

6. Short News

2K22 Tunguska Air Defence System

Context – India has approved the purchase of 2K22 Tunguska from Russia to strengthen its multi-layered air defence against drones, aircraft, and low-flying threats.

About the 2K22 Tunguska Air Defence System

The 2K22 Tunguska is a Soviet-origin, self-propelled, short-range air defence system designed to protect ground forces from low-flying aerial threats.

NATO Designation – It is known by NATO as SA-19 “Grison”.

Hybrid Weapon – It combines surface-to-air missiles and twin 30 mm autocannons on a single platform for layered engagement.

Target Capability – The system can neutralise helicopters, drones, low-flying aircraft, and cruise missiles, making it effective against modern threats.

Missile Range – Its missile system (9M311 series) can engage targets at 8–10 km range and up to 3,500 m altitude with high precision.

Firepower – The twin autocannons fire at 3,900–5,000 rounds per minute, enabling rapid close-range defence.

Radar & Technology – It features 360° acquisition radar, tracking radar, and digital fire control systems for accurate targeting.

Electronic Warfare Capability – The system can function even under radar jamming using optical tracking systems.

Mobility – Mounted on a tracked armoured chassis, it can move alongside mechanised forces across varied terrains.

Strategic Role – It is a key component of a multi-layered air defence network, especially effective against drones and precision-guided weapons.

Zoji La Pass

Context – A deadly avalanche at Zoji La caused several fatalities and serious injuries.

About Zoji La Pass

Zoji La is a high-altitude mountain pass (~3,580 m) in the Western Himalayas, linking the Kashmir Valley with Ladakh.

Location – It lies between Ganderbal (J&K) and Kargil (Ladakh), connecting Sonmarg to Dras–Suru valleys and further to Leh.

Strategic Importance – It is a crucial link on National Highway-1, connecting Srinagar to Leh and ensuring military and civilian access to Ladakh.

Military Significance – Serves as a key supply route for Indian forces deployed near Siachen Glacier and the Line of Actual Control (LAC).

Weather Conditions – The pass remains closed during winter due to heavy snowfall, affecting connectivity.

Infrastructure Development – The Zoji La Tunnel project aims to provide all-weather connectivity between Kashmir and Ladakh.

Shigellosis

Context – An outbreak of shigellosis has been reported in Kerala, including deaths and multiple infections, raising public health concerns.

About Shigellosis

Shigellosis is a highly contagious bacterial infection caused by *Shigella*, leading to acute diarrhoea, especially in children under five.

Transmission – It spreads through the faecal-oral route, including contaminated food and water.

Symptoms – Common symptoms include diarrhoea (often bloody), stomach cramps, fever, vomiting, and a persistent urge to pass stool.

Risk Factors – High risk among young children, immunocompromised individuals, travellers, and people in crowded or poor sanitation conditions.

Treatment – Most cases are self-limiting, requiring hydration and rest, while severe cases may need antibiotics and medical care.

Global Burden – Causes around 188 million cases annually worldwide, with significant mortality among children under five.

AMR Concern – Rising antimicrobial resistance (AMR) makes infections harder to treat, highlighting the need for better sanitation and new treatments.

Surface Water and Ocean Topography (SWOT) Satellite

Context – NASA has developed a new ocean floor map using satellite-based gravity data from Surface Water and Ocean Topography satellite.

About the Surface Water and Ocean Topography (SWOT) Satellite

SWOT is a joint Earth observation mission by NASA (National Aeronautics and Space Administration) and CNES (Centre National d'Études Spatiales) of France.

It was launched in December 2022 to map global surface water.

Objective – It aims to measure the height and distribution of water across oceans, rivers, and lakes to understand Earth's water cycle.

Technology – The satellite uses the advanced Ka-band Radar Interferometer (KaRIn) to detect centimetre-level variations in water surface height.

Coverage – SWOT can scan nearly 90% of Earth's surface every 21 days, providing high-resolution, wide-swath data.

Ocean Applications – It helps study ocean currents, eddies, sea level rise, and indirectly maps seafloor features using gravity-induced surface variations.

Inland Water Monitoring – The mission enables detailed observation of lakes, reservoirs, and rivers, including smaller water bodies not captured earlier.

Significance – SWOT enhances understanding of climate change, hydrology, and ocean-atmosphere interactions.

Helium Shortage & Tech Supply Chains

Context – A global helium shortage triggered by the Middle East conflict is beginning to disrupt technology supply chains, particularly semiconductor production.

Importance of Helium in Tech Industry

Helium is a critical input in chip manufacturing, used for cooling, leak detection, and precision processes.

Supply Constraints – Helium supply is geographically concentrated, with Qatar contributing a major share of global production.

Producers – Helium production is highly concentrated in a few countries, as it is mainly extracted as a byproduct of natural gas processing. The USA and Qatar are the largest producers of helium.

Market Impact – Prices of helium have surged significantly due to supply disruptions and logistical challenges.

Impact on Semiconductor Industry – Chipmakers are facing production slowdowns and may need to prioritise critical manufacturing.

Supply Chain Effects – The shortage is expected to create ripple effects across industries such as **electronics, automobiles, and smartphones**.

Alternatives – Companies are exploring alternative helium sources, including increased reliance on the United States.

About Helium

Helium is a colourless, odourless, inert noble gas with atomic number 2.

Position in Periodic Table – It belongs to the noble gases group (Group 18) and is chemically non-reactive due to a complete outer electron shell.

Occurrence – Helium is the second most abundant element in the universe but is rare on Earth and mainly obtained from natural gas deposits.

Physical Properties – It has an extremely low boiling point (-269°C), making it useful for ultra-cold applications.

Key Uses – Helium is widely used in cryogenics, semiconductor manufacturing, MRI machines, leak detection, and space.

