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1. Agaléga airstrip inaugurated: Mauritius, Maldives, and India

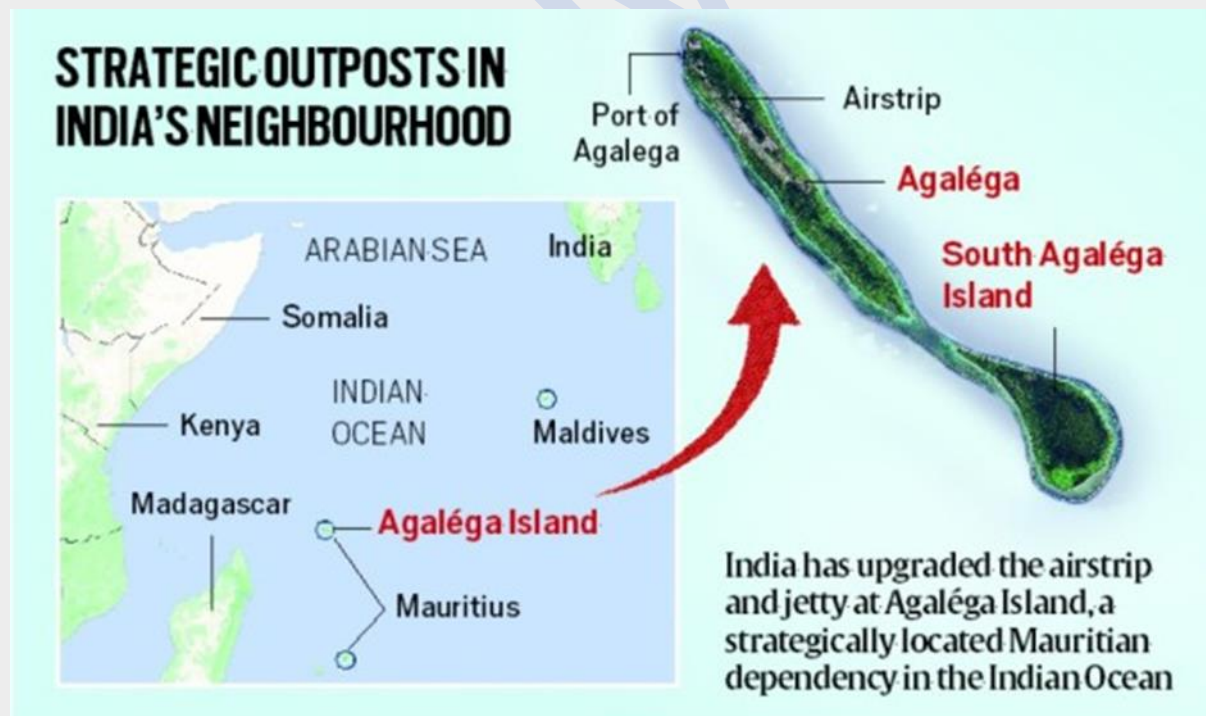
Why in news?

Earlier this week, the first team of Indian "technical personnel" reached the Maldives to take charge of one of the three aviation platforms stationed in the country. They will replace Indian military personnel whose first batch is required to leave the islands by March 10.

Airstrip and a jetty on Agaléga

Recently, Prime Minister Narendra Modi and Prime Minister Pravind Jugnauth of Mauritius jointly inaugurated an airstrip and a jetty that India has built on Agaléga, a two-island Mauritian dependency 1,100 km to the north of Port Louis and 2,500 km southwest of Malé.

As Indian Ocean outposts, Mauritius and the Maldives have great strategic significance for India. New Delhi's maritime security and strategic imperatives in the Indian Ocean are linked to the presence and increased activities of China in the region.



The Maldives case

Soon after coming to power in November 2023, Mohamed Muizzu, the pro-China President of the Maldives, requested India to withdraw its military personnel from his country. Muizzu had defeated the incumbent Ibrahim Mohamed Solih in the presidential election on the "India Out" plank.

The Maldives defence ministry said the first team of Indian civilians had arrived, and would take charge of the operation of a helicopter in Addu, the country's southernmost atoll. The two countries had agreed on February 2 that India would pull out 80-odd military personnel stationed in the Maldives between March 10 and May 10.

The Indian Ministry of External Affairs had said that the two helicopters and a Dornier aircraft in the Maldives would be operated by "competent Indian technical personnel" who would replace the "present personnel".

The Mauritius case

Following Prime Minister Modi's visit to Mauritius in March 2015, India signed a Memorandum of Understanding for the "improvement in sea and air transportation facilities" at Agaléga island.

At the inauguration of the new airstrip and jetty, Prime Minister Jugnauth recalled that several attempts to upgrade the airstrip on the 70-sq-km island since 2003 had not been successful. He said that India was committed to assisting his country, and "deplored" the "India-bashing campaign" by "ill-minded persons in and outside Mauritius".

The presence of India would lead to more effective monitoring of Mauritius' vast 2.3 million sq km Exclusive Economic Zone, and equip it to better counter piracy, terrorism, narcotics and human trafficking, and illegal and unregulated fishing, Prime Minister Jugnauth said.

Relevance: GS Prelims & Mains Paper II; Bilateral Relations

Source: Indian Express

2. PM Modi launches hydrogen-powered ferry: features, significance



Built at a cost of Rs 18 crore, the ferry will be handed over to the Inland Waterways Authority of India by the CSL after rigorous trials.

Why in news?

Prime Minister Narendra Modi virtually launched India's first indigenously developed hydrogen fuel cell ferry. The vessel, manufactured by Cochin Shipyard Limited (CSL), will be deployed for service at Varanasi in Uttar Pradesh.

Built at a cost of Rs 18 crore, the ferry will be handed over to the Inland Waterways Authority of India by the CSL after rigorous trials. The Ministry of Ports, Shipping and Waterways met 75 per cent of the project cost.

What are the special features of the vessel?

The Hydrogen fuel cell vessel is a 24-meter-long catamaran, which can carry 50 people in its air-conditioned passenger area. The accommodation area has been constructed with high-quality fiberglass reinforced plastic, similar to metro train coaches.

Hydrogen fuel cell vessels do not use conventional batteries as the primary storage house of electrical energy. The vessels run on hydrogen fuel, which is stored in cylinders. This boat has five hydrogen cylinders that can carry 40kg of hydrogen and support eight hours of operations. The vessel is also fitted with a 3-kW solar panel.

The hydrogen fuel cell-powered vessel has zero emission, zero noise and is energy-efficient, which makes it more environment-friendly. Since there are no moving parts, the ferry requires less maintenance than combustion vessels.

How do hydrogen fuel cells work?

A hydrogen fuel cell generates electricity by utilising the chemical energy contained in hydrogen. It releases only pure water, not discharging pollutants. Hydrogen is loaded into cells. The energy within the hydrogen is converted into electricity and heat, which is then used to power the vessel's propulsion mechanism. In the fuel cell, the hydrogen reacts with the oxygen in the air to produce electricity. Unlike batteries, hydrogen fuel cells do not require recharging. Provided uninterrupted supply of fuel and oxygen, these cells would work continuously.

What type of cells have been used in the vessel?

This vessel uses a 50-kW PEM (proton-exchange membrane) fuel cell, with Lithium-Ion Phosphate batteries. The advantage is that the cells can quickly change their output depending upon the power demand. PEM fuel cells are popular in automotive applications because they operate at a lower temperature, and are lighter and more compact.

How was it developed?

India has now indigenously developed hydrogen fuel cells and their related systems. The vessel has been built completely by the CSL. The hydrogen fuel cell system was developed by KPIT Technologies, Pune, in collaboration with the Council of Scientific and Industrial Research Labs, under the Union Ministry of Science and Technology.

While hydrogen fuel cell technology has been under development for maritime applications, only a few countries globally have done demonstration projects. This ferry, thus, has given India an early mover advantage to tap the potential of hydrogen as an emerging green fuel in the marine sector.

The 'Harit Nauka' (green boat) initiative of the Ministry of Ports, Shipping and Waterways envisages a green transition of inland vessels. In line with this, the ferry can be replicated in other parts of the country for urban mobility. It is also a boost to the National Green Hydrogen Mission.

What is the Harit Nauka initiative?

In January 2024, the shipping ministry unveiled the Harit Nauka guidelines for inland vessels. As per the guidelines, all states have to make efforts to use green fuels for 50 per cent of inland waterways-based passenger fleets in the next one decade, and 100 per cent by 2045. This is to reduce greenhouse gas emissions as per the Maritime Amrit Kaal Vision 2047.

Globally, the shipping industry is increasingly transitioning to green fuels due to environmental regulations, sustainability goals, and advancements in green fuel technologies. Hydrogen and its derivatives are gaining attention for promising zero-emission fuels for the industry.

Relevance: GS Prelims & Mains Paper III; Science & Technology

Source: The Indian Express

3. Giant leap for India Semiconductor Mission: Cabinet approves three more semiconductor units

The Union Cabinet chaired by Prime Minister Shri Narendra Modi approved the establishment of three semiconductor units under 'Development of Semiconductors and Display Manufacturing Ecosystems in India. All three units will start construction within next 100 days.

The Programme for Development of Semiconductors and Display Manufacturing Ecosystem in India was notified on 21.12.2021 with a total outlay of Rs. 76,000 crore.

In June, 2023, the Union Cabinet had approved the proposal of Micron for setting up a semiconductor unit in Sanand, Gujarat.

Construction of this unit is progressing at a rapid pace and a robust semiconductor ecosystem is emerging near the unit.

The approved three semiconductor units are:

1. Semiconductor Fab with 50,000 wfsm capacity:

Tata Electronics Private Limited ("TEPL") will set up a semiconductor fab in partnership with Powerchip Semiconductor Manufacturing Corp (PSMC), Taiwan.

Investment: This fab will be constructed in Dholera, Gujarat. Investment in this fab will be Rs.91,000 crore.

Technology partner: PSMC is renowned for its expertise in logic and memory foundry segments. PSMC has 6 semiconductor foundries in Taiwan.

Capacity: 50,000 wafer starts per month (WSPM)

Segments covered:

- High performance compute chips

- Power management chips for electric vehicles (EV), telecom, defence, automotive, consumer electronics, display, power electronics, etc. Power management chips are high voltage, high current applications.

2. Semiconductor ATMP unit in Assam:

Tata Semiconductor Assembly and Test Pvt Ltd ("TSAT") will set up a semiconductor unit in Morigaon, Assam.

Investment: This unit will be set up with an investment of Rs.27,000 crore.

Technology: TSAT semiconductor is developing indigenous advanced semiconductor packaging technologies including flip chip and ISIP (integrated system in package) technologies.

Capacity: 48 million per day

Segments covered: Automotive, electric vehicles, consumer electronics, telecom, mobile phones, etc.

3. Semiconductor ATMP unit for specialized chips:

Crompton Greaves (CG) Power, in partnership with Renesas Electronics Corporation, Japan and Stars Microelectronics, Thailand will set up a semiconductor unit in Sanand, Gujarat.

Investment: This unit will be set up with an investment of Rs.7,600 crore.

Technology partner: Renesas is a leading semiconductor company focussed on specialised chips. It operates 12 semiconductor facilities and is an important player in microcontrollers, analog, power, and System on Chip ('SoC') products.

Segments covered: The CG power semiconductor unit will manufacture chips for consumer, industrial, automotive and power applications.

Capacity: 15 million per day

Strategic importance of these units:

- Within a very short time, India Semiconductor Mission has achieved four big successes. With these units, the semiconductor ecosystem will get established in India.
- India already has deep capabilities in chip design. With these units, our country will develop capabilities in chip fabrication.
- Advanced packaging technologies will be indigenously developed in India with today's announcement.

Employment potential:

- These units will generate direct employment of 20 thousand advanced technology jobs and about 60 thousand indirect jobs.
- These units will accelerate employment creation in downstream automotive, electronics manufacturing, telecom manufacturing, industrial manufacturing, and other semiconductor consuming industries.

Relevance: GS Prelims & Mains Paper III; Economics

Source: PIB