

AVIOVATE

ARHAKRZ MAGAZINE



Skybound Innovations:
The Future of Aerospace in
2024-25

DEPARTMENT OF AERONAUTICAL ENGINEERING

VISION

- **To Empower the students with subject knowledge of aeronautical engineering for serving the society in a challenging global environment,**

MISSION

- **To Provide quality technical education in tune with the challenges. To offer latest technological developments in the field of aeronautical engineering.**
- **To integrate the intellectual, spiritual, ethical and society development of the students for becoming dynamic aeronautical engineers.**
- **To initiate desires for undertaking entrepreneurship and lifelong learning.**

CHAIRMAN'S MESSAGE

OUR COMMITMENT TO PUSHING THE BOUNDARIES OF WHAT IS POSSIBLE IN AERONAUTICS IS UNWAVERING, AND WE TAKE IMMENSE PRIDE IN SHAPING THE FUTURE OF AVIATION. I ENCOURAGE YOU TO DELVE INTO THE ARTICLES, CELEBRATE THE ACHIEVEMENTS OF OUR TALENTED TEAM, AND JOIN US IN OUR JOURNEY TOWARD NEW HORIZONS IN AERONAUTICAL ENGINEERING.

-DR.A.K.NATESAN,M.COM,MBA.M.PHIL,FTA
CHAIRMAN



VICE CHAIRMAN'S MESSAGE

WE REMAIN STEADFAST IN OUR PURSUIT OF INNOVATION, EXCELLENCE, AND THE RELENTLESS EXPLORATION OF NEW POSSIBILITIES IN AERONAUTICS. OUR INDUSTRY STANDS AT THE FOREFRONT OF GROUNDBREAKING ADVANCEMENTS, AND IT IS THROUGH DEDICATION, EXPERTISE, AND VISIONARY THINKING THAT WE CONTINUE TO REDEFINE THE FUTURE OF AVIATION,

-DR.N.MATHAN KARTHICK,M.B.B.S,M.H.SC(DIABETOLOGY)
VICE CHAIRMAN



PRINCIPAL'S MESSAGE

INNOVATION, DEDICATION, AND A PASSION FOR DISCOVERY DEFINE OUR JOURNEY IN AERONAUTICS. AS WE CONTINUE TO PUSH THE LIMITS OF ENGINEERING AND TECHNOLOGY, OUR COMMITMENT TO EXCELLENCE REMAINS UNWAVERING. EVERY MILESTONE ACHIEVED IS A REFLECTION OF THE TALENT, PERSEVERANCE, AND INGENUITY OF OUR TEAM.

-DR.K.BOMMANNA RAJA M.TECH ., PH.D PRINCIPAL



HOD'S MESSAGE

THE FIELD OF AERONAUTICS IS ONE OF CONSTANT EVOLUTION, WHERE INNOVATION AND DETERMINATION PAVE THE WAY FOR GROUNDBREAKING ACHIEVEMENTS. AS A DEPARTMENT, WE ARE COMMITTED TO FOSTERING EXCELLENCE IN RESEARCH, EDUCATION, AND TECHNOLOGICAL ADVANCEMENTS THAT CONTRIBUTE TO THE EVER-EXPANDING HORIZONS OF AVIATION.

--DR.A.KARTHIKEYAN, ASSO. PROFESSOR & HEAD



AIRCRAFT INNOVATIONS IN 2024

NEWS

UPDATE

HYDROGEN-POWERED AVIATION ACHIEVED CRITICAL MILESTONES IN 2024, WITH SUCCESSFUL TEST FLIGHTS AND NEW AIRCRAFT DESIGNS UNVEILED. AIRBUS' ZEROE PROTOTYPE COMPLETED ITS FIRST FLIGHT USING HYDROGEN FUEL CELLS AND ADVANCED PROPULSION SYSTEMS, MARKING A HISTORIC ACHIEVEMENT FOR AVIATION DECARBONIZATION.



Airbus zeroe



HEART XI

HEART AEROSPACE, A SWEDISH AVIATION STARTUP, IS GEARING UP FOR ITS FIRST ALL-ELECTRIC EXPERIMENTAL FLIGHT IN 2025. THE AIRCRAFT CALLED THE HEART EXPERIMENTAL 1 (HEART X1) WILL BE A DEMONSTRATION AIRCRAFT, WHICH WILL BE SIMILAR IN SIZE TO ITS FUTURE COMMERCIAL PLANE.

Arul Raj R
2nd year aero





XPOSAT

IN 2024, ISRO ACHIEVED NOTABLE SUCCESSES, INCLUDING THE LAUNCH OF THE X-RAY POLARIMETER SATELLITE (XPOSAT) TO STUDY COSMIC X-RAY SOURCES AND THE APPROVAL OF THE VENUS ORBIT MISSION (VOM) AND CHANDRAYAAN-4 MISSIONS, UNDERSCORING INDIA'S COMMITMENT TO ADVANCING SPACE SCIENCE AND EXPLORATION.



In a move to bolster its air defense capabilities, the Indian Air Force has signed a contract with Hindustan Aeronautics Limited (HAL) to acquire 12 Su-30MKI fighter jets. This \$150 million deal emphasizes India's commitment to modernizing its fleet and achieving self-reliance in defense production. The new aircraft will be manufactured at HAL's Nashik facility, promoting local employment and technological advancement.

Varraaoc Addhithiyachola
2nd year aero



SU-30MKI FIGHTER

INDIA'S LEAP INTO AEROSPACE – INNOVATIONS & FUTURE PROSPECTS



The HAL Tejas is India's indigenous, supersonic, multi-role fighter jet developed by Hindustan Aeronautics Limited (HAL) under the Atmanirbhar Bharat initiative. Designed for air superiority, ground attack, and naval operations, it features fly-by-wire controls, advanced avionics, and a stealthy low radar cross-section. With a top speed of Mach 1.8, Tejas is equipped with air-to-air and air-to-ground missiles, laser-guided bombs, and electronic warfare systems. Currently operational in the Indian Air Force (Tejas Mk1), it is being upgraded to Tejas Mk1A and Mk2 with improved radar, range, and payload. Additionally, a Twin Engine Deck-Based Fighter (TEDBF) variant is under development for the Indian Navy's aircraft carriers. The Tejas program strengthens India's self-reliance in defense, replaces aging MiG-21s, and enhances India's position in the global aerospace industry.



The Gaganyaan capsule, developed by ISRO (Indian Space Research Organisation), is India's first crewed spacecraft designed to carry three astronauts (Gagannauts) into low Earth orbit (LEO) at 400 km altitude for up to three days. As part of the Gaganyaan mission, this capsule will be launched aboard a modified GSLV Mk III (LVM3) rocket and is equipped with advanced life support systems, thermal shielding, and re-entry technology to ensure astronaut safety. The spacecraft features an escape system for emergency aborts and will undergo multiple uncrewed test flights before the first human mission. Expected to launch by 2025, Gaganyaan marks India's entry into human spaceflight, paving the way for future space stations and deep-space missions.

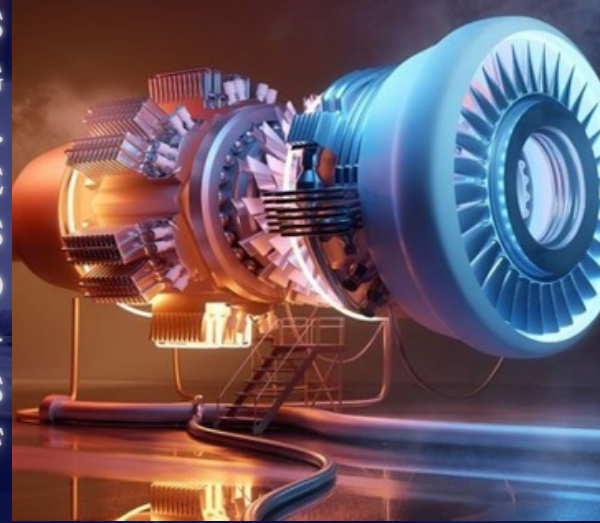
Rohinth
2nd year aero

"India's Aerospace Future is Skybound!"



The Rise of AI and Automation in Aerospace

ARTIFICIAL INTELLIGENCE (AI) IS TRANSFORMING AEROSPACE, ENHANCING EFFICIENCY, SAFETY, AND AUTOMATION. FROM AI-ASSISTED PILOTING TO PREDICTIVE MAINTENANCE, THE AVIATION INDUSTRY IS EMBRACING INTELLIGENT SYSTEMS TO REVOLUTIONIZE AIR TRAVEL. BY 2025, AI-DRIVEN AIRCRAFT AND AUTONOMOUS SYSTEMS WILL REDEFINE THE FUTURE OF AEROSPACE.



BY 2030, AI WILL PLAY A CRUCIAL ROLE IN FULLY AUTONOMOUS COMMERCIAL AIRCRAFT, AI-POWERED AIRPORT OPERATIONS, AND SMART AIR MOBILITY SOLUTIONS. THE INTEGRATION OF AI AND MACHINE LEARNING IN AEROSPACE WILL PUSH THE BOUNDARIES OF SAFETY, SUSTAINABILITY, AND EFFICIENCY IN AIR TRAVEL.



AI-Powered Aircraft Design – AI algorithms optimize aerodynamics, fuel efficiency, and materials for next-gen aircraft.



Predictive Maintenance – AI detects mechanical issues before failure, reducing downtime and improving safety.



AI in Air Traffic Control – Intelligent systems streamline flight paths, reduce congestion, and enhance real-time decision-making.

"AI IS THE NEW CO-PILOT OF THE SKIES!"



Nitesh kumar Sah
2nd year aero

"SUPERSONIC & HYPERSONIC FLIGHT – THE NEXT ERA OF HIGH-SPEED TRAVEL"

BOOM



MACH
12

Jeevapriya N
3rd year aero

The future of air travel is accelerating with the advancements in supersonic and hypersonic flight. These technologies promise to cut travel times dramatically, with supersonic jets reducing intercontinental flights to a few hours and hypersonic vehicles reaching speeds beyond Mach 5, revolutionizing defense and commercial travel.

India and Russia are jointly developing BrahMos-II, a next-generation hypersonic cruise missile capable of reaching Mach 7 speeds. It is an advanced version of the existing BrahMos (Mach 2.8-3), making it one of the fastest cruise missiles in the world



BY 2035,
INDIA AIMS TO
DEVELOP
OPERATIONAL
HYPERSONIC
CRUISE
MISSILES AND
REUSABLE
HYPERSONIC
AIRCRAFT



By 2027, hypersonic aircraft could enable passenger travel at speeds over Mach 5, making London to New York in under an hour a reality. Military and defense applications will continue to push the boundaries, with next-generation hypersonic weapons and aircraft shaping the future of global security and aerospace innovation.



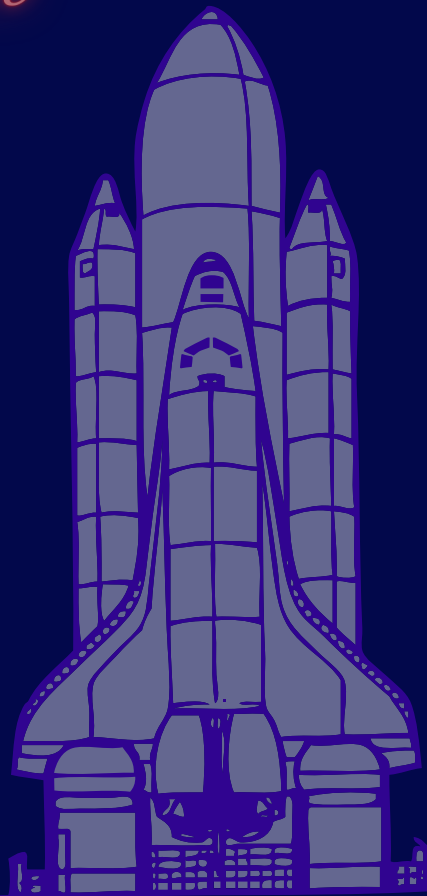
"SPACE TOURISM & COMMERCIAL SPACEFLIGHT"



Madhan S
3rd year aero

The Future of Space Tourism

SPACE TOURISM IS SET TO REVOLUTIONIZE TRAVEL, OFFERING ORDINARY PEOPLE THE CHANCE TO EXPERIENCE THE WONDERS OF SPACE. COMPANIES LIKE SPACEX, BLUE ORIGIN, AND VIRGIN GALACTIC ARE PIONEERING SUBORBITAL AND ORBITAL TRIPS, WHILE FUTURISTIC SPACE HOTELS AND MOON BASES ARE IN DEVELOPMENT.



India's Role **IN COMMERCIAL SPACE FLIGHTS**

new space policies and private sector participation, companies like Skyroot Aerospace and Agnikul Cosmos are developing indigenous launch vehicles. India's low-cost satellite launch services and ambitions for Moon and Mars exploration position it as a key player in the growing space economy. The future of Indian commercial spaceflight is bright and expanding rapidly.



"INDIA IS NOT JUST REACHING FOR THE STARS; IT IS LAUNCHING TOWARDS THE FUTURE".



"The Role of 3D Printing in Aerospace (2024-2025)"

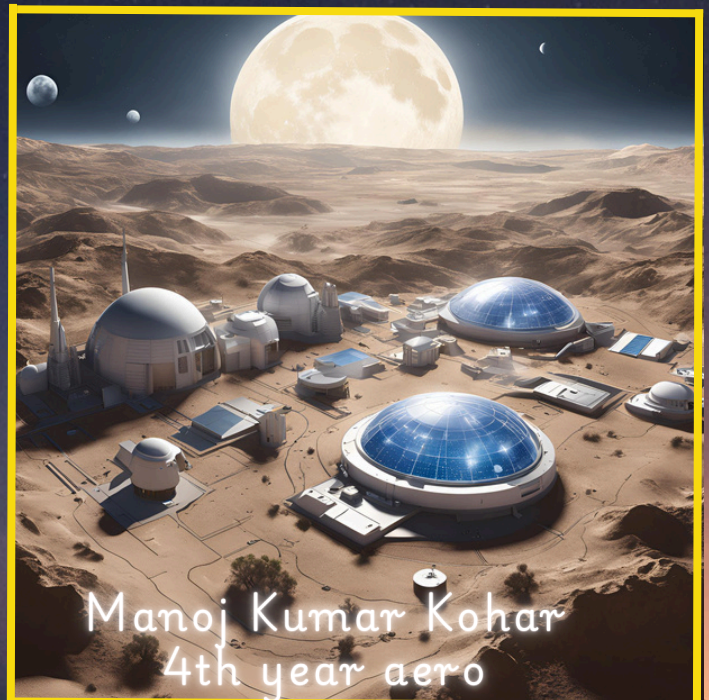
REUSABLE 3D-PRINTED ROCKET :

NASA, ISRO, and SpaceX are leveraging 3D printing for rocket engines to enhance efficiency, reduce costs, and accelerate production. NASA's RS-25 and BE-7 engines feature 3D-printed components for Artemis missions. ISRO is integrating 3D-printed propulsion systems in PSLV's PS4 engine to reduce weight. SpaceX uses 3D-printed SuperDraco thrusters for Crew Dragon and Raptor engine components, enabling rapid manufacturing and reusability.



"FUTURE OF ON-DEMAND SPACE MANUFACTURING"

Space agencies and private companies are developing 3D printing technology to build self-sustaining habitats on the Moon and Mars using local materials. NASA's Artemis program and ESA's lunar projects aim to use lunar regolith for constructing bases, while SpaceX envisions Mars colonies using 3D-printed infrastructure. ISRO is also exploring regolith-based construction for future missions. These advancements will reduce transportation costs, enable long-term space habitation, and support deep-space exploration.



Manoj Kumar Kohar
4th year aero

"URBAN AIR MOBILITY & EVTOLS: THE FUTURE OF CITY TRANSPORT"





THE RISE OF AIR TAXIS IN 2024-2025:

Air taxis, powered by electric vertical take-off and landing (eVTOL) technology, are set to revolutionize urban transportation in 2024-2025. Companies like Joby Aviation, Archer, and Lilium are leading the way with advanced, eco-friendly aircraft designed for short-distance city travel. Governments and aviation authorities are working on air traffic management systems and urban infrastructure, including vertiports for takeoff and landing. With reduced noise, zero emissions, and increasing investments, air taxis are expected to become a mainstream mode of transport, easing urban congestion and offering faster, more efficient travel.

LEADING COMPANIES DRIVING INNOVATION IN AIR TAXIS (2024-2025):

 **Joby Aviation** – Leading with long-range, low-noise eVTOLs targeting commercial air taxi services.

 **Archer Aviation** – Developing the Midnight eVTOL, set for launch in 2025 with a focus on city commutes.

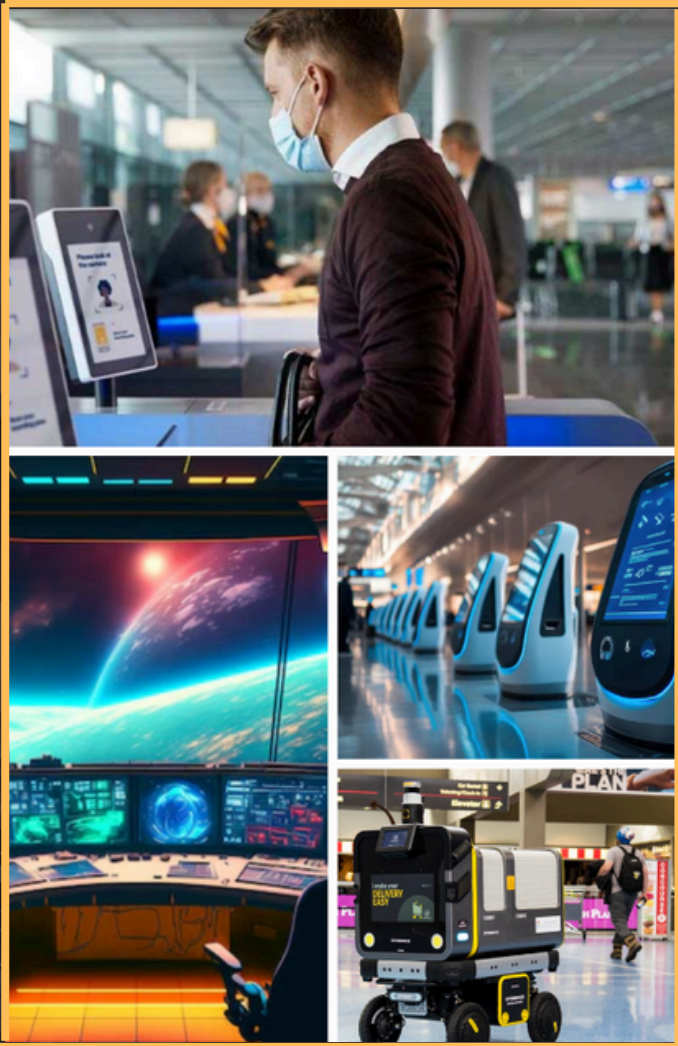
 **Lilium** – Innovating jet-powered eVTOLs for high-speed urban and regional travel.

 **Vertical Aerospace** – Partnering with airlines to integrate eVTOLs into existing transport networks.

"AIR TAXIS ARE TURNING SCI-FI DREAMS INTO REALITY, REVOLUTIONIZING URBAN TRAVEL"

Alwin J
4th year aero

FUTURE AIRPORTS & SMART AVIATION INFRASTRUCTURE



SUSTAINABLE AVIATION TECHNOLOGIES:

The aviation industry is embracing green innovations to reduce carbon footprints. Electric and hydrogen-powered aircraft are emerging as eco-friendly alternatives to traditional fuel-based planes. Sustainable Aviation Fuel (SAF), solar-powered airports, AI-driven flight optimization, and carbon-neutral airport designs are shaping the future. With advancements in renewable energy and smart infrastructure.

THE RISE OF SMART AIRPORTS:

Smart airports are transforming air travel with AI, automation, and sustainable technology. Biometric check-ins, robotic baggage handling, and AI-powered security streamline passenger flow. Solar-powered runways, electric aircraft charging stations, and digital air traffic control enhance efficiency and sustainability.

AI & AUTOMATION IN AIRPORT OPERATIONS 2024-25:

AI and automation are revolutionizing airport operations in 2024-25, making travel faster, safer, and more efficient. AI-powered air traffic control optimizes flight paths, while self-driving airport shuttles improve terminal connectivity. Robot assistants provide real-time updates and navigation help, while smart boarding gates use facial recognition for seamless check-ins. Predictive maintenance systems monitor aircraft health, reducing downtime, and energy-efficient AI optimizes power usage for sustainability. With these innovations, airports are becoming smarter, greener, and more passenger-friendly than ever.

**"AI IS MAKING AIRPORTS FASTER,
SMARTER, AND MORE EFFICIENT THAN
EVER"**

Kowshal Raj Bhattarai
4th year aero

GLIMPSE OF AERO



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(AUTONOMOUS)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Accredited by NBA (AERO, MECH, CSE, ECE, AGRI, CIVIL & BME)
NAAC (A+ Grade - 5.29) and
Recognized by UGC (21 & 2B)
NH-544, Salem Main Road, Komarapalayam, Namakkal District - 637303

Date
24.02.2025
Time
10:00 a.m

DEPARTMENT OF
AERONAUTICAL ENGINEERING
"INDUSTRY GUEST LECTURE ON
DESIGN AND TECHNOLOGY USED IN
AIRCRAFT ENGINES"

Chief Guest



Mr. K. SARAVANAN,
Chief Executive Officer,
Aakash Aerospace Private Ltd.,
Puthupalayam, Erode.



Venue: Board Room



EEC / 2024-25 / EVEN / AERO / MOU (2/1)



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ENGINEERING COLLEGE
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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
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NAAC (A+ Grade - 5.29) and
Recognized by UGC (21 & 2B)
NH-544, Salem Main Road, Komarapalayam, Namakkal District - 637303

Date
25.02.2025
Time
10:00 a.m

DEPARTMENT OF
AERONAUTICAL ENGINEERING

Mou
Signing
Ceremony

Chief Guest



Dr. N. SURESHKUMAR,
Managing Director,
Nova Aerospace Private Ltd.,
Thirumayam,
Pudukkottai - 622 507



Venue: Board Room



GLIMPSE OF AERO



WORKSHOP
11.09.24

C CUBE
TECHNOLOGIES



Excël ENGINEERING COLLEGE
AUTONOMOUS
Komanagallayam, Namakkal Dt. - 637303

Congratulates NCC Airwing Cadets
ACHIEVERS OF ALL INDIA VAYU SAINIK CAMP
HELD AT
AIR FORCE STATION,
JALAHALLI.



CADET UNDER OFFICER

RAHUL B JAMADAR - (III - Aero)
Silver in Drill
All India Overall IIIrd Position



CADET WARRANT OFFICER

HAFAEEZ AHMED - (III - Aero)
Tamilnadu Contingent Commander.
Silver in Drill
All India Overall IIIrd Position



FLIGHT CADET

NITESH KUMAR SAH - (II - Aero)
All India Overall IIIrd Position



FLIGHT CADET

BAVITHRAN B - (II - AI&DS)
All India Overall IIIrd Position



PROGRAM EDUCATIONAL
OBJECTIVES (PEOs)

PEO 1

- Graduate will have the ability to handle industrial challenges through advanced engineering technologies.

PEO 2

- Graduate will have the capability to become socially, intellectually, and ethically responsible aeronautical engineers.

PEO 3

- Graduate experts with essential technical, managerial and soft skills that make them to be professionally competent.

PROGRAM SPECIFIC
OUTCOMES (PSOs)

PSO 1

- Exhibit skill and knowledge on aerodynamics, propulsion and structures.

PSO 2

- Solve real time problems related to aircraft manufacturing and maintenance.

PSO 3

- Apply CAD/CAE tools to design and analyse the aircraft components.



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SCAN ME

