

Kent Headley Sorted By Project

300057 - Mooring Maintenance

300078 - DMO Support - AUV

- Before doing a test of dorado layered control modifications to support macros, Erik suggested a simple test I hadn't previously done. It turned up a priority management issue that, while OK for the planned test, was critical enough to postpone testing until the code could be refactored (~3+ days focused effort, including effort to speed up the build/sim environment). A refactored version is being tested. It addresses the priority issue, simplifies the logic, and makes the use of macros more flexible.
It has some limitations (macros are currently mutually exclusive), though it may not be a limitation in practice, given current use cases. (Week 12)
- Tested refactoring of layered control macro code, and sent a write up and new scripts to DMO for testing at sea. (Week 13)
- prepping layered control tests for next week (Week 18)
- Last week, Erik and Tad ran some tests at sea using the updated Dorado layered control stack: a new Box behavior and a mission using the real-time clock start/end conditions. There were a couple of minor issues (now resolved), and the missions were otherwise successful. This body of code is aimed at enabling longer multi-day I2MAP missions that require the vehicle to transit to a site, loiter, then start a mission at a specified time of day. Now that the updates have been exercised successfully in isolation, the next step is to combine them in a scaled down version of a production mission. (Week 20)
- Chatted w/ Erik re Reson and other hyperion drivers; looking for 2026 time to begin driver work (Week 22)
- working with Tad re Dorado acomms telemetry from LayeredControl (Week 23)

701147 - MARS O&M IV

- Worked with Bryan and Knute to install and test the new SSD image. (Week 3)
- Put together a spreadsheet to track various SSDs and disk images used for MARS. It includes a lookup area that provides a printable summary to store with devices (e.g. spares). (Week 3)
- Team meeting re system cooling, integration, deployment schedule (Week 5)
- Will defer Mar deployment to address cooling issues: some redundancy in the cooling system is needed, along with additional cooling capacity. (Week 5)
- Potential need for a little software to respond to temperature alarm conditions, e.g. detect failure, enable aux fans. (Week 5)

- laying some groundwork for fan monitor software in connection with the MARS node cooling updates. If required, the software would detect overheating in the event of a fan failure and enable a redundant fan. It's not certain we'll need it if passive heat sinks can provide enough (Week 6)
- Worked on a fan monitor app, now ~80% complete (developed as personal interest) to enable a secondary fan in the event of primary fan failure (overtemp). The underlying foundations are of general use: MARS message pub/sub test tools, and a driver library for the ethernet IO modules that control the fans. It's not certain whether we'll need it, as passive cooling measures are proving very effective; if so, it's in a state that could be completed fairly quickly. (Week 8)
- Last week, tested prototype fan control with Ethernet IO module hardware; was able to verify that protocol works. (Week 11)
- Fan control still pending final logic design/implementation, but can demonstrate basic functionality. It's not certain that it will be needed, so deferring completion. (Week 11)
- UW APL is shipping the remaining MARS hardware spares, and the team has effectively moved on. (Week 15)
- test planning w. Knute and Bryan (Week 26)
- reviewing utils related to ZMQ pub/sub and fan control, potentially useful for tank test troubleshooting. (Week 26)

901007 - Benthic Biology & Ecology

- ran some BRS script sims (Week 23)
- took a look at OASIS date issue on BRS; suspect dead coin cell (confirmation pending) (Week 23)

901101 - Seafloor Mapping

- Finally resolved a bug that I chased for a couple of weeks. The issue manifested as segfaults caused when some (but not all) references to a particular object were invalid, as most of its data members appeared to be shifted 8 bytes in memory. Furthermore, when it occurred seems to be affected by when the first references were made. The root cause turned out to be that the class in question was both compiled with application sources, and linked in a library. However, the compilation options - one of which included an extra class data member - were different for the library and the application code. This created conflicting (and context-dependent) references for the object memory layout at run time, and hilarity ensued. Shout out to Tom, Brent, and Dave for their fine debugging ideas. (Week 3)
- Resuming the refactoring effort sidetracked by the deep bug-chasing rabbit hole. (Week 3)
- Refactoring LCM TRN front end (TRN for ROV); in progress (Week 4)
- Checked in change set to libtrnav and MB-System affecting TRN particle filter noise floor and drift std deviation, per Steve Rock (Week 4)

- Refactoring ROV TRN (LCM front end for TRN) continues (Week 5)
- Tested basic data flow using a portuguese ledge DVL data set from a LASS cruise. Fixed a few issues in refactored plug-in and processing code. TRN performance is not good in that data, but data flow is OK after resolving a number of issues. (Week 5)
- Eliminated a lot of unnecessary code from TrnClient, and did some initialization cleanup in base classes TerrainNav and TerrainNavClient. (Week 5)
- Testing code, syncing across repos, and submitting pull request for large-ish TRN change set, first to libtrnav, then MB-System.
Changes primarily related to LCM front end for TRN on ROV, but also includes some updates to TerrainNav and client subclasses. (Week 9)
- Worked with Tom O to address build MB-System build issue (libproj v9.8 introduced a variable name that collides with termios baud macro B0) (Week 11)
- Added updates to MB-System trndev to address build issues with LCM v1.5.2 and fix a couple of parsing bugs. (Week 11)
- Have a large PR pending (Week 11)
- submitted pull request with a refactor of an LCM front end for TRN, along with bug fixes and some cleanup of TRN client initialization. (Week 14)
- Reviewing Tom O's notes on the graphical update, and learning about the new architectural components, e.g. VTK and underlying graphics standards/implementations WebGPU, Metal, Vulkan, etc. (Week 14)
- trying out some of the MB-System graphical tools using MiniROV scalable robotics (SR) sonar data. This will help refine the SR processing pipeline, as well as help me understand the MB-System graphical tools better. (Week 14)
- met w/ Tom O re MB-Systems graphics port to get an overview of the architecture (Qt, VTK, C++), and reviewing the existing codebase (Week 15)
- Dave C gave me some pointers on using mbeditviz, and we discussed the graphics port and related build issues. (Week 15)
- Posted significant update to TRN code; primarily a refactoring of the LCM front-end for using TRN in an ROV context, along with various bug fixes and some updates to initialization in TRN Client classes. (Week 15)
- Fixed issue resulting in incorrect beam count in published MB1 records. The issue was a bookkeeping error, in which beams were not checked for flags and incorrectly included in the output count. (Week 16)
- meet w/ Tom O re MB-Systems graphics architecture (Week 18)
- In a meeting with Tom and Dave last week, Tom presented some details of the MB-System Qt/VTK implementation (Week 20)
- code review for MB-System PR. Interesting case where a PR was generated largely by Claude AI, which did some questionable things. (Week 25)
- Chatted w Dave re code review, TRN, Axial etc. (Week 26)
- graphics update meeting w Tom and Dave (Week 29)

901221 - Midwater Time Series

- pending test date for updates to layered control macro feature (Week 14)
- pending test opportunity for layered control updates (Week 15)

902204 - Scalable Robotics

- project kickoff meeting (Week 3)
- Looking at possible areas of contribution, timing for 2026 (Week 5)
- Reviewing mbs-tools (sonar log conversion by Mauro C); I may operate/support this on the upcoming Packard Cruise either onboard or remotely. (Week 9)
- set up map processing tools for this week's sponge ridge expedition (Week 11)
- providing remote support for Norbit sonar processing (Week 11)
- Shore support for Giancarlo's Packard cruise to Sponge Ridge. The weather was often marginal, but they got a lot of work in at alternative sites. My role was to better understand a workflow using MB-System and tools developed by Akshay H and Mauro C to validate and process Norbit multibeam data. I converted data successfully and (less so) attempted to generate grids/maps
The objective is to help develop a complete pipeline for making maps products using data from ScalableRobotics platforms like MiniROV and BlueBoat. (Week 12)
- Learning mb-system tools (e.g. editing) to understand sonar data pipeline into mapping. (Week 13)
- Profiling two implementations of an LCM log merge tool to compare memory and CPU use (Week 13)
- fixed a bug in the oculus simulator: message protocol version not initialized before connecting, causing failure to send messages to Oculus Viewpoint and SDK sonar viewer app. (Week 14)
- Ported the SDK sonar app to ubuntu 24; was thinking it might be a good base for an update, but it turns out to be somewhat buggy and lacks a lot of features that are in the Oculus Viewpoint software. (Week 14)
- Using MB-System to process Norbit data from the March cruise. Mostly this is an exercise to help develop a tool chain/pipeline that could be used on the Falkor, and also to become familiar with the MB-System graphical tools (Week 15)
- Fixed issue in mbtrnpp that was causing anomalous behavior in mb1stream (Week 16)
- Looks like the pipeline I'd intended to try out this week on the cruise won't work: it's not intended for use with the Reson sonar. (Week 16)
- While testing mb1stream on linux, found potential issue in lcm 1.5.2 cmake (build breaks on find_package(lcm)); filed issue and potential fix with LCM developers. (Week 16)
- Reviewing (Week 20)
- Looking at Cerulean sonar protocols and logging (Week 22)
- Thread re oculus sonar and network traffic (Week 22)
- wrote cerulean sonar reader; tested with log files so far. (Week 23)
- working on driver application, logging, publishing, etc. (Week 23)
- Some email exchange with Cerulean tech support, but not finding the responses to be super helpful. (Week 23)
- working on Cerulean BB data (Week 25)
- wrote util to convert svlog to LCM and generate MB1 from LCM log (Week 26)

- wrote a little test code to help reverse engineer the Cerulean discovery protocol (Week 26)
- made an initial grid/map of the blue boat survey (20260614) w/o extrinsics (Week 26)
 - generated LCM bathy data from svlog (Week 26)
 - merged LCM bathy with nav/attitude log (Week 26)
 - generated MB1 log from combined LCM log (Week 26)
 - used MB-System to generate grid (Week 26)
- Still work to do to incorporate extrinsics and evaluate actual validity/quality of map (Week 26)
- Spent Tue-Wed with Blue Boat, working out the Cerulean sonar device discovery and connection protocols, some of which is undocumented, and the folks at Cerulean wouldn't disclose. Wireshark to the rescue, and kudos to Johann for configuring the Blue Boat to accommodate testing. (Week 27)
- Some testing of Cerulean sonar driver, and trying to understand (Week 28)

Out of Office

- Apr 20-24 (personal travel, available by phone/online)
- Apr 17 - Rachel Carson Caress/Troni LASS cruise
- n/a
- Sep 21-24: Oceans conference

Overhead

- Annual review prep (mostly) (Week 3)
- hyperion meeting (Week 3)
- misc admin (Week 3)
- Review prep, mostly (Week 4)
- Review meetings, prep (Week 5)
- review meetings, wrap up (Week 6)
- studying MB-System processing pipeline as it relates to Tom O'Reilly's work and Scalable Robotics. (Week 8)
- Attended compensation review presentation (Week 8)
- Went on paragon AUV recovery (Week 8)
- misc admin (Week 8)
- misc admin (Week 11)
- Matt Schultz contacted me and Kevin G about the possibility of transitioning support of the DMO asset scheduling system to MBARI (currently maintained by a third-party) (Week 12)
- Strategic Ideas meeting (Week 12)
- Engr Meeting (Week 12)
- Hyperion meeting (Week 12)
- Met w/ Steve Rock, LRAUV folks re TRN, Gazebo sim (Week 12)
- Misc Admin, drop-in meetings (Week 12)

- Strategic planning meeting (Week 13)
- Misc admin (Week 13)
- Hyperion meeting (Week 15)
- directors dialog (Week 15)
- misc admin (Week 15)
- John Ryan inquired about interactive whale sound keyboard, and mentioned that Thom Maughan may have done something like this. Will find out and maybe see what I can do. (Week 16)
- Met w/ Brent Jones re cell/satellite solutions for OASIS telemetry. We're looking at a cell modem and driver that Paul Barter (Cawthron) uses with OASIS in New Zealand, along with other potential ideas. (Week 16)
- Attended proposal workshop (Week 16)
- Misc admin (Week 16)
- working with John Ryan on ocean sound demo (Week 18)
- budget, proposal process (Week 18)
- review process (Week 18)
- misc admin (Week 18)
- Hyperion update meeting (Week 20)
- Prep for budgets, proposal review (Week 20)
- Ocean Soundscape demo for DOEST with John Ryan (Week 20)
- Developed dual-monitor prototype for ocean soundscape demo with new visualizer and pin-drop feature. Splits content into a touchscreen (control,input) and larger monitor (view, output). A bit sluggish on the raspberry pi, but it proves the concept, and exposes some challenges for a turnkey system (automating two kiosk mode browser instances with IPC). (Week 22)
- Input for proposals (Week 22)
- Misc admin (Week 22)
- Soundscape demo: minor updates; have dual-screen kiosk working, but not demo ready. It's a bit sluggish on the RPi. Will use single touchscreen for DOEST. The dual screen kiosk mode renders the X11 based virtual keyboard (for debugging) unusable. figured out terminal based solution using wrldctl and ydotool to send keystrokes (i.e. for reloading pages), but a keyboard/mouse are currently needed to manage the kiosk windows - would not be suitable for a production system. (Week 23)
- DOEST prep (Week 25)
- 2027 budget (Week 25)
- misc admin (Week 25)
- DOEST ocean soundscape demo (Week 26)
- proposal review, process prep (Week 26)
- Code review for libtrnav, MB-System (Week 26)
- misc admin (Week 26)
- Proposal reading, labor spreadsheet updates (Week 27)
- misc admin (Week 27)
- proposal review (Week 28)

- ocean soundscape demo setup w/ new computer (for Jennifer Gray visit) (Week 28)
- misc admin (Week 28)
- proposal review (Week 29)
- misc admin (Week 29)