UPSC CURRENT AFFAIRS NOTES 10-04-2024

C-Dome

Israel for the first time deployed its ship-mounted defence system, called the C-Dome.

It is a naval version ofIsrael's Iron Dome air defence system, used to shield against rocket and missile attacks.

The Iron Dome, which was activated in 2011 and has an effectiveness of about 90%, works by using radars to detect short-range rockets before destroying them with its own missiles.

The C-Dome, which was first unveiled in 2014, declared operational in November 2022, works similarly to the Iron Dosme, using some of the same technology, except that it's mounted on ships.

It is mounted on Sa'ar 6-class corvettes, German-made warships, and uses the same interceptor as the Iron Dome.

Unlike the Iron Dome, which has its own dedicated radar, the C-Dome is integratedinto the ship's radar to detect incoming targets.

C-Dome ensures full-circular vessel protection and high kill probability against a full spectrum of modern threats—maritime and coastal.

Key Facts about Iron Dome

It is Israel's air missile defense system that can defend against short-range rockets, intercepting them in the air above the state.

It is capable of successfully handling multiple rockets at a time.

Developed by Rafael Advanced Defense Systems and Israel Aerospace Industries, the system became operational in March 2011.

Features:

It is powered by missile-defense batteries.

It has all-weather capabilities and is able to function night or day.

It is able to launch a variety of interceptor missiles.

It is designed to shoot down missiles with a range of about40 miles or less.

It also has the ability to be moved, either onto ships or across land, to better suit defense needs.

It must be reloadedto continuously intercept incoming missiles.

The Iron Dome operates through three main components:

A radar that detects incoming rockets,

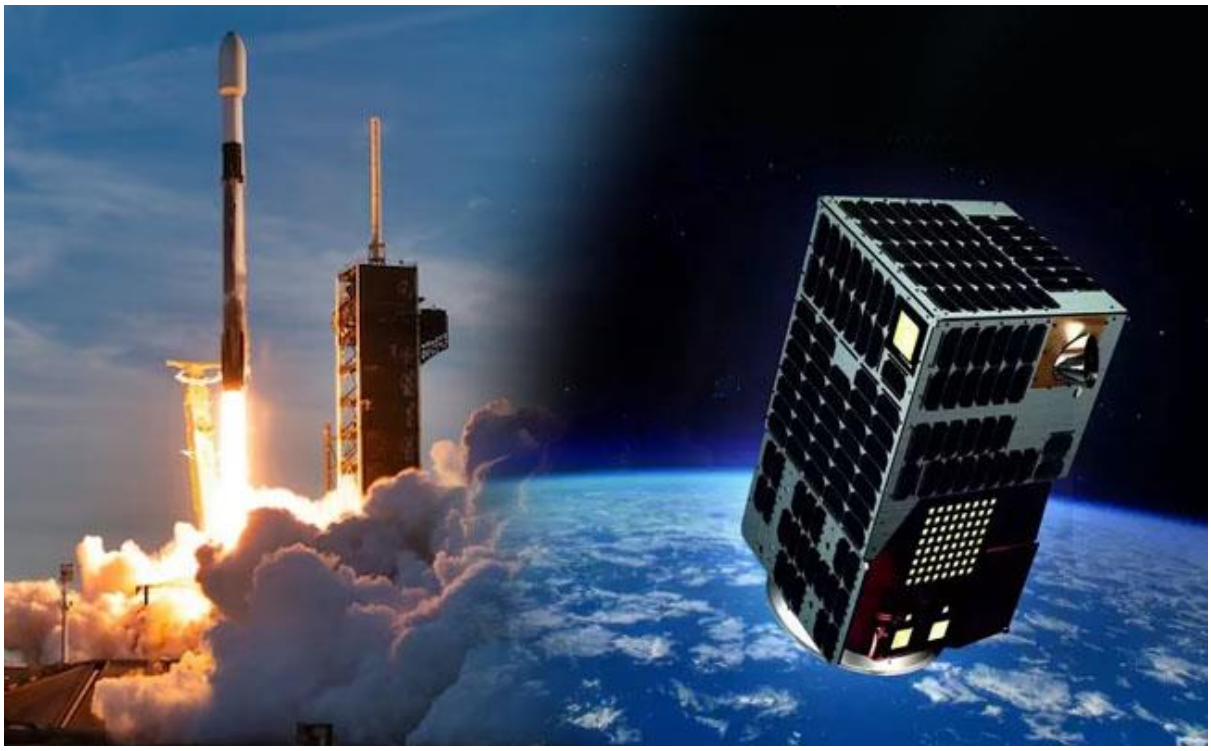
A command-and-control system that determines the threat level,

An interceptor that seeks to destroy the incoming rocket before it strikes.

RADAR stands for 'Radio Detection And Ranging' and is an active transmission and reception method in the microwave GHz range. Radar sensors are used for contactless detection, tracking, and positioning of one or more objects by means of electromagnetic waves. The radar antenna emits a signal in the form of radar waves, which move at the speed of light and are not perceivable by humans. When the waves hit objects, the signal changes and is reflected back to the sensor – similarly to an echo. The signal arriving at the antenna contains information about the detected object.

TSAT-1A

TASL announces successful deployment of sub-metre resolution optical satellite TSAT-1A.



Launch Vehicle: SpaceX's Falcon 9 rocket

Mission Name: Bandwagon-1

Collaboration:

TASL collaborated with Satellogic, leveraging the latter's expertise in developing and integrating advanced earth observation satellites.

The collaboration was initiated in November 2023 to develop and integrate TSAT-1A, showcasing TASL's capability in complex system integration.

Satellite Capabilities

High-Resolution Imaging: TSAT-1A is capable of delivering high-resolution optical satellite images with sub-metre resolution.

Increased Collection Capacity: The satellite features enhanced collection capacity, enabling it to capture a wide range of imagery.

Multispectral and Hyperspectral Capabilities: TSAT-1A is equipped with multispectral and hyperspectral capabilities for advanced imaging.

Manufacturing

TSAT-1A was assembled at TASL's Assembly, Integration, and Testing plant located at its Vemagal facility in Karnataka, India.

This milestone demonstrates TASL's commitment to the space sector and showcases India's capabilities in satellite manufacturing and integration.

Bandwagon-1 Mission

SpaceX's Bandwagon-1 mission marks the first dedicated rideshare mission launched into a mid-inclination orbit, offering a higher revisit rate for customers.

In addition to TSAT-1A, the mission included 11 other spacecraft from various organizations, further expanding the capabilities of space exploration and observation.

About Satellites

Satellites are artificial objects placed into orbit around celestial bodies, primarily Earth, for various purposes, including communication, navigation, Earth observation, scientific research, and national security.

They play a crucial role in modern-day communication, weather forecasting, disaster management, and surveillance.

General Components of a Satellite:

Power Source: Solar panels for power requirements.

Housing: Protection for critical instruments.

Transponders: Transmit and amplify radio signals.

Thermal Control: Maintain equipment temperature.

Command and Data Handling: Control and monitor satellite functions.

Guidance and Stabilization: Maintain orbit and orientation.

Types of Satellites:

Communication Satellites:

Purpose: Facilitate communication by transmitting signals between ground stations and receivers.

Examples:

Intelsat: Provides global communication services.

Iridium: Offers satellite phone and data services worldwide.

Navigation Satellites:

Purpose: Provide precise positioning and timing information for navigation purposes.

Examples:

Global Positioning System (GPS): Maintained by the U.S. Department of Defense for worldwide navigation.

Galileo: European Union's global navigation satellite system.

Earth Observation Satellites:

Purpose: Capture high-resolution images of Earth's surface for various applications, including environmental monitoring, agriculture, urban planning, and disaster management.

Examples:

Landsat: Provides multispectral imagery for monitoring changes in land use and environmental conditions.

Sentinel series: Part of the European Space Agency's Copernicus program for environmental monitoring.

Weather Satellites:

Purpose: Monitor atmospheric conditions, track weather patterns, and forecast weather events.

Examples:

GOES (Geostationary Operational Environmental Satellites): Operated by NOAA for weather monitoring and forecasting in the U.S.

Meteosat: European weather satellites operated by EUMETSAT.

Reconnaissance Satellites:

Purpose: Gather intelligence and perform surveillance for military and security purposes.

Examples:

Keyhole series (KH): Used by the U.S. National Reconnaissance Office (NRO) for reconnaissance missions.

Lacrosse series: Radar imaging reconnaissance satellites operated by the NRO.

Scientific Satellites:

Purpose: Conduct scientific research and experiments in space, studying celestial bodies, cosmic phenomena, and space environment.

Examples:

Hubble Space Telescope: Observes distant galaxies, stars, and planets, providing valuable insights into the universe.

Chandra X-ray Observatory: Studies X-ray emissions from celestial objects, including black holes and supernovae.

Navigation and Research Satellites:

Purpose: Combine navigation and scientific research capabilities for various applications.

Examples:

BeiDou Navigation Satellite System (BDS): Provides navigation services while supporting scientific research activities.

International Space Station (ISS): Serves as a research laboratory for conducting experiments in microgravity.

Orbits of Different Satellite Types:

Communication Satellites: GEO for telecommunication, LEO for high-speed internet.

Earth Observation Satellites: Synchronous sub-recurrent orbit for continuous monitoring.

Navigation Satellites: MEO for GPS, Geostationary orbits for NavIC.

Astronomical Satellites: Low Earth orbit for Hubble Space Telescope, unique orbits for James Webb Space Telescope.

Strategic importance of Andaman and Nicobar Islands

The strategic Andaman and Nicobar Islands are in the middle of a major military infrastructure upgrade.

Need for infrastructure upgrade

To facilitate deployment of additional military forces, and facilities for larger and more warships, aircraft, missile batteries and troops.

To counter the ongoing large-scale construction activities come amid growing Chinese attempts to expand its influence in the region, which includes the construction of a military facility at Myanmar's Coco Islands lying 55 km north of A&N Islands.

Increasing the length of an airstrip at a vital naval air station to enable landing of bigger aircraft like P8Is and fighter jets. Its jetty is also being expanded for use by larger ships.

Constructing a road from the north of the islands to Port Blair in the south is being improved for more traffic.

Upgrading an IAF station to hold fighter squadrons, and for longer durations.

To construct a container transhipment terminal alongside associated infrastructure to support traffic and operations.

Important Infrastructures established in ANI recently established

Chief of Defence Staff (CDS) General Anil Chauhan inaugurated a modern Hangar and Dispersal system at INS Utkrosh in Port Blair.

Navy Chief Admiral R Hari Kumar inaugurated a Precision Approach Radar (PAR) at INS Utkrosh to enable accurate horizontal and vertical guidance to land an aircraft safely in low visibility conditions as well as the Integrated Underwater Harbour Defence and Surveillance System.

Admiral Kumar had also inaugurated the Naval Communication Network (NCN) Centres at INS Kohassa, INS Baaz and INS Kardi, designed to further augment the communication and operational capability of the ANC.

The Ministry of Tourism is developing the Coastal Circuit (Long Island-Ross Smith Island- Neil Island- Havelock Island- Baratang Island-Port Blair) in Andaman & Nicobar under the Coastal thematic circuit of Swadesh Darshan Scheme for development of island tourism in the country.

Strategic importance of The Andaman and Nicobar Islands

The Andaman and Nicobar Islands are of great strategic importance since they straddle one of the busiest sea lanes in the world and give India the reach to monitor the flow of traffic from the South China Sea (Pacific Ocean) to the Andaman Sea (Indian Ocean) via the Strait of Malacca that's key to trade and oil shipments in the Indo-Pacific.

Net security provider:

India can leverage its position in these islands to protect its own interests and portray its image as the 'net security provider' in the region.

Connection with Southeast Asia:

With about 30 percent of India's Exclusive Economic Zone (EEZ), A&N Islands connect South Asia with Southeast Asia.

The northernmost point of this archipelago is a mere 22 nautical miles from Myanmar and the southernmost point, Indira Point, is only 90 nautical miles from Indonesia.

Importance of Indo-Pacific:

The A&N Islands are at the intersection of the Indian Ocean, the South China Sea, and the Pacific Ocean. therefore it acts as an important fulcrum of the strategic importance of the Indo-Pacific.

Japan's Overseas Development Assistance:

Japan approved a USD 265 crore grant aid for Andaman and Nicobar Islands development projects in 2021.

NITI Aayog's Project for Great Nicobar:

It includes an international container transhipment terminal, an airport, a power plant, and a township.

Maintaining the regional balance:

From these islands, India can create a maritime exclusion zone in the event of a conflict with China. Through Andaman and Nicobar Islands India can counter the presence of People's Liberation Army Navy (PLAN) in the Indian Ocean.

The ability to monitor Chinese maritime activity in the Indian Ocean Region would allow India to acquire valuable information about the nature of Chinese operations in the IOR, such as operational patterns.

About A&N Islands

It comprises two island groups, the Andaman Islands (partly) and the Nicobar Islands, separated by the 150 km wide Ten Degree Channel (on the 10°N parallel).

The island chains are a submerged extension of the Arakan Mountains.

The Andaman Islands are divided into three main islands i.e. North, Middle, and South.

Port Blair, the capital of Andaman Nicobar Islands lies in South Andaman.

Duncan passage separates Little Andaman from South Andaman.

The Coco Strait is between the North Andaman islands and the Coco Islands of Myanmar.

The Barren and Narcondam Islands North of Port Blair – are the only active volcanoes in India.

Saddle peak (737 m) in North Andaman is the highest peak.

Ritchie's Archipelago is a cluster of smaller islands that lie 20 km east of Great Andaman and Neil Island and Havelock Island are in Ritchie's Archipelago.

Ross Island in South Andaman has been renamed as Netaji Subhas Chandra Bose Dweep, Neil Island as Shaheed Dweep, and Havelock Island as Swaraj Dweep.

Coordinated Lunar Time (LTC)

Recently, the US White House officially directed the National Aeronautics and Space Administration (NASA) to create a time standard for the Moon, which different international bodies and private companies can use to coordinate their activities on the lunar surface.

About Coordinated Lunar Time (LTC)

It will provide a time-keeping benchmark for lunar spacecraft and satellites that require extreme precision for their missions.

It will also synchronise the communication between satellites, astronauts, bases and the Earth.

A unified time standard would be essential for coordinating operations, ensuring the reliability of transactions and managing the logistics of lunar commerce.

Why there is need of LTC?

As there is less gravity on the Moon, time ticks slightly faster there relative to the time on the Earth.

In other words, for someone on the Moon, an Earth-based clock will appear to lose on average 58.7 microseconds per Earth day with "additional periodic variations.

It can create problems for situations such as a spacecraft seeking to dock on the Moon, data transferring at a specific time, communication, and navigation.

How does Earth's time standard work?

Most of the clocks and time zones of the world are based on Coordinated Universal Time (UTC) which is essentially an internationally agreed upon standard for world time.

It is set by the International Bureau of Weights and Measures in Paris, France.

It is tracked by a weighted average of more than 400 atomic clocks placed in different parts of the globe.

Atomic clocks measure time in terms of the resonant frequencies — the natural frequency of an object where it tends to vibrate at a higher amplitude — of atoms such as cesium-133.

In atomic time, a second is defined as the period in which a caesium atom vibrates 9,192,631,770 times. As the vibration rates at which atoms absorb energy are highly stable and ultra-accurate, atomic clocks make for an excellent device for gauging the passage of time.

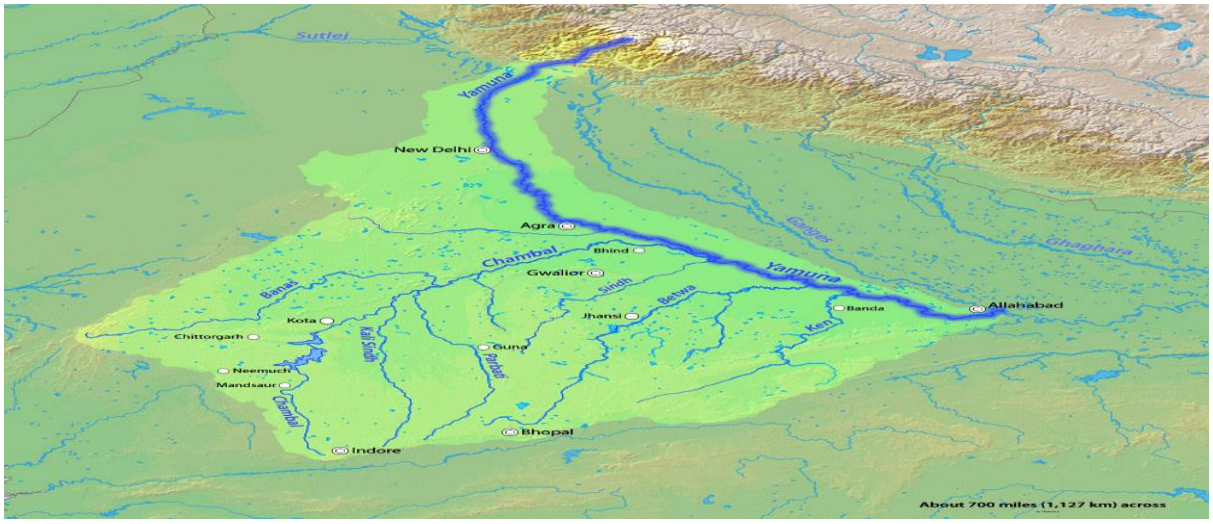
To obtain their local time, countries need to subtract or add a certain number of hours from UTC depending on how many time zones they are away from 0 degree longitude meridian, also known as the Greenwich meridian.

If a country lies on the west of the Greenwich meridian, it has to subtract from the UTC, and if a country is located on the east of the meridian, it has to add.

Tons River

Two people recently drowned in the Tons River while bathing in UP's Ballia.

About Tons River



It is the largest and most important tributary of the Yamuna.

It is one of the most perennial rivers emerging from the Himalayas.

Course:

Tons River originates at a height of 6,315 metres from the Bandarpunch Mountain in Uttarakhand.

It flows through the Garhwal region of Uttarakhand and touches Himachal Pradesh.

Surging from that great height, the glacier-fed river's course ends when it meets the Yamuna River.

It joins Yamuna near Kalsi in the Dehradun district, Uttarakhand.

It has a length of about 200 km.

Along the way, the river cuts through deep gorges, tranquil valleys, and dense forests.

Tons, even being a tributary, contribute more water than Yamuna itself possesses at the point of meeting.

Tributaries: The Pabbar and Asan rivers are the main tributaries of the Tons River.

The Tons Valley is also culturally significant, inhabited by indigenous communities like the Jaunsari and Bhotiya tribes, who have their own unique traditions, dialects, and lifestyles.

International Narcotics Control Board

India's Jagjit Pavadia was re-elected for a third term for five years from March 2025-2030 to the International Narcotics Control Board.

About International Narcotics Control Board

It was established in 1968 and is the independent and quasi-judicial monitoring body for the implementation of the United Nations international drug control conventions.

History

It was established by the Single Convention on Narcotic Drugs of 1961 by merging two bodies: the Permanent Central Narcotics Board, created by the

1925 International Opium Convention; and the Drug Supervisory Body, created by the 1931 Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs.

Members:

It consists of 13 members who are elected by the Economic and Social Council and who serve in their capacity, not as government representatives.

Three members with medical, pharmacological or pharmaceutical experience are elected from a list of persons nominated by the World Health Organization (WHO) and 10 members are elected from a list of persons nominated by Governments.

Mandate: INCB endeavours in cooperation with Governments, to ensure that adequate supplies of drugs are available for medical and scientific uses and that the diversion of drugs from licit sources to illicit channels does not occur.

It also monitors Governments' control over chemicals used in the illicit manufacture of drugs and assists them in preventing the diversion of those chemicals into illicit traffic.