Australian Universities Rocketry Competition 2018/2019

Awards and Scoring

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1 Introduction

The Australian Universities Rocket Competition is Australia's first national university rocketry competition hosted by the Australian Youth Aerospace Association. Commencing in 2018, the AURC was designed with the aim to provide graduate engineers and scientists with the skills required for the growing aerospace industry in Australia. It also aims to provide a practical competition for Australian students passionate about rocketry. The AURC was inspired by a number of rocket competitions around the world, with the intention is to integrate the best parts of other rocket competitions around the globe to design the greatest tertiary rocket competition in the world. Furthermore, the AURC aims to encourage student teams to be as multidisciplinary as possible to reflect complex, real life space projects that require a mix of engineers and scientists from different backgrounds. This event continues the AYAA's legacy of promoting education, awareness and involvement in the aerospace industry to young Australians.

1.1 Background

Australia is no stranger to space; the nation's involvement can be dated back as far as the 1940's when the Woomera Rocket Range was established in South Australia. This site eventually became a landmark in the west as the world's second largest launch and tracking facility. Paul Scully-Power, the first Australian to enter space as an Oceanographer in 1985, and Andy Thomas the first Professional Australian Astronaut acting as payload commander in 1996 are a few famous names in Australia's space adventures. Fast forwarding to recent times, in 2017, South Australia hosted the International Astronautical Congress, where the Australian Space Agency was announced. Exciting times are certainly abound for Australians, and the AYAA hopes to strengthen this by fostering a greater interest in aerospace with a national rocketry competition. Additionally, this competition aims to increase the interest in STEM careers for Australian university students and provide them with a practical outlet to extend themselves beyond the lecture halls to design and build rockets themselves. The students that compete will develop their skills in a team environment, solving real-world problems under the same pressures they would experience in their future careers. This will be the inaugural AURC and the AYAA hope to continue this as an annual competition.

1.2 Purpose

This document defines the scoring breakdown and awards for competing teams. Provided will be a description of how scoring category and awards will be assessed. If there are any further questions that are not answered by this document and all other subsequent resources, do not hesitate to contact an AURC representative whose details can be found on the AYAA website.
Note: The awards structure will be released following Aerospace Futures: 16th to 19th of July

1.3 Revision

AYAA withholds the right to revise the AURC Awards and Scoring document. Minor revisions which do not impact the design goals of the teams competing may be made throughout the year. Major revisions which affect the design goals of competing teams will only be made during the transition between competition years. It is the responsibility of the participating team to ensure that they are correctly using the most recently revised document, available on the AYAA website (https://ayaa.com.au/AURC).

2 Scoring (Total marks = 200)

Assessment of a team's performance in the AURC is based on engineering reporting, engineering design and product performance. The competition score will be a maximum of 200 marks, spread over multiple categories. The scoring breakdown and assessment criteria for each score category is outlined below.

2.1 Progress Updates (3 x 5 marks = 15 marks)

The report shall adhere to the format/style guide, and will be evaluated for quality and technical aptitude. There are three reports throughout the competition. Progress updates will be scored on engineering professionalism, punctuation, grammar, spelling, technicality and adherences to safety codes. Specific criteria and mandatory content for each progress update will be released in advance of the deadline.

2.2 Project Technical Report (40 marks)

A complete technical report must be submitted before launch. This report shall adhere to the format/style guide, and will be evaluated for quality and technical aptitude. The report must contain details about the teams: research, design process, design decisions, adherence to safety guidelines, adherence to legal requirements, and adherence to competition requirements, final design, and estimation of performance, suggested improvements/limitations, and any other relevant details. It will also be assessed for logical structure, engineering professionalism, punctuation, grammar, spelling, technicality, and appropriate usage of appendices. Specific criteria and mandatory content for this document will be released in advance of the deadline.

2.3 Virtual Vehicle Design (20 marks)

All teams are expected to submit their CAD models and drawings for their final designs. These will be evaluated for applied best modelling practice and technical drawing conformance to AS1100 (mechanical drawings) and AS1103 (circuit/wiring diagrams).This will require dimensioning and constraining each part with appropriate tolerancing and surface finishes specified. An organized model tree and clear assembly drawings will also be required.

2.4 Analytical Simulation (20 marks)

Teams are expected to simulate the trajectory of their vehicle in a package such as Python, MATLAB, OpenRocket or other simulation software. The submitted code must display best programming practice, with clear commenting, and is required in order for launch. Supporting documentation must be included to explain the code and appropriate assumptions made, and must be packaged in a way that the judges can run it. The outputs must be accurate and assist in optimising their vehicle performance.

2.5 Prototype Vehicle Design (40 marks)

The design of the vehicle will be evaluated for quality of construction and design decisions made by each team. Teams will be expected to provide substantiation for their major design decisions when prompted by AURC representatives during the launch days. Consideration of vehicle flight operation safety will also be assessed in this section. The team must demonstrate understanding of the physics behind their rocket, consideration of manufacturing in the design, and utilization of COTS components. Judges will look for utilization of a systems engineering approach in the design and construction.

2.6 Flight Performance (65 marks)

The vehicle's flight performance will be demonstrated by its achieved altitude relative to the target apogee (10,000ft or 30,000ft AGL), and successful recovery. Closeness to target altitude will be assessed, with height above target considered just as bad as height below target. The condition of recovery will also affect the flight performance.

3 Awards

No current details for the competition awards are available for registration release. Details will be released after the AYAA's Aerospace Futures conference (16th to 19th of July 2018).