AUSTRALIAN UNIVERSITIES ROCKET COMPETITION

2024 AURC Deliverables Requirements

Version 2.1: 11th March 2024

AYAA

Table of Contents

Revision History

Revision	Description	Date
Version 1.0	Initial Release	28/11/2023
Version 2.0	Added requirements for Progress Report 2 and guidelines for systems engineering and design methodology.	03/03/2024
Version 2.1	Added Hazard Log template. Updated descriptions for Systems Engineering. Moved FMECA and checklist deliverables to Technical Report.	11/03/2024

1 Purpose and Scope

This document outlines the required scope and marking rubrics for each deliverable of the 2024 Australian Universities Rocket Competition (AURC). This document will be repeatedly updated in accordance with the "2024 AURC Key Dates" timeline to include further information about assessable items as the competition progresses. This document does not include information pertaining to the list of assessable items and their associated due dates, submission instructions, penalties and judging. Subsequent information is available in the "2024 AURC Rules" document.

2 General Report Guidelines

2.1 Formatting

- Submissions must be made as a single pdf document.
- If completed in Microsoft Word or similar, the report must be written in size 12 pt Times New Roman, have 'single' line spacing and must be presented in a professional and consistent manner, alternatively the use of LaTeX or comparable typesetting software is also permitted.
- All submissions must begin with a cover page which lists the team number, team name, university, title of deliverable, word count, due date and date submitted.
- Any academic referencing method is acceptable, but it must be applied consistently.
- Submitted documents must follow the naming format of "Team_#_assesed_item.pdf", for example "Team_1_Progress_Report_1.pdf".

2.2 Language

Reports must be written in English. Clear and concise presentation is important; do not confuse the encouraged brevity of components with the amount of thought required. Research is vital in producing a high-quality report. Spelling, punctuation, grammar and formatting errors will be heavily penalised. It is recommended that you proofread your work thoroughly and ensure it is readable, logical, free from errors and consistently formatted (e.g. dot point formatting is consistent).

2.3 Word or Page Limits

Written reports that exceed the allowable word or page limit will only be marked based on the information included within the limit. Appendices, references and cover pages do not contribute to the word or page limit. Information provided in an appendix section should be supporting documentation only, and the report must be assessable without reading appendices unless otherwise specified in the marking criteria.

3 Progress Report 1

Progress Report 1 is the first assessed deliverable for the 2024 AURC. The purpose of this report is to provide an overview of each team's progression and to gain a better understanding of how each rocket project is being managed and executed. This progress report has a maximum length of 10 pages of main matter. Please use the recommended page limits as a guide for how much time and effort should be put into writing each section.

Progress report 1 submissions are required to have the following information:

1. **Executive Summary** (1 page) - A clear, concise, and informative overview of the rocket and competition category, the project's objectives and goals
2. **Introduction** (1/2 page) – Should provide an overview of the project. Includes the project aim in the context of the technical background.
3. **Design overview** (1-2 pages) - A conceptual design, brief overview of the rocket, its planned subsystems, and functions. A satisfactory motor selection is also expected.
4. **Systems Engineering and Design Methodology** (2-3 pages)
    - **Systems engineering process**, which includes the following:
        - **Problem definition** - From the initial statement given in the rules and regulations what is your team's interpretation? Use this to develop your problem context and hence definition.
        - **System requirements** - This can be developed from your problem definition and design overview. These requirements should show clear understanding of the problem and are concise, convincing, and clearly expressed aligning with the "INCOSE guide to writing requirements" good practice.
    - **Overview of design methodology and process** - This section will discuss how your team will tackle the engineering project.
        - How will your team draw on existing design methodologies and adapt it. What procedures will your team use to implement design decisions and changes?
5. **Team management and organisation** (2-3 pages)
    - **Overview of team management structure and responsibilities**
        - Concise overview of team management structure, roles, and their responsibilities for the project.
        - Demonstrates fair task allocation or justifies tasks allocation for various roles.
    - **Overview of communication management**
        - Concise overview of communication processes and procedures utilised to ensure efficient communication within the team.
        - Identifies and demonstrates appropriate communication with various project stakeholders.
6. **Overview of project budget**
    - Budget is discerning in its set out and is representative of all costs relevant to the project.
    - Contingencies are strongly justified.
7. **Overview of project timeline, milestones and launch schedule.**
    - All major competition milestones identified with a clear and well thought out plan of how and when they will be met.
    - Reasonable project technical and management milestones are disclosed.
8. **Conclusion** (1/2 page) - should summarise the report in terms of its goals and projected milestones.
9. **Appendices** – if necessary

4 Progress Report 2

Progress Report 2 is the second assessed deliverable for the 2024 AURC. The purpose of this report is to provide an overview of each team's progression and to gain a better understanding of how each rocket project is being developed, verified, and tested. This progress report has a maximum length of 20 pages of main matter content. Please use the recommended page limits as a guide for how much time and effort should be put into writing each section.

Progress report 2 submissions are required to have the following information:

1. **Executive Summary** (1 page) - A clear, concise, and informative overview of the rocket, progress made to date and challenges overcome so far.
2. **Introduction** (½ page) – Should provide an overview of the project's progress thus far.
3. **Design Overview** (3-4 pages) - What design choices have you made so far? Take this opportunity to highlight the modifications made since the first progress report.
   - How have you further developed your subsystems?
   - What design choices have you made in terms of rocket operation such as recovery method, chosen altimeters and materials.
   - What testing have you done to verify the behaviour of your rocket?
4. **Payload** (1-2 pages) - A summary of the payload system, its intended purpose, and benefits to stakeholders and/or project. It should detail the design choices made to enhance the system reliability and convincingly showcase scientific or technical viability and applicability.
5. **Systems Engineering** (5-8 pages) - Discuss how you determined system and subsystem functional requirements and used them to identify hazards and develop design requirements. Should expand on the system requirements from PR1 to include more detailed analysis of the required functionality of systems and subsystems. The following items are expected to be covered:
   - How have system requirements been updated and system boundaries and functions defined?
   - What design choices have you made so far to enhance your system's reliability and safety?
   - What methods and tools have you used to determine system and subsystem functional requirements? Do the system requirements support and align with the overall rocket requirements?
   - What methods and tools have you used hazard identification? Is the hazard identification based on functional failures? Are hazards defined for all operational stages? Are both safety (personnel) hazards and flightworthiness (mission performance) hazards assessed?
   - How are you planning to verify your final design against these system functional requirements?
   - A preliminary hazard log should be attached at the end of your report. A hazard log template and guidance note are provided on the AURC website for teams to use. Lists of hazards and associated mishaps and initial risk assessments must be included. Risk reduction (controls) and residual risk assessments are not required for PR2, however teams are encouraged to log any controls designed so far.
   - Note, Appendix C provides detail on the typical process in which a team should apply systems engineering to their rocket design. Although this exact process will not be a prerequisite for marking, good systems engineering should resemble this framework.
6. **Simulation and Flight Profile** (1 page) - From your current design what are your initial simulation results. Open Rocket or RASAero II is required and further simulation is highly encouraged.
   - How was the model setup and created? What are the input parameters?
   - Explain the rocket flight profile and key statistics. Include Table 1 in this section, these parameters must comply with the rocket specifications document.
7. **Manufacturing Processes & Plans** (2-3 pages) - This section should include an overview of manufacturing methods and materials. It should also cover your manufacturing progress to date.
   - What has been procured?
   - What has been constructed?
   - What plans do you have in the future for your manufacturing? Provide an updated timeline.

8. **Flyer of Record Documentation** (½ page)
   - Include Table 2 in this section.
9. **Conclusion** (½ page) - should summarise the report in terms of its current progress and projected plans in completing the rocket. Discuss potential issues that might arise and how you plan to account for them.
10. **Appendices** - The following sections are required.
    - Hazard log

Table 1: Simulation Results

Simulation Results	Value	Additional Comments (Optional)
Liftoff Thrust-Weight Ratio:		
Launch Rail Departure Velocity (m/s):		
Minimum Static Margin During Boost:		
Maximum Acceleration (G):		
Maximum Velocity (m/s):		
Target Apogee (feet AGL):		
Predicted Apogee (feet AGL):		
Fin Flutter Velocity (m/s):		

Table 2: Flyer of Record

First Name	
Last Name	
Relationship to team	
Email	
Phone	
State and Country of Residence	
TRA #	
Certified Level	
Date of certification attainment	

Appendix A: Progress Report 1 Marking Rubric

Item	High Distinction	Distinction	Credit	Pass	Fail	Score
	90+ pts	79-89 pts	55-78 pts	38-54 pts	<37 pts	
Executive Summary (5%) A clear, concise, and informative overview of the rocket and competition category, the project's objectives and goals	5 pts Executive summary is comprehensive, succinct and informative. It introduces the project background, problem addressed, and approach taken. Discussion of the key findings throughout the process, along with the overall recommendations. Structure, cohesion, and language used enhance communicability.	4 pts Executive summary explains the background, problem addressed and approach, as well as covering the key outcomes. May be a minor issue with the content, or with structure, cohesion, or language.	3 pts Executive summary explains the background, problem addressed and approach, as well as covering the key outcomes. May be several minor issues with the content, or with structure, cohesion, or language.	2.5 pts Executive summary explains the background, problem addressed and approach, as well as covering the key outcomes. May have significant issues with the content, or with structure, cohesion or language.	<2.5 pts Either no executive summary provided, or executive summary does not explain the background or problem addressed. Significant issues with the content, or with structure, cohesion, or language.	/5
Introduction and Conclusion **(5%)** Should provide an overview of the project. Includes the project aim in the context of the technical background. Conclusion should summarise the report in terms of its goals and projected milestones.	5 pts Clearly summarises the background of the project and outlines the purpose of the report. Presents a clear overview of the team and its goals and projected milestones.	4 pts Summarises the background of the project and outlines the purpose of the report. Presents an overview of the team and its goals and projected milestones. May be a minor issue with the content, or with structure, cohesion, or language.	3 pts Fails to concisely summarise the project background or outline the purpose of the report. Too long or too brief to accurately capture the contents of the report.	2.5 pts Fails to concisely summarise the project background or outline the purpose of the report. Too long or too brief to accurately capture the contents of the report. May be significant issues with the content, or with structure, cohesion or language.	<2.5 pts Either no introduction and/or conclusion provided or introduction and/or conclusion is to a very poor quality. Does not summarise the project background or the purpose of the report. Significant issues with the content, or with structure, cohesion or language.	/5

Design Overview **(20%)** A conceptual design, Brief overview of the rocket, its planned subsystems, and functions	19-20 pts Matured rocket design that captures the critical elements of a rocket and provides sufficient detail for the selection of a suitable rocket motor. Satisfactory motor selection. Appropriate recovery method selection with safe proposed descent rates. Brief but informative overview of your payload and its intended purpose. Concise but informative overview of your current avionics' details provided. System complies with TRA and CASA regulations and competition requirements.	17-18 pts Adequate rocket design that captures most elements of a rocket and provides enough detail for the selection of a suitable motor. Will need extra work to achieve a model suitable for detailed design. Satisfactory motor selection. Adequate recovery method selection which may be lacking in the required detail or could result in inappropriate descent rates. Brief overview of your payload. Overview of avionics details provided. System complies with TRA and CASA regulations and competition requirements.	11-15 pts Rocket design is incomplete or is not flight worthy. Model needs significant work before deemed suitable. Unsatisfactory motor selection criteria and selected motor. Little to no payload overview. Little to no overview of avionics provided. Aspects of the design fails to comply with the TRA and CASA regulations and competition requirements.	6-10 pts Insufficient to no detail of rocket systems for their intended functions provided. System does not comply with TRA and CASA regulations or competition requirements.	<5 pts Little to no overview provided. Provided overview does not capture any rocket systems or the intended functions. System clearly violates TRA and CASA regulations and competition requirements.	/20

Systems Engineering and Design Methodology **(30%)** Systems engineering process, which includes problem definition and system requirements.	14-15 pts Rules and Regulations used as the starting point, then definition is clearly explained, including stakeholders. Clear evidence of the "so what" derived from this analysis. System requirements are identified that convincingly capture the distillation of the problem, providing a set that can be designed to, and can guide the verification of a successful system solution.	12-13 pts Rules and Regulations used as the starting point, then definition is clearly explained, including stakeholders. Clear evidence of the "so what" derived from this analysis. System requirements are identified that substantially capture the distillation of the problem. These requirements are well expressed. Scope for a minor issue or two.	9-11 pts Rules and Regulations used as the starting point, then definition is explained. Evidence of the "so what" derived from this analysis. System requirements are identified that mostly capture the distillation of the problem. These requirements are capably expressed. Scope for several minor issues.	6-8 pts Rules and Regulations used as the starting point, then definition is poorly explained. Some evidence of the "so what" derived from this analysis. System requirements are identified that partially capture the distillation of the problem. These requirements are passably expressed. Scope for several significant issues.	<5 pts Missing multiple system requirements or major issues such as clearly incorrect or unjustified requirements, or major, repeated expression issues.	/15
Overview of design methodology and process to discuss how your team will tackle the engineering project.	14-15 pts Details clearly and concisely the design process of how the design problems and challenges are addressed and validated. Details clearly how the team approaches the problem and processes / procedures to implement design decisions and changes.	12-13 pts Details the design process of how the design problems and challenges are addressed and validated. Details how the team approaches the problem and processes / procedures to implement design decisions and changes.	9-11 pts Details some of the design process of how the design problems and challenges are addressed and validated. Some details on how the team approaches the problem and processes / procedures to implement design decisions and changes.	6-8 pts Some outline of procedures and processes to address design challenges. Team demonstrates inconsistent or ineffective decisions-making procedures and processes to implement changes.	<5 pts No overview of design methodology and process provided. Design methodology provided would not assist with addressing any design challenges. No to very little justification on the decision-making procedures of implementing changes.	/15

Team Management and Organisation **(30%)** Overview of team management structure and responsibilities	9-10 pts Concise and clear overview of team management structure, roles and their responsibilities for the project. Demonstrates fair task allocation or justifies tasks allocation for various roles.	7-8 pts Good overview of team management structure, roles and their responsibilities for the project. Somewhat demonstrates fair task allocation or justifies tasks allocation for various roles.	5-6 pts A decent overview of team management structure, roles and their responsibilities for the project. Does not demonstrate fair task allocation or justifies tasks allocation for various roles.	3 – 4 pts An overview of team management structure. Lacks detail on the responsibilities of various roles within the team. Demonstrates an uneven task allocation or inability to adequately to distribute tasks.	< 2 pts Little to no overview of the team management structure or responsibilities. Management structure provided is poor and demonstrates an uneven task allocation.	/10
Overview of communication management Overview of project budget Overview of project timeline, milestones and launch schedule.	9-10 pts Concise and clear overview of communication processes and procedures utilised to ensure efficient communication within the team. Identifies and demonstrates appropriate communication with various project stakeholders.	7-8 pts Sound overview of team communication strategies, with mention of specific processes and procedures. Identifies various project stakeholders with moderate information regarding strategies of engagement.	5-6 pts Some information detailing team communication strategies. Identifies few project stakeholders and little information regarding strategies of engagement.	3 – 4 pts Little detail regarding team communication strategies. Fails to identify key stakeholders in the project and strategies of engagement.	< 2 pts Little to no communication management overview provided. Communication strategies provided would not be suitable for the competition. No stakeholders identified	/10

Team Management and Organisation **(30% Continued)** Overview of team management structure and responsibilities Overview of communication management Overview of project budget Overview of project timeline, milestones and launch schedule.	5 pts Budget is discerning in its set out and is representative of all costs relevant to the project. Contingencies are strongly justified.	4 pts Budget is considerate of largely considerate of the relevant costs – omitting only few items. Contingencies are justified with minimal inconsistencies and errors.	3 pts Budget set out has moderate errors pertaining to quantities. Budget is largely self-consistent with little to no errors. Contingencies are not well-justified	2.5 pts A minimal budget is set out. Clear issues and concerns are identifiable. Budget is not self-consistent. Contingencies are not considered.	<2.5 pts No to very little information of the budget is set out. Budget is not self-consistent. Contingencies are not considered.	/5
	4- 5 pts All major competition milestones identified with a clear and well thought out plan of how and when they will be met. Reasonable project technical and management milestones are disclosed.		2-3 pts Unreasonable timeline and milestones are disclosed. Competition milestones do not align with project timeline. Lack of detail regarding launch opportunities and system preparation		< 2 pts An unreasonable timeline is set out. Timeline is inconsistent with the competition milestones. Timeline does not consider contingencies.	/5
Language **(5%)** Formal, objective, neutral academic language Spelling and grammar Precision, rather than ambiguity Linking language	5 pts Professional, formal language used throughout, Spelling and grammar are of a high standard. Precision is evident, avoiding ambiguity. Effective use of linking language enhances overall coherence. .	4 pts Mainly formal, objective, and neutral academic language. Spelling and grammar are correct. Communicates with precision, with rare ambiguity. Consistent use of linking language enhances coherence.	3 pts Language is generally formal, objective, and neutral. Spelling and grammar have minimal errors that do not impede understanding. Attempts precision, with occasional ambiguity. Attempts to use linking language, with room for improvement in coherence.	2 pts Language is formal, objective, and neutral with no errors. Spelling and grammar are correct with no errors. Communicates with precision, with rare ambiguity. Consistent use of linking language enhances coherence.	1 pt Language lacks formality, objectivity, and neutrality. Spelling and grammar errors significantly impede understanding. Lacks precision, resulting in significant ambiguity. Linking language is absent or ineffective, leading to a lack of coherence.	/5

Report Format and Presentation (5%) Professional presentation. Frontal matter (title page, executive summary, disclaimer, table of contents, lists figures and tables, glossary). Logical structure for body of report Consistent heading, table and list formatting. Clear images and diagrams. Correct captioning.	5 pts Report is well formatted and professionally presented. Frontal matter is present, and formatting is high standard. The structure is logical and formatting for figures, tables, heading, text is high standard throughout Images and diagrams are clear and easy to read.	4 pts Report is professionally presented, but some minor errors in formatting (e.g. tables, lists, figures, images etc.).	3 pts Report is acceptably formatted and structured. A medium to high number of formatting errors are present.	2.5 pts Report structure is clearly inadequate. A high number of formatting errors are present.	<2.5 pts Very poorly presented report	/5
/100						

Appendix B: Progress Report 2 Marking Rubric

Item	Excellent *High-quality industry level work.*	Good *High-quality undergraduate work.*	Developing *Good-quality undergraduate work.*	Satisfactory *Ordinary undergraduate work*	Insufficient *Inadequate work*	Score
Executive Summary (5%) A comprehensive and complete summary of the project and report which can be understood in isolation to rest of the document.	5 pts Executive summary exemplifies industry-leading standards with its comprehensive, succinct and a highly informative presentation. A compelling overview of the project that invites further reading.	4 pts Executive summary is comprehensive, succinct, and informative. Provides a solid overview of the project that encourages further exploration.	3 pts Executive summary is somewhat comprehensive and provides a basic overview. Provides essential information about the project but lacks depth.	2 pts Executive summary is self-contained with some detail but could be improved for a more cohesive overview.	1pts Executive summary is unclear, incomplete, or significantly lacking in substance. It does not effectively outline the key points of the project.	/5
Introduction and Conclusion (5%) The introduction provides an overview of the project's progress thus far. The conclusion summarises the report in terms of project to date and projected plans.	5 pts The introduction provides a comprehensive but concise overview of the project's progress and effectively sets the stage for the report, creating interest and clarity. The conclusion summarises the report thoroughly, highlighting current progress and projected plans. Clear thought has been put into potential roadblocks which could become an issue, and the precautions in place to mitigate them.	4 pts The introduction offers a mostly comprehensive overview of the project's progress and establishes a solid foundation for the report, generating interest. The conclusion offers a mostly comprehensive summary of the report and highlights current progress and projected plans effectively. Some thought has gone into potential roadblocks which could become an issue.	3 pts The introduction provides a solid, albeit basic, overview of the project's progress and conveys essential information in a competent manner, with room for deeper exploration. The conclusion offers a competent summary of the report and touches on current progress and projected plans adequately, with potential for more depth.	2 pts The introduction introduces the project's progress with some detail. It may benefit from improved emphasis and cohesion for a more engaging introduction. The conclusion summarises the report with some detail but could benefit from improved cohesion. It may need more emphasis on current progress and projected plans.	1 pts The introduction is unclear, incomplete, or significantly lacking in substance. It does not effectively provide a sufficient overview of the project's progress. The conclusion is unclear, incomplete, or significantly lacking in substance. It does not effectively summarise the report's progress and projected plans.	/5

Design Overview (20%) A conceptual design, overview of the rocket, its planned subsystems, and functions. The design choices are explained. Changes to the design from the previous report are highlighted.	19-20 pts Exceptional depth and detail in presenting design choices. Comprehensive development of subsystems with precise explanations. Demonstrates an advanced understanding of rocket operation design choices. Rigorous testing procedures are outlined with detailed results. The section reflects a highly matured and well-considered design.	16-18 pts Clear and detailed presentation of design choices. Subsystems are well-developed with adequate explanations. Demonstrates a good understanding of rocket operation design choices. Testing procedures are outlined with satisfactory results. The section reflects a well-developed and considered design.	11-15 pts Adequate presentation of design choices. Subsystems are presented with some detail and explanation. Demonstrates an acceptable understanding of rocket operation design choices. Testing procedures are outlined with basic results. The section reflects an adequately developed design.	6-10 pts Basic presentation of design choices. Subsystems are presented with limited detail and explanation. Demonstrates a basic understanding of rocket operation design choices. Testing procedures are outlined with minimal results. The section reflects a rudimentary design.	<5 pts Inadequate or missing presentation of design choices. Subsystems are inadequately presented or entirely missing. Demonstrates a lack of understanding of rocket operation design choices. Testing procedures are missing or insufficient. The section lacks evidence of a coherent design.	/20
Payload (10%) A concise summary of the payload system, its intended purpose and benefits to stakeholders and/or project. It should detail the design choices made to enhance the system reliability and convincingly showcase scientific or technical viability and applicability.	10 pts Exceptionally concise and detailed summary of the payload system. Clearly outlines the intended purpose and benefits to stakeholders or the project. Demonstrates advanced design choices that enhance system reliability. Convincingly showcases the scientific or technical viability and applicability. The section reflects a highly sophisticated and well-justified payload design.	8-9 pts Clear and concise summary of the payload system. Outlines the intended purpose and benefits to stakeholders or the project. Demonstrates good design choices contributing to system reliability. Presents a convincing case for the scientific or technical viability and applicability. The section reflects a well-considered and justified payload design.	6-7 pts Adequate summary of the payload system. Describes the intended purpose and benefits to stakeholders or the project. Demonstrates acceptable design choices for system reliability. Presents a reasonable case for the scientific or technical viability and applicability. The section reflects an adequately developed payload design.	4-5 pts Basic summary of the payload system. Provides limited information on the intended purpose and benefits. Design choices for system reliability are basic. Presents a limited case for the scientific or technical viability and applicability. The section reflects a rudimentary payload design.	<3 pts Inadequate or missing summary of the payload system. Fails to describe the intended purpose and benefits convincingly. Design choices for system reliability are missing or insufficient. Fails to present a case for the scientific or technical viability and applicability. The section lacks evidence of a coherent payload design.	/10

Systems Engineering (30%) What design choices have you made to enhance your system's reliability and safety? In this section updated system requirements are expected. How are you planning to verify your design against these system requirements?	10 pts Exceptionally detailed and updated system requirements are presented. Demonstrates a comprehensive plan for verifying the design against system requirements. Design choices to enhance system reliability and safety are advanced and well-justified. Comprehensive and robust discussion of hazard identification and hazard log. Demonstrates advanced implementation of safety approach. Clear evidence of supporting documentation from Appendices.	8-9 pts Clear and detailed presentation of updated system requirements. Presents a good plan for verifying the design against system requirements. Design choices to enhance system reliability and safety are well-justified. Robust discussion of hazard identification and hazard log. Demonstrates a well-implemented safety approach. Adequate evidence of supporting documentation from Appendices.	6-7 pts Adequate presentation of updated system requirements. Describes an acceptable plan for verifying the design against system requirements. Design choices to enhance system reliability and safety are reasonable. Provides an acceptable discussion of hazard identification and hazard log. Demonstrates an adequately implemented safety approach. Some evidence of supporting documentation from Appendices.	4-5 pts Basic presentation of updated system requirements. Provides a basic plan for verifying the design against system requirements. Design choices for enhancing system reliability and safety are basic. Offers a basic discussion of hazard identification and hazard log. Demonstrates a basic implementation of safety approach. Limited evidence of supporting documentation from Appendices.	<3 pts Inadequate or missing presentation of updated system requirements. Fails to provide a plan for verifying the design against system requirements convincingly. Design choices for enhancing system reliability and safety are missing or insufficient. Fails to provide a convincing discussion of hazard identification and hazard log. Demonstrates a lack of implementation of safety approach. Insufficient evidence of supporting documentation from Appendices.	/30
Simulations and flight profile (5%) A methodology for simulating the rocket flight is outlined and the results are presented. The simulation is done correctly and could be relied on.	5 pts A robust simulation has been completed with methodology clearly outlined and justified. There is a clear attention to detail. Provided table is completed with valid information and meets safety requirements in AURC documentation.	4 pts A robust simulation has been completed with methodology outlined and justified. Provided table is completed with valid information and meets safety requirements in AURC documentation.	3pts A simulation has been completed with methodology outlined but not justified. Provided table is completed with valid information and meets safety requirements in AURC documentation.	2pts A simulation has been completed and is briefly summarised. Provided table is completed with valid information and meets safety requirements in AURC documentation.	< 2 pts An inadequate or no simulation of the rocket is provided. Provided table is incomplete or does not meet safety requirements in AURC documentation.	/5

Manufacturing Processes & Plans (10%) This section should include an overview of manufacturing methods and materials. It should also cover your manufacturing progress to date.	10 pts Exceptionally detailed overview of manufacturing methods and materials. Comprehensive coverage of manufacturing progress to date with substantial evidence. Demonstrates advanced planning and implementation of manufacturing processes; the timeline is well thought out	8-9 pts Clear and detailed overview of manufacturing methods and materials. Good coverage of manufacturing progress to date with clear evidence. Demonstrates well-planned and implemented manufacturing processes; the timeline is thought out.	6-7 pts Adequate overview of manufacturing methods and materials. Provides an acceptable coverage of manufacturing progress to date with some evidence. Demonstrates adequately planned and implemented manufacturing processes.	4-5 pts Basic overview of manufacturing methods and materials. Offers a basic coverage of manufacturing progress to date with limited evidence. Demonstrates basic planning and implementation of manufacturing processes.	<3 pts Inadequate or missing overview of manufacturing methods and materials. Fails to provide convincing coverage of manufacturing progress to date. Demonstrates a lack of planning and implementation of manufacturing processes.	/10
Flyer of record documentation (5%)	5 pts Flyer of record documentation table is filled out correctly with valid information				0 pts Flyer of record documentation is not provided, complete with invalid information or filled out incorrectly.	/5
Language **(5%)** Formal, objective, neutral academic language Spelling and grammar Precision, rather than ambiguity Linking language	5 pts Professional, formal language used throughout, Spelling and grammar are of a high standard. Precision is evident, avoiding ambiguity. Effective use of linking language enhances overall coherence.	4 pts Mainly formal, objective, and neutral academic language. Spelling and grammar are correct. Communicates with precision, with rare ambiguity. Consistent use of linking language enhances coherence.	3 pts Language is generally formal, objective, and neutral. Spelling and grammar have minimal errors that do not impede understanding. Attempts precision, with occasional ambiguity. Attempts to use linking language, with room for improvement in coherence.	2 pts Language is formal, objective, and neutral with no errors. Spelling and grammar are correct with no errors. Communicates with precision, with rare ambiguity. Consistent use of linking language enhances coherence.	1 pt Language lacks formality, objectivity, and neutrality. Spelling and grammar errors significantly impede understanding. Lacks precision, resulting in significant ambiguity. Linking language is absent or ineffective, leading to a lack of coherence.	/5

Report Format and Presentation (5%) Professional presentation. Frontal matter (title page, executive summary, disclaimer, table of contents, lists figures and tables, glossary). Logical structure for body of report Consistent heading, table and list formatting. Clear images and diagrams. Correct captioning.	5 pts Report is well formatted and professionally presented. Frontal matter is present, and formatting is high standard. The structure is logical and formatting for figures, tables, heading, text is high standard throughout Images and diagrams are clear and easy to read.	4 pts Report is professionally presented, but some minor errors in formatting (e.g. tables, lists, figures, images etc.).	3 pts Report is acceptably formatted and structured. A medium to high number of formatting errors are present.	2.5 pts Report structure is clearly inadequate. A high number of formatting errors are present.	<2.5 pts Very poorly presented report	/5
/100						

Appendix C: Systems Engineering and Design Methodology

This section provides normative guidelines for student teams when undertaking design of their competition rockets and associated systems. The following process is provided as a reference but should be undertaken as a minimum while undertaking the design of the rocket.

1. **Top-level functional requirements**: Teams shall define the operational objectives of their rocket architecture as a whole. Most of this should be heavily borrowed from the requirements outlined in the "2024 AURC Rocket Specifications" document.
   - Examples of requirements: Carry a 2 kg payload, reach 10k feet altitude, dual stage recovery.
2. **System definition:** Teams shall define the systems of their rocket including system boundaries, interactions with other systems and any major subsystems.
   - Examples of systems: recovery, avionics, aerostructures, propulsion and payload.
3. **System functional requirements:** Teams shall define the functional requirements for each of the systems (and subsystems if relevant). These system level requirements must feed into the top-level requirement for the rocket architecture as a whole.
   - Examples for the avionics systems: must trigger a separation event at apogee, must log altitude.
4. **Hazard identification:** Teams shall carry out a top-down hazard identification activity to identify how functional failures in systems and subsystems will produce safety and flightworthiness hazards. This should cover all system functions across all system states. The systems states analysed should cover all phases where the rocket experiences substantial changes in operating conditions.
   - Example of hazard: should the avionics unsuccessfully activate a separation event at apogee, what would the safety and flight worthiness hazards be?
   - Examples of system states: preparation, standby for launch, boost, coast, descent.
5. **Hazard log:** Teams shall document identified hazards in a hazard log which should be updated as the design evolves.
   - A hazard log template will be provided by AURC.
6. **Risk reduction:** Teams shall reduce the risk of hazards occurring by applying measures following the hierarchy of controls (elimination, substitution, isolation, engineering, administrative, PPE). These controls should be documented and linked to hazards in the hazard log.
   - Example of controls: engineering control by utilising dual redundant flight computers, written assembly procedures and the use of PPE for arming rockets.
7. **Safety assessment**: Once the design for the rocket has been finalised a bottom-up safety assessment shall be undertaken such as a Failure modes, effects, and criticality analysis (FMECA). This approach analyses each component individually to identify hazardous failure modes. Note that this is different to the top-down approach during design. This should identify any missed controls and verify that the rocket and its systems have been designed to a suitable standard of safety and flight worthiness.
   - A FMECA template will be provided by AURC.
8. **Updated hazard log:** Teams shall document all the hazards identified throughout the design process and the controls that have been applied to each of them.

This process develops across the scope of multiple deliverables as teams progress their designs and is not addressed in a single deliverable. Progress Report 1 covers items 1-3, Progress Report 2 covers items 3-5 and the Technical Report covers items 6-8.

Note that while an activity may have initially taken place in an earlier deliverable, each sequential item relies on inputs from previous steps. As such, any changes or updates during detailed design that affects the architecture and system level functions must be reassessed through all activities.