

NDA Monthly Compendium

September 2026

Compiled from in-window PIB press releases · 60 items



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How to use this digest

- Each entry is a **ready-to-revise note**: the **headline fact** an NDA examiner would pin, with the static context (full form, year, ministry/body, related facts) built around it.
- Bold** marks the load-bearing detail to memorise.
- Tap any **PIB** link at the foot of an entry to open the original press release and verify or go deeper.
- Entries are grouped by theme; every figure is drawn from in-window PIB press releases.

Polity/Bodies (2)

- Teachers' Day — Radhakrishnan and the two highest offices**
Body: President conferred the **National Awards on Teachers**, 5 Sep 2026; **Dr S. Radhakrishnan** (b. 1888, Tiruttani): first Vice-President 1952–62, second President 1962–67, Bharat Ratna 1954, Spalding Professor at Oxford, chaired the **University Education Commission 1948–49** → UGC. **World Teachers' Day = 5 October**
Detail: Presidents: **Prasad (two terms)** → Radhakrishnan → Zakir Husain (died in office) → Giri → Ahmed → Reddy (unopposed) → Zail Singh → Venkataraman → Sharma → Narayanan → Kalam → Patil (first woman) → Mukherjee → Kovind → Murmu (first tribal)
Detail: Six VPs became President: Radhakrishnan, Husain, Giri, Venkataraman, Sharma, Narayanan
Detail: President (Arts. 52–62): college of **elected MPs + elected MLAs** (Art. 54), **nominated excluded; impeachment Art. 61**
Detail: Vice-President (Arts. 63–71): **both Houses incl. nominated members, no MLAs; ex officio Chairman of Rajya Sabha** (Art. 64); removed by **Rajya Sabha resolution agreed by Lok Sabha** — no impeachment
PIB 2306919 · 2026-09-05
- Drug-Free India by 2029 — the NDPS framework**
Body: Home Minister's roadmap at **Panaji**, 6 Sep 2026: **July 2026–July 2029; four pillars — enforcement, precursor/synthetic control, demand and harm reduction, capacity building**
Detail: Seizures: **2004–14: 2.6 million kg / Rs 40,000 crore; 2014–26: 11.9 million kg / Rs 1.89 lakh crore. NMBA: 250 million pledged;** de-addiction centres to 1,751
Detail: **NDPS Act 1985** (amended 1989, 2001, 2014, 2021): **quantity-based punishment; S.31A death penalty discretionary since 2014; UN conventions 1961, 1971, 1988. PIT-NDPS 1988 = preventive detention**
Detail: Entry 19, Concurrent List; Art. 47. **Golden Crescent = Afghanistan-Pakistan-Iran; Golden Triangle = Myanmar-Laos-Thailand**
Detail: **NCB 1986 (MHA); NCORD 2016**, four-tier since 2019; **MANAS helpline 1933; NMBA 15 Aug 2020 (MoSJE); 26 June = International Day Against Drug Abuse; INCB, Vienna**

Defence (30)

- AVM Shakti Sharma — first woman non-medical two-star officer**
Body: Assumed **Assistant Chief of the Air Staff (Education)** on 1 Sep 2026; commissioned into the **IAF Education Branch 18 June 1994**; first woman to command a **Sainik School (Kapurthala)**
Detail: **Two-star: Major General = Rear Admiral = Air Vice Marshal. One-star: Brigadier = Commodore = Air Commodore** — Commodore is not two-star
Detail: **Three-star: Lt Gen = Vice Admiral = Air Marshal. Four-star: General = Admiral = Air Chief Marshal. Five-star: two Field Marshals (Cariappa, Manekshaw), one MIAF (Arjan Singh), no Admiral of the Fleet**
Detail: Women's timeline: **1992 SSC entry** → **2016 fighter pilots** → **2020 Permanent Commission (Babita Puniya)** → **2021 NDA opened, 2022 first cadets** → **2026 first non-medical two-star**
Detail: **Sainik Schools: Sainik Schools Society, MoD, since 1961; open to girls from 2021-22**
PIB 2305594 · 2026-09-01
- Raksha Mantri reviews 16 DPSUs — defence production Rs 1.8 lakh crore**
Body: **2025-26 defence production ≈ Rs 1.8 lakh crore; DPSUs Rs 1.29 lakh crore (~72%); balance ≈ Rs 51,000 crore** from private industry and other PSUs
Detail: **9 DPSUs before 2021:** HAL, BEL, BEML, BDL, GRSE, Goa Shipyard, Mazagon Dock, MIDHANI, Hindustan Shipyard. **OFB corporatised 1 Oct 2021** into 7 — MIL, AVNL, AWE India, Troop Comforts, Yantra India, India Optel, Gliders India. **9 + 7 = 16**
Detail: **DPSUs → Department of Defence Production; DRDO → Department of Defence R&D**
Detail: **DAP 2020** tops out at **Buy (Indian-IDDm); iDEX** funds start-ups; **SRIJAN** portal; **Defence Industrial Corridors in UP and Tamil Nadu**
Detail: R&D to be judged on **technologies, IP, prototypes, operational products, not spend; security logic = surge capacity, spares, sustained production**
PIB 2305615 · 2026-09-01
- INS Sudarshini at Barcelona — sail training and the naval commands**
Body: Sail training ship reached **Barcelona**, 1 Sep 2026 on expedition **Lokayan 26**; engagements with the **Spanish Navy**; open to visitors **4 Sep**
Detail: Sail training ships: **INS Tarangini (1997, first)** and **INS Sudarshini (2012)** — **three-masted barques**, built at **Goa Shipyard**, in the **First Training Squadron, Kochi**. **INSV Tarini/Mhadei** are circumnavigation vessels
Detail: Commands: **Western — Mumbai; Eastern — Visakhapatnam; Southern — Kochi (training); Andaman & Nicobar Command, Port Blair, 2001 = only tri-service theatre command**
Detail: Officer pipeline: **NDA Khadakwasla → Indian Naval Academy, Ezhimala (2009) → afloat training → fleet**
Detail: **SAGAR (2015); India as net security provider; widened to MAHASAGAR (2025)**
PIB 2305902 · 2026-09-02
- 16th Aero India — 8–12 February 2027, Yelahanka**
Body: **Air Force Station Yelahanka, Bengaluru**; organised by the **Department of Defence Production — not DRDO, not the IAF**; registration from 3 Sep 2026
Detail: **Biennial, odd years, since 1996**, always at Yelahanka. **DefExpo = land and naval, even years, rotating venue**
Detail: Bengaluru cluster: **HAL (manufacture), ADA (designs Tejas), CSIR-NAL (Saras, Hansa), DRDO labs — ADE, LRDE, GTRE (Kaveri)**
Detail: Display teams: **Suryakiran — Hawk Mk 132 (jets); Sarang — Dhruv ALH (helicopters); Akash Ganga — skydiving**
Detail: Exports on show: **BrahMos (India–Russia JV; Philippines 2022), Dhruv (Mauritius, Maldives, Nepal, Ecuador), the Tejas pitch**
PIB 2305993 · 2026-09-02

• **RAKSHA defence diplomacy document — four pillars, ten years**

Body: Released by **Rajnath Singh**, 3 Sep 2026; **10-year roadmap**; pillars — **Strategic Partnerships, Capacity Building, Indigenous Exports, Maritime Security**
Detail: Defence diplomacy = armed forces as a **peacetime foreign-policy instrument**; exercises, training, attachés, port calls, HADR, arms transfers
Detail: **Net Security Provider** — contributes more security than it consumes; **IFC-IOR, Gurugram, 2018. First Responder** = HADR: **Rahat 2015, Dost 2023, Sadbhav 2024, Brahma 2025**
Detail: Exercises: **Yudh Abhyas (USA, Army), Malabar (USA-Japan-Australia, Navy), Varuna (France, Navy), Garuda (France, Air), Indra (Russia), Ajeya Warrior (UK), Dharma Guardian (Japan), Surya Kiran (Nepal), Mitra Shakti (Sri Lanka), Ekuverin (Maldives)**
Detail: Same day: **India–Belgium Defence CEOs Roundtable** — co-development in **cyber, AI-enabled UAS, underwater vehicles, complex weapons**
 PIB 2306256 · 2026-09-03

• **Sarang at the El Alamein International Airshow, Egypt**

Body: IAF's **Sarang** helicopter team at the **2nd El Alamein Airshow**, 8–10 Sep 2026; new manoeuvre '**Spot Stall Turn**' with the '**Dolphin Leap**'
Detail: **World's only five-helicopter display team**; formed **2003**, first display **Singapore 2004**; based at **AFS Sulur**; name = **peacock**. Aircraft: **HAL Dhruv ALH** (first flight 1992, inducted 2002, **Shakti** engine; armed variant **Rudra**)
Detail: Rotor physics: **tail rotor cancels main-rotor torque**; translational lift; **autorotation** on engine failure
Detail: India–Egypt: **Nehru–Nasser, NAM; Strategic Partnership 2023; Order of the Nile** to the PM; exercises **Cyclone (SF), Desert Warrior (AF), Bright Star**; Egypt in **BRICS 2024; Suez Canal**
Detail: **Second Battle of El Alamein, Oct–Nov 1942** — **Montgomery's Eighth Army** beat **Rommel**; **4th Indian Division (Red Eagles)** fought there. WWII Indian Army **2.5 million** — largest volunteer army

• **DAC clears AoNs worth about Rs 1.10 lakh crore**

Body: **Defence Acquisition Council** under the **Raksha Mantri**, 7 September 2026 — **Acceptance of Necessity** worth about **Rs 1.10 lakh crore**, about **98% from Indian industry**.
Detail: Army — CBRN reconnaissance vehicles, high-mobility vehicles, mechanical mine layers, **ALH Dhruv** (with the IAF), trawl tanks, **Sarvatra bridges**. Navy — **Arudhra** radars for Naval Air Stations; marine **gas turbines**. Common — **Ground-Based Multi-Purpose Jammer**.
Detail: **AoN is only in-principle approval of need** — the first step under **DAP 2020** (in force **1 October 2020**). The contract follows RFP, trials, CNC and CFA sanction; **CCS approval above Rs 3,000 crore**.
Lineage: **DAC was created in 2001** on the recommendation of the post-Kargil Group of Ministers. The **Raksha Mantri chairs**; the **DG (Acquisition) is Member Secretary**.
Detail: Makers — **Sarvatra, R&DE(E) Pune** (5 x 15 m = 75 m, MLC 60); **Dhruv, HAL; Arudhra, LRDE Bengaluru; LM2500, HAL Bengaluru** under GE licence.
Exam hook: **AoN is not a contract** — the commonest wrong statement. **DAP 2020 governs capital** procurement; **DPM** governs revenue.

• **President's Colour to the Goa Police**

Body: **President's Colour** conferred on the **Goa Police** at Panaji, 7 September 2026, presented by the Union Home Minister.
Detail: It is the **highest honour for a unit**, awarded by the **President as Supreme Commander** under **Article 53(2)**; also called the **Nishaan**.
Lineage: Firsts — **Indian Navy, 27 May 1951** (from Dr Rajendra Prasad); **Uttar Pradesh Police, 23 November 1952**, the first State force; **Delhi Police 1954**.
Detail: Recent police recipients — **Gujarat 2019, Himachal 2021, Assam and Tamil Nadu 2022, Haryana 2023, Chhattisgarh 2024, Sikkim May 2026 (15th State), Goa September 2026**.
Detail: **Goa — liberated 19 December 1961 (Operation Vijay); Statehood 30 May 1987** as India's **25th State**; **Konkani** entered the Eighth Schedule by the **71st Amendment, 1992**.
Exam hook: **Article 53(2)** for the Supreme Commander; **Navy 1951** as the first-ever recipient and **UP Police 1952** as the first State force.

• **Veer Guardian 2026 — first Indian edition of the India-Japan air exercise**

Body: **Veer Guardian 2026, IAF-JASDF, Air Force Station Jodhpur**, 9-22 September 2026 — the first edition held in India.
Detail: IAF flew **Tejas, Su-30MKI and Rafale**; the JASDF brought the **F-2A**.
Lineage: **First edition at Hyakuri Air Base, Japan, 12-26 January 2023**.
Detail: The **F-2** is a **Mitsubishi-Lockheed Martin, F-16-derived** fighter, in service from **2000** — the **first operational fighter with an AESA radar**.
Detail: The India-Japan exercise family — **Malabar** (Quad navies), **JIMEX** (navies, 2012), **Dharma Guardian** (armies, 2018), **Shinyuu Maitri** (air transport), **Sahyog Kaijin** (coast guards), **Veer Guardian** (fighters, 2023).
Detail: Framework — **Special Strategic and Global Partnership, 2014; 2+2 dialogue since November 2019; ACSA signed 10 September 2020**, making Japan India's sixth logistics-pact partner. Japan's **Article 9** constitution; **Self-Defense Forces from 1954**.
Exam hook: **Veer Guardian** = **air forces**; **Dharma Guardian** = **armies**. The 'Guardian' pair is the designed confusion.

• **INS Mysore at Lumut — Samudra Laksamana and the Malacca choke point**

Body: **INS Mysore at Lumut, Malaysia**, from 9 September 2026 for the **4th edition of Exercise Samudra Laksamana** with the **Royal Malaysian Navy**; harbour phase plus sea phase. Follows the **12th India-Malaysia Sub-Committee Meeting, 1 July 2026**.
Detail: '**Laksamana**' means **admiral in Malay**; the exercise began in **2019**.
Detail: **INS Mysore (D60) — Delhi class (Project 15)**, India's **first indigenously designed destroyers**; **Mazagon Dock, Mumbai**; commissioned **2 June 1999**; about **6,700 tonnes**. Class: **Delhi, Mysore, Mumbai**; ancestors of the **Kolkata (15A)** and **Visakhapatnam (15B)** classes.
Detail: Naval commands — **Western (Mumbai), Eastern (Visakhapatnam), Southern (Kochi, training)**, and the **Andaman and Nicobar Command (Port Blair, 2001)**, India's **only tri-service command**.
Detail: The **Strait of Malacca** runs about **800 km** between the **Malay Peninsula and Sumatra**, under **3 km** navigable at its narrowest, carrying about a quarter of world traded goods. **Lumut is the Royal Malaysian Navy's main base**.
Exam hook: **Samudra Laksamana** = **Malaysia, Samudra Shakti** = **Indonesia**; **Harimau Shakti** is the **India-Malaysia army** exercise.

• **IAF Dronathon-2026 at Pokhran — and Vayu UTtaM, the indigenous UTM**

Body: **Air Marshal Ashutosh Dixit, Vice Chief of the Air Staff**, inaugurated the **first IAF Dronathon-2026** at the **Pokhran Field Firing Range, Jaisalmer**, on **14 September 2026**, running **14-16 September** with **over 20** defence companies, start-ups, MSMEs, DPSUs and innovators. Attended by **MoD, HQ IDS, Indian Army and BSF**. The **IAF UAS Roadmap** was released to give industry clarity on capability priorities.
Detail: Demonstrated — surveillance and reconnaissance, autonomous operations, **swarm technologies**, electronic warfare and **CUAS**, with a stated shift from **technology demonstration to operational effect**.
Detail: **Vayu UTtaM** — the IAF's **indigenous multi-mode Unmanned Traffic Management (UTM)** system. At Pokhran it **detected and tracked both military and civil UAS**, coordinating operations in congested airspace and identifying **rogue drones**. Civil applications: airspace safety, critical infrastructure, civil aviation, public safety.
Detail: The distinction to hold — **UTM = detect, identify, manage** (the picture); **CUAS = defeat** through jamming, spoofing, net capture or kinetic means (the response). **Cooperative** tracking relies on the aircraft reporting itself; **non-cooperative detection** finds something trying not to be found, using radar, **RF detection** of the control link, electro-optical/infra-red and acoustic sensors fused together — hence **multi-mode**.
Law: Classification by weight under the **Drone Rules, 2021 (DGCA)** — **Nano up to 250 g, Micro 250 g-2 kg, Small 2-25 kg, Medium 25-150 kg, Large above 150 kg**; the **Digital Sky** platform with **green, yellow and red** airspace zones.
Exam hook: By endurance, **MALE** and **HALE**. By role, **ISR, armed UAS** and **loitering munition** (single-use — the drone is the weapon). A **swarm** is autonomous coordination among multiple platforms under one operator. Venue note: **Pokhran** is also the site of **Exercise Vayu Shakti**.

• Yudh Abhyas 2026 — the 22nd edition, at Auli and Mahajan at once

Body: 22nd edition of Yudh Abhyas, opening ceremony 15 September 2026 at the Auli Foreign Training Node, Uttarakhand, conducted simultaneously at Mahajan Field Firing Range, Rajasthan, with 600 personnel from each side. Commanders: Maj Gen Amaresh Gunjan, GOC 14 Infantry Division, and Col Benjamin Jackman, Commander, 1st Infantry Brigade Combat Team, 11th Airborne Division, US Army.

Detail: The aim — joint capability for the employment of **Integrated Battle Groups in mountainous and semi-mountainous terrain**, with emphasis on **infantry-dominated operations**. Technology focus: **drones and autonomous systems** for surveillance and reconnaissance, contemporary weapon systems demonstrated at Mahajan, and expert exchanges on **multi-domain warfare**.

Detail: An **Integrated Battle Group** is a **self-contained, all-arms, brigade-sized** formation with armour, artillery, engineers, air defence, signals and logistics **integral** to it — designed for **rapid mobilisation and terrain-tailored** composition, infantry-heavy in mountains and armour-heavy in plains.

Detail: Two terrains in one exercise — **Auli**, Chamoli district, Garhwal Himalaya, **high-altitude**; **Mahajan**, Bikaner district, **desert and semi-desert**, one of the Army's largest field firing ranges. The formation ladder: **section -> platoon -> company -> battalion -> brigade -> division -> corps -> command**; a **Brigade Combat Team** is the US modular equivalent of a brigade group.

Lineage: The series began 2004 and **alternates between India and the US**; the 2025 edition was in Alaska. It is the **oldest and largest** India-US military exercise.

Exam hook: The India-US exercise map — **Yudh Abhyas** armies, **Vajra Prahar** special forces, **Cope India** air forces, **Tiger Triumph** tri-service amphibious/HADR, **Malabar** navies and **multilateral** (India, US, Japan, Australia). Foundational agreements: **GSOMIA (2002)**, **LEMOA (2016)**, **COMCASA (2018)**, **BECA (2020)**; India a **Major Defence Partner** since 2016. **Multi-domain operations** span **land, sea, air, space and cyberspace**, with the **electromagnetic spectrum and information environment** contested alongside.

• NCC 'Aparajita - Parang La 2026' — 250 km over a 5,578 m pass

Body: 'Aparajita - Parang La 2026', the NCC's All India Girls High Altitude Long Trek — 20 NCC girl cadets, flagged off by the **Raksha Mantri** in New Delhi on 18 August 2026 and flagged in at **Karzok, Ladakh**, on 16 September 2026 by DG NCC Lt Gen Virendra Vats and Addl Secretary MoD Smt Dipti Mohil Chawla.

Detail: The route — **Kibber (Himachal Pradesh) to Karzok (Ladakh)**, crossing the **Parang La** at about 5,578 m; about 250 km in 30 days through glaciers, snowfields and river valleys. An **old trade route** between **Spiti** and **Changthang**, following the **Pare Chu**, a river that flows from India into Tibet and back.

Detail: The geography — north of the pass lie the **Rupshu plains of the Changthang**, the western extension of the **Tibetan Plateau**, a **cold desert**. Pastoralists are the **Changpa**, whose **Changthangi** goats yield **pashmina**. Wildlife includes the **kiang** (Tibetan wild ass) and the **black-necked crane**. **Karzok** stands on **Tso Moriri**, a **Ramsar site** in the **Changthang Cold Desert Wildlife Sanctuary**; related lakes are **Pangong Tso** and **Tso Kar**, all **brackish** because they are **endorheic** — no outlet to the sea.

Detail: Altitude physiology — the **percentage** of oxygen stays about 21%; it is the **partial pressure** that falls with total atmospheric pressure, which at about 5,500 m is roughly **half** that at sea level. **Acclimatisation** means faster and deeper breathing, a raised heart rate, then **erythropoietin** stimulating more **red blood cells** over weeks — hence a slow, staged ascent. Dangers: **AMS**, **HAPE** (pulmonary oedema) and **HACE** (cerebral oedema); the definitive treatment for the severe forms is to **descend**. Rule of thumb: **climb high, sleep low**.

Law: The NCC was raised under the **NCC Act, 1948** and sits under the **Ministry of Defence** — not Education. Headed by a **Director General**; motto '**Unity and Discipline**'; **Army, Navy and Air Wings**; **Senior and Junior Divisions**; certificates **A, B and C**, with the '**C**' certificate carrying entry benefits.

Exam hook: The wider shift — women were admitted to the **NDA from 2022** after Supreme Court orders, and the **first 17 NDA-trained women officers were commissioned in 2026**.

• Chief of the Army Staff in Russia — Moscow and Saint Petersburg

Body: General Dhiraj Seth, Chief of the Army Staff, visited Russia 16-18 September 2026. Programme: ceremonial **Guard of Honour**; tribute at the **Tomb of the Unknown Soldier**, Moscow; talks with Col Gen Andrei Nikolayevich Mordvichev, Commander-in-Chief of the Russian Land Forces; a visit to the National Defence Control Centre, Moscow; interaction with Vasily Sergeyevich Osmakov, Deputy Minister of Defence on defence industry and procurement; and a visit to the **Mikhailovskaya Military Artillery Academy, Saint Petersburg**.

Detail: The three strands are **training and professional cooperation** (army chief to army chief), **defence industry and procurement** (deputy minister) and **military education** (artillery academy).

Lineage: **Strategic Partnership 2000**, elevated to a **Special and Privileged Strategic Partnership in 2010** — a term India uses for **Russia alone**. **Annual summits** and a **2+2 dialogue**.

Detail: Russian-origin inventory — **T-72 and T-90** tanks, **BMP** ICVs, **Su-30MKI**, **MiG-29**, **Kilo-class** submarines, **S-400** air defence. **BrahMos** is an **India-Russia joint venture**, named for the **Brahmaputra** and **Moskva**, and was India's first major missile **export**, to the **Philippines in 2022**. What is distinctive is **licensed production in India** (Su-30MKI at HAL, T-90 at HVF Avadi) and **co-development** rather than only off-the-shelf purchase.

Detail: Diversification — major acquisitions now also from **France** (Rafale, Scorpene), the **United States** (C-17, C-130J, P-8I, Apache, Chinook, MQ-9B) and **Israel**, plus rising domestic production. Russia remains the largest single source but its share has fallen.

Exam hook: **Military diplomacy** is the peacetime use of armed forces for foreign policy — exercises, visits, training, port calls, attaches — and its output is **interoperability and trust**, not a treaty. Exercise pairing: **INDRA = Russia** (naval from 2003, later tri-service and army); **Indra Dhanush = United Kingdom, air force**. Shared multilateral platforms: **SCO, BRICS, RIC**.

• HAL hands over Tejas FOC trainers, HTT-40s and Dhruv NG

Body: HAL handover at Bengaluru, 18 September 2026 — two **LCA Tejas FOC** twin-seat trainers and **HTT-40** basic trainers to the IAF, and four **Dhruv NG** helicopters to Pawan Hans Limited. Present: **Raksha Mantri Shri Rajnath Singh**, Civil Aviation Minister **Shri K Ram Mohan Naidu**, CAS Air Chief Marshal **AP Singh**, Secretary (Defence Production) **Shri Sanjeev Kumar**, Secretary MoCA **Shri Samir Kumar Sinha** and CMD HAL **Shri Ravi K**.

Detail: The two trainers complete the **2010 FOC-standard order of 20 aircraft** — **16 single-seaters** (delivered 2022-23) and **four twin-seaters**.

Detail: **IOC vs FOC** — **IOC** means safe to fly and fight in a **restricted envelope**; **Tejas IOC 2013, No. 45 Squadron 'Flying Daggers' July 2016**. **FOC** means **full envelope and full weapons fit** (air-to-air refuelling, gun, BVR missiles); declared **20 February 2019, No. 18 Squadron 'Flying Bullets' 2020**. Both at **Sulur**. **ADA** (under **DRDO**) designs; **HAL** manufactures. The **Kaveri** engine did not mature, so **Tejas** flies on the **GE F404**, with the **F414** for the **Mk2**; current production focus is the **Tejas Mk1A** with **AESA** radar and an improved **EW** suite.

Detail: **HTT-40** — HAL-designed **basic trainer** replacing the **HPT-32 Deepak**, grounded in 2009. **70** ordered **March 2023** for about **US\$388 million**; **Honeywell TPE331-12B** turboprop of about **950 shp** with **FADEC**; the **first 16 engines** from the USA, the rest to be built by HAL under **technology transfer**. Stated plainly: **12 aircraft were due in FY 2025-26 and none were delivered**, owing to Honeywell engine supply bottlenecks, with first engines reaching HAL **mid-2026**.

Detail: **Dhruv NG** — the **civil-certified** development of the **ALH Dhruv**: **14 seats**, **Shakti** engines, civil-certified glass cockpit, **MTOW** about **5,500 kg**, top speed about **285 km/h**, range about **630 km**, endurance over **3.5 hours**. The **DGCA** certified **indigenous manufacture of the Shakti civil engine** — the **first aero engine so certified** for indigenous production. **Pawan Hans** flies offshore support, regional connectivity, pilgrimage routes and air ambulance.

Exam hook: The IAF training pipeline — **Stage I Basic**: **PC-7 Mk II**, with **HTT-40** entering; **Stage II Intermediate**: **HJT-16 Kiran**, with **HJT-36 Yashas** as replacement; **Stage III Advanced**: **Hawk Mk 132**; then **type conversion**, which is what the **Tejas** twin-seater is for. The honest summary: **airframes indigenous and reliable, propulsion still dependent**.

• CORE Programme 2026 — five days of tri-service argument at Manekshaw Centre

Body: Combined Operational Review and Evaluation (CORE) Programme 2026, 14-18 September 2026, Manekshaw Centre, New Delhi — organised by HQ IDS, conducted by CENJOWS, with participants from the **three Services, MoD, MEA and MHA**, plus experts, academia and think tanks. The CDS, **Chief of the Naval Staff** and CISC interacted with participants, as did the **Vice Chief of the Air Staff** and **Vice Chief of the Army Staff**.

Lineage: HQ IDS was raised **23 November 2001** as the apex tri-service organisation for higher defence management, following the **Kargil Review Committee** and the **Group of Ministers** report. CENJOWS — Centre for Joint Warfare Studies — was raised **2007** under HQ IDS, registered under the **Societies Registration Act, 1860**.

Detail: CISC is the **Chief of Integrated Defence Staff to the Chairman, Chiefs of Staff Committee** — a **three-star** officer from any service, executive head of IDS, with oversight of inter-service **intelligence, doctrine, joint planning, budgetary allocation and training**, subordinate only to the CDS on jointness. The CDS is **four-star**, created **2019**, also **Secretary, Department of Military Affairs**, principal military adviser on **tri-service** matters and permanent Chairman of the **Chiefs of Staff Committee**; service chiefs advise on their own service. Note the **eighteen-year gap** — HQ IDS in **2001**, CDS only in **2019**.

Detail: Three terms that are not synonyms — **jointness** (services plan and operate together, structures stay separate), **integration** (shared logistics, procurement, communications, intelligence, with service HQ integrated into the MoD via the **Department of Military Affairs**) and **theaterisation** (**theatre commands** under a single commander for all assets in an area). Progression: **cooperate** -> **share** -> **unify**. Existing joint commands: **Andaman and Nicobar Command**, the only **geographical** tri-service command, and **Strategic Forces Command**, which is **functional**.

Detail: Kinetic means destroying physically; **non-kinetic** achieves effect without destruction — electronic warfare, cyber, information operations, economic pressure. **Cognitive warfare** targets **what an adversary population and leadership believe and decide**, and success does not require belief in a falsehood — only the collapse of belief that anything can be verified. It is countered by **strategic communication** and **counter-disinformation**, whose real currency is **credibility built in peacetime**.

Exam hook: DIME — **Diplomatic, Informational, Economic, Military** — is the set of domains the programme concluded must be coordinated under a **whole-of-nation** approach. Technology on the agenda: **artificial intelligence, robotics and quantum computing**.

• Steel cutting for the second Next Generation Missile Vessel at Kochi

Body: Steel cutting of the second Next Generation Missile Vessel (NGMV) at Cochin Shipyard Limited, Kochi, on 17 September 2026. Chief Guest **RAAdm Kapil Mehta**, Assistant Controller of Warship Production and Acquisition.

Detail: The project — **six NGMVs**, contracted with CSL in **March 2023**, order value about **Rs 9,804 crore**; displacement about **1,437 tonnes**; **high speed**; **waterjet** propulsion. The first ship's steel was cut in **December 2024**, with first delivery expected **March 2027**. Armament and sensors: a **surface-to-surface missile system**, an **anti-missile defence system**, and **air surveillance and fire control radars**. The DAC accorded **AoN** in **January 2023** for **BrahMos launchers and fire control systems** for NGMVs and **Shivalik-class** frigates.

Detail: The four stages, in order — **steel cutting** -> **keel laying** -> **launch** (named, enters water) -> **commissioning** (prefix **INS**, pennant number, enters service).

Detail: Role — offensive capability against **enemy warships, merchantmen and land targets**; **maritime strike** and **anti-surface warfare**; an instrument of **sea denial**, especially at **choke points**. **Sea control** means you can use the sea and the enemy cannot — expensive, needing carriers, destroyers, submarines and logistics. **Sea denial** means the enemy cannot use it even if you cannot either — cheaper, achieved with small fast missile craft, submarines, mines and shore-based missiles.

Detail: Why small works — cheap enough for numbers, hard to detect in coastal clutter, fast enough to strike and withdraw, and **the missile does not care how big the launch platform is**. Cost asymmetry between shooter and target is the whole idea.

Exam hook: Indian Ocean choke points — **Strait of Hormuz, Strait of Malacca, Bab-el-Mandeb, Sunda and Lombok Straits**, the **Nine Degree Channel** (Lakshadweep) and the **Ten Degree Channel** (Andaman and Nicobar). The five yards: **Mazagon Dock** (Mumbai, destroyers and submarines), **GRSE** (Kolkata, frigates and smaller combatants), **Goa Shipyard**, **Hindustan Shipyard** (Visakhapatnam) and **Cochin Shipyard**, builder of **INS Vikrant**.

• INS Trishul at Alexandria — and nineteen names at Chatby

Body: INS Trishul port call at Alexandria, Egypt, 14-17 September 2026, escorted into harbour by ENS Al Qadeer; Ambassador **Shri Suresh K Reddy** visited the ship; a **PASSEX** was conducted with ENS Bernees on departure. The **Chatby War Memorial** holds **12 burials** and bears the names of **19 Indian soldiers** who died in ships sunk in the **Eastern Mediterranean** in the two World Wars.

Detail: INS Trishul is a **Talwar-class guided missile frigate** — a **modified Krivak III** design **built in Russia at Baltiysky Zavod**, **commissioned 25 June 2003 at St Petersburg**. About **3,620 tonnes** standard and **4,035 tonnes** full load; **124.8 m** long; about **30 knots**. The Talwar class is closely associated with **BrahMos** in Indian service.

Detail: Ship hierarchy by size — **patrol vessel** -> **corvette** -> **frigate** -> **destroyer** -> **cruiser** -> **aircraft carrier**. A **frigate** is a general-purpose escort and patrol combatant; a **destroyer** is larger, with heavier air-defence and land-attack armament.

Detail: A **PASSEX** is a **Passage Exercise** — an **unscheduled, short** exercise between ships of two navies that happen to be in proximity, **not** a named annual bilateral exercise. With ENS Bernees it covered **coordinated manoeuvring, communication exercises and approaches for replenishment at sea**. Manoeuvring tests holding station with an unfamiliar ship; communications tests shared frequencies, procedures and vocabulary across two languages; replenishment approaches are the most demanding, two ships parallel and close for extended periods.

Detail: Why the Mediterranean matters to India — the **Bab-el-Mandeb - Red Sea - Suez Canal - Mediterranean** chain carries a large share of India-Europe trade, and the canal opens to the Mediterranean at **Port Said**.

Exam hook: India and Egypt were both founding movers of the **Non-Aligned Movement**. Historical hook: Indian troops fought in **Egypt, Palestine and Mesopotamia** in the First World War and across **North Africa**, including **El Alamein**, in the Second. **Interoperability must exist before a contingency, not be created during one**.

• SLINEX-26 — the 13th India-Sri Lanka maritime exercise

Body: SLINEX-26, the 13th edition of the Sri Lanka-India bilateral maritime exercise, at Visakhapatnam, 17 to 21 September 2026.

Conceptualised in 2005. Harbour Phase under Eastern Naval Command. Participants — **Indian Navy:** INS Kavaratti (indigenous ASW corvette) and INS Jyoti (fleet tanker); **Sri Lanka Navy:** SLNS Sindurala.

Detail: Two phases — the **Harbour Phase** covers the opening ceremony and reception, **professional interactions, cross-deck visits**, sharing of best practices, yoga, sports and cultural activities. It settles frequencies, callsigns, signals and procedures **before** the ships are at sea. The **Sea Phase** builds operational synergy and **interoperability** through coordinated activity at sea.

Detail: INS Kavaratti — the **fourth and final Kamorta-class ASW corvette, Project 28**, built by GRSE, Kolkata, commissioned 22 October 2020 at Visakhapatnam. About 109 m long, 14 m beam, 3,300 tonnes, up to 90 per cent indigenous content, with a **carbon-composite superstructure** for lower top weight, reduced maintenance and better stealth.

Detail: INS Jyoti is a **fleet tanker**. Replenishment at sea removes the fuel, water, food and ammunition constraint on endurance — without it a task group's radius is roughly **half** what it can travel on one tank. **Sea legs are a logistics achievement**, and cross-navy replenishment is among the most demanding things two fleets can practise.

Detail: Geography — Sri Lanka sits astride the lanes between the **Arabian Sea** and the **Bay of Bengal**, separated from India by the **Gulf of Mannar** and the **Palk Strait**, so activity around Sri Lanka is activity in India's immediate approaches. Thirteen editions matter because continuity produces officers who have worked together at successive ranks, refined procedures, and a relationship that survives changes of government.

Exam hook: Three categories of exercise — **named bilateral:** SLINEX (Sri Lanka), **Varuna** (France), **Konkan** (UK), **SIMBEX** (Singapore), **Indra** (Russia), **AUSINDEX** (Australia); **named multilateral:** **Malabar** (US, Japan, Australia), **MILAN** (multinational, hosted by India), **AIKEYME** (African navies); and **PASSEX**, short-notice and unnumbered.

• Suryakiran over Meerut — nine Hawks, five metres apart

Body: The Suryakiran Aerobatic Team (SKAT) displayed over Meerut for the first time on 19 and 20 September 2026 under the Seva Sankalp Abhiyan, following the team's 2026 training season. **More than 1 lakh** spectators including students, **NCC cadets** and **NSS volunteers**; **Raksha Rajya Mantri Shri Sanjay Seth** attended on 20 September. **Three team members**, including two display pilots, are from Meerut.

Detail: The team was established 1996. It is the **only nine-aircraft aerobatic team in Asia** and among few worldwide — most national teams fly six or seven. Over **800 displays** in about **30 years**, with international appearances in **China, Sri Lanka, Myanmar, Thailand, Singapore, the UAE and Dubai**. Known as the '**Ambassadors of the Indian Air Force**'.

Detail: The aircraft are **nine red-and-white Hawk Mk 132, licence-manufactured by HAL** — the same type used for **Stage III Advanced** training, which is deliberate: using the trainer rather than a front-line fighter saves combat airframe hours. The **indigenous smoke pods** producing **saffron, white and green** trails were developed at the IAF's **Base Repair Depot, Nashik** — a maintenance establishment, not a design bureau. Aircraft fly **less than five metres** apart.

Detail: Manoeuvres include the **loop, barrel roll, inverted flying** and the signature **DNA manoeuvre**. The physics — a **loop** is a vertical circle, with **centripetal acceleration** towards the centre felt as **positive g**, and it must be entered fast enough or the aircraft stalls at the top. **Inverted flight** works because lift depends on **angle of attack** relative to airflow, not on attitude; it produces **negative g**, which is less tolerable than positive, hence short passes.

Detail: **g-tolerance** — high positive g pulls blood to the lower body, causing greying, tunnel vision and eventually **G-LOC**, managed by anti-g straining and conditioning. In **formation flying**, pilots fly **visual references** against the leader's aircraft, not the horizon: only the **leader** flies the manoeuvre and everyone else flies the leader. **Wingtip vortices and wake turbulence** constrain which formation geometries are flyable.

Exam hook: Display teams exist for **recruitment, public connection** and **professional flying standards**, against a real cost in **airframe hours, fuel and instructor time**. The IAF pipeline in order: **PC-7 Mk II basic, HJT-16 Kiran (HJT-36 Yashas** replacing) intermediate, **Hawk Mk 132** advanced.

• Exercise NOMADIC ELEPHANT 2026 — India and Mongolia

Body: **Exercise:** NOMADIC ELEPHANT, 18th edition — India and Mongolia, bilateral

Dates: 21 September to 3 October 2026

Venue: Foreign Training Node, Pithoragarh, Uttarakhand

Participation: 45 personnel from each side; platoon level

Previous edition: Ulaanbaatar, Mongolia, May–June 2025; the exercise alternates between the two countries

First held: 2004, at the Peace Support Training Centre, Terelj, Mongolia; second edition 2005 at Vairengte, Mizoram

Aim: counter-insurgency operations in semi-urban and mountainous terrain under the United Nations mandate

Curriculum: cordon and search, room intervention drills, special heliborne operations, cyber security, drones and counter-drone systems

Cordon and search: outer cordon seals, inner cordon contains, search party clears

Do not confuse: KHAAN QUEST is multinational, hosted by Mongolia, focused on UN peacekeeping

Army structure: section 10–12 → platoon about 30 → company about 120 → battalion 900–1,000

India–Mongolia: diplomatic relations 1955; India supported UN membership 1961; Strategic Partnership declared during PM's visit of 16–18 May 2015

Exam hook: Economic: USD 1 billion line of credit for infrastructure (2015); about USD 1.7 billion line of credit for the oil refinery project

• Auxiliary Power Units for T-72 and T-90 Tanks

Body: **Contract:** Rs 586 crore, signed 21 September 2026, New Delhi, in the presence of Defence Secretary Rajesh Kumar Singh

Vendor: Accurate Industrial Controls Private Limited — a private company, not a DPSU

Item: Auxiliary Power Units for T-72 and T-90 tanks

Function: alternate source of electrical power for the fire control system, firing circuit, gun stabilisation system and other ancillaries

Silent watch: main engine off, sensors and systems running on APU power

Four gains from an APU: fuel economy, reduced main-engine wear from idling, lower acoustic and thermal signature, reduced crew fatigue

Gun stabilisation: gyroscopes sense hull motion; servos counter-move the gun in elevation and the turret in azimuth; enables accurate fire on the move; requires continuous power

Procurement route: Make-II — **industry funded**, no government funding for prototype development, aimed at import substitution and innovative solutions

Make-I contrast: government funded, up to 70 per cent of prototype development cost (reduced from 90 per cent), ceiling Rs 250 crore per Development Agency

Fleet: T-72 in service since the 1980s; T-90S licence-produced at Heavy Vehicles Factory, Avadi

Exam hook: Framing: indigenisation of critical sub-systems of armoured platforms; Aatmanirbharta in defence

• **SAT-SAAW Contract with Bharat Dynamics Limited**

Body: **The contract:** Rs 810.79 crore, signed 23 September 2026 at New Delhi, in the presence of Defence Secretary Rajesh Kumar Singh
Vendor: Bharat Dynamics Limited (BDL), a DPSU specialising in missiles and guided weapons
Designer: DRDO
Item: 160 Satellite Smart Anti Airfield Weapons (SAT-SAAW) with associated equipment, for the Indian Air Force
Category: Buy (Indian – Indigenously Designed, Developed and Manufactured)
Indigenous content: 60 per cent
Sub-systems indigenised: inertial measurement unit, long impact delay fuse, twin store carrier
Launch platforms: Jaguar, Hawk, Su-30 MKI
Delivery: 2027-28 to 2028-29
Glide bomb: wings but **no engine**; trades altitude for forward distance; range depends on release altitude and speed
"Satellite" in the name: satellite navigation guidance to a pre-loaded coordinate
Stand-off range: release from outside the defended envelope around the target
Inertial measurement unit: accelerometers and gyroscopes; needs no external signal, so it continues guidance if satellite navigation is jammed or spoofed
Long impact delay fuse: penetrates before detonating, damaging the runway sub-base rather than only the surface
Twin store carrier: allows one hardpoint to carry two weapons, doubling aimpoints per sortie
DAP priority order: Buy (Indian-IDDM) → Buy (Indian) → Buy and Make (Indian) → Buy (Global – Manufacture in India) → Buy (Global)
Buy (Indian-IDDM) minimum indigenous content: 50 per cent, with Indian design required
Exam hook: **Make versus Buy:** Make categories concern who funds development (Make-I government-funded, Make-II industry-funded); Buy categories concern the source of the finished product

• **Exercise VARUNA 2026 — 24th Edition at Toulon**

Body: **The event:** INS Trishul arrived at **Toulon, France**, on 22 September 2026 for the 24th edition of Exercise VARUNA
Participants: Indian Navy and French Navy — bilateral
Origin: India-France bilateral maritime exercises since May 1993; series named VARUNA in 2001
The name: Varuna, the Vedic god of the waters
23rd edition: Arabian Sea, March 2025 — the venue alternates between the two countries
Structure: harbour phase (professional engagements, cross-deck visits) and sea phase
France in the Indian Ocean: holds Réunion and Mayotte as part of France, with resident citizens and an exclusive economic zone; maintains a standing military presence; member of the **Indian Ocean Commission**
Strategic Partnership: established 1998, immediately after India's nuclear tests
Reciprocal logistics support agreement: signed 2018 — mutual access to each other's bases for refuelling, replenishment and repair
Shared platforms: Rafale and Rafale-M aircraft; Scorpène-class submarines under **Project 75** at Mazagon Dock
India-France exercises by service: Varuna navies, Garuda air forces, Shakti armies
Do not confuse: INDRA (Russia), SLINEX (Sri Lanka), SIMBEX (Singapore), Konkan (United Kingdom), AUSINDEX (Australia), Malabar (multilateral — India, US, Japan, Australia), MILAN (multinational, hosted by India)
Exam hook: **INS Trishul:** Talwar-class guided missile frigate, commissioned 2003

• **First Ascent Expedition — 20 Unclimbed Peaks in Ladakh**

Body: **The event:** 25 September 2026 — Raksha Mantri **Rajnath Singh** flagged in the **First Ascent Expedition** at Kartavya Bhavan-2, New Delhi
The achievement: 20 previously unclimbed peaks above 6,000 metres, summited in 23 days
Where: the **Chamser-Lungser, Gyama Nala and Chokula** areas of the **Ladakh Range** — first recorded summits
The team: 20 climbers from NIMAS, **Dirang**, led by **Col Ranveer Singh Jamwal**
First ascent: the first documented successful climb of a peak by any route — distinct from a new route, a first winter ascent or a first solo
Why unclimbed 6,000ers remain: sheer number of such peaks; remote approaches; access and permission in frontier areas; and no reputational return for commercial expeditions
Altitude: above about 5,500 m atmospheric pressure is roughly half sea level; the **proportion** of oxygen stays about **21 per cent**, but **partial pressure** falls
Acclimatisation: faster and deeper breathing and raised heart rate within hours; **erythropoietin**-driven red blood cell increase over days and weeks
Altitude illnesses: AMS, HAPE (pulmonary oedema), HACE (cerebral oedema); definitive treatment for severe forms is **descent**; rule of thumb **climb high, sleep low**
NIMAS: Dirang, **Arunachal Pradesh**, under the **Ministry of Defence**; covers land, air and water adventure sports
HMI: Darjeeling, West Bengal, established 1954; **Tenzing Norgay** its first Director of Field Training
NIM: Uttarkashi, Uttarakhand
JIM: Pahalgam, Jammu and Kashmir
High Altitude Warfare School: Gulmarg
Exam hook: **Why the forces do it:** terrain competence, selection and development under consequence, knowledge of the ground, and inspiration

• **Tarang Shakti 2026 — Multinational Air Exercise at Jodhpur**
Body: **Exercise:** Tarang Shakti 2026, theme "**Power in Partnership**"
Dates and venue: 26 September to 12 October 2026, **Air Force Station Jodhpur**; operational phase commenced 27 September
Participating Friendly Foreign Countries (7): Australia, USA, UAE, France, Germany, Sri Lanka, Bangladesh; others as **observers**
Foreign aircraft: F-35 Lightning II, Rafale, F-16, A400M, MRTT, C-130, C-130J, KC-30A
Inaugural edition: **Tarang Shakti 2024** — India's first and largest multinational air exercise; two phases, **Sulur (Tamil Nadu)** and **Jodhpur (Rajasthan)**; about 150 aircraft; 51 countries invited, 10 with assets, 18 observers
Cadence: biennial
Fifth-generation fighter features: low observability (stealth), sensor fusion, networked data sharing — the F-35 is fifth-generation; the IAF operates fourth and 4.5-generation types (Su-30 MKI, Rafale, Mirage 2000, MiG-29, Tejas)
Air-to-air refuelling aircraft here: MRTT (Multi-Role Tanker Transport) and KC-30A; tankers convert combat radius, and cross-national refuelling cannot be improvised
Airlifters: A400M, C-130J
What the exercise trains: advanced joint training, interoperability, mission planning across nations, **operating philosophies**, and **aerospace safety** in mixed airspace
Hosting vs participating: hosting demands ramp space, fuel, ordnance handling, ranges, airspace, radar and ATC for a mixed package, maintenance, and diplomatic and customs clearance — an infrastructure and staff-work demonstration
Guest-list logic: Australia, USA, France as strategic partners; Germany reflecting European Indo-Pacific interest; **Sri Lanka and Bangladesh** as neighbourhood capacity-building
Side activities: seminar, **industrial tour** (defence-export purpose), heritage tours, yoga, **Sekhon Marathon**
Exam hook: Flying Officer **Nirmal Jit Singh Sekhon:** the only IAF officer awarded the **Param Vir Chakra**, posthumously, for action over Srinagar on 14 December 1971 flying a **Gnat**

• ADMM-Plus Maritime Security Activity at Subic Bay

Body: The activity: 23rd ADMM-Plus Experts' Working Group on Maritime Security Joint Cooperation Activity (EWG-MS JCA), Subic Bay, Philippines

Dates: commenced 21 September 2026 at Naval Operating Base Subic; closing ceremony 25 September 2026

Hosted by: the Philippine Navy; co-chaired by Japan

Indian ships: INS Sahyadri (Shivalik-class stealth frigate, Mazagon Dock) and INS Kulish (Kora-class missile corvette, GRSE Kolkata)

ADMM: ASEAN Defence Ministers' Meeting — the ASEAN member states' defence ministers

ADMM-Plus: ASEAN plus eight Dialogue Partners — Australia, China, India, Japan, New Zealand, Republic of Korea, Russia, United States; inaugurated 12 October 2010

Seven Experts' Working Groups: Maritime Security, Counter-Terrorism, Humanitarian Assistance and Disaster Relief, Peacekeeping Operations, Military Medicine, Humanitarian Mine Action, Cyber Security

EWG co-chairing: one ASEAN member and one Plus country, on a three-year cycle

Sea phase serials: search and rescue, hydrographic survey, casualty and medical evacuation, deck landing qualification, assistance to vessels aground — all non-warfighting

Why no combat serials: the forum includes both China and the United States, and states with live maritime disputes; no warfighting scenario is acceptable to all participants

Harbour phase: Subject Matter Expert Exchanges on Peace and Security; ASEAN Navy Chiefs' Meeting and Guidelines for Maritime Interaction (ANCM-GMI); Senior Enlisted Leadership; Marine Environmental Protection

Tabletop Exercise: a discussion-based rehearsal around a map or plan, where disagreements surface before ships are committed

Pre-Sail Conference: fixes frequencies, callsigns, formations and emergency actions before the sea phase

Indian framing: Act East Policy and MAHASAGAR — Mutual and Holistic Advancement for Security and Growth Across Regions

Exam hook: Bilateral vs multilateral: bilateral exercises can go as high-end as the two navies choose; inclusive multilateral activity is limited to what all participants accept, and delivers presence and normalisation

• Naval Commanders' Conference 2026/02 and Operation Urja Suraksha

Body: Commanders' Conference 2026/02: Nausena Bhawan, New Delhi, 29 September to 1 October 2026. The Navy's apex-level forum, held twice a year.

Attended by the CNS, the Commanders-in-Chief and outstation Operational and Area Commanders. The Raksha Mantri opens it; the CDS and COAS engage on tri-service synergy.

Review is at the military-strategic level — above the operational level, below grand strategy.

Operation Urja Suraksha: launched 25 March 2026, escorting Indian-flagged crude, LNG and LPG carriers through the Strait of Hormuz.

Over 5 frontline warships deployed, including INS Surat (D69), across the Gulf of Oman and Persian Gulf. Provides escort plus route-specific navigational guidance.

At the peak, 36-38 vessels and about 1,100 Indian sailors were affected; some 20-22 Indian-flagged ships remained in the western Strait in late March.

The Strait of Hormuz carries roughly one-fifth of the world's traded oil and about 60% of India's oil and gas imports.

Lineage: Gulf of Aden anti-piracy escort since 2008 → Operation Sankalp, June 2019 (after Gulf of Oman tanker attacks) → Operation Urja Suraksha, 2026.

Sustainment rule of thumb: roughly 3 hulls in the cycle for 1 continuously on station.

Exam hook: JAI pillars: Jointness, Aatmanirbharta, Innovation. Technology focus: AI, Big Data Analysis, autonomous/uncrewed systems, cyber operations.

• Second India-Fiji Bilateral Joint Working Group on defence

Body: 2nd India-Fiji Bilateral Joint Working Group on defence: New Delhi, 28 September 2026.

Co-chairs: Shri Amitabh Prasad, Joint Secretary (International Cooperation), Ministry of Defence, and Mr Mason Smith, Permanent Secretary for Defence and Veterans Affairs, Fiji. Defence Secretary: Shri Rajesh Kumar Singh.

Agenda: military training and capacity building, service-to-service engagements, maritime security, cyber training, defence industry collaboration.

Fijian delegation visited Southern Naval Command, Kochi, on 29-30 September 2026 — the Navy's training command — for advanced naval and professional aviation training modules. Also visited DPSU Bhavan and the National War Memorial.

Girmit = local pronunciation of "agreement"; indentured migrants were **girmitiya**. First ship Leonidas, 464 migrants, May 1879. About 60,553 Indians migrated 1879-1916; indenture abolished 1920. Indo-Fijians are about 37% of Fiji's population.

RFMF — Republic of Fiji Military Forces. UN peacekeeping since UNIFIL, Lebanon, 1978. Over 330 personnel across 7 UN operations; UNAMI commitment concluded December 2025; continues with the MFO in the Sinai.

FIPIIC launched November 2014. Summits: Suva 2014, Jaipur 2015, Port Moresby 22 May 2023. 14 Pacific Island Countries.

The 14 PICs: Cook Islands, Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.

Exam hook: India's formula: a free, open, inclusive and secure Indo-Pacific — "inclusive" is the distinctively Indian addition.

• Operation Drishti — AFMS mega eye surgical camps in Kashmir

Body: 11th Mega Eye Surgical Camp under Operation Drishti concluded at 92 Base Hospital, Srinagar, on 30 September 2026, closing the Kashmir leg.

364 eye surgeries across both camps — cataract, glaucoma, pterygium and retinal procedures. Surgical team from Army Hospital (Research & Referral), led by Brigadier Sanjay Kumar Mishra.

Screening: teams from 92 Base Hospital and 328 Field Hospital ran 18 screening camps at Tangdhar, Dawar, Machil, Uri, Baramulla, Bandipora, Khanabal and Kangan; nearly 6,000 screened, about 500 identified as needing surgery.

Phase 1 — Tangdhar, 24-25 September 2026, in the sector along the Line of Control: the first-ever mega eye surgical camp at the LoC, in an underground operation theatre. 220 surgeries in two days.

Phase 2 — 92 Base Hospital, Srinagar, 28-29 September 2026: 144 surgeries, including glued IOL implantation, glaucoma surgery, pterygium excision and retinal interventions for diabetic retinopathy. LG of J&K Shri Manoj Sinha attended the closing; Lt Gen Balbir Singh, GOC 15 Corps, present.

Cataract: clouding of the lens; leading cause of blindness in India; reversible — lens removed and an intraocular lens (IOL) implanted. A glued IOL is fixed to the sclera where capsular support is inadequate.

Glaucoma: damage to the optic nerve, usually with raised intraocular pressure; vision lost is not recoverable — treatment arrests progression.

Pterygium: benign fibrovascular growth of the conjunctiva over the cornea; linked to UV light, wind and dust; common in outdoor and high-altitude populations.

Diabetic retinopathy: damage to retinal blood vessels from diabetes; interventions arrest rather than reverse damage.

Operation Drishti has covered the North, West, East and Central regions; next phase in Odisha.

Exam hook: AFMS = Armed Forces Medical Services. Note the distinction between restoring sight (cataract) and preserving it (glaucoma, retinopathy) — the reason screening matters as much as surgery.

Environment (3)

- **CAQM inspection at Nuh — 17 of 35 units non-compliant**
Body: 8 flying squads with HSPCB, 3 Sep 2026; 17 non-compliant, 11 compliant, 7 closed; violations — defective wet scrubbers, non-functional ESPs, low stack height, fugitive dust, non-compliant DG sets, wood burning
Detail: CAQM: ordinance Oct 2020, Act 2021; statutory; replaced EPCA (1998, Supreme Court); jurisdiction NCR + Haryana, Punjab, Rajasthan, UP; directions override State boards; penalty up to 5 years / Rs 1 crore
Detail: Consent to Establish / Consent to Operate under the Air Act 1981 and Water Act 1974, issued by the SPCB
Detail: Wet scrubber = water capture; ESP = electric charge + collecting plates; stack height = dispersion; fugitive dust = emissions not from a stack
Detail: AQI (8 pollutants): Poor 201–300, Very Poor 301–400, Severe 401–500. GRAP Stages I–IV (IV above 450). NCAP 2019: 40% PM cut by 2026, 2017 base, 131 cities
 PIB 2306808 · 2026-09-04
- **Project Rhino and World Rhino Day**
Body: The announcement: 22 September 2026, World Rhino Day — the Prime Minister announced that Project Rhino has been initiated
Mandate: financial and technical support to range states for protection, habitat management, genetic improvement and understanding population dynamics
World Rhino Day: 22 September, covering all five species
Five species: white and black (Africa); greater one-horned, Javan, Sumatran (Asia). One horn — Indian and Javan; two horns — white, black, Sumatran
Species: *Rhinoceros unicornis*, greater one-horned rhinoceros; IUCN Vulnerable; Schedule I, Wild Life (Protection) Act, 1972; trade controlled under CITES
Horn: keratin, the protein in hair and nails — not bone, not ivory
Global population: about 4,075; India about 3,323; Nepal about 752
Assam: about 3,260 — close to 80 per cent of the world total
Kaziranga: more than 2,600 — largest single stronghold
Pobitora: highest density of one-horned rhino
Manas: National Park and UNESCO World Heritage Site; restocked after losing its wildlife
Indian Rhino Vision 2020: launched 2005; target of at least 3,000 wild rhinos across seven protected areas in Assam
The seven: Kaziranga, Pobitora, Orang, Manas, Laokhowa, Burachapori, Dibru-Saikhowa
Dudhwa, Uttar Pradesh: four rhinos moved into fully wild grassland in March 2026, taking the free-ranging population to eight
Poaching: Assam recorded zero incidents in 2025, about 86 per cent down since 2016
The structural risk: concentration — disease, flood or a single sustained poaching campaign reaches most of the species at once
Exam hook: Project series: Project Tiger 1973, Project Elephant 1992, Project Snow Leopard 2009, Project Dolphin, Project Lion, Project Rhino 2026

- **River rejuvenation through the watershed approach — DoLR pilot projects**
Body: National Workshop on pilot projects for River Rejuvenation through the Watershed Approach, Department of Land Resources, New Delhi, 29 September 2026.
Secretary, DoLR: Shri Narendra Bhooshan. Joint Secretary (Watershed Management): Shri Nitin Khade. CEO, NRAA: Dr Chandra Shekhar Kumar.
Watershed / catchment / drainage basin — the area draining to a common outlet, bounded by a water divide.
Base flow — streamflow sustained by groundwater discharge between rain events; it is what makes a river perennial.
 A river that has become seasonal has usually lost its base flow, not its rainfall. If groundwater falls below the stream bed, the aquifer stops feeding the river and may begin to drain it.
Ridge-to-valley sequencing: contour bunding and trenching on slopes → gully plugs and check dams on drainage lines → percolation tanks and farm ponds → afforestation and pasture development.
 The common mechanism: slow the water down so it has time to infiltrate.
Caveat: watershed treatment redistributes water, it does not create it. Upstream storage can reduce downstream inflow, and recovered groundwater often raises crop water use, increasing irrecoverable evaporative loss.
Stream order (Strahler): a headwater stream with no tributaries is first order; two streams of equal order joining raise the order by one; a lower-order stream joining a higher-order one does not change the order. Pilots target first-, second- and third-order streams — the most numerous, and the most responsive to catchment treatment.
Selection parameters: historical decline in flow, catchment condition, rainfall, groundwater depletion, intervention potential, data availability.
Institutions involved: NRSC, Central Ground Water Board, NMCG, NRCD, Indian Institute of Remote Sensing, National Institute of Hydrology, National Geophysical Research Institute, ICAR, IITs.
Convergence with VB-G RAM G, CAMPA, Ministry of Jal Shakti, state schemes and CSR — a Whole of Government and Whole of Society approach.
Exam hook: Monitoring across 4 dimensions: hydrological, environmental, agricultural, socio-economic.

Sci/Tech (21)

- **Green shipping corridors and green-fuel bunkering hubs**
Body: Ports Minister at TERI, Gurugram; reviewed the National Centre of Excellence for Green Ports and Shipping; bunkering hubs at Deendayal (Kandla), Paradip, V.O. Chidambaram (Thoothukudi); Kamarajar (Ennore) has shore power at coal terminals
Detail: Bunkering = fuelling a ship. Shore power / cold ironing = grid electricity at berth. Green corridor = a route with fuels, ships and infrastructure committed together — Clydebank Declaration, COP26 2021
Detail: Fuels: ammonia (carbon-free, toxic), methanol (liquid, easier), hydrogen (cleanest, −253 °C), LNG (transitional; methane slip)
Detail: IMO (London) 2023 strategy: net-zero by or around 2050. 12 major ports under the Major Port Authorities Act 2021; Vadhavan 13th (2024)
Detail: Frameworks: Harit Sagar 2023, Maritime India Vision 2030, Amrit Kaal Vision 2047; National Green Hydrogen Mission 2023 named the same three ports
 PIB 2306501 · 2026-09-03

• GSVL-F17 launches EOS-05 — India's first geo-imaging satellite

Body: 4 Sep 2026; PM: 'first-ever imaging satellite from geosynchronous orbit'; ISRO–industry partnership stressed
Detail: GEO ≈ 35,786 km, period one day, appears fixed — **continuous view, coarser resolution; LEO/SSO 500–800 km — high resolution, periodic revisit.** Earlier attempt EOS-03 on GSVL-F10, Aug 2021, lost to a **cryogenic ignition failure**

Detail: GSVL Mk II: solid first stage + 4 liquid strap-ons → liquid second (Vikas) → **cryogenic third (LH₂/LOX)**; indigenous cryo stage first flew GSVL-D5, Jan 2014

Detail: PSLV → polar/SSO ~1.75 t; GSVL Mk II → GTO ~2–2.5 t; LVM3 → GTO ~4 t (Chandrayaan-3, Gaganyaan). **Sriharikota; GSVL-F15 (NVS-02, Jan 2025) = 100th launch**

Detail: IN-SPACe (2020), NSIL (2019). India–France: **International Space Summit, Paris; Vikas derives from the French Viking**
 PIB 2306635 · 2026-09-04

• Coal gasification scheme — Rs 37,500 crore; Coal India's monsoon recovery

Body: Scheme approved 13 May 2026, Rs 37,500 crore; products syngas, methanol, ammonia, urea; RFP 7 July, first deadline 7 Sep 2026; applicants **Talcher Fertilisers and NTPC**. CIL supplied 322.90 MT in Apr–Aug, +6.70%

Detail: Gasification: coal + steam + limited O₂ → syngas (CO + H₂); C + H₂O → CO + H₂; methanol CO + 2H₂ → CH₃OH; ammonia via **Haber-Bosch**; urea from NH₃ + CO₂. Surface vs underground gasification; **lignite = Neyveli**

Detail: CIL: 1975, Kolkata, Maharatna, world's largest coal producer; 7 subsidiaries + CMPDIL. India = **2nd-largest producer** (China first); output > **1 billion tonnes in 2024-25**

Detail: **Opencast mining; overburden removal** = leading indicator. Monsoon: **sticky coal, flooded benches, failed haul roads**; daily output 1.36 → 1.7 MT/day as rain eased

Detail: **Gondwana coal ≈ 98% of reserves; Tertiary in the NE; Jharia = coking coal**; Indian coal **high ash, low sulphur**
 PIB 2306880 · 2026-09-05

• India endorses the 6G Call to Action

Body: India endorsed the **Call to Action for 6G Leadership and Security**, announced **9 September 2026**; declared on the margins of the **G20 Innovation Ministerial, Chapel Hill, North Carolina, 1-2 September 2026**, under the **US G20 Presidency**. DoT coordinates.

Detail: Principles — open, interoperable, secure, resilient, resource-efficient, innovation-led. Timeline — 1 month for points of contact, 3 months to map the landscape, 6 months for a supply-chain strategy, **12 months to meet in person in 2027**.

Detail: Generation names — **4G = IMT-Advanced; 5G = IMT-2020** (launched in India **1 October 2022**); **6G = IMT-2030**, ITU framework **December 2023**, deployment around 2030.

Lineage: **Bharat 6G Vision, March 2023** (with the 6G test bed and the **ITU Area Office, New Delhi**); **Bharat 6G Alliance, 3 July 2023**; indigenous 4G/5G stack from **C-DOT; TSDSI, 2013**. Target: **10% of global 6G patents**.

Detail: Bodies — **ITU**, a UN agency founded **1865**, headquartered in **Geneva**; **3GPP** writes the technical standards.

Exam hook: the IMT naming ladder (IMT-Advanced / IMT-2020 / IMT-2030) and ITU's 1865 founding — the oldest international organisation in the UN system.

• ORV Sagar Manthan launched at Kolkata

Body: **Ocean Research Vessel Sagar Manthan** launched **9 September 2026** at the **Rishi Bankim Shipyard, Kolkata**; built by **GRSE for NCPOR** under the **Ministry of Earth Sciences**; delivery due **2028**.

Detail: About **Rs 840 crore**; all-weather, **Southern Ocean capable**; **30-year design life**; dynamic positioning, multibeam bathymetry, multichannel seismic, sub-bottom profiling, ROV and AUV handling, CTD. **Dual class** — Indian Register of Shipping and American Bureau of Shipping.

Detail: Milestones — contract **July 2024**; first steel **29 November 2024**; keel laid **8 April 2026**; launched **9 September 2026**.

Detail: Mission — Indian Ocean **mid-oceanic ridges**, multi-metal **hydrothermal sulphides**, environmental baselines.

Lineage: Predecessor **ORV Sagar Kanya** — built in Germany, delivered **1983**. Also **Sagar Nidhi** (Italy, 2007, NIOT) and **Sagar Sampada**.

Detail: NCPOR is at **Vasco da Gama, Goa**, established **25 May 1998** (as **NCAOR**); Antarctic stations **Maitri (1989)** and **Bharati (2012)**.

Exam hook: NCPOR (polar and ocean research, MoES) vs NIOT (Chennai, ocean technology) — the two are routinely swapped.

• First International Space Summit — orbital congestion and the law

Body: **First International Space Summit**, Paris, **10 September 2026**, convened by the French President; the Indian PM addressed it by video.

Law: **Outer Space Treaty, in force 10 October 1967** — space is the **province of all mankind, no national appropriation, no weapons of mass destruction in orbit, peaceful use, and state responsibility for private actors**.

Detail: The rest of the corpus — **Rescue Agreement 1968, Liability Convention 1972, Registration Convention 1975, Moon Agreement 1979, COPUOS, 1959; UNOOSA at Vienna**. Debris guidelines are **voluntary** — **IADC 2002, UN 2008**.

Detail: Objects in low Earth orbit travel at about **7.8 km/s**; the **Kessler syndrome** is the collision-cascade risk. India's answer is **Project NETRA** with **IS4OM, Bengaluru**.

Detail: India's record — **Chandrayaan-3 landed 23 August 2023** near the lunar south pole.

Exam hook: the four treaty years (1968/1972/1975/1979) and the fact that the **Moon Agreement has few major signatories**; debris rules are **guidelines, not binding law**.

• Biosimilars — a new Indian Pharmacopoeia reference standard

Body: **Indian Pharmacopoeia Commission** national conference on 'Quality and Safety of Biosimilars', **10-11 September 2026**, at **C-CAMP, Bengaluru**.

Detail: The output — an **Indian Pharmacopoeia Reference Substance (IPRS) for Enoxaparin Sodium** for bioassays.

Detail: The core concept — **biologics are made in living cells and cannot be copied exactly**, so a copy is a **similar biologic or biosimilar, never a 'generic'**. Generics are **chemically identical**; biosimilars are **highly similar**.

Detail: Key terms — **critical quality attributes, comparability assessment, immunogenicity, pharmacovigilance, and bioassay** (a test of **biological activity**, not chemical identity).

Detail: **Enoxaparin Sodium** is a **low-molecular-weight heparin**, an anticoagulant acting through **antithrombin**, mainly on **factor Xa**.

Exam hook: the generic/biosimilar distinction is the whole question; IPC sits under the **Ministry of Health and Family Welfare** and publishes the **Indian Pharmacopoeia**.

• A Badri calf from a Sahiwal mother — OPU-IVF embryo transfer

Body: A **Badri female calf** born **11 September 2026** through **OPU-IVF**, from a **Badri embryo** transferred into a **Sahiwal recipient cow**.

Detail: Work by **ICAR-National Dairy Research Institute, Karnal**, with **G.B. Pant University, Pantnagar**; funded by the **Uttarakhand Biotechnology Council**. Programme initiated **2023**.

Detail: **OPU = Ovum Pick-Up** — ultrasound-guided aspiration of oocytes from a **live donor's** ovarian follicles; repeatable, and gentler than superovulation-based **MOET**.

Detail: The chain — **ovum pick-up - in vitro maturation - in vitro fertilisation - embryo culture - oestrus synchronisation of recipients - embryo transfer**.

Detail: The core contrast — **artificial insemination multiplies a superior bull; OPU-IVF with embryo transfer multiplies a superior cow**. **Badri** is Uttarakhand's indigenous hill cattle breed.

Exam hook: that AI multiplies male genetics while embryo transfer multiplies female genetics — the conceptual point examiners test.

• Steel slag roads — a Guinness record at Raigarh

Body: Guinness World Record for the '**World's Longest Road Built with Processed Steel Slag Aggregates**' — a **1.85 km** road at **Raigarh, Chhattisgarh**, conferred **12 September 2026**.

Detail: Built by **CSIR-Central Road Research Institute, New Delhi** with **Jindal Steel Limited**; brand launched as '**Steel Grit**'. Next: a **40 km** road in Odisha.

Detail: Claims — about **40% lower construction cost, four times the strength**, major maintenance only after about **15 years**, in suitable applications.

Detail: **Two slags, kept apart** — **blast furnace slag** is an **iron-making** by-product, ground to **GGBS for Portland Slag Cement**; **steel slag** is a **steelmaking** by-product and contains **free lime**, which must be weathered or processed before use.

Detail: **CSIR-CRRI** is one of the 37 CSIR laboratories; **DSIR** is the parent department.

Exam hook: the blast-furnace vs steel slag distinction, and that **free lime** is the reason raw steel slag cannot simply be used as aggregate.

• Moth bean varieties survive a 35-day dry spell

Body: ICAR-Central Arid Zone Research Institute, Jodhpur — four varieties, CAZRI Moth-4, 5, 6 and 7, withstood a 35-day dry spell in Kharif 2026 in arid western Rajasthan.

Detail: Moth bean (*Vigna aconitifolia**) is grown on nearly 10 lakh hectares in western Rajasthan; productivity about 350 kg per hectare. Regional rainfall 150-250 mm, with normal dry spells of 20-30 days.

Detail: The season's water balance — crop period 10 July to 2 September, pan evaporation about 317 mm; last significant rain 2 August (86 mm); dry spell 3 August to 7 September.

Detail: Soil moisture — surface (0-10 cm) fell from 15-16% to 5-6%, while subsurface (10-40 cm) fell only from about 23% to 16% and kept supplying the crop. That subsurface reserve is the mechanism.

Detail: CAZRI, Jodhpur, established 1959, is the national institute for arid-zone research.

Exam hook: moth bean as a drought-escaping arid pulse; CAZRI's location and mandate; the difference between drought escape (short duration) and drought tolerance.

• Wave-like heat transport in TiCu5Se3 — a zT of about 1.7 from JNCASR

Body: Researchers at JNCASR, Bengaluru (autonomous under DST) reported an unusual wave-like thermal transport regime in thallium copper selenide, TiCu5Se3, reaching a thermoelectric figure of merit zT of about 1.7 — among the highest for a pristine ternary chalcogenide. Published in Science Advances. Team: Prof. Kanishka Biswas with Sayantoni Choudhury and Dr. Animesh Bhui; theory with Prof. Umesh V. Waghmare and Dr. Prasad V. Matukumilli.

Detail: The effects — Seebeck: a temperature difference produces a voltage. Peltier (the reverse): a current produces a heat flow. Thomson: heating or cooling along a single current-carrying conductor in a temperature gradient.

Detail: The figure of merit is $zT = S^2 \sigma T / \kappa$, with S the Seebeck coefficient, σ electrical conductivity, T absolute temperature and κ total thermal conductivity. You want S and σ high, κ low.

Detail: Why it is hard — in metals electrons carry both charge and heat, so σ and κ rise together (Wiedemann-Franz law). Only the lattice part of κ can be attacked independently.

Detail: Phonons are quantised lattice vibrations, the main heat carriers in a crystal. In a crystal the mean free path is far greater than interatomic distance, giving particle-like transport; in a glass it is about equal, suppressing propagation. This material keeps crystalline order but its localised, closely spaced modes give wave-like coherence and ultralow lattice thermal conductivity — produced by confined copper dynamics inside a tetragonal, cloverleaf knot-like 3D framework with open channels along the c-axis, avoiding the instability of superionic conductors and producing strong anharmonicity.

Exam hook: Applications are waste-heat recovery in power plants, cement, steel, automobiles, data centres and battery thermal management, plus thermal barrier coatings and quantum technologies. Thermoelectric generators have no moving parts — which is why they power deep-space missions.

• Hanle Dark Sky Reserve — the fourth Star Party at 4,500 metres

Body: Fourth HDSR Star Party, 7-12 September 2026, at the Indian Astronomical Observatory, Hanle, Ladakh — about 40 amateur astronomers and astrophotographers from 12 States and UTs over four nights. Organised by IIA, the Department of Wildlife Protection, UT Ladakh, BARC and TIFR. The Open Night on 10 September drew over 1,200 visitors.

Detail: The Hanle Dark Sky Reserve was notified by the Government of Ladakh in December 2022 — India's first, about 1,073 sq km around the observatory. Two aims: reduce light pollution for research and promote astro-tourism benefiting local communities. 25 HDSR Astronomy Ambassadors — local villagers trained to run tours, supplied with telescopes by the Ladakh administration.

Detail: Why the site works — altitude about 4,500 m (less atmosphere overhead), a cold desert in the Himalaya's rain shadow (low humidity, few clouds), stable air (good 'seeing'), and darkness. Light pollution's components are skyglow, glare, light trespass and clutter; upward light scatters off air molecules and aerosols, raising the background brightness against which faint objects must be detected.

Detail: The instruments — Himalayan Chandra Telescope, a 2 m optical/infrared telescope operated remotely from Hosakote near Bengaluru; and MACE, the Major Atmospheric Cherenkov Experiment run by BARC, the world's highest imaging atmospheric Cherenkov telescope, for very-high-energy gamma rays. Also HAGAR and GROWTH-India. Proposed: an upgrade of the HCT to 3.7 m and a 13.7-m National Large Optical-infrared Telescope.

Detail: Cherenkov radiation — a charged particle moving faster than light in a medium (not in vacuum) emits a faint bluish flash, the optical analogue of a sonic boom. A gamma ray is absorbed by the atmosphere, so MACE images the particle cascade's Cherenkov flash instead: the atmosphere is part of the detector.

Exam hook: The institutional split — IIA is autonomous under the Department of Science and Technology; BARC and TIFR are under the Department of Atomic Energy.

• India's 51st Doppler Weather Radar at Sambalpur

Body: India's 51st Doppler Weather Radar, at Sambalpur, Odisha, inaugurated virtually on 17 September 2026 by Dr Jitendra Singh, MoS (IC) Earth Sciences, with Odisha CM Shri Mohan Charan Majhi. The network has grown from 14 radars in 2014 to 51 in 2026, with about 40 more planned under Mission Mausam, taking the total to roughly 81. Odisha now has three — Gopalpur, Paradip, Sambalpur — with Balasore, Puri and Bhubaneswar in the pipeline.

Detail: The Doppler effect is the change in observed frequency due to relative motion between source and observer. In radar this yields reflectivity from return strength (how much rain) plus radial velocity from the frequency shift (how fast, toward or away).

Detail: Why velocity matters — adjacent inbound and outbound returns reveal rotation, a mesocyclone, plus wind shear and gust fronts. The limitation is that only the radial component is measured: wind exactly perpendicular to the beam gives no shift. Dual-polarimetric radars compare horizontal and vertical pulses to infer shape — flattened raindrops versus near-spherical hail versus ice — separating rain, hail and snow.

Detail: Bands — S-band about 400 km (least attenuation, best for cyclones), C-band about 250 km (general purpose), X-band about 100 km (highest resolution, attenuates fastest, for urban and hilly nowcasting).

Longer wavelength means longer reach. Supporting layers: Automatic Weather Stations and rain gauges for surface ground truth, radiosondes for balloon-borne vertical profiles, and microwave radiometers, which are passive.

Detail: Mission Mausam sits with the Ministry of Earth Sciences, executed through the IMD. The IMD was established 1875, marked its 150th anniversary in 2025, and is the RSMC for tropical cyclones over the North Indian Ocean under the WMO — it issues advisories and names cyclones for the basin, and supports 13 neighbouring countries under 'Neighbour First'.

Exam hook: The limitation worth stating — radar is line-of-sight, so Earth curvature means long-range beams overshoot low-level rain, and terrain casts permanent shadows in hills. That is why the radar count matters more than radar range.

• **Ayush wires AI to old texts — retrieval-augmented generation on Ayush Grid**

Body: 19 September 2026, Ministry of Ayush — an AI programme built on Ayush Grid, the Ministry's digital backbone.

Detail: RAG — Retrieval-Augmented Generation — the system retrieves relevant passages from a defined corpus **first**, then **generates** an answer **grounded** in them. The gains are **grounding** (less fabrication), **traceability** (the answer can be cited) and **currency without retraining** (refresh the index, not the model). A **hallucination** is a language model producing a **fluent and confident but false** answer from its parameters — and fluency, not hesitancy, is what makes it dangerous.

Detail: The showcase — 'AI-driven Decision Support for Ayurveda: A Retrieval-Augmented Generation (RAG) Approach', featured in the **AI Impact Casebook on Health** developed with the **World Health Organization**, at the **IndiaAI Impact Summit 2026**.

Detail: Six assistants — **MAISP Chatbot** (citizen information), **ARP Research Assistant** (Ayush Research Portal), **eLMS Chatbot** (student life-cycle management), **e-CHARAK Chatbot** (medicinal-plant trade), **Yoga Saarthi** (yoga recommendation) and **Nivesh Saarthi** (investment facilitation).

Detail: The language layer — collaboration with **IndiaAI** and the **Digital India Bhashini Division, MeitY**; Ayush Grid portals now in the **22 scheduled languages**, those in the **Eighth Schedule**; Ministry artefacts placed on **AI Kosh**. Models perform worse on **low-resource languages** where digitised text is scarce, which is why Bhashini and AI Kosh focus on **data creation**, not just model training.

Exam hook: The international frame is the **WHO, ITU and WIPO** technical brief of **11 July 2025**, *Mapping the Application of Artificial Intelligence in Traditional Medicine* — the three agencies mapping to **health, technology standards** and **intellectual property**. The tension worth stating: AI can make existing knowledge **easier to find and apply**, or it can lend **unearned authority** to efficacy claims the evidence does not support.

• **9th Molecular Virology Meeting at BRIC-NII**

Body: **The meeting:** 9th Molecular Virology Meeting (MVM 2026), concluded 18 September 2026 at BRIC-NII, New Delhi; about 200 participants; initiated 2009

Keynote: Dr Naveen Kumar, Director, ICMR-National Institute of Virology, Pune — *"Flip the Switch: Host Factors That Block or Boost Viruses"*

Supported by: ICGB and the Regional Centre for Biotechnology; seven scientific sessions

Panel: *"Future of Virology Research and its Contribution in BioE3 Policy: Advancing Towards Viksit Bharat"*, moderated by Dr Nimesh Gupta

A virus: genetic material (DNA or RNA) in a protein coat, sometimes enveloped; no ribosomes, no metabolism; replicates only inside a host cell
Host factors: proviral factors the virus needs; antiviral or restriction factors the cell uses to block it

Host-directed antivirals: resistance is harder to acquire and one drug may cover several viruses, but toxicity risk is higher than for virus-directed drugs

Viruses on the programme: influenza, dengue, chikungunya, HIV, hepatitis E, West Nile virus, coronaviruses, respiratory syncytial virus

Antigenic drift: gradual mutation, hence annual reformulation of the influenza vaccine

Antigenic shift: abrupt reassortment of gene segments, the mechanism behind pandemics

Dengue: four serotypes; antibody-dependent enhancement makes a second infection with a different serotype potentially worse

Platform technology: separates delivery system from pathogen-specific content — validate once, swap the sequence; mRNA and viral-vector vaccines

BRIC: Biotechnology Research and Innovation Council, Society registered November 2023 under DBT, subsuming 14 autonomous institutes including NII

ICGB: intergovernmental organisation, established 1983, autonomous since 1994, 60+ member states; components at Trieste, New Delhi and Cape Town — **not** a DBT institute

Exam hook: **ICMR-NIV:** National Institute of Virology, Pune, under ICMR

• **ePlane, the TDB and the RDI Fund**

Body: **The approval:** 23 September 2026 — Technology Development Board (TDB), Department of Science and Technology, approved **Rs 285 crore** to **Ubifly Technologies Private Limited**, Chennai

Total project cost: Rs 570 crore; **TDB Secretary:** Rajesh Kumar Pathak
Fund: the Research Development and Innovation (RDI) Fund, the government's Rs 1 lakh crore corpus

Instrument: Optionally Convertible Debentures — debt that may later be converted to equity; shares risk without transferring control

Purpose: take the indigenous ePlane from **TRL-6 to TRL-9**; categorised under Deep Technology

The aircraft — e200X: three-seater (one pilot, two passengers), zero-emission, targeted range **110 km**, ideal speed **160 kmph**

Distinctive feature: landing gear for **both conventional and vertical** landing

Indigenous elements: vertical rotors, forward propellers, flight-control algorithms, power-distribution controllers, battery-pack modules with integrated cooling; complete airframe designed in house

TRL scale: developed by NASA in the 1970s, runs **1 to 9**

TRL 1 basic principles observed · **TRL 2** concept formulated · **TRL 3** proof of concept · **TRL 4** component validation in a **laboratory** environment · **TRL 5** component validation in a **relevant** environment ·

TRL 6 prototype demonstrated in a **relevant** environment · **TRL 7** prototype demonstrated in an **operational** environment · **TRL 8** system completed and qualified · **TRL 9** system proven in operations

The valley of death: TRL 6 to 9 — too applied for a research grant, too unproven for commercial finance; the work shifts from making it function to qualifying it

Why VTOL costs energy: hovering needs rotor lift equal to full aircraft weight with no help from forward motion; a wing produces lift from airspeed far more efficiently

Flight-control algorithms: a multi-rotor aircraft is aerodynamically unstable and is flown by a computer adjusting rotor speeds continuously

Exam hook: **Battery thermal management:** a safety system against cell degradation and thermal runaway, not merely an efficiency measure

• **DRDO, TDF and a 20 Millikelvin Dilution Refrigerator**

Body: **The agreement:** 24 September 2026 — DRDO's **first high-value deep-tech project agreement with a start-up** under the **Technology Development Fund (TDF)** scheme

Partner: Zero mK India Private Limited, **Alwar, Rajasthan**

Item: indigenous **20 millikelvin dilution refrigerator** for quantum applications

Corpus: first high-value agreement under the **Rs 500 crore** deep-tech corpus approved by Raksha Mantri Rajnath Singh

Mentoring: Director, **Solid State Physics Laboratory (SSPL)** and team; Defence Secretary and Chairman DRDO **Rajesh Kumar Singh**

Temperature scale: room temperature about **300 K**; liquid nitrogen **77 K**; liquid helium **4.2 K**; cosmic microwave background **2.7 K**; target **0.02 K (20 mK)**

Evaporative cooling floor: about **1 K** pumping on helium-4; about **0.3 K** pumping on helium-3

Phase separation: below about **870 mK**, a helium-3/helium-4 mixture separates into a **concentrated phase** (nearly pure He-3) and a **dilute phase** (He-4 with about **6.6 per cent** He-3)

The cooling mechanism: moving He-3 across the phase boundary into the dilute phase absorbs heat, like evaporation — and does **not** shut down at low temperature, because the dilute phase retains about 6.6 per cent He-3 however cold it gets

Components: **mixing chamber** (final cooling), **still** (He-3 distilled out at about 0.7 K), **heat exchangers**, and a **pulse-tube cryocooler** for the stage from 300 K to about 3 K

Why qubits need it: thermal energy of order **kT** must be far smaller than the qubit's energy splitting; superconducting qubits work at about **10-20 mK**; superconductivity itself also requires low temperature

Decoherence: loss of quantum state through interaction with the environment; cooling buys **coherence time** rather than eliminating decoherence

Strategic point: reduces dependence on **imported cryogenic infrastructure**; helium-3 is scarce, produced largely from tritium decay

Exam hook: **TDF:** DRDO scheme funding Indian industry, especially **MSMEs and start-ups**, to develop technologies not available domestically — **development funding, not procurement**

• Agnibaan RLV and Agnikul Cosmos

Body: The agreement: 25 September 2026 — TDB, Department of Science and Technology, with **Agnikul Cosmos Private Limited**, Chennai
Amount: Rs 200 crore under the **Research Development and Innovation (RDI) Fund**, through **Optionally Convertible Debentures**
Objective: develop the **Agnibaan RLV**, moving from **TRL-4 and above towards TRL-8**

Ambition: beyond recovering only the first stage — towards **full-system reusability**, including a reusable upper stage with descent propulsion
Why the upper stage is harder: it returns from **orbital velocity**, about 7.8 km/s in low Earth orbit; kinetic energy scales with the **square** of velocity, so re-entry heating is far more severe, requiring a **thermal protection system** and imposing a heavy mass penalty
Restart: an engine must relight in vacuum after shutdown — needing ignition after cold-soak, propellant settling in microgravity, and tolerance of thermal cycling

Deep throttling: an engine sized for a fully fuelled lift-off must produce a small fraction of rated thrust to land a nearly empty stage; combustion becomes unstable far below the design point

Cryogenic vs semi-cryogenic: cryogenic uses liquid hydrogen with liquid oxygen (highest performance, hardest handling); **semi-cryogenic** uses a **cryogenic oxidiser with a non-cryogenic fuel** — liquid oxygen with refined kerosene — denser, storable and easier to handle

Agnibaan SOrTeD: flew **30 May 2024** from Sriharikota; about **6.2 m**, 575 kg, thrust about **6.2 kN**, burn **70 seconds**, propellants **LOX and aviation turbine fuel**

Three firsts on that flight: world's first **single-piece 3D-printed rocket engine (Agnilet)**; **India's first semi-cryogenic engine flight**; launch from 'Dhanush', India's first privately developed launchpad

Agnikul: incubated at **IIT Madras**

ISRO's RLV-TD: winged vehicle **Pushpak**; **LEX-03** on **23 June 2024**, released from an **IAF Chinook** at about **4.5 km**, autonomous runway landing above **320 km/h**, decelerated by brake parachute and landing-gear brakes

Two approaches: winged runway landing (Pushpak) versus propulsive descent landing (Agnibaan RLV)

Exam hook: Debris argument: spent upper stages are major debris objects; the cascading collision process is the **Kessler syndrome**

• India's First Port-Based e-Methanol Plant at Kandla

Body: The event: 26 September 2026 — foundation stone for **India's first port-based e-methanol plant** at **Deendayal Port Authority, Kandla, Gandhidham, Gujarat**

Present: Gujarat CM **Bhupendra Patel**, Union MoPSW Minister

Sarbananda Sonowal, Assam CM **Dr Himanta Biswa Sarma**

Partners: DPA and **Assam Petro-Chemicals Limited (APCL)**, Namrup — capital ratio **76:24**

Capacity and cost: **150 tonnes per day**; total **Rs 2,300 crore** — Phase I **50 tpd / Rs 1,200 crore** by **January 2027**, Phase II **+100 tpd / Rs 1,100 crore** by **March 2027**

DPA's contribution: **Rs 567.32 crore** equity, **75 acres** of land, desalinated water, renewable energy as green hydrogen

Jobs: more than **3,500** direct and indirect

Cost claim: **US\$750 per tonne** against a global rate of about **US\$1,300 per tonne**

Target traffic: vessels on the **Asia-Europe International Trade Corridor**
Methanol: **CH₃OH**, the simplest alcohol; conventional methanol uses **fossil carbon** from natural gas or coal

Green methanol families: **bio-methanol** (from biomass) and **e-methanol** (green hydrogen + CO₂)

Feedstock here: renewable power, water and **biogenic CO₂**

Biogenic vs fossil CO₂: biogenic carbon was recently absorbed from the atmosphere, so the cycle approximately closes; fossil-sourced carbon only delays the emission

Why shipping wants methanol: it is a **liquid at ambient temperature and pressure**, so storage, pumping and bunkering use largely existing infrastructure — near **drop-in**; dual-fuel engines are available

The penalty: roughly **half** the energy per litre of conventional marine fuel oil, so about twice the tank volume

Alternatives: **liquid hydrogen** needs cryogenic storage around **20 K**; **ammonia** is carbon-free but **toxic** and lacks port handling at scale

Regulator: the **International Maritime Organization (IMO)**, UN specialised agency for shipping, headquartered at **London**; international shipping falls outside national emissions inventories

IMO trajectory: substantial **carbon intensity** reduction by 2030 and **net zero from international shipping by around 2050**

Scale check: 150 tpd is about **55,000 tonnes a year**; replacing all marine fuel by 2050 would need over **540 million tonnes a year** of green methanol

Exam hook: The geographic point: the twelve largest bunkering hubs handle about **40 per cent** of world bunkering, while much green methanol capacity is far from them — producing at the port removes a transport leg

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• DGCA training syllabus for gyroplane pilot licences; autorotation explained

Body: DGCA CAR, Section 7, Series B, Part XXI — *Ground and Flying Training Syllabus for Issue of Pilot Licence for Gyroplanes*, promulgated **29 September 2026**. Stated as an **initial step** towards introducing gyroplanes in India; training organisations and manufacturing to follow.

Gyroplane: **propeller** provides **thrust**; a **freely rotating, unpowered rotor** provides **lift**.

Airflow is upward through the rotor disc — the opposite of a powered helicopter, which drives air **downward**.

Autorotation: the rotor derives **100%** of the power to turn it from the freestream.

No anti-torque tail rotor needed — the engine drives the propeller, not the rotor, so there is **no torque reaction** on the fuselage.

Cannot hover and cannot take off vertically in normal operation; needs forward motion through the air.

Pre-rotator: a clutch letting the engine spin the rotor up before take-off, shortening the ground roll. A **jump take-off** uses stored rotor energy and needs a specially designed machine.

Cannot stall in the fixed-wing sense — slowing down steepens the descent, which increases upward flow and sustains rotation.

First documented autogiro flight: the **C.4, 17 January 1923**, pilot **Alejandro Gomez Spencer**, Cuatro Vientos near Madrid. Inventor **Juan de la Cierva** (Spain).

Dissymmetry of lift: in forward flight the **advancing** blade sees rotational speed **plus** forward speed and the **retreating** blade sees rotational speed **minus** forward speed, producing unequal lift and a rolling moment.

Flapping hinge: Cierva's solution — the advancing blade flaps up (reducing angle of attack and lift) and the retreating blade flaps down (increasing it), equalising the rotor automatically. It is the ancestor of the **articulated helicopter rotor head**.

Uses: joyrides, air experience flights, and aerial work — **agricultural spraying, banner towing, surveillance, survey**.

Exam hook: **Power pushover** — abrupt rotor unloading with propeller thrust still acting — is the characteristic gyroplane handling hazard.

• CHIME's standalone 21-cm hydrogen detection and dark energy

Body: CHIME = Canadian Hydrogen Intensity Mapping Experiment, at the **Dominion Radio Astrophysical Observatory**, Penticton, **British Columbia**, Canada.

First standalone detection of the cosmological 21-cm hydrogen signal — previously only via **cross-correlation** with galaxy surveys. Published in **The Astrophysical Journal**.

Indian participation: **Raman Research Institute (RRI)**, an autonomous institute of the **Department of Science and Technology**. **Dr Saurabh Singh (RRI)**; **Dr Arnab Chakraborty (Toronto)**; **Dr Mark Halpern (UBC, PI)**; **Dr Shabbir Shaikh (Arizona State)**.

21-cm line: a **hyperfine** (spin-flip) transition of **neutral hydrogen**; wavelength about **21 cm**, rest frequency about **1420 MHz**; a **forbidden** transition with a mean lifetime of order **10 million years** per atom — detectable only because hydrogen is so abundant.

Redshift: expansion stretches wavelength, so a **lower observed frequency means higher redshift and an earlier epoch**.

CHIME observes 400-800 MHz → redshifts $z \approx 0.8$ to 2.5 → universe about **2.5 to 7 billion years old**. The reported signal is from about **five billion years**.

Design: four cylindrical parabolic reflectors, **20 m × 100 m**, each with **256 dual-polarisation cloverleaf antennas** — **1,024 total**. **No moving parts**; a **transit / drift-scan** instrument relying on Earth's rotation. Uses **interferometry**.

Intensity mapping: measures the **combined** 21-cm brightness of a sky patch rather than resolving individual galaxies — far larger volume, far lower cost, and measures all the hydrogen rather than only bright galaxies.

Science target: **baryon acoustic oscillations (BAO)** as a **standard ruler** to trace the **expansion history**, and thereby probe **dark energy**.

Data: **94 nights** from **2019**; nearly **7 years** of data available; next target the universe at about **3 billion years**.

About 2% of the universe's hydrogen was neutral atomic at the observed epoch — confirming this is a **post-reionisation** measurement.

Sequence to remember: Big Bang → **recombination** (about **380,000 years**, releases the **CMB**) → dark ages → first stars → **reionisation** (largely complete within the first **billion years**) → neutral hydrogen survives mainly **inside galaxies**.

Exam hook: The release's headline "earliest glow of hydrogen" is **misleading** — five billion years is well after reionisation.

Infra (1)

• One year of the Bairabi-Sairang line to Aizawl

Body: The **51.38 km Bairabi-Sairang** railway line completed one year on **13 September 2026**; inaugurated by the Prime Minister on **13 September 2025**. It brought the railway to **Aizawl, Mizoram**.

Detail: First year — over **15 lakh passengers**, more than **1,100 trips**, **Rs 54 crore** in ticket sales; every train above **100% capacity**. Sairang station handled over **5.54 lakh** passenger movements.

Detail: Engineering — **153 bridges** (55 major, 88 minor, 10 ROB/RUB) and **45 tunnels totalling almost 16 km**. **Six bridges above 70 m**; the tallest about **114 m**, roughly **42 m taller than the Qutub Minar** (about 72 m).

Detail: Four new stations — **Hortoki, Kawnpui, Mualkhang, Sairang**. **Bairabi** was the earlier railhead.

Detail: Services — Sairang-Anand Vihar **Rajdhani** (occupancy over 145%), Sairang-Kolkata tri-weekly, Sairang-Guwahati daily, and Sairang-Silchar linking the **Barak Valley**.

Exam hook: Aizawl as a **State capital newly connected by rail** — the running theme of North-East capital connectivity (Itanagar, Agartala, Aizawl).

Culture/Sport (3)

• 503-member contingent for the Aichi-Nagoya Asian Games

Body: Send-off in New Delhi, **8 September 2026** — **503 members, 300+ first-timers**; IOA President **P.T. Usha** present.

Detail: **20th Asian Games, Aichi-Nagoya, Japan, 19 September-4 October 2026** — **43 sports, 71 disciplines, 469 events**; **11,000+ athletes, 45 NOCs**. **Japan's third Asian Games after Tokyo 1958 and Hiroshima 1994**.

Lineage: **First Asian Games, New Delhi, March 1951** (11 nations); India hosted again in **1982** (mascot **Appu**, colour television). **Hangzhou 2022 was held in 2023** — India took **107 medals (28-38-41)**, ranking 4th. India's best rank was **3rd, at Jakarta 1962**.

Detail: Bodies — **IOA, 1927** (founded with Dorabji Tata); **P.T. Usha, first woman president, December 2022**; **OCA 1982, headquartered in Kuwait**; **SAI 1984**; **TOPS 2014**; **Khelo India 2018**.

Detail: Recent law and policy — **National Sports Governance Act, 2025** and **Khelo Bharat Niti, 2025**.

Exam hook: 1951 New Delhi as the first edition and 1982 as India's second hosting; the Hangzhou 2022/2023 date mismatch is a favourite.

• Lothal — the National Maritime Heritage Complex nears Phase 1A

Body: **2nd Governing Council meeting of the NMHC Society, 11 September 2026**, chaired by the Minister of Ports, Shipping and Waterways.

Detail: **Phase 1A at about 82% physical completion**; revised target **31 October 2026**; **1,492 artefacts** ready for installation; **ASI excavation about 70% complete**.

Detail: **13 countries** have signed MoUs — Portugal, UAE, Vietnam, Thailand, the Netherlands, Denmark, Oman, Israel, Germany, Republic of Korea, Italy, New Zealand and Singapore.

Detail: Planned — a **5D Dome Theatre**, Coastal States Pavilion, a **Lighthouse Museum** with DGLL (potentially the world's tallest), and a Maritime Research Institute with the Indian Maritime University.

Detail: **Lothal** lies in the **Bhal region of Gujarat**, on the **Bhogavo**, a Harappan port site famous for its **dockyard** — the earliest known in the world.

Exam hook: Lothal's dockyard and its Gujarat location; do not confuse it with **Dholavira** (Kutch, a UNESCO World Heritage Site) or **Surkotada**.

- **Kabaddi Double Gold at the 2026 Asian Games**

Body: 2026 Asian Games: India's **men's team beat Iran** for gold, becoming **nine-time champions**; the **women's team also beat Iran** for gold, taking India's overall tally past **100** medals

Asian Games debut: 1990, Beijing — six teams (India, Bangladesh, Pakistan, China, Japan, Nepal) in round-robin; India undefeated

Women's event introduced: 2010

India's men's record: nine of ten golds since 1990, including **seven** successive golds before 2018

2018 Jakarta: **Iran** won **both** titles — beat India in the men's **semi-final** (India finished **fourth**) and the women's final **27-24**

Women's record: gold in every edition except 2018

Team size: **seven players** a side

The raid: a single **raider** enters the opposition half to touch **antis** (defenders) and return across the **midline**; must maintain the **cant** — a continuous chant on **one breath**; raid limited to **30 seconds**

Lona: bonus points when a team's entire side is out

Distinctive features: requires **no equipment**; the breath-held chant makes it a test of **anaerobic capacity** under physical pressure

Pro Kabaddi League: launched **2014**; professionalised the sport and brought foreign players, notably Iranians, into Indian franchises

Domestic federation: **Amateur Kabaddi Federation of India (AKFI)**, founded **1950**

International body: **International Kabaddi Federation**

Olympics: appeared at the **1936 Berlin Olympics** as a **demonstration** sport — never a medal event

Obstacle to Olympic inclusion: competitive strength concentrated in South and West Asia; inclusion needs cross-continental participation

Exam hook: Why it suits service training: explosive movement, grappling strength, breath control, spatial awareness, rapid decisions in a team, and no equipment

