

Future Trends

- Increasing autonomy of sUAS
- Skills shift from active piloting to system monitoring
- Multiple aircraft controlled by one pilot
- Trend to move beyond visual line of sight (BVLOS) will require new skills sets & technologies
- Integration into national airspace
- Increasing FAA requirements may lead to change in licensure/certifications needed
- Regulatory environment evolving
- Commoditization/saturation in sUAS field (personnel, hardware, software)
- Increase in data processing automation
- Massive data storage and access to data
- Maturation of sUAS technologies
- Industry consolidation
- More pilots/aircrafts lead to more safety concerns and case law
- Developing role of insurance (liability)
- Industry standards effect on insurance
- Public acceptance of sUAS
- Cybersecurity considerations
- Night operations
- Large UAS operations

Acronyms

- ATC - Air Traffic Control
- BVLOS - Beyond Visual Line of Sight
- FAA - Federal Aviation Administration
- FOD - Foreign Object and Debris
- GNSS - Global Navigation Satellite System
- GIS - Geographical Information System
- GPS - Global Position Satellite
- NOTAMS - Notices to Airmen
- OSHA - Occupational Safety and Health Administration
- PIC - Pilot in Command
- PPE - Personal Protective Equipment
- RC - Radio Control
- RF - Radio Frequency
- RTK - Real Time Kinematic
- SOP - Standard Operating Procedure
- sUAS - small Unmanned Aircraft Systems
- TFR - Temporary Flight Restrictions
- VLOS - Visual Line of Sight



DACUM Panel

Thomas Chase Riley
Sentinel Robotic Solutions

Mark Blanks
Mid-Atlantic Aviation Partnership, Virginia Tech

Matthew Jungnitsch
Measure UAS, Inc.

Jeff Sloan
U.S. Geological Survey

Darren Goodbar
Draper Aden Associates

Daniel Cross
Conservation Management Institute, Virginia Tech

Franklin (Keith) Harris
NASA Langley Research Center

Jay Willmott
Nexutech, LLC

Thomas Jordan
NASA Langley Research Center

Alexander Mirot
Embry-Riddle Aeronautical University

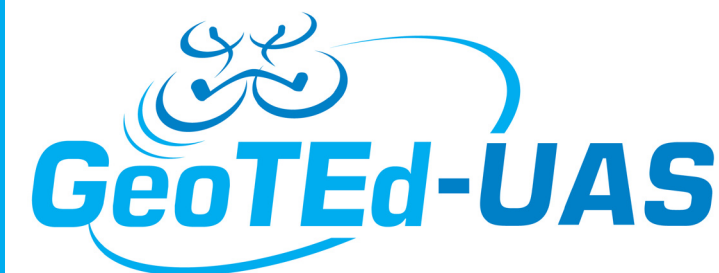
DACUM Facilitator

Jennifer Stevens, Chief Operating Officer
Virginia Advanced Study Strategies
324 Factory Street, South Boston VA 24592
jenniferstevens@vaadvstudies.org

Project Point of Contact

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

Produced for:



DACUM Research Chart

Small Unmanned Aircraft Systems Operations Technician

Produced by:



DACUM Job Analysis Research Chart for Small Unmanned Aircraft Systems Operations Technician (sUAS)

DUTIES	T A S K S													
Plan sUAS Flight A	A.01	A.02	A.03	A.04	A.05	A.06	A.07	A.08	A.09	A.10	A.11	A.12	A.13	
	Define operation objective	Define area of operation	Assess area of operations (e.g. aviation, chart, map, NOTAMs, weather)	Define data requirements (e.g. data types, accuracies, frequencies, deliverables, format)	Plan flight path (e.g. manual or autonomous)	Obtain regulatory permissions (FAA)	Obtain landuse authorization (e.g. landowner, state/local permits)	Select sUAS to meet objective	Define aircraft configuration (eg. firmware, payload)	Conduct operational risk assessment	Establish operation communications plan (data links, radio, frequencies)	Assign sUAS and personnel	Rehearse flight operation	
Perform Flight Operation B	B.01	B.02	B.03	B.04	B.05	B.06	B.07	B.08	B.09	B.10	B.11	B.12	B.13	B.14
	Conduct site survey	Check advisory info (NOTAMs, weather, TFR)	Establish ground control points (GCPs)	Set up flight operations center	Assemble aircraft	Upload flight plan to aircraft	Calibrate sUAS sensors	Conduct flight checks of sUAS	Conduct safety briefing	Conduct mission briefing	Check for FOD	Verify use of PPEs	Communicate with crew and ATC	Secure launch and recovery area
	B.15	B.16	B.17	B.18	B.19	B.20	B.21	B.22	B.23	B.24	B.25	B.26	B.27	B.28
Launch aircraft	Fly sUAS *	Maintain visual contact with aircraft	Monitor site communications	Monitor air traffic communications	Collect geospatial data	Execute emergency procedures	Adapt flight plan	Recover aircraft	Retrieve geospatial data	Verify data integrity	Conduct post flight inspection	Conduct post flight debrief	Pack sUAS for transport	
Process Geospatial Data C	C.01	C.02	C.03	C.04	C.05	C.06	C.07	C.08	C.09	C.10	C.11			
	Transfer geospatial data	Prepare data for processing	Select processing software	Load data to system	Create 3-D point cloud	Create digital model	Create orthomosaic	Create derivative products	Generate data report	Deliver aerial images/videos	Disseminate deliverables to customer			
Maintain sUAS D	D.01	D.02	D.03	D.04	D.05	D.06	D.07	D.08	D.09	D.10	D.11	D.12	D.13	D.14
	Troubleshoot/repair electrical system	Troubleshoot/repair mechanical systems	Troubleshoot/repair airframe	Troubleshoot/repair fuel system**	Troubleshoot/repair propulsion/power plant	Troubleshoot/repair ground control station	Perform scheduled maintenance on electrical system	Perform scheduled maintenance on mechanical systems	Perform scheduled maintenance on airframe	Perform scheduled maintenance on fuel system**	Perform scheduled maintenance on propulsion/power plant	Perform scheduled maintenance on ground control station	Troubleshoot software	Update software
	D.15	D.16	D.17	D.18	D.19	D.20	D.21	D.22						
Inspect sUAS for maintenance issues	Inspect aircraft for air worthiness	Integrate pay loads	Implement configuration changes (e.g. hardware, software)	Document configuration changes (e.g. hardware, software)	Maintain maintenance logs	Conduct maintenance test flight	Maintain inventory of equipment/supplies							
Coordinate Flight Operations Logistics E	E.01	E.02	E.03	E.04	E.05	E.06	E.07	E.08	E.09	E.10	E.11	E.12	E.13	E.14
	Develop day of flight schedule	Communicate flight schedule	Coordinate mission dependent resources	Schedule mission personnel	Schedule transport vehicles	Establish transport route	Plan travel logistics	Acquire spare parts	Create pack list	Determine fuel/battery requirements	Facilitate personnel needs in the field (e.g. water, tent, chairs, etc.)	Secure mission supplies	Ship sUAS equipment	Charge UAS batteries
	E.15	E.16	E.17	E.18	E.19	E.20								
Pack sUAS equipment/supplies	Secure physical access to the operations area	Secure operations area	Transport sUAS equipment/supplies	Prepare operations area	Safeguard geospatial data									
Maintain Proficiency, Currency & Recency in Professional Knowledge/Skills F	F.01	F.02	F.03	F.04	F.05	F.06	F.07	F.08						
	Practice flying sUAS	Train on flight simulator	Attend professional conferences and training	Maintain membership in professional organizations	Maintain required certifications	Review professional literature	Participate in online forums	Participate in community awareness activities						
Perform Administrative Tasks G	G.01	G.02	G.03	G.04	G.05	G.06	G.07	G.08	G.09	G.10	G.11	G.12	G.13	
	Order equipment/supplies	Develop operations budget	Complete expense reports	Submit timesheets	Create proposals & presentation	Present to a variety of audiences	Submit accident reports	Train peers	Submit budget requests	Submit budget reports	Maintain company vehicle	File flight reports	Maintain flight logs	

* Denotes that the task may be performed within more than one duty.

** e.g. battery or liquid

Knowledge and Skills

Microsoft Office
GIS software
Programming skills
Ground control software
Flight simulators
Budgeting/basic accounting skills
Google Earth
Knowledge of system components/functions
Hazmat skills/knowledge
Personal safety
Technology
Battery technology
Advanced mathematics
Read schematic
Read flow charts, block diagrams
Diagnostics & troubleshooting understanding
Radio transmission theory
Photogrammetry theory
Meteorology
OSHA
Solder
Cable/Crimp/Harness
Basic photography/videography
Understanding of geographic projections
& coordinate systems
Electromagnetic spectrum
Physics
Grounding and shielding
RTK (Real Time Kinematics)
GNSS (Global Navigation Satellite Systems)
Aviation knowledge
Remote control proficiency
Hand-eye coordination
GIS basic knowledge
Public speaking
Electronics
Project management
First aid
Communication (oral & written)
Able to speak English
Composites
Situational awareness
Aircraft performance
Aeronautical knowledge
Aviation terminology
Instrumentation

Tools and Equipment

Laptop
MSOffice
Driver's license
Drone
Voltage meter
Spectrum analyzer
Radios
Hand tools
sUAS
Anemometer
Battery charger
Oscilloscope
Soldering iron
Personal Protective Equipment
Lawn mower
Windsock
Generator
Fire extinguisher
First aid kit
Duct tape
Bug spray
Sunscreen
WD-40
Pop-up tent
Fan
Portable lighting
Cables
Cot
Coolers
Table (folding)
Chairs
Trash cans/bags
Food/water
Ice
Traffic cones
Caution tape
Lens cleaning supplies
Transportation cases
Battery storage containers/bags
3-ring binder/clipboard
Shipping supplies
Pencils/pens
Paper
Vinyl lettering
Label maker
Crew apparel
Binoculars
LED headlamp
Adhesives
Fuel containers
Fuel transfer pump
Aircraft starter
Scale
Weight/balance apparatus
Printer (3-D)
Hand-held GPS
Power tools
Surveying equipment

Tools and Equipment, continued

Smart phone
Compass
Aeronautical chart
Map
Range finder
Clinometer
Tachometer
Camera
Video recorder
Tracking device
Monitors
Enclosed trailer
Vehicles
Directional antennas
Micrometer
Tape measure
Level
Shovel
Sledge hammer
Bungee cords
Zip ties
Velcro
Ratchet straps

Worker Behaviors

Risk adverse
Safety conscious
Team player
Able to say "no"
Interpersonal skills
Getting along with others
Competence
Confidence
Disciplined
Able to multi-task
Assertive
Attention to detail
Time lines
Time management
Likes outdoors
Able to handle adverse work environment
Pioneering ethos
Initiative
Integrity
Work ethic
Customer service
Professional
Able to focus/eliminate distractions
Autonomous
Able to work independently
Flexibility
Able to adapt
Self-starter
Problem solving
Ability to follow rules/regulations