

Kent Headley Sorted By Project

300057 - Mooring Maintenance

- helping DMO (French) with metsys/vaisala issue: latest vaisala wind sensor not working with metsys. The metsys uses a campbell scientific CR10X data logger (c. 1993) to collect data from the sensors. The CR10X has a very arcane programming language: numbers that encode instructions and parameters, much like raw machine code. I took a quick look last year, and didn't have time to figure out CR10X programming. I recently found the original manual, and a trial version of a modern software tool that "disassembles" the program to describe the instructions. After looking at the code, I think that the CR10X communicates via SDI-12 bus, but the Vaisala may be configured to use RS232. Dave has ordered a cable needed to reconfigure the Vaisala; we'll test that hypothesis, and hopefully resolve the issue. (Week 4)
- Working with Dave French on OASIS metsys using new model Vaisala wind sensor. The metsys uses a Campbell Scientific data logger to interrogate the wind sensor using SDI-12 serial protocol. Recent wind sensors haven't been working with OASIS, and Dave is checking configuration options to see if that may be the root cause. (Week 6)
- Working w/ Jared and Dave F on metsys, gps debugging (Week 8)
- Jared and I are closing in on the root cause of a couple of OASIS GPS issues: a possible warm-up time violation for newer GPS models and a conflict between the gpsclock and gps drivers. Good news is that we've been able to get a new GPS working w/o software changes (but w/o gpsclock driver) (Week 10)
- Resurrected the OASIS3 tool chain and was able to build and program O3 persistors (Week 10)
- testing software fix for interference between gps and gpsClock drivers, that also addresses possible warm-up time violation for garmin 19xHVS (Week 12)
- Working with Dave French to troubleshoot issue with new Vaisala wind sensor for OASIS metsys. The metsys uses an old Campbell data logger, which has an arcane programming language that is poorly documented. (Week 12)
- Created git repo for oasis3, and plan to reach out to stakeholders about migrating to git. For now, continuing to work in CVS (Week 12)
- after bench testing GPS driver mods, tagged a release and installed on Jared's test setup. (Week 13)
- Working w/ Dave French to troubleshoot metsys wind sensor issues (Week 13)
- Testing fix for GPS, GPSClock drivers; looking good (Week 14)
- Working w/ Dave and Jared on troubleshooting metsys (Week 14)
- Working w/ James and Jared on OASIS metsys wind sensor issues. (Week 16)
- Finally found the root cause(s) of sampling issues with the new sonic wind sensor. We weren't able to get samples at 1Hz, and the instrument seems to have a longer start delay. The sampling firmware also had some brittle logic; in combination with the slow data return, it was failing to travel a critical branch. The long startup time was also causing sampling errors. (Week 17)
- found root cause of metsys issues. There were two factors causing it not to sample: first, the new wind sensor takes longer to produce a sample, breaking some brittle logic in the sampler firmware. Second, the new wind sensor has a longer power up delay, causing sampling errors. I modified the sampler firmware, and am working with Jared (Week 18)
- Figured out why gpsclock driver stopped working: a reset reverted back to a retry configuration value that doesn't work; updated the default config (Week 20)
- Worked with Karen to restore downloads on 2023M1 test system (Week 20)
- Now metsys, gps and gps clock are all working on 2023M1 (Week 20)
- Monitoring 2023M1 output from gps, gpsclock and metsys driver updates. All looking good. (Week 21)
- Wrapped up changes to metsys and gps clock (Week 22)
- Checked in updates to CVS and git (Week 22)
- Added sonic wind sensor firmware source to repo (Week 22)

- Migrated O3 build environment to windows 10 (Week 22)
- Investigated system init issue; believe that compact flash card may have some bad media. (Week 23)
- working with Jared to understand download failures for 2023M1 (now in test on the dock) (Week 24)
- Checked data and noted metsys wind errors; turns out sonic is not currently installed. (Week 28)
- Met w/ Jared re options for changing time on metsys cr10x data logger (Week 28)

300078 - DMO Divisional Support - AUV

- Updated several modules, including latest TRN simulator code (Week 9)
- Met w/ Rich and Rob to discuss workflow and potential activities (Week 9)
- Working on several proposed updates related to TRN for the dorado linux port (Week 10)
- working on auv linux port (Week 12)
- helped Rob to get simulation running to investigate pitch oscillation encountered on MidAtlantic cruise (Week 13)
- Working on Dorado linux port (Week 22)
- Fixed issues with QNX simulator Makefile (Week 30)
- working on Dorado Linux port (Week 36)
- QNX serial and USB drivers related to Iridium comms for Jan 2024 dorado tow-out missions (Week 36)
- dorado linux port (Week 40)

500055 - VARS, M3/RS, DSG

- Worked with Brian Schlining to resolve segfault encountered while integrating black magic image capture feature on VARS with MiniROV, Root cause appears to be an issue in the latest version of ImageMagick library on macOS Ventura; Wrote an independent/minimal test to confirm this (pending), but meanwhile, the previous version of the library is working. (Week 12)
- VARS users reported long processing times (12-15s) for 4k frame grabs (FG). Brian Schlining did some testing and found the issue to be somewhere in the frame grab server, which I maintain. I made some diagnostic updates and we isolated the issue to the ImageMagick library. It turns out that the PNG image format can have particularly long write times. After experimenting with some operations that affect compression and storage size, we found a good balance between size and speed, ~11MB and 750 ms. (Week 30)
- Libbmagic updates: Added support for new BlackMagic SDK, added support for GraphicsMagick builds (alternative to ImageMagick), added configuration option to set quality at run-time (Week 30)
- Attempting linux build (Week 31)
- Libbmagic linux build ready to test, pending access (Week 32)
- meet w/ Brian Schlining to test updates to BlackMagic video capture drivers (Week 36)
- Tested (w/ Brian S) and merged changes for libbmagic Linux build and SDK update (Week 37)

600034 - Precision Control Technologies for ROVs and AUVs

- Met with Steve Rock, who had put together a great compilation of Terrain Relative Nav data from Portuguese ledge. It showed consistently good TRN performance and repeatability over 75 missions. There was some interesting structure, which (if I understand correctly) may be related to noise/biases associated with location (terrain?) or direction. (Week 6)
- Helped Rob w/ some git operations (Week 20)
- Helping Rob with code merge (Week 21)
- Working with Rob to sync mbtrn sim work with dorado repo updates (Week 22)
- Helping Rob to get mbtrnpp simulation running again (Week 26)
- Working out some QNX build issues in the context of integrating multibeam filtering w/ TRN into the dorado simulator (Week 28)
- Working w/ Rob to complete integration of mb-system TRN into the Dorado AUV simulation (Week 29)
- Helping Rob with TRN integration into Dorado simulation (Week 30)
- Looking at GRD/binary octree map conversion utility (Week 31)

- Replacing debug output library with new mframe module. Used in libtrnav/MB-System (Week 31)
- Helping Rob run simulations (Week 33)
- Supported Rob in running a Dorado sim of the upcoming Axial mission with MB-System TRN processing in the loop (a goal of the project for 2023) (Week 34)
- Working with Rob to wrap up MB-System TRN in simulation loop (Week 36)
- support Rob on simulator cleanup (Week 37)
- reviewing pull request for mbtrnpp sim integration (Week 40)
- added plugin handler support (Week 40)
- working on geometry updates and hopefully new handler (Week 40)
- See seafloor mapping (Week 43)
- Processing Sponge ridge ROV TRN dataset (Week 44)
- Committed a branch of work related to TRN (terrain relative navigation) in the ROV context in the libtrnav and MB-System. Worked closely with Steve Rock and Dave Caress to use the LASS data set collected in October at Sponge Ridge to develop and demonstrate a complete TRN pipeline on Ventana. We were able to use a combination of sensors from the LASS sled and the vehicle to produce TRN output in post-processing. A long term objective is to use sensors of opportunity to efficiently locate places of interest in repeat surveys, increasing time available for science activities. Kudos to the Rachel Carson crew and Ventana pilots for their support and accommodation to collect this data set. (Week 47)
- Working to wrap up TRN dorado simulation code review submitted by Rob McEwen (Week 47)
- Completed code review (with some modifications) for TRN in simulation loop for Dorado. (Week 48)

901101 - Seafloor Mapping

- chatted with Dave a bit about the year ahead. I need to get the MB-System codebase synched up before the vehicles ship to the Mid Atlantic in late Feb (Week 4)
- Nice article on using TRN with Sentry appeared in the WHOI newsletter:
https://www.whoi.edu/?p=559452&post_type=oceanus_article&preview=1&_ppp=ec7bd175aa
Dave and Raul told the story very well. (Week 4)
- Prep for TRN May 10-12 Carson days? (Week 17)
- helped with various build issues for Rob's mapper oscillation analysis/sim (Week 18)
- Participated in last Fri Carson cruise to test TRN on ROV. Encountered several technical issues upstream, so couldn't fully exercise TRN code, but did find some bugs and got a lot of useful context for running TRN w/ LASS and other use cases. (Week 20)
- Preparing for mapping AUV test cruise 6/20 (Week 23)
- Syncing codebases (Week 23)
- Troubleshooting Win7 test setup issues (Week 23)
- preparing for Dorado TRN test day 6/20; this is a test run for Axial in Aug/Sep (Week 24)
- Test cruise on Carson: quite a few software issues: first with environment and scripting on cygwin, then segfaults in mbtrnpp. High winds brought us back early. (Week 25)
- Currently working to trace source of segfaults, made more difficult by the facilities provided by Cygwin, and also that we likely won't be able to reproduce conditions in the test tank (since it's a sonar thing). (Week 25)
- Did reproduce a segfault by replaying yesterday's mission data, but not certain yet it's the root cause (Week 25)
- Located and fixed issue that generated segfaults at sea last week. A frame limit was using a value that was too small, leading to partial frame reads. Subsequent reads from the frame buffer were incorrectly interpreted, resulting in invalid memory access. (Week 26)
- Prepped for alternate test day this Thu to complete last week's objectives (Week 26)
- Updates to debug output library (development for post-axial cruise); simpler, more intuitive API, thread-safe (Week 29)
- Helping Rob with dorado sim MB-System setup (Week 30)
- Call w/ Dave C and Christian Ferriera at MARUM (Week 30)
- Prep for Axial (Week 30)

- Wrote up some notes on building MB-System under Cygwin (Week 30)
- Prepping TRN on mapping vehicle sonars (Week 32)
- Prepped sonars with TRN software for Pacific NW cruise (Week 33)
- Standby support for ongoing Pacific NW cruise. They've had rough weather and some HW issues to work through, but they've managed to deploy a couple of times on the Cascadia leg. They've been running another quick survey Wed/Thu, and will pick up Erik Thu for the Axial leg, conditions permitting. (Week 34)
- Submitted an MB-System docker image based on Alpine linux. Danelle Cline recommended Alpine for reducing image size, and it did make a pretty compact version (~30% reduction). Found a build issue that affects a couple of linux variants: CFLAGS -m<bits> is not set correctly on some platforms (Alpine linux, Jetson Nano), breaking the build. It is set using "gmt-config --bits", which returns an empty value in some contexts. The empty value results in an invalid flag (-m) to be passed to the compiler/linker. Also, it is being added to LDFLAGS, when it is a compiler flag (CFLAGS). Resolution TBD. (Week 34)
- Troubleshooting run-time errors in MB-System Docker images (Week 36)
- planning for October cruise (ROV TRN using LASS) (Week 37)
- Refactoring stream handlers for ROV TRN utility; tried out an implementation using dynamic shared libraries, but decided to use a simpler approach instead. It made the code more modular without making configuration more complicated, and required less code. (Week 38)
- Figuring out instrument configuration for october dive and working on test plan (Week 38)
- testing multibeam pipeline for cruise next week (Week 40)
- Carson LASS cruise at Sponge Ridge 10/10-12: (Week 42)
- Collected data set for testing TRN using a combination of Ventana and LASS LCM inputs and 5cm scale map (Week 42)
- The data flow through the pipeline worked, but the geometry corrections were not all in place. (Week 42)
- Have been working post-cruise to refine and test LCM TRN preprocessing. Geometry corrections seem to work, though TRN performance still not great. (Week 42)
- Continuing to investigate with Steve and Dave (Week 42)
- Working with Steve and Dave on analyzing and validating terrain relative nav (TRN) results from the Sponge Ridge cruise last week (Week 43)

901618 - Pelagic-Benthic Coupling

901704.99 - Benthic Observing System Maintenance

902204 - Scalable Robotics

- attended kickoff meeting (Week 2)
- kickoff meeting (Week 3)
- meeting, planning (Week 4)
- Implemented gemini sonar GLF log reader/image capture (Week 6)
- Met with GT and Bastian re sonar LCM messages (Week 6)
- Working on (Week 6)
- Implementation, testing of LCM image publisher for Gemini sonar (Week 8)
- Met with team re message design (Week 8)
- Working on LCM message type definitions w/ team (Week 9)
- Testing Gemini sonar driver (Week 9)
- Fixed a bug in gemini lstream configuration app (Week 10)
- Worked with Bastian to resolve a dependency conflict between the Gemini SDK and FFMPEG package. The issue was that a mutual dependency, libavcodecs, was not API compatible. Wrote a script to install the Gemini SDK to an alternative path, and use ldconfig to adjust the runtime linker search path. Thanks to Brent Roman for the consultation. (Week 10)
- Working with Bastian to test Gemini driver features (Week 12)

- Wrote wrapper script to address issues with broken batch processing in Gemini Svs5 API (Week 12)
- a few minor fixes/features for Gemini driver as Bastian continues testing (Week 13)
- Worked with DJ to get new Gemini sonar software installed on the Carson; there may be a window of opportunity to collect some Gemini data during Ventana dives this week. (Week 13)
- DMO made a super effort last week during heavy weather to run the Gemini sonar and and collect some data for Compas Lab. kudos to DJ and Knute. (Week 14)
- Updated Blueprint Subsea SDK (imaging sonar) demo to build under Linux and wrote quick emulator for sonar network connections needed to exercise GUI features. (Week 16)
- Reviewed a couple existing drivers for oculus sonar; one written in GT's lab, another from APL, written by Aaron Marburg, Laura Lindzey and Tanner Poling - small world. (Week 16)
- Sprint 7 planning meeting (Week 17)
- Prep for Sonar driver testing May 10-12 Carson days (Week 17)
- Get sonar data kindly collected by DJ / the Ventana crew (Week 17)
- Worked with Bastian to debug an issue with the Oculus sonar driver, which was skipping/repeating frames. It turned out to be an issue with indexing a ring buffer. Now testing a fix. (Week 18)
- Participated in last Wed Carson cruise to test gemini sonar driver image capture and LCM publishing. That was successful, and determined that hard disk speed is a potential bottleneck at the data rates we were using (Week 20)
- Working with Bastian to review some cruise data and a potential issue (image resolution differences between logged and captured images) (Week 21)
- Working on some libgemini data issues with Bastian (Week 22)
- Met w/ Bastian, whose last day at MBARI was Wed (Week 23)
- Investigating gemini sonar image issues w/ Bastian: images change dimension in different range regimes. Trittech indicates it's range compression. This may interfere w/ the ability to use the images in the way Bastian intended. (Week 23)
- Working with Sebastian to develop a tool for using multibeam sonar for SLAM. Adopted an MB1 translation tool to generate LCM output; later, we'll recast MB1 data to another format (TBD) (Week 26)
- Helped a little to look at Gemini sonar settings (Week 26)
- Updated metadata features and fixed timestamp bug in app for converting multibeam data into LCM stream/log for SLAM. Generated some data sets for Sebastian to share with GIM (Finnish SLAM contractor/collaborator). Help Sebastian set up his processing pipeline as needed. (Week 28)
- Added socket input to mb12x, enabling real-time streaming of sonar data via mb-system to LCM for SLAM. Refactored mb12x, decomposing some functions for better modularity. (Week 29)
- Put together a complete pipeline example for converting sonar data to LCM logs and/or live stream for SLAM. Also wrote some documentation for the example, and put together a makefile for generating an example distribution, and delivered it to Sebastian. (Week 30)
- Fixed bug in mb12x: file list arguments counted twice (Week 31)
- Investigating apparent network buffer errors (Week 31)
- Docker images for multibeam SLAM pipeline (Week 33)
- Generated a compact docker image for the multibeam processing (see notes, seafloor mapping) (Week 34)
- planning for October cruise (sonar data for SLAM, imaging sonar) (Week 37)
- Installed mb1stream on atuncita, built docker image (Week 38)
- Tested X windows forwarding and fixed a couple of issues for linux build, and a GMT error that affected both linux and macOS (Week 38)
- testing multibeam pipeline for cruise next week (Week 40)
- Carson LASS cruise at Sponge Ridge 10/10-12: (Week 42)
- Collected Gemini sonar data (Week 42)
- Though available time was too brief to collect a good data set, prepared a computer with libgemini and did get to see it run. Planning a tank test to compare libgemini (Week 42)
- Preparing for tank test this week; will be collecting a data set for Bastian to compare the Trittech Genesis data logs with the libgemini lstream application (built on the Trittech SDK). (Week 43)
- Set up a windows laptop with Genesis software (Week 43)

- Set up libgeminini on atuncita (Week 43)
- debugging new range and gain controls on the libgeminini driver/app (Week 44)
- debugging new logger feature (Week 44)
- won't be deployed on sponge ridge cruise 11/B, since test and debug requires tank test (Week 44)
- Committed some changes to address issues with the Gemini Sonar GUI. Specifically, range and gain values were not propagating correctly, and the window would resize unexpectedly. These tests are pending testing (requires tank test). (Week 47)
- Added features : GUI overlays to display a border around the sonar image and image timestamp; add grid and range text display in cartesian mode. (Week 47)
- coding/testing timestamp updates (Week 50)
- working w/ Tritech re possible logger bug (Week 51)

902302 - DEI

- attended Lori Mackenzie Inclusive workplace seminar (Week 25)
- completed Raben survey (Week 37)

Out of Office

- Weather related issues 1/8 ~ 1/16 (late/WFH/out)
- medical (1/25 afternoon)
- medical (3/10 a.m.)
- vacation (4/28 - 5/1)
- 6/20 Rachel Carson
- 6/29 Rachel Carson
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- Nov 23-24
- Dec 22-Jan 2

Overhead

- Review prep (Week 1)
- Hiring activities (SEE, AOSE) (Week 1)
- Misc admin (Week 1)
- Hiring meetings (Week 2)
- Annual Review Prep (Week 2)
- Open Robotics catchup : acquired by Intrinsic (Alphabet/Google) (Week 2)
- review prep, meetings (Week 3)
- hiring committee (Week 3)
- annual reviews (3), feedback (Week 4)
- hiring: app review, reformat app review input, scheduling screening (Week 4)
- SRSC meeting (2nd half) (Week 4)
- Hiring: Application review, screenings, interviews (Week 6)
- Resource adjustments (Week 6)
- Meetings (Week 6)
- Annual Reviews (Week 6)
- Covid communications (Week 6)
- Hiring: interview w/ Rowan Border (Week 8)
- Supervisor's meeting (Week 8)
- RRE interview (Week 9)
- SE-DA screening session, application review (Week 9)
- Travel requests (Week 9)
- Misc admin (Week 9)

- Hiring: feedback for RRE role, scheduling meeting for SE-DA to discuss status and reviewing applications (Week 10)
- Misc admin (Week 10)
- hiring - working on getting a committee together, scheduling a few more screenings, (Week 12)
- Screening calls (4), working on interview panel (Week 13)
- Misc admin (Week 13)
- hiring (Week 14)
- misc admin (Week 14)
- SE-EAD interviews - kudos to Cindy for handling logistics, and to a great interview panel for participating. (Week 16)
- Misc admin (Week 16)
- Hiring (Week 17)
- General support (Week 17)
- Misc admin (Week 17)
- Interview SE candidate (Week 18)
- SE-EAD interviews this week and next (Week 20)
- AOSE phone screening and application review (Week 20)
- Misc admin (Week 20)
- Hiring: completed first set of interviews, now working on deliberation (Week 21)
- Attended abstract presentations (Week 21)
- Misc admin (Week 21)
- Hiring: Held meeting to discuss candidates; (Week 22)
- did not have quorum due to travel and other absences, working off line (Week 22)
- Working w/ Erik, Alana on AOSE hire (Week 22)
- Hiring: recommendation pending (Week 23)
- 2024 budget, resources, proposals (Week 24)
- hiring: AOSE reference check call, SE-EAD (Week 24)
- misc admin (Week 24)
- hiring (Week 25)
- proposals (Week 25)
- misc admin (Week 25)
- Proposals (Week 26)
- Hiring (Week 26)
- Budget (Week 26)
- Proposal process: prep, pre-review, labor spreadsheet (Week 28)
- Hiring - candidate negotiation (Week 28)
- Proposals, labor spreadsheet prep, meetings (Week 29)
- Hiring: meeting with committee on next steps (Week 29)
- Meeting w CEO search committee, AOSE search input (Week 29)
- Hiring : preparing offer for SE-EAD, scheduling AOSE interview (Week 30)
- Proposal review (Week 30)
- Proposal review (Week 31)
- Hiring (SE-EAD, AOSE) (Week 31)
- OASIS support for Cawthron (Week 31)
- AOSE hire: screening (Peter Marsh), interview (Ethan Park) (Week 32)
- SE-EAD hire: planning (Week 32)
- Misc admin (Week 32)
- (Week 33)
- Hiring: reviewing applications, met w/ Norm re ad updates, AOSE, EE (Week 34)
- Cawthron visit 9/11 week (Week 34)
- Proposal feedback review (Week 34)
- AOSE, EE-MiniROV interviews (Week 36)

- SE-EAD application review (Week 36)
- Phase 2 resource balancing meetings (Week 36)
- Cawthron visit 9/11 week (Week 36)
- hosted Cawthron visitors (Paul Barter, Chris Cornelisen, Shaun Graham) (Week 37)
- updating SE-EAD job description and writing screening questions (Week 37)
- AOSE interview (Week 37)
- Resource balancing (last week) (Week 37)
- Castroville cleanout (check for CIMT parts) (Week 37)
- Engineering meeting (Week 37)
- Hiring (Week 38)
 - Sent job description and screening questions to HR (Week 38)
 - Met w/ Andy re requirements (Week 38)
 - met w/ Norm re questions (Week 38)
- Questions re Irauv software licensing (Week 38)
- Trying out tmux (terminal mux util) (Week 38)
- SE-EAD job reposted, reviewing applications (Week 40)
- misc admin (Week 40)
- Reviewing SE-EAD applications, preparing screening questions (Week 43)
- Hiring: application review (Week 47)
- Hiring: application review, scheduling zoom screenings (Week 48)
- Hiring: application review, screening calls. (Week 49)
- Misc admin (Week 49)
- Helping with some Matlab debugging (Week 49)
- SE-EAD : 2 applicant screenings (Week 50)
- misc admin (Week 50)
- review prep (Week 50)
- hiring (Week 51)
- misc admin (Week 51)