

901902 - Unoccupied Aerial Vehicles for Science, Operations and Outreach

Week 33

1. Danelle Cline
 - a. Weekly meeting and discussion with collaborator about paper figures
 - b. Sarah did a great job on her intern presentation.
2. Duane Edgington
 - a. Sarah wrapped up her Seminar presentation Aug 12. Great job! And her parents got to come and view her presentation in the Pacific Forum. It was wonderful to meet them.
 - b. Starting work on MARINE26 workshop poster
 - c. Initiated collaborators agreement with Sarah Williams to produce a longer peer reviewed paper for Springer special issue publication.
3. Enoch Nicholson
 - a. Improving flight request system

Week 32

1. Danelle Cline
 - a. Summer intern presentation support, added lazy loading to [modelhub](https://cortex.shore.mbari.org/modelhub/) <https://cortex.shore.mbari.org/modelhub/>. Sarah is doing a great job on paper, presentation, and work will be integrated into the production pipeline.
2. Duane Edgington
 - a. UAVS paper submitted. Registered for ECCV conference and the MARINE26 workshop.
 - b. Work continues comparing yolo26Medium with RFDETRMedium. Preparing for follow-on training sessions to make Large and XL and 2XL models to compare and contrast. All training on NVIDIA DGX Spark boxes.

Week 31

1. Duane Edgington
 - a. Great progress on summer work evaluating RFDETR and Yolo26 new models for object detection. We are running jobs on 3 GPU systems at MBARI plus on CoLab.

- b. Sarah is making great progress and cranking out models and analysis. She is now focusing on project presentation and final report. She presented work to date at the team meeting July 28.
- c. Paper drafted and submitted to [Workshop on Machine Vision 2026](#) to be held at ECCV Sept 2026.

Week 30

- 1. Duane Edgington
 - a. Sarah Williams is making great progress, now working in Colab and on DGX Spark-0626 training models and validating performance. Pushing on a July 31 deadline for paper to be presented at ECCV workshop (as a poster).
 - b. Tim is working on paper for presentation at IEEE Oceans Conference 2026.
 - c. Working on debugging problems with RFDETR inference pipeline involving SAHI and ONNX model. Lots of moving parts to get pytorch -> ONNX -> SAHI all working together properly.

Week 29

- 1. Danelle Cline
 - a. Updates to mbari-aidata module to support summer intern, Sarah Williams, who is making good progress.
- 2. Duane Edgington
 - a. Team meeting with Intern Sarah Williams. Some work on infrastructure to support her model training.
 - b. Touched base with Tim Sananikone. He is working on a paper for the IEEE Oceans Conference. Danelle and I will review in a week or two.

Week 28

- 1. Danelle Cline
 - a. Helping intern Sara with aidata download and workflow design
- 2. Duane Edgington
 - a. Sara Williams continues to make great strides in training models and running inference. Meetings and sharing of code. Set up so she can run on NVIDIA DGX Spark if she needs to for long training runs.
- 3. Irene Hu
 - a. Helped Tom with a flight
- 4. Enoch Nicholson
 - a. Open house prep

Week 27

- 1. Danelle Cline

- a. Oceans abstract on Kelp SAM Coverage accepted
- b. Summer intern help and VO

Week 25

1. Danelle Cline
 - a. Proposal input
 - b. Deployment of [stratagrid](#) to visualize training data
 - c. A few mbari-aidata pip modules updates to support train/test
2. Duane Edgington
 - a. Team meeting
 - b. Team discussion on yolo26 and RF-DETR trading and inference strategy. Discussed testset. Discussed ONNX
 - c. Discussed SAHI and image slicing
 - d. Posted sample inference notebook to github
 - e. Ran inference test on testset to confirm notebook working as desired
 - f. Discussed short paper/poster opportunity due July 19
3. Enoch Nicholson
 - a. Started UAV project proposal form

Week 24

1. Danelle Cline
 - a. Onboarding Sarah with [AI/UAV](#) documentation and tools. Setup account on drone for downloading annotation data, setup Slack channel, weekly meetings, and added to github repos for documentation. She is off to a great start!
 - b. Visual observer for NewBrighton deployment
2. Duane Edgington
 - a. Welcome summer intern Sarah Williams, graduate of Harvey Mudd College, soon to matriculate as Masters CS student University of Chicago.
 - b. Sarah is working on training a new version of RF-DETR detector (updated by Roboflow team) and training/comparing with Yolo26. Great progress already. She is working in CoLab and on her MacBookPro M1 from IS.
3. Johann Voigtlander
 - a. Visual observer for the VTOL UAV in Santa Cruz

Week 23

1. Danelle Cline
 - a. VO on mission, continued work on mission viewer and [updated docs](#)

Week 22

1. Duane Edgington

- a. Team meeting

Week 21

1. Danelle Cline
 - a. Deployed latest classification model to [MBARI modelhub](#) (an easy to use model card for internal use only)
 - b. Added FastAPI health to cortex
 - c. Team meeting [update](#)
 - d. Discussed SAM3 few-shot with collaborator
2. Duane Edgington
 - a. Team meeting.
3. Irene Hu
 - a. Sat in on a meeting
4. Enoch Nicholson
 - a. Completed SUAS recurrent exam
 - b. Submitted flight request for Carson cruise
 - c. Conducted Matrice test flight off the Carson
 - d. Started consolidated flight request, ops, and risk-management form
 - e. Onboarded Karen on Matrice for test flights

Week 20

1. Danelle Cline
 - a. Added two new classes to the classification model and retrained. Improved performance 5%. Models exported to ONNX format.
2. Duane Edgington
 - a. Released github repo with UAVS RF-DETR inference CoLab notebook and sample data files to UCSC project intern Sage
3. Enoch Nicholson
 - a. Completed three Matrice test flights off the Paragon searching for velella. Captured lessons learned on Paragon hatch covers and non-slip mats
 - b. Rebuilt spare CW prop assembly from damaged units and ordered replacement parts

Week 18

1. Duane Edgington
 - a. Team meetings
2. Johann Voigtlander
 - a. Studying for Part 107 license

Week 17

1. Danelle Cline
 - a. Some work on a React web application to visualize mission results

- b. Loaded last three missions and running processing pipeline
 - c. Deployed Voxel51 sync service to drone.mbari annotation server to support faster review of results. Many thanks to Adriana and Peter in IS for their assistance with this.
- 2. Enoch Nicholson
 - a. Created flight requests for Matrice test flight and state parks surveys

Week 16

- 1. Duane Edgington
 - a. Team meeting
 - b. Weekly check-in meeting with Tim Sananikone. Plan to submit abstract to IEEE Oceans Conference 2026 Monterey

Week 14

- 1. Danelle Cline
 - a. Summer intern review and interviews
 - b. Tested revised threshold on ML pipeline which reduced false detections ~30%. Issues with running RF-DETR now need attention. perhaps misalignment with repo version.
 - c. Team meeting
- 2. Duane Edgington
 - a. Team meeting
- 3. Enoch Nicholson
 - a. Packard Flight attempt
- 4. Johann Voigtlander
 - a. Studying for Part 107 examination

Week 13

- 1. Duane Edgington
 - a. Team meeting

Week 12

- 1. Duane Edgington
 - a. Intern application processing due Mar 23, 2026
 - b. Team meeting
 - c. Meeting with Tim.
- 2. Enoch Nicholson
 - a. Packard flight prep
 - b. Terrace Point Survey

Week 11

1. Duane Edgington
 - a. Team meeting
2. Enoch Nicholson
 - a. Flight planning
 - b. Intern review
 - c. Installing polarizer

Week 10

1. Danelle Cline
 - a. VO assistance. Some issues with the camera so we had to cancel the flight.
2. Duane Edgington
 - a. Finishing “threshold” parameter sweep of UAVS RF-DETR detection model with benchmark dataset
 - b. New RF-DETR release; will need to retrain model to pick up new weights and configuration

Week 9

1. Danelle Cline
 - a. Team meeting
2. Duane Edgington
 - a. Implemented roboflow subversion sliced inferencing for UAV images in RF-DETR detection pipeline. Analyzing the results.
 - b. Next step, sweep detection threshold to find optimal true positives vs false detections.
 - c. Present kelp segmentation poster virtually at OSM conference. Teleconference set up for 8AM PDT 2/26/2026. (Tim is presenting 9PM PDT 2/25/2026)

Week 8

1. Duane Edgington
 - a. Adding supervision sliced inference to RF-detr detector pipeline. Should be ready for testing at the end of this week.

Week 7

1. Danelle Cline
 - a. OSM poster review
2. Duane Edgington
 - a. Working on completion of Poster for Ocean Sciences Meeting. Super job Melissa!

- b. Incorporating team input to poster text and figures. Thanks Tom O'Reilly for adding scale bar to poster UAVs image.
- c. Tim and Duane to present the poster Thursday at the in-house OSM poster session.
- d. Enoch to carry physical poster to Edinburgh and present poster live Feb 26.
- e. Tim and Duane to present the poster virtually Feb 26.

Week 6

- 1. Danelle Cline
 - a. Loaded new RF-DETR model results to drone.mbari.org. Appears to be a much more sensitive model than YOLOv11; some adjustments needed for threshold.
 - b. Team meeting and OSM poster discussion on kelp coverage ML
- 2. Duane Edgington
 - a. Team meeting
 - b. Continued evaluation of testset with RF-Detr detector.
 - c. Plan to integrate SAHI with RF-Detr inference flow.
 - d. Poster work for OSM meeting.

Week 5

- 1. Danelle Cline
 - a. Working on <https://github.com/mbari-org/UAV-issues/issues/23>. Had some issues with the vGPU reporting no available memory that others have reported. A reboot fixed this issue.
 - b. Shared image mosaic of a mission with collaborator T. Sananikone who is working on a [SAM-based kelp coverage tool](#). He is evaluating the performance on a mission mosaic and looking towards the [SAM3](#) model.
- 2. Duane Edgington
 - a. Debugging output of benchmark test set from tator database, in preparation for making coco format version for inference through RF-DETR detector.
 - b. Working on poster for OSM meeting with Tim Sananikone.
 - c. Team meeting.
- 3. Enoch Nicholson
 - a. Built flight data scraping tool for annual report generation

Week 4

- 1. Danelle Cline
 - a. Team meeting
 - b. Working on issue [23](#) to replace current YOLOv11 detector with better performing RF-DETR. Processed latest Trinity Pro mission in Seacliff on 20260114 with new RF-DETR model.

- c. Review with collaborator, Tim of mission mosaic processing with Kelp coverage; some issues with edge artifacts confounding SAM algorithm. Setup Kelp segmentation test project on drone.mbari.org anticipating test segmentation map loads.
- 2. Duane Edgington
 - a. Team meeting.
 - b. Plan to work on running our benchmark dataset through the RF-DETR detector to establish benchmark performance metrics.
- 3. Enoch Nicholson
 - a. First UAV Flight with Trinity Pro outside of Moss Landing

Week 3

- 1. Duane Edgington
 - a. Team meeting Jan 13.
 - b. Preparing to download and analyze benchmark testset through our best RF-detr object detector, to gather metrics. It will be useful to have the metrics and workflow in place to compare data and model performance with our new higher-resolution camera and lens setup.

Week 2

- 1. Danelle Cline
 - a. Migrated image loader to new Trinity3 platform. Some minor continued exploration of a web dashboard.
 - b. Team meeting
- 2. Duane Edgington
 - a. Team meeting
 - b. Starting work on Poster for OSM March 2026.