

Tom O'Reilly Sorted By Project

200105 - Core Navigation Data - MDUC

300078 - DMO Divisional Support - AUV

300082 - DMO Divisional Support - Wave Glider

- Working with Chris Wahl to prepare our new SMC-2 “hotspot” payload for deployment. The SMC-2 interfaces to the Wave Glider and WGMS are different from the older SMC-1 payloads, and are not well-documented or supported yet by Liquid Robotics. We’ve had to “reverse engineer” functions to control the SMC-2 payload from shore. (Week 2)
- Writing function to support Hotspot software interface to either SMC version 1 or SMC version 2 host. This function will greatly simplify software support and maintenance for either platform. (Week 12)

300083 - DMO Divisional Support - LRAUV

808012 - OPC IFCB

- Installed new solid-state drive and latest Linux software onto IFCB, testing IFCB in preparation for power buoy integration. (Week 13)
- Helped remote troubleshooting of IFCB deployed on power buoy (Week 20)

901101 - Seafloor Mapping

- Modified existing MB-System ‘C’ functions to be more robust against memory segmentation-fault errors. (Week 2)
- Working with Caress to automate/simplify MB-System build process (using cmake) on a variety of systems including MacOS, Linux, and others (Week 3)
- Helping prepare next MB-System software release; installation now managed with ‘cmake’ build scripts which simplifies package configuration and maintenance (Week 30)

901112 - Monterey Bay Time Series

- Attending Imaging Flow Cytobot (IFCB) workshop at UCSC (Week 4)
- Attended Imaging Flow Cytobot workshop hosted by Kudela lab at UCSC, along with other West Coast IFCB users from Scripps, UCSB, and others. Learned that McLane now provides a kit to enable IFCB operation while in a horizontal orientation, which opens interesting possibilities to integrate the instrument with Wave Glider or an AUV. Learned that latest IFCB software offers more flexibility in sampling procedure and schedules, no longer assumes constant power and communications. (Week 5)

901513 - Targeted Sampling by AUVs

- Worked with Rueda to test Wave Glider front-tracking application on the SMC-2 hotspot payload. Waiting for completion of hotspot Iridium antenna before first sea-trials of application. (Week 2)
- Refining ‘hotspot’ software for use during Zhang/Rueda tracking experiment, using ‘SMC version 2’ sensor management computer. SMC-2 interface to Wave Glider vehicle differs from that of our standard SMC-1 (Week 13)

- Helped with first deployment of Wave Glider sensor management computer (SMC) version 2, in support of front tracking experiment by Zhang and Rueda (Week 20)

901618 - Pelagic-Benthic Coupling

901809 - Deep Sea Bioinspiration

901902 - Unoccupied Aerial Vehicles for Science, Operations, and Outreach

- I'm evaluating multispectral camera data from Trinity VTOL drone over-ocean surveys conducted just offshore of MBARI. The Micasense RedEdge Dual-MX camera simultaneously acquires data in 10 bands in the visible and near-infrared that closely match VIIRS, Landsat, and MODIS bands. These bands are very useful for detecting chlorophyll and other plant pigments. We believe the multispectral data can complement higher spatial resolution images from the Sony RX1R2 RGB camera in our biosurvey science application. I.e. we may be able to correlate the presence of jellies and other organisms seen in high-resolution RGB images with the presence of chlorophyll detected in lower-resolution multispectral images of the same area. (Week 2)
- For example the data below were acquired by the multispectral camera a few hundred meters offshore of MBARI at 60 meters altitude, have a ground-sampled distance (GSD) of 4 cm per pixel, and image width of 52 meters (1280 pixels). The image on the left is a composite of red, green and blue visible band reflectance, similar to what is seen with the naked eye; the right-hand image is a false-color infrared composite (CIR) image of red, green, and near-infrared bands. Several low-reflectance dark patches ~1 meter across are visible in the left image; the same patches are visible in the color infrared composite, showing high infrared reflectance (bright red). These patches are most likely floating kelp, with high near IR reflectance due to chlorophyll and other pigments. (Week 2)
- (Week 2)
- We will take delivery of a Trinity VTOL in the next few days, and will conduct more RedEdge multispectral surveys in the near future, along with higher spatial resolution RGB surveys of the same area with the Sony RX1R2 RGB payload. (Week 2)
- Took delivery of Trinity 90+ VTOL drone. Configured aircraft, learning operation, preparing for flight (Week 4)
- Working with team to configure new Trinity VTOL, becoming familiar with vehicle (Week 5)
- Finished setting up, calibrating Trinity UAV in preparation for first flight (Week 7)
- Coordinating first flight plan with project team and collaborators (Week 7)
- Refining post-flight processing procedures for rgb images acquired during flights on 2/16. Scheduled meeting with regional collaborators from NOAA, UCSC. Planning more over-ocean flights in next two weeks, weather permitting. (Week 9)
- Develop plans for next over-ocean flights, possibly next week, weather permitting. We plan to assess visibility "jelly-like" submerged objects, in this case a Secchi disk suspended at various depths from the Paragon, while the Trinity UAV with Sony science camera flies over at 60 meters altitude. We may also fly a RedEdge 10-channel multispectral camera payload (with includes near IR bands) to assess kelp and other chlorophyll spectral signatures; we plan to fly over the MLML kelp tanks just south of MBARI for this purpose. (Week 10)
- Meeting on 3/13 with collaborators Elliot Hazen (UCSC) and JC Clark (NOAA UAV pilot) to discuss further collaboration activities, ranging from science applications to flight planning through post-processing and machine-learning. (Week 10)
- Refining post-flight processing, including use of post-processing kinematics (PPK), which utilizes differential GPS groundstations within 100 km to greatly improve GPS accuracy. (Week 10)
- Working with CENCOOS and Axiom to provide Internet access of processed UAV images through CENCOOS website (Week 12)
- Hosted NOAA collaborator JC Clark, discussed flight coordination strategies (Week 13)
- Discussing UAV imagery access through CENCOOS website, with Axiom contractors (Week 13)
- Trinity UAV flight with 'RedEdge' 10-band multispectral camera payload, flew over MLML aquaculture tanks at 60 meters altitude to test near-infrared response to chlorophyll. This false-color image consists of visible red and green bands plus near-IR band. Chlorophyll appears red. Most of the water-filled aquaculture tanks contain living alga. (Week 15)

- UAV flight with Sony RGB camera payload. We stationed a small boat with Secchi disk suspended over the rail at 0.5 meters depth while UAV flew overhead at 60 meters altitude to assess underwater target visibility in somewhat turbid conditions (measured Secchi depth = 1 meter). Target at 0.5 meter depth is easily visible from UAV at 60 meters altitude.
(Week 15)
- Carried out flights to assess visibility of underwater targets, using Secchi disk (Week 20)
- Assessed UAV launch/land locations in Santa Cruz county near Soquel Point, which is near 'upwelling shadow' and associated thermal/biological features in Monterey Bay. (Week 20)
- Assessed operations sites in north bay, for access to upwelling shadow. Seymour Center and New Brighton State Beach especially promising (Week 23)
- Obtained Santa Cruz County Parks research permit, permission granted to fly from Bonny Doon Beach and Davenport landing (Week 23)
- Helped finalize research permit allowing us to launch and land UAV from Santa Cruz County Parks property (Week 26)
- Helping to plan over-ocean flights from Seymour Center UCSC (Week 26)
- Conducted over-ocean aerial survey out of Davenport Landing, adjacent to upwelling center. Acquired imagery of jellies, cetaceans, fish schools and more. (Week 26)
- Conducted our first survey over kelp beds offshore from Terrace Point near the Seymour Marine Discovery Center (UC Santa Cruz). Science team now assessing images.

(Week 30)
- Conducted aerial surveys recently in north Monterey Bay over the "upwelling shadow", at Terrace Point (near UC Santa Cruz Seymour Center) and Davenport Landing beach. Imaged feeding sea birds, many moon jellies (aurelia), biofilm slicks and more from 60 meters altitude. (Week 41)

902101 - LRAUV Technology Development and Fleet Operations

- Assisted in beach recovery of vehicle (Week 5)
- Working with Kieft and Rueda to make LRAUV acoustic messages relayed by Wave Glider Hotspot visible in the LRAUV 'dash' (Week 7)
- Working with Kieft and Rueda to connect acoustic messages retrieved by Wave Glider hotspot with the LRAUV 'dash' user interface. This will enable dash users to monitor acoustic modem message exchanges between LRAUV and Wave Glider, as well as LRAUV-to-LRAUV. We expect this capability to be quite useful for the upcoming EcoHab campaign. (Week 10)

902101 - LRAUV Technology Development and Fleet Operations.

- Implemented and tested software to provide Hotspot-relayed LRAUV acoustic message files to LRAUV dashboard, for ECOHAB operations (Week 12)
- Implemented and tested 'bridge' between Wave Glider hotspot and LRAUV dashboard, such that LRAUV acoustic messages received by hotspot are relayed to shore, and from there to LRAUV dashboard, where message content is displayed. (Week 20)

Out of Office

Overhead

- Contingency (Week 3)
 - Submitted IEEE Oceans 2023 abstract: "Ocean-based carbon dioxide removal: Role of standards and best practices", coauthored by colleagues on IEEE OES standards committee. This paper will describe how sensor networks that monitor CO2 removal can use practices and standards developed and used by previous successful efforts, especially Argo. (Week 3)

- Contingency (Week 4)
- Discussing potential mobile IFCB project with interested science and engineering colleagues (Week 7)
- Developing outline for paper submitted to Oceans 2023: "Ocean-based carbon dioxide removal: Role of standards and best practices" (Week 7)
- Adopted a SOCCOM float on behalf of Friends of Hue shelter in Vietnam, working with kids there to design a logo for their float, the 'Jenny Do' (Week 7)
- Abstract accepted for Oceans 2023: 'Ocean-based carbon dioxide removal: Role of standards and best practices'. Working with Yui Takeshita and other collaborators on paper text. (Week 9)
- Adopted a SOCCOM float on behalf of Friends of Hue Foundation children's shelter in Vietnam. (Week 12)
- Working on Oceans paper with collaborators: 'Ocean-based carbon dioxide removal: (Week 13)
- *Working with team on Oceans 2023 paper 'Ocean-based carbon dioxide removal: Role of standards and best practices' (Week 15)*
- Hosted UAV project booth at Open House with help from team - lots of interest from all ages of the public (Week 31)