





13 March 2024

National and International News

<p>Cutlass Express 24</p> 	<p>Context:</p> <ul style="list-style-type: none"> • The Indian Navy led the maritime exercise "Cutlass Express" – 24 with INS Tir at Port Victoria, Seychelles. • The exercise involved active engagement with participants from 16 friendly foreign countries. <p>Training Activities:</p> <ul style="list-style-type: none"> • The training encompassed theoretical and practical aspects of Maritime Interdiction Operations, Visit Board Search and Seizure (VBSS) procedures, and Diving operations. • During the sea phase, the VBSS team of INS Tir boarded the Seychelles Coast Guard ship LE Vigilant, showcasing boarding operation procedures. • Joint diving operations were conducted by Indian, US, and Seychelles divers after intensive training. <p>INS Tir:</p> <ul style="list-style-type: none"> • INS Tir (A86) is the first dedicated cadet's training ship to be built by Mazagon Dock Limited and commissioned as such by the Indian Navy. • She is the senior ship of the 1st Training Squadron of the Southern Naval Command. • INS Tir was commissioned on 21 February 1986.
<p>INS Tushil</p> 	<p>Context: INS Tushil, India's latest naval asset, began its sea trials from Russia's Baltiysk naval base on March 5.</p> <p>Key points:</p> <ul style="list-style-type: none"> • INS Tushil belongs to the Talwar-class frigates, known for their stealth-guided missile capabilities. • These frigates are upgraded versions of the Russian Krivak III-class frigates, originally used by the Coast Guard. • The Indian Navy currently operates six of these ships, with four more under construction, including two at India's Goa shipyard. • These ships incorporate "stealth technology"



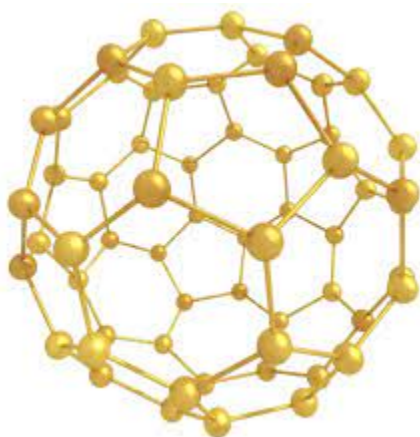
to minimize radar and underwater noise detection.

- They are equipped with **Indian and Russian weaponry**, including **surface-to-surface missiles, sonar systems, surveillance radar, communication suites, anti-submarine warfare systems, surface-to-air missiles, and gun mounts.**
- Designed for combat in brown and blue waters, they can engage submarines, warships, and repel air attacks independently or in formations.
- The frigates have a displacement of **3620 tons, a length of 124.8 meters, a top speed of 30 knots, and a cruising range of 4850 miles.**

Project 11356M:

- In **October 2016, India and Russia signed an Inter-Governmental Agreement (IGA) for four Admiral Grigorovich-class frigates (Project 11356M).**
- Russia agreed to deliver two frigates, including **INS Tushil and INS Tamala**, while India would build the other two domestically.
- The construction of these ships is tailored to meet the **Indian Navy's requirements for comprehensive naval warfare capabilities in air, surface, and sub-surface domains.**

Gold Nanoparticles



Context:

- Often referred to as '**gold bhasma**,' **gold nanoparticles are recognized for their therapeutic and beautifying properties in skincare.**
- They protect the skin from external infestations, combat aging, improve metabolism, and rejuvenate the body.

Key points:

- Gold nanoparticles (AuNPs) are **tiny particles made of gold atoms, typically ranging from 1 to 100 nanometers in size.**
- They possess unique optical, electronic, and catalytic properties due to their small size and shape.

Benefits

- Easily absorbed by the skin, they act as a **rejuvenator, potentially benefiting various systems of the human body.**
- Integral to various Ayurvedic preparations, they



are known for their rejuvenating, immuno-modulating, beautifying, and healing properties.

- They **slow down collagen depletion, stimulate cell regeneration, improve metabolism, and tone up muscles.**
- They strengthen underlying tissue, bones, and nerves, contributing to a youthful appearance.
- Innovative formulations like sparkling gold face washes enriched with gold nanoparticles and natural ingredients offer potent skincare solutions.

Applications

- **Biomedical:** Used in imaging, therapy, and diagnostics, serving as contrast agents in X-ray, computed tomography (CT), and photoacoustic imaging, and facilitating photothermal therapy and drug delivery.
- **Catalysis:** Exhibit remarkable catalytic activity in various chemical transformations.
- **Electronics:** Used in nanoelectronic devices, conductive inks, and sensors.
- **Environmental Remediation:** Employed in detecting and removing pollutants from water and soil.

India's indigenous fifth gen fighter jet AMCA

FUTURE'S FIGHTER

Stealth aircraft are designed to avoid detection by enemy radars and radar-guided weapons. India's Advanced Medium Combat Aircraft (AMCA) Mark-1 will be a fifth-generation stealth aircraft

LENGTH
17.6m

WINGSPAN
11.13m

MAXIMUM TAKE-OFF WEIGHT
25,000kg

MAXIMUM SPEED
2,600 kmph (Mach 2.15)

COMBAT RANGE
1,620km

SERVICE CEILING
20,000m

PAYLOAD CAPACITY
6,500kg

PERFORMANCE
Can achieve superior speed/altitude performance

COST
₹15,000 crore to develop the first five jets

AMCA VARIANTS

- AMCA Mark-1**: 1st-gen engines, 5th-gen technologies
- AMCA Mark-2**: 6th-gen engines, 6th-gen technologies (expected)

COCKPIT: Glass cockpit with single bubble canopy

WINGS: The shoulder-mounted, diamond-shaped trapezoidal wings will reduce drag at supersonic speeds; aligned edges to disturb radar returns

FUSELAGE: Faceted design; radar-absorbent surface

INTERNAL WEAPONS BAY: Under the fuselage

WEAPONS: Air to Air, Air to Ground, Stand-Off, Attack Munitions, Precision Guided Munitions, Beyond Visual Range Missile

ADVANCED FIGHTER GENERATIONS

FOURTH-GENERATION
F-16
Can switch and swing between air-to-air and air-to-ground roles; first fighter to make regular use of fly-by-wire control system (a fully electronic flight control system)
Development: 1960s to late 1980s
Examples: MiG-29, Su-27, F/A-18, F-15, F-16 and Mirage-2000

4.5-GENERATION
Rafale
Evolved from fourth-gen aircraft, better sensors and limited stealth characteristics, and reduced visibility compared with fourth-gen aircraft
Development: late 1980s and into the 1990s
Examples: Eurofighter Typhoon, Dassault Rafale, MiG-35, Su-30SM, F/A-18E/F Super Hornet

FIFTH-GENERATION
F-22
Advanced stealth characteristics and advanced integrated sensors; improved situational awareness and decision superiority over adversaries
Development: 1980s-present
Examples: F-22, F-35, Su-57
South Korea is expected to get F-35 jets; first inducted jet, Chengdu J-20 (claimed)
Turkey's TF-X has a similar timeline as the AMCA
RAE Systems Tegeth and Future Combat Air Systems are the European programmes working on next-gen fighters
South Korea is expected to get F-35 jets; first inducted jet, Chengdu J-20 (claimed)

Context

- The **Cabinet Committee on Security (CCS)** cleared a **Rs 15,000 crore project to design and develop the Advanced Medium Combat Aircraft (AMCA), India's fifth-generation fighter multirole fighter jet.**

Agencies Involved

- The **Aeronautical Development Agency (ADA)** under the Defence Research and Development Organisation (DRDO) will be the nodal agency for executing the programme and designing the aircraft.
- It will be manufactured by **state-owned Hindustan Aeronautics Limited (HAL).**

Features

- Stealth features
- Low-probability-of-intercept radar
- Agile airframes with super cruise performance
- Advanced avionics features
- Highly integrated computer systems capable of networking with other elements within the



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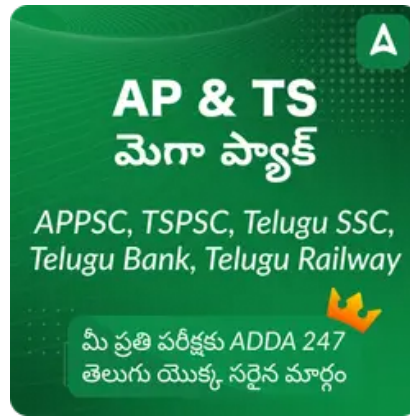
Daily Current Affairs Encyclopedia

battlespace

- Higher utilization time and smaller serviceability or maintenance periods

Other fifth-generation fighters

- Only a few countries have built a fifth-generation stealth fighter aircraft.
- The list of the aircraft currently in service includes the **F-22 Raptor** and **F-35A Lightning II** of the US, the Chinese **J-20 Mighty Dragon**, and the Russian **Sukhoi Su-57**.



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