

SINHGAD TECHNICAL EDUCATION SOCIETY'S
**SINHGAD INSTITUTE OF
TECHNOLOGY, LONAVALA**
INSTITUTION'S INNOVATION COUNCIL (IIC)

THE R&D CONSTITUTION
2026 – 2036

**Standard Operating Procedures for the Elite
Research Wing**

*A Deep-Dive Operational Manual for Technical Supremacy, Financial
Integrity, and Institutional Legacy.*

Custodian:

R&D Head (Lead Specialist)
IIC SIT Lonavala

Approving Authority:

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1 ARTICLE I: FOUNDATIONAL MISSION AND SCOPE

1.1 The "Special Forces" Mandate

The Research & Development (R&D) Wing is established as the absolute technical core of the IIC. It is not a club for general interests; it is a technical strike team. Its primary purpose is to secure victories in high-stakes national and international competitions (e.g., ISRO IROC-U, Smart India Hackathon) and to facilitate the development of market-ready, patentable intellectual property.

1.2 The 10-Year Continuity Rule

This document is designed to survive leadership transitions for the next decade. If a new lead assumes the role in 2034, they must be able to follow this "spoon-feeding" manual to replicate the successes of the 2026 era. Documentation and rigid adherence to protocol are the primary currencies of survival in the R&D Wing.

2 ARTICLE II: ELITE HIRING PROTOCOL (THE GAUNTLET)

Selection for R&D is strictly merit-based and follows a tiered evaluation designed to find "builders" rather than "talkers."

2.1 Phase 1: Portfolio Pre-Screening

Candidates must submit proof of past work (GitHub, Portfolio PDF, or physical prototypes). We do not hire based on grades; we hire based on the ability to break, fix, and optimize hardware and code.

2.2 Phase 2: The 100-Mark Aptitude Assessment

- a. **Logical & Analytical Reasoning (20%):** Engineering math, spatial reasoning, and pattern series.
- b. **Software Fundamentals (30%):** Basic programming (Python/C++), loop logic, and debugging theory.
- c. **Hardware Fundamentals (30%):** Electronics, IoT protocols (I2C/UART/SPI), and sensor theory.
- d. **The Applied Martian Problem (20%):** Candidates must draft a high-level solution for a real-world scenario (e.g., "Designing a recovery system for a rover in a GNSS-denied crater").

2.3 Phase 3: The 48-Hour Technical Sprint

Shortlisted candidates are given a practical task (e.g., "Integrate a LiDAR with a ROS 2 node" or "Design a landing leg with FEA analysis in Fusion 360"). Results are judged on documentation quality as much as technical success.

2.4 Phase 4: The High-Command Interview

Final screening by the President and R&D Lead to assess psychological resilience, teamwork ethics, and the "Bus Factor"—ensuring the member documents their work so well that the team survives even if the member leaves.

3 ARTICLE III: COMMAND HIERARCHY AND ABSOLUTE AUTONOMY

3.1 R&D Lead Sovereignty

The R&D Head is the ultimate technical authority of the Council.

- **Competition Supremacy:** In any technical competition, the R&D Head's technical decision is final and overrides the general Technical Team Head.
- **Role Delegation:** The R&D Head has the autonomy to define and assign specialized roles (e.g., *Squad Lead*, *Embedded Architect*, *AI/ML Specialist*, *Mechanical Chief*) under their command.
- **Direct Communication:** The R&D wing bypasses the Convenor for all technical approvals, reporting directly to the President and the Dean of R&D (Faculty).

4 ARTICLE IV: TECHNICAL COMPETITION MASTERY

4.1 Participation and Readiness (External)

1. **Architecture Design:** The R&D Head sets the "Mission Architecture" (Tactical, Strategic, and Perception layers).
2. **Green-Light Review:** No IIC team can represent the institution externally without a "Technical Readiness Certificate" issued by the R&D Head after a mock review.
3. **Code Sovereignty:** All code must be pushed to IIC-controlled servers. Leaking internal logic to other institutions results in immediate blacklisting and legal review.

4.2 Organizing Technical Events (Internal)

- **Tech-Transfer Mandate:** R&D must conduct "Technology Introduction" workshops (e.g., on LiDAR, Jetson, or ROS 2) for the general council members at least once per quarter to ensure no knowledge silos exist.

- **Organizer Responsibility:** If IIC organizes a tech-competition, the R&D Wing is responsible for the Problem Statement, the Evaluation Rubric, and the technical setup before the Event Management or Technical Team steps in.

5 ARTICLE V: FINANCIAL INTEGRITY AND THE "NO-LOOPHOLE" BOM

5.1 The 15-Page Dossier Requirement

Funding requests for research or competitions are rejected unless they contain:

- **System Architecture Map:** Visualizing the data flow between layers.
- **Endurance Analysis:** Detailed power-to-weight and discharge calculations.
- **Failure Mode Analysis:** What happens if a sensor fails?

5.2 The Rigid Bill of Materials (BOM)

The BOM must be a live document with the following mandatory headers:

SR	Product	Model	Purchase Link	Price (INR)	Qty	Total
1	SOC	R-Pi 5	[Verified Link]	15,399	1	15,399

Note: Only verified links from approved vendors (Robu.in, RoboticsDNA, etc.) are accepted.

6 ARTICLE VI: ADMINISTRATIVE EXCELLENCE AND LETTER PROTOCOLS

6.1 Routing and Tone

Letters to STES Management (Campus Director/President) must be "Humble Requests" that emphasize institutional pride and national recognition.

- **Proper Channel:** Faculty President → Campus Director → Hon’ble President STES.
- **Disbursement Request:** To avoid red tape, the team must request "Direct Disbursement" to a designated procurement account, attaching a copy of the bank passbook and the ISRO/Competition selection letter.

7 ARTICLE VII: LAB LSOP AND HARDWARE LIFECYCLE

7.1 Access and Maintenance

- **Specialist Access:** The IIC Innovation Lab is a 24/7 technical sanctuary reserved for R&D members.

- **Friday Deep-Clean:** Every Friday, the lab undergoes a "Gears Audit." All soldering irons, power supplies, and logic analyzers are checked, cleaned, and logged.
- **Hardware Theft:** Personal use of IIC components or printing non-IIC models on the 3D printer is treated as theft and results in immediate membership termination.

8 ARTICLE VIII: DOCUMENTATION (THE "BUS FACTOR" PROTOCOL)

8.1 Daily Progress Reports (DPR)

Every R&D member must log their daily activity.

- **Documentation Standard:** If a member is absent tomorrow, their DPR must be sufficient for any other member to pick up the work and continue without asking questions.
- **Tech-Stacks:** Standardized stacks (e.g., Python for AI, C++ for Embedded) must be followed unless a "Deviation Request" is approved by the R&D Lead.

9 ARTICLE IX: SQUAD FRAMEWORK (SPECIALIZATION)

The R&D Head shall divide the wing into focused "Squads":

1. **Embedded Squad:** Focus on low-level firmware and stability.
2. **Perception Squad:** Focus on Computer Vision, SLAM, and AI.
3. **Mechanical Squad:** Focus on CAD, FEA, and 3D fabrication.
4. *Documentation Squad:* Ensuring the legacy of letters, BOMs, and reports.

10 ARTICLE X: THE LEGACY HANDOVER (HDD PROTOCOL)

10.1 Final Transition

The outgoing R&D Lead must provide a "Legacy HDD" containing every schematic, code repository, and successfully funded letter.

11 ARTICLE XI: CONTINUOUS LEARNING AND KNOWLEDGE TRANSFER

11.1 Mandatory Internal Research Sprints (WIRS)

The R&D Lead is mandated to conduct **Weekly Internal Research Sprints (WIRS)** for all R&D members.

- **Frequency:** Every Saturday (unless a competition is ongoing).

- **Format:** A 2-hour deep-dive session where the Lead teaches a specific advanced technical skill (e.g., ROS 2 Action Servers, Custom YOLOv11 Training, PCB Routing).

11.2 The "Tech-Horizon" Institutional Sessions

The R&D Lead must organize a monthly (or bi-weekly as per event load) **"Tech-Horizon"** session for all other Team Heads and interested general members.

12 ARTICLE XII: STEWARDSHIP AND THE MULTI-CAMPUS LEGACY

12.1 The Dual-Campus Stewardship Mandate

Since IIC is established across two colleges, the R&D Lead acts as the **Chief Steward** of the joint technical assets and institutional knowledge.

- **Resource Uniformity:** The R&D Lead must ensure that both campuses follow the same technical standards. If Campus A develops a SLAM library, it must be documented and made accessible to Campus B via the centralized IIC repository.
- **Master Assets Register (MAR):** The R&D Lead must maintain a joint "Master Assets Register" that tracks specialized hardware (LiDARs, Jetson boards, Pixhawks) across both campuses to prevent resource duplication and ensure efficient sharing.

12.2 Inter-College Knowledge Synchronization

To maintain a unified legacy, the R&D Lead shall:

1. **Synchronized WIRS:** Conduct joint research sprints involving R&D members from both campuses via hybrid sessions.
2. **The Quality Parity Rule:** No campus is "primary." Both must adhere to the same 10-year legacy standards, and the R&D Lead is responsible for auditing both labs once a month.

12.3 Preservation of Institutional IP

The R&D Lead is the guardian of the Council's "Brain."

- **The Code Vault:** Maintain a secure, version-controlled vault of all previous research code. This is not just for backup, but for **"Stewardship"**—ensuring that the work of 2026 serves as the foundation for the work of 2030.
- **Technical History Log:** Maintain a record of failed experiments. Legacy is not just about recording wins; it is about ensuring future teams do not repeat the same technical mistakes.

SIGNATORIES OF THE 2026 CONSTITUTION

R&D Head (Architect)

Student President

Dean R&D (STES)