India's approach to Vostok 22

The story so far:

- From September 1-7, Russia is holding annual military exercises in its eastern region, with about 13 countries including India and China sending contingents
- They include a maritime component near the disputed islands of South Kuril, claimed by both Russia and Japan.

Who is taking part in Vostok-22?

- The countries that have sent military contingents are Algeria, Armenia, Azerbaijan, Belarus, India, Kazakhstan, Kyrgyzstan, China, Laos, Mongolia, Nicaragua, Syria, and Tajikistan.
- India has only sent its army contingent of the 7/8 Gurkha Rifles, and will not take part in the maritime section of the two-part event.
- This is because, while the first part of the land exercises will be held in Russian military training grounds in Siberia and the Far Eastern Federal District, the maritime part of the exercises would be held in the Sea of Okhotsk and the Sea of Japan.
- These are near the disputed South Kuril Islands.

What does India's participation mean?

- By sending an army contingent to join Russian and Chinese troops in the exercises at this time, New Delhi is aiming to send a four-pronged message.
- The first is its continuing relationship with Russia despite the Ukraine war, where the Modi government has decided not to join the Western sanctions regime, or to curb oil imports and other economic engagement with Moscow.
- The second is to signal balance and non-alignment in the current crisis, given India has mostly abstained from votes at the United Nations seeking to criticize Russia.
- India also takes part in routine Indo-Pacific exercises with its Western partners including the Quad, as well as in bilateral exercises, like the India-U.S. "Yudh Abhyas" in Uttarakhand next month.
- These exercises will take place just after Prime Minister Narendra Modi's visit to Uzbekistan for the Shanghai Cooperation Organisation (SCO) summit in September, where he will participate alongside leaders of Russia, China, Belarus, Kazakhstan, and Kyrgyzstan, who have sent contingents for Vostok-22 as well.

- It is a way of signalling that India remains comfortable in both its engagement with the U.S.-EU coalition and its rival groupings led by Russia-China.
- Third, by staying away from the maritime exercises, New Delhi has shown both its sensitivity to Japan's concerns on maintaining the status quo over the disputed islands, as well as stressing the importance of territorial sovereignty and integrity for India.
- This coming week, India is hosting a Quad meeting on Indo-Pacific initiatives in Delhi and holding bilateral talks with the U.S. and Japan on trade and defence as well.
- Finally, the message the government continues to give is that it is willing to engage with China on a number of fronts, even as military talks with China at the LAC (Line of Actual Control) remain stuck.
- The government, however, asserts that it cannot be "business as usual" with China until the latest logjam over Chinese troops' transgression since April 2020 is resolved.

THE HINDU

James Webb telescope

- CO2 on exoplanet
- The James Webb Space Telescope has captured the first unambiguous evidence of carbon dioxide in the atmosphere of a planet outside the Solar System.
- The telescope gleaned information about the composition of the gas giant WASP-39b as it moved across the face of its star.
- The James Webb Space Telescope (JWST) is a space telescope designed primarily to conduct infrared astronomy. As the largest optical telescope in space, its greatly improved infrared resolution and sensitivity allow it to view objects too old, distant, or faint for the Hubble Space Telescope
- U.S. National Aeronautics and Space Administration (NASA) led JWST's development in collaboration with European Space Agency (ESA) and the Canadian Space Agency (CSA).
- Infrared astronomy is a sub-discipline of astronomy which specializes in the observation and analysis of astronomical objects using infrared (IR) radiation.
- The wavelength infrared light ranges from 0.75 to 300 micrometres and falls in between visible radiation, which ranges from 380 to 750 nanometres, and submillimeter waves.

- Infrared astronomy began in the 1830s, a few decades after the discovery of infrared light by William Herschel in 1800.
- The NASA Goddard Space Flight Center (GSFC) in Maryland managed telescope development, the Space Telescope Science Institute in Baltimore on the Homewood Campus of Johns Hopkins University operates JWST, and the prime contractor was Northrop Grumman.
- The telescope is named after James E. Webb, who was the administrator of NASA from 1961 to 1968 during the Mercury, Gemini, and Apollo programs.

MISSION GOALS

- Search for the first galaxies or luminous objects formed after the Big Bang
- Determine how galaxies evolved from their formation until now
- Observe the formation of stars from the first stages to the formation of planetary systems
- Measure the physical and chemical properties of planetary systems, including our own Solar System, and investigate the potential for life in those systems.

INSTRUMENTS

Near Infrared Camera (NIRCam)

- Near Infrared Spectrograph (NIRSpec)
- Mid Infrared Instrument (MIRI)
- Fine Guidance Sensors/Near Infrared Imager and Slitless Spectrograph (FGS/NIRISS).

WASP-39b

- WASP-39b, officially named Bocaprins, is a "hot Jupiter" extrasolar planet discovered in February 2011 by the WASP project, notable for containing a substantial amount of water in its atmosphere.
- In addition, for the first time for any exoplanet, WASP-39b was found to contain carbon dioxide in its atmosphere.

THE HINDU

Diamond in Earth's core

Can diamonds be found in plenty deep inside the Earth?

- The Earth's core is the largest carbon storage on Earth roughly 90% is buried there.
- Scientists have shown that the oceanic crust that sits on top of tectonic plates and falls into the interior contains hydrous minerals

and can sometimes descend all the way to the core-mantle boundary.

- The temperature at the core-mantle boundary is at least twice as hot as lava, and high enough that water can be released from the hydrous mineral.
- They found that for the conditions of the core-mantle boundary carbon comes out of the liquid iron-metal alloy and forms diamond (Geophysical Research Letters).
- They found that carbon leaking from the core into the mantle by this diamond formation process may supply enough carbon to explain the elevated carbon amounts in the mantle.

THE HINDU

Migration and conservation effort

- Conservation efforts usually aim to bring in more individuals to increase the population size of endangered species.
- This is done with a view of promoting gene flow.
- Such a move is based on the understanding that bringing in (migrating) more members of the endangered group will lead to a greater import of genetic variation and thereby a greater variation in the focal population.
- Experiments done by researchers from the Indian Institute of Science Education and Research (IISER), Pune, indicate that in contrast to the simple plan outlined here, other factors, namely, the nature of the environment and the genetic constitution of the immigrants can play a role in deciding whether the evolutionary outcomes of immigration are beneficial.
- The effect of migration is not just a property of the evolving individuals but results from an interaction between the nature of their environment and the genetics of the immigrating individuals.

THE HINDU