

902101 - LRAUV Technology Development and Fleet Operations

Week 50

1. Brian Kieft
 - a. Dropped a fresh MF modem off with sub Elecia for further development on the Benthos driver.
 - b. Need to work with her/Benthos to see if we can implement a datagram response to a range request.
2. Carlos Rueda
 - a. Some exchanges with Mike G and Brian re unserialization of individual .lzma files.

Week 49

1. Brian Kieft
 - a. Prepping for wet wifi testing alongside waveglider for this weekend.

Week 48

1. Carlos Rueda
 - a. Dash system is now [4.23.0](#), mainly with configurability adjustments in preparation to incorporate Steve's status widgets for WHOI. Previous recent versions, 4.22.8 and 4.22.7/6, with more detailed cell connection information, now including last time the vehicle itself has connected via the DataLink endpoint; improved handling of reported git reference from the vehicle.

Week 46

1. Brian Kieft
 - a. Handed off an MF DAT to Elecia for MMP mode integration. Progress is looking good with basic binary command/response flowing.
 - b. There may be a minor budget overage on the MMP integration task. Working on scoping. I'm inclined to spend a little more and implement the full headers at this point. Will seek \$\$
 - c. Working with Tanner on integrating the new lights component.
2. Carlos Rueda
 - a. Dash is now [4.22.5](#).

Week 45

1. Carlos Rueda
 - a. Dash system is now [4.22.4](#).

Week 42

1. Rich Henthorn
 - a. TRN prep for pontus deployment
2. Brent Jones
 - a. Making high level diagram of BioAcoustics data flow. Diagnosing errors from Great Lakes deployment
3. Brian Kieft
 - a. Fixing bug with ESPComponent and writing data after critical failure
 - b. TRN ingest work
4. Carlos Rueda
 - a. Dash: Enabled "ayeris_particle_*" variables for the science plots as requested by Paul R.

Week 41

1. Jon Erickson
 - a. Rev'ing the battery chassis parts yet again. Rev. D and Rev. G.
2. Brian Kieft
 - a. Working on bioacc tasks and system diagram
 - b. Arm actuator integration with new smaller controller.

Week 39

1. Jon Erickson
 - a. In the process of Rev'ing the battery bulkheads. Shipping damage is tearing them apart.
2. Carlos Rueda
 - a. Applied a workaround in Pontus prior to its (just finished) deployment given that it was to use an old version of the LRAUV software (git tag 2002-06-07), that is, not reflecting the new passwords recently put in place across the whole fleet. This also exposed a long-standing (~10year) bug in TethysDash, which I have already fixed.
 - b. Dash system [4.21.0](#).

Week 37

1. Denis Klimov
 - a. Removing LRAUV project related parts from building G.
2. Carlos Rueda
 - a. New passwords for all LRAUVs now in place.
 - b. Dash system maintenance release (4.12.7).

Week 35

1. Carlos Rueda
 - a. Dash is now 4.12.6, with internal changes/cleanup and MXM related adjustments.

Week 34

1. Brian Kieft
 - a. Updated CPLD programming repo and tested on test mobo
 - b. Diagnosed clock issue on spare mobo

Week 33

1. Brian Kieft
 - a. Trying to fix CPLD issue on spare mobo
 - b. Passed along repo info and gave permissions to Elicia for DAT development.
 - c. Grabbing raw AHRS data for Giancarlo
2. Carlos Rueda
 - a. TethysDash backend and frontend: merging branches upon good testing of some significant adjustments over the last several days during real LRAUV operations.

Week 32

1. Carlos Rueda
 - a. TethysDash: Refactored/expanded logic to recognize waypoints in mission scripts, with immediate need for the "Smear" mission being exercised in the Great Lakes, but with flexibility to add more cases.

Week 30

1. Carlos Rueda
 - a. [New repo to create mbari/lrauv-unserialize](#), a docker image only containing the LRAUV 'unserialize' executable, which is the only piece from the LRAUV needed by TethysDash.
 - b. Dash system is now [4.12.0](#), with docker image now using such mbari/lrauv-unserialize base.
 - c. Many thanks to Tim Player for bringing up to our attention the need to improve the creation of docker images given the close nature of the source code behind lrauv-application. I already merged adjustments he has made as part of this purpose in [mbari/lrauv-docker](#). (Note that [the corresponding repo](#) at DockerHub has always been private.) I also removed *all* previous versions of such image at DockerHub. There's still a pending discussion to make a decision about how to handle the runtime access to some required information, including lrauv-config and lrauv-mission. One option is via volume mappings to such spaces, which would have to be provided by the user.

Week 29

1. Jon Erickson
 - a. New materials for the nose shells from Carbon Scope Tubes.

Week 28

1. Rich Henthorn
 - a. Met with Ben Raanan a couple times regarding the LRAUV Ignition simulation
2. Brent Jones
 - a. 2x deployment, flying, troubleshooting, and recovery of LRAUV Triton
 - b. Processing AOS data from Triton
 - c. Learning backseat computer in anticipation of B Raanan leaving
3. Brian Kieft
 - a. Launched Brizo/Tethys for testing Tim's hotbunking missions.
 - b. Launched Triton for bioacoustics testing.

Week 25

1. Brian Kieft
 - a. Deployed Tethys yesterday and recovered today following docking tests.
2. Carlos Rueda
 - a. Dash system is now 4.11.1, with fixes related to the display of waypoints for TethysL missions.
 - b. LRAUV: investigation of issue with failed submission of TethysL missions (noted by WHOI a few days ago and again by us during Tethys deployment. This looked like a tricky regression but then we diagnosed the problem (a "little" aspect I overlooked) and I just submitted a PR with a fix. (Thanks Brian!)
 - c. Toward future modernization of the TethysDash backend, continued with code cleanup (still lots more that can be done). See also the Quarkus bullet below.
 - d. Some hassle trying to use a newer GraalVM version for new TethysL binary releases. Linux and macOS are now in [good shape](#) again, but the Windows one is again turning problematic.

Week 23

1. Carlos Rueda
 - a. Created API key and explored <https://www.marinetraffic.com/> API to possibly include a layer of vessel positions on the map.
 - b. Some exploration trying to include a "Chlorophyll-a, NOAA VIIRS" layer on the map.
 - c. Fixed a bug in TethysDash backend, now [4.8.88](#).

- d. Preparing docker release

Week 22

1. Carlos Rueda
 - a. Dash is now [4.10.7](#) (several releases during the last couple weeks as the system is exercised during active deployments in MB and SB). In summary, main enhancements include a few that are exposed on the Map tab, as well as in the underlying asynchronous message handling.



- b. TethysL: Put together one other C++ based prototype toward direct translation of TethysL to XML as a possible mechanism in the future: <https://bitbucket.org/mbari/tl2xml/>.

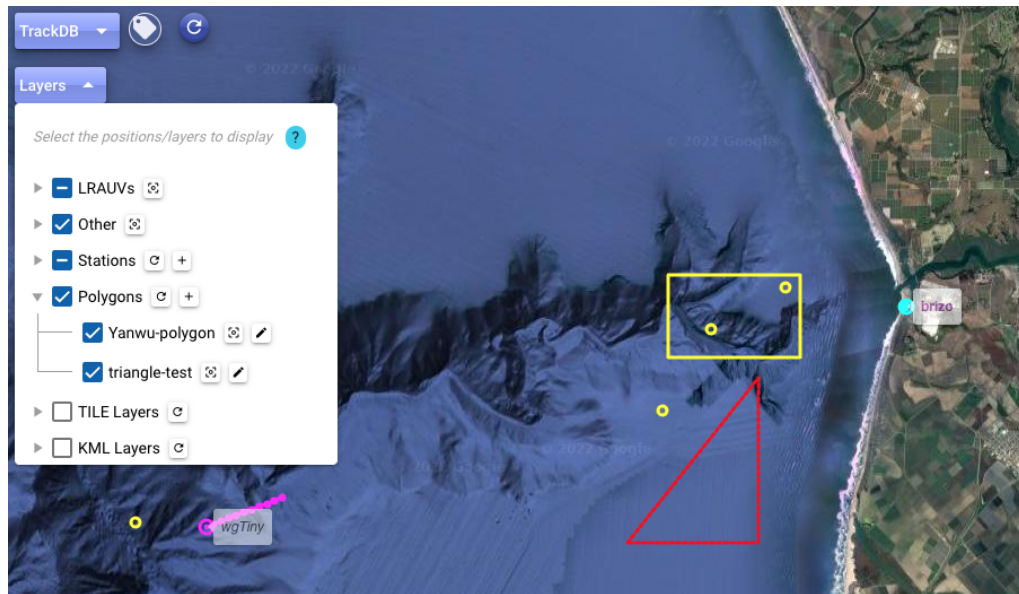
Week 20

1. Ben Raanan
 - a. Supporting EcoHAB deployment in Santa Barbara
 - b. LRAUV video clip
 - c. Resolved network configuration issue on LRAUV backseat computers

Week 19

1. Rich Henthorn
 - a. Co-Navigation project
2. Ben Raanan
 - a. Prep for EcoHAB
3. Carlos Rueda
 - a. Dash system is now [4.10.1](#) with enhancements related with the definition of *stations*, and a new similar handling for *polygons*, all of these (persisted in the backend) editable by operators using the DashUI

and with GeoJSON format.



Week 18

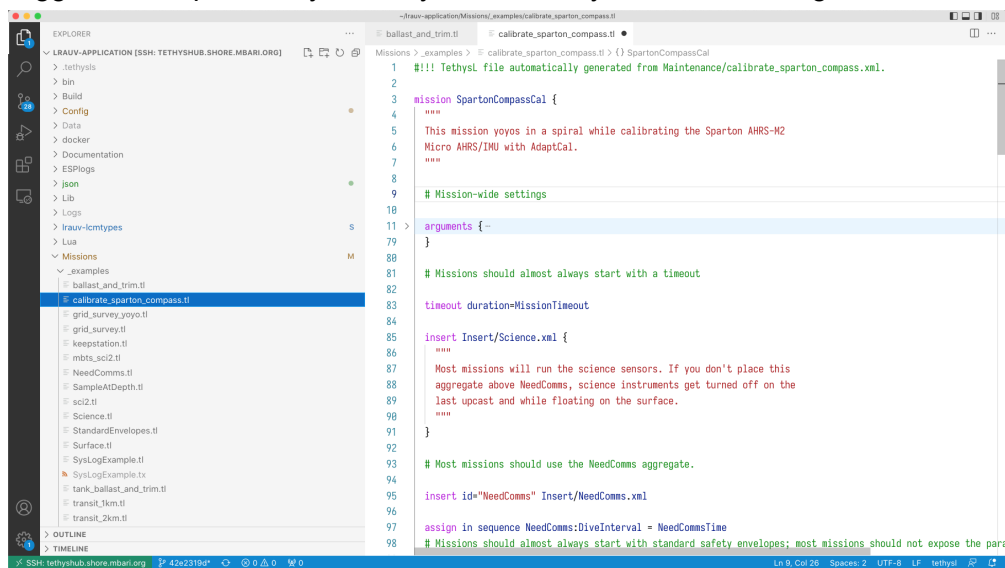
1. Rich Henthorn
 - a. Pulled TRN logs from tethys
2. Brian Kieft
 - a. Got Benthos MF replacement quote
 - b. Ran FQT on coulomb counter on vehicle Makai in preparation for EcoHAB
 - c. Tested quick GPS mission fix offshore last week
 - d. Opened Tethys to repair failed ethernet cable on backseat computer in preparation for TRN runs.
 - e. Logged bad batteries on Brizo/Makai
3. Denis Klimov
 - a. Degaussing two primary battery packs for upcoming LRAUV deployment
4. Ben Raanan
 - a. PR reviews
5. Carlos Rueda
 - a. LRAUV ESPComponent:
 - i. Adjustment to use COURIER for the log summary report (merged in EcoHAB branch).
 - ii. New request (low priority): <https://mbari1.atlassian.net/browse/TETHYS-637>
 - b. DashUI: Yanwu reported a bug in the “Build a command” feature: a missing “value” field, which seems like a long-standing regression as no changes have recently been made in relevant code. He also inquired about a possible way to display a boundary box (defined at the lrauv-config level) on the map for upcoming experiments in SB. This is not supported per se but I’m looking into it, probably just resorting to defining such a polygon in one of the formats supported under the Layers dropdown.
 - c. TethysL:
 - i. Brian and Ben have suggested we start migrating a few of the commonly used missions from XML to TethysL. I already prepared a PR for this purpose, initially with a dozen of such missions, and sent an email to the team about this plan.
 - ii. Regarding execution of TethysL directly on the LRAUV (a desirable goal we have discussed for a future version –maybe in 2023?), I put together a pretty successful proof of concept involving the generation of a TethysL C library that can be called from the LRAUV for the tethysl-to-xml translation at runtime. All working great but, unfortunately, at least for the time being, this is not viable for real LRAUVs due to the lack of support for ARM32 as a target architecture in the technology I’ve been using to generate native binaries and such a linkable library.

Week 17

1. Brian Kieft
 - a. Ran Tethys Thu-Tue on a mission testing some docking changes as well as patch mapping
 - b. Tested fixes to fast GPS fix mission
2. Carlos Rueda
 - a. TethysL is now [2.3.5](#), already set up globally on tethyshub. Main change is a language enhancement related to macros (used in the updated/simplified [examples/mbts_sci2.tl](#)).

Week 16

1. Rich Henthorn
 - a. TRN CoNavigation
2. Brian Kieft
 - a. Added joystick control on Makai in prep for EcoHAB
 - b. Troubleshooting network issues on Brizo
 - c. Prepped EZ servo to send in for noise assessment
 - d. Roughed in coulomb counter interface in CBIT to interface to Tanner's user space application interface to the hardware. Testing continues on Melia.
3. Carlos Rueda
 - a. (not reported past week) Very productive internal TethysL status update ([April 11](#)).
 - b. All end-to-end tests (from the DashUi to real vehicles) have gone well. Thanks Brian for using and promoting use of TethysL.
 - c. Re-enabled the TethysL CLI binary releases at GitHub.
 - d. Successfully tried the [Remote SSH connection using VS Code](#). Thanks Ben for the great finding and suggestion, super handy not only for our TethysL efforts but in general.



The screenshot shows the VS Code interface with a file explorer on the left and a code editor on the right. The file explorer shows a project structure for 'tethys' with various subfolders like 'bin', 'Data', 'docking', etc. The code editor displays the contents of 'calibrate_sparton_compass.tl', which is a TethysL mission file. The file starts with a comment indicating it was automatically generated from 'Maintenance/calibrate_sparton_compass.xml'. It defines a mission named 'SpartonCompassCal' with a description: 'This mission yoyos in a spiral while calibrating the Sparton AHRS-H2 Micro AHRS/IMU with AdaptCal.' The mission includes mission-wide settings, arguments, a timeout duration, and an insert of 'Insert/Science.xml'. It also includes a 'NeedComms' aggregate and an assign statement for 'NeedComms:DiveInterval = NeedCommsTime'. The file ends with a comment: '# Missions should almost always start with standard safety envelopes; most missions should not expose the para'.

Week 15

1. Brian Kieft
 - a. Got up to speed on TethysL and tried writing a new mission. Attempting to install on my host.

Week 14

1. Brian Kieft
 - a. Performed a successful joystick integration and harbor test on Pontus.
 - b. Setting up backseat computers for work in Santa Barbara
 - c. Working with Tanner to get fuel gauge component operational for use with primary batteries.

2. Carlos Rueda
 - a. Scheduling an internal TethysL status update and demo.

Week 13

1. Brian Kieft
 - a. Tethys deployed last Thursday for docking and patch tracking tests
 - b. Integrated joystick control over cellular for vehicle Pontus. Testing underway and plans to use this feature for EcoHAB in Santa Barbara (May/Jun)
2. Ben Raanan
 - a. Tethys deployed for docking tests
 - b. Processing ROMs data from Santa Barbara for EcoHAB pre-deployment testing
3. Carlos Rueda
 - a. TethysL: First end-to-end mission execution exercise, all the way from the DashUI to Galene! Lrauv-application makefile updated with enhanced and more efficient dispatch of TethysL missions. The TethysL system is now enabled globally on tethyshub for all users.

Week 12

1. Brian Kieft
 - a. Integrated the WHOI joystick operation on vehicle Pontus here. Will test cell soon. Planning to use for video shoot and EcoHAB.
2. Rob McEwen
 - a. Planning to look at Tethys data to predict range.

Week 11

1. Brian Kieft
 - a. Supported docking deployments that ended last week and recovered dock last Friday. Very successful experiment. The real dock will be deployed asap.
2. Carlos Rueda
 - a. Several TethysL items, including LRAUV PR reviewed and merged (thanks Mike and Ben); adjustments toward using .tl as file extension; productive meeting with Mike G. (he seems to be able to spend ~2-3hr/month from now on); more adjustments in TetysDash system to support TethysL. Now, supporting insertion of XML scripts in TethysL scripts to further facilitate overall integration (still being worked out).

Week 10

1. Brian Kieft
 - a. Wrapped up DAT firmware updates on all 7 units
 - b. Added bootloader flashing tools to repo. Assisting Tanner with SOM bringup
 - c. Prepped Pontus for deployment next week
2. Rob McEwen
 - a. Will examine recent Tethys data for power consumption and maximum possible range.
3. Ben Raanan
 - a. Fixed additional issues with config set
4. Carlos Rueda
 - a. TethysL and mission/behavior documentation work. Productive session with Yanwu in preparation for a general status update (which WHOI is also interested in attending).
 - b. Advancing additions in TethysDash (both backend and frontend) to expose TethysL missions for scheduling (as with the usual XML files).

Week 9

1. Brian Kieft
 - a. Fixed issue with navigation when including water speed from RDI DVL
 - b. Fixed Thruster HE fault interface issue with addition of polling for masked faults
2. Ben Raanan
 - a. Fixed altitude following behavior (testing offshore)
 - b. Fixed configuration set bug
 - c. Fixed mission manager bug
 - d. Fixed minor bug in the acoustic tracking behavior
3. Carlos Rueda
 - a. New version of the TethysL tooling with significant changes both internally and externally.
 - b. Submitted Irauv-application pull-request to speed up tethysl translation.

Week 8

1. Brian Kieft
 - a. Found issue with Thruster HE interface. Working on a workaround
 - b. Fixed water speed navigation issue
2. Ben Raanan
 - a. Docking sea trials with new proportional navigation guidance code
 - b. Resolved config set issue
 - c. Resolved mission manger issue
 - d.

Week 7

1. Rich Henthorn
 - a. Logs from recent TRN runs at PL
2. Brian Kieft
 - a. Updated altitude servo behavior to allow for missing altitudes
 - b. Fixed DAT command mode issue following a fault
 - c. Re-installed thruster HE after fixing a wiring issue on tethys and closed vehicle
 - d. Mission updates for line capture testing this week
 - e. Ran tank docking tests in preparation for deployment this week
3. Ben Raanan
 - a. Major rehaul of terminal guidance stack using velocity based proportional navigation guidance law
 - b. Added single-pole IIR filter and median filter classes and integrated into the acoustic tracking stack
4. Carlos Rueda
 - a. About to complete migration of TethysL to Scala3, while also improving autocompletions via LSP server and doing other code cleanup. Planning for a demo within the next few weeks.

Week 6

1. Brian Kieft
 - a. Added in water speed for current estimator and ran some tests at sea on tethys
 - b. Assisting in upgrades to Tethys including HE thruster. Diagnosing possible wiring error.
2. Ben Raanan
 - a. Terminal homing improvements — Resolved vehicle→navigation frame projection issue. Adding median and single pole IIR low-pass filtering on dock nav-frame projection and bearing rate calculation.
3. Carlos Rueda
 - a. Dash is now [4.9.51](#). (Also already installed by WHOI.)
 - b. Resuming work on TethysL, with an immediate focus on migrating to cats-parse and Scala3.

Week 5

1. Brian Kieft
 - a. Added the water speed on DVL to water current estimator
 - b. Fixed a DAT init issue
 - c. Tethys is deployed on a wet wifi engineering mission as well as portuguese ledge tests.

Week 4

1. Rob McEwen
 - a. Plotted latest Triton run, analyzing power and sonar pointing problem.
2. Carlos Rueda
 - a. Lots of TethysDash related development/activities.

Week 3

1. Carlos Rueda
 - a. Dash is now [4.8.93](#) with various fixes, in particular some related with the logic that gathers the waypoint information that gets exposed upon the “Started mission” event.
 - b. Various exchanges with the team and WHOI as they exercised the recent Dash additions.
 - c. Started removal of the legacy TethysDash UI as planned.

Week 2

1. Brian Kieft
 - a. Added check for
2. Carlos Rueda
 - a. Dash v4.8.9 with generation of grid waypoints. Writing associated [doc section](#) including a [screencast](#). Docker image released and already installed by WHOI.
 - b. Preparing for the planned removal of the legacy UI (lots of cleanup and testing coming up).

Week 1

1. Brian Kieft
 - a. Tested DAT compass wiring fixes
 - b. Automated HE thruster configuration parameters
 - c. Working on HE component final fixes
2. Carlos Rueda
 - a. Inspection on TethysDash service upon being called by users because of issues, which turned out to be network related (likely associated with what Todd emailed to all-hands).