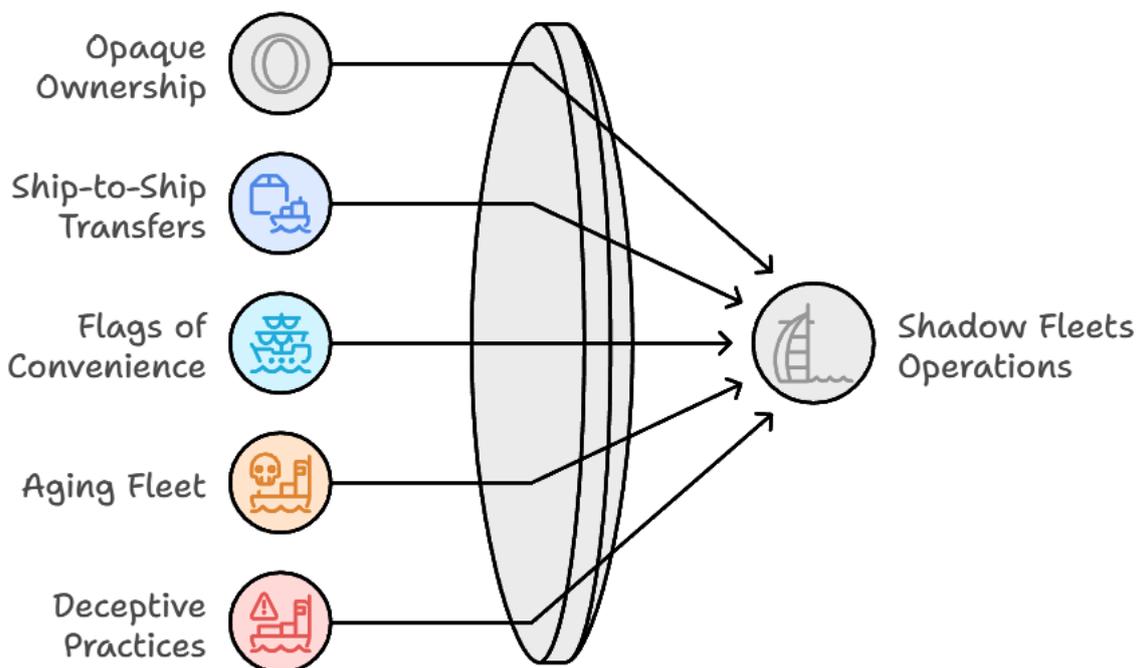


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1. How US Sanctions on Russia's Shadow Fleet May Impact India's Oil Imports**US Sanctions on Russia's Oil Trade**

The United States has imposed significant sanctions on Russia's oil trade, targeting 183 tankers forming the "shadow fleet" that enables Russian oil exports to countries like India and China. These sanctions also include Russian oil companies and associated entities, aiming to disrupt Russia's oil shipping sector.

Characteristics of Shadow Fleets**Implications for India**

Russia is India's largest crude oil supplier, accounting for 38% of its imports in 2024. The sanctions may impact India's oil trade, depending on Russia's pricing and delivery strategies, as well as policy shifts under the incoming US administration.

Transition Period and Short-Term Impact

- Indian refiners will accept oil cargoes booked before January 10, 2025, with delivery allowed until March 12.
- Beyond this wind-down period, trade disruptions are expected, but ample supply from other exporters is likely to prevent significant import challenges.

Shift Towards West Asian Suppliers

- With reduced availability of Russian tankers, freight costs may rise, diminishing the discount advantage of Russian crude.
- India may increase imports from traditional suppliers like Iraq, Saudi Arabia, and the UAE, which were top suppliers before the Ukraine war.

Russia's Response: Rebuilding the Shadow Fleet

- Russia is expected to rebuild its tanker fleet, but this will take time.
- Without competitive discounts, Indian refiners may favor West Asian crude, which has become more competitive.

Potential for Deeper Discounts

- To comply with the Western price cap of \$60 per barrel, Russia might offer steeper discounts.
- Indian refiners could benefit if Russia lowers prices to use Western shipping and insurance services.

Uncertainty Under the Trump Administration

- President Donald Trump, taking office on January 20, 2025, has expressed interest in ending the Russia-Ukraine war.
- While Trump's approach to sanctions is uncertain, the recent measures could provide leverage for negotiating peace.

India's oil trade landscape faces near-term uncertainties but remains adaptable, with alternative suppliers and potential discounts mitigating the impact of US sanctions on Russian oil.

Relevance: GS Prelims; International Relations

Source: Indian Express

2. Israel-Hamas Ceasefire Deal

Terms of the Ceasefire Agreement

'BREAKTHROUGH' WHAT'S IN GAZA CEASEFIRE DEAL?



The ceasefire agreement is structured in three phases. The first phase, lasting 42 days, mandates Hamas to release 33 hostages while Israel releases between 900 and 1,650 Palestinian detainees, including those detained after October 7, 2023. During this period, the Israeli Defense Forces (IDF) will withdraw from central Gaza, the Netzarim Corridor, and eventually the Philadelphi Corridor near the

Gaza-Egypt border. The second phase will begin on the 16th day, focusing on further Israeli withdrawals and the release of remaining hostages in exchange for more Palestinian detainees. In the final phase, border crossings will fully reopen, and reconstruction efforts in Gaza will commence.

Background and Negotiation Progress

The current agreement follows a stalled proposal from May 2024, known as the "Biden Plan," which Israel rejected due to last-minute amendments by Hamas. Domestic political changes in Israel, including a weakened far-right influence in Netanyahu's coalition, helped pave the way for this deal. Additionally, pressure from outgoing US President Joe Biden, Qatar, and Trump's incoming administration played a critical role in advancing negotiations.

Significant Aspects of the Deal

A key feature of the agreement is Israel's conditional commitment to withdraw from the Philadelphi Corridor. Israel has long resisted this due to concerns over Hamas smuggling operations and the potential inability to re-enter the area under international scrutiny. Another prominent aspect is the hostage-prisoner swap, with Israel agreeing to release 250 prisoners serving life sentences. This move challenges a 2014 Israeli law prohibiting such exchanges, highlighting the magnitude of the concessions involved.

Implications for Hamas and Israel

For Hamas, the ceasefire provides an opportunity to regroup after significant losses and secure a potential role in Gaza's governance, akin to Hezbollah's position in Lebanon post-civil war. Despite setbacks, Hamas continues to demonstrate tactical resilience through effective guerilla warfare. For Israel, the ceasefire secures the release of hostages, alleviating domestic pressure from families of captives. However, its inability to eliminate Hamas militarily and the lopsided prisoner exchange could draw criticism, particularly from Netanyahu's far-right allies.

US Influence and Trump's Role

The deal has been supported by the outgoing Biden administration, but its long-term success may depend on Donald Trump's policies after taking office. Trump's approach could shape regional dynamics, offering Netanyahu strategic leverage in exchange for adherence to the ceasefire.

This agreement signifies a temporary cessation of hostilities, but its success will depend on how both sides navigate the challenges in subsequent phases and the influence of external mediators.

Relevance: GS Prelims; Economics

Source: The Hindu Business Line and PIB

3. ISRO Docks SpaDeX Satellites in Space: What was done and how – and why does it matter?

ISRO SpaDeX Docking Mission Explained

The Indian Space Research Organisation (ISRO) successfully demonstrated space docking — or the joining of two fast-moving satellites in space.

Two small 220-kg satellites were brought within a distance of 3 metres from each other in orbit, their extended ring was joined with each other, retracted, and locked in space.

ISRO also demonstrated giving commands to the two satellites as one composite object.

The successful docking makes India the fourth country in the world — after the United States, Russia, and China — to have this capability.



What is “docking”, and why is this achievement important?

Docking is a process by which two fast-moving spacecraft are brought to the same orbit, brought closer to each other manually or autonomously, and finally joined together.

This capability is necessary for carrying out missions that require heavy spacecraft that a single launch vehicle may not be capable of lifting off with.

The capability is needed not only for setting up a space station — for which separate modules are joined in space — but also for carrying crew and supplies to it.

When was the first docking in space achieved?

UNITED STATES: As the United States and the erstwhile Soviet Union competed fiercely during the space race of the Cold War decades, it was essential to demonstrate rendezvous and docking to achieve the objective of sending humans to the Moon.

In 1966, NASA’s Gemini VIII became the first spacecraft to dock with the target vehicle Agena. Gemini VIII was a crewed mission orbiting the Earth, commanded by Neil Armstrong, who in 1969 became the first human to set foot on the Moon.

USSR: While the US mission had astronauts on board to steer the spacecraft, the Soviet Union in 1967 demonstrated the first uncrewed, automated docking of the Kosmos 186 and Kosmos 188 spacecraft.

CHINA: China demonstrated its docking capability in 2011, when the unmanned Shenzhou 8 spacecraft docked with the Tiangong 1 space laboratory.

A year later, China demonstrated its first crewed space docking, when the astronauts manually joined its Shenzhou 9 spacecraft to the same space laboratory.

Why has India carried out its docking mission at this juncture?

ISRO has been working on key technologies to realise its vision of setting up a space station by 2035 and sending humans to the Moon by 2040.

Besides a new heavy-lift launch vehicle capable of carrying up to 30 tonnes to low earth orbit, the missions would require docking capability. The Bharatiya Antariksh Station, the space station that India envisages, will be built by bringing together five modules in space. The first of these robotic modules is slated to be launched in 2028.

Docking capability will also be required for the next lunar mission — Chandrayaan-4 — which aims to bring back samples from the Moon. This mission will see five key modules being sent into orbit in two separate launches.

The first launch will have four of the five modules — the propulsion module will carry the spacecraft from Earth orbit to the Moon orbit, from where the lander and ascender modules will go to the lunar surface and collect the samples. The ascender module will then hop up with the samples, and dock with the transfer module in the lunar orbit.

This transfer module will carry back the samples to the Earth orbit where it will dock with a re-entry module that will be launched separately. The module will be designed to withstand the heat of entering the Earth's atmosphere.

In preparation for this mission, ISRO carried out a "hop experiment" towards the end of the Chandrayaan-3 mission.

A human mission to the Moon is likely to follow a similar plan.

What happened during the docking experiment?

ISRO carried out a series of manoeuvres to progressively bring the SDX01 or "Chaser" satellite close to SDX02, or the "Target" satellite. The satellites were allowed to drift close, and then their positions were held at around 5 km, 1.5 km, 500 m, 225 m, 15 m, and 3 m, before finally being joined together.

The space agency has demonstrated giving command to the satellites as a single composite object. In the coming days, it will demonstrate sharing of electrical power between the two satellites.

Once that is complete, ISRO will demonstrate “undocking”, during which the satellites will separate and drift away to carry out their respective experiments over the two years of the mission’s life.

The docking experiment was initially slated for January 7, but was postponed after identifying an abort scenario. More simulations were carried out on the ground to improve the accuracy of docking.

The docking could not take place on January 9 either, with the satellites drifting more than anticipated during a manoeuvre to reduce the distance to 225 metres on the previous day.

After this, the satellites drifted nearly 5 km apart, and manoeuvres to bring them closer were restarted. Early on January 12 morning, the satellites were brought closer together, and this time they reached the hold point of 3 metres before being moved away to a safe distance.

ISRO said that the data were being analysed before the actual docking could be conducted.

What is the Bharatiya Docking System?

Several types of docking mechanisms have been used by space agencies over the years, including some interoperability. The spacecraft that go to the International Space Station follow the International Docking System Standard (IDSS), which was first baselined in 2010.

The docking mechanism being used by India is androgynous — meaning the systems on both the Chaser and Target satellites are identical. This is similar to the IDSS used by other agencies, but uses two motors as compared to the 24 used in IDSS.

The mission used several new sensors such as Laser Range Finder, Rendezvous Sensor, and Proximity and Docking Sensor to take precise measurements while bringing the two satellites closer and joining them.

It also used a new processor based on satellite navigation systems to determine the relative position and velocity of the spacecraft. This is a precursor to a completely autonomous system for future missions that would be able to achieve docking without satellite-based navigation data.

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

Source: The Indian Express