



Queen's
UNIVERSITY

Queen's University Advanced Sounding Rocket Design Team (QUASR)



2015/2016 Sponsorship Package



About QUASR

The Queen's University Advanced Sounding Rocket Design Team (QUASR) is a student-run engineering design team with the goal of safely designing, building, and testing sounding rockets to compete in interscholastic competitions.

QUASR is a team of roughly 30 students, run by six executive members (one graduate and five undergraduate) from Queen's University. Students working on this challenging project gain unique design, teamwork, and manufacturing skills.

Last year, we completed our inaugural competition in the Intercollegiate Rocket Engineering Competition (IREC) in Green River, Utah, and will compete again in the 2016 IREC in the coming school year.

Executive Team



PRESIDENT

Bradley Taylor • Ph.D. Candidate • Mechanical Engineering



VICE-PRESIDENT

Eric Donders • Undergraduate • Engineering Chemistry



SPONSORSHIP COORDINATOR

Shannon Neville • Undergraduate • Mechanical Engineering



TREASURER

Mitchell Wheatley • Undergraduate • Mechanical Engineering



HEAD OF CONSTRUCTION

Nick Schwenger • Undergraduate • Mechanical Engineering



SAFETY COORDINATOR

Geoff Donoghue • Undergraduate • Engineering Physics

Intercollegiate Rocket Engineering Competition (IREC)

The Experimental Sounding Rocket Association (ESRA) hosts an annual international Intercollegiate Rocket Engineering Competitions every June near Green River, Utah. Teams compete in a variety of categories, including safety, innovation, performance, payload design, and construction quality.

•**Basic Category:** 10 lb payload to 10,000 ft

•**Advanced Category:** 10 lb payload to 23,000 ft



2013 16 Universities from 4 Countries

2014 27 Universities from 4 Countries

2015 50 Universities from 7 Countries

2016 76 Universities from 9 Countries

Payload Information

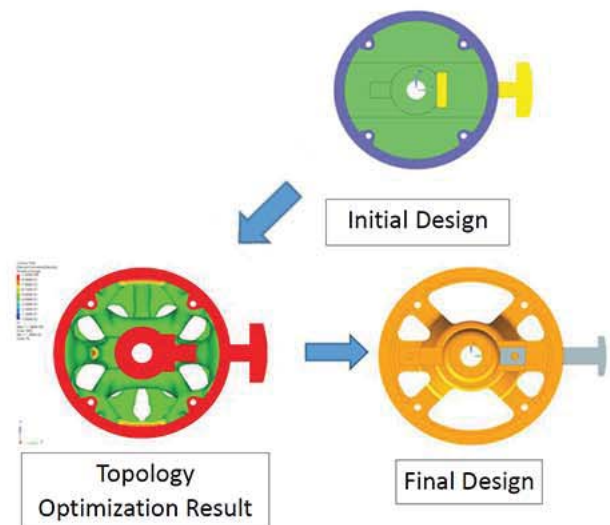


The objective of any sounding rocket is to deliver a payload to its given altitude. As such, the payload design presents an integral component of the rocket design process. It is an inherently interdisciplinary project that requires students from a wide array of engineering backgrounds work together effectively, to establish a functional and reliable payload design. This year's payload will provide panoramic flight footage – through takeoff and descent – a live video stream back to the launch site, and an automated, fan-driven system, to direct the payload to a pre-selected set of GPS coordinates for quick, convenient recovery.

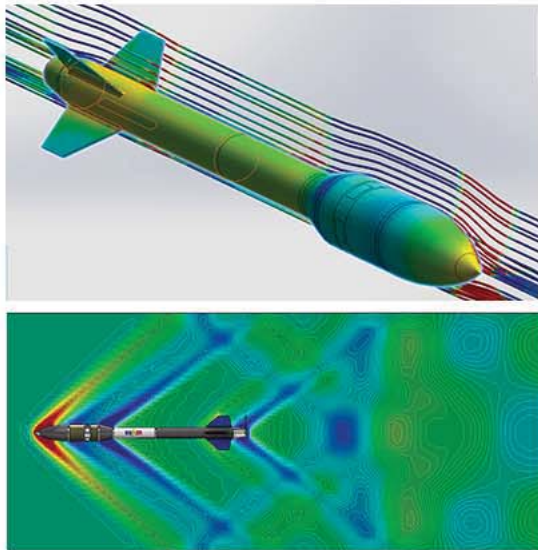


Topology Optimization

With four graduate students from Prof. Il Yong Kim's structural design group, QUASR has the personnel and computing facilities required to develop the most mechanically efficient designs possible, using topology optimization. The process uses finite element modelling, and state of the art optimization programs to determine the most efficient designs for any structural component of the rocket.



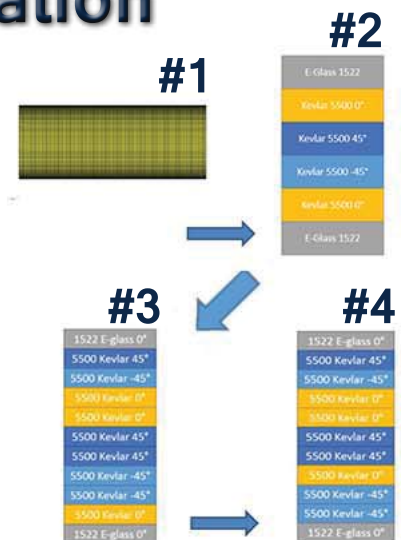
Computational Fluid Dynamics



With competition scoring placing an enormous emphasis on achieving the exact specified objective altitude of 10,000 feet, accurate altitude prediction for the rocket is crucial. Incorporating computational fluid dynamics into the design process allows for more accurate altitude predictions under variable flight conditions, and has been instrumental in providing quantitative performance metrics during the development of this year's new aerobraking mechanism.

Composites Optimization

QUASR student's extensive exposure to finite element analysis problems allow them to take novel approaches when it comes to lightweight design. The majority of the rocket structure is constructed out of composites, and the use of finite element analysis for complicated composites structures, with highly anisotropic material properties allows the team to optimize weave pattern, orientation, and ply layering. Using this technology, Queen's team produced by far the lightest rocket at the competition last year.



Benefits of Partnership

Make an Impact

- IREC has received news coverage in the past and continues to grow exponentially.
- IREC is attended and monitored by a diverse target group including high school students, retired hobbyists, university students, and aerospace industry professionals.
- Sponsors have an opportunity to demonstrate commitment and build their reputation within an interested and specialized audience with unique interests.

Recruit Future Leaders

- Access to nearly **600 university students** and over **75 faculty members**.
- Spread your name – reach out to **76 top universities** from **9 countries**.
- Interact with future leaders of the space and aerospace industry.
- Identify motivated and talented students as they develop, test, and build high-powered rockets.

Support Education and Student Development

- Provide the next generation of Canadian engineers with hands-on, real-world experience on a challenging technical problem.

2016 Budget Projections

Travel Accomodations

Hotel	\$ 1,200
Flights	\$ 5,000
Car Rentals	\$ 550
Gas for Cars	\$ 400
Airport Parking	\$ 250

Manufacturing & Materials

Composites	\$ 1,750
Machining Costs	\$ 500
Motor	\$ 600
Avionics	\$ 800
Deployment System	\$ 300
Parachutes	\$ 800
Construction Tools	\$ 900
Payload Design	\$ 1,000
Tent and Banner	\$ 200
Video Equipment	\$ 300
Communication	\$ 600
Flight Certification	\$ 125

Test Flight

Hotel	\$ 300
Car Rental	\$ 225
Gas	\$ 200

Total 2015–16 Cost: \$ 16,000

Donation Classification

Donations represent contributions to the team, without expectations of receiving any compensation in return, and can be classified into two separate categories:

Philanthropic Donations






- Eligible for Charitable Tax Receipts through Queen's University
- Cheques should be made payable to Queen's University

In-Kind Donations

- Valued at market price and contribute towards sponsorship categories
- The use of donated products will be advertised at competition events and in promotional videos

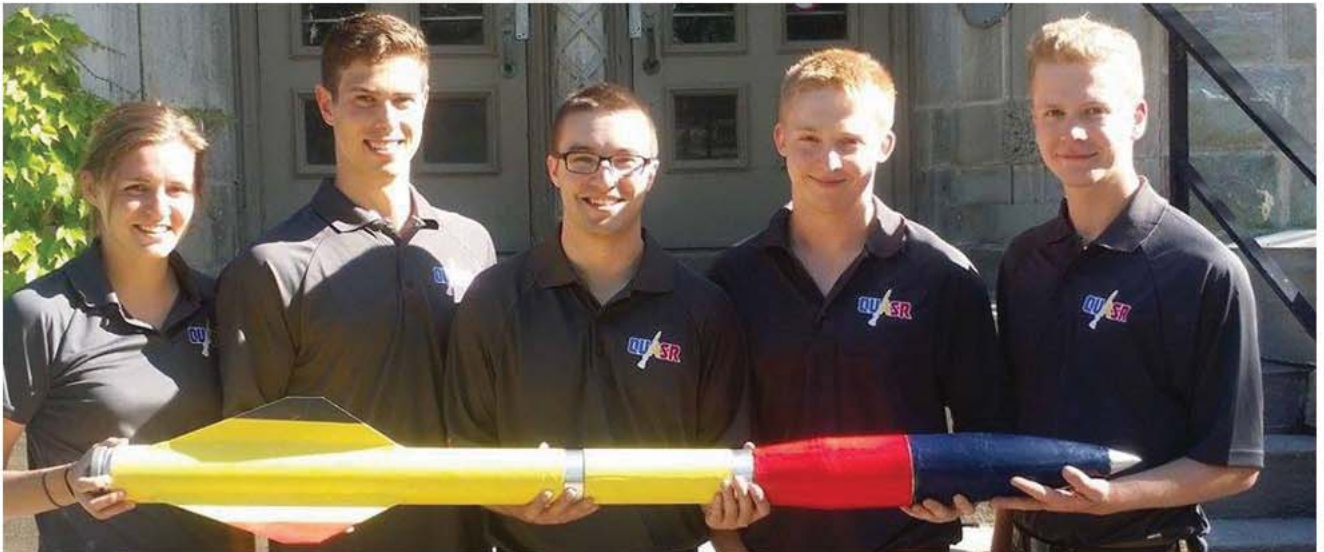
Sponsorship Packages

Corporate sponsorship packages are available to those who wish to leverage the unique qualifications, resources, and market position afforded to the Queen's University Advanced Sounding Rocket engineering design team and its members. The quantity and degree of services offered to sponsors vary, depending on the magnitude of their donations.

	Platinum \$5000	Gold \$2500	Silver \$1000	Bronze \$500
Logo on QUASR team website Logo in team promotional video Logo on team T-shirt, which is worn to promotional events and competition				
Larger logo on team T-shirt Logo on team banner, which is taken to all team events and competition				
Logo posted directly on team rocket Large logo on team tent at competition in Utah				
Invitation for company representatives to visit Queen's University, meet with team members, and tour team facilities				

QUASR is committed to ensuring that all benefactors get the most value out of every donation. If there are any benefits not listed in the above packages that you would be interested in, contact us directly, and we will be happy to work out a packages that maximizes the value for both parties.

Contact Us



On behalf of the entire team, I would like to thank you for your time and support; we look forward to working with you again in the future.

Handwritten signature of Bradley Taylor.

Sincerely,
Bradley Taylor, BAsC., PhD Candidate
quasr@engsoc.queensu.ca
President

Queen's University Advanced Sounding Rocket Design Team