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PSLV-C45 successfully launches EMISAT and 28 customer satellites

Why in news?

India's Polar Satellite Launch Vehicle (PSLV-C45) today successfully launched EMISAT and 28 international customer satellites from Satish Dhawan Space Centre (SDSC) SHAR in Sriharikota.

Highlights:

- PSLV-C45 injected India's EMISAT into a 748 km sun-synchronous polar orbit, 17 minutes and 12 seconds after liftoff. After separation, the two solar arrays of EMISAT were deployed automatically and the ISRO Telemetry Tracking and Command Network at Bengaluru assumed control of the satellite. In the coming days, the satellite will be brought to its final operational configuration.
- Following the separation of EMISAT, the vehicle's fourth stage engines were restarted twice to place the 28 international customer satellites precisely into a sun-synchronous orbit of 504 km height. The last customer satellite was placed into its designated orbit 1 hour and 55 minutes after lift-off.

About EMISAT:

- EMISAT is a satellite built around ISRO's Mini Satellite-2 bus weighing about 436 kg. The satellite is intended for electromagnetic

spectrum measurement.

- This low-Earth orbit satellite that weighs 436 kg, sources say, will monitor and give locations for enemy radar sites deep in their territory. Till now, India was using airplanes as early warning platforms, but this satellite will give a space-based platform to sniff out enemy radars.

CIC orders to Release list of convicted officials

Why in news?

The Central Information Commission (CIC) has directed the Customs Department to make public a list of officers caught red-handed for smuggling gold and heroin, and other illegal activities.

Central Information Commission:
• Under the provision of Section-12 of RTI Act 2005 the Central Government shall, by notification in the Official Gazette constitute a body to be known as the Central Information Commission.
• The Central Information Commission shall consist of the Chief Information Commissioner (CIC) and such number of Central Information Commissioners not exceeding 10 as may be deemed necessary.
• Section 13 of the RTI Act 2005 provides that the Chief Information Commissioner shall hold office for a term of five years from the date on which he enters upon his office and shall not be eligible for reappointment:
• Section 13(5)(a) of the RTI Act 2005 provides that the salaries and allowances payable to and other terms and conditions of service of the Chief Information Commissioner shall be the same as that of the Chief Election Commissioner.
• Appointed by President after a candidate recommended by the committee consisting of
(i) The Prime Minister, who shall be the Chairperson of the committee;
(ii) The Leader of Opposition in the Lok Sabha; and
(iii). A Union Cabinet Minister to be nominated by the Prime Minister.
• Section 12(5) of the RTI Act 2005 provides that the Chief Information Commissioner and Information Commissioners shall be persons of eminence in public life with wide knowledge and experience in law, science and technology, social service, management, journalism, mass media or administration and governance.
• Section 12(6) of the RTI Act 2005 provides that Chief Information Commissioner or an Information Commissioner shall not be a Member of Parliament or Member of the Legislature of any State or Union Territory as the case may be, or hold any other office of profit or connected with any political party or carrying on any business or pursuing any profession.

CIC Order:

- The CIC also called for making public details of officers convicted or jailed for giving false statements or evidence.
- Such data cannot be considered personal information, as held by the Customs Department, and should be made available in the public

interest.

RTI question:

- The direction came in response to a Right To Information request to the Chief Commissioner of Customs in Amritsar, asking for information on officers caught, convicted or jailed for smuggling over the last 10 years.
- The Central Public Information Officer (CPIO) responded by saying that the data requested "pertained to personal information of employees," and hence could not be provided.
- In response to questioning in the appeal case, the CPIO also said no such list of convicted officers was maintained by the Department.
- In his ruling Central Information Commission said the information should be disclosed voluntarily "for the sake of transparency and accountability in the public authority.
- Citing prior cases, IT held that such information cannot be held as a personal information and such information deserves to be given to expose the corrupt person in the public.
- Pointing out that the purpose of the RTI Act was to make public authorities more transparent and accountable to the public, it directed the department to release the requested information as it was in the larger public interest and instrumental in achieving good governance.

SC suspends eco clearance for international airport in Goa

Why in news?

The health of the environment is key to preserving the right to life, the Supreme Court has observed in a recent judgment and suspended the environmental clearance granted for an international airport at Mopa in Goa.

SC Judgment:

- Upholding the need to strengthen the 'environmental rule of law' for both intra and inter-generational equity, the Bench said every branch of governance and institutions across the country should strive to enforce this rule of law.
- While the most direct effect of a strong rule of law is protection of the environment, a firm regime against environmental exploitation would strengthen rule of law more broadly, support sustainable economic and social development, protect public health, contribute to peace and security by avoiding and defusing conflict, and protect human and constitutional rights.
- The apex court said transparency is necessary for the robust enforcement of environmental rule of law.
- The rule of law requires a regime which has effective, accountable and transparent institutions.
- In this case, the court said how the State of Goa, the Centre and the concessionaire highlighted the need for the new airport to accommodate the increasing volume of passengers. They had urged the court to disregard the "flaws" in the Environment Impact Assessment (EIA) process. They had argued that setting up a new airport was a "matter of policy."
- However, dismissing their pleas, the court said "the role of the decision-makers is to ensure that every important facet of the environment is adequately studied and that the impact of the proposed activity is carefully assessed.
- In the present case, as our analysis has indicated, there has been a failure of due process, the court held.

Spider research yet to pick up pace in India

Why in news?

The recent discovery of a new species of jumping spiders in Aarey Colony has had arachnologists specialists in spiders and related animals and wildlife experts call for a greater focus on studying spiders in India.

Lack of Study:

- While the last major research was conducted between the 1990s and 2000s experts believe a lot of diversities of spiders are yet to be discovered in the country

- In a study published on Saturday by Russian peer-reviewed journal Arthropoda Selecta announced that they had discovered a new species of jumping spiders in the city's Aarey Milk Colony.

- Named after additional principal chief conservator of forest, Sunil Limaye, **Jerzegosunillimaye** was found for the first time in 2016.

- In the research that spanned over the next three years, researchers were able to understand the natural history of this species and explore interesting aspects that were not documented before.

- They were able to explore different habitats such as grasslands, rocky and forested patches to find out the habitat these tiny spiders preferred. Several males and females of various life stages were observed throughout the years, specifically in the monsoon, when the females were observed guarding their egg sacs, while males were seen wandering under the rocks.

- While other species of jumping spiders such as the Langelurillus Onyx, LangelurillusLacteusboth described in 2017 and Piranthusdecorus recorded for the first time in 122 years in the area have inhabited the Aarey Colony, more studies pertaining to their complete biology, habits and interactions with other species are yet to be carried out. While there are 4,800 species of spiders in the world, India alone accounts for 1,800 spider species.

- Spiders are important creatures as they are pest-controllers. They are like the tigers of the microhabitat world. Pulling them out could cause ecological imbalance.

- Species of spiders other than wolf, crab, orb-weaver and ground spiders have not received enough attention in India. Fewer number of arachnologists in India is also a problem. While the research on spiders was catalysed by **Dr. B.K. Tikader,** considered the father of Indian arachnology, it has subsided over the years.

'Taxonomic study tough:

- The taxonomy the morphological features is tough in India. Without taxonomic studies, one cannot arrive at a proper conclusion till experts are consulted. Besides that, a lot of specimens collected in

India are deposited in museums abroad.

- While describing new species, we have to draw comparisons with what has already been described, by seeing type specimens, which is hard.
- Most characters used in the 19th century have been revised and updated over the years and without specimens, identification of species being observed becomes difficult.
- Efforts to improve and enrich the collection of specimens of spiders in India has just begun.

Considered dangerous:

- The data sharing and awareness about spiders in the country was minimal.
- People consider crawling beings as dangerous and some have phobias too.
- There are also certain baseless myths attached to spiders. One needs to understand that while studying any arthropod, animal or other being, one needs to respect their space.

Systematic Investment Plan

What is a SIP?

- A Systematic Investment Plan (SIP) is a way to invest in mutual funds wherein a fixed sum of money is put into a mutual fund scheme at a specified date every month.
- It is considered to be investor-friendly and an efficient manner of investing in the capital markets as one can start investing with small monthly contributions instead of first building a huge investment corpus.
- It is a hassle-free manner of investment as well since one can issue standing instructions to the bank for a specified amount to be transferred to the fund house/distributor every month at a pre-determined date.

How can one start a SIP?

- There are two ways of starting an SIP. One can use the direct way of investing though the fund house or go through a distributor.
- For direct plans, an investor can go to the website of the fund house for the scheme in which the SIP has to be started.
- All the fund houses have a link on their portals for investors who want to start an SIP. Typically, only the Permanent Account Number (PAN) and/or Aadhaar is needed to open an account.
- Thereafter, one can select the scheme, SIP amount, starting date and duration of SIP. If one opts for a distributor, then the same process can be done online on the distributor's portal.

Is it better to start direct SIPs or go through a distributor?

- The returns for those investing directly will always be marginally better than for those investing through distributors as direct plan investors do not need to pay distributor commission.
- And since SIPs are typically long-term investments, the difference in the total corpus, at times, could be substantial.
- However, going through a distributor has its advantages as well as one can get access to investment advice, help in fund selection and a consolidated view of the holdings through an app.
- On the other hand, if an investor wants to start 4-5 SIPs with different fund houses, then a direct approach would mean going to each of the fund house websites and opening a folio and keying in the details to start the SIP.
- However, there are some fintech start-ups that offer direct SIP options on their platform.

Is a demat account necessary for starting a SIP?

- No. One does not need a demat account to start a SIP. As mentioned earlier, one can just start a SIP by opening an account folio in industry parlance through the fund house or the distributor.
- In fact, this is also one of the reasons for the increasing popularity of SIPs as one need not open a demat account through a stock broker.

What are the benefits of a SIP?

- Timing the market is the most difficult thing when it comes to equity investment. SIPs, in a way, address this issue.
- SIPs capture every rise and fall of the market and hence, an investor

need not worry about the level of the market.

- Also, there are sector-specific funds pharma, banks, technology, etc. and also those based on the size of the companies such as large-cap, mid-cap, small-cap funds that allow the investor to have a diversified portfolio rather than concentrate risk in a few companies.

Poisoned cattle carcass kills 37 vultures

Why in news?

At least 37 vultures belonging to three endangered species died in eastern Assam's Sivasagar district evening after feeding on pesticide-laced cattle carcass.

Causes:

- Forest officials and a wildlife rescue team from the Vulture Conservation Breeding Centre (VCBC) rescued an equal number of vultures in a critical condition.
- The incident happened at Bam Rajabari village, where 20 vultures died of carcass-poisoning in April last year.
- Most of the 37 vultures that died are Himalayan griffon. A few are oriental white-backed and slender-billed vultures. Thankfully, the team was able to rescue 37 more, but not sure how much the poison has taken.
- They need treatment and observation at the Centre for Wildlife Rehabilitation and Conservation at Kaziranga for at least 10 days.
- It was a clear case of poisoning the carcass of a cow by the villagers, meant to kill feral dogs. But, as is often the case, the vultures died.
- It is unfortunate that such things happen despite awareness campaigns being carried out.
- A study by the Bombay Natural History Society and other organisations in the 1990s found that the population of the Gyps group, Himalayan griffon, white-backed and slender-billed are among

its members in India and Nepal declined from about 40 million by 99.9% in just two decades.

Ramappa temple for world heritage site

Why in news?

Telangana may get its first UNESCO World Heritage Site, but it may be the Ramappa Temple at Palampet near Warangal than any of the Qutb Shahi era sites in Hyderabad.

Application for the Heritage Tag:

- While the Qutb Shahi monuments of Hyderabad, **Golconda Fort, Qutb Shahi Tombs and Charminar** have been on the tentative list of World Heritage Sites from September 2010, the Ramappa Temple's application, filed as 'The Glorious Kakatiya Temples and Gateways', has been fast-tracked from April 2014.
- Earlier, the Ramappa Temple was part of a 'serial nomination' along with the **Thousand Pillar Temple, Swayambhu Temple and KeertiThoranas of Warangal** Fort. But now, thanks to a small tweak, the temple is in the reckoning as a standalone world heritage site.

Unique, stunning:

- The Siva temple is perhaps the **only one in the country that is known by the name of the architect** rather than the king who commissioned it or its presiding deity.
- The stunning dance sculptures and friezes of the temple appear as if they have been machined into shape on black dolomite, rather than being chiselled.
- The temple is built on a valley and it rests on bricks that are scientifically shown to float in water.
- The Ramappa Temple is a jewel of the Kakatiya era and it stands out.

Heritage Tag Process:

- The world heritage site/city status appears like a series of hoops that have to be cleared by the site owners.
- The first step involves creating a detailed dossier showing the outstanding universal value of the site, besides meeting a few other criteria.
- Once the documentation is complete, it requires a push by the State party or the country where the site is located.
- The property is then evaluated by the International Council on Monuments and Sites (ICOMOS) and the International Union for Conservation of Nature (IUCN).
- The International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) then provides advice on conservation of the site, and training.
- After all these steps, the World Heritage Committee evaluates the site and decides to inscribe it or send back the nomination.
- It remains to be seen whether the Ramappa temple will win the prized inscription at the 43rd session of the World Heritage Committee meeting to be held in Azerbaijan in the first week of July.

VVPAT

Why in news?

The Election Commission indicated to the Supreme Court that if the 50% Voter Verified Paper Audit Trail (VVPAT) slip verification is carried out, it will delay counting by six days. Twenty-one Opposition parties had moved the Supreme Court against the EC's guideline that VVPAT counting would take place only in one polling station in each Assembly segment in the coming Lok Sabha election.

What is the VVPAT and how does it function?

- The Voter Verifiable Paper Audit Trail device is an add-on connected

to the Electronic Voting Machine.

- It allows voters to verify if their vote has indeed gone to the intended candidate by leaving a paper trail of the vote cast.
- After the voter casts his or her mandate by pressing a button related on the ballot machine (next to the symbol of the chosen party), the VVPAT connected to it prints a slip containing the poll symbol and the name of the candidate.
- The slip is visible to the voter from a glass case in the VVPAT for a total of seven seconds and the voter can verify if the mandate that s/he has cast has been registered correctly.
- After this time, it is cut and dropped into the drop box in the VVPAT and a beep is heard, indicating the vote has been recorded.
- Prior to voting, the VVPAT unit is calibrated to ensure that the button pressed on the ballot unit of the EVM is reflected correctly on the printed slips by the VVPAT.
- The presence of the slips that correspond to voter choice on the EVM helps retain a paper trail for the votes and makes it possible for the returning officer to corroborate machine readings of the vote.

Allegations

- The VVPAT machines can be accessed only by polling officers. The units are sealed and can be opened during counting by the returning officer if there's a contingency.
- The VVPAT has been a universal presence in all EVMs in the Assembly elections from mid-2017.
- Only a few VVPAT machines are tallied to account for the accuracy of the EVM.
- Currently slips in one randomly chosen VVPAT machine per Assembly constituency are counted manually to tally with the EVM generated count.
- The EC has stated that VVPAT recounts have recorded 100% accuracy wherever it has been deployed in Assembly elections.

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- After this time, it is cut and dropped into the drop box in the VVPAT and a beep is heard, indicating the vote has been recorded.
- The EVMs allowed for elimination of invalid votes as the voting process was made easier registering the vote by pressing a button. It also allowed for a quicker and easier tallying of votes.
- Cumulatively, the tallying and elimination of invalid votes reduced the scope for human error.
- Secondly, the EVMs made it difficult to commit malpractices as they allowed for only five votes to be registered every minute, discouraging mass rigging of the scale that was seen in earlier days when ballot papers were used.
- That said, there have been questions raised about the security of the EVMs and whether they can be manipulated and tampered with.
- The EC has addressed the possibility of tampering by gradually introducing newer security and monitoring features, upgrading EVMs with technological features that allow for dynamic coding and time-stamping of operations on ballot units and later, features such as tamper-detection and self-diagnostics.
- Furthermore, there are administrative steps that prevent EVMs from being stolen and tampered with.
- The introduction of the VVPAT adds another layer of accountability to the electoral process. The recount rules out any EVM tampering, despite the safeguards, through an "insider fraud" by EC officials or EVM manufacturers.

What problems have been encountered?

- In the initial phase of VVPAT implementation in the Lok Sabha by-elections in States such as Uttar Pradesh, Bihar and Maharashtra and the Assembly election in Karnataka, there was a high rate of failure of VVPAT machines due to manufacturing glitches.
- In the Lok Sabha by-elections in 2017, the rate of VVPAT

replacement, owing to glitches, was more than 15%, higher than the acceptable rates of failure (1-2%). In Karnataka, the failure and replacement rate was 4.3%.

- Coincidentally, the failure rate of the EVM unit (excluding the VVPAT) was very low. These glitches also caused severe disruptions to polling.
- To account for failure rates, the EC has tried to provide back-up machines to allow for swift replacement.
- The EC admitted later that the machines had high failure rates owing to hardware issues that occurred during the transport of EVMs and their exposure to extreme weather conditions.
- It sought to correct these problems by repairing components related to the printing spool of the VVPAT machines.
- The deployment of many corrected machines in the Assembly elections held recently in Madhya Pradesh, Rajasthan and Chhattisgarh resulted in much reduced replacement rates (close to 2.5% in Madhya Pradesh and 1.9% in Chhattisgarh).
- This suggests that the EC is relatively better prepared to handle VVPAT-related glitches in the upcoming Lok Sabha election, where the VVPATs will be deployed in nearly 10.5 lakh polling stations nationwide.

Is the current rate of VVPAT recounts enough?

- Political parties, primarily of the Opposition, have demanded a greater VVPAT recount than the one booth per Assembly/Lok Sabha constituency rule that is now in place.
- The EC responded to a plea by the Opposition parties in the Supreme Court that there was a need for 50% VVPAT recount, saying such an exercise would delay the counting by six days.
- Statistically speaking, it does not require a 50% sample to adequately match VVPAT tallies with those of EVMs.
- The Indian Statistical Institute, Kolkata, has presented a report on possible and appropriate VVPAT counts to the EC, in which it said a sample verification of 479 EVMs and VVPATs of a total 10.35 lakh machines would bring the level of confidence in the process to 99.9936%.
- The logic behind counting only one booth per constituency in each State stems from the understanding that there are nearly 10.35 lakh polling stations and 4,125 Assembly constituencies in the country.

ECI Stand:

- By counting the slips in at least one VVPAT in each Assembly constituency, the EC argues, a relatively high sample size of the EVMs (0.5%) is verified.
- Critics have argued that this sample size is not enough to statistically select a potentially tampered EVM within a high confidence level and adjusting for a small margin of error (less than 2%) as the unit of selection must be EVMs in each State rather than the entire country as a whole.
- One suggestion, by the former bureaucrat Ashok Vardhan Shetty, is for adjusting the VVPAT counting process to factor in the size of the State, population of the constituency and turnout to account for a higher confidence level and a low margin of error.
- This would entail the certain tallying of more than one VVPAT per constituency, in fact close to 30 per constituency in smaller States and less than five per constituency for larger States.
- The Supreme Court has said the EC must increase the VVPAT count to more than the current number.

Petroleum waste toluene into useful product

Why in news?

Using platinum nanocatalyst, a two-member team at the Indian Institute of Technology (IIT) Madras has successfully converted petroleum waste-product toluene into benzoic acid.

Findings of the Study:

- Benzoic acid is used as a food preservative (E210) and medicine for fungal/bacterial infection. Toluene is converted into benzoic acid through selective and controlled oxidation in the presence of a catalyst binaphthyl-stabilised platinum nanoparticles (Pt-BNP).
- Generally, organic reactions are carried out using organic solvents,

which makes it expensive and also generates toxic waste.

- So, in a departure from current practice, the team has used water as solvent to make it environment-friendly.
- Also, a green oxidant (70% aqueous tert-butyl hydroperoxide or TBHP) is used for converting toluene into benzoic acid.
- When toluene is oxidised, it gives four products. But when used the catalyst that the team developed, only benzoic acid is produced. No alcohol, aldehyde or ester is produced.
- The yield of benzoic acid varied from 68-96% depending on whether the toluene used is electron-deficient or electron-rich.
- Central to the work is the novel catalysts that the team developed. Generally, platinum nanoparticles are not stable in nature as they tend to agglomerate and become macroparticles.
- The catalytic activity is reduced once it becomes macroparticles. The binaphthyl that is bound to platinum nanoparticles acts as a stabiliser and prevents nanoparticle agglomeration.
- Toluene when oxidised gets converted into benzoic acid. Molecular oxygen when used alone does not oxidise toluene and so no benzoic acid is generated. So the researchers used TBHP as an oxidiser.
- The catalyst reacts with TBHP to initiate the oxidisation reaction where toluene gets converted into benzoic acid through a series of reaction steps

Economical combination:

- When used alone, a large quantity (four parts of TBHP to 1 part of toluene) of TBHP would be required for the conversion, which will not be economically favourable.
- In order to reduce the amount of TBHP used, the researchers also used molecular oxygen.
- In the presence of molecular oxygen, only two parts of TBHP are needed for the conversion. So molecular oxygen behaves as a co-oxidiser.
- The use of TBHP along with molecular oxygen also increased the yield of benzoic acid.

Leopard Cats

Why in news?

A team has used camera traps technology to estimate activity patterns of some, rarely studied small cats of northeast India. Their findings suggest that factors other than inter-species competition could explain why some of these wild cats occur in the same area together.

Findings of the Survey:

- Northeast India is home to nine wild cats, including the 'standard four': **the clouded leopard, Asiatic golden cat, marbled cat and leopard cat**.
- However, very little is known about these cats in this region at present, such as what times of the day they are most active or how they do not out-compete each other for resources despite living in the same ecosystem.

Standard four:

- A collaborative study by 14 researchers compiled information from ten independent camera trap studies to estimate the activity patterns of the 'standard four' in Assam, Arunachal Pradesh, Nagaland, Meghalaya and Mizoram.
- The team obtained 783 photo captures from around 27,500 trap nights (the total number of nights the camera traps were deployed) between 2013 and 2018.
- Based on the time that each photo was captured, they analysed their activity patterns
- Their results reveal that all four cats occurred together only in three of the 10 sites surveyed.
- Analyses of activity patterns showed that Asiatic golden cats and marbled cats were strongly diurnal, the clouded leopard largely crepuscular and nocturnal, and the leopard cat mostly nocturnal.
- Like others across southeast Asia, this study also found that the activity times of the marbled cat and leopard cat did not overlap much, in areas where they occurred together and otherwise.

- According to the authors, this suggests something other than inter-species competition could be at work here.
- Both cats could be utilising different niches marbled cats have long tails that suggest arboreality so they could be catching arboreal prey, while leopard cats are known to feed primarily on ground prey, especially rodents.
- The study also shows how data from already conducted camera trap studies can be used to learn more about other less-known species.