Edition 4

AD ASTRA PER ASPERA

May 2025

THE ZENITH

OFFICIAL NEWS LETTER OF TEAM ROCKETRY DTU

THE SKY IS NO LONGER THE LIMIT FOR OUR PRIDE

DELHI TECHNOLOGICAL UNIVERSITY

Team Rocketry DTU proudly expresses its deepest gratitude to Delhi Technological University for its unwavering commitment to fostering innovation, research, and technological advancement. From cutting-edge research projects to nurturing student-led tech teams like ours, DTU has consistently provided an environment where ideas take flight—quite literally in our case.

We extend our heartfelt thanks to Vice Chancellor Sir and our faculty advisor, Dr. Deshraj Meena, whose constant support, guidance, and belief in our vision have been instrumental in our journey. Their encouragement fuels our drive to push boundaries and take on challenges in aerospace and rocketry, a field where DTU shines despite not having a dedicated aerospace department.

Since its inception, DTU has been a pioneer in promoting student-led innovation, empowering young engineers to take on ambitious projects, conduct groundbreaking research, and contribute to the future of technology. It is this culture of support and excellence that enables us to dare, dream, and achieve.

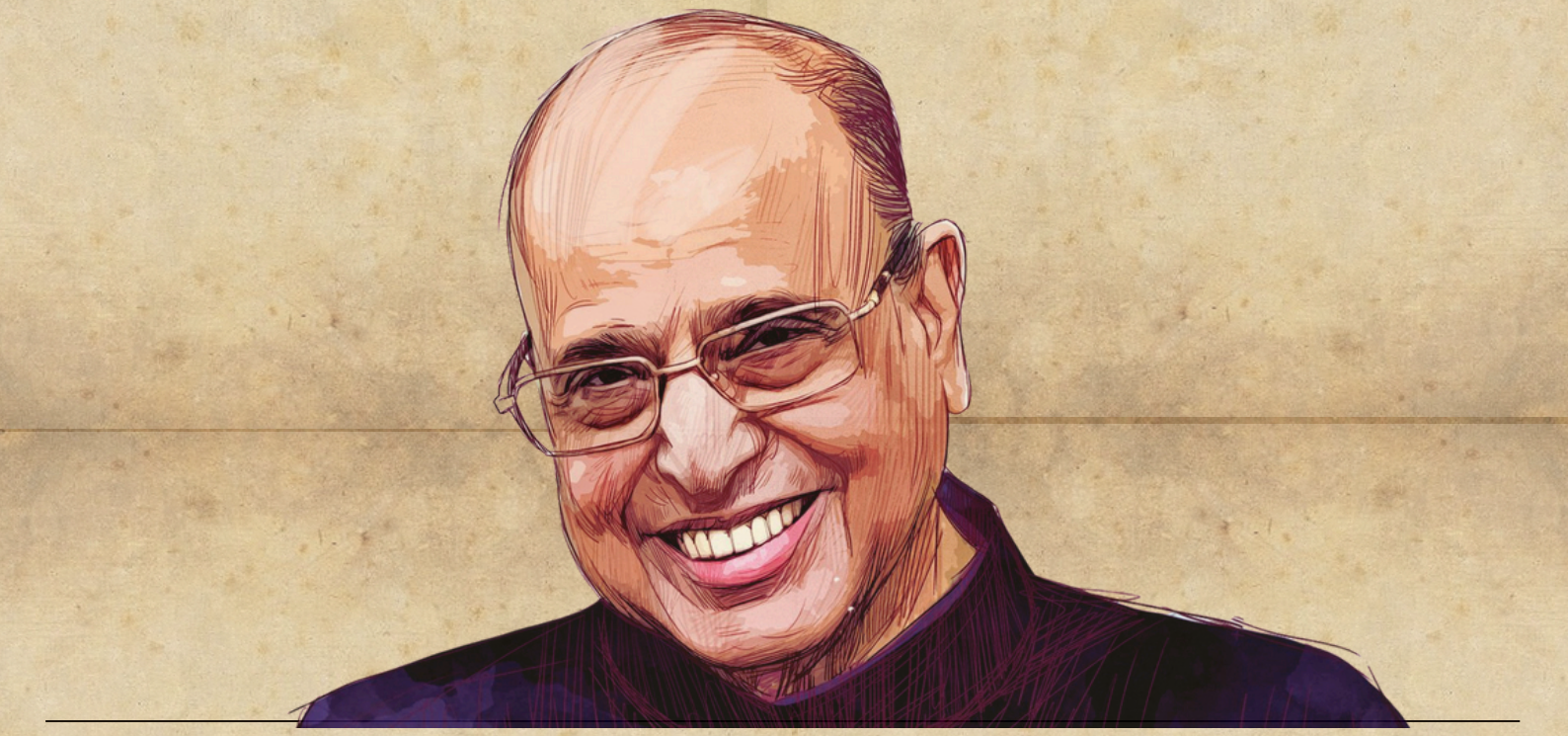
SALUTE BEYOND THE STRATOSPHERE

AS WE CHASE THE SKIES THROUGH ROCKETRY AND EXPLORATION, WE PAUSE TO HONOR THE BRAVE HEARTS OF OUR ARMED FORCES. IN THE FACE OF DISTRESS AND UNCERTAINTY, ESPECIALLY DURING RECENT TENSIONS BETWEEN INDIA AND PAKISTAN, THEIR UNWAVERING COURAGE AND SACRIFICE BECAME THE BACKBONE OF OUR NATION'S STRENGTH. THIS IS OUR HUMBLE SALUTE TO THOSE WHO GUARD OUR DREAMS SO WE CAN AIM HIGHER.

JAI HIND

A TRIBUTE TO A VISIONARY: Dr. K. Kasturirangan

Dr. Krishnaswamy Kasturirangan (1940–2025) was a distinguished Indian space scientist and visionary leader who significantly advanced India's space capabilities. Born in Ernakulam, Kerala, He earned his B.Sc. and M.Sc. in Physics from Bombay University and obtained a Ph.D. in Experimental High Energy Astronomy from the Physical Research Laboratory, Ahmedabad



Dr. Kasturirangan held pivotal roles in the Indian Space Research Organisation (ISRO), including Project Director for the Bhaskara-I and II satellites and the first operational Indian Remote Sensing Satellite, IRS-1A. As Chairman of ISRO from 1994 to 2003, he spearheaded the development and launch of the Polar Satellite Launch Vehicle (PSLV), Geosynchronous Satellite Launch Vehicle (GSLV), and advanced remote sensing satellites like IRS-1C and 1D. His leadership also initiated India's planetary exploration with Chandrayaan-I. Beyond space science, Dr. Kasturirangan contributed to education policy as the architect of India's National Education Policy 2020 and served in various academic and governmental roles. He was honored with the Padma Vibhushan, Padma Bhushan, and Padma Shri for his exceptional contributions to science and nation-building

OUR FACULTY ADVISOR

Dr.Deshraj Meena
(Assistant Professor)

Every launch needs a steady hand at the helm-and for Team Rocketry DTU, that guiding force has been none other than Dr. Deshraj Meena, our incredible Faculty Advisor and Assistant Professor at DTU.

From the first meeting to every mission after, Dr. Meena sir brought more than just academic wisdom — he brought belief. Whether it was approving a late-night session, navigating technical uncertainties, or backing our boldest ideas, he's been the unwavering support that turned our ambitions into action.

Sir didn't just supervise us — he stood with us. His mentorship was never just about what looked good on paper, but about what could fly. With every blueprint, every discussion, and every test, he pushed us to dream bigger, work harder, and trust ourselves a little more.

And behind the formal title is someone who genuinely cared — for the team, for the process, and for the passion that brought us all together. In him, we found not just a professor, but a partner in progress.

So here's to you, Dr. Deshraj Meena — thank you for fueling our journey, for guiding us through turbulence, and for helping us build not just rockets, but confidence, character, and community.

We're proud to have you on this launchpad with us. And with you by our side — the sky is no longer the limit.

DEPARTMENTAL UPDATES

AVIONICS

- In Progress: LoRa integration for telemetry and ground station.
- Completed: System check integrated into load cell for better diagnostics.

AEROSTRUCTURES

- Developed a 3D mold for a new layup method to improve build quality of the nosecone and transition sections.
- Implementing a new design to integrate the bulkhead with the coupler into a single unit, aimed at reducing weight and increasing internal space.

DEPARTMENTAL UPDATES

PROPULSION

- New J-class nozzle is ready.
- Motor testing scheduled this week.
- One motor test successfully completed on April 15.

CORPORATE & PR

- Monitoring deal secured with XTCY.
- Deliverables provided to previous sponsors based on solid work.
- Potential outreach to additional sponsors is being considered.

ROCKET LAUNCH REPORT

AGNI MK-IV

The mission marked a significant milestone in the team's composite engineering efforts, with the first successful deployment of fiberglass tip-to-tip layup fins, offering improved structural rigidity and reduced warping under dynamic flight loads. In addition, a fiberglass-reinforced nose cone was introduced, enhancing impact resistance and thermal durability during ascent. These upgrades were the result of extensive prototyping, testing, and interdisciplinary collaboration across propulsion, structures, and recovery sub-teams.

Agni Mk-4 reflects Team Rocketry's commitment to iterative design, experimental rigor, and hands-on aerospace engineering. The project not only validated the team's growing expertise in SRAD propulsion and composite fabrication but also set a new standard for future low-altitude flight platforms within the club.

Agni Mk-4 is an advanced experimental sounding model rocket developed by Team Rocketry, DTU, aimed at exploring flight stability, composite material applications, and low-altitude flight performance. With a length of 93 cm and a launch mass of approximately 2 kg, the rocket was designed to push the boundaries of structural efficiency and material innovation within the constraints of a compact student-led project. Powered by a solid-propellant SRAD motor, Agni Mk-4 achieved an apogee of 130 meters, demonstrating a stability margin of 1.63—an essential metric confirming aerodynamic reliability under real launch conditions.

BRAHMOS

Supersonic Powerhouse of Global Defense

The BrahMos missile is a supersonic cruise missile developed by India and Russia, capable of precision strikes from land, sea, air, and submarine platforms. With speeds up to Mach 3, a 500+ km range, and high accuracy, BrahMos is a core asset in India's defence, with advanced variants under development. The BrahMos missile, a pinnacle of supersonic cruise technology, employs a two-stage propulsion system that ensures its formidable performance. In the first stage, a solid-propellant rocket booster propels the missile to supersonic speeds, followed by a liquid-fueled ramjet sustainer in the second stage, maintaining speeds near Mach 3 during its cruise phase for superior range and fuel efficiency compared to traditional rocket-powered missiles. Its special features enhance its ersatility and lethality:

universal platform compatibility allows deployment from land, sea, and sub-sea platforms, while its fire-and-forget capability eliminates the need for operator input post-launch. With stealth technology reducing its radar cross-section, high kinetic energy from its supersonic velocity, and the ability to execute multiple flight trajectories—such as steep dives or sea-skimming—to evade defenses, the BrahMos is a formidable weapon. Additionally, its Transport Launch Canister (TLC) ensures ease of transport, storage, and deployment, making it a highly adaptable and survivable missile system. The BrahMos missile boasts an impressive range of up to 600 km, enabling it to strike targets at long distances with precision, while maintaining a blistering speed of Mach 3, making it one of the fastest supersonic cruise missiles globally.

Feature	Details
Type	Supersonic Cruise Missile
Length	Approx. 8.2 meters (varies by variant)
Diameter	Around 0.67 to 0.7 meters
Wingspan	1.7 meters
Weight	2,200 to 3,000 kg depending on variant
Warhead	200 to 300 kg conventional high-explosive or semi-armour piercing warhead
Speed	Mach 2.8 to Mach 3.5 (supersonic cruise
Range	290 km (original) to 500 km (extended range variants)
Accuracy	1 meter Circular Error Probable (CEP)

ISRO TIMES

SHUBHANSHU SHUKLA TO ISS IN MAY!

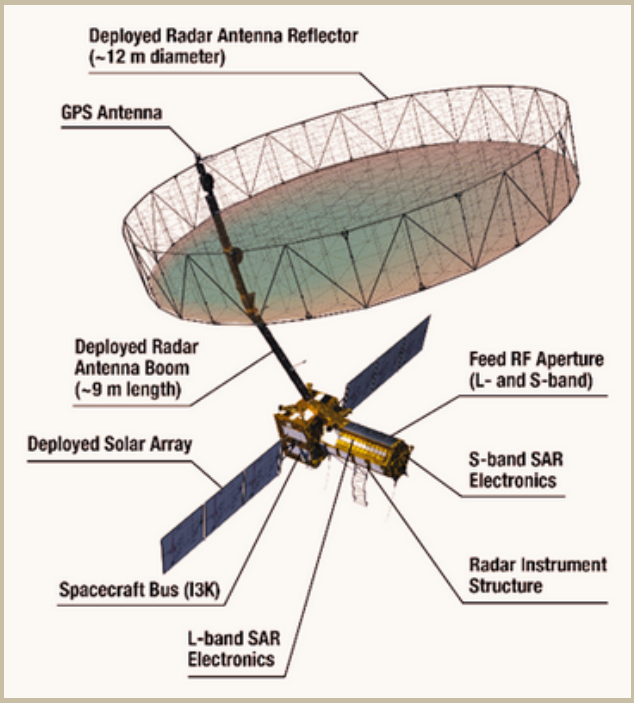
India is set to mark a historic milestone in its space journey as Group Captain Shubhanshu Shukla of the Indian Air Force prepares to become the first Indian astronaut to visit the International Space Station (ISS). Scheduled for launch aboard Axiom Mission 4 (Ax-4) from NASA's Kennedy Space Center, Shukla's mission is targeted for May 29, 2025, though a slight delay into early June is possible due to minor technical checks.

During his 14-day stay on the ISS, Shukla will lead seven pioneering experiments designed by ISRO, focusing on micrograv-ity's effects on seed germination, muscle loss, cognitive performance, and the survival of tardigrades-findings that will directly inform India's upcoming Gaganyaan human spaceflight program. This mission not only makes Shukla the second Indian in space after Rakesh Sharma but also provides invaluable operational experience for ISRO's future crewed missions and strengthens India's role in global space exploration

Gaganyaan Human Spaceflight Delayed to 2027

India's landmark Gaganyaan human spaceflight mission has now been rescheduled for launch in the first quarter of 2027, reflecting the complexity of developing advanced technologies for crewed spaceflight and the impact of earlier delays, including those caused by the COVID-19 pandemic. ISRO is currently in the final phase of preparations, with 3 uncrewed missions scheduled before the crewed flight. The first uncrewed mission (G-1) is set for late 2025, followed by 2 more in 2026-one featuring the Vyommitra half-humanoid robot to test onboard systems. These precursor flights will validate critical safety systems, including the human-rated LVM3 launch vehicle, life support systems, crew escape mechanisms, and recovery operations. Gaganyaan will send three Indian astronauts into orbit. Training is underway. India will join the few nations with human spaceflight capability.

NISAR EARTH OBSERVATION SATELLITE LAUNCH IN JUNE



After years of meticulous preparation and overcoming technical hurdles, the NASA-ISRO Synthetic Aperture Radar (NISAR) satellite is officially set for launch in June 2025. This historic joint mission between ISRO and NASA will see one of the world's most advanced Earth observation satellites take flight aboard the GSLV-F16 rocket from the Satish Dhawan Space Centre, Sriharikota.

NISAR is the first satellite to feature a dual-frequency synthetic aperture radar, combining NASA's L-band and ISRO's S-band systems. This cutting-edge technology will allow the satellite to scan nearly all of Earth's land and ice surfaces every 12 days, providing high-resolution data on changes in ecosystems, ice sheets, and the planet's crust. The data, which will be freely accessible, promises to revolutionize research in climate change, natural hazards, and environmental monitoring.

The mission's advanced radar imaging will support disaster management, infrastructure monitoring, and scientific research, with centimeter-level precision-even through clouds and dense vegetation. NISAR's launch marks a major milestone in international space collaboration and underscores India's growing leadership in global Earth observation efforts.

ISRO AND ESA DEEPEN HUMAN SPACEFLIGHT COLLABORATION

In a landmark step for international space collaboration, the Indian Space Research Organisation (ISRO) and the European Space Agency (ESA) signed a Joint Statement of Intent on Human Space Exploration in May 2025 at the Global Space Exploration Conference in New Delhi. This agreement marks a new chapter in their 40-year partnership, focusing on joint crewed missions, technology sharing, and sustainable exploration in low Earth orbit and, eventually, the Moon.

Key areas of cooperation include developing interoperable rendezvous and docking systems, astronaut training, analogue space missions, and parabolic flight activities. The partnership will also facilitate joint research projects and allow European experiments on India's POEM orbital platforms, with future prospects for ESA astronauts to visit India's planned Bharatiya Antariksh Station (BAS). The BAS, India's first modular space station, is set to launch its base module in 2028 and be fully operational by 2035.

ESA may contribute to BAS construction by providing cargo delivery support, and both agencies are exploring alignment on scientific payloads and potential robotic lunar missions. Leaders from both sides emphasized that this collaboration will leverage shared expertise, reduce costs, and accelerate advancements in human spaceflight, positioning India and Europe as key partners in global space exploration.

Rocket Lab's Neutron Selected for U.S. Military Cargo Test

Rocket Lab's upcoming Neutron rocket has been chosen for a U.S. Air Force Research Laboratory (AFRL) mission under the "rocket cargo" program, aimed at testing rapid global cargo delivery via spaceflight. The experimental mission, set for no earlier than 2026, explores the feasibility of using commercial rockets to deliver military supplies anywhere on Earth within hours.

Announced on May 8, the contract value remains undisclosed. Rocket Lab CEO Peter Beck stated that the program is still in its early stages, emphasizing that the mission represents a key opportunity to shape future military logistics through space.

The upcoming test will serve as a "survivability experiment," with Neutron expected to carry multiple payloads that will re-enter Earth's atmosphere—demonstrating the rocket's capability for safe, global cargo transport. This multi-manifest mission is part of Rocket Lab's broader efforts to expand into national security space launches.

Neutron, capable of lifting up to 13,000 kg to low earth orbit, is on track for its first launch in 2025. Construction of the launch pad at Wallops Island, Virginia, and rocket

development are proceeding as planned, according to the company.

U.S. Space Force Advances Laser Communication Program

The U.S. Space Force has selected CACI, General Atomics, and Viasat to move forward in Phase 2 of its $100 million Enterprise Space Terminal (EST) program, aiming to develop standardized laser-based communication terminals for military satellites. Blue Origin, which participated in Phase 1, was not chosen for this next phase.

Announced on May 8 by Space Systems Command (SSC), the EST program is focused on creating interoperable, commercial-off-the-shelf optical terminals that can link satellites across multiple orbits. These terminals are expected to serve as a foundation for a secure and efficient space-based data transport network.

Optical, or laser, communications offer high bandwidth and low latency compared to traditional radio systems, along with enhanced resistance to jamming and interception—key advantages for defense applications. The terminals will use a common waveform, allowing seamless communication among satellites in different orbits.

The companies were selected based on cost, schedule, and performance to ensure value and foster competition. According to SSC, this approach helps build the industrial base for long-range laser communications while encouraging innovation.

Lt. Col. Jeffrey Fry, program manager, emphasized that the selected terminals will support a flexible and secure military space network. No date has been set for in-orbit demonstrations.

INTRODUCTION TO UAV TECHNOLOGY

MAY 2025

Unmanned Aerial Vehicles (UAVs), or drones, are innovative aircraft that fly without an onboard pilot. Controlled remotely or autonomously, they feature lightweight frames, powerful motors, and advanced flight controllers. Equipped with high-tech sensors and cameras (like GPS, LiDAR, and HD video), drones can navigate, capture data, and transmit real-time information. Their flexible designs-from compact quadcopters to long-range fixed-wing models-make UAVs invaluable for photography, agriculture, mapping, emergency response, and more, transforming how we see and interact with the world.

Applications of UAV

Civilian & Commercial:

- **Aerial Photography & Videography:** Used in media, real estate, and tourism.
- **Mapping & Surveying:** Creating maps for construction, agriculture, and research.
- **Security & Surveillance:** Crowd monitoring, border patrol, and event security.

Military & Defense:

- **Reconnaissance & Surveillance:** Gathering intelligence and monitoring activities.
- **Combat & Targeting:** Precision strikes and support missions.

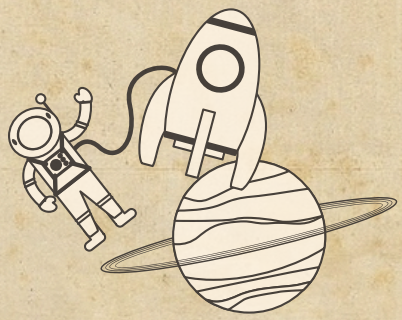
Emerging Uses:

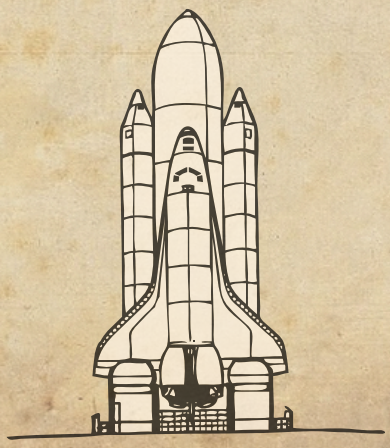
- **Healthcare:** Delivering medicines and emergency supplies.
- **Research:** Studying weather, pollution, and geology.

UAV Sensors : The eyes and ears of Drones

- **IMU :** An IMU (Inertial Measurement Unit) is a device that measures and reports a UAV's attitude, velocity, acceleration, and orientation using accelerometers and gyroscopes, enabling stable and controlled flight
- **GPS :** It enables UAVs to determine their exact position, altitude, and speed, allowing for accurate navigation, autonomous flight, and reliable return-to-home functions.
- **LiDAR :** On UAVs it uses laser pulses to create highly accurate 3D maps of terrain, buildings, and vegetation, enabling fast and detailed surveying even in hard-to-reach or hazardous areas.

MEET THE SENIOR MAYANK MISHRA





If you've ever walked past the Rocketry room and heard someone passionately explaining "why this booster is the booster," chances are — it was Mayank Mishra in action.

This month, we're featuring Mayank Mishra (aka Mayank bhaiya) mechanical engineer, space enthusiast, data wizard, and one of the founding forces behind Team Rocketry DTU.
From dreaming about building rockets back in first year corridors to actually co-founding the team that now builds them Mayank bhaiya didn't just join DTU, he left a launchpad behind for every curious mind that followed. Whether it was decoding propulsion systems, figuring out admin hurdles (shoutout to the Physics Department maze), or simply mentoring juniors with clarity and patience — he's seen it all, and done it with style.

But wait — he didn't stop at just rockets. From e-commerce analytics at DentalKart to ML Ops at EnterpriseChai and rocket tech at EtherealX, Mayank bhaiya's resume has more range than a Falcon 9. Currently interning at Bain and Co. he's now blending tech, strategy, and machine learning like a pro.

Mayank bhaiya, thank you for giving us a dream to follow and a team to belong to. You didn't just build rockets — you built a legacy that's ready to soar.

MEET THE MEMBER

AD ATRA PER ASPERA

Aditya Nambidi

Aero-Structures 2nd Year

My time in DTU Rocketry has honestly been a crazy learning curve. I joined the aerostructure team not really knowing what to expect, but it's pushed me to think way beyond just textbook knowledge. From researching materials to designing and manufacturing actual parts of rockets, it's been super hands-on. I've spent hours on making and testing the rocket's structure and propulsion system — and even though things don't always work on the first try, that's what makes it fun. Failing, fixing, and figuring it out with the team has taught me a lot.

One of the coolest parts about being here is how everyone genuinely wants to build things that not only work, but work really well. That shared energy creates an environment where you're constantly inspired to step up, try new things, and take real ownership of what you create. It's motivating to be surrounded by people who care deeply about their craft.

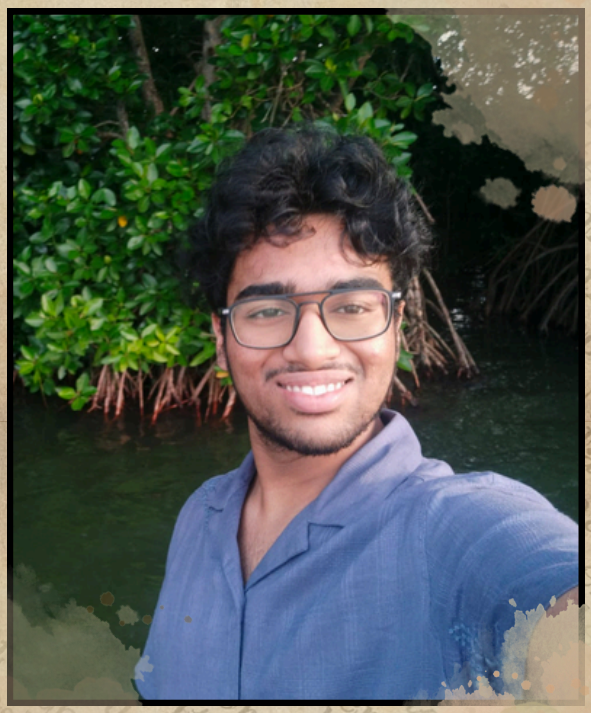
Shoutout to Adhi, Aaron and all my other team mates for all the supporting and believing in me through this journey.

MEET THE MEMBER

MAY 2025

My journey with DTU Rocketry began right from my first year, and it has shaped the way I think about engineering and collaboration. Jumping into the aerostructure domain with limited experience, I was welcomed into an environment that thrives on curiosity, learning, and hands-on innovation.

From understanding composite materials to actively building and refining critical rocket components, every task demanded more than just classroom knowledge. Whether it was spending hours on structure design or closely working on propulsion-related systems, each moment pushed me to adapt, think critically, and evolve.



ADHITHYA ARUN
Aero-Structures 2nd Year

What stands out the most is the culture—DTU Rocketry is filled with passionate individuals who want to innovate, not just imitate. That spirit pushes you to take initiative, ask the right questions, and value teamwork over individual glory. It's not just about building rockets; it's about building confidence and capability.

Shoutout to Nambidi, Aaron and all my other team mates for all the supporting and believing in me through this journey.

FEATURED SPONSOR

TEAM ROCKETRY, DTU PROUDLY PRESENTS

XTCY

AS OUR OFFICIAL BEVERAGE PARTNER

PARTNER WITH US

Join us in shaping the **future of innovation**. Partnering with us means more than just sponsorship—it's an opportunity to drive **real impact**, support **visionary talent**, and be part of something **extraordinary**.

Let's build the future together. Reach out to us today!

CONTACT US

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BEHIND THE SCENES

BEHIND THE SCENES