

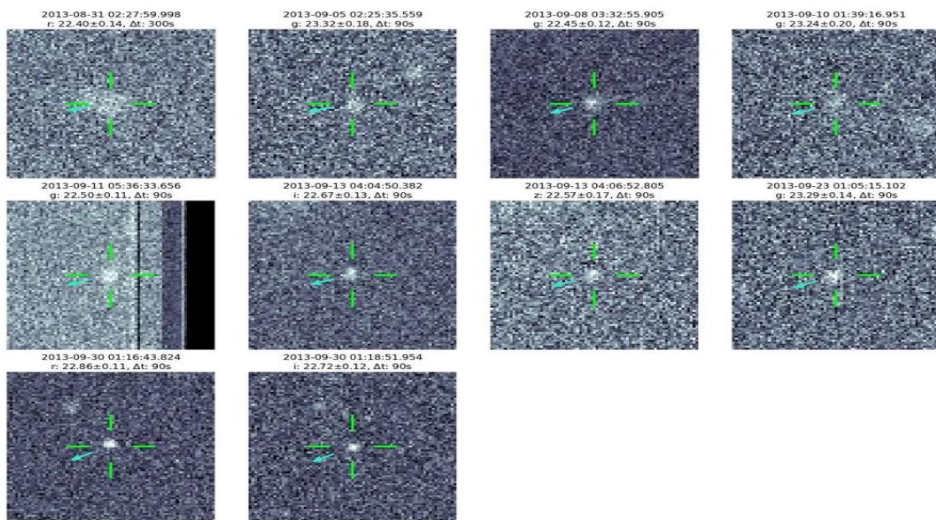
**THOR**

❖ **Context**

- Scientists have developed an algorithm that can discover new unknown asteroids not with the help of a telescope but by scanning the previous images of the night sky.

❖ **Key Highlights**

- The algorithm has been named as **Tracklet-less Heliocentric Orbit Recovery**, or THOR.
- Typically, asteroids are discovered when the same part of the sky is photographed multiple times during the course of one night.
- The algorithm works on **412,000 images** - in the digital archives at the **National Optical-Infrared Astronomy Research Laboratory, or NOIRLab** (Arizona, USA) — to sift asteroids out of the 68 billion dots of cosmic light captured in the images.
- By scanning one-eighth of data of a month Sep-2013, the **algorithm has discovered 100 new asteroids**.



- The algorithm is **currently configured to only find main belt asteroids**, those with orbits between Mars and Jupiter, and not near-Earth asteroids.
- **Identifying near-Earth asteroids**, the ones that could collide with our planet, is more difficult because they move faster.

❖ **What is a Tracklet?**

- **Astronomers call a series of observations of a single moving object during a single night a “tracklet.”**
- Though distant stars and galaxies remain in the same arrangement, the objects that are much closer, within the solar system, move quickly, and their positions shift over the course of the night.
- **A tracklet provides an indication of the object’s motion**, pointing astronomers to where they might look for it on another night. They can also search older images for the same object.
- **For the algorithm, a single point of light that is not a star or a galaxy is the starting point.**
- The asteroid follows the law of gravity. THOR constructs a test orbit of the asteroid. It then calculates where the asteroid would be on subsequent and previous nights.
- If the algorithm can link together five or six observations across a few weeks, that is a promising candidate for an asteroid discovery.

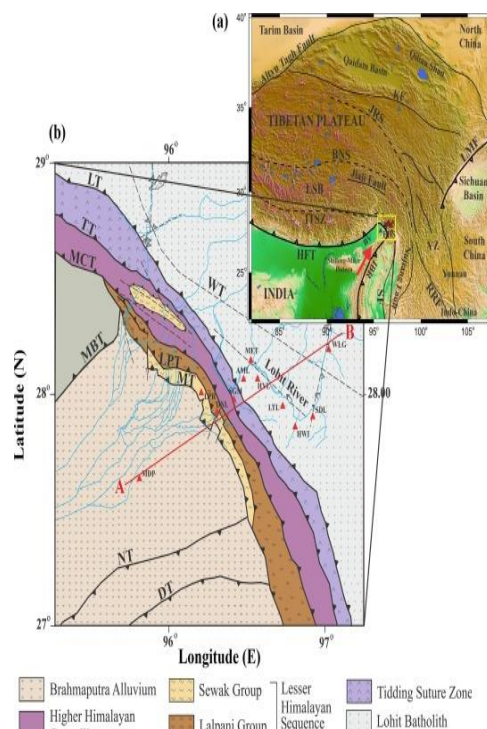
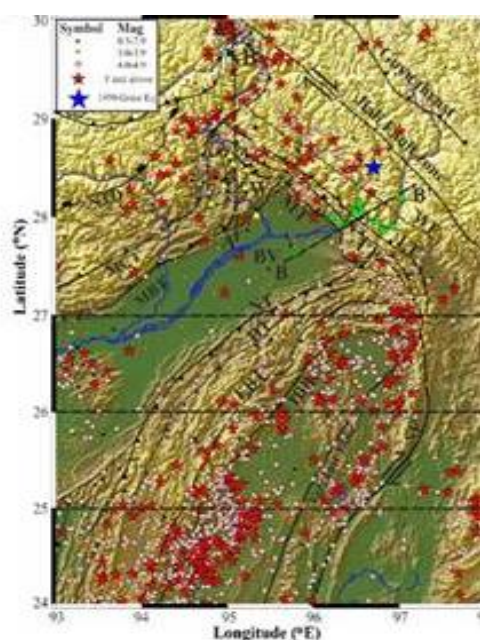
**Tidding-Tuting Suture Zone (TTSZ)**

❖ **Context**

- Researchers have traced the great Assam earthquake of 1950 to complex tectonics of the north eastern fringe of the Indian Plate in the Eastern Himalaya and the Indo-Burma Ranges (IBR) and the interactions between the two.

❖ **Key Highlights**

- TTSZ is the **north eastern part of Eastern Himalayas** where Himalayas take a sharp southward bend and merge with the Indo-Burman Ranges.
- TTSZ has been found to be **seismically active up to about 40 km depth**, while the seismicity in the Indo-Burma Ranges (IBR) is observed up to a depth of around 200 km.
- They have suggested that **this seismic structure forms a complex tectonics which produced the great Assam earthquake of 1950 (M 8.6)** and maybe building up stress for a future earthquake.



- The Great Assam Earthquake is the **largest intra-continental earthquake ever recorded**, which was located at the India-China border near the Mishmi Hills of Arunachal Himalaya.
- The **Eastern Himalayan Syntaxis (EHS)** in Arunachal Pradesh and bordering regions of Assam is acknowledged as one of the most **seismically active regions in the world**.
- TTSZ belongs to the **seismic zone V** of the national zoning map of India and does have a potential to trigger major earthquakes in the future.



## News in Between the Lines

### Human-Rated Spacecraft for Gaganyaan Mission



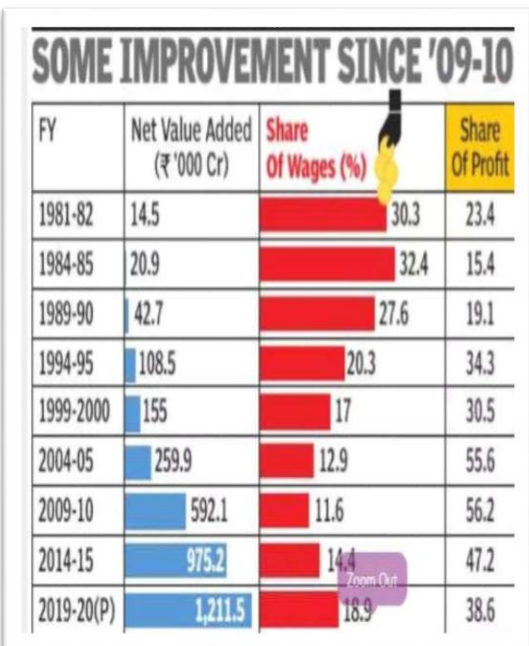
#### ❖ Context

➤ The Indian Space Research Organisation (ISRO) is taking the help of doctors in building its human-rated spacecraft for the **Gaganyaan mission**.

#### ❖ Key Highlights

- Gaganyaan mission 2022 is ISRO's first human spaceflight that aims to take astronauts **into a low earth orbit**.
- ISRO has roped in doctors to understand the impact of the spaceflight on humans and will design the spacecraft accordingly.
- The astronauts selected for the mission have also been involved in making of the orbital module.
- ISRO is also looking at how doctors can **connect with the human spacecraft design**.
- A human-rated spacecraft should be able to accommodate the crew as if they are living in normal acceptable conditions and they should be able to perform various activities during their stay.
- The engineers have to design the spacecraft by identifying potential hazards and developing systems to control such happenings.

### Surge in Income Inequality



#### ❖ Context

➤ The liberalisation process that began in the 1990s may have sparked **economic growth** in the following decades, but it has also caused an increase in income inequality by reducing the **share of wages in net value addition** in India's organised manufacturing sector.

#### ❖ Key Highlights

- Report shows that in 1981-82, India's organised sector had net value addition of about Rs **14,500 crore**, of which 30.3% went to workers as wages while **23.4% went to factory owners and shareholders as profits**.
- In 2019-20 – a year for which provisional data has been released – the net value added had increased to **Rs 12.1 lakh crore**. However, only **18.9%** of this went as workers' wages while profits accounted for **38.6%**.
- Between 1981-82 and 1987-88, the share of wages in net value addition remained at or **above 30%**. The share of profits decreased from **23.4% to 11.6%**, **mostly** because of higher interest payments.
- Analysis of data from 20 large states and the national capital shows that the share of wages in net value added is **highest in West Bengal** followed by Andhra Pradesh, Tamil Nadu, Kerala, Punjab and Delhi.
- Workers' wages in each of these states have 25% or higher share in net value-added. Among large states, the share is lowest in **Bihar, Rajasthan, MP, Gujarat and Assam**, in all of which it is below 17%.

### Procurement by Cooperatives through GeM Portal



#### ❖ Context

➤ The Union Cabinet recently approved **expanding the mandate of Government e-Marketplace GeM** to allow procurement by Cooperatives as Buyers.

#### ❖ Key Highlights

- The move will help Cooperatives in getting **competitive prices through open and transparent process**.
- Over 8.54 lakh registered cooperatives and their 27 crore members will benefit.
- **Ministry of Cooperatives** will decide on validated list of cooperatives to be onboarded on GeM.
- GeM will provide dedicated onboarding process for cooperatives.

### The world's Fastest Supercomputer

#### ❖ Context

➤ The world's fastest supercomputer performed more than a **quintillion calculations** per second, entering the realm of **exascale computing**.

## Face to Face Centres







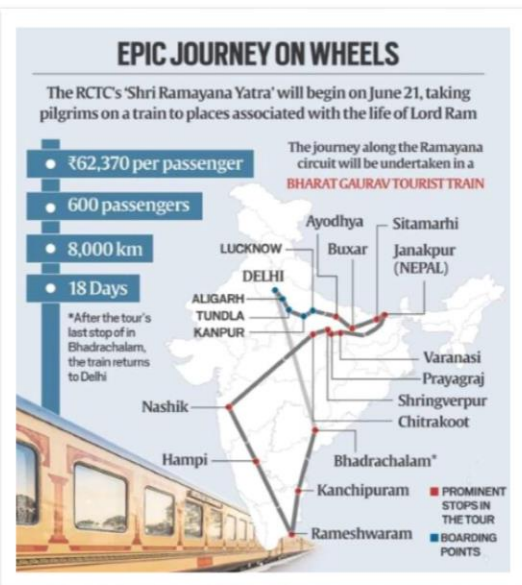
### ❖ Key Highlights

- **Oak Ridge's Frontier** clocked in at about **1.1 exaflops**, or **1.1 quintillion operations per second**.
- **Frontier** beat out the previous record-holder, a supercomputer called **Fugaku** at the RIKEN Center for Computational Science in Kobe, Japan, which achieved more than **0.4 exaflops**.
- The computer, known as Frontier, is the first exascale computer to be included on the **biannual list**.

### ❖ Significance

- With its new **exascale capability**, researchers aim to simulate how stars explode, calculate the properties of subatomic particles, investigate new energy sources such as nuclear fusion and harness artificial intelligence to improve the diagnosis and **prevention of disease, among many other research topics**.
- **Exascale computing**: It refers to computing systems capable of calculating at least **10<sup>18</sup> floating point operations per second (1 exa FLOPS)**.

## The Ramayana Circuit



### ❖ Context

- On June 21, when the **first Bharat Gaurav Tourist Train** starts on its maiden journey, it will breach a new frontier - becoming the first tourist train from India to cross the **international border into Nepal**.

### ❖ Key Highlights

- The train will run on the Ramayana Circuit identified under the Ministry of Tourism's **Swadesh Darshan scheme**, covering prominent places associated with the **life of Lord Ram**.
- The train will have an infotainment system, and CCTV cameras and guards will ensure security on board.
- The 18-day tour will start from Delhi's **Safdarjung Railway Station**.
- **To Nepal For First Time**: The Indian Railways, with support from Nepal Railway, has extended the track from Jainagar station in India to **Janakpur in Nepal**.

### ❖ Significance

- **India and Nepal have deep religious and culture links. Besides Nepal being the birthplace of Sita and the venue of wedding of Ram and Sita, the two countries are also bound by Buddhist links. Both of these links are central to India's diplomatic as well as people-to-people ties with Nepal.**

## General Insurance Products to be Launched Without Prior Nod



### ❖ Context

- Recently the **Insurance Regulatory and Development Authority of India (IRDAI)** has permitted **general and standalone health insurers** to launch products without **any prior approval**.

### ❖ Key Highlights

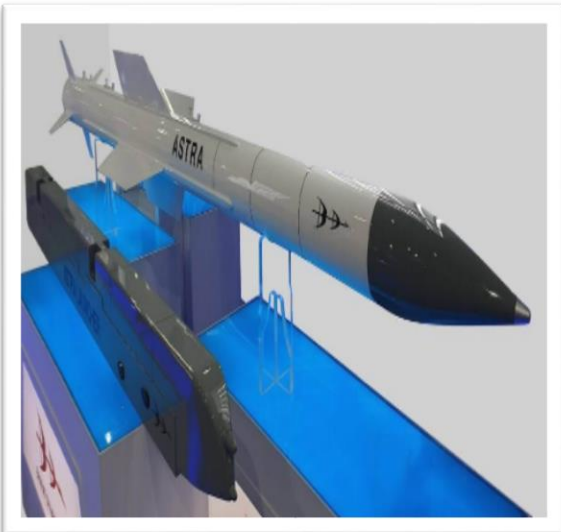
- The IRDAI has extended the use and file procedure for **all health insurance products and almost all general insurance products**, in line with the reforms agenda taken up towards having a fully insured India.
- According to the circular sent to insurers, they are required to put in place the **board-approved policy** of products that are to be offered or modified/ revised.
- The board-approved policy should also comply with certain norms specified in **the circular**, and the same should be complied at the point of launching the products or their modification/revision.
- **The Product Management Committee** of the insurer will ensure compliance to the policy of the board while signing of the new products or modification of products.

### ❖ Significance

- The initiative will provide some necessary mechanisms to insurance companies that wish to bring out more innovative products in the market at a **faster frequency**.



## ASTRA MARK-1



- The use and file procedure would essentially mean that insurers can introduce their products to the market on **filing with the regulator**, thus avoiding a **longer waiting duration in offering innovative insurance** solutions to customers in order to help address the dynamic environment.
- The initiatives would enable the insurance industry to launch suitable products in a **timely manner**.

### ❖ Context

- The Ministry of Defence has signed a contract with **Bharat Dynamics Ltd (BDL)** for supply of the Astra Mark-1 missile.

### ❖ Key Highlights

- The missile is a **beyond visual range (BVR i.e. 37 km), air-to-air missile, designed and developed by DRDO**.
- With a **range of upto 110 kms**, the missile can travel at **speed four times that of sound** and reach an **altitude of upto 20 km**.
- AAM with BVR capability provides large stand-off ranges to aircraft. **Stand off range** means that the missile is launched at a distance far enough to allow the attacking side to evade adversary air defence measures.
- The missile is developed for **deployment on fighter jets** such as **Sukhoi-30 MKI** and **Tejas** of IAF and **Mig-29K** of the Navy.
- The purchase will be under **Buy(India-IDDm) category** of defence acquisition - or procurement from an Indian vendor of defence products that have been "indigenously designed, developed and manufactured" with a minimum of 50% indigenous content (on the basis of cost).
- At present, India imports similar missiles from Israel, Russia and some other manufacturers.

## Duties on e-transmission



### ❖ Context

- India is set to firmly oppose any further extension of a **moratorium** on the **imposition of customs duties on electronic transmission** at WTO's 12th ministerial conference (**MC12**).

### ❖ Key Highlights

- Though it is not clear what is an electronic transmission. The dominant understanding has been that it is a **digital good**.
- **WTO members have agreed not to impose customs duty on electronic transmission since 1998** and the moratorium has been periodically extended at the ministerial conferences.
- Several countries are seeking to make the moratorium permanent.
- Since **digital trade at present is dominated by big tech and developed countries**, the moratorium squarely favours the developed nations.

### ❖ Concerns Of Developing Countries

- India and South Africa (SA) have been making several joint submissions highlighting the adverse impact of the moratorium on developing nations and suggesting reconsideration.
- It is estimated that **India loses about \$500 million annually by foregoing duty on e-transmission**.
- In one of the joint statements by India and SA, it was argued that the **percentage of customs revenue lost for developing nations is 4.35%** while that of the developed countries is a mere **0.24%**.
- Moreover, India has argued that the pace of growth of **3D printing would significantly increase the potential tariff revenue loss**.
- As per UNCTAD, 3D printing is currently at a nascent stage in developing countries, its market has grown annually by 22% between 2014-2018.
- It is estimated that **if investment in 3D printing is doubled, it could potentially replace 40% of the cross-border physical global trade by 2047**.

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## Face to Face Centres

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