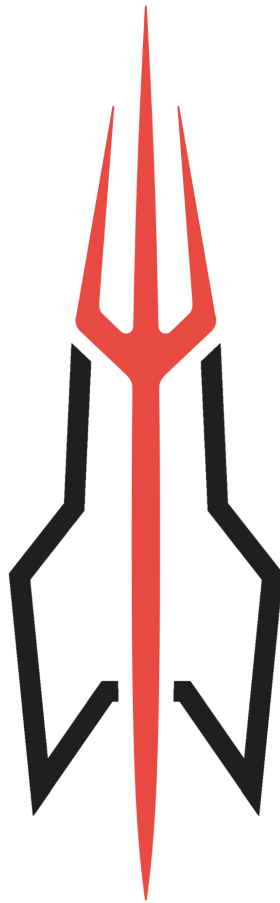


# Letter to Prospective Sponsors

ROCKET PROPULSION LABORATORY

University of California, San Diego



## THE NEXT GENERATION OF INNOVATORS & PROBLEM SOLVERS

### Who we are:

Rocket Propulsion Laboratory (RPL) was founded at the University of California, San Diego in the Spring of 2017. We are a non-profit, student-run organization seeking to advance aerospace technology and student capabilities through the design and manufacture of propulsion systems.

### What we do:

The overarching work of RPL is centered around producing and launching vehicles with innovative and complex propulsion systems at their core. Designing sophisticated liquid bipropellant rocket engines is a challenging and difficult task. To utilize members of all skill levels, we provide a variety of challenges for our students to take on. We currently have three main projects in progress: Phoenix, Hermes-I and the New Member Project (NMP).

### Our Mission:

RPL strives to provide challenging and exciting projects for students to develop their technical knowledge, leadership abilities, and hands-on skills. We believe in the future of science and technology and are dedicated to building a close-knit, diverse community of passionate young engineers. The NMP project allows for all interested students, regardless of major or expertise, to develop their knowledge and then use their experience in more advanced projects such as Phoenix and Hermes. Our work seeks to improve the talent and diversity of the next generation of emerging talent pushing the limits of what an undergraduate rocketry team can do. Our mission also includes nurturing a network of young professionals to build lifelong friends and lasting connections with our growing alumni network.



*Rocket Propulsion Laboratory Team, Fall 2021*

# Current Projects

*Innovation, Determination, and Success.*

## 1. New Member Project

Engineering design intuition is best gained by working on a small project. Prospective members without practical experience frequently start out on our New Member Project. This year there are 15 teams, each with ~5 members. Each group is guided by experienced members through the design and construction of a “H” class model rocket. During their projects, new members develop the engineering skills they will need to contribute to our bigger projects.

This program provides a foundation of practical engineering knowledge that serves to reinforce the fundamental theory provided by the UCSD curriculum. Through this two-quarter program, members learn the basic skills necessary such as fundamental propulsion theory, aerospace electronics, computer-aided design, 3D printing, and other manufacturing methods. By having small teams build and launch high-power amateur rockets, we facilitate every member's ability to learn the engineering process while building confidence and enthusiasm.



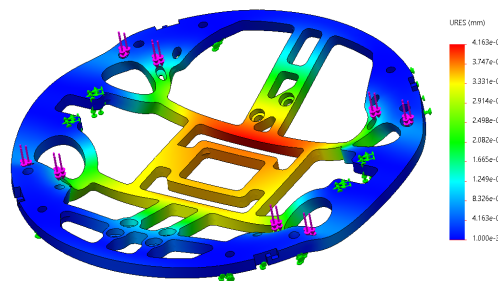
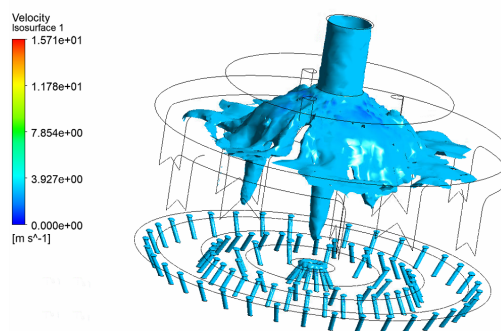
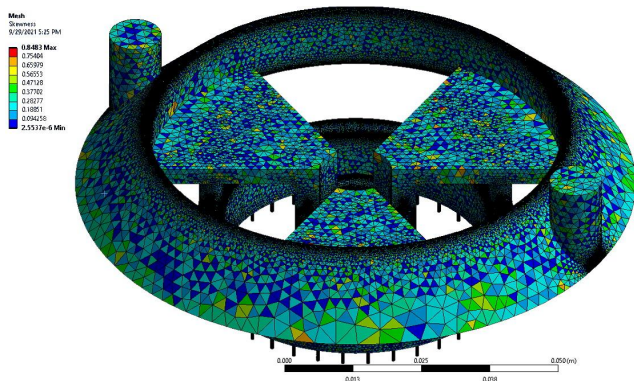
*Above: An NMP rocket during liftoff*

## 2. Phoenix

Small in scale, but brimming with complex challenges is the FAR-MARS Competition. RPL is entering into the competition with our very first liquid bi-propellant vehicle to win \$100,000. The goals of the competition are twofold: reach 45,000 feet to demonstrate the precise control required to create reusable launch vehicles, and do so using a combination of liquid methane and liquid oxygen propellants, both of which may be extracted from the Martian environment in future missions to the red planet.

The rocket measures 15 feet tall. The engine will provide 600 lbs of thrust and reach half the temperature of the sun. At T+15, the rocket will break the sound barrier, and continue accelerating to Mach 1.5 (1150 mph).

The Phoenix program is designed to give more advanced members a deeper understanding of the complexities of the design, fabrication, and operation of a liquid propellant rocket. Students get an in-depth look at avionics systems, structural mechanics, propulsion and flight dynamics, and testing and launch site safety and operations.



Left: Checking the skewness of the liquid natural gas channel mesh




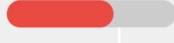

Above: Fluid dynamic analysis on the velocity isosurface (top), static displacement analysis on the recovery bay plate (bottom)

Right: Phoenix rocket



## Upcoming Phoenix Milestones

The Phoenix rocket is near completion, with our expected launch window between January and early February. We will use your funds to manufacture and assemble the rocket by mid-November, perform a series of engine tests in October and November, and have the rocket ready for launch in January.

	Summer '22	Sept '22	Oct '22	Nov '22	Dec '22	Jan '23	Feb '23
Design, Manufacturing, & Assembly							
Water Flow Test							
Cold Flow Test							
Static Fire							
Launch Window							

### 3. Hermes-I

RPL debuted Hermes-I this year to fill the gap between our smaller NMP rockets, and larger bipropellant projects. The Hermes project involves the construction of a sugar propellant rocket competing in the FAR 51025 competition. This rocket is intended to reach an altitude of 10,000 feet, use a motor manufactured in-house, and carry a cube satellite payload in collaboration with UC Davis.

The team has manufactured propellant with university approval and received our cube satellite payload from UC Davis. We expect this challenge to increase RPL's collaboration with other universities, and expand our project capabilities with the new solid propellant.

The team expects to use the summer remote period to finalize design considerations under a comprehensive review process prior to beginning manufacturing in the early fall quarter. With materials on hand to produce the internal structure and thrust chamber assembly, production is imminent. Hermes team members expect a static fire mid-fall quarter and a launch by the end of December.

*Right: Preliminary CAD model of Hermes-I*



# Becoming a Sponsor

*We need help from companies like yours to reach our goals!*

## Our Sponsorship Structure

*Choose a tier that fits your requirements!*

**Contributions can include monetary donations, materials, manufacturing, mentorship hours, etc. In case of non-monetary donations like parts or discounts, we will tier it according to the value of that donation.**

Basic	Professional	Personalized
<p><b>Be recognized by a large group of talented students</b></p> <ul style="list-style-type: none"> <li>• Logo on current projects</li> <li>• Logo on team shirt and website</li> <li>• Promotion on social media</li> </ul>	<p><b>Engage with the team members and be represented at various team tabling events</b></p> <ul style="list-style-type: none"> <li>• All benefits from the Basic tier</li> <li>• Invitation to project tests and launches</li> <li>• Dedicated representation at all RPL tabling events</li> </ul>	<p><b>You can choose the way you want your company to be represented. We will work with you to execute any ideas you have. Benefits include but are not limited to:</b></p> <ul style="list-style-type: none"> <li>• All benefits from the Professional tier</li> <li>• Invitation to address student groups at events and seminars</li> <li>• Personalized social media posts</li> </ul>
<p>\$500</p>	<p>\$1,000 - \$4,999</p>	<p>\$5,000 + Donation will depend on level of customization chosen</p>

## Considering the Personalized tier?

*Here's what to do!*

1. Email us about the benefits that interest you the most . Also mention any other ideas you may have that are not listed.
2. We'll look over your choices and prepare a plan for implementing them. Based upon your choices, we will calculate a corresponding donation amount.

3. We will work with you to ensure that the execution of these plans matches your exact needs!

## Benefit

Joining RPL's community of sponsors opens access to a large pool of talented engineers who will be an integral part of the industry in the future. Investing in our work aids us in the development of innovative rocketry solutions. We are a non-profit organization, but due to school regulations only non-monetary donations (i.e. donation of components, material, tools, etc) are eligible for a tax deduction but all donations would be gratefully appreciated. We invite you to have a look at our ideas and contact us with your own suggestions about how you want to engage with us! Our success would not be possible without the support of sponsors like you.



Top & Below: RPL tabling at SD Air and Space Event 2022



Top: Engagement with attendees at TEDx Event 2022





## Our Current Sponsors



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## Contact

Thank you for reviewing our sponsorship packet! If you would like to reach out to us about sponsoring or with any questions, you can visit our website or contact us through social media.



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