

901101 - Ocean Imaging

Week 51

1. Eric Martin
 - a. Purchasing spare and parts repair.

Week 50

1. Mike Risi
 - a. Working on prototype user interface for, "The Rack"

Week 49

1. Eric Martin
 - a. Finalizing drawings and fielding quotes
2. Tom O'Reilly
 - a. Continuing tests of improved cross-platform installation and build of MB-System software, using 'cmake', which is easier to refine and maintain than the more antiquated "autoconfig" system currently used by MB-System. This is important, as MB-System is used on diverse operating systems by many users; we have to make the software easy to distribute and install

Week 48

1. Eric Martin
 - a. Cable and parts manifest,
 - b. building quotes and drawings updates

Week 47

1. Eric Martin
 - a. Ordering cables and hydraulic equipment, as well as focal spares.

Week 46

1. Eric Martin
 - a. End of year purchases underway
2. Rob McEwen
 - a. Completed kinematic computation and plots for Andy's radar data.

Week 45

1. Rob McEwen
 - a. Did some analysis for the 28 Sept Paragon radar test. Specifically, computed the translational velocity of the radar mount from a non-colocated Ahrs.

Week 44

1. Eric Martin
 - a. Converting drawings from Altium to Orcad.
 - b. Soliciting quotes for replacement cables.

- c. Discussing internship and Compas Lab future efforts post-cruise.
2. Rob McEwen
 - a. Vetting nav440 data from September's radar test on the Paragon.
 - b. Investigating converting Dave's boulder data from last week into an octree map. Will then verify Imagenex simulation using this map.
3. Mike Risi
 - a. Participated in cruise to survey Sur Ridge, clam fields, and test sled and software improvements.

Week 43

1. Eric Martin
 - a. Last week's expedition was very successful, we collected surveys on all full days of areas including Sur Ridge, the 2850 CCE Clam Bed Site using the low altitude sled. This cruise was the first use of telepresence for remote engineering as well, as we leveraged help with new camera control drivers from our collaborators Giancarlo Troni and Jose Eyzaguirre in Santiago, Chile.

Week 42

1. Andy Hamilton
 - a. Did some small cruise support
2. Tom O'Reilly
 - a. Helping Caress prepare code release of latest MB-System GUI prototype. Like the rest of MB-System the system must be easily built and installed on a variety of operating systems, including Linux and MacOS
3. Carlos Rueda
 - a. Replied to Dave's email regarding questions about automated builds at Docker Hub.

Week 41

1. Eric Martin
 - a. Mobilizing for the 10/12-10/17 expedition
 - b. Working with collaborators on new camera driver
2. Mike Risi
 - a. Moved way-point processor to standalone process to help with user access.
 - b. Got Kearfott watchdog working for cruise.

Week 40

1. Kent Headley
 - a. Minor post-cruise code maintenance
2. Eric Martin
 - a. Preparing for the Western Flyer cruise October 12-17.
 - b. Working with Giancarlo Troni and Jose Antonio Eyzaguirre Dominguez from Pontificia Universidad Católica de Chile to implement new camera drivers
 - c. Working with Domenic at 3DatDepth to adjust issues found during tank testing of the lidar.
 - d. Preparing telepresence needs for the cruise
 - e. Purchasing Spare linden cables.
3. Mike Risi
 - a. Misc. prep for upcoming cruise
 - b. Way-point processing completed, testing on scripts from previous expeditions

Week 39

1. Kent Headley
 - a. Finished Axial cruise with some exciting results. In addition to getting good science map coverage overall, Sentry was able to steer away from its holding-pattern trackline, then close the loop using Terrain Relative Navigation to bring it back onto the trackline using the TRN offsets.
 - b. Working on post-cruise software maintenance
2. Mike Risi
 - a. Added position loop around track-line velocity loop to allow for position based move commands.
 - b. Testing way-point concept with new track-line move commands

Week 38

1. Eric Martin
 - a. Added lidar system to frame
 - b. Getting TWA for tank work
 - c. Lining up for tank tests next week
2. Mike Risi
 - a. Working on way-point and scripting changes for Ocean Imaging control systems

Week 37

1. Kent Headley
 - a. Been helping with TRN at Axial. We had two Sentry dives before some vehicle issues and weather delayed ops Sun-Tue. Meanwhile, Dave did a lot of testing and analysis of the recent TRN data, and has come up with some modifications that look promising. The changes mostly consist of adjusting parameters that decide when to reset the TRN algorithm.
 - b. It's likely we'll have another Sentry dive Wed, and we'll be able to test the new settings.
 - c. I'm working with Rich, Rob and Steve to implement another change that enables us to specify the TRN algorithm search space during a reset, a complement to a change Dave already implemented to specify the center of the search space. I've also been adding/adjusting metrics and plotting code that generate performance plots.
 - d. Interesting weather note: the folks on the ship reported haze/smoke smell from all the fires
2. Eric Martin
 - a. Installing lidar system this week, aiming for tank testing soon.

Week 36

1. Kent Headley
 - a. Providing remote software support for Axial Sentry cruise with Dave and Hans.
 - b. The ship is transiting and will arrive on site this afternoon
 - c. We've been busy with software updates and configuration/network checks
 - d. First Sentry dive Wed 0600-1800, an engineering dive, will collect some TRN data if all goes to plan, though TRN would not be connected to the Sentry control system
2. Mike Risi
 - a. Working on way-point and scripting changes for Ocean Imaging control systems

Week 35

1. Kent Headley
 - a. Due to the fires interfering with quarantine, Dave will be unable to participate in the UNOLS Axial cruise. There is still a chance that we will be able to participate remotely, at least enough to run TRN on Sentry and collect some performance data. Even if it isn't possible to interface with the Sentry control

system. Hans and Dave have prepared Sentry data-pod hardware/drives that ship this week to meet the WHOI team in Oregon. I have been finishing TRN client code for Sentry, updating and documenting configuration/operation procedures, and doing code review on MB-System code updates that Dave has been working on (renaming variables, file process error handling, new TRN reinit triggers).

2. Eric Martin
 - a. Lidar Returned
 - b. Second strobe back from new bulkhead installed
 - c. Next steps are to build the sled up for a full tank calibration in the next two weeks.
3. Mike Risi
 - a. Starting way-point and scripting changes to Ocean Imaging control systems for the October 12th cruise

Week 34

1. Kent Headley
 - a. Wrote some cmake relocatable packaging code to help with Sentry TRN integration
 - b. CMake has a bit of a learning curve, but it's OK to use; less arcane than Autotools and gnu make. Don't know how it scales to large projects and across platforms, but for the small projects I'm working on, it's quick to get up and running. The packaging stuff took a couple of days to make work; there is lots of doc, but concrete examples and best practices/patterns are hard to find.

Week 33

1. Kent Headley
 - a. Tested release of a Terrain Relative Nav (TRN) client component that we hope to integrate onto Sentry for the upcoming Axial volcano mapping expedition. The TRN client enables the Sentry control system to receive real-time updates from MB-System with an embedded MBARI/Stanford TRN engine instance. MB-System provides filtered multibeam bathymetry and navigation. The TRN engine uses the filtered data to locate the vehicle on map. An estimate of location in the form of an offset is provided that may be used by a control system to direct the vehicle.
 - b. WHOI is working to integrate the TRN client with their control system using ROS. It's not 100% certain it'll happen on this cruise, but the plan is to run with a mission with TRN enabled, which may optionally be used to close the control system navigation loop.
 - c. The scientific context is that MBARI and WHOI are performing annual surveys of the Axial volcano to make high resolution maps of changes to this (large) geologically active region. TRN and MB-System enable the surveys to be conducted without installing navigation infrastructure. Recent TRN research by Steve Rock's PhD students is focused on algorithms for dealing with terrain that has changed since the map was made.
2. Tom O'Reilly
 - a. Released latest bathymetry grid viewer prototype to MB-System team for their feedback. We've been evaluating several software approaches to interactive viewing and editing of 3D bathymetry data, with criteria including flexible visualization, efficiency, programming effort required, maintainability and portability to different OS's. This latest C++ prototype utilizes 'Qt' and 'Visualization Toolkit' libraries - both built on OpenGL - and in my opinion best meets our criteria.

Week 31

1. Eric Martin
 - a. Intern advisement.
2. Tom O'Reilly
 - a. Released MB grid viewer prototype which combines tools from the Visualization Toolkit (VTK) for 3D surface rendering with Qt, which enables rapid user interface development. This looks to be the best approach so far to upgrading MB-System

Week 30

1. Tom O'Reilly
 - a. Evaluating integration of Visualization Toolkit (VTK) to visualize bathymetric surfaces, with Qt/QML toolkit to quickly design and generate user interfaces (menus, buttons, etc), portable to a wide variety of platforms including mobile.

Week 29

1. Kent Headley
 - a. Working on new features and integration package for TRN on Sentry
2. Eric Martin
 - a. Tank prep

Week 28

1. Eric Martin
 - a. Brought sled to test tank, rebuilding it for testing in the tank.
2. Tom O'Reilly
 - a. Held preliminary design review for "MB-System+" improvements. Compared various approaches to upgrading interactive MB-System GUI apps, which allow users to view, analyze, and edit bathymetry datasets. Discussed next steps, schedule, etc.

Week 26

1. Eric Martin
 - a. Working with intern
 - b. Strobes have been modified, waiting for bulkhead replacements
2. Tom O'Reilly
 - a. Refining MB-System+ bathymetry grid viewer prototype
 - b. Preparing preliminary design review for MB-System+ upgrade; PDR will be held on Friday 6/26 at 9:00 PDT

Week 25

1. Eric Martin
 - a. Our intern, Jose, has been doing fantastic work to improve the speed and reliability of stereo calibration procedures. I am working on getting components for a tank calibration.
 - b. This means we need a new optical target, as the old one has warped.
2. Carlos Rueda
 - a. Some [edits](#) for clarification in the docker user instructions. (Thanks Giancarlo for the feedback.)

Week 24

1. Eric Martin
 - a. Submitted servo coil drive board to e-tech for build
 - b. Strobes are in for refit
 - c. Intern meetings this week
2. Tom O'Reilly
 - a. Preparing for MB-System+ design review

Week 23

1. Eric Martin

- a. Phone call tuesday
 - b. Coordinating Strobe upgrades
2. Tom O'Reilly
 - a. Preparing for software design review, which will present options for MB-System GUI upgrades

Week 22

1. Eric Martin
 - a. Documentation organization
2. Carlos Rueda
 - a. Rebuilt/published docker image 5.7.6beta37 upon the proper release notification, and updated and tested the instance on mbscentos7. Also updated the general status at [github](#).
 - b. Thanks Dave for the testing and finding a nice solution for the OpenGL issues on Mac. Also for the email indicating the image is "a fully viable way to process data locally with MB-System."

Week 21

1. Eric Martin
 - a. Internship check in call.
 - b. Falkor time has been scheduled, Dave has reached out and we're compiling integration information for the ROV team there.
2. Tom O'Reilly
 - a. Refining MB grid viewer prototypes, planning software design review
3. Carlos Rueda
 - a. Dave's starting to do some tests related with the dockerized MB-System.

Week 20

1. Tom O'Reilly
 - a. Working with Caress to evaluate and compare approaches to display bathymetric data. Goals are to update MB-System and simplify its development, distribution and maintenance

Week 19

1. Kent Headley
 - a. Testing mbtrnpp (MB system TRN app) configuration file implementation, code review
2. Tom O'Reilly
 - a. Refining Qt-based prototypes to view bathymetry grids

Week 18

1. Eric Martin
 - a. Strobe upgrades meeting
 - b. Internship update meeting
 - c. Collaborator update with Giancarlo
2. Carlos Rueda
 - a. MB-System dockerization is pretty advanced now, with good testing not only on MacOS but also on a Centos7 vm, including an exercise during a Slack session with Dave, where we ran a GUI program and verified read/write access to a Titan share. Updated the [user-oriented instructions](#) and improved the [launcher script](#) so it's easier to use. Looking forward to [some more testing by more users](#), hopefully including on an Ubuntu host as well.
Thanks Pat for assistance with VMs and Brian S. for the quick feedback.
(BTW, attention on the Windows 10 target has been postponed, in part because it's of lower priority and

also because of difficulties that prevented us -including IS- from setting up Docker Desktop on a vm for that purpose. A proper Windows computer could be considered later.)

Week 17

1. Tom O'Reilly
 - a. Provided prototype MB-System grid-viewer app to prototype to Dave Caress - prototype is based on Qt/QML, a more modern and better supported graphics platform than used by current MB-System
 - b. Working with Dave Caress to modify MB-System install procedures, with support for Qt/QML.
2. Carlos Rueda
 - a. Advancing MB-system dockerization. Doing GUI testing on both linux and macos, and soon on windows 10 (thanks Pat for the VM). Putting together a general [doc](#) with links and some notes.

Week 16

1. Kent Headley
 - a. Syncing trndev branch with updates from master
 - b. Addressing (cosmetic/style) issues in TRN code
2. Eric Martin
 - a. Scoping strobe guard modifications
3. Tom O'Reilly
 - a. Developing prototype GUI for bathymetry grid viewer, working with Caress to distribute for team evaluation/feedback
4. Carlos Rueda
 - a. Resuming some work on MB-system dockerization (syncing with upstream, checking other docker related activities there).

Week 14

1. Eric Martin
 - a. Looking at getting cables for Axial cruises in the fall, so far all the vendors are still open and running.
2. Tom O'Reilly
 - a. Refining MB-System bathymetry viewer prototype, this new version based on C++ and Qt/QML toolkit, which is a more modern and maintainable platform than X11/Motif which nearing end-of-life
3. Carlos Rueda
 - a. Looking into resuming work on dockerizing MB-System.

Week 13

1. Kent Headley
 - a. Working w/ Dave on Terrain-relative nav (TRN) merge
2. Tom O'Reilly
 - a. Refining "Son of MB-System" map viewer application
3. Ben Raanan
 - a. Completed opencv upgrade to the mosystem photomosaic app. Started work on stereocalibration scripts.

Week 12

1. Tom O'Reilly
 - a. Assessing how current C-code could be modified to C++ in preparation for "Son of MB-System"
2. Ben Raanan
 - a. Updating mosystem photomosaic app to OpenCV 4.2 and integrating with MB-System build

Week 11

1. Tom O'Reilly
 - a. Assessing object-oriented design approach for new MB-System, testing installation procedures
2. Ben Raanan
 - a. Started work on OpenCV upgrade for MB-System photomosaic app.

Week 10

1. Rich Henthorn
 - a. OI-Sim
2. Eric Martin
 - a. Following up on the cruise, we have installed the critical components to ride along on the Barry cruise and see if we've resolved the issues we saw at sea.
 - b. Reviewing intern applications

Week 9

1. Eric Martin
 - a. Efforts at sea last week have proven the light bar concept can produce great improvement in image quality. However difficulties with collecting data at depths greater than 1500 meters will need further investigation.

b.

2. Mike Risi
 - a. Tested software changes and new strobe rotators at sea

Week 8

1. Eric Martin
 - a. At sea this week. Testing new strobe arrangement.
2. Ben Raanan
 - a. Met with Dave and Tom for kick off.

Week 7

1. Eric Martin
 - a. Integrating new rotators and strobes onto the platform, loading on the Flyer for a cruise starting next Wednesday.
2. Mike Risi
 - a. Met with Dave to go over anticipated patch tests for next weeks cruise. Testing patterns against simulator.
 - b. Tested new strobe rotators with Moxa RS-485 interface. Modified the ROS positioner class slightly to take advantage of new ramping velocity commands in current model of rotator. Rotators are now mounted on the sled and ready to go.
 - c. Misc. help with Ocean Imaging MOB.

Week 6

1. Eric Martin
 - a. Working on new strobe position evaluation
 - b. getting spare boards built up
2. Mike Risi
 - a. Testing first cut of automated surveys for February cruise series

Week 5

1. Eric Martin
 - a. Working on refining the strobe lighting model, the first pass gave us light spacing locations and the next will hopefully help dictate final pattern.
 - b. Working with Hans regarding power distribution for the new strobes and conversion to fiber telemetry.
2. Mike Risi
 - a. Finished LCM interface for (<https://www.rosys.com/>) light tilter
 - b. Added control loop to light tilter interface so lights track sled angle. Tested code on deployment computer
 - c. Working on survey automation