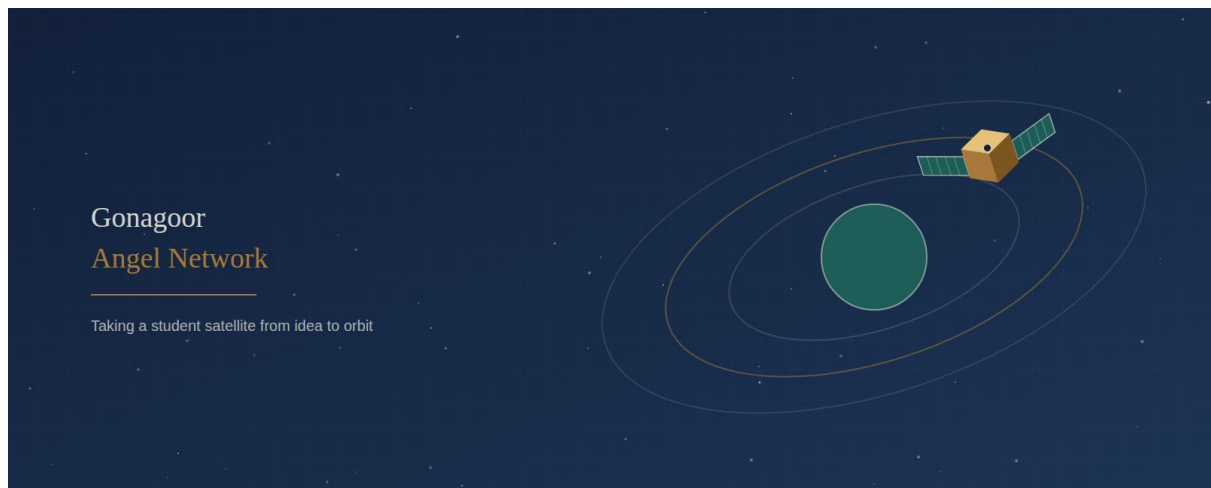




Case study

From classroom to orbit: DS-SAT-P

How Gonagoor Technologies helped Dayananda Sagar College of Engineering take a student satellite from idea to launch

Prepared by

Gonagoor Technology Solutions

A select circle of technologically inclined angels backing the next wave of deep technology

Abstract

The core argument

Engineering colleges teach the theory of space systems. Building a satellite that the national space agency will fly asks for far more: teams that cross departments, flight-grade engineering, disciplined testing and a chain of approvals that no single department can supply. Gonagoor's programme management closed that gap and turned a classroom ambition into a flown satellite, which lifted the college's academic standing.

Dayananda Sagar College of Engineering (DSCE) set out to become an institute that can design and develop a satellite. It established a Space Technology Cell in the Department of Electronics and Telecommunication Engineering through an MoU with ISRO's ISTRAC, signed on 29 April 2024, and named a student-owned satellite as its long-term objective.

An objective is not a capability. A college has faculty and eager students, but a satellite needs subsystem design, systems engineering, environmental testing, launch interfaces and regulatory approval, all within a fixed launch window. Student cohorts also change every year, so knowledge can disappear as quickly as it is built.

Gonagoor Technology Solutions signed an MoU with the Space Technology Cell for the design and development of small orbital and aerial satellites, and took on programme management of all subsystems, including the data management system. Five academic streams took part: electronics and telecommunication, MCA, data science, AI and machine learning, and aeronautical engineering. This case study follows DS-SAT-P through seven stages, from ideation to launch, and shows what each gave DSCE academically.

Why incubation, not just capital

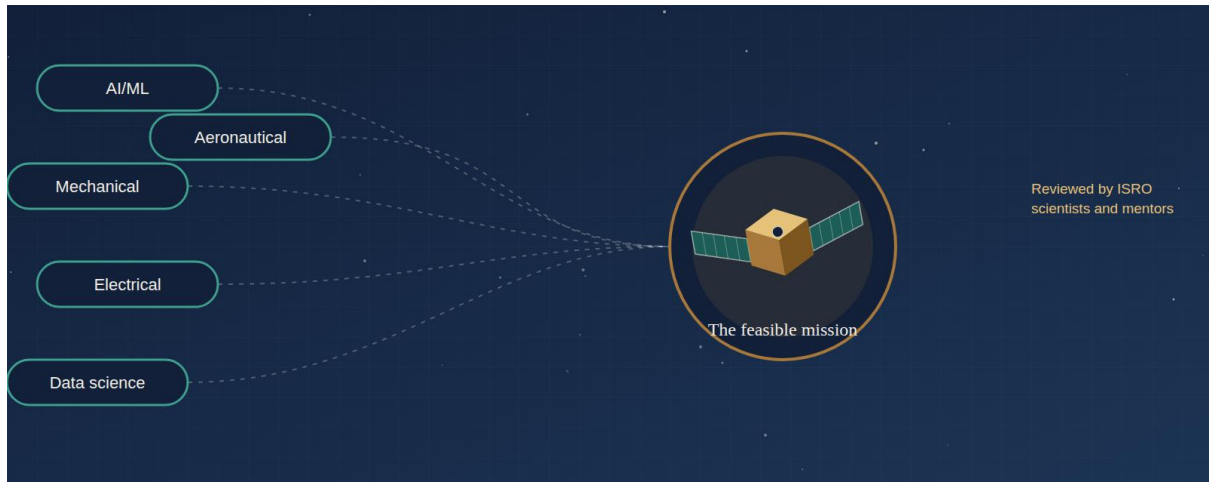
- **Curriculum gap.** Coursework covers theory, while a flight programme needs hands-on design, integration and test experience that students rarely get.
- **Continuity gap.** Students graduate every year. Without strong documentation and programme management, learning leaves with them.
- **Approval gap.** Reviews by ISRO and authorisation by IN-SPACE demand evidence and procedure that a college has no prior experience of.

At a glance

Item	Detail
Institution	Dayananda Sagar College of Engineering, Bengaluru
Programme host	Space Technology Cell, Department of Electronics and Telecommunication Engineering
Satellite	DS-SAT-P (listed publicly as DS-SAT, also called Vishnu Chakra Orbital Satellite 1) [confirm final designation]
Programme management	Gonagoor Technology Solutions Pvt. Ltd.

Item	Detail
Space agency partner	ISRO ISTRAC (STC MoU signed 29 April 2024)
Launch and payload	[Add launch date, vehicle, orbit and payload]

1. Ideation



The need

Every satellite begins as an argument that a mission is worth flying and can be built by this team, in this time, with this budget. Students bring imagination but usually no yardstick for feasibility, and ideas that ignore mass, power, data rate and launch limits do not survive their first review.

DSCE's own process shows how this worked. On 20 February 2025 teams from AI and machine learning, mechanical, electrical, data science and aeronautical engineering presented satellite ideas to ISRO scientists and the programme team. Of the three proposals reviewed, "OceanScan", put forward by a third-semester data science student, was judged the most feasible.

What Gonagoor provided

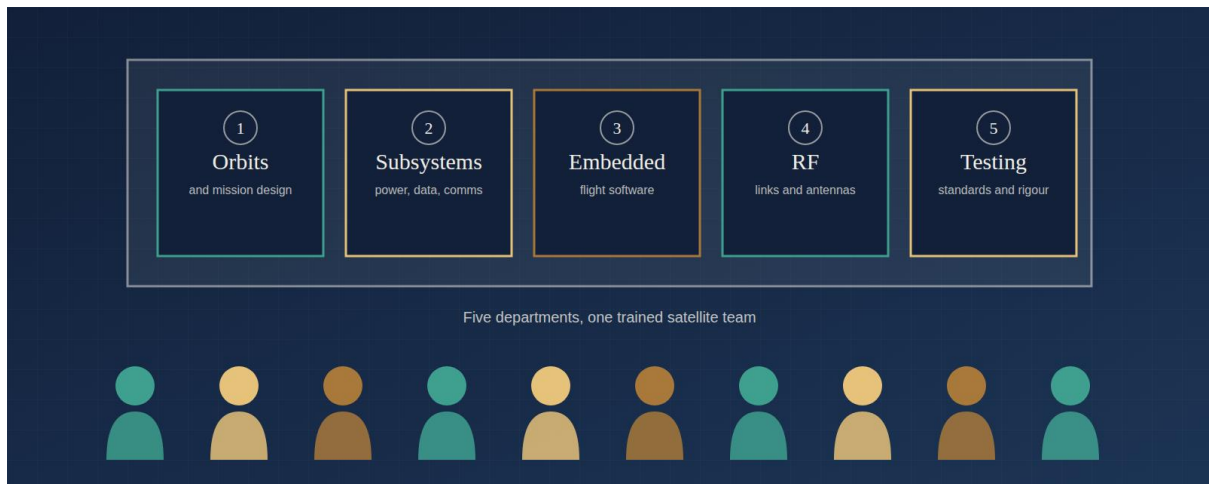
- **Mission framing.** Turned open brainstorming into clear mission statements with objectives, users and success measures.
- **Feasibility screening.** Tested each idea against size, mass, power, communication and orbit limits, so ambition matched engineering reality.
- **Expert review.** Brought ISRO scientists and mentors into the room so students heard candid technical criticism early.
- **Requirements baseline.** Converted the chosen idea into a written requirements set that every later stage could be traced back to.

Academic impact

Students learned that engineering starts with a question worth answering and a discipline of proving it can be done. A first-year idea competed on merit, and a young student's concept reached the top of a review by national scientists.

Milestone to record: 3 ideas proposed, 1 selected, 30 students, 5 departments, and 10 faculty involved.

2. Training to students



The need

Building a satellite needs skills that sit between the standard subjects. Orbital mechanics, power budgets, flight software, radio links and test standards are rarely taught together, and almost never with a real launch date attached.

A programme this demanding also has to teach quickly and keep teaching. Students from five departments arrive with different vocabularies, and the team must speak one common technical language before real design can begin.

What Gonagoor provided

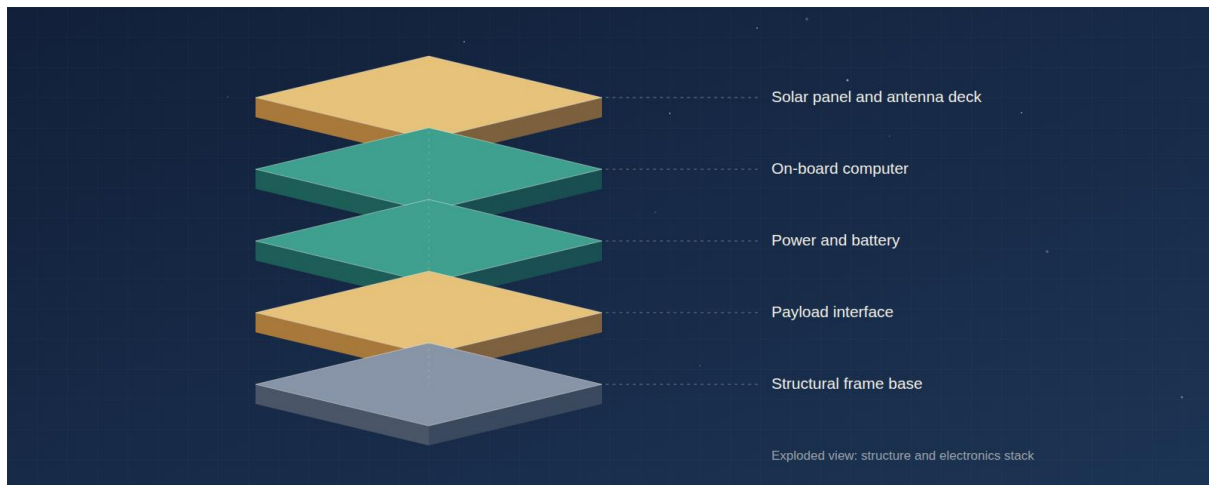
- **Structured curriculum.** Short modules on orbits and mission design, satellite subsystems, embedded flight software, RF links and test standards.
- **Hands-on labs.** Students worked with real hardware, flight-like tools and design reviews rather than slides alone.
- **Cross-department teaming.** Mixed teams from electronics, computing, data science and aeronautics learned to divide work and agree interfaces.
- **Knowledge capture.** Design notes, checklists and lessons learned were documented so later batches inherit the work.

Academic impact

DSCE now has a trained pool of students and faculty who understand satellite engineering end to end. The skills carry into project work, internships, placements and higher study in space and embedded systems.

Milestone to record: 130 students trained, 10 faculty co-ordinators.

3. Structural and electrical development



The need

A satellite has to survive launch and then work unattended for its whole life. Its structure must carry loads and vibration without failing, and its electronics must generate, store and distribute power, run the on-board computer and manage data, all inside a very small mass and volume.

Every choice trades against another. A heavier frame is stronger but leaves less for the payload. A bigger battery lengthens operations but strains the power budget. Students need engineers who have made those trade-offs before.

What Gonagoor provided

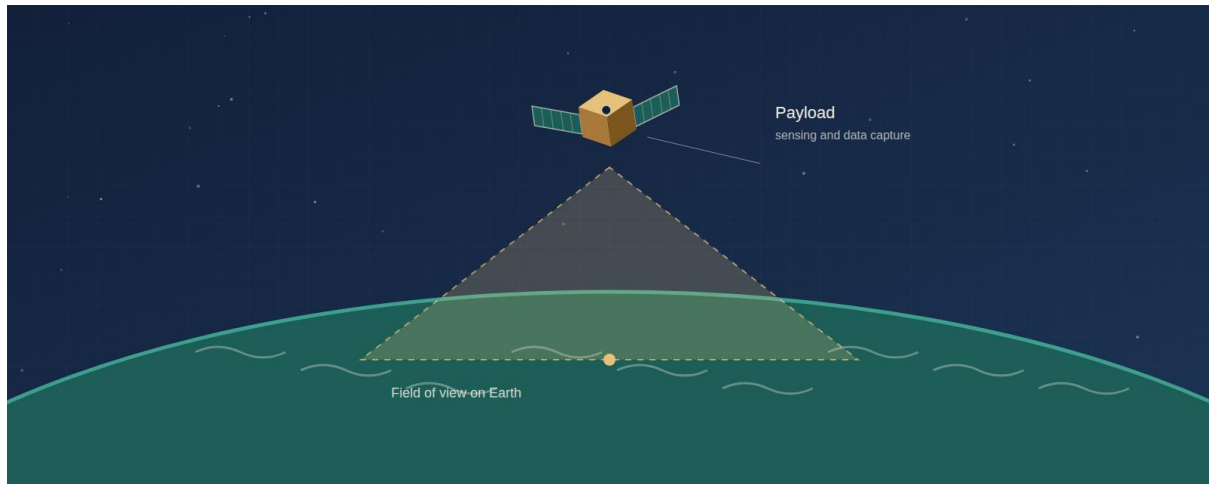
- **Structural design.** Frame, panels and mounting designed for launch loads, with material and mass decisions reviewed against requirements.
- **Electrical power system.** Solar generation, battery and power distribution sized from a proper power budget.
- **On-board computer and data handling.** Flight computer, data management and communication interfaces designed with fault handling in mind.
- **Design reviews.** Formal preliminary and critical design reviews checked each subsystem before manufacture.

Academic impact

Mechanical, electrical and computing students met the discipline of flight hardware: margins, redundancy and traceability. Concepts from lectures became drawings, boards and assemblies with real consequences.

Milestone to record: Structures, solar panel integration, on board computers, camera and lens selections, power management module design.

4. Payload development



The need

The payload is the reason the satellite exists. It defines the mission, sets the power and data needs of the rest of the spacecraft, and is where a college can contribute original science or technology.

Payload work is also where the strands of a campus meet. Sensing hardware, embedded control, data processing and machine learning all sit here, which makes it well suited to a multi-department team.

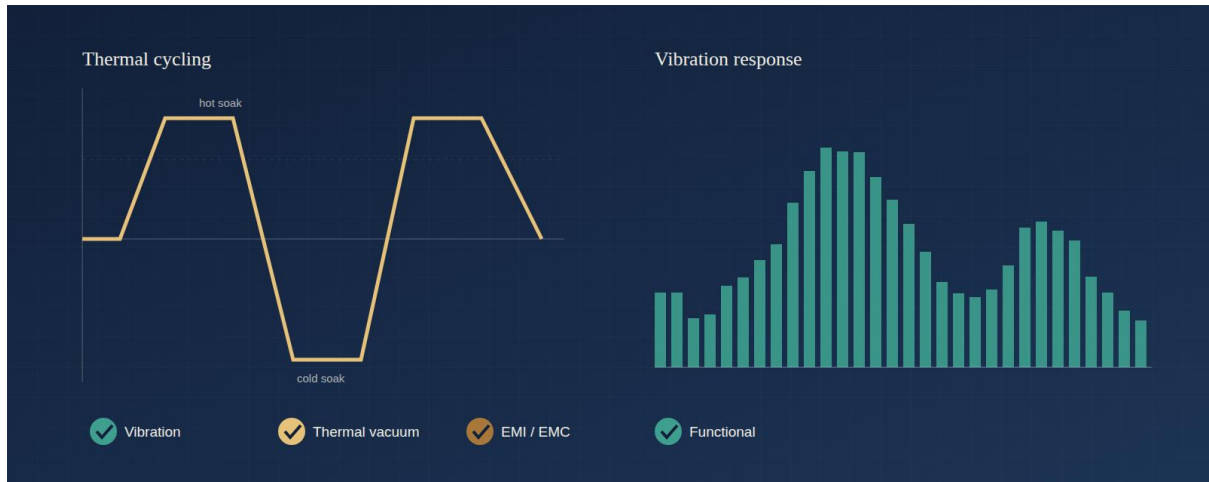
What Gonagoor provided

- **Payload definition.** Linked payload objectives to the requirements set from ideation, with clear performance targets.
- **Design and build.** Guided sensor or instrument selection, interface design and the integration of the payload with the satellite bus.
- **Data pipeline.** Set up onboard data handling and ground processing so that payload data becomes usable results.
- **Calibration and validation.** Checked payload performance on the ground before integration with the full satellite.

Academic impact

Data science, AI and electronics students worked on a real payload with real data. The mission gives DSCE original datasets and a base for research papers, project work and future missions.

5. Integrated testing



The need

A satellite cannot be repaired after launch, so it must be proven on the ground. Integrated testing checks that separately built subsystems work together and that the whole satellite survives the conditions it will meet, from launch vibration to the heat and cold of orbit.

Testing is also where student teams learn most. A failed test in the lab is cheap, and an in-orbit failure is permanent. The habit of testing, recording and fixing is the most valuable lesson of the programme.

What Gonagoor provided

- **Test planning.** A full test plan tied to requirements, with clear pass and fail criteria for every test.
- **Environmental testing.** Vibration, thermal and related tests that reproduce launch and orbital conditions, run at suitable facilities.
- **Electrical and EMI/EMC checks.** Verification that subsystems do not disturb each other and that radio links work as intended.
- **Functional end-to-end tests.** Complete mission simulations, from command and telemetry to payload operation and data return.

Academic impact

Students learned verification: to write a test, run it, record the result and act on it. That discipline is prized by the aerospace, automotive and electronics industries.

6. Complete ISRO validation and IN-SPACe approval management



The need

A satellite cannot fly on engineering alone. It must satisfy ISRO's requirements for the launch interface and safety, and it needs authorisation under India's space policy through IN-SPACe. Where the mission uses radio spectrum, frequency licensing is part of the path too.

Each step demands precise documents, evidence and timing. Many student projects stall here because no one on campus has done it before, and a missed document can cost a launch slot.

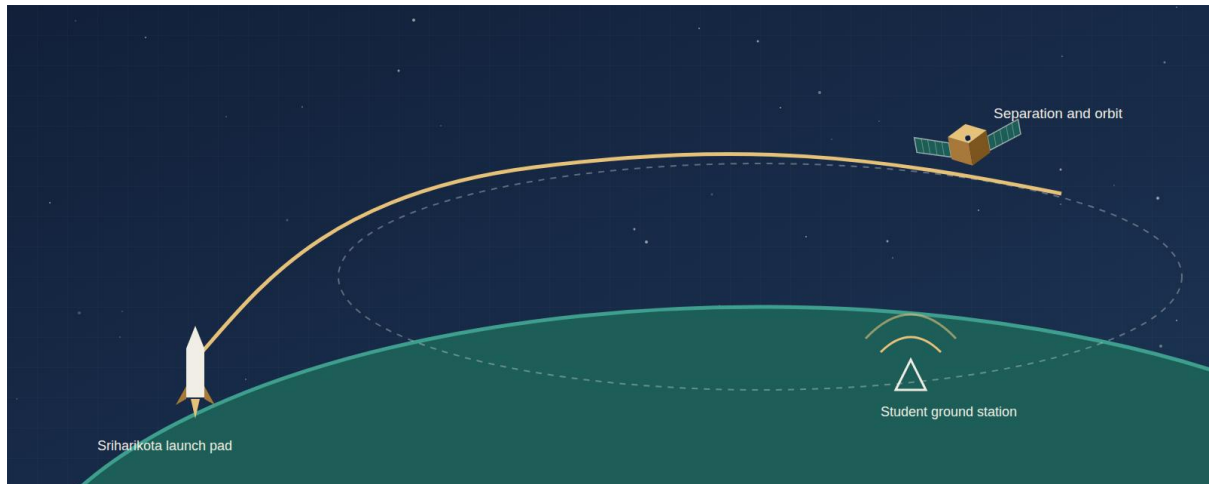
What Gonagoor provided

- **Document management.** Prepared and tracked the technical documentation, test reports and declarations that reviewers require.
- **ISRO review support.** Prepared the team for design, safety and interface reviews and closed review actions on schedule.
- **IN-SPACe authorisation.** Managed the application and clarifications for approval to fly the satellite.
- **Regulatory coordination.** Handled frequency, compliance and launch-interface requirements so the college met every deadline.

Academic impact

DSCE learned how a space project is governed. Its faculty now hold a working playbook for future missions, and the institute has a documented record of engagement with ISRO and IN-SPACe.

7. Launch and integration



The need

Launch is the moment the whole programme is judged. The satellite must be delivered to the launch site, integrated with the launch vehicle or its deployer, checked one last time and released into orbit on a schedule set by others.

The mission does not end at separation. Students must acquire the first signal, keep the satellite healthy and turn its telemetry and payload data into learning and results.

What Gonagoor provided

- **Delivery and integration.** Managed transport, final checks and integration at the launch site with the launch authority's teams.
- **Launch campaign.** Coordinated readiness reviews and countdown activities, with students present and involved.
- **Early operations.** Prepared the ground station and team for first contact, commissioning and routine operations.
- **Mission data use.** Set out how mission data supports coursework, projects and publications after launch.

Academic impact

A student satellite in orbit gives DSCE a visible national milestone. It inspires new students, strengthens partnerships with ISRO and industry and supports admissions, research and future funded space projects.

Summary and way forward

The seven stages worked as one system. Ideation chose a mission that could be built. Training gave the team its skills. Structural, electrical and payload work turned the idea into hardware. Integrated testing proved it, approval management cleared it to fly and the launch campaign delivered it to orbit. At each step Gonagoor supplied programme management and technical mentorship, and DSCE's students and faculty did the building and learning.

Programme timeline

When	Milestone
29 April 2024	MoU signed with ISRO ISTRAC to establish the Space Technology Cell at DSCE
[Date]	MoU signed with Gonagoor for the design and development of the student satellite
20 February 2025	Satellite design presentations reviewed by ISRO scientists and the programme team
[Date]	Design reviews, build and integrated testing
[Date]	ISRO validation and IN-SPACe approval
[Date]	Launch and first contact

Impact on academic growth

Dimension	Impact
Skills	A trained pool of students and faculty in satellite engineering, embedded systems and testing
Interdisciplinary teaming	Five academic streams working to one mission plan
Research	Original mission data and a base for papers and projects
Institutional capability	A documented playbook for design, testing and approvals
Reputation	A national milestone that supports admissions and partnerships
Careers	Real flight-programme experience for placements and higher study

The model in one line

Angels who are technologists invest capital and time together. That combination is what lets a young venture grow into a company that creates lasting value.