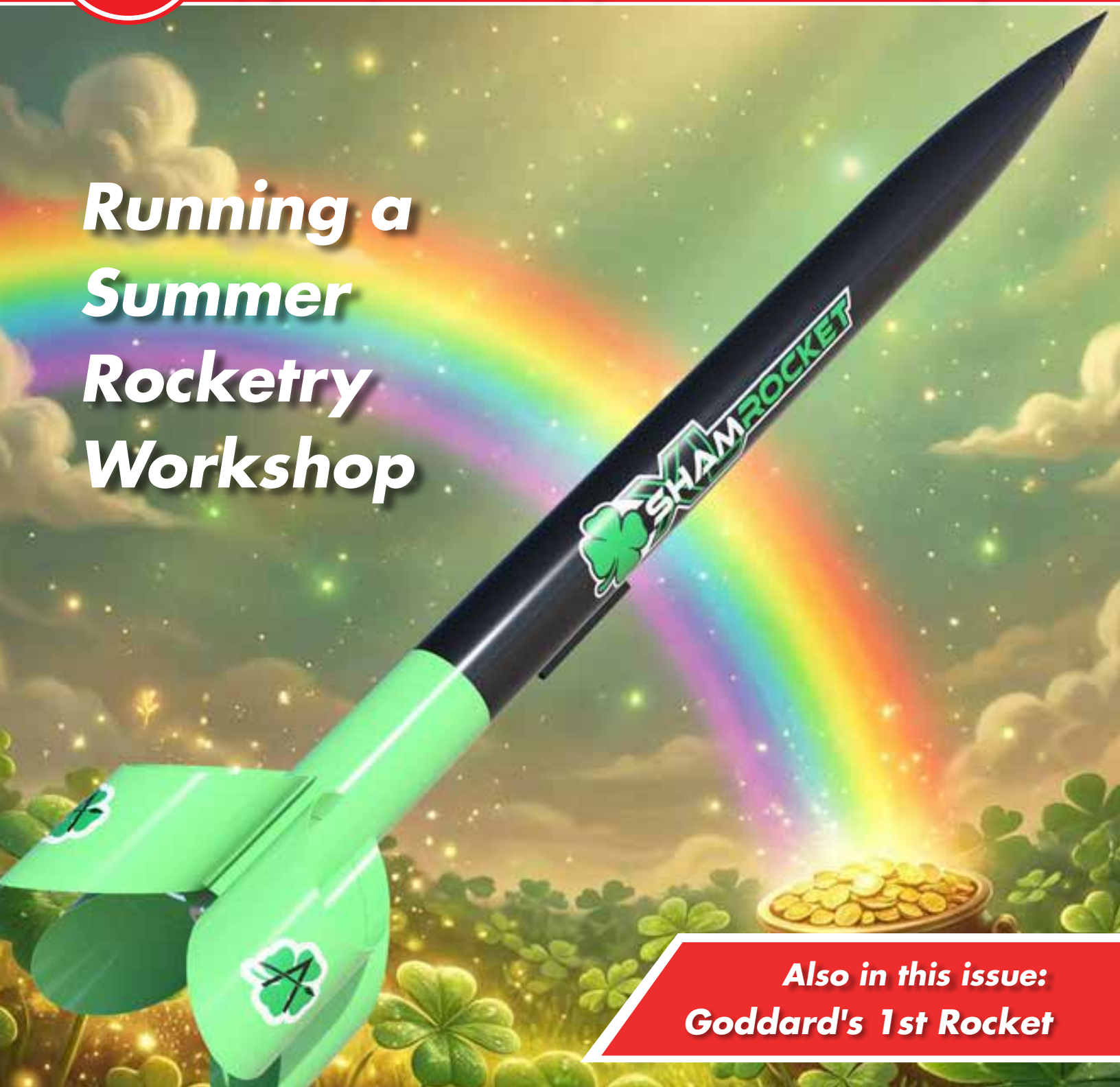
Issue 672 / February 24th, 2026

PEAK OF FLIGHT NEWSLETTER

Apogee Components, Inc. / ApogeeRockets.com / Colorado Springs, CO



Running a Summer Rocketry Workshop

Also in this issue:
Goddard's 1st Rocket

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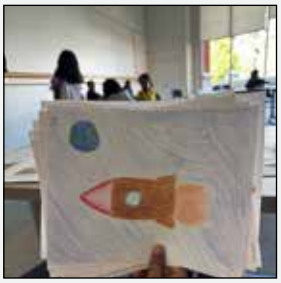
COVER PHOTO



Shamrocket XL kit

The Shamrocket XL is an upscale kit based on the plan that was in *Peak-of-Flight Newsletter #534.* It's a rocket that will bring you luck, because it flies great, even in breezy conditions. Click here for more information.

FEATURED ARTICLES



Running a Summer Rocketry Workshop

Discover how one student-led nonprofit turned a simple idea into a high-impact summer rocketry workshop that inspired over 120 young learners.



Goddard's First Liquid Fuel Rocket

Here's a short story of the 1st Liquid Fueled rocket, what makes it unique, how it worked, and why a lady is key to your knowing all this!

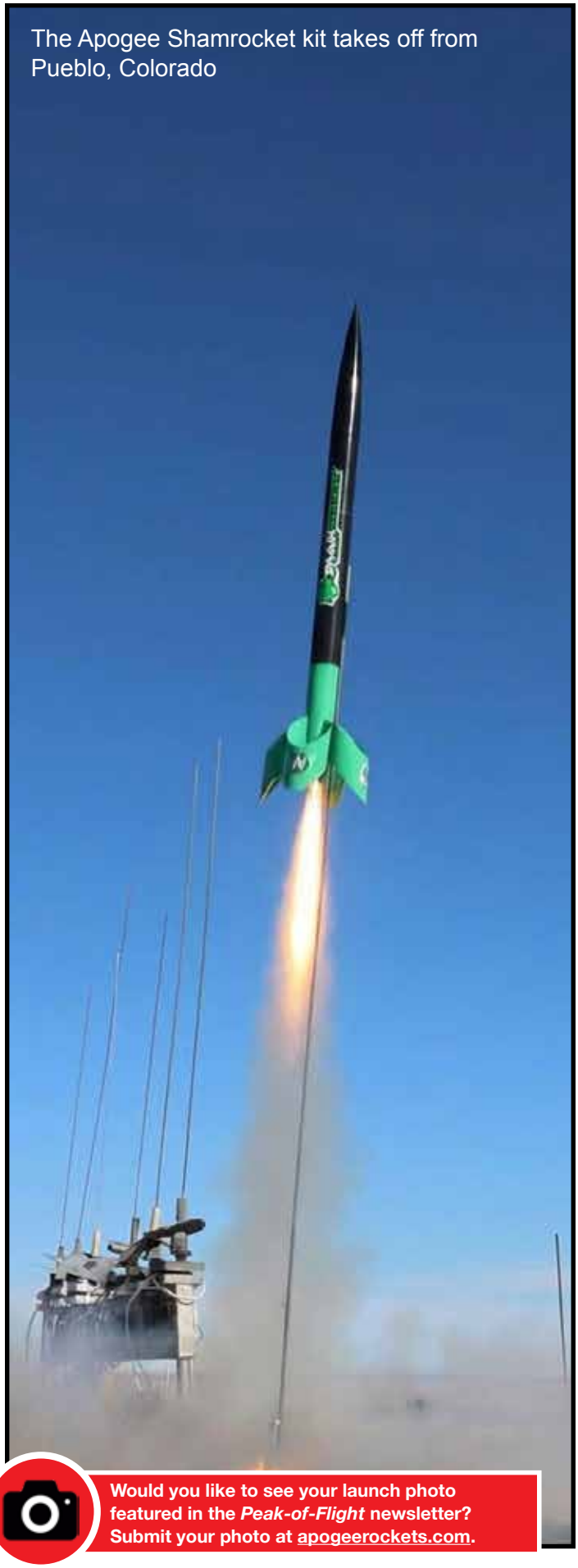
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About this Newsletter

You can subscribe to recieve this e-zine FREE at the Apogee Components website: www.ApogeeComponents.com, or by clicking the link here Newsletter Sign-Up

Editor-in-Chief: Tim Van Milligan
Managing Editor: Michelle Mason
Content Editor: Martin Jay McKee
Layout Design: Tim Van Milligan

The Apogee Shamrocket kit takes off from Pueblo, Colorado



Would you like to see your launch photo featured in the *Peak-of-Flight* newsletter? Submit your photo at apogeerockets.com.

Running a Summer Rocketry Workshop

By Raghav Vaidyanathan - President
Together We Shine Horizons Non-Profit (San Diego, CA)

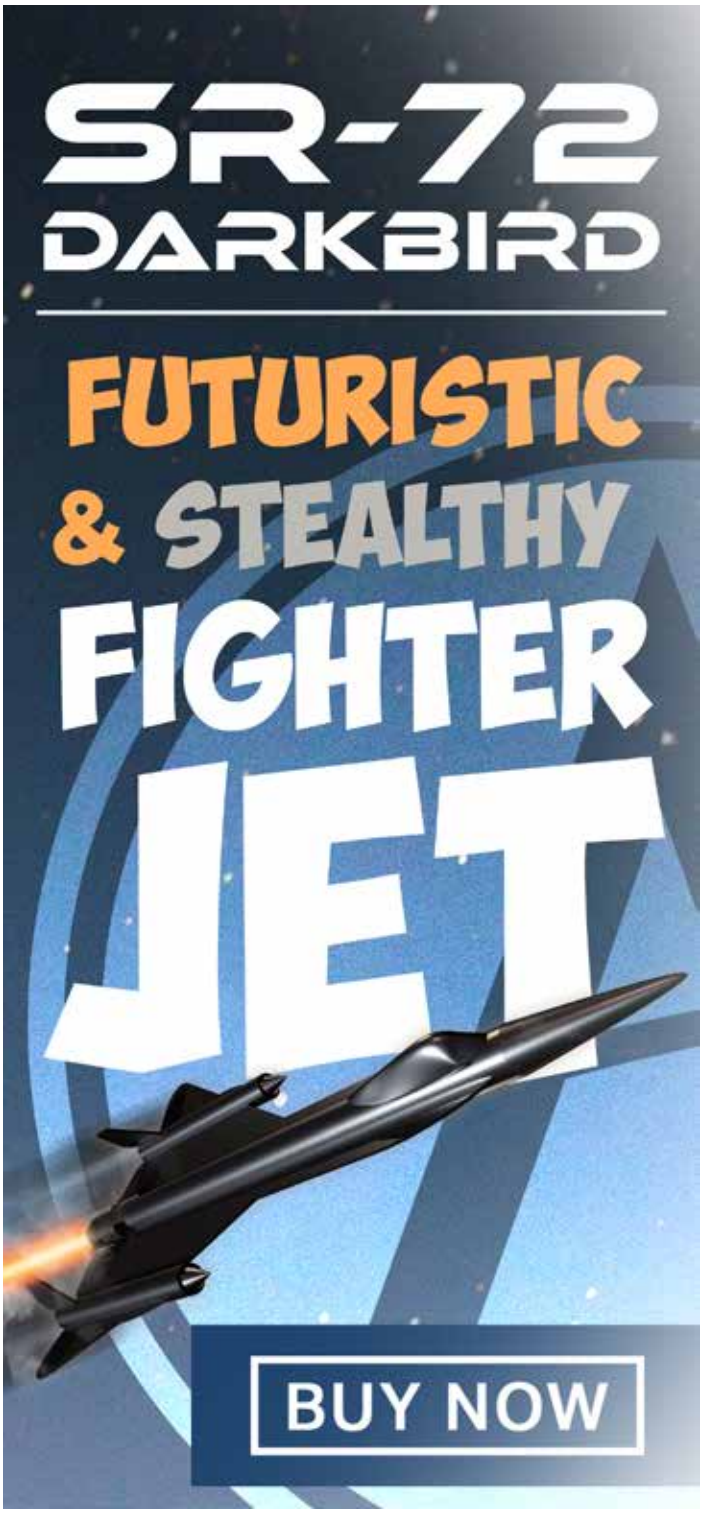
Organization

Our team organized a library outreach event by first reaching out to local public libraries via email using contact information from their websites. We introduced our rocketry program and explored collaboration opportunities. Though it required persistent follow-up, we eventually connected with interested librarians and completed the necessary Right of Entry permit to host the event on library property. We then coordinated scheduling that worked for both the library and our team. The librarians generously promoted our event on their public calendar, allowing families to register directly for the workshop. Meanwhile, we handled our own marketing exclusively through Instagram. The community response exceeded our expectations. All twelve available spots filled within just two days, and the six-person waitlist was complete by the next day.

This experience demonstrated that successful outreach events require three key elements: persistence in initial outreach, clear communication throughout the planning process, and strategic community engagement through appropriate channels. Working with the library proved invaluable—their established community presence and promotional support significantly amplified



Figure 1 - Students and Instructors at the summer camp.



our reach. The rapid registration confirmed strong local interest in STEM programming and validated our approach to community partnership. In planning the workshop, we relied on established educational rocketry resources such as www.ApogeeRockets.com to ensure our program met safety and instructional best practices.

Sourcing Materials

The very first task of our non-profit organization was to draw up a thorough spending plan. The school team's restriction on the amount of money we could spend and our intention of being accountable for our spending led us to set up a Google spreadsheet to monitor all expenses and material purchases. The financial sheet became this spreadsheet pretty fast. It allowed us to specify the needed materials, price them against each other, and record the costs as we made purchases to ensure that we would not exceed our budget. We built the spreadsheet in a way that information would be classified properly by having multiple tabs: one for materials, another for shipping and tax estimates, and miscellaneous for demo supplies and promo materials. The document being centralized made it easier for every team member to see the updates and to collaborate.

After our spreadsheet was completed, we commenced with the research on the materials that would be required for our project. Since the main purpose of our project was to give lessons on model rocket launching, we would have to find cheap, however dependable, rocket kits that were safe for demonstration use. For a couple of days, we were searching the web, price comparing, and reading reviews from different suppliers. One of the suppliers identified during our research was Apogee Rockets, which offers a wide range of rocket kits and accessories suitable for educational use. Using Apogee's catalog as a reference, we selected a lightweight, simple-to-assemble rocket model that best balanced cost, durability, and ease of use for beginners, our target audience.

After selecting the model, we recorded the estimated price and shipping costs in our spreadsheet and adjusted our budget projections accordingly. We tracked both per-unit and total costs, including any additional materials required for demonstrations, to ensure the project remained within budget.

Through this process, we realized that our overall expenses totaled to approximately $300, which was a reasonable amount that was still within our initial funding limits. Having a clear breakdown of costs also gave us confidence when presenting our budget to our organization's leadership and potential donors. It showed that we were being responsible stewards of our funds and that every purchase had a clear purpose.

As we continued brainstorming, we realized that launching the rockets alone would not help in making the sessions informative





as well as entertaining. We wanted participants to witness the science involved in the process, right from the beginning. That called for interactive demonstrations, along with the building of the rockets. During brainstorming sessions, several hands-on experiments were suggested, such as demonstrating how an igniter works. We thought that students would find it fascinating to see an igniter light up in a controlled environment to understand how ignition systems work in rocketry.

However, adding demonstrations also increased the number of materials we needed. Now we require additional components, including extra igniters, wire, batteries, and safety equipment, to conduct the experiments safely. We revised our spreadsheet once again, creating new categories in it for demonstration supplies. Each item was thoroughly researched for affordability and quality. For example, we compared various types of batteries to find ones that gave enough voltage for the igniters but were not that expensive. Each time we found something else that we needed, we documented that and revised the total budget to make sure that we did not go over the limit.

Through this entire process, we learned just how valuable organized budgeting and research can be for a small organization. The Google spreadsheet was far more than a record; it was a decision-making tool through which we accounted for how we al-



Figure 2 - Instructor teaching the students about thrust.

located our resources. Because all the data was in one place, we could instantly see where our money was going and instantly make informed choices about future purchases. It also taught us to balance creativity with practicality: while we wanted to make our sessions engaging, we had to make sure that every dollar spent meaningfully contributed to our mission. Our total expenditures came to about $300 for the rocket kits, demonstration supplies, and other materials needed. The budgeting process helped us to manage our money in a responsible manner and, at the same time, enhanced our team's skills in terms of teamwork and planning. Combining sound financial tracking with our extensive product research and creative project design empowered our creation of an original, interactive educational experience that exemplified our passion for science education and commitment to responsible financial management. Using well-documented suppliers such as Apogee Rockets allowed us to plan confidently and allocate funds efficiently.

Management

When we worked with the kids, our main goal was to make learning about aerospace fun and exciting while still keeping things organized. We used different activities like games, small competitions, and drawing contests to keep everyone interested. We also set up a point system and gave out prizes to reward good effort and behavior. This made the students more eager to participate and helped turn difficult topics into something they could enjoy.

The games and competitions worked really well because they gave the students a reason to stay focused. For example, they could earn points for answering questions, helping their teammates, or showing good behavior. At the end, those points could be exchanged for small rewards, which made them feel proud of what they had learned. It was a good mix of fun and learning, and it helped them see that aerospace doesn't have to be boring or too hard to understand.

Even though we kept things light and fun, we also made sure the students knew when to focus. We were firm but still approachable so they felt comfortable asking questions or sharing ideas. This balance helped create a respectful and positive learning environment. The students knew we cared about them having a good time, but they also understood that learning was the main goal.

We also took regular breaks between lessons and activities. Aerospace concepts can be tricky, and taking short breaks gives the students time to rest and reset. During those breaks, we often talked casually about what they had learned or what they were curious about. These moments helped reinforce what they were learning in a relaxed way.





To encourage good behavior, we focused on positive reinforcement instead of punishment. When students followed directions, they worked well in teams, or showed effort, they earned extra points or small rewards. This helped everyone stay motivated and respectful. The students also started encouraging each other, which made the group more cooperative and supportive.

In a few cases, when a student's behavior got out of hand, we talked to their parents to make sure we could all work together to help the student improve. Those conversations were always handled respectfully and with the goal of helping the student do better next time.

Overall, the combination of fun, structure, and encouragement made a big difference. The kids learned real aerospace concepts, but they also built teamwork, patience, and problem-solving skills. By keeping things both enjoyable and organized, we created a learning environment where students could grow and feel excited about engineering. Our goal was to inspire the next generation of engineers, and through these activities, we saw that it's possible to



Figure 3 - Student drawing of a rocket.

make even tough subjects fun and meaningful for young learners.

Our Future Goals

Each summer, our rocketry team hosts hands-on workshops to inspire students and get them excited about science, engineering, and rocketry. Summer is the perfect time for these events because students have more time to dedicate to learning something new without stressing about homework and grades. It's an awesome environment as people show up curious, ready to build, test, and launch rockets. Over the years, we've worked hard to expand our workshops to new libraries and communities. This past summer we reached even more students than before. Seeing so many new faces get excited about their first launch is what makes it all worth it.

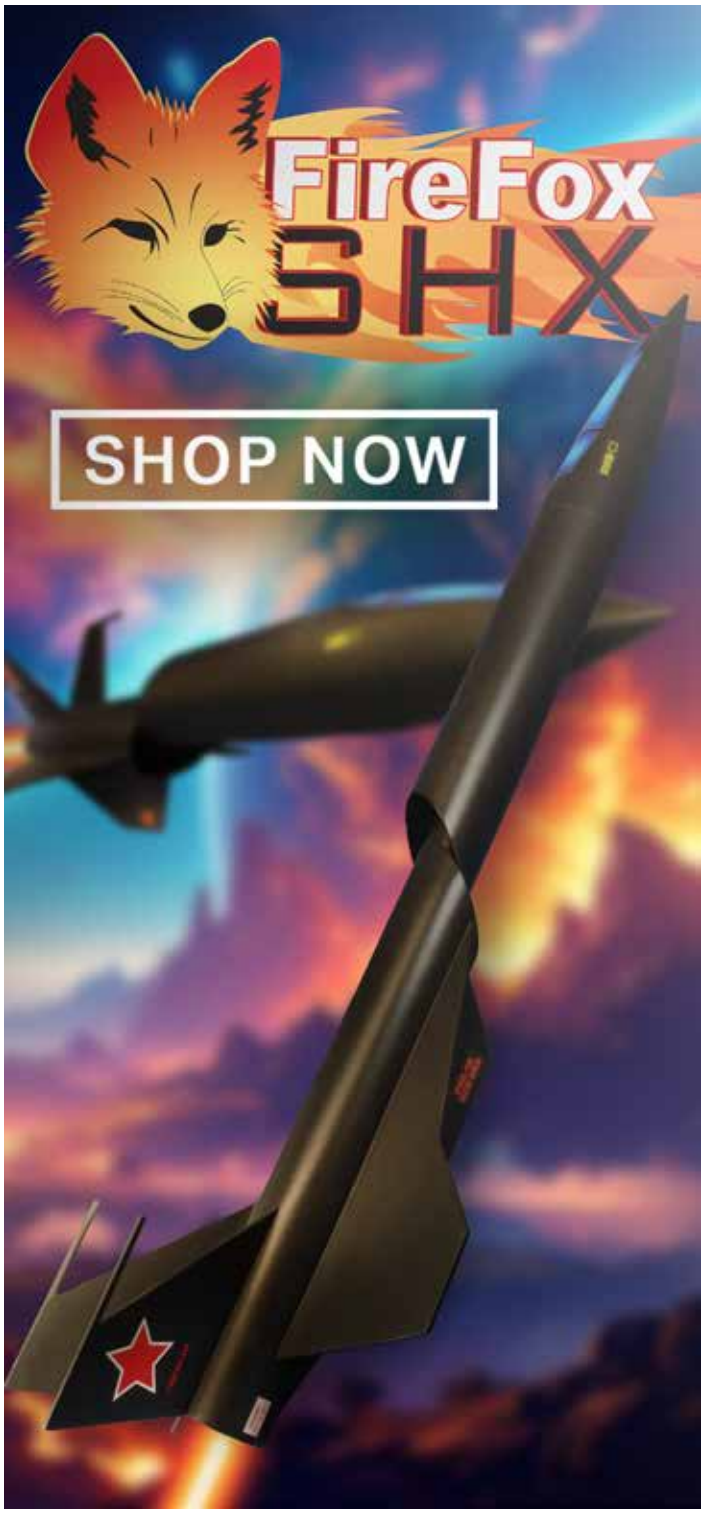
Looking ahead, we're planning to introduce an intermediate rocketry course that takes everything we've taught so far to the next level. It'll cover more advanced design, testing, and data analysis—basically everything that makes rocketry even more fun and challenging. Our long-term goal is to reach over 500 students in the next five years and keep building a community of young engineers and innovators who love taking on big ideas. Every summer we keep growing, learning, and sharing what we love, and there's nothing better than watching someone's face light up when their rocket finally takes off. As we expand into intermediate rocketry, we plan to continue drawing from established educational suppliers such as Apogee Rockets to support more advanced design and testing concepts.

Community Impact

Last year, as part of our various outreach and community programs, our team engaged in classes and workshops to spread our knowledge about rocketry and engineering in general to the public. We had over 120 children attend these workshops, each and every child vouching that they learned at least something new due to our teaching. The majority of children who attended were complete beginners, our guidance allowing them to take their first steps into rocketry and engineering as a whole.

Furthermore, a large percentage of students did not have access to the materials needed to even begin learning how to construct or create a model rocket. As a result, the resources we were able to obtain from fundraising went straight to equipment and parts for students, allowing them to break into groups and have hands-on practice in such an expensive field. Over the summer, we ended up putting well over 100 hours of our time to instruct and mentor children present at our workshops. Such time commitment did end up paying off, with almost every single group in our workshop succeeding in creating a model rocket that was able to function in one way or another.





One of the students who attended has also emailed us back and let us know that he continued to work on the model rocket he created with his team for weeks after the workshop, letting us know that we had inspired him to take part in other various engineering competitions. In total, over 100 rockets were launched across various launch dates, with a large percentage proving to be successful.

In order to host large workshops and seminars such as the one described in the previous section, our team has accrued over one thousand dollars in total funding across the 3 years of our team's existence. Almost all of this money came from generous sponsors, and we owe our success to their kindness. Without money, a large portion of the work we have done for our community would have been out of reach, leaving children who may have the potential to do well in engineering without a passageway into the field. After deducting the total we have spent of the aforementioned $1000, we are left with a profit of around $100.

All in all, running these workshops was as fulfilling for us as it was for these young engineers. Our biggest hope is that they carry on the torch, leading the world as the engineers of tomorrow. Access to reliable educational suppliers like Apogee Rockets made it possible for us to provide safe, hands-on experiences to students who otherwise might not have access to rocketry materials.

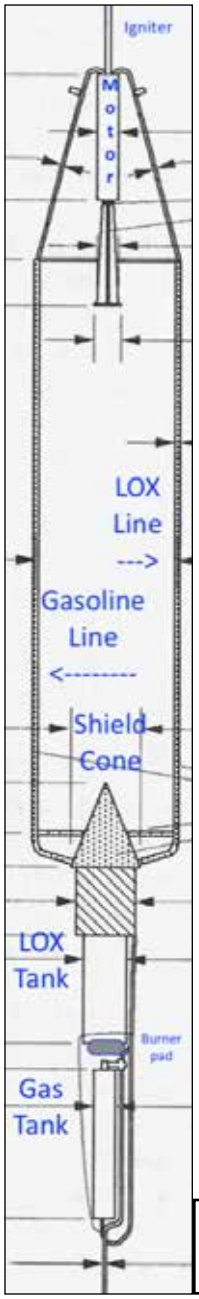


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www.ApogeeRockets.com

Goddard's First Liquid Fuel Rocket

By David Newill

This article describes the 1st Liquid Fueled rocket, what makes it unique, how it worked, and why a lady is key to your knowing all this!



"Nell" – (image shown from Peter Always' Rockets of the World), was named after his aunt.

It was 100 years ago, Dr. Robert Goddard began a series of carefully documented lab experiments to understand the physics and mechanics of using liquid fuels. He is experiments proved liquid fuels have a high specific impulse [ISP measured in "seconds"]. Your typical black powder rocket ISP = 80 "seconds". A liquid motor with Kerosene and oxygen ISP = 300! Hydrogen Oxygen yields ISP = 450! Hence, liquid fuel is 3-½ to 5 times as powerful. If you want to go into space, liquids are the solution.

Dr. Goddard knew he could work with gasoline and oxygen – he had easy access to those items. But gasoline is not a great fuel – it did not have enough "power" or ISP to lift both the fuel tanks and the pumps needed to get the liquids to the rocket motor.

What makes his first rocket unique is his solution to pressurizing the fuel in their tanks without a mechanical pump!

The complete machine was 9 1/2 feet tall. Starting at the bottom, there are two fuel tanks, with plumbing connecting them. Just above the pipe for the liquid oxygen [LOX] is a 2-inch round, gasoline tank. Moving up is a gap – an important item - where Goddard had a pad of cloth soaked in alcohol – his external burner. Next, we find a four-inch-diameter LOX tank. The stack of tanks is topped with a cone of Asbestos and insulation to shield them from the hot exhaust above. Note that the oxygen tank has a gaseous oxygen pipe to the bottom of the gasoline tank. It was the use of this gas pressure that eliminated the much heavier pumps.

Gasoline and LOX flow up the two 3/8" insulated fuel lines to the top of a 12-inch chamber. At the top, and drilled into the chamber, is a six-inch tube packed with kitchen match heads and black powder.



Ester Goddard preserved her husband's papers.

Time to launch! The gasoline tank is filled, the LOX tank is filled, and kept that way by the attached cylinder on the ground. Goddard's assistant then held a blowtorch mounted to a 10-foot pole to reach the top and ignited the match head / black powder "starter. Next, he lit the alcohol-soaked pad to heat the LOX, generating O2 gas for pressure. This pressurized both the upper and lower tanks. Pulling the release valve cord allowed the two fuels to rush up the side pipes to the motor chamber, where the now-gaseous oxygen-gasoline mixture encountered the burning black powder. Launch was NOT immediate, the system burned off some fuel, getting lighter, the LOX hose at the bottom popped off, and - for only four seconds – the world's first liquid-fueled rocket rose on March 16, 1926 to a magnificent altitude of 41 feet before crashing onto a snow-covered field!

Not much of a flight, but over the next ten years, his rockets exceeded the speed of sound and an altitude of over 1 ½ miles. The motor moved to the bottom, gyroscopes controlled the fins and vanes, and parachute recovery was made standard.

But it is a wonderful woman – his wife – Ester – who both supported his research, stating *"we are poised at the edge of achieve-*

ment", made his parachutes, and importantly, transcribed his notes that only she could read!

Because of her work, we can now understand his meticulous process of experimentation, documentation, and vision of space-flight.

After his passing in 1945, she began documenting his work and securing over 130 patents, even winning a case against the US government for infringement. Later, she used the funds from the patent case for museum donations and educational outreach.

Ester edited and published her husband's book, *"Rocket Development: Liquid Fuel Rocket Research, 1929-1941"* then assembled the 1,700-page, three- volume set of books, *"The Papers of Robert H. Goddard".*

She wrote, "This work is the result of many years of effort to preserve and present the record of a man whose vision and persistence opened the way to space flight."



Robert Goddard stands with his rocket.



Goddard on March 16, 1926.

She also established the Robert H. Goddard wing of the Roswell Museum, where you can see a reconstruction of his laboratory and some of his rockets. https://roswell-nm.gov/1930/Robert-H-Goddard-Rocket-Pioneer. To read much more about Dr. Goddard's later rocket work, check out The Papers of Dr. Robert H. Goddard https://commons.clarku.edu/papersgoddard/

This High Man: The Life of Robert H. Goddard by Milton Lehman

Reference for "Nell" from Peter Always' *"Rockets of the World – a Modelers Guide"* Published by the Author

References for Esther Goddard section from AIAA's three-part series commemorating the 100th anniversary of the launch of the first liquid-propellant rocket on March 16, 1926 By Launis and Coppersmith.

PEAK OF FLIGHT NEWSLETTER

Issue 672 / February 24th, 2026

www.ApogeeRockets.com

Article Submission Guidelines

SUBMITTING ARTICLES TO APOGEE

We are always looking for quality articles to publish in the *Peak-of-Flight* newsletter. Please submit the "idea" first before you write your article. It will need to be approved first.

When you have an idea for an article you'd like to submit, please use our contact form at **https://www.apogeerockets.com/Contact**. After review, we will be able to tell you if your article idea will be appropriate for our publication.

Always include your name, address, and contact information with all submissions. Including best contact information allows us to conduct correspondence faster. If you have questions about the current disposition of a submission, contact the editor via email or phone.

CONTENT WE ARE LOOKING FOR

We prefer articles that have at least one photo or diagram for every 500 words of text. Total article length should be between 2000-4000 words and no shorter than 1750 words. Articles of a "how-to" nature are preferred (though other types of articles will be considered) and can be on any rocketry topic: design, construction, manufacture, decoration, contest organization, etc. Both model rocket and high-power rocket articles are accepted.

CONTENT WE ARE NOT LOOKING FOR

We don't publish articles like "launch reports." They are nice to read, but if you don't learn anything new from them, then they can get boring pretty quick... Example: "Bob flew a blue rocket on a H120 motor for his certification flight." As mentioned above, we're looking for articles that have an educational component to them, which is why we like "how-to" articles.

You can see what articles and topics we've published before at: **https://www.apogeerockets.com/Peak-of-Flight?pof_list=archives&m=education**. You might use this list to give you an idea or two for your topic.

Here are some of the common articles that we reject all the time, because we've published on these topics before:

- How to get a L1, L2, or L3 Cert
- Building cheap rockets and equipment (pads & controllers)
- How to 3D print parts, or a Rocket Kit
- How to Build a cheap Rocket Kit
- Getting Back Into Rocketry After a Long Hiatus

ARTICLE & IMAGES SUBMISSION

Articles may be submitted by emailing them to the editor. Article text can be provided in any standard word processor format, or as plain-text. Graphics should be sent in either a vector format (Adobe Illustrator, SVG, etc.) or a raster format (such as jpg or png) with a width of at least 600 pixels for single column images or 1200 pixels for two-column images. It is preferable for images to be simple enough to be readable in a two-column layout, but special layouts can be used.

Send the images separately via email as well as show where they go by placing them in the word processor document.

ACCEPTANCE

Submitted articles will be evaluated against a rubric (available here on our website). All articles will be evaluated and the results will be sent to the author. In the evaluation process, our goal is to ensure the quality of the content in *Peak-of-Flight*, but we want to publish your article! Resubmission of articles that do not meet the required standard are heavily encouraged.

ORIGINALITY

All articles submitted to Peak-of-Flight must not run in another publication before inclusion in the *POF* newsletter, but it may be based on another work such as a prior article, R&D report, etc. After we have published and paid for an article, you are free to submit them to other publications.

RATES

Apogee Components offers **$300** for a quality-written article over 2,000 words in length. Payment is pro-rated for shorter articles.

WHERE WILL IT APPEAR?

These articles will mainly be published in our free newsletter, *Peak-of-Flight*. Occasionally some of the higher-quality articles could potentially appear in one of Tim Van Milligan's books that he publishes from time to time.





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Your Success Is Our Mission!



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