
SRET
EXCEL
Excel
ENGINEERING
COLLEGE
(AUTONOMOUS)
HorizonX
ARHAKRZ MAGAZINE
"Elevating Aerospace, Expanding Horizons"
VOL.01/ISSUE 01/2022-2023

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 aeroatuical engineers.
- To initiate desires for undertaking enterpreneurship and lifelong learning.

CHAIRMAN'S MESSAGE

THE SKY IS NOT THE LIMIT—IT IS JUST THE BEGINNING. AEROSPACE PIONEERS HAVE ALWAYS DARED TO DREAM BEYOND THE HORIZON. LET YOUR CURIOSITY FUEL YOUR PASSION, YOUR KNOWLEDGE SHAPE INNOVATION, AND YOUR DETERMINATION PROPEL YOU TO NEW HEIGHTS. THE FUTURE OF FLIGHT IS IN YOUR HANDS. AIM HIGH!.

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

VICE CHAIRMAN'S MESSAGE

AVIATION IS BUILT ON VISION, PRECISION, AND PERSEVERANCE. LIKE AN AIRCRAFT DEFYING GRAVITY, YOU TOO MUST RISE ABOVE CHALLENGES. EVERY GREAT INNOVATION STARTS WITH A DREAM AND TAKES OFF WITH EFFORT. SO, SPREAD YOUR WINGS, EMBRACE THE UNKNOWN, AND SOAR BEYOND LIMITS. THE SKY AWAITS YOUR BRILLIANCE!.

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

PRINCIPAL'S MESSAGE

GREAT AVIATORS AND ENGINEERS ARE NOT BORN; THEY ARE MADE THROUGH DEDICATION, LEARNING, AND RESILIENCE. JUST LIKE AN AIRCRAFT NEEDS A STRONG FOUNDATION TO TAKE FLIGHT, YOUR EDUCATION IS YOUR RUNWAY TO SUCCESS. STAY PASSIONATE, STAY INNOVATIVE, AND ALWAYS STRIVE TO ELEVATE THE AEROSPACE INDUSTRY!.

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

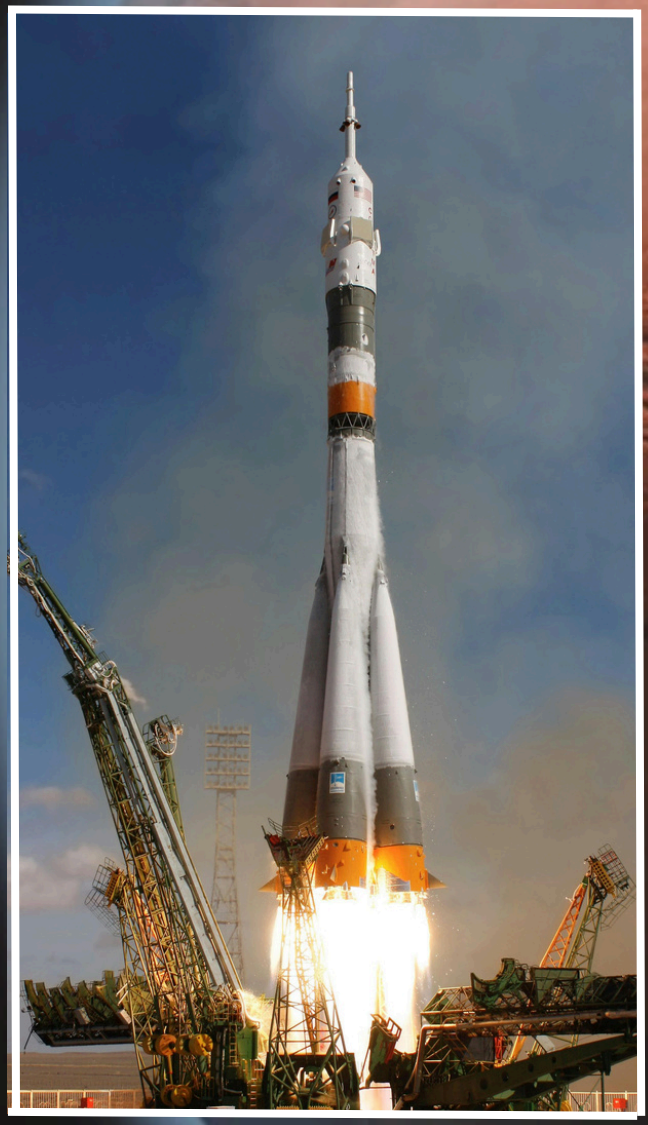
HOD'S MESSAGE

IN AERONAUTICS, PRECISION AND PASSION GO HAND IN HAND. THE MOST GROUNDBREAKING INNOVATIONS IN AVIATION CAME FROM THOSE WHO REFUSED TO ACCEPT LIMITS. YOU ARE THE NEXT GENERATION OF PIONEERS—ENGINEERS WHO WILL SHAPE THE FUTURE OF FLIGHT. STAY CURIOUS, STAY COMMITTED, AND LET YOUR DREAMS TAKE FLIGHT!.

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

INTRODUCTION: A NEW HORIZON FOR AEROSPACE (2022-2023)

THE AEROSPACE INDUSTRY SAW GROUNDBREAKING ADVANCEMENTS IN 2022-2023, WITH A SURGE IN AI-POWERED AVIATION, SUSTAINABLE AIRCRAFT, AND PRIVATE SPACE EXPLORATION. NATIONS AND COMPANIES ALIKE PUSHED THE BOUNDARIES OF INNOVATION, BRINGING US CLOSER TO A FUTURE WHERE AIR AND SPACE TRAVEL ARE MORE EFFICIENT, ECO-FRIENDLY, AND ACCESSIBLE. THIS MAGAZINE EXPLORES THE KEY TRENDS THAT SHAPED THE PAST TWO YEARS AND SET THE STAGE FOR FUTURE BREAKTHROUGHS.



KEY HIGHLIGHTS OF 2022-2023

- **RISE OF COMMERCIAL SPACEFLIGHT**
- **SUSTAINABLE AVIATION INNOVATIONS**
- **INTEGRATION OF AI AND AUTOMATION**
- **GLOBAL COLLABORATIONS IN AEROSPACE**

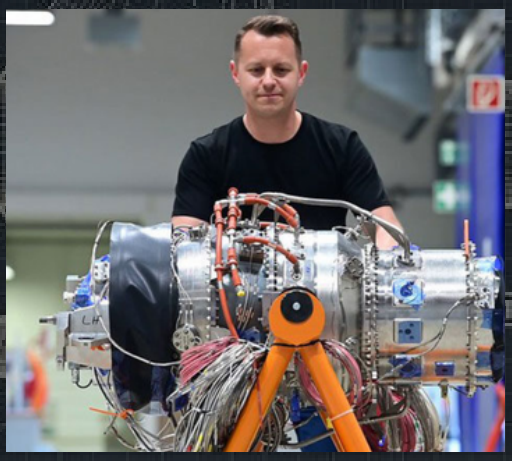
Saivignesh S
2nd year aero

BREAKTHROUGH AIRCRAFT

"Revolutionizing the Future of Flight: Supersonic, Electric & Urban Air Mobility"

SUPERSONIC JET

THE DREAM OF SUPERSONIC TRAVEL WAS REIGNITED WITH DEVELOPMENTS LIKE BOOM SUPERSONIC'S OVERTURE, PROMISING SPEEDS 1.7 TIMES FASTER THAN SOUND, CUTTING LONG-HAUL FLIGHT TIMES DRAMATICALLY WHILE FOCUSING ON SUSTAINABLE AVIATION FUELS (SAFS).



ELECTRIC AIRCRAFT

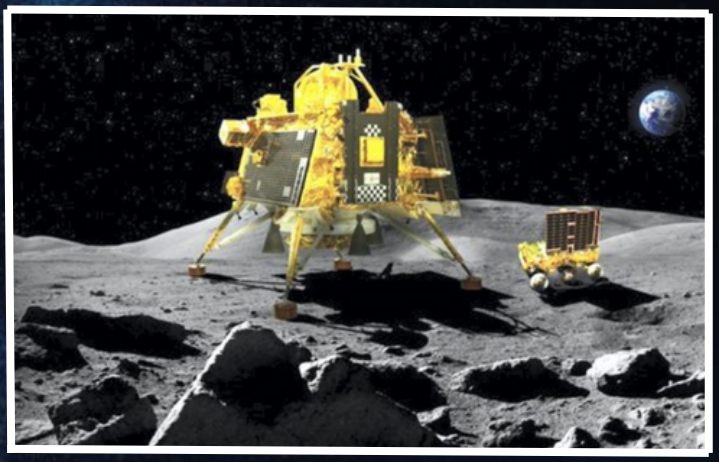
COMPANIES LIKE EVIATION (ALICE), ROLLS-ROYCE, AND AIRBUS MADE STRIDES IN ALL-ELECTRIC AIRCRAFT, REDUCING CARBON EMISSIONS AND SETTING THE STAGE FOR CLEANER, QUIETER AVIATION. THE FIRST SUCCESSFUL TEST FLIGHTS OF ALICE, THE ALL-ELECTRIC COMMUTER PLANE, MARKED A TURNING POINT IN ECO-FRIENDLY AIR TRAVEL.

URBAN AIR MOBILITY

EVTOL (ELECTRIC VERTICAL TAKEOFF AND LANDING) AIRCRAFT GAINED MOMENTUM WITH PIONEERS LIKE JOBY AVIATION, ARCHER AVIATION, AND LILIUM WORKING TOWARDS COMMERCIALIZING AIR TAXIS. THESE FUTURISTIC AIRCRAFT AIM TO REDUCE URBAN CONGESTION AND MAKE ON-DEMAND AERIAL TRANSPORT AN EVERYDAY REALITY.

Prasanth M
2nd year aero

SPACE EXPLORATION UPDATES!



NASA'S KEY MISSIONS (2022-2023)

ARTEMIS I (NOV 2022): The first uncrewed mission of NASA's Artemis program, successfully tested the Space Launch System (SLS) and Orion spacecraft, paving the way for future lunar missions.

JAMES WEBB TELESCOPCE (ONGOING): Released breathtaking images of deep space, providing insights into exoplanets, distant galaxies, and the origins of the universe

PSYCHE MISSION (OCT 2023): Launched to study the metal-rich asteroid Psyche, offering clues about planetary cores and early solar system formation.

DART MISSION (SUCCESS IN 2022): The Double Asteroid Redirection Test (DART) successfully altered an asteroid's trajectory, marking a breakthrough in planetary defense.

ISRO'S KEY MISSIONS (2022-2023)

CHANDRAYAAM-3 (JULY 2023, SUCCESS IN 2023): India's third lunar exploration mission successfully landed on the Moon's south pole, making India the first country to achieve this feat.

ADITYA-L1 (SEPT 2023): India's first solar mission launched to study the Sun's corona, solar winds, and their impact on Earth's space weather.

Evangeline Christia
2nd year aero

GAGANYAAN (TESTING PHASE, 2023): ISRO conducted successful crew escape system tests for India's first human spaceflight program, planned for 2024-2025.

ONEWEB SATELLITE (2022-2023): ISRO launched multiple satellites for OneWeb's broadband constellation, showcasing its growing role in global commercial space launches.

“SUSTAINABLE AVIATION : GREENER SKIES, CLEANER FUTURE”

🌿INNOVATIONS:

🔋 EVIATION ALICE:

The world’s first all-electric commuter aircraft successfully completed its maiden flight in 2022, marking a major step toward zero-emission regional travel. With a range of 250 nautical miles, Alice is designed for short-haul routes, offering a greener alternative to traditional fuel-based aircraft.

♻️ SUSTAINABLE AVIATION FUEL (SAF):

SAF, made from renewable sources like algae, waste oils, and biomass, can reduce lifecycle carbon emissions by up to 80% compared to conventional jet fuel. Major airlines, including Boeing, have committed to 100% SAF capability in all aircraft by 2030, accelerating the transition to cleaner aviation.

Ganesh Chandra
3rd year aero

📊 INDUSTRY GOALS :

🌍 IATA NET-ZERO TARGET:

The International Air Transport Association (IATA) has set an ambitious goal to achieve net-zero carbon emissions by 2050, requiring a mix of SAF, hydrogen, electric propulsion, and carbon offset programs. Airlines worldwide are aligning with this target, investing in next-gen aircraft technologies to meet sustainability demands.

💡 AIRLINES INVESTING IN SAF:

Major airlines such as United, Delta, and Lufthansa are investing billions in SAF production and distribution. United Airlines launched the "Eco-Skies Alliance", collaborating with corporations to fund SAF, while Lufthansa is testing power-to-liquid (PtL) fuels to further reduce carbon footprints in aviation.

"Pioneering the Future of Flight One Sustainable Innovation at a Time." ✈️🌱

"NEURAL SKIES: HOW AI & AUTOMATION ARE RESHAPING AEROSPACE"

🛰️ Autonomous Spacecraft & Rovers:

NASA and ISRO are leveraging AI-powered autonomous systems for deep-space exploration. The Perseverance rover on Mars uses AI for self-navigation, while ISRO's Chandrayaan-3 lander used AI-assisted systems to safely land on the Moon in 2023.

AI INNOVATIONS IN AEROSPACE:

AI is advancing autonomous flight technology, reducing pilot workload and improving efficiency. Boeing and Airbus are integrating AI copilots capable of making real-time decisions based on weather conditions, air traffic, and mechanical health.Aircraft manufacturers are using AI to detect mechanical issues before failures occur. AI-powered sensors analyze real-time data, preventing costly repairs and improving fleet reliability. Airlines like Delta and Lufthansa have adopted AI-driven predictive maintenance to cut delays and enhance safety.To handle increasing global air traffic, AI-powered air traffic control (ATC) systems are improving flight coordination, reducing congestion and delays. AI analyzes flight paths, weather patterns, and aircraft performance to optimize routing.

"SKY SHIELDS: ADVANCEMENTS IN DEFENSE & MILITARY AVIATION "

The U.S. Air Force enhanced the F-35's AI and sensor fusion, improving stealth, speed, and battlefield awareness. India's HAL Tejas Mk2 and Advanced Medium Combat Aircraft (AMCA) projects are set to enhance air superiority with indigenous technology.Unveiled by the U.S., this AI-powered, long-range nuclear bomber will redefine air dominance.

THE RISE OF AI & DRONES IN COMBAT:

🤖 **AI-Driven UAVs & Swarm Drones: Nations deployed AI-powered autonomous drone swarms for surveillance, attack, and air defense missions.**

🛡️ **Loyal Wingman Program: Boeing's AI-controlled drone flies alongside fighter jets, enhancing missions without risking pilot lives.**

🔥 **Kamikaze Drones in Warfare: The use of loitering munitions like the Switchblade & Shahed drones changed battlefield strategies in recent conflicts.**

🚀 **S-500 & Iron Beam: Advanced missile defense systems using laser and AI technologies for ultra-fast threat neutralization.**

📡 **AI-Enhanced Radar & Electronic Warfare: Nations are integrating AI into radar for instant threat detection & jamming enemy signals.**

Ashika K.V
3rd year aero

“BEYOND THE HORIZON – FUTURE OUTLOOK & PREDICTIONS IN AEROSPACE”

Rahul Rahavendran M
4th year aero

NEXT-GEN AIRCRAFT & SPACE TECHNOLOGIES:

- ✈️ **Supersonic & Hypersonic Travel:** Companies like Boom Supersonic & NASA are working on Mach 5+ aircraft that could cut flight times in half.
- 🚀 **Commercial Space Travel:** SpaceX, Blue Origin, and ISRO are paving the way for space tourism & lunar colonization.
- 🛰️ **AI-Powered Smart Satellites:** Advanced AI-driven orbital navigation and space debris management are becoming a reality.

SUSTAINABLE & AI-DRIVEN AEROSPACE INNOVATIONS:

- 🌿 **GREEN AVIATION:** ELECTRIC AND HYDROGEN-POWERED AIRCRAFT ARE THE NEXT STEP TOWARD ZERO-EMISSION FLIGHTS.
- 🤖 **AUTONOMOUS FLIGHTS**: AI COPILOTS AND SELF-FLYING PLANES WILL TRANSFORM PASSENGER & CARGO AVIATION.
- 🛡️ **SPACE DEFENSE SYSTEMS:** LASER AND AI-DRIVEN DEFENSE TECH ARE BECOMING CRUCIAL FOR SECURING ORBITS & PREVENTING SPACE CONFLICTS.

2050 VISION: WHAT LIES AHEAD?

- **Space Habitats & Mars Missions:** Scientists predict permanent lunar bases & Mars settlements within a few decades.
- **Quantum Computing in Aerospace:** Game-changing quantum algorithms could revolutionize flight simulations & air traffic control.
- **AI-Powered Air Traffic Management:** Fully autonomous global airspace coordination to reduce delays & maximize efficiency.

"PUSHING BOUNDARIES, UNLOCKING THE SKIES OF TOMORROW."

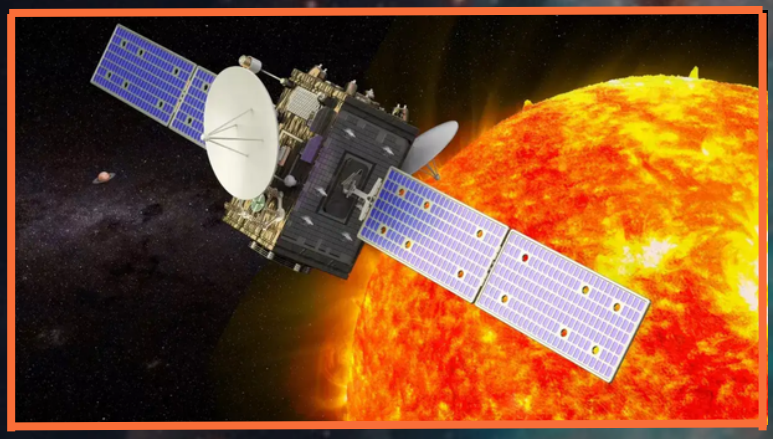
"INDIA'S AEROSPACE MOMENTUM: LEAPING INTO THE FUTURE "

GAGANYAAN: INDIA'S HUMAN SPACEFLIGHT DREAM:

INDIA'S FIRST MANNED SPACE MISSION, GAGANYAAN, HAS BECOME A SYMBOL OF NATIONAL PRIDE. WITH SUCCESSFUL ENGINE TESTS AND CREW MODULE READINESS, INDIA IS PREPARING TO SEND ITS ASTRONAUTS TO SPACE BY 2025, JOINING AN ELITE GLOBAL CLUB.

ISRO-INDUSTRY COLLABORATION:

ISRO HAS PARTNERED WITH INDIAN PRIVATE PLAYERS LIKE SKYROOT AEROSPACE, AGNIKUL COSMOS, AND BELLATRIX AEROSPACE, FOSTERING A THRIVING SPACE STARTUP ECOSYSTEM AND BOOSTING INDIA'S GLOBAL AEROSPACE PRESENCE.



ADITYA L-1: TOUCHING THE SUN:

INDIA'S FIRST SOLAR OBSERVATORY, ADITYA L-1, AIMS TO STUDY SOLAR STORMS AND PROTECT SATELLITES AND POWER GRIDS ON EARTH. THIS MISSION PLACES INDIA ON THE CUTTING EDGE OF SPACE WEATHER RESEARCH — CRITICAL FOR FUTURE SPACE TRAVEL SAFETY.

SMALL SATELLITE REVOLUTION WITH SSLV:

IN FEBRUARY 2023, INDIA LAUNCHED THE SMALL SATELLITE LAUNCH VEHICLE (SSLV) — DESIGNED FOR RAPID DEPLOYMENT OF SMALL SATELLITES. THIS LAUNCH VEHICLE MAKES INDIA A GO-TO DESTINATION FOR GLOBAL SATELLITE STARTUPS, OFFERING AFFORDABLE AND EFFICIENT SPACE ACCESS.

“SKY WARRIORS — INDIA’S AEROSPACE DEFENCE BREAKTHROUGHS”

HYPERSONIC POWER: BRAHMOS AND BEYOND:

India’s hypersonic missile programs are advancing fast – working on missiles that can travel five times the speed of sound, impossible to intercept, and offering next-level deterrence.

DRONE SWARMS — THE NEW AGE WARRIORS:

India isn’t just building single aircraft but deploying swarms of autonomous drones for reconnaissance, electronic warfare, and precision strikes. These AI-powered aerial teams will reshape the future of defense.

HOMEGROWN FIGHTER JETS — THE PRIDE OF INDIA:

2023 saw rapid advancements in the Tejas Mk2 — a supersonic, multi-role fighter aircraft that represents India’s aerospace self-reliance and cutting-edge engineering. With better avionics and extended range, Tejas is ready to soar on global defense markets.

AMCA — THE FUTURE STEALTH FIGHTER:

Imagine a fighter jet that cannot be seen on radar, flies supersonic without afterburners, and is controlled by AI. That’s the AMCA project — India’s futuristic 5th-generation stealth aircraft that will revolutionize air dominance in Asia by the next decade.

"GUARDIANS OF THE SKY – INDIA’S DEFENCE AVIATION LEADING THE NEXT FRONTIER."

GALLERY


Namakkal, Tamil Nadu, India
CQWC+XHM Sports Ground, Tamil Nadu 63800
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Long 77.771232°
03/09/22 10:30 AM
Namakkal, Tamil Nadu, India
Civil Department, Tamil Nadu 638005
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GALLERY


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PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1

- To strengthen the fundamental subject knowledge and practical skills of the aeronauctical students for meeting the requirements of aeronautical industries and educational instituitions including research centre.

PEO 2

- To give quality technical education to the students covering latest technologies concepts for facilitating them to diagnose and solve industrial problems.

PEO 3

- **To shape the students for becoming socially,intellectually and ethically responsible aeronautical engineers.**

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1

- identify,formulate and analyze complex engineering problems in aerodynamics,propulsion,aircraft structures,aircraft manufacturing and maintanence domains.

PSO 2

- Design and develop interdisciplinary and innovative systems.

PSO 3

- **Inculcate effective communication skills,team work,ethics and leadership in preparation for a successful career in industry and R&D organizations.**

ARHAKRZ MAGAZINE

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