

# **DACUM Research Chart for Unmanned Aircraft Systems Operations Technician (UAS)**



**National Geospatial Technology  
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DACUM Research Chart for Unmanned Aircraft Systems Operations Technician (UAS)

DUTIES		T A S K S												
A	Plan the UAS Operation	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
		Identify mission objectives	Interpret airspace	Plan flight route	Calculate duration	Determine launch/landing zones	Identify equipment needs	Identify mission accuracy needs (such as GCP's)	Identify personnel needs	Check weather forecast*	Determine density altitude	Identify critical infrastructure	Identify sources of electromagnetic interference	Deconflict wireless frequencies
		A.14 Determine population density within/around flight route	A.15 Identify obstacles/terrain hazards	A.16 Develop emergency contingency plan	A.17 Obtain waivers/exemptions	A.18 Interpret RF spectrum analysis	A.19 Gain site access	A.20 Perform operational risk assessment*	A.21 Develop emergency evacuation plan	A.22 Develop communications plan				
B	Prepare for the UAS operation	B.01	B.02	B.03	B.04	B.05	B.06	B.07	B.08	B.09	B.10	B.11	B.12	
		Charge UAS batteries	Procure equipment and supplies*	Update firmware*	Check NOTAM/TFR	Deploy support equipment	Configure payload	Assemble UAS	Conduct preflight safety inspection	Calibrate compass	Determine crew roles	Conduct safety briefing	Configure UAS for flight	
C	Perform UAS Flights	C.01	C.02	C.03	C.04	C.05	C.06	C.07	C.08	C.09	C.10	C.11	C.12	C.13
		Complete prelaunch checklist	Communicate with visual observer (VO)	Check control surfaces	Conduct command/control (C2) check	Upload flight plan	Verify GPS lock	Deconflict airspace	Troubleshoot technical issues	Make go/no-go decision	Clear launch/landing zones	Communicate with ATC*	Launch aircraft	Monitor telemetry
		C.14 Manage data links	C.15 Conduct post-takeoff system check	C.16 Maintain situational awareness	C.17 Complete emergency procedures	C.18 Adjust flight profile	C.19 Complete mission objective	C.20 Return to base	C.21 Land aircraft					
D	Perform UAS post-flight procedures	D.01	D.02	D.03	D.04	D.05	D.06	D.07	D.08	D.09				
		Conduct post-flight inspection	Complete post-flight paperwork	Perform QA/QC on data	Disassemble UAS	Transfer data	Post process data	Prepare mission deliverable	Present mission deliverable	Perform root cause analysis				
E	Maintain the UAS	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
		Perform periodic inspection procedures	Follow battery charging protocol	Inspect external and electrical health of battery	Document battery activity	Conduct battery deep cycle	Maintain long-term battery storage voltage	Check condition of airframe	Check blades (propellers)	Check motors for play	Inspect cables and connectors	Check gimbal	Check camera	Clean UAS equipment
		E.14 Lubricate drive-train	E.15 Repair/replace UAS components	E.16 Maintain inventory of spare parts	E.17 Log maintenance activity	E.18 Conduct cyber-security assessment	E.19 Schedule manufacturer maintenance	E.20 Review flight controller logs	E.21 Maintain mission specific UAS configurations	E.22 Maintain software	E.23 Register UAS with FAA	E.24 Integrate payloads (sensors, cameras) and check center of gravity	E.25 Perform functional test flight	E.26 Store UAS in secure area
F	Maintain professional proficiency	F.01	F.02	F.03	F.04	F.05	F.06	F.07	F.08	F.09	F.10	F.11	F.12	F.13
		Maintain FAA certificate	Participate in UAS tradeshows	Maintain mission specific knowledge and credentials	Maintain flight currencies	Research new hardware/software solutions	Participate in online forums	Participate in local UAS industry groups	Attend FAA seminars (WINGS, FAAST)	Maintain UAS operations manual	Mentor others	Maintain policy awareness	Simulate emergency procedures	Train on degraded flight modes

\* Denotes task is performed multiple times in various duties

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## **Worker Behaviors**

Organized  
Attention to detail  
Emotional intelligence  
Able to follow checklists  
Level headed/"cool and collected"  
Able to handle sensitive situations  
Problem solver  
Integrity  
Safety oriented  
Punctual  
Proactive  
Spatial awareness  
Situational awareness  
Eye/hand coordination  
Team player  
Manage expectations  
Ambassador for company  
Takes responsibility  
Honest  
Resourceful  
Project management  
Learns from mistakes  
Assertive  
Leadership skills  
Clear/concise communicator  
Understanding of security in field  
Security clearance  
Able to pass background check  
Initiative  
Respect for authority  
Humble

## **General Knowledge & Skills**

Aircraft fundamentals  
Airspace  
Aeronautical knowledge  
GPS  
Weather  
Solder  
IT knowledge  
Cameras  
Sensors  
Resistance  
Amateur radio license  
Research land use/ownership  
Photogrammetry  
Remote sensing

## **General Knowledge & Skills cont.**

Electronics  
Battery technology  
Fuel technology  
Physics  
Electrical engineering  
Voltage  
Current  
Communications  
FAA regulations  
FCC regulations  
Crew resource management  
Aeronautical decision making  
RF communications  
Surveying/mapping – GIS  
Airspace authorizations  
Part 107  
Privacy policies- NTIA and state  
State mapping laws  
Basic cybersecurity  
Liabilities/consequences  
Insurance requirements  
Mission planning  
Post processing data  
PWM  
General mechanical torque skills  
Flight controllers  
PID control tuning

## **Tools/Equipment**

UAS  
PPE  
Soldering iron  
Multimeter  
Batteries  
Chargers  
Package release mechanisms  
Spotlight  
Speaker  
Magnetometer  
Gas spectrometer  
Ag. chemicals/treatments  
Biological detection equipment  
Multispectral/hyperspectral imager  
Plotter  
3D printer  
Mechanical tools  
Spectrum analyzer

## **Tools/Equipment cont.**

Sunscreen  
Truck/van  
Fire extinguisher  
Mobile office  
Ground station  
LAANC  
UAS zone  
Wind anemometer  
Air horn  
Air radio  
SD cards  
Thumb drives  
Lighting equipment  
Cellular/wireless hotspot  
Bucket/sand  
FPV goggles  
Ground control targets  
Surveying equipment  
Laser height gauge  
Field cases  
Cones  
Caution tape  
Vest  
Walkie talkies  
First aid kit  
Monitors  
Aeronautical charts  
Land use paperwork  
Payloads  
Camera  
Thermal camera  
LIDAR  
Computer  
Cell phone  
Fire cabinet  
Fire gloves  
Spare parts  
Generator  
Cooler  
Table/chairs  
GPS  
IMU

## **Future trends/ Concerns**

Automation

Artificial intelligence

Ability to request authorization automatically

Machine learning

Detect and avoid (DAA)

Beyond/extended visual line of sight

Being pilot in command of multiple aircraft

UTM integration

Coordination with military/LAANC

Operations over people

Operations at night

Part 135/121

Privacy- public and operators- 4th amendment

RTK system on UAV

Public acceptance of use of UAS

Workforce implications- loss of jobs due to increased use of UAS

Adding new types of jobs

Issues with wireless interference- places you cannot fly UAS

Real time onboard data processing

Real time delivery of products

Inspections by UAS

More efficiency/less cost using UAS

Manned/ unmanned teaming

Cybersecurity- concern with spy equipment and protection of data

Counter UAS

Terrorist attacks/weaponization

Protection of critical infrastructure

Existence of geofences

## **Recommendations from the Field**

Require workplace experience as part of training program

Join ASSURE (for schools to test/stay abreast of new technologies)

Higher degrees may be in mission-specific industry (not UAS)

Minimum degree/requirements

- Certificate in UAS
- 2-year degree-mission specific
- Minimum hours of flight time (25+ hours)
- Need to fly non-GPS mode comfortably
- Capstone project or portfolio