **Study Mars' "Hybrid" Magnetosphere**
    - Mars doesn't have a global dipole magnetic field like Earth. Instead, it has patchy crustal magnetic fields plus induced magnetic effects from solar wind.

    - ESCAPADE aims to understand how this “hybrid” magnetosphere works, how it responds to solar wind, and how particles move in & out of Mars’ magnetic environment.
- **Quantify Atmospheric Escape**
    - Over time, Mars has lost much of its atmosphere. ESCAPADE will look at how the solar wind strips ions and energy from the upper atmosphere.
    - By observing these processes, scientists hope to better understand how Mars’ climate evolved, including how it became the cold, thin-air planet we see today.

Reference

Space | NASA 'ESCAPADE'