



C-295 Aircraft

For Prelims: Potential of India's Civil Aviation Sector, MSME, Offset Obligations.

For Mains: C-295 Aircraft and Significance of its Manufacturing Project.

Why in News?

Recently, Prime Minister of India has laid the foundation stone for the [C-295 transport aircraft manufacturing facility in Vadodara](#) to be set up by Airbus Defence and Space S.A., Spain and Tata Advanced Systems Limited (TASL).

- This is the first time a **private sector company would be manufacturing a full aircraft in the country.**

What is the C-295 MW transporter?

- **About:**
 - The C-295 is a **transport aircraft of 5-10 tonne capacity** with contemporary technology.
 - Robust and reliable, it is a **versatile and efficient tactical transport aircraft** which can perform a number of different missions.



Image credit: airbus.com/en

- **Features:**
 - The aircraft, with a flight endurance of up to 11 hours, **can carry out multi-role operations under all weather conditions.**
 - It can routinely operate day as well as night combat missions from desert to maritime environments.
 - It has a **rear ramp door for quick reaction and para dropping of troops** and cargo. Short take-off/land from semi-prepared surfaces is another of its features.
- **Replacement:**
 - It will replace the Indian Air Force's ageing fleet of Avro-748 planes.
 - The Avro-748 planes are a British-origin twin-engine turboprop, military transport and freighter with a 6-tonne freight capacity.
- **Project Execution:**
 - TASL will jointly execute the project to equip the air force with the new transport aircraft under the **Make-in-India** initiative in the aerospace sector.
 - Airbus will supply the first 16 aircraft in fly away condition between September 2023 and August 2025 while the remaining 40 will be assembled in India by TASL between September 2026 and 2031 at the rate of eight aircraft per year.

What is the Significance of this Manufacturing Facility?

- **Employment Generation:**
 - The TATA Consortium has identified more than **125 in-country MSME suppliers spread over seven states.** This will act as a catalyst in employment generation in the aerospace ecosystem of the country.
 - It is expected to generate 600 highly skilled jobs directly, over 3000 indirect jobs, and an additional 3000 medium-skill employment opportunities with more than 42.5 lakh man hours of work within the aerospace and defence sector of India.
- **Boost MSMEs:**
 - The project will give a boost to the **aerospace ecosystem in India wherein several [Micro, Small and Medium Enterprises \(MSMEs\)](#)** spread over the country will be involved in manufacturing of parts of the aircraft.
- **Reduce Import Dependence:**
 - The project will augment **domestic aviation manufacturing resulting in reduced import dependence** and expected increase in exports.
 - A large number of detail parts, sub-assemblies and major component assemblies of aero structure are scheduled to be manufactured in India.
- **Infrastructure Development:**
 - It will involve development of specialized infrastructure in the form of hangars, buildings, aprons and taxiways.
 - Before completion of deliveries, **'D' Level servicing facility (MRO) for C-295MW aircraft are scheduled** to be set up in India.
 - It is expected that this **facility will act as a regional MRO (Maintenance, Repair and Overhaul)** hub for various variants of C-295 aircraft.
- **Offset Obligations:**
 - Airbus will discharge its **offset obligations through direct purchase of eligible products** and services from Indian offset partners giving further boost to the economy.
 - In simplest terms, the offset is an obligation by an international player to boost India's domestic defence industry if India is buying defence equipment from it.

What is the Potential of India's Civil Aviation Sector?

- India has a much bigger footprint in civil aviation manufacturing than defence, in addition to being a major market itself. Both Airbus and Boeing, the USA, do significant sourcing from India for their civil programmes.
 - Boeing's sourcing from India stands at USD 1 billion annually, of which over 60% is in manufacturing
- India buys manufactured parts and engineering services worth USD 650 million every year from more than 45 Indian suppliers.
- India, which is moving ahead with the mantra of 'Make in India' and 'Make for the Globe',

continues to enhance **its potential by becoming a major manufacturer of transport planes.**

- Since 2007, Airbus has had a wholly domestic-owned design centre in India which has more than 650 engineers who specialise in high-tech aeronautical engineering and work across both fixed- and rotary-wing Airbus aircraft programmes.
- It is estimated that in the coming 10-15 years, India will need about 2000 more **passenger and cargo aircraft.**
- Another major growing area is MRO for which India can emerge as the regional hub.
 - MRO is any action that **helps keep or restore an item to its working condition.**

UPSC Civil Services Examination Previous Year Question:

Q. International civil aviation laws provide all countries complete and exclusive sovereignty over the airspace above their territory. What do you understand by 'airspace'? What are the implications of these laws on the space above this airspace? Discuss the challenges which this poses and suggest ways to contain the threat. **(2014)**

Q. Examine the development of Airports in India through joint ventures under Public-Private Partnership (PPP) model. What are the challenges faced by the authorities in this regard? **(2017)**

[Source: TH](#)

Coronal Holes

Why in News?

Recently, NASA captured an image having [dark patches on the sun's surface](#) resembling eyes and a smile.

- These patches are called '**Coronal holes**', which **can be seen in ultraviolet light but are typically invisible to our eyes.**

What are Coronal Holes?

▪ About:

- These are **regions on the sun's surface from where fast solar wind gushes out into space.**
 - In these regions, the **magnetic field is open to interplanetary space**, sending solar material out in a **high-speed stream of solar wind** i.e. [geomagnetic storm](#).
- They have **lower temperatures and appear much darker than their surroundings** as they contain little solar material.
- Coronal holes can **last between a few weeks to months.**
- The holes are not a unique phenomenon, **appearing throughout the sun's approximately 11-year solar cycle.**
- They can last much **longer during solar minimum**, a period of time when activity on the Sun is substantially diminished.

▪ Significance:

- Coronal Holes are **important in understanding the space environment** around the earth through which our technology and astronauts' travel.

What is a Geomagnetic Storm?

- Geomagnetic storm is a solar storm that occurs during the **release of magnetic energy** associated with sunspots (**'dark' regions on the Sun that are cooler than the surrounding photosphere - the lowest layer of the solar atmosphere**), and can last for a few minutes or hours.
- It is a **major disturbance of Earth's magnetosphere** that occurs when there is a very **efficient exchange of energy from the solar wind into the space environment** surrounding Earth.
 - The magnetosphere **shields our home planet from harmful solar and cosmic particle radiation**, as well as erosion of the atmosphere by the solar wind - the constant flow of charged particles streaming off the Sun.
- These storms **result from variations in the solar wind** that produce major changes in the currents, plasmas, and fields in Earth's magnetosphere.
 - The solar wind conditions that are effective for creating geomagnetic storms are sustained (for several to many hours) periods of high-speed solar wind, and most importantly, a southward directed solar wind magnetic field (opposite the direction of Earth's field) at the dayside of the magnetosphere.
 - This **condition is effective for transferring energy** from the solar wind into Earth's

magnetosphere.

- The largest storms that result from these conditions are associated with solar **Coronal Mass Ejections (CMEs)** where a billion tons or so of plasma from the sun, with its embedded magnetic field, arrives at Earth.
 - CMEs are large ejections of plasma and magnetic fields that **originate from the Sun's corona** (outermost layer).

UPSC Civil Services Examination Previous Year Question:

Q. If a major solar storm (solar flare) reaches the Earth, which of the following are the possible effects on the Earth? (2022)

1. GPS and navigation systems could fail.
2. Tsunamis could occur at equatorial regions.
3. Power grids could be damaged.
4. Intense auroras could occur over much of the Earth.
5. Forest fires could take place over much of the planet.
6. Orbits of the satellites could be disturbed.
7. Shortwave radio communication of the aircraft flying over polar regions could be interrupted.

Select the correct answer using the code given below:

- (a) 1, 2, 4 and 5 only
- (b) 2, 3, 5, 6 and 7 only
- (c) 1, 3, 4, 6 and 7 only
- (d) 1, 2, 3, 4, 5, 6 and 7

Ans: (c)

Exp:

- Solar flares are powerful bursts of energy.
- The storms can often be observed as **beautiful aurorae in our night sky**, but they can also cause major disturbances in Earth's power grids and navigation systems.
- A massive solar flare erupted from the Sun's surface, disrupting radio **waves, telecommunication networks, and power systems by triggering an intense magnetic storm.**
- Scientists have found evidence of an extreme solar 'tsunami' deep within the Earth's ice through analyses of ice cores from Greenland and Antarctica.
- A magnetic dam is formed which is storing a big mass of plasma. At the end of a solar cycle, this magnetic dam can break, releasing huge amounts of plasma cascading like a tsunami towards the poles.
- Therefore, **statements 1, 3, 4, 6 & 7 are correct. Hence option (c) is correct.**

Source: IE

Warehousing Development

For Prelims: Warehouse Development and Regulatory Authority, Electronic Negotiable Warehouse

Why in News?

Recently, a seminar on “**e-NWR - An Effective Tool for Promoting Pledge Financing**” was organised by the **Warehousing Development and Regulatory Authority (WDRA)** under the **Department of Food and Public Distribution (DFPD)** on the foundation day of WDRA.

What is Warehousing Development and Regulatory Authority?

- **About:**
 - It was **constituted in 2010** under the **Warehousing (Development and Regulation) Act, 2007**.
 - It was an **initiative of public policy** where the benefits of technology had been transferred into benefits for farmer with the objective to make **e-NWR** a prime tool of trade, increase rural liquidity, increase farmers’ income, reduce post-harvest losses, etc.
- **Objective:**
 - The main objective of WDRA is to implement **Negotiable Warehouse Receipt (NWR) System** in the country.
 - The main functions of the Authority are to **make provisions** for the development and regulation of warehouses which interalia includes negotiability of warehouse receipts, **registration of warehouses, promotion of scientific warehousing** of goods, improving fiduciary trust of depositors and banks, **enhancing liquidity in rural areas** and promoting efficient supply chain.
- **Achievements:**
 - There had been an **increase in the number of warehouses registered** with WDRA and its outreach with banks and farmers had improved exponentially.
 - As of 2021-22, **123 warehouses** are registered under WDRA issuing total of **17,975 e-NWR**.

What is Negotiable Warehouse Receipt?

- **About:**
 - It was launched in **2011 by the Ministry of Consumer Affairs, Food & Public Distribution**.
- **Benefits:**
 - Farmers can **seek loans** from banks against the warehouse receipts issued to them against their storage.
 - These receipts issued by the warehouses registered with the WDRA would become a **fully negotiable instrument backed by a Central legislation**.
- **The NWR in electronic form could be issued either as:**
 - **Electronic Negotiable Warehouse Receipt (e-NWR):**
 - It has negotiability and can be used for deposit and withdrawal of commodities as well as trade transactions such as **transfer and Pledge**.
 - It was launched in 2017.
 - It has been integrated with the [electronic National Agriculture Market \(e-NAM\)](#) platform by providing an interface between e-NAM and repositories.
 - **Electronic Non-Negotiable Warehouse Receipt (e-NNWR)**, which can be used **only for deposit and withdrawal of commodities** (generally issued for goods received in the warehouse with pending final assaying reports or if assaying is not desired by the applicant) **without the facility of trade / transfer**.

What is e-NWR Pledge Finance?

- Pledging is a process in which the holder of the eNWR will **get a loan from the financial institution** using the underlying commodity of eNWR as collateral.
- When a pledge is marked, the **eNWR balances will remain in the client's account** (borrower) only but the control on the balance will be with the financial institution.
- The client will **not be able to use** the eNWR balances until the pledge in favour of the **financial institution is active**.

UPSC Civil Services Examination Previous Year Question:

Q. What are the impediments in marketing and supply chain management in developing the food processing industry in India? Can e-commerce help in overcoming this bottleneck? **(2016)**

[Source: PIB](#)

Adoption of Self-Driving Cars

For Mains: The Moral Dilemmas Faced by Self-Driving Cars

Why in News?

In a series of lawsuits and a criminal case arising out of fatal Tesla accidents, **Tesla faces its biggest challenge since launching Autopilot in 2015.**

What are the Moral Dilemmas Self-Driving Cars Face?

- **Predetermined Decisions:**
 - Self-driving cars are **basically robots that have been programmed using algorithms**. So, they are most likely to follow set rules or patterns in all cases.
- **Giving Control to the Driver:**
 - One of the biggest dilemmas of self-driving cars is **whether it would be right to hand over the control to the driver at the last instant**.
 - This will not only raise a question about the ethics of self-driving cars but also about the ethics of the driver.
- **Rightful Deciders of the Ethics of Self-Driving Cars:**
 - There is a debate about who should decide the ethics of self-driving cars, according to some.
 - It can be **argued that no one is the right owner to decide the ethics of self-driving cases**. The decision must lie in the hands of the driver of the car.
- **Program the Car to Make an Impartial Decision:**
 - Some also argue that the best way for a **self-driving car is to make an impartial decision in case of accidents**.
 - They **must not discriminate between humans based on age, gender, or other parameters**. They should always make the decision that causes the least impact.
- **The Hacking Dilemma:**

- There is **always a risk of a cyber-criminal hacking** into the car's system to gain access to sensitive data or to carry out a misdeed.
- For example, what **if the autonomous car is hacked by a cybercriminal and commanded to carry out an accident** to implicate the driver?

What are Self Driving Cars or Autonomous Cars?

▪ About:

- An autonomous car is a **vehicle capable of sensing its environment and operating without human involvement.**
- A **human passenger is not required to take control of the vehicle** at any time, nor is a human passenger required to be present in the vehicle at all.
- An autonomous car can go anywhere a traditional car goes and do everything that an experienced human driver does.

▪ Benefits:

- Reduce traffic congestion
- Cut transportation costs by 40%
- Improve walkability and livability
- Free up parking lots for other uses
- Reduce urban CO2 emissions by 80% worldwide

Way Forward

As the debate around the topic intensifies due to the increasing adoption of self-driving cars, it is **hoped that strict laws and regulations will be developed** that can finally answer the questions in a correct, justifiable manner.

[Source: TH](#)

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