



HAPPY NEW YEAR!!

NATIONAL SPACE DESIGN COMPETITION

Record number of teams competing in 2024-2025 Space Design Competition, competing in third and final qualification round this month



Photo credit: Mike Tsukamoto (AFA)

375 teams registered for this year's National Space Design Competition, a record-shattering number of teams and a 25 percent increase over the 2023-2024 competition year. This year's teams represent 34 states around the nation, Puerto Rico, Guam, the U.S. Department of Defense schools in Germany and Spain, and Canada. A map of registered teams is available for viewing [here](#).

teams have come up with impressive solutions to rather challenging missions. Qualification Round 1 (Oct. 31 – Nov. 3) required teams to find the optimal orbit for a New Year's "fireworks" display over several cities. The mission carried over into Qualification Round 2 (Dec. 5-8), where teams had to then choose a variety different satellite



Photo credit: Arlington Career Center (Twitter)

Having completed two of the three qualification rounds so far, components to make the fireworks display a reality (all while staying within time, weight, and budget limits). Qualification Round 3, the final qualification round before the Semifinals, is scheduled for Jan. 23-26 and will focus on launch operations.



Photo credit: Hahnville High School AFJROTC

Following that round, the top 30% of teams will advance to the Semifinals based on their cumulative Qualification Round scores. From there, the top 10 teams compete in the in-person National Finals Competition in Denver, CO, April 23-25, 2025.

Team Director Highlight: Paul Boren, Edmond Memorial High School

Edmond Memorial High School's "Ruff Draft" crew interviewed teacher Paul Boren on his life as the newest physics teacher and StellarXplorers team director. Watch the interview at <https://ruffdraft.net/14682/personality-profiles/paul-boren-and-the-stellarxplorers/>.



SPONSOR NEWS

BlueHalo donates \$10,000 to AFA STEM Programs



The Air & Space Forces Association (AFA) welcomes [BlueHalo](#) as its newest sponsor for both of AFA's youth STEM programs, CyberPatriot and StellarXplorers.

"We are thrilled to announce our partnership with BlueHalo, joining our valued group of supporters dedicated to advancing STEM education nationwide," said Stuart Pettis, Director of AFA STEM Programs. "BlueHalo understands the vital role of empowering the next generation in science and technology, and we're excited to collaborate with them in this important mission."

CyberPatriot, AFA's flagship STEM program, is the nation's largest youth cyber education program dedicated to strengthening cyber skills among American youth. In addition to the National Youth Cyber Defense Competition for high school and middle school students, the program features AFA CyberCamps, an Elementary School Cyber Education Initiative and Literature Series, a Tech Caregiver certification and community service opportunity, and CyberGenerations—a program aimed at equipping senior citizens with the skills needed to stay protected from cyber threats.

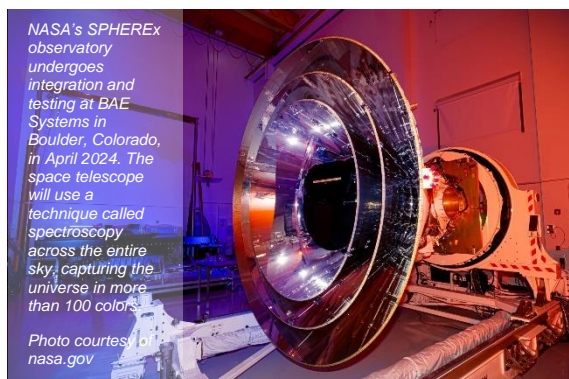
The StellarXplorers Space STEM Program inspires K-12 students toward careers in aerospace, aviation, and other STEM disciplines critical to our nation's future. The StellarXplorers National Space Design Competition provides specific training in the use of system simulation software, Systems Tool Kit (STK), as well as an online textbook as a curriculum supplement and study resource for online "team" quizzes given during the competition.

BlueHalo's donation empowers the Association to expand its outreach to more schools, enhancing our efforts to promote STEM education and continuing to grow our impact among the nation's youth.

"Encouraging the next generation of aerospace engineers and cybersecurity experts is critical to continuing to support the missions we face every day," said Diek Minkhorst, SVP of Strategy and Corporate Development for BlueHalo. "We're proud to support AFA in encouraging students to stay curious, explore new ideas, and innovate for the future. All of that is possible with a strong focus on STEM education."

To learn more about BlueHalo, visit www.bluehalo.com.

BAE Systems completes environmental testing and helps advance NASA's groundbreaking SPHEREx Observatory mission



BAE Systems has completed environmental testing of NASA's Spectro-Photometer for the History of the Universe, Epoch of Reionization and Ices Explorer (SPHEREx) Observatory. This mission will conduct all-sky spectral surveys for the first time and provide scientists with new insights into the formation of the universe and the galaxies that inhabit it.

Over the course of its minimum two-year mission, SPHEREx will utilize an advanced imager to survey the entire sky in near-infrared light four times, providing the most high-resolution color maps of the universe ever created and gathering data on more than 450 million galaxies, along with millions of stars in our solar system. These surveys will help to shed light on fundamental questions about the cosmos, map the 3D distribution of galaxies to study the expansion of the universe since the Big Bang, track the faint glow of ancient galaxies for clues as to how they formed and grew over time, and seek out how life-sustaining ingredients like water play a role in the development of planets.

"SPHEREx will allow us to look back into the early universe and provide new insights into how and why it came to be as it is," said Alberto Conti, vice president and general manager of BAE Systems Space &

Mission Systems. “We’re excited to help uncover these enduring mysteries and to continue our long-standing support of NASA’s astrophysics missions.”

In addition to its primary science missions, SPHEREx will also work to identify targets of interest for more detailed observation by other satellites, such as the James Webb Space Telescope, and help lay a foundation for future missions like the Nancy Grace Roman Space Telescope.

BAE Systems built the satellite bus for the mission, along with the instrument’s telescope and cover. The other instrument elements were developed by the California Institute of Technology (Caltech) and NASA’s Jet Propulsion Laboratory. Caltech’s Dr. Jamie Bock is serving as the principal investigator for the mission.

BAE Systems also led the observatory’s integration and environmental testing program, which includes thermal vacuum chamber tests that simulate temperature and conditions in space, vibration and acoustic tests that mimic launch conditions, and electromagnetic interference and compatibility tests to ensure the spacecraft isn’t vulnerable to electrical disruptions. With testing completed, BAE Systems will now enter final preparations for shipment and launch.

SPHEREx is scheduled to launch no earlier than February 2025. (Source: <https://www.baesystems.com/en-us/news>)

STEM RESOURCES

Join the StellarXplorers Alumni Network

The StellarXplorers Alumni Network is intended to connect program alumni with each other and with program sponsors and supporters from industry and academia. Within this group we will share networking opportunities, available internships, job postings, and more!

This is a private group for past and present StellarXplorers participants. You must be at least 16 years of age to join, per LinkedIn account regulations. All requests to join will be reviewed by StellarXplorers staff to verify participation in the program.



To join, visit: <https://www.linkedin.com/groups/12721859/>

SPACE NEWS

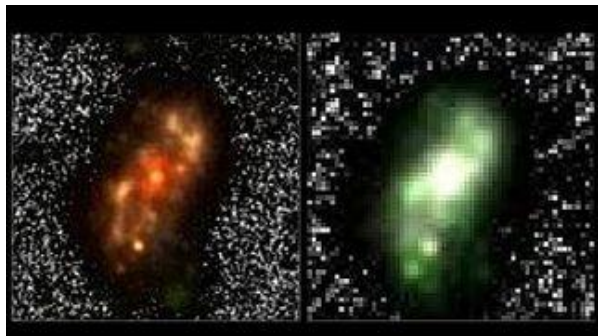


Curious About What’s Happening Overhead?

Check out the Space.com [Space Calendar](#) to stay up to date with upcoming planned rocket launches and skywatching-worthy dates. And in case you missed it...

- 02 JAN 2025 | [James Webb telescope uncovers massive 'grand design' spiral galaxy in early universe](#)
- 21 DEC 2025 | [Astronauts on NASA's moon-orbiting Gateway space station will wear “smart” undershirts](#)
- 18 DEC 2024 | [Boeing Starliner astronauts will return to Earth in Mar. 2025 after new NASA, SpaceX delay](#)
- 17 DEC 2024 | [US Priority Mail stamps to again star James Webb deep space images in 2025](#)
- 12 DEC 2024 | [Astronomers discover 7 new 'dark comets,' but what exactly are they?](#)
- 11 DEC 2024 | [NASA's Ingenuity helicopter could live on as a Mars weather station for 20 years](#)
- 05 DEC 2024 | [NASA delays historic Artemis 2 moon mission to 2026, Artemis 3 astronaut landing to 2027](#)

Photos from Space:



(Image credit: Jain et al.)

[Spiral galaxies](#) tend to be on the younger side. Grand-design galaxies like A2744-GDSp-z4 are characterized by their two well-defined spiral arms. Very few have ever been found with a redshift above 3.0 — meaning their light has been traveling for nearly 11.5 billion years, according to the [Las Cumbres Observatory](#). The newfound galaxy, meanwhile, has a redshift of 4.03, meaning the light JWST detected was emitted more than 12 billion years ago.

According to the researchers who discovered it, that means A2744-GDSp-z4 came together when the universe was only about 1.5 billion years old — and it appears to have formed very rapidly. Given its estimated [star formation](#) rate, it accrued a mass of about 10 billion solar masses in just a few hundred million years.

Read the full article at <https://www.space.com/space-exploration/james-webb-space-telescope/james-webb-telescope-uncovers-massive-grand-design-spiral-galaxy-in-the-early-universe-and-scientists-cant-explain-how-it-got-so-big-so-fast>

JUST FOR FUN

Dazzling Celestial Events to See in 2025

2025 promises to be another captivating year in astronomy. Meteors will blaze through the night, a total lunar eclipse will bathe the moon in a blood-red glow, and [Saturn's rings will apparently disappear](#). On top of all that, keep an eye out for surprise aurora appearances as the sun experiences a high level of activity known as solar maximum.

To make sure you don't miss a stunning celestial sight, mark your calendars for the following events, likely to be among the biggest astronomical spectacles of the year. (Source: [Smithsonian](#))



- 1. January 15 to 16: Mars at opposition** – the red planet will reach a point known as opposition, a point of peak viewing when Mars, Earth and the sun form a line, with our planet in the middle. Like the moon when it's full, Mars will be aligned with its entire illuminated face turned toward Earth
- 2. February 28: All planets align in the sky** – All seven of the solar system's other planets will appear together in Earth's skies in a rare alignment. Uranus and Neptune are too faint to see without a telescope, but Mars, Jupiter, Venus, Mercury and Saturn will all be visible to the naked eye.
- 3. March 14: Total lunar eclipse** – During the total lunar eclipse on March 14, you can truly see the moon take on a deep red hue. This eclipse will be visible from all U.S. states and parts of every continent, though only the Americas and Antarctica will see the full duration of the total eclipse phase. Totality will last for 65 minutes.
- 4. March 29: Partial Solar Eclipse** – Unlike the solar eclipse of April 8, 2024, this one won't see any period of totality. But through a pair of eclipse glasses, viewers can watch the moon take a "bite" out of the sun, obscuring just part of its face.

Stay in the Know!



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Tweet us, like us, follow us, and share with StellarXplorers on your favorite platform!
We would love to share some stories about your team. Send them our way: info@stellarxplorers.org.

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