Andrew Woogen

WHO AM I?

MARINE TECHNICIAN SUPERINTENDENT - OSU MTG

iRobot, Texas A&M, BIOS

RVTEC **SCOAR** rep – *future* RVTEC Chair

Oregon State University

Oregon State University Marine Technician Group

What we've done

- *Procured UAS's to support science objectives on the R/V Oceanus*
- *Hosted a UAS training event at the OSU MTG facility*
- *Obtained Part 107 certifications via the FAA for all OSU MarTech's*
- *Utilized UAS's to support public outreach*
- *Developed OSU MTG specific US documentation (JSA/SOP)*

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Training

Part 107 training with General Pacific. A 2-day “cram” course with a guaranteed Part 107 test pass.

Continued pilot training and system familiarization within team

Oregon State University

R/V Oceanus UAS JSA (*job safety analysis*)

OSU SHIP OPERATIONS

DRONE FLIGHT OPERATIONS

Originator: Kate Kouba	Approved By: Andrew Woogen

Job Safety Analysis

Task to Be Accomplished: **Deployment and Recovery of Drone in Flight**

Potential Hazards:

- *Projectile from broken propeller*
- *Entanglement of drone in ships equipment*
- *Loss sight of drone*
- *Wave and swell action enhance potential for hazards*
- *Wind effects within proximity of the ship*
- *Personal Injury when preforming hand launch / landing*
- *Battery failure*
- *Experiencing external distractions or interruptions may enhance potential hazards*
- *Lack of adequate communication may enhance potential hazards*
- *Line or cable in water being caught in the propulsion system*
- *Deploying or recovering before everyone is notified and ready, particularly the bridge officer*
- *Personnel falling overboard while working near deck edge*

Engineering and Administrative Controls: *(Note: The following is not a comprehensive list of engineering controls available. Controls listed serve simply as a reminder that you should properly use items that may be on hand to mitigate potential hazards)*

- ✓ *Familiarity with the SMM sections "Overboarding Operations"*
- ✓ *Properly trained pilot in command (POC) with part 107*
- ✓ *Properly trained personnel on deck*
- ✓ *Properly submitting NOTAM prior to flight*

OSU SHIP OPERATIONS

DRONE FLIGHT OPERATIONS

Originator:	Approved By:

- ✓ *Clear and proper communications between everyone involved*
- ✓ *Good housekeeping on deck*
- ✓ *Situational awareness*
- ✓ *Only personnel directly involved in operation will be in the work area.*

Environmental Concerns:

- *Loss of Drone at sea*
- *Loss of Li Batteries*

Environmental Controls:

- ✓ *Maintaining adequate battery levels for flight and return*
- ✓ *Maintaining visual on drone when in flight*
- ✓ *Ensure positive control of all components as they are brought on board.*

Personal Protective Equipment: *(Note: Some items may or may not be required depending on the situation, company policy, etc.)*

- ➢ *Eye Protection*
- ➢ *Hard Hat*
- ➢ *PFD*
- ➢ *Safety shoes*
- ➢ *Work clothing appropriate for outside deck work*

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SOP (*standard operating procedure*) & vehicle specific **user manual**

Includes:
- Flight planning
- How to submit a NOTOM (*notice to airmen, which is required if operating in controlled airspace*)
- piloting instructions specific to each vehicle
- How to operate the vehicle's controls
- Tips and techniques for piloting
- Account usernames and passwords
- Video editing instructions
- Where to find help if needed

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Drone resources at OSU

- Drone Group (on campus)
- COA (*OSU moved away from this and is pushing for all OSU UAS pilots to just get their own part 107's*)
- Drone Compiler app (*A great resource to logging flight data, and used to be required when OSU provided the COA*)
- UAS training at University for students and employees
- OSU has its own UAS policies depending on how they're being used
- OSU will register our drones with the FAA for us (*and make sure we stay current*)

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Satellite Domes - Grey whale Thermal

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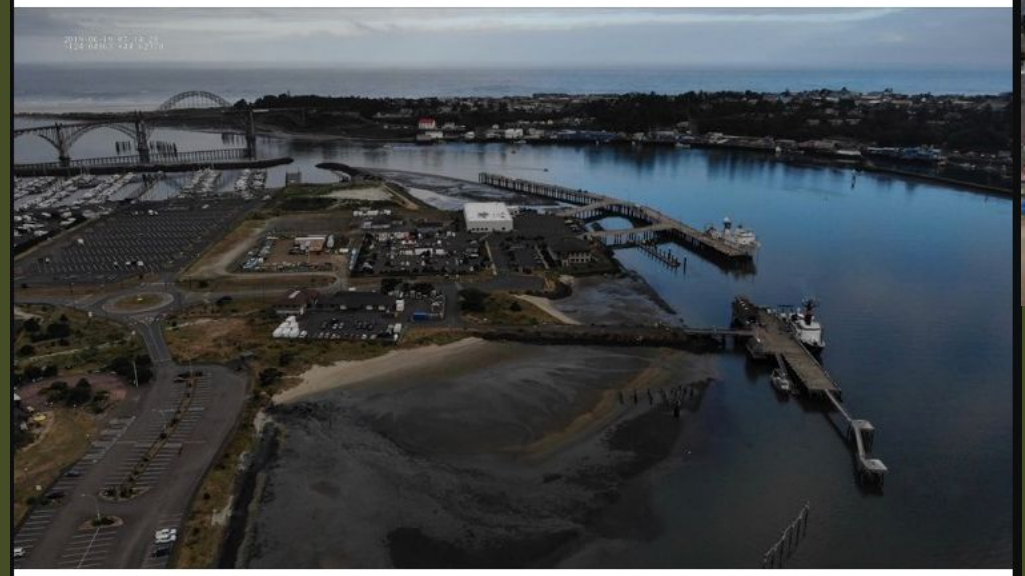
OSU MTG UAS publicity in our college

College of Earth, Ocean, and Atmospheric Sciences - Oregon State University

8 hrs ·

Photo Finish Friday (not a thing; we just made it up): great aerial view of Ship Ops, NOAA MOC-P, Yaquina Bay Bridge, and beyond, taken with the OSU Marine Technician Group's aerial drone.



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OSU MTG drone science uses on Oceanus

UAS utilized to video whales
Tracy Crew's 2019
OSU MarTech served as pilot in command b/c scientist's Part 107 expired

View an R&D vehicle being towed off the starboard side as well as to look at waves over the horizon
Jim Moum – two cruises 2018 & 2019
Footage utilized in ONR conferences

Credit: Leigh Torres

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Seaglider Deployment/Recoveries

Sarah Webster 2021

Footage significantly utilized in UW APL documentary

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Oceanus's NSF/JMS *inspection*

OSU Ship Operations facility

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First drone flight - R/V Oceanus

Vehicle = Splash Pro w/Hero GoPro

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Last drone flight - R/V OCEANS

Vehicle = Mavic 2 Enterprise Dual

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OSU MTG public outreach *with* drones

Photo of the Week

Marine Technician Kristin Beem presenting at a public outreach event hosted by the Oregon State CEOAS Marine Technician Group in their Corvallis workshop. Photo by Andrew Woogen

Send Announcements (and photos!)

OSU MTG Pilot Training – **how** to land a UAS on a moving ship (*catch it?)*

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Future of UAS's with the OSU MTG

- Anticipate more use cases identified by the science community
- Continued training on UAS piloting and operating off a **moving ship**
- Explore new payloads (*sensors?)*
- Invest in spare equipment and innovation
- Renew part 107 certs every 24 months for all OSU MarTech's
- Establish clear expectations of UAS services MarTechs will provide to the ship-using science community

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R/V Armstrong

Oregon State University

RVTEC *Community*

- Guidance on '*hobbyist*' drone use on ARF vessels
- Requested recommendations of vehicle type (R/V *Langseth seismic*)
- Create list of **new** technology possibilities **&** technical **support** needed
- Seeing an increase use in fleet and anticipate more
- Overall lots of interest by the RVTEC community, but also hesitation

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Future of UAS's in **RVTEC** – *potential*

- Consider a center for excellence – one MarTech Group could spearhead this innovation to provide a service to the science community as needed. Potentially funding as a specialize service.
- Consider group training for UNOLS MarTechs, to economically and efficiently train MarTechs in UAS's and get them part 107 certified
- Consider establishing a fleet-wide COA for UAS operations in the MarTech community. Which could include a set of requirements (ex. Training/vehicle registration/flight data recoding/mission ops pre-approval…)
- Establish clear expectations of UAS services MarTechs will provide to the ship-using science community

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OSU MTG's UAS Mavic2 Enterprise Dual

4K video gimbal
FLIR thermal camera
Daylight readable display/controller
Strobe light for dusk/dawn flights
Speaker
Spot light
Floats
Protective case and spare batteries/parts

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