

901902 - Unoccupied Aerial Vehicles for Science, Operations and Outreach

Week 51

1. Danelle Cline
 - a. [Argo workflow](#) created for running RF-DETR object detection model via k3s cluster. Next step is to deploy through the Tator admin console. This will allow any member of the team to process the images post-deployment without a need for programming.

Week 47

1. Duane Edgington
 - a. Trained [rf-detr](#) detector model on UAVS dataset. mAP50 is 35% better than our best yolo11x detector model. Ready to integrate into pipeline with clustering and classification.

Week 46

1. Danelle Cline
 - a. Trained new ViT-S classifier
 - b. Working on missionview web application
2. Duane Edgington
 - a. Training detector model on Nvidia DGX-spark system. [RF-detr](#) Large model. So far so good... Will compare/contrast with our [RF-detr nano model](#) released to Huggingface

Week 45

1. Duane Edgington
 - a. Working on running model training for detection (one label) and for detection & classification (20 labels) of RF-detr Pytorch model against verified 901902 labeled dataset. Porting to my nvidia dgx-spark system (instead of CoLab).
 - b. Team meeting
 - c. Collaborator meeting.

Week 44

1. Duane Edgington
 - a. Teleconference with former intern Tim on Kelp analysis and next steps.

- b. Plan to train rf-detr model against UAVS dataset using new Nvidia DGX-spark system. Evaluate rf-detr on detection and classification tasks.

Week 42

1. Danelle Cline
 - a. missionview webapp updates
 - b. Meeting with former intern Tim to discuss updates on Kelp model.
 - c. Created test dataset and loaded into version testdata on drone.mbari.org.
2. Duane Edgington
 - a. Generated [rf-detr detection model](#). Danelle to incorporate into the detect/classify pipeline so we can compare with the [yolo11x detection model](#). mAP50 metrics suggest the rf-detr model to be superior.

Week 41

1. Danelle Cline
 - a. Generated random testset from [drone.mbari.org](#)
 - b. Trained ViTS classifier model with added classes for Seacliff site and improved Egregia localizations
 - c. Working on exploring Cursor+React web app with [uavscope](#)
 - d. Zoom with Tim on [KelpCoverage](#)
2. Duane Edgington
 - a. Built [updated yolo11x detector](#) (single class, all objects) with verified localizations from ~all classes and survey sites. Dataset archived to google drive.
 - b. Working on creating [RF-DETR](#) detector with the same dataset to see if performance improved with the state of the art transformer architecture.
 - c. Teleconference with Tim on Kelp coverage tool progress
3. Enoch Nicholson
 - a. Drafted public comment for Part 108 NPRM

Week 40

1. Duane Edgington
 - a. Focused on verification of Egregia and Kelp localizations in UAVS database to enable clean [detection](#) dataset
 - b. Prepared data for training [new yolo11x detection model](#)
 - c. Running [training](#) 10/1/2025 on Colab A100 Hi-Ram instance
2. Enoch Nicholson
 - a. Completed Trinity Pro aircraft training
 - b. Created UAV survey mapping plan

Week 39

1. Enoch Nicholson

- a. Created UAV survey mapping plan for co-located operations

Week 38

- 1. Duane Edgington
 - a. Team meeting

Week 37

- 1. Danelle Cline
 - a. Minor maintenance to remove some duplicate loads
 - b. Some refactoring of the ML pipeline to move Tator image loads earlier with Axiom image sync as needed for better downstream processing
 - c. Backlog processing.
- 2. Duane Edgington
 - a. Project team meeting
- 3. Enoch Nicholson
 - a. Working on camera payload

Week 36

- 1. Duane Edgington
 - a. Phase 1 response work
 - b. Returning to building an updated detection model
- 2. Enoch Nicholson
 - a. Completed UAV proposal feedback response

Week 35

- 1. Danelle Cline
 - a. Team meeting to discuss 2026 phase 2 proposal feedback.
- 2. Duane Edgington
 - a. Team meeting 8/26
 - b. Work on 2026 phase 1 feedback response planned for this week.
 - c. Zoom meeting with Tim on next steps as post-intern collaborator.
- 3. Enoch Nicholson
 - a. Independent payload system development
 - b. Proposal response

Week 34

- 1. Duane Edgington
 - a. Intern Tim Sananikone, with input from Steve Haddock and me, submitted an abstract on his summer work to [OSM conference](#), to be held February 2026.
- 2. Enoch Nicholson
 - a. Reviewed Part 108 NPRM regulations for BVLOS operations

- b. Advanced Seahawk robotics winch collaboration discussions
- c. Recovered IACRA account and requested Part 107 certificate renewal

Week 33

- 1. Duane Edgington
 - a. Intern meeting

Week 32

- 1. Danelle Cline
 - a. Intern meeting
- 2. Duane Edgington
 - a. Intern meetings
 - b. Start collaborator agreement process
- 3. Enoch Nicholson
 - a. Consolidated payload development documentation for multi-platform deployment (kites, aerostats, UAVs)
 - b. Hardware procurement complete: GoPro Hero 12, Raspberry Pi 4, and accessories
 - c. Continued collaboration discussions with Seahawk for aerostat winch deployment system

Week 31

- 1. Duane Edgington
 - a. Team meeting.

Week 30

- 1. Duane Edgington
 - a. Team meeting
 - b. Intern meeting

Week 29

- 1. Duane Edgington
 - a. Intern meeting. Great progress!

Week 28

- 1. Danelle Cline
 - a. Proposal work
 - b. Met with CSUMB collaborators to discuss progress on kelp coverage with SAM model, otter/shark detection. They contributed some difficult localizations of otters and validated sharks.

- c. Intern meeting
- 2. Duane Edgington
 - a. Team meeting
 - b. Proposal work
 - c. Collaborator meeting

Week 27

- 1. Danelle Cline
 - a. Intern mentoring and arranging upcoming meeting with collaborators to discuss shark/otter/kelp research

Week 26

- 1. Danelle Cline
 - a. Annotation system moved to <https://drone.mbari.org> debugging issues with SSL failure through python API. Shark localizations verified by external collaborators.
 - b. Intern meeting with Tim. Addressing many questions. Kelp coverage using Meta Segment Anything Model (SAM).
- 2. Duane Edgington
 - a. Team meeting
 - b. Intern Tim Sananikone weekly meeting.

Week 25

- 1. Duane Edgington
 - a. Welcome Intern Tim Sananikone! Team discussions.

Week 21

- 1. Danelle Cline
 - a. Assisting as VO for flights
 - b. Briefly tried the tool <https://www.animaldetect.com/> . Worked at 0% confidence threshold on uncluttered drone images to detect larger megafauna. Limited to 1G for free version Worth trying further on images with high reflectance.
 - c. Met with collaborator to discuss shark/kelp data
 - d. IS request for new VM drone to host data externally for broader access

Week 19

- 1. Danelle Cline
 - a. Update to processing pipeline to support either per mission or mission discovery level processing.
 - b. Processed mission trinity-2_20250422T171024_NewBrighton
 - c. Team meeting with collaborators interested in otter/shark avoidance.
- 2. Duane Edgington

- a. Collaboration meeting with folks from CSUMB interested in otters, sharks, and kelp...

Week 17

1. Danelle Cline
 - a. Assisted as VO for deployment and ongoing improvements to processing code with the team. [Need to move the master branch to main.](#)
 - b. Summer intern correspondence

Week 15

1. Duane Edgington
 - a. Team meeting

Week 14

1. Danelle Cline
 - a. Team discussion on level processing and strategies for full automation that support multiple platforms
 - b. Attended [Modovolo](#) webinar
 - c. Simple POC RestAPI for processing from a UI deployed to VM [uav.shore.mbari.org](#)
 - d. Summer intern discussions
 - e. Searching for velella velella in recent missing where they were washed up on shore revealed potential groups at sea. Resolution is difficult to confirm.
 - f. Continued work on ai documentation at <https://docs.mbari.org/internal/ai>
2. Duane Edgington
 - a. Team meeting

Week 12

1. Danelle Cline
 - a. Evaluating Argo as a way to orchestrate machine learning workflows
 - b. Updated UAV [documentation](#)
 - c. Assisted VO two days drone flights
 - d. Helping team fully automate processing pipeline from raw + level1/2+ ai
2. Duane Edgington
 - a. Reviewed ~35 intern applications - to discuss with Danelle 3/19

Week 10

1. Danelle Cline
 - a. Tator upgrade
 - b. ARGO Kubernetes sandbox.

- c. Setup justfile recipes and some minor rework of processing scripts to help avoid an error in the post-flight processing. Thanks to Bill Kirkwood for the help.
- 2. Duane Edgington
 - a. Pipeline and planning discussion with Danelle C.

Week 9

- 1. Duane Edgington
 - a. Team meeting. Steve H. ran through his presentation materials for an upcoming meeting.

Week 8

- 1. Danelle Cline
 - a. YV11 looks good for general detection but mixed results on large versus small kelp
 - b. VO for flights
 - c. Team meeting
 - d. SOCAR upcoming meeting at NASA Ames with team members on Friday. Will be interesting to hear more about what other groups are doing for image post processing. I cannot attend, but T. O'reilly will give an update.

Week 7

- 1. Danelle Cline
 - a. Pipeline load, detect, classify working. Need to teach the team how to use.
 - b. Evaluating YV11 model
- 2. Duane Edgington
 - a. Generated yolo11x model for detection, using all verified object data in training/val/test split. Danelle to evaluate.
- 3. Enoch Nicholson
 - a. Submitted paperwork to visit AMES at the end of the month for SCOAR meeting

Week 6

- 1. Danelle Cline
 - a. Finished SAM (Segment Anything Model) based corrections of bird localizations
 - b. ViTS classification model trained with improved bird localizations. .98 top-1 balanced accuracy, 27 classes.
 - c. Working on code migration task [#9](#)
- 2. Duane Edgington
 - a. Team meeting Feb 4.
 - b. Working on yolov11x detection model with Danelle's new class assignments.

Week 5

1. Danelle Cline
 - a. VO flight volunteer Jan 29th Terrace Point
 - b. Moving ApacheBeam pipeline from aipeline GitHub repo to uavprocessing BitBucket repo. To simplify install, moved aidata repo to a pip module.
2. Duane Edgington
 - a. Preparing to train yolov11x model on full UAVS labeled dataset, to produce a better object detector. Run on Colab NVIDIA A100 or on MBARI DORIS dual NVIDIA L40S-48C.

Week 4

1. Danelle Cline
 - a. Team meeting
 - b. Using Meta Segment Anything model (SAM) + SIFT keypoints, cleaned up bird localizations. Worked pretty well, but some manual cleaning still needed for heavy shadows
 - c. Setup jupyter notebook for teams to use for training on doris as user mldevops
 - d. uav.shore.mbari.org IS request for GPU for running processing pipeline
 - e. Retraining ViTS model
 - f. Synopsis of ML work for Sanctuary report
2. Duane Edgington
 - a. Team meeting
 - b. Completed yolov11x jelly model for eval
 - c. Preparing to train yolov11x one-class model with full dataset with aim to improve object detection accuracy

Week 3

1. Danelle Cline
 - a. Send Bryan our ML synopsis for sanctuary report
 - b. Processing and cleaning Dec 2024 missions
 - c. Ongoing refactoring of FastAPI-tator to simplify revisions for bulk modifications
 - d. ViTS model training. .86 top-1 balanced accuracy
 - e. Working on SAM based corrections of some bird localizations
2. Duane Edgington
 - a. Working on yolov11 detection model in quest for improved detection accuracy

Week 2

1. Duane Edgington
 - a. Team meeting 1/7/2025