AUSTRALIAN ROVER CHALLENGE

AUSTRALIAN ROVER CHALLENGE 2025

SYSTEM ACCEPTANCE REVIEW GUIDELINES

VERSION 1.0 6 NOVEMBER, 2024

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About This Document

This document is to be read and interpreted together with the Rules and Requirements document for the 2025 Australian Rover Challenge. It sets out the requirements for the System Acceptance Review, a deliverable of the challenge that is detailed in Chapter 6 of the Rules and Requirements document.

Contacts

For *any* general enquiries about the challenge, please feel free to use the general inbox which is monitored by a range of the staff involved with the challenge.

Australian Rover Challenge – General Inbox
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This is the best way to connect with the technical committee who develop and manage these rules.

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Changelog

Date	Version	Change notes
06/11/2024	V1.0	V1.0 release. Note that this version removes direct reference to a ”Distributed Field Test” which is mentioned in the rules. There is still a requirement for teams to accompany their SAR report with a supporting ”proof of life” video showing key rover capability. This video content should be filmed in the weeks leading up to SAR report submission, there just does not need to be a specific ”Distributed Field Test” event. Please read this document carefully in its entirety. Future versions may be issued if any errors are found or areas of clarification are needed.

Requirements

1. This document sets out the requirements for the System Acceptance Review (SAR), a deliverable for the 2025 Australian Rover Challenge (ARCh) specified in Chapter 6 of the Rules and Requirements document.

2. The aims of the SAR are as follows:

    2.1. To ensure that the rover produced by a team is of the expected level of maturity and readiness to safely compete in the 2025 Australian Rover Challenge.

    2.2. To convey the technical maturity of your rover, and its current state of readiness through a design report and associated ”proof of life” video capturing field testing and other evaluation.

    2.3. To demonstrate that the rover has met, or intends to meet, your acceptance criteria.

    2.4. To provide teams with a benchmarking opportunity for rover operation.

3. Teams will receive a mark for the SAR. This mark will contribute a maximum of **70 points** to the team’s 2025 challenge score.

4. Each SAR report shall contain clear evidence of attempted verification for identified essential requirements with associated ”proof of life” video supporting this verification as entry conditions for the review. All rovers shall be capable of manoeuvring on sand at this point, though additional consideration will be given to new teams at the judges’ discretion. Each report and video pair will undergo an initial review entry conditions check within 48 hours of the submission deadline. SAR report and video pairs addressing all expected elements will receive an “Accepted” message. Any SAR report and video pair missing these elements upon first submission will receive a “Rejected” message, with the team then having a further 48 hours to update and resubmit the report and video. Rejected report and video pairs will incur a 20% penalty for this element.

5. Format and submission details:

    5.1. SAR reports shall be limited to 14 pages with the following restrictions:

        5.1.1. Page 1 shall be a cover page which identifies the competing team’s name, university, the student team lead(s), and an additional optional point of contact.

        5.1.2. Page 2 shall discuss your team’s *execution* of your approach to the system development life cycle for your system to date that you outlined in your Critical Design Review.

        5.1.3. Pages 3–11, the body of the report, shall contain text and graphics (images, figures, etc.) The points to cover in the report are discussed in rule 6.

        5.1.4. Page 12 shall contain written descriptions of each test or demonstration in the accompanying ”proof of life” video. Descriptions should include timestamps so that judges know exactly which steps are being referred to. Teams can refer to more detailed testing plans or results in the body of the report, where appropriate.

        5.1.5. Page 13 shall discuss your team’s planned activities to prepare the rover for the challenge, making reference to the schedule on page 14 where appropriate.

5.1.6. Page 14 shall contain a schedule of activities (Gantt chart or similar) depicting the expected activities to be carried out by the team from the due date of the SAR (12 February 2025) until the competition. Tasks on the critical path should be highlighted. Page 14 may be A3 in size to accommodate more detail, however it should be concise, neat and with a font size that is readable at normal levels of zoom.

5.1.7. Pages of references in your elected referencing format do not count toward the page limit. Please only include a reference list, not a bibliography.

5.2. Pages should be A4 paper size with margins no smaller than 2cm, contain page numbers, use text in Calibri or similar 11-point font, and be single spaced.

5.3. You may choose how to structure the body of the report (e.g. style of headings, titles of sections, etc.) freely, so long as it follows some standard technical/academic practice, and your report comprehensively covers every point in rule 6.

5.4. All content and ideas not created by the submitting team must be cited in a standard referencing style (i.e. Harvard, IEEE, or similar) on the pertinent page where appropriate or in a references section. Reports must comply with expectations of academic honesty at your host university. Plagiarism concerns are taken very seriously and are grounds for disqualification.

5.4.1. Teams are reminded that self-plagiarism will also be taken seriously. The content for this report may be inspired from previous reports prepared for any competition, but the exact content must be developed specifically for this delivery.

5.5. A supporting ”proof of life” video no longer than 2 minutes in duration shall supplement the report with the following restrictions:

5.5.1. Videos must contain new footage, filmed in the weeks leading up to the submission and not previously submitted to any other competition.

5.5.2. Videos should be simple, contain little editing, and cover as many points as possible in rule 7.

5.5.3. The video shall be accompanied by written descriptions in the report, including video timestamps, which describe what is being shown, as detailed in rule 5.1.4.

5.6. Electronic submissions are required for both the report and supporting ”proof of life” video. Reports are required in PDF file format, while videos are required as a YouTube link (which may be unlisted).

5.6.1. Files will be uploaded via a form on the ARCh website that will be sent directly to team leads.

5.6.2. SAR reports and supporting ”proof of life” videos must be submitted no later than 23:59 Australian Central Daylight Saving Time (ACDT) UTC+10.5 on the due date (12 February 2025) and may be submitted at any time before this point.

5.6.3. Multiple submissions are allowed. The most recent submission before the deadline from each team will be judged.

6. The report shall, in an order of your choosing:

6.1. Convince the panel that your *integrated system* has met the requirements for the challenge. While your rover needs to meet *all* the rover requirements in the latest version of the challenge rules, only key requirements (as identified by your team) in addition to the minimum requirements need to be directly addressed in the SAR.

6.1.1. You must address the following minimum requirements: size, weight, E-STOP, status LED, communications, and safe carry.

6.1.2. Failure to demonstrate adherence to the minimum requirements, with no planned corrective action described in the report, may result in your team's entry to the 2025 challenge being cancelled.

6.1.3. You may also, as your team sees fit, identify any other requirements as key requirements for discussion.

6.1.4. Please note the subtlety in the difference between the SAR and Critical Design Review (CDR) requirements. In the CDR you were asked to show how your *design* met the requirements, whereas in the SAR you are required to show how your *integrated system* meets the requirements.

6.2. Present an overview of the final technical design for your system. This should show all of the elements that make up your design such as the rover, base station and any other pertinent system elements.

6.3. Present the final technical design for your system elements. This should provide an overview of every subsystem, and pay particular attention to details that have been updated or changed since the CDR. A successful report will include the following details for each subsystem:

6.3.1. The final requirements you used to design the subsystem.

6.3.2. How you tested or plan to test the subsystem.

6.3.3. How you integrated or plan to integrate the subsystem into the rover system.

6.3.4. Results of any subsystem or integrated system level tests. Note that testing failures accompanied by an appropriate plan to remedy the failure and re-test will be viewed more favourably than simply omitting test failures.

6.4. Confirm the set of competition tasks in which your team intends to compete.

6.4.1. Weighing up your team's resources and experience, and making a judgement on which tasks to compete in will be viewed favourably.

7. The SAR supporting "proof of life" video (of no more than 2 minutes in length) is intended to accompany and support the SAR report. Ideally, it should contain:

7.1. Simple rover remote operation: rover and base station set up, followed by driving, turning and imagery capture all by a remote team (all commands are sent by a team making decisions based on information only available to them at the base station).

7.2. Evidence of subsystem or system level testing outlined in the SAR report. Note that this is not all encompassing (not all tests listed in the report need to be shown, there is not enough time for this

in the video). Rather, the tests performed that demonstrate the most progress of the system at the time should be presented. For example:

7.2.1. A fully integrated rover could demonstrate full system tests such as testing communications range in competition conditions.

7.2.2. A rover which has not had its drive subsystem integrated into its chassis subsystem may demonstrate velocity control of a wheel unit, separate from the rover, to confirm that the wheel unit has met the team's requirements.

7.3. Any other footage that supplements key details presented in the SAR report such as E-STOP operation, status LED, safe carry, and size and weight restrictions.

8. Submissions will be marked by a panel of representatives from academia and industry.

9. The weighting of the relevant sections of the report are as follows:

9.1. Execution of your approach to the system development cycle: 10%, Judges are directed to consider information in the following categories to make up the overall section mark:

- Requirements
- Scheduling
- Manufacturing
- Testing
- Verification
- Validation
- Rover operation

9.2. Final technical design: 60%, Judges are directed to consider information in the following categories to make up the overall section mark:

- System overview (including hierarchy)
- Interface definition (including subsystem and external interfaces)
- Requirements analysis
- Subsystem overview - Drivetrain
- Subsystem overview - Chassis
- Subsystem overview - Perception
- Subsystem overview - Power
- Subsystem overview - Communications
- Subsystem overview - Command and control
- Subsystem overview - Base station
- Subsystem overview - Specific payload
- Procurement/manufacturing progress

9.3. Convince the panel that your integrated system has met the requirements for the challenge: 30%. Judges are directed to consider information in the following categories to make up the overall section mark:

- Size
- Weight
- E-STOP
- Status LED
- Communication
- Safe carry
- Other minimum viable product requirements as identified by your team