67th Foundation Day of DRDO

For Prelims: Defence Research and Development Organisation, unmanned aerial vehicles, sonar systems, Air Defence Tactical Control Radar , Long Range Land Attack Cruise Missile , Quick Reaction Surface to Air Missile , Trishul, Akash,BrahMos

For Mains: Contributions of DRDO in India's defense sector, Defense Technologies

Source: PIB

Why in News?

Recently, the **Defence Research and Development Organisation (DRDO)** celebrated its **67th Foundation Day on 1st January** and paid tributes to former President **Dr. APJ Abdul Kalam,** the **Missile Man of India**

- The event highlighted the significant strides DRDO has made in bolstering India's defense capabilities.

What are the Key Facts About DRDO?

- **About:** DRDO was established in 1958 by merging the **Technical Development Establishment (TDEs)** of the Indian Army, the **Directorate of Technical Development and Production (DTDP)**, and the **Defence Science Organisation (DSO).**
  - **DRDO** is the R&D wing of the **Ministry of Defence**, Government of India.
  - DRDO initially had 10 laboratories, it currently operates 41 laboratories and 5 **DRDO Young Scientist Laboratories (DYSLs).**
- **Philosophy:** The guiding principle of DRDO is "***Balasya Mulam Vigyanam***" **(Strength lies in science),** driving the nation in both peace and war.
- **Mission:** Achieve **self-reliance in critical defence technologies** and systems while equipping the Indian armed forces with state-of-the-art weapon systems and equipment, as per the requirements of the three Services.
- **Technology Clusters of DRDO:** A committee under the chairmanship of **Dr. P. Rama Rao** was constituted in 2007 to conduct a comprehensive review of the DRDO.
  - This led to the creation of **seven technology domain-based clusters,** each headed by a Director General.
  - **Aeronautics Systems (Aero):** Focuses on **unmanned aerial vehicles (UAVs)**, aerostats, and related technologies.
  - **Missiles and Strategic Systems (MSS):** Develops **missile systems, including long and short-range missiles,** and related technologies.
  - **Naval Systems and Materials (NSM):** Works on naval platforms, underwater systems, including **sonar systems** and submarine technologies.
  - **Micro Electronic Devices (MED) and Computational Systems (CoS):** Focuses on electronics, radars, **cyber security,** and **artificial intelligence** for defense applications.
  - **Armament and Combat Engineering Systems (ACE):** Involves the development

of **armaments, ammunition, explosives**, and combat vehicles.
    - **Electronics and Communication Systems (ECS):** Specializes in military **electronics, sensors, communication systems,** and electronic warfare technologies.
    - **Soldier Support System (SSS):** Equipping the **armed forces with advanced weapon systems** must be complemented by optimizing the psychological, physiological, and nutritional well-being of personnel.
- **Key Achievements of DRDO:**
    - **Achievements of DRDO in 2024:**
        - **System Handovers:** DRDO handed over multiple advanced systems notable systems include:
            - **Air Defence Systems: Air Defence Tactical Control Radar (ADTCR), Air Defence Fire Control Radar (ADFCR)**.
            - **Missile Systems: Long Range Land Attack Cruise Missile (LR-LACM)** , **Quick Reaction Surface to Air Missile (QRSAM), and Medium Range Anti-ship Missile (MRAshM).**
            - **Advanced Platforms:** Multi-Mission Maritime Aircraft (MMMA), SCA (Signal Intelligence and COMJAM Aircraft), and **Anti-Tank Influence Mine PRACHAND.**
        - **AI Tools:** DRDO developed **'Divya Drishti,'** an AI tool that integrates face recognition with **immutable physiological traits** like gait (pattern of walking) and skeleton.
        - **Flagship Programs:** Two flagship programs **Full Scale Engineering Development (FSED) of Advanced Medium Combat Aircraft (AMCA)** and a new **Missile Test Range in Andhra Pradesh**, were sanctioned by the **Cabinet Committee on Security (CCS).**
    - **Missile Systems:**
        - **Air-to-Air Missile: MICA, Astra Missile**
        - **Surface-to-Air Missiles: Trishul, Akash, Barak 8**
        - **Surface-to-Surface Missiles: Agni, Prithvi, Dhanush**, **Shaurya**
        - **Cruise Missiles: BrahMos**, **Nirbhay**
    - **Combat Aircraft: Indigenous Fighter Jet Light Combat Aircraft (LCA) Tejas.**
    - **Rocket Systems: Multi-barrel rocket launcher Pinaka.**
    - **Naval Systems: Humsa,** Nagan (sonar system), Ushus (Submarine Sonar Suite), Mihir (helicopter sonar system).
    - **Main Battle Tank: Arjun.**
    - **Unmanned Aerial Systems (UAS):**
        - **Lakshya:** Reusable aerial target system for training, launched from land/ship with tow targets.
        - **Nishant:** Multi-mission **UAV** for surveillance and artillery correction with autonomous flight and parachute recovery.

What are the Contributions of Dr. APJ Abdul Kalam to DRDO?

- **Leadership in IGMDP:** Dr. Kalam was instrumental in the creation and execution of the **Integrated Guided Missile Development Program (IGMDP)**, launched in 1983.
    - His leadership led to the successful development of the **Prithvi, Trishul, Akash, Nag, and Agni missiles,** positioning India as a member of the **exclusive group of missile-producing nations** and earning him the title of '**Missile Man of India.**'
    - Under Dr. Kalam's leadership, DRDO achieved breakthroughs in missile technologies like **propulsion, navigation, control systems, and aerodynamics,** leading to **indigenous missile systems** and reduced dependency on foreign suppliers.
- **Integrated Guided Missile Development Program:** The IGMDP was a program initiated by the **Indian Ministry of Defence** in 1982–1983 under the leadership of **Dr. APJ Abdul Kalam,** aimed at researching and developing a wide array of missiles.
    - The program's primary objective was to **reduce dependency on imports and build indigenous expertise** in areas such as propulsion, navigation, and control systems.
    - The program resulted in the development of key missile systems such as **Prithvi, Trishul, Akash, Nag, and Agni.**
    - Concluding in 2008, IGMDP also provided significant technological spin-offs, strengthened

India's strategic deterrence, and contributed to the development of the **defense-industrial base**, in alignment with the **'Make in India' initiative.**

Key Facts About Dr. APJ Abdul Kalam

- **Born:** Dr. Avul Pakir Jainulabdeen Abdul Kalam born on **15th October 1931,** Rameswaram, Tamil Nadu.
- **President:** Served as India's **11th President from 2002 to 2007.**
- **Awards:** **Padma Bhushan (1981), Padma Vibhushan (1990),** and **Bharat Ratna** (1997).
- **Literary Works:** *Wings of Fire*, *India 2020 - A Vision for the New Millennium*, *My Journey*, *Ignited Minds*.
- **Contributions:**
  - **ISRO:** Project Director for India's first indigenous **Satellite Launch Vehicle (SLV-III).**
    - Successfully launched the **Rohini satellite** into near-earth orbit (July 1980).
    - Played a key role in evolving ISRO's launch vehicle program, particularly in developing configurations for **PSLV (Polar Satellite Launch Vehicle)** configuration**.**
    - Pioneer at ISRO, leading the development of **fiberglass technology** (fibrous form of glass).
    - **Pokhran-II:** Led India's nuclear tests in collaboration with the **Department of Atomic Energy**, making India a nuclear weapon state.
    - **Pokhran-II:** Dr. Kalam led the **Pokhran-II nuclear tests in 1998,** which were conducted in collaboration with the **Department of Atomic Energy.**
    - **Vision 2020:** Proposed a national plan to transform India from a developing to a developed nation by 2020.
    - **Kalam-Raju Stent:** Co-developed an affordable stent for **coronary heart disease with cardiologist B. Soma Raju.**

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Drishti Mains Question:

Discuss the role of DRDO in India’s journey towards self-reliance in defense technologies, with specific reference to the Integrated Guided Missile Development Program.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. In the context of Indian defence, consider the following statements: (2009)

1. The Shourya missile flies with a speed of more than 8 Mach.
2. The range of Shourya missile is more than 1600 km.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Ans: (d)

Q. Which one of the following is the best description of ‘INS Astradharini’, that was in the news recently? (2016)

(a) Amphibious warfare ship

(b) Nuclear-powered submarine

(c) Torpedo launch and recovery vessel

(d) Nuclear-powered aircraft carrier

Ans: (c)

Mains:

Q. How is S-400 air defence system technically superior to any other system presently available in the world? **(2021)**