

Improving Pathways into the Geospatial and Unmanned Aircraft Systems Technician Workforce



HIGHLIGHTS

Workforce Survey Report

Page 2

Faculty Institute Application

Page 2

New Award Supports UAS Partnerships

Page 3

GeoTED-UAS Supports High School Educators

Page 4

GeoTED-UAS Team Conducts sUAS Demonstration Event

Page 5

What is GeoTED-UAS?

The Improving Pathways into the Geospatial and Unmanned Aircraft Systems Technician Workforce (GeoTED-UAS) project team includes the Virginia Space Grant Consortium (VSGC), Germanna Community College, Virginia Tech, and the Virginia Community College System (VCCS).

Small unmanned aircraft systems (sUAS)—one of the disruptive technologies of our time—will transform our daily lives over the next few decades as profoundly as the smart phone and the only way to realize the full potential is to grow the industry's current and future workforce.

As the integration and combination of geospatial technology and sUAS into nearly every employment sector increases, the demand for skilled technicians to support the multitude of applications is expanding. sUAS, and the ability to collect and analyze high resolution geospatial data on demand are poised to transform businesses, impact safety and security, improve health, and reshape the economy.

Administered by the VSGC, the GeoTED-UAS team was awarded a project grant by the National Science Foundation's Advanced Technological Education (NSF-ATE) program (NSF #2000715).

GeoTED-UAS will prepare students for success as sUAS operations technicians (sUAS-OT) and as geospatial technicians. Small UAS-OT duties typically include planning and flying sUAS missions, maintaining sUAS, and processing geospatial data to analyze and solve problems.

Entry-level technician positions in geospatial technology generally include job titles such as geographic information systems (GIS) technician, survey and mapping technician, GIS specialist, spatial data technician and other similar titles. These positions are broadly responsible for developing, creating, and maintaining spatial information layers stored in a GIS. With the emergence of sUAS and their ability to collect geospatial data of many types, the use of sUAS has become a critical data acquisition tool for GT technicians.

Improving Pathways into The Geospatial and Unmanned Aircraft Systems (UAS) Technician Workforce



Mission:
To educate and train the Geospatial Technology and Small UAS Operations Technician (sUAS-OT) workforce.

Partners:

- Virginia Space Grant Consortium
- Germanna Community College
- Virginia Community College System
- Virginia Tech

Key Components:

- Develop courses in geospatial technology and sUAS.
- Integrate GIS and sUAS across many disciplines.
- Train and mentor faculty and educators.
- Conduct student outreach.
- Coordinate student service-learning projects.

Service Learning Partnerships:

The Nature Conservancy

NASA Langley Research Center

NASA Wallops Flight Facility

Virginia Tech

US Forest Service

Partnerships with Business/Industry for Internships and Support

Outcomes and Impacts:

New UMS Prefix and 8 New sUAS-Focused Courses.

Seven New sUAS Pathways.

70 Educators Trained (Two-year Cohort Model).

Faculty and Student Service-Learning Projects.

10 Colleges Offering sUAS Courses.

Nearly 750 Students Completed Courses.

Precollege Outreach Impacting More Than 1,000 Participants.

GeoEd-UAS Contacts:

Chris Carter, PI
Deputy Director
Virginia Space Grant Consortium
cxcarter@odu.edu

Dr. Shawn Shields Lyons, Co-PI
Professor of Chemistry and GIS
Germanna Community College

Cherie Aukland, Co-PI
Faculty Consultant for GIS and sUAS

David Webb, Co-PI
Faculty Consultant for GIS and sUAS

Dr. John McGee, Co-PI
Professor and Virginia Geospatial Extension Specialist
Virginia Tech

geoted-uas.org

UNMANNED AIRCRAFT SYSTEMS (UAS) WORKFORCE SURVEY REPORT

With funding support from GO Virginia and in partnership with the Richard Bland College of William & Mary (RBC), the Virginia Space Grant Consortium (VSGC), Virginia Tech, and the Virginia Unmanned Systems Center at the Center for Innovative Technology (CIT) recently conducted an Unmanned Aircraft Systems (UAS) Workforce Survey to inform future workforce development and education programs to train the UAS workforce. Faculty leaders from the NSF-funded GeoTEd-UAS (NSF DUE# 1601614) project were also partners on the project.

Here is a link to the [final report](#). The survey was completed by employers and organization from throughout the entire Commonwealth of Virginia. Richard Bland College's Chief Development Officer Tyler Hart stated, "At Richard Bland College we strive to be industry focused and data driven, the data collected from this survey is invaluable and will shape the development of credentials to help meet the training needs of the region and the state."

VSGC Deputy Director Chris Carter stated, "We are excited to be able to collect this valuable data and information to inform future UAS education and workforce training efforts. We really appreciate Richard Bland College's support for the statewide UAS and



their interest in starting an aeronautics and UAS program. We thank all of the organizations who took time to respond."

The survey and reports were administered and developed by Magnolia Consulting, an independent research firm. Data was collected between April and May 2020.

GeoTEd-UAS Selects Faculty for the 2021-23 Faculty Institute Cohort

Germanna Community College	Environmental Science, Geography, Administration of Justice, Biology (2), Biology/Geology, Cybersecurity, IT
Northern Virginia Community College	Geography and Geology
Patrick Henry Community College	General Engineering Technology
Blue Ridge Community College	Criminal Justice / Homeland Security / Emergency Management
Southside Virginia Community College	Information Technology and Industry
Central Virginia Community College	Technology and Engineering
Lord Fairfax Community College	Computer Science, Information Systems Technology and Cybersecurity
Virginia Highlands Community College	Horticulture
Eastern Shore Community College	Technology and Management
J. Sargaent Reynolds Community College	Engineering
Spotsylvania High School	Engineering
Orange County High School	Technology and Engineering

Eighteen community college faculty and two high-school educators have been selected to become members of the GeoTEd-UAS faculty cohort. These 20 educators will attend the sUAS Faculty Institutes offered by the project team. The multi-year cohort model to train and mentor faculty has been used in previous projects and is based on a best-practice model in faculty professional development. The 20 educators chosen have committed to three years of participation in the project and will attend the Institute, attend webinars and other professional development opportunities, and implement geospatial technology and sUAS into their teaching.

Eight faculty from seven different disciplines from partnering institution Germanna Community College (GCC) were selected. Ten faculty from nine other community colleges were selected. These faculty teach at colleges that serve high percentages of underrepresented and underserved student populations. Two high-school teachers who teach in GCC's service region were also selected to participate. They will integrate these technologies into the classroom to support student recruitment, and to also work with GCC to build dual-enrollment courses and other partnerships.

NEW AWARD SUPPORTS PARTNERSHIPS TO DEVELOP THE UNMANNED AIRCRAFT SYSTEMS (UAS) AND GEOSPATIAL TECHNOLOGY WORKFORCE IN VIRGINIA



Faculty and students at community colleges across the Commonwealth will continue to learn how to operate unmanned aircraft systems (UAS) and collect and analyze geospatial data. The Virginia Space Grant Consortium (VSGC) is leading a statewide partnership to develop the geospatial technology and UAS workforce in Virginia. The new award of \$561,977 from the National Science Foundation (NSF) Advanced Technological Education (ATE) program is the fifth award to VSGC and partners targeting the technician workforce in these emerging technologies.

VSGC, Germanna Community College (GCC), the Virginia Community College System (VCCS) and Virginia Tech are partnering on the Improving Pathways into the Geospatial and Unmanned Aircraft Systems Technician Workforce (GeoTEd-UAS) project (NSF# 2000715). GeoTEd-UAS will prepare students for success as geospatial technicians and small UAS (sUAS) operation technicians (sUAS-OT) who will plan and fly sUAS missions and analyze geospatial data to solve problems and answer questions.

Dr. Shawn Shields Lyons, Professor of Chemistry and GIS at GCC states, "Our work will include the development of two stackable career studies certificates; one in Geographic Information Systems (GIS) and Data Analytics, and another in UAS."

The GeoTEd-UAS team is partnering with industry, NASA, and other organizations to support the project. "Community colleges are well-positioned to respond to rapid changes in these technologies and offer flexible curriculum aligned with industry need," state VSGC Deputy Director Chris Carter. The project will also offer UAS-themed activities for precollege students and leverage the Commonwealth STEM Industry Internship Program offered by VSGC to place students in paid internships with business and industry throughout Virginia.

Small UAS, weighing under 55 lbs., can be used to collect data-on-demand and replace larger aircraft and other means that were previously used to collect data and imagery. Cherie Aukland, faculty consultant states, "These faculty, through experiential learning and integrated mapping and drone data collection projects, will help their students solve real problems. Pathways will allow students to obtain the FAA Remote Pilot Certificate."

Leveraging partner and team expertise, the GeoTEd-UAS project will build faculty capacity at GCC to develop academic pathways. The project will also provide professional development to faculty from other colleges in Virginia. "These technologies add value to a student's educational program, creating much sought-after and valuable employees," said retired faculty and project consultant David Webb. "The GeoTEd-UAS workforce development model integrates interactive classroom instruction, sUAS applied field work targeting real-world issues, accompanied by structured mentoring," stated Dr. John McGee, Professor and Geospatial Extension Specialist in Virginia Tech's Department of Forest Resources and Environmental Conservation.



GeoEd-UAS Supports High School Educators to Complete UAS Training and Obtain Remote Pilot Certificate



Two educators from Hampton City Schools were provided funding from GeoEd-UAS to complete the Unmanned Systems Remote Pilot Ground School (UMS-107) course offered by Thomas Nelson Community College (TNCC). The educators were also supported to take the FAA Part 107 Remote Pilot Certificate exam. Possessing a Part 107 Remote Pilot Certificate is required to legally fly small unmanned aircraft systems (sUAS). Sherry Hildebrandt, Transportation Academy Coach for Bethel High School, and Alex Minter, Social Studies Teacher and soon to be GIS and UAS instructor, both successfully completed the UMS 107 course and obtained their Remote Pilot Certificate. The UMS 107 course was developed through the GeoEd-UAS project and has served as a model for other colleges and high schools in the Commonwealth.

When asked about her opportunity, Hildebrandt said “I am so excited that I took this course because it prepared me for my Part 107 remote pilot certificate exam. The course was awesome---knowledgeable, fun, and engaging! In obtaining the certificate, I can now assist teachers in all of the academies at Bethel High School-the Transportation, Analytics, Information, and Logistics Academy, the Law and Public Safety Academy, the Media Arts and Design Academy, and the Governor’s Health Science Academy. I can expose students to various academic concepts through an industrial and drone technology lens.”

When discussing the program in her school, she said “By having this [remote pilot] certificate, teachers at Bethel High School can now actively engage students using drones. For example, while Mr. Minter is integrating Geospatial and Unmanned Technologies into his curricula using GIS and drones, his students can be studying towards earning their Part 107 certificate.”Hildebrandt continued, “I will have the opportunity to supervise flights in our math, science, English, and social studies classrooms and engage learning through a different type of lens, that of a drone

lens! How exciting is this! Imagine, learning about basic trigonometry concepts by recording points on a drone’s flight, calculating distances, reading graphs, analyzing geographical variations, gaining new perspectives for writing prompts, the list is endless. I cannot wait for our students to return! And of course, none of this would be possible without funding from GeoEd-UAS and the training from TNCC allowing us to gain the knowledge and experience necessary to take back into our classrooms! This course was awesome!”

“We anticipate our support of these teachers will impact hundreds of students who will now get hands-on exposure to drones,” said Dr. Scott Bellows, VSGC Technical Programs Coordinator who coordinates the Commonwealth STEM Industry Internship Program (CSIIP, csiip.org). “I look forward to helping these students get paid internships in the future,” said Dr. Bellows

“We will also facilitate dual-enrollment partnerships between Hampton City Schools and Thomas Nelson Community College so these students can earn college credit toward a Career Studies Certificate while in high school. This will be a great investment by the GeoEd-UAS project,” stated Chris Carter, VSGC Deputy Director.



GeoEd-UAS Team Conducts sUAS Demonstration Event Hosted by Richard Bland College of William & Mary.



On December 3, Richard Bland College of William & Mary (RBC), in partnership with the Virginia Space-Grant Consortium (VSGC) and Virginia Tech, hosted a Small Unmanned Aircraft System (sUAS) demonstration in the Pecan Groves located on the RBC campus in Petersburg Virginia.

The event featured demonstrations of a variety of sUAS including fixed-wing and multi-rotor vehicles and gave attendees the opportunity to observe flight operations and data capture. Faculty and other members of the GeoEd-UAS project team led the event. "Richard Bland College of William & Mary was thrilled to host the Small Unmanned Aircraft Systems demonstration in the Pecan Groves," says Tyler Hart, Chief Administrative Officer.

The focus of the demonstration was to Inform the Richard Bland College community and stakeholders of the many applications and uses of sUAS, market the proposed aviation and sUAS courses and pathways including a FAA Part 107 online course to be offered by Richard Bland College in 2021.

"The collaborative partnerships with the Virginia Space Grant Consortium, Virginia Tech, and experts in sUAS will enable RBC to build out a certificate program, providing students new opportunities to pursue careers in this exciting and rapidly growing field," said Hart.

Chris Carter, deputy director of the Virginia Space Grant Consortium and PI on the GeoEd-UAS project was part of the leadership team for the event.

"It was a great event and the audience seemed engaged and interested in learning more about UAS," said Carter. "The highlight of the event was watching two different autonomous missions successfully capture data and land safely. Our GeoEd-UAS team includes a strong and experienced group of faculty leaders and UAS subject matter experts."

Although COVID-19 has impacted the ability to host in-person events, the collaborative efforts of RBC, VSGC, and Virginia Tech made this event possible and has opened the doors for more events like this in the future."

It was great to partner with RBC to offer a safe event that followed all COVID-19 safety protocols," said Carter. "We look forward to doing more of these demo events in partnership with education institutions across Virginia."

For more information about sUAS and future events visit the GeoEd-UAS website [here](#).

