

902204 - Scalable Robotics

Week 52

1. George Stern
 - a. HSI cap board RevB first board bring up completed without issue; need to test at least one more PCB before considering the design working
 - b. Next two LED boards tested
 - c. Opened existing HSI lights and began rebuild
 - d. Fixed ethernet continuously disconnecting in the mola dock stereo camera

Week 51

1. Akshay Hinduja
 - a. Assist team with s7k conversion of harbor survey lcm-logs
 - b. Improvements made to 7k-writer and mbs-tools yaml file read for sonar settings
 - c. Converted data to s7k to meet EOW deadline for DMO using 7k-writer, and fixed bugs in lcm-logs from 11/26
 - d. Resume ironing out sonar based navigation troubles with loop closure detection and optimization.
2. Eric Martin
 - a. EOY Spending
 - b. Lab cleanup
 - c. Mola2 battery checkout
3. George Stern
 - a. Worked with Jose on the HSI light respin layout
 - b. Ordered light and pcb bom
 - c. Bracket for light faceplates
 - d. 1st remote test of the OakD/RPI in a water proof box; camera looks terrible and it kept loosing connection
4. Johann Voigtlander
 - a. Integrated new Cerulean sonar on Blueboat
 - b. Cleaned lab
 - c. Added RTC to Blueboat

Week 50

1. Akshay Hinduja
 - a. Refined and finished getting data for ASV surveys of MBARI dock, assist with data verification
 - b. Getting back into Sonar based navigation, looking at data from sponge ridge for localization and loop closure detection

2. George Stern
 - a. Tested new extremely accurate clock trigger board and rebuilt Mola's OAK-D500m chassis with the board
 - b. Updated HSI light schematic
3. Johann Voigtlander
 - a. Debugging Blueboat tailscale disconnection. Purchased an RTC to integrate
 - b. Drew up sensor baselines in solidworks for data processing
 - c. Surveyed the harbour where RC & DP moor up

Week 49

1. Kent Headley
 - a. meeting
2. Akshay Hinduja
 - a. Test data collected last week for harbor surveys
 - b. Resume Sonar based navigation development
3. George Stern
 - a. Opened OakD500M can to replace SD card and timing card
 - b. Updated HSI schematic
4. Johann Voigtlander
 - a. Completed blueboat survey of the harbour
 - b. Purchased blueboat spares
 - c. Looking at transport case for blueboat

Week 48

1. Akshay Hinduja
 - a. Tie up loose ends on config read/write between driver, gui config client and console config client
 - b. Assist survey of dock
 - c. Assist in lcm log conversion to s7k
2. Johann Voigtlander
 - a. Debugged Blueboat power issue
 - b. Completed multiple harbor tests

Week 47

1. Akshay Hinduja
 - a. Support ASV deployment for dock surveys
 - b. Found hardware issues with Norbit dropping out frequently. Cause currently unknown
 - c. Driver remains to work as expected
2. George Stern

- a. Began updating the HSI strobe schematic to fix problems banded during the last deployment; discovered likely root cause for one of the issues: Vishay SOA curves are garbage and they are slowly fixing their datasheets
- b. Updated Mola500D strobe trigger board with new oscillator to facilitate 0.03 to 3fps mode; Sebastian tested the current board in mola and is getting 3 or more fps successfully.

Week 46

- 1. Kent Headley
 - a. checked out oculus sonar for tank test and MOB
- 2. Akshay Hinduja
 - a. Worked with Johann to checkout latest versions of norbit driver for ASV operations, setup scripts to enable single operator modes
 - b. Random issue with image display is unresolved, perhaps a change in system packages caused a break? Was working a day before
 - c. Help Johann with dock survey on Thursday 11/13
- 3. Paul Roberts
 - a. HSI strobe deployment
- 4. George Stern
 - a. Rebuilt PoE and HSI camera cans with finalized trigger board
 - b. Rebuilt electronics HSI light housings a few additional times; root cause for switching chip failure remains unclear and another odd failure mode was identified; best effort to keep them working for the deployment today, hopefully they work
- 5. Johann Voigtlander
 - a. Added Procman & LCM spy to blueboat
 - b. Event camera tests in the test tank
 - c. Organized Blueboat harbor survey for DMO

Week 45

- 1. Francois Cazenave
 - a. Designed and start assembled mapping drawer for Ventana
- 2. Kent Headley
 - a. spent a little time getting the Oculus SDK sonar viewer to build for macOS/linux, with an eye toward refactoring (at some point) the oculus GUI to use OpenGL rendering used by the SDK viewer. I have a feeling that the OpenGL texture mapping is more efficient/faster than my oculus gui. There were seemingly bugs in the SDK viewer, e.g. sending messages with 0 payload length and non-zero payloads, and also, the SDK viewer uses an older version of Qt and is configured for windows. I currently have it building with Qt 6 and though untested, should still build on windows.
 - b. Added necessary protocol to oculus sim to work correctly with the oculus SDK viewer (and ViewPoint);

3. Akshay Hinduja
 - a. Meet with Johann and Michael to migrate ASV framework to single user system
 - b. Update drivers on ASV to latest versions and test.
4. George Stern
 - a. Continue integrating the OAKD500 strobe board with drivers on mola with higher level software drivers/support
 - b. The HSI light project continues to be a challenge; one light was fully assembled, tested and working until a power clip slipped off a connector while testing optical performance shorting the cap bank and requiring complete rebuild. The other light had another FET fail; the design has a lot of positive margin against all requirements so failure mode remains unclear. Fixes and root cause were identified for the other FET failure mechanism; margin testing was conducted and no additional failures have been observed after fixes.
5. Johann Voigtlander
 - a. Wrapped up code, wiring, and housing for the event camera - ready for testing
 - b. Installed and enabled Procman on the blueboat, updated documentation

Week 44

1. Paul Roberts
 - a. HSI lighting support
2. George Stern
 - a. Finished assembly of the first HSI light but the 2nd electronics stack is not working; the manufacturer comments on their forum that the problematic chip is capable of destroying itself and says they are in the process of replacing the older products with things that don't self destruct, unfortunately there are no drop in replacements - now trying to find the magical combination of white wires which will keep everything happy and puzzled over why the first was ok
 - b. Rebuilt the OakD500 can with the latest light and camera controller and helped integrate on mola; initial testing is positive
3. Johann Voigtlander
 - a. Redesigned the event camera to fit the new lens
 - b. Enhanced event camera software

Week 43

1. Francois Cazenave
 - a. Starting work on next camera drawer
2. George Stern
 - a. Continued build/testing on HSI light housing
 - b. Got DMA driven PWM working (scope) and finished code to send USB uart throttle commands and translate them into Dshot PWM messages; next step is to test it with Mola ESCs and motors.
3. Johann Voigtlander
 - a. Improved code for Eventcam

- b. Shrunk housing to use GroupB without the extension
- c. Investigating a better lens option with Paul R

Week 42

1. Eric Martin
 - a. Working on plan for 11/12 deployment
 - b. HSI, EVT, and FLS experiments
2. George Stern
 - a. Killed 2nd FET on the HSI light current controller board; datasheet dive to reverify SOA curves and correctly configuring FET controller; everything looked right, PCBs assembled correctly, and all signals looked good; continued testing to try to capture a failure on the scope, killed another FET and might have caught the start of the failure. Reduced power by 10W and added likely unneeded protection diode. Could not get the infrequent death to occur again... is it fixed?
 - b. Checked thermal lockout circuit, regulated in air to ~85C. Little warmer than expected but ok,
 - c. Assembled HSI light housing
 - d. Continued ESC controller code, can now send and receive messages over USB UART without missing bits when characters are sent quickly.
3. Johann Voigtlander
 - a. Wired up event camera
 - b. Fixed bugs in code

Week 41

1. Kent Headley
 - a. pre-deployment updates/test of Oculus sonar driver
 - b. investigating oculus driver crashes reported during arctic cruise (multiple times, after several hours of operation). No smoking gun; this one's likely going to be tricky to trap...
2. Johann Voigtlander
 - a. Designed housing for event camera. Mounted components and built electrical harness
 - b. Improved event camera code, fixed ERC, added record button, added buttons to change FPS, added a timestamp to the filename.
 - c. Calculated camera FOV in seawater
 - d. Improved blueboat Norbit mount
 - e. Fixed blueboat Tailscale networking issues

Week 40

1. Francois Cazenave
 - a. Met with Eric above future projects
2. Eric Martin

- a. Getting end of year efforts going.
- 3. George Stern
 - a. Began testing/integrating HSI light electronics; found two issues possibly related to build that I have been unable to reproduce despite torture testing and a few additional tweaks to further optimize performance, but all the components fit on the pads, preliminary fit check looked promising and electronics are working well enough that a respin seems unlikely
 - b. Got USB talking on a bare metal STM32 dev board for the mola ESC control project, lot more code to write.
- 4. Johann Voigtlander
 - a. Started working on the event camera. Installed and bench tested on raspberry pi
 - b. 3D modelled all components, working on 3D modelling a mounting plate

Week 39

- 1. Kent Headley
 - a. looking into a couple of faults that occurred in Oculus during arctic cruise
- 2. Eric Martin
 - a. Met with Todd Gregory moving forward with the 1km design
 - b. Starting Event camera work
 - c. Reviewing work for HSI and Mola improvements.
- 3. George Stern
 - a. Continued trade into using ArduPilot IOMCU vs baremetal for Mola ESC control; planning to try baremetal.
 - b. Identified potential microcontroller and began poking through pertinent sections of docs for DMA and timer control.
 - c. Pitched development plan
- 4. Johann Voigtlander
 - a. Working on new event camera
 - i. 3D model of camera made
 - ii. Electronics purchased

Week 38

- 1. George Stern
 - a. Setup a ros2 node publishing 3d depth and image data from a luxonis camera on a raspberrypi
 - b. Assembled the Mola Docking Camera can and mostly wired it
 - c. Began reviewing ArduPilot IOMCU code for potential modification for a mola thruster control board; bare metal development might be easier
 - d. Discovered MOLA ESCs are one software version off from supporting a really simple uart communication based bus but can't be upgraded because of ukraine war.

Week 37

1. Eric Martin
 - a. Phase II feedback last week.
2. George Stern
 - a. Integrated camera/light controller board with luxonis card and discovered uC pll was not sufficiently stable/jitter was still too high at low frame rates and each camera type needed an independently adjustable strobe timing. Respun a new board in kicad with external oscillator/multiple strobe signals and updated software.
 - b. Ordered parts for HSI light build

Week 36

1. George Stern
 - a. Updated LED board layout for single layer and order
 - b. Finished Cap board layout and order
 - c. Integrating SAMD light controller board with Luxonis OAK D

Week 35

1. George Stern
 - a. Schematic capture place and route for a power conditioning board

Week 34

1. Akshay Hinduja
 - a. Finished technology transfer before Arctic cruise deployment
 - b. Working on LCM→FBT converter addition to 7k-writer.
2. George Stern
 - a. Fit checked printed parts and COTs cables for OAK-D camera in a box
 - b. Completed HSI camera LED board design and routing

Week 33

1. Kent Headley
 - a. fixed bug in LCM timestamps
2. Akshay Hinduja
 - a. Prepare and push deployment ready versions of sen_norbit, 7k_writer, and mbes_localization
 - b. Facilitate technology knowledge transfer for team travelling to arctic cruise
 - c. Update Atuncita with latest versions, verify modules work
 - d. Update readmes and write guides for offshore team
3. Eric Martin
 - a. Arctic Prep
4. Paul Roberts

- a. HSI strobe design
- 5. George Stern
 - a. Completed fixturing design and drawings
 - b. Purchased and received remaining mechanical hardware
 - c. Electrical interconnect planning and procurement
- 6. Johann Voigtlander
 - a. Assisting with Mola in the test tank
 - b. Purchased RTK GPS options for the Arctic
 - i. Resolving shipping issues
 - c. 3D model of the docking station complete

Week 32

- 1. Akshay Hinduja
 - a. Feature adds and deployment readiness for sen-norbit, 7k-writer in preparation of arctic cruise
 - b. Improvements to mbes_localization pipeline for UTM coordinate reference frames
 - c. Continue improvement on mbes_localization system using older data, might be not ideal due to possibly poor overlap.
 - d. Improvements to reference_preprocess submodule to move from mb-grid → submap database
- 2. Eric Martin
 - a. See arctic work
 - b. HSI Light design review
 - c. DVL bringup.
 - d. Intern help by the tank
 - e. Attended Vicente's defense, he passed!
- 3. Paul Roberts
 - a. HSI strobe design
- 4. George Stern
 - a. Completed Mola Dock Stereo Vision box design and started drawings
- 5. Johann Voigtlander
 - a. Assisting with Mola in test tank
 - b. 3D modelling new blueboat Norbit mount

Week 31

- 1. Eric Martin
 - a.
- 2. George Stern
 - a. Continued working on solid models and system design for a stereo vision distance sensor for docking
- 3. Johann Voigtlander
 - a. Designed and printed mounts for USBL on MOLA and docking station

- b. Mola in test tank to collect data

Week 30

1. Akshay Hinduja
 - a. Worked with Sebastian to get the GIM robotics front end submap generator
 - b. Searched for MBSYSTEM grids to test with as reference grids
 - c. Wrote scripts to generate and assess databases made from grd file generated pointclouds
 - d. Generated s7k records for recent BlueBoat data to test for heave data
 - e. Made changes to 7k-writer's snippet record generator based on Norbit feedback, however their feedback seems to conflict with data
2. George Stern
 - a. Mola light strobe control board built and tested
3. Johann Voigtlander
 - a. Started Mola2 commissioning, discovered overdischarged batteries
 - b. Mola1 in the test tank on Tuesday, collecting data
 - c. Designed and printed mounts for WiSub & USBL on Mola AUV docking station
 - d. Helped Pushyami repair Blueye ROV thruster

Week 29

1. Eric Martin
 - a. Lab management
2. George Stern
 - a. Continued working on samd21 code for strobe timing
 - b. Tried to identify a proximity sensor solution for mola docking; unfortunately VCEL lasers are almost all 940nm and magnetometers alignments without mechanical coupling aren't going to work so visible light point clouds from an OAKD appear best.
3. Johann Voigtlander
 - a. Designed and built Mola AUV docking station
 - b. Created powerpoint presentation for ASVs

Week 28

1. Akshay Hinduja
 - a. Continue with setup of GIM tool for Arctic Sled data from 26 June, 2025
 - b. Intern support
 - c. Meet Dave and Jenny to investigate issues with seismo sands survey s7k data
2. Eric Martin
 - a. Proposal Writing
3. George Stern
 - a. Completed testing luxonis new code with an Arb and completed initial rewrite of uC code to remove all software interaction except to setup peripherals; appears

to have decreased jitter by 2 orders of magnitude so it might now play nicely with the luxonis hardware

- b. Designed a PWB with a few logic gates to support functions removed from SW to lower jitter

Week 27

1. Akshay Hinduja
 - a. Testing localization system with older logs from LASS,
 - b. Testing new reference database generated from MBSystem grids
2. Eric Martin
 - a. Proposal writing
3. George Stern
 - a. Tested Luxonis's minimal code for external camera sync; it works much better when jitter is kept to less than a microsecond
 - b. Reworking current mola microcontroller software to eliminate IRQs which add too much jitter
4. Johann Voigtlander
 - a. Mobilized & demobilized Ventana mapping drawer
 - b. Blueboat improvements
 - i. Base station bulkheads installed
 - ii. Cart stands designed and 3D printed to protect Norbit WBMS
 - iii. Updated software
 - iv. Purchased waterproof camera

Week 26

1. Francois Cazenave
 - a. Assembly of ventana mapping drawer
2. Akshay Hinduja
 - a. Testing Sonar based navigation stack
 - i. Improved matching metrics with Hausdorff distance implemented
 - ii. Wrote new lcm publisher for state estimate
 - b. Wrote MB system point cloud to database script
 - c. Bug fixes to Norbit driver + standalone gui
 - d. Cruise preparations for Thursday 26th June
3. George Stern
 - a. After many failed attempts finally got mola fiber reterminated and tested, thank you to Bryan, James and DJ for recommendations, tool loans and support
 - b. After 2mths and some skillful prodding from Eric to their BD folks, luxonis responded to my help request providing new hardware requirements and previously undocumented code snippets to make FrameSync work. Initial testing indicates my current hardware solution will not meet the new requirements and must be reworked; testing with external TE to ensure the new solution will

actually work this time once the hardware conforms to the new requirements is in progress.

4. Johann Voigtlander
 - a. Constructed the Ventana mapping drawer
 - b. Blueboat is back together
 - i. Working on battery safety

Week 25

1. Francois Cazenave
 - a. Building Ventana mapping drawer
2. Kent Headley
 - a. Issued pull request for file naming changes proposed by Bastian M.
 - b. Notified Sebastian about changes to mbtrnpp (used for m1stream)
3. Akshay Hinduja
 - a. Finished the Pose Graph manager module
 - b. Finished integration script to run localization
 - c. Testing on parameter tuning
 - d. Added visualization of trajectories
 - e. Working on fixing bugs with ground truth trajectories
 - f. TODO: Final map visualization, lcm channel broadcast, test with larger datasets, MBSys_{tem}→DB
4. George Stern
 - a. Reterminating the fiber tether on mola; still not working after more than 5 attempts representing days of work. The boxfish design seems overly complicated considering most of the pieces are custom machined. Thank you James and Bryan for the help and advice on terminating fiber
5. Johann Voigtlander
 - a. Blueboat electronics re-installed into new hull
 - i. Debugged tailscale connection issue
 - b. Coordinating plan to confirm old batteries are useable or not
 - c. Installed VN100 into PoE2 can and confirmed all sensors functional
 - d. Ordered new connectors and daisy-chained lights

Week 24

1. Francois Cazenave
 - a. Designing Ventana Mapping drawer
2. Kent Headley
 - a. reviewed some changes to mb1stream proposed by Bastian, and pushed a test implementation to try. The changes are intended to simplify his workflow by flattening file output paths and enable mirroring in images.
3. Eric Martin
 - a. Intern onboard, PM'ng
 - b. Mola fiber term repair failed, ordering new parts from NZ

- c. Board meeting support for Javi
- 4. George Stern
 - a. Spent far too much time learning the overly complicated boxfish fiber termination; then broke it after following the process. New parts on order.
- 5. Johann Voigtlander
 - a. Laser assembled in new housing
 - b. 3D printed PoE can mount brackets and laser/camera caps
 - c. Tested PoE gear: cameras, lights, multibeam, laser...
 - d. Ordered parts to daisy chain additional lights

Week 23

- 1. Francois Cazenave
 - a. Design Ventana mapping sled
- 2. Kent Headley
 - a. Tested mbtrnpp decimation changes made for mb1stream, to ensure that there are no negative side effects in the TRN context.
- 3. Akshay Hinduja
 - a. Working on MBES localization framework. Finished modules on database management, submap matching and registration management.
 - b. Working on backend pose graph optimization framework
- 4. Paul Roberts
 - a. 10G Interface assembly and testing

Week 22

- 1. Francois Cazenave
 - a. Designing Ventana mapping drawer
- 2. Kent Headley
 - a. Added cmake build to mb1stream
 - b. Updates ready for testing
 - c. Testing updates to MB-System
- 3. Akshay Hinduja
 - a. Worked on MBES localization system.
 - b. Finished first module + unit tests for database management and submap query system based on location. This covers databases for both reference and query maps.
 - c. Working on registration system + pose graph backend next.
- 4. Paul Roberts
 - a. 10G Interface can wiring and assembly
- 5. Johann Voigtlander
 - a. Working on Blueboat Norbit WBMS pole re-design

Week 21

1. Francois Cazenave
 - a. Met with Eric to define new project
2. Kent Headley
 - a. Found root cause of issue reported from cruise in the mbtrnpp/mb1stream SLAM data.

The issue was related to the logic that mbtrnpp uses for beam decimation/selection. An integer decimation modulus is typically > 1 in the TRN context that mbtrnpp is normally used. In the SLAM context, the modulus is reduced to 1, which selects the first N records in the specified swath. Also the number of beams requested is less than the number of beams in the requested swath. Thus, the subtend an angle less than the swath, and are not centered. A new floating point scheme has been implemented that distributes the requested number of beams over the swath. It's in feature/compas-dev branch of MB-System, for testing with the SLAM pipeline.
 - b. Proposed some changes to viz_bathy to make the display more intuitive
3. Akshay Hinduja
 - a. Changes made to 7k-writer, asv branch created for use with blueboat lcm channels to generate s7k records from seismosands survey
 - b. Updates to norbit driver, reverting back to vehicle frame for bathy messages
4. Eric Martin
 - a. Prep for Jun 28 carson Day
 - i. POE can build
 - ii. Ordering parts
 - iii. Drawer design concept
 - iv.
5. Paul Roberts
 - a. PoE Can 2 assembly
6. Johann Voigtlander
 - a. Deployed Blueboat on the beach from the paragon - hull sustained damage
 - b. Installed cradlepoint router in the boat and installed tailscale VPN

Week 20

1. Kent Headley
 - a. Investigating some issues reported with the mb1stream application: decreased swath width and asymmetric (off-center) beams
 - b. So far, have not been able to reproduce the issue
 - c. Did find a limitation in max number of beams in MB1 record, and updated for mb1stream
2. Akshay Hinduja
 - a. Added an interactive console client to update norbit settings in real time without needing to restart driver.

- b. Added GUI to control norbit settings, using the console client as the backbone. GUI also contains a low bandwidth snapshot mode for taking snaps of bathymetry plots for debugging and viewing sonar data.
 - c. Water tank testing for new changes, investigate why soundings were poor in last paragon off shore test. Possibly loose cable covering Norbit.
- 3. Eric Martin
 - a. Thruster work in tank with Vicente
 - b. Support Javiera's hunt for the rock
 - c. Review of Poster for ICRA
 - d. Project Management
- 4. Paul Roberts
 - a. PoE can 2 assembly
- 5. George Stern
 - a. Disassembled the mola control station and identified an easier approach to blocking the MQTT server that didn't require hardware modifications; after more updates from Boxfish, there is an even easier method with two nice script commands they should have given us years ago
- 6. Johann Voigtlander
 - a. Integrated a relay on the Blueboat to remotely power the Norbit
 - b. Built up a network map of Blueboat - working with Adriana & Travis for Tailscale VPN integration

Week 19

- 1. Kevin Barnard
 - a. Cruise May 2, 2025
 - b. Rebasng changes made to RTAB-Map SLAM to latest version
- 2. Kent Headley
 - a. prepped oculus sonar software for cruise days 5/1-5
 - b. investigating issue with mb1stream (part of multibeam ingest for SLAM pipeline) reported during cruise. Sonar data from mb1stream appeared to encompass less swath than expected, and to present asymmetrically.
- 3. Akshay Hinduja
 - a. Continued development of S7k translator tool, last missing pieces are Water Column and Snippet data
 - b. Assisted in dock deployment of blueboat and collected data
 - c. Processed RTK data to repackage as LCM and combine logs to make complete logs with all required message types as GPS fix messages from RTK were missing
 - d. Fixed a bug causing S7k logs to have some missing data.
 - e. Converted two logs with bathy + nav data to provide to Aaron Micallef before next Tuesday deployment.
- 4. Eric Martin
 - a. PM'ng supporting many initiatives.

- b. Starting build of second POE can.
- 5. Paul Roberts
 - a. PoE can #2 chassis assembly
- 6. Johann Voigtlander
 - a. Cleaned up Blueboat wiring
 - b. Scheduled a deployment with the Paragon, the boat performed well, but requires further upgrades
 - c. Conducted a blueboat harbour test. Data was processed, and a bathymetry map was created

Week 16

- 1. Akshay Hinduja
 - a. Finished bug fixes and updates to norbit lcm driver, now records in binary without lcm as option
 - b. Finished bathy translation in s7k translator, will finish water column and snippet by EOW
 - c. Test surface vehicle operations with blueboat on Thursday April 17
- 2. Eric Martin
 - a. Domed camera setup
 - b. HSI kickoff
- 3. Johann Voigtlander
 - a. Connected Blueboat with 4g/5g modem
 - b. Prepared blueboat for harbour test

Week 15

- 1. Kevin Barnard
 - a. Implemented LASS SLAM for upcoming May deployments
- 2. Kent Headley
 - a. project meeting
- 3. Akshay Hinduja
 - a. Finish up changes to norbit driver for binary read and write
 - b. Work on s7k translator
 - c. Start MBES localization module work. Met with Sebastian to discuss action plan steps on 04/09/25
- 4. Paul Roberts
 - a. Concept design for HSI lighting
- 5. Johann Voigtlander
 - a. Cleaning up Atuncita wiring in miniROV control van
 - b. Routed SDI cable for additional monitors in control van
 - c. Investigating 4g/5g router installation on blueboat. Looking into zerotier option with Adriana

Week 14

1. Akshay Hinduja
 - a. Norbit Driver: Change socket read behavior to non-blocking, update socket reads to run on independent threads instead of single. Able to achieve lcm message rate parity with norbit ping rate.
 - b. Norbit sk7 translator: Integrated navigation information into bathy records through nearest neighbor search based on timestamp. Changed log reading behaviour to replicate live stream instead of earlier possibly more efficient way of using dequeues per message type. This allows better nearest neighbour search for nav - wbms integration.
 - c. BlueBoat: Updated driver, wrote service scripts for gui and config mode
2. Johann Voigtlander
 - a. MiniROV in test tank for final Arctic tests
 - b. I deployed the blueboat in the harbour and tested the RTK GPS and Norbit multibeam.
 - c. Working on Blueboat 4G/5G modem integration with Adriana

Week 13

1. Akshay Hinduja
 - a. Working on s7k conversion tool for Norbit WBMS
 - b. Met Dave to understand more details on MB system requirements
 - c. Focusing on record 7027 to reach minimal viable product to test in tank
 - d. Write module to tie in nav messages into 7027
 - e. Familiarize with mutlibeam submap module.
2. Eric Martin
 - a. Project management
 - b. Bulkhead order
 - c.
3. Johann Voigtlander
 - a. Remounted RTK GPS antennas further towards the bow
 - b. Found GPS offsets
 - c. Organized harbour deployment for later this week

Week 12

1. Kent Headley
 - a. Tested Oculus LCM and ROS builds on miniROV during tank test last week; these worked well.
 - b. Made bug fixes and updates to frames7k (S7K reader) utility
2. Eric Martin
 - a. Tank testing support
 - b. Procman Upgrades
 - c. 3d sonar testing.

Week 11

1. Kevin Barnard
 - a. MiniROV Arctic prep
 - i. Fixed issues with SLAM not using estimator data
 - ii. Investigated missing estimator data from Feb 11, 2025 and Feb 12, 2025 TT days
 - iii. Set up configurations for down
 - iv. Tested forward camera SLAM configuration
2. Kent Headley
 - a. tank test oculus after publishing updates to support ROS and LCM configurations
3. Eric Martin
 - a. Blueboat mapping support
 - b. Project management
 - c. Multibeam Review
4. George Stern
 - a. Completed reassembling mola with light and laser control can
5. Johann Voigtlander
 - a. Enabled RTK on the BlueBoat

Week 10

1. Akshay Hinduja
 - a. Debug and test LCM to S7K tool
 - b. Scoping meeting for Norbit WBMS localization
 - c. Setup timeline analysis for Localization
2. George Stern
 - a. Tweaked a fixture design and completed assembly and testing of the mola laser and light can on mola
3. Johann Voigtlander
 - a. Installed Norbit WBMS
 - b. Charged & Installed 8P batteries for deployment
 - c. Programmed mission failsafes
 - d. Advised Vicente how to build thrusters to create a small constant water flow currentt in the test tank

Week 9

1. Kent Headley
 - a. Wrote OculusPublisher, a message publishing wrapper with ROS and LCM implementations
 - b. Spent some time trying to build ROS2 from source on M1 mac; unsuccessful so far.
2. Akshay Hinduja
 - a. Finished front end lcm subscriber for norbit + nav data

- b. Wrote container classes for s7k datagram
 - c. Work on integrating front end with s7k writing
- 3. George Stern
 - a. Designed light/laser controller can mounting fixture for mola
- 4. Johann Voigtlander
 - a. Removed VN110 from BlueBoat. Helping install InertialSense IMU/RTK sensor

Week 8

- 1. Kent Headley
 - a. working on refactor of Oculus driver to abstract out the messaging implementation and Qt dependencies. The messaging work enables support of ROS and LCM; the Qt refactor is intended to decouple the core sonar driver from Qt to the extent possible.
- 2. Akshay Hinduja
 - a. LCM→7K translation. Wrote subscriber to take in relevant lcm topics
 - b. Decode raw binary data to get required data fields
 - c. Current work on repacking to 7k datagrams
- 3. George Stern
 - a. Fixturing design for revised mola light controller can
 - b. Order material for can build

Week 7

- 1. Akshay Hinduja
 - a. Met with Mauro to go over S7K conversion tool, and discuss with Dave
 - b. Get frontend lcm log reader reader and converge WBMS and Navigation data together
 - c. Start formal exploration of wbms based relocalization module to supplement visual SLAM and usbl readings
- 2. George Stern
 - a. Tested luxonis camera triggering which didn't seem to be working as specified; it isn't and luxonis is now debugging
- 3. Johann Voigtlander
 - a. MiniROV In test tank for camera and laser calibrations

Week 6

- 1. Francois Cazenave
 - a. meeting
- 2. Kent Headley
 - a. meeting with Dave, Giancarlo, Akshay re Norbit data processing. The open question is whether S7K is the best format to use for SR and Seafloor mapping, given that Norbit's S7K output implementation is tied to the Norbit GUI and doesn't support navigation/attitude/depth data.

3. Akshay Hinduja
 - a. Met Giancarlo to look at next steps for SLAM and localization using FLS and WBMS
 - b. Attended mapping meeting with Caress and Troni group for unifying mapping system for MBARI
4. George Stern
 - a. Fixturing and setup to test if luxonis software accepts external camera sync

Week 5

1. Francois Cazenave
 - a. meeting
2. Akshay Hinduja
 - a. Norbit c++ driver documentation writeup
3. Eric Martin
 - a. Project kickoff for 2025
 - b. Helping Javi with defence practice
 - c. Advising many developments.
4. Paul Roberts
 - a. 2025 Kickoff Meeting, HSI and EVS planning

Week 4

1. Francois Cazenave
 - a. Laser bracket
2. Akshay Hinduja
 - a. Beta driver development finished
 - b. Background/legacy research on s7k conversion tool
 - c. Go through Ocean Imaging repositories on reson and 7kcenter
3. George Stern
 - a. Ordered Charuco targets

Week 3

1. Francois Cazenave
 - a. Laser brackets
 - b. Mini ROV bumper
2. Kent Headley
 - a. project kickoff meeting, team is planning for cruise (this week)
3. Akshay Hinduja
 - a. Finished Norbit beta driver development to test on cruise days Jan 14 and 15 2025
 - b. Changes from alpha: Streamlined, and removed redundant features from alpha driver
 - c. Added verbose/debug modes to both drivers to limit console prints

- d. Cruise days Jan 14/15
- 4. Eric Martin
 - a. Sprint Kickoff, postdoc reviews.

Week 2

- 1. Francois Cazenave
 - a. Designing bracket for laser
- 2. Kent Headley
 - a. weekly project meeting
 - b. team is prepping for cruise next week to test SLAM and norbit sonar (no-op for me)
- 3. Akshay Hinduja
 - a. Beta development of Norbit driver in C++. Expected to be functionally same as alpha driver, but will get rid of some bloat, and experience speed improvements due to c++ arch. Expected to be tested by Thursday 01/09 in time for first cruise of January in week of 01/13
- 4. Eric Martin
 - a. Project task setup
 - b. Annual planning

Week 1

- 1. Akshay Hinduja
 - a. Cleaned up uncertainty estimation and base values for factor graph in SBN
 - b. Fixed localization matching with better method from above and verified performance is unaffected
 - c. Made modifications to loop closures, pending test
- 2. George Stern
 - a. Tested and integrated 3 new cap boards
 - b. Tested 2 new led boards
 - c. Built up 1st HSI light RevB; unfortunately discovered ponoko web entry form has a dangerous feature I missed; updated parts and re-ordered
 - d. Continued debugging motor controller software