

WORLD CYBERCRIME INDEX



Following three years of intensive research, an international team of researchers has compiled the first ever 'World Cybercrime Index'.

World Cybercrime Index identifies the globe's major cybercrime hotspots by ranking the most significant sources of cybercrime at a national level.

- It has been developed as a joint partnership between the **University of Oxford and UNSW Canberra**.
 - The data that underpins the index was gathered **through a survey of 92 leading cybercrime experts** from around the world who are involved in cybercrime intelligence gathering and investigations.
 - It **ranks roughly 100 countries** and identifies key hotspots according to various categories of cybercrime, including ransomware, credit card theft, and scams.
 - **Key Findings:**
 - **Russia** tops the list, followed by Ukraine, China, the USA, Nigeria and Romania.
 - **India** captured the number 10 spot in the rankings.
 - The researchers also found that **certain kinds of cybercrime were associated with particular countries**. For example, the **United States was associated with data and identity theft**, while those related to technical products or services seemed to often originate from China.
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ASIAN DEVELOPMENT BANK (ADB)

Asian Development Bank:

- The Asian Development Bank (ADB) is a **regional development bank** established in December 1966.
- Its primary mission is to "foster economic growth and cooperation" among countries in the **Asia-Pacific Region**.

- **Functions:**
 - ADB assists members and partners by providing loans, technical assistance, grants, and equity investments to promote social and economic development.
 - It also provides financing to certain private sector projects as well as public-private partnerships.
 - The ADB regularly facilitates policy dialogues and provides advisory services.
- **Headquarters:** Manila, Philippines
- **Members:**
 - From 31 members at its establishment in 1966, ADB has grown to encompass **68 members**.
 - Of this, 49 are from within Asia and the Pacific and 19 outside.
 - **As of 2022**, ADB's five **largest shareholders are:**
 - **Japan** and the **United States** (each with 15.6% of total shares),
 - **People's Republic of China** (6.4%),
 - **India** (6.3%), and
 - **Australia** (5.8%).
 - **Source of Funding:**
 - It relies on member contributions, retained earnings from lending, and the repayment of loans for the funding of the organization.

India & ADB:

- India is a founding member of ADB and the bank's fourth largest shareholder.
- Since commencing operations in 1986, ADB has aligned its operations in the country to the government's developing priorities.
- This approach will be pursued through the forthcoming country partnership strategy, **2023–2027**.
- To date, **ADB has committed 605 public sector loans, grants, and technical assistance totaling \$52.6 billion to India.**
- ADB operations in India cover more than 20 states.

ISRO'S ZERO ORBITAL DEBRIS MILESTONE

Why in news?

ISRO launched a mission called PSLV-C58/XPoSat and made sure it left no debris in space. It did this by turning the last stage of the rocket into a small space station called **POEM-3 (PSLV Orbital Experimental Module-3)**.

Instead of leaving it to float in space, they let it come back into the Earth's atmosphere after the mission was completed.

POEM

- It has been developed by the Vikram Sarabhai Space Centre (VSSC) as an inexpensive space platform.
- It uses the spent fourth stage of a PSLV rocket as an orbital platform.
- Used for the first time in the **PSLV-C53** mission in June 2022, ISRO had POEM orbit the earth as a stabilised platform to perform in-orbit scientific experiments with various payloads.

Space debris: A challenge

- **Increasing space debris**
 - Space debris in the low earth orbit (LEO) mainly comprises pieces of spacecraft, rockets, and defunct satellites, and the fragments of objects that have deteriorated as a result of anti-satellite missile tests.
 - The number of space objects greater than 10 cm in size in LEO is expected to be about 60,000 by 2030, as per ISRO estimates.
- **Threat to several space assets**
 - This debris often flies around at high speeds of up to 27,000 kilometres per hour.
 - Due to their sheer volume and momentum, they **pose a risk to several space assets**.
- **Threats on the ground:** Recently, a chunk of metal believed to be a discarded battery pallet from the International Space Station ripped through the roof and two stories of a house in Florida.

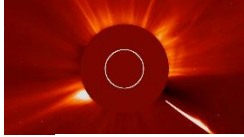
How are space agencies dealing with debris?

- **Legal provisions**
 - Currently, there are no international space laws pertaining to LEO debris.
 - However, most space-exploring nations abide by the **Space Debris Mitigation Guidelines 2002** specified by the Inter-Agency Space Debris Coordination Committee (IADC). This was endorsed by the U.N. in 2007.
- **Space Debris Mitigation Guidelines 2002**
 - The guidelines outline methods to limit accidental collisions in orbit, break-ups during operations, intentional destruction, and post-mission break-ups.
 - They also advise against the long-term presence of spacecraft and launch vehicle orbital stages in LEO and limit their interference in the GEO region.
- **Steps taken by other countries**
 - **NASA** had instituted its Orbital Debris Program in 1979 to find ways to create less orbital debris and design equipment to track and remove existing debris.
 - Currently, its Space Force tracks space debris and collisions in LEO.
 - However, the agency has not implemented any technology to clean such debris yet; most such ideas are in the conceptual stage.
 - **European Space Agency (ESA)** has adopted a ‘Zero Debris charter,’ which includes multiple ways to mitigate space debris. It has also called for zero space debris by 2030 and seeks that other agencies adopt it as well.
 - Recently, **China** deployed a large spacecraft designed to de-orbit its defunct spacecraft.
 - **Japan** also has a project, called the Commercial Removal of Debris Demonstration (CRD2), to tackle space junk.
 - **India:** Apart from the POEM missions, ISRO has set up a **Space Situational Awareness Control Centre** to protect its high-value assets from close approaches and collisions.

An **Indian start-up named Manastu Space** is working on technologies like in-space refuelling, de-orbiting of old satellites, and satellite life extension.

WHAT ARE SUNGRAZING COMETS?

A tiny "sungrazer" comet was discovered during the recent total solar eclipse.



- Sungrazing comets are a special class of **comets that come very close to the sun** at their nearest approach, a point **called perihelion**.

To be considered a sungrazer, a comet needs to get within about 850,000 miles from the sun at perihelion. Many come even closer, even to within a few thousand miles.

- Being so close to the sun is very hard on comets for many reasons.
 - They are subjected to a lot of **solar radiation**, which boils off their water or other volatiles.
 - The physical push of the radiation and the **solar wind** also helps form the tails.
 - As they get closer to the sun, the comets experience extremely **strong tidal forces** or gravitational stress.
 - In this hostile environment, **many sungrazers do not survive** their trip around the sun.
 - **Most usually evaporate** in the hot solar atmosphere.
- **Orbit:** Most of the sungrazing comets observed follow a similar orbit, called the **Kreutz Path**, a single orbit that takes 800 years to complete. They collectively belong to a population called the Kreutz Group.
- These Kreutz comets **are fragments of a single large comet** that was shattered thousands of years ago. The far end of the Kreutz path lies 160 times farther from the sun than the orbit of Earth.

What is a Comet?

- Comets are **frozen leftovers** from the formation of the solar system, composed of dust, rock and ice.
- They **orbit the sun in highly elliptical orbits** that can take hundreds of thousands of years to complete.

- They range from a few miles to tens of miles wide, but as they orbit closer to the Sun, they heat up and spew gases and dust into a glowing head that can be larger than a planet.
 - The dust and gases **form a tail** that stretches away from the Sun for millions of miles.
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METHANOL



Recently, health officials in the United States have recalled several lots of hand sanitisers and aloe gels over the risk of methanol exposure.

- It appears as a **colorless fairly volatile liquid** with a faintly sweet pungent odor like that of ethyl alcohol. It is also known as also known as **wood alcohol**. It can completely mixes with water.
 - **Production:** Preparing methanol is based on the **direct combination** of **carbon monoxide** gas and **hydrogen** in the presence of a catalyst. Increasingly, syngas, a mixture of hydrogen and carbon monoxide derived from biomass, is used for methanol production.
 - **Benefits:**
 - **Lower production costs**—Methanol is cheap to produce relative to other alternative fuels.
 - **Improved safety**—Methanol has a lower risk of flammability compared to gasoline.
 - **Increased energy security**—Methanol can be manufactured from a variety of domestic carbon-based feedstocks, such as biomass, natural gas and coal.
 - **Applications:** Used to **make chemicals**, to remove water from automotive and aviation fuels, as a solvent for paints and plastics, and as an ingredient in a wide variety of products.
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DGCA'S FLIGHT DUTY TIME LIMITATION RULES

Directorate General of Civil Aviation (DGCA):

- DGCA is the regulatory body in the field of Civil Aviation, primarily dealing with safety issues.
- It was accorded a statutory status under the **Aircraft (Amendment) Bill, 2020**.
- It is responsible for regulation of air transport services to/from/within India and for enforcement of civil air regulations, air safety and airworthiness standards.
- It also co-ordinates all regulatory functions with International Civil Aviation Organisation.
- **Headquarters:** New Delhi

Flight Duty Time Limitation Rules:

- Flight crew fatigue and exhaustion are seen as major factors contributing to human errors in aircraft operations, which can lead to catastrophic accidents.
- Also, fatigue and exhaustion can be dangerous for the health of the crew.
- Across airlines, pilots have been expressing concerns over growing fatigue and stress due to:
 - Being stretched to their limits in terms of flying hours,
 - Haphazard and ill-planned rostering, and
 - Unusually high crew utilisation levels as carriers compete to rapidly expand their networks.
- The International Civil Aviation Organization (ICAO) mandates that the country where an aircraft operator or airline is based shall establish regulations for the purpose of managing fatigue.
- The DGCA, in 2019, had issued the Flight Duty Time Limitation (FDTL) Rules, accordingly.
- **Key Rules include:**
 - Different categories of maximum flight duty periods per day based on maximum permitted landings and flight time.
 - Mandatory rest periods between flight duty periods,
 - In-flight rest periods for long-haul flights,
 - Guidelines for scheduling night operations,

- Maximum cumulative flight time and duty period limitations per week, two weeks, four weeks, 90 days, and one year.
- The rules also include special norms for ultra-long-haul flights.
- FDTL rules prohibit airlines from asking flight crew to operate a flight if the prescribed time limitations are exceeded.
- According to the DGCA, airlines are required to establish their own limitations on these counts within the regulator's framework of fatigue management regulations.

Background of DGCA Letter:

- Recently, the Directorate General of Civil Aviation has written to Indian airlines, asking them to indicate when they would be in a position to implement the new Flight Duty Time Limitation (FDTL) rules.
- The communication from the DGCA follows a hearing in the Delhi High Court earlier this month.
- The High Court had asked the DGCA to indicate the tentative date for the implementation of the new FDTL regulations that were initially supposed to be enforced from June 1.
- However, the date was deferred due to stiff resistance from airlines. The DGCA was asked to indicate the likely implementation date in the next hearing scheduled for May 8.
- The decision to postpone was in line with directions issued to the DGCA by the Ministry of Civil Aviation (MoCA) in March.

GPT-4 VISION

Following its launch, OpenAI's ChatGPT has evolved by leaps and bounds and also recently announced API access to GPT-4 with Vision.



GPT-4 Vision is also referred to as **GPT-4V** which allows users to instruct GPT-4 to analyse image inputs. It has been considered OpenAI's step forward towards making its chatbot multimodal — an AI model with a **combination of image, text and audio as inputs**.

- It allows users to upload an image as input and ask a question about it. This task is known as **visual question answering (VQA)**.
- It is a **Large Multimodal Model** or LMM, which is essentially a model that is capable of taking information in multiple modalities like text and images or text and audio and generating responses based on it.

Features:

- It has capabilities such as **processing visual content** including photographs, screenshots, and documents. The latest iteration allows it to perform a slew of tasks such as **identifying objects within images**, and interpreting and analysing data displayed in graphs, charts, and other visualisations.
- It can also **interpret handwritten and printed text** contained within images. This is a significant leap in AI as it, in a way, bridges the gap between visual understanding and textual analysis.
- **Potential Application fields:**
 - It can be a handy tool for **researchers, web developers, data analysts** and content creators. With its integration of advanced language modelling with visual capabilities, GPT-4 Vision can help in **academic research**, especially in interpreting historical documents and manuscripts.
 - Developers can now **write code for a website** simply from a visual image of the design, which could even be a sketch. The model is capable of taking from a design on paper and creating code for a website.
 - Data interpretation is another key area where the model can work wonders as the model lets one unlock insights based on visuals and graphics.