



## VIRGINIA SPACE GRANT CONSORTIUM

Old Dominion University Peninsula Center, 600 Butler Farm Road, Suite 2200, Hampton, VA 23666, (757) 766-5210

### Three Virginia University Satellites Count Down to Launch

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**Contact: Primary --** Mary Sandy, Director

Virginia Space Grant Consortium, [msandy@odu.edu](mailto:msandy@odu.edu), 757-218-4496

**Student University Leads:**

Erin Puckette, Student Mission Manager, University of Virginia, [ep2hk@virginia.edu](mailto:ep2hk@virginia.edu), 843-729-7082

Madison Broadnax, Virginia Tech Team Lead, [bmadi17@vt.edu](mailto:bmadi17@vt.edu), 410-903-9607

Kim Wright, Old Dominion University Team Lead, [kwrigh051@odu.edu](mailto:kwrigh051@odu.edu), 757-620-5015

Three student-designed and developed small satellites are set for launch from the Mid-Atlantic Regional Spaceport on Virginia's Eastern Shore on April 17. The satellites are part of the Virginia CubeSat Constellation mission, a collaborative project of the Virginia Space Grant Consortium and four of its member universities: Old Dominion University (ODU), Virginia Tech (VT), University of Virginia (UVA), and Hampton University (HU).

The three nano-satellites, each about 4 inches cubed and weighing approximately 3 pounds, have been developed and instrumented (one each at ODU, VT and UVA) to obtain measurements of atmospheric properties and quantify atmospheric density with respect to orbital decay. The satellites have been integrated into the NanoRacks CubeSat Deployers and loaded into the Northrop Grumman Cygnus module which is being launched on the company's Antares rocket as a resupply mission to the International Space Station (ISS). Cygnus will arrive at the ISS about 3 days after launch. The satellites will be deployed from the ISS in early July by astronauts onboard near-simultaneously so they can orbit together and function as a constellation.

The ODU satellite, which has a drag brake to intentionally cause orbital decay, is expected to remain in orbit for up to four months. The other two satellites should orbit for up to two years at an altitude of 250 miles before burning up when they re-enter Earth's atmosphere. The satellites will communicate data to ground stations at Virginia Tech, University of Virginia and Old Dominion University for subsequent analysis using an analytical tool being developed by Hampton University students from the Atmospheric and Planetary Science Department.

The students have named their satellites after the Roman goddesses on the back of the Virginia State Seal who represent the blessings of freedom and peace. UVA has chosen Libertas, the goddess of individual liberties; Virginia Tech selected Ceres, the goddess of agriculture; and Old Dominion University chose Aeternitas, the goddess representing eternity.

Students, faculty members and Virginia Space Grant Consortium staff will be at the launch, cheering as their satellites head for space.



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More than 140 undergraduate students across many disciplines at the participating universities have worked for the past three years under the guidance of faculty advisors. As UVA Professor Chris Goynes notes, "There were many highs and lows for our students throughout the mission. I have been impressed by the students' tenacity and perseverance when things went not as planned. They were able to find both technical and programmatic solutions when required and they supported each other so that the team as a whole was successful." He adds, "The opportunity for our students to work closely with NASA has been a real highlight."

The satellite development teams at each of the three universities have been led by female engineering students, with UVA providing overall technical leadership. UVA Team Lead and Student Mission Manager Erin Puckette states, "Having this opportunity as an undergrad to go through all of the processes required to design, build, launch, and soon operate a satellite is a unique endeavor for which I am grateful. The lessons that all of the students have learned will carry us forward well as we move on to jobs and graduate schools."

"Having the opportunity to be a part of the CubeSat project has allowed me to gain experience with an industry project, developing a payload that will be launched into space," notes ODU Team Lead Kim Wright. "My favorite part was working with a highly skilled and dedicated team throughout the build, testing and delivery of this CubeSat. I believe the strength of our team was the reason we were able to accomplish as much as we did in such a short period of time." Virginia Tech Team lead Madison Brodnax states, "This project has been exciting and challenging for everyone at Virginia Tech. Our team put in long hours at the lab to finish the CubeSat and make it to launch. We are very proud of what we have accomplished and learned about being a multi-faceted team with one common goal - space exploration. From physics majors to aerospace engineers, we have all found a love of building something that will go down in VT undergrad history."

ODU engineering student Westin Messer stated, "The CubeSat project was a fantastic experience that helped me grow as a future engineer more than I could've possibly expected. Being the mechanical design lead gave me practical engineering experience, but perhaps more importantly, I learned how to work with and lead a team of diverse individuals. As the project comes to a close, it's rewarding to know that the team's hard work and long nights have paid off and our CubeSat will soon be in space!"

In addition to guidance from faculty members, the mission has benefitted greatly from advice from NASA, industry and academic advisors. Students have also received excellent guidance from NanoRacks, the world's leading commercial space station company.

The project is part of NASA's CubeSat Launch Initiative which provides opportunities for small satellite payloads built by universities, high schools and non-profit organizations to fly on upcoming launches. It is funded by the NASA Undergraduate Student Instrument Program and the Virginia Space Grant Consortium. The Undergraduate Student Instrument Program is managed by NASA's Wallops Flight Facility on Virginia's Eastern Shore.



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**Note: Launch and Post-launch photos and video will be available at the Virginia Space Grant Consortium blog site on the night of the launch at:**

**<http://vsgc.odu.edu/blog/virginia-cubesat-constellation-launch/>**

**NASA photography will be available at: <https://www.flickr.com/photos/nasahqphoto>**

**See captions below for photographs included in the attached zipped file (VirginiaCubeSatConstellation.zip):**

Photo credit for Photos 2 and 3 to: Keith Pierce, Batten College of Engineering and Technology, Old Dominion University.

*VACubeSatConstellation\_1*: Virginia CubeSat Constellation Mission Patch.

*VACubeSatConstellation\_2*: Mission leads from UVA (Erin Puckette), ODU (Kim Wright) and Virginia Tech (Madison Brodnax) happily pose with their teams' satellites prior to integration.

*VACubeSatConstellation\_3*: Members of the Virginia CubeSat Constellation Team pose with the deployer containing their satellites which will be placed into orbit by astronauts aboard the International Space Station.