ERC 2025 Rules – Full Summary Presentation

COMPREHENSIVE OVERVIEW OF EUROPEAN ROVER CHALLENGE RULEBOOK

1. Introduction

- ERC is an international planetary robotics competition.
- Teams build Mars-analog rovers and drones.
- Simulates real mission scenarios aligned with space robotics roadmaps.
- 2025 event hosted at AGH University, Kraków.

2. Competition Philosophy

- Benchmarking platform for planetary exploration technologies.
- Focuses on engineering excellence, autonomy, and scientific reasoning.
- Encourages multidisciplinary collaboration and STEM growth.

3. Organizational Structure

- Organized by the European Space Foundation and Polish Space Professionals Association.
- Judged by independent experts.
- Multiple Q&A sessions and update reports provided to teams.

4. Milestones

- Kick-Off & Registration: Proposal submission.
- Preliminary Design Review: Preliminary Report + RF Form.
- Qualification Phase: Jury evaluates documentation.
- Critical Design Review: Final Report, Final RF Form, Science Plan.
- Finals: Field Tasks, Presentation, and Final Reports.

5. Required Deliverables

- Proposal (submitted with registration).
- Preliminary Design Report (technical maturity).
- Final Design Report (complete system documentation).
- Radio Frequency Form (mandatory for each RF module).
- Science Planning Report (geology-based mission planning).
- Droning Sub-Task Report.
- Scientific Exploration & AstroBio Final Reports.
- 10-minute capability video.
- Final presentation slides.

6. Submission Rules

- Deadlines strictly enforced.
- Late submissions penalized up to 20% per time unit.
- Files must follow naming and formatting rules.
- Video must include specific rover and drone capabilities.

7. Tasks Overview

- Science Task: Exploration, Surface Sampling, Deep Sampling, AstroBio.
- Navigation Task: Autonomous Traverse and Droning Sub-task.
- Maintenance Task: Repair of malfunctioning instrument.
- Probing Task: Retrieval of environmental probes.
- Presentation Task: Mission-style scientific presentation.

8. Science Task (Detailed)

- Part 1: Regional Geology Analysis (landing site selection).
- Part 2: Science Planning (mapping, hypothesis, strategy).
- Part 3: Scientific Exploration (on-site verification + USOs).
- Teams must create geological maps and test scientific hypotheses.
- Sampling tasks require photos, mass measurement, and proper storage.

9. Navigation Task (Detailed)

- Traverse requires autonomous waypoint navigation.
- Droning Sub-task: Perform reconnaissance, obstacle detection.
- Drone must find sealed probe and return safely.
- Autonomy and robustness heavily judged.

10. Maintenance Task

- Simulates repairing a malfunctioning payload.
- Tasks include pressing buttons, flipping switches, and manipulating connectors.
- Precision control and effective UI/UX design matter.

11. Probing Task

- Rovers collect environmental probes left from previous missions.
- Focuses on navigation, manipulation, and sample handling.
- Must ensure safe transport of probes back to start line.

12. Presentation Task

- Teams deliver scientific/engineering presentation.
- Must include mission strategy, design choices, science results.
- Scored on clarity, professionalism, and scientific rigor.

13. Technical Requirements

- Rovers must meet Appendix 3 specs (mobility, power, safety).
- Drones must operate within weight and RF rules.
- Mandatory RF Check before each task.
- System must be safe; unsafe hardware risks disqualification.

14. Communication Requirements

- Wi-Fi 2.4 GHz / 5 GHz, specific amateur radio bands allowed.
- LTE/5G permitted.
- RF interference expected; robust systems recommended.
- Unauthorized config changes = –20 points per violation.

15. Venue & Field Conditions

- Outdoor Mars Yard with rocks, slopes, dunes, regolith.
- Weather variation expected: rain, heat, wind.
- Warm-up day provided but terrain may be incomplete.
- Teams must operate without line-of-sight in control room.

16. Scoring & Qualification

- Up to 20 qualified teams + up to 5 wild cards.
- Documentation quality heavily weighted.
- Scoring per task is independent.
- Penalties apply for delays, safety issues, RF violations.

17. Awards & Recognition

- 1st, 2nd, 3rd overall places.
- Best-in-task awards for Science, Navigation, Droning, Maintenance, Probing, Presentation.
- Winning rovers receive commemorative stickers.
- Digital participation certificates issued to active team members.

18. Final Notes

- Teams bear responsibility for their hardware and safety.
- Organizer may alter schedule due to weather or logistics.
- All decisions by organizer or jury are final.
- Event aims to prepare the next generation of planetary robotics engineers.