

902204 - Scalable Marine Robotics Foundations

Week 52

1. Eric Martin
 - a. End of year purchases for the lab
 - b. Hiring contacts for RE position finalists.

Week 51

1. Kevin Barnard
 - a. Prep for cruise (canceled)
 - b. Ran online SLAM with OI sled in test tank
2. Eric Martin
 - a. Cabling for VN100 on Mola
 - b. Test tank data collection using LASS for SLAM work.

Week 50

1. Kevin Barnard
 - a. Prep work for SLAM demo cruises

Week 49

1. Kevin Barnard
 - a. Performed in-air intrinsic and extrinsic calibration of Mola AUV cameras
2. Kent Headley
 - a. Working on fast log playback; working with Tritech on SDK support
3. Eric Martin
 - a. Hiring committee work
 - b. Fixed the Mola with help of Boxfish

Week 48

1. Kevin Barnard
 - a. Evaluated & validated GIM RTAB-Map code modifications
 - b. Tested RTAB-Map performance with different feature detectors
 - c. Attempting to calibrate Mola AUV stereo cameras and 4K camera
2. Kent Headley
 - a. Working with Bastian to use image playback/capture pipeline on Gemini sonar dataset collected by Paul Roberts during a recent Barry cruise.

Week 46

1. Kevin Barnard
 - a. Diving into RTAB-Map SLAM with filtered IMU + DVL measurement for visual-inertial odometry
 - b. Investigating additional factors (e.g. absolute depth factor) in GTSAM backend graph optimization
 - c. Tried running stereo calibration on Mola test tank images
2. Kent Headley
 - a. Looking at sonar data from Monday piggyback
3. Eric Martin

- a. Working with Boxfish to resolve issues with the pcb assemblies. They are sending a new one out.
- b. REE hiring Committee
- c. Working on end of year fund commitments.

Week 44

1. Kevin Barnard
 - a. Working on stereo camera calibration for Mola AUV
2. Kent Headley
 - a. Worked with Bastian M to tested the Gemini sonar with image capture driver, and added a configuration file parser to the code, and done some build cleanup as well.
 - b. Testing/mob on the Carson for cruise 11/8.

Week 42

1. Eric Martin
 - a. The boxfish vehicle is here and working, we are working through understanding some issues with it, and trying to close out all tickets with Boxfish.
 - b. Supported photo shoots with the aquarium
 - c. Many project management items this week.
 - d. Reviewing applicants for the REE position.

Week 41

1. Kent Headley
 - a. Adding features and fixing issues for the Gemini sonar driver/utility app. This week, changing the renderer to map sonar image output to cartesian coordinates and optionally convert to grayscale. Bastian M is reviewing images and providing feedback.
2. Paul Roberts
 - a. Training on Mola vehicle operations
 - b. Designing PoE j-box, camera housings, and structured light housing to fit on Mola vehicle

Week 39

1. Kent Headley
 - a. Continuing work on Gemini sonar drivers for image distribution
2. Eric Martin
 - a. Finalizing the shipping details on the Boxfish, including export controls
 - b. Scheduling Training for Boxfish
 - c. GIM Sprint review
 - d. Testing the Ouster Lidars

Week 38

1. Kent Headley
 - a. Have made some progress on understanding image rendering w/ Qt, though currently stuck on Qt threading model
 - b.
2. Eric Martin
 - a. Catching up on Boxfish shipment

Week 37

1. Kevin Barnard

- a. Evaluated RTAB-Map for stereo-based SLAM
- b. Continued support for GIM Robotics introduction to Kimera

Week 35

- 1. Kent Headley
 - a. Working in Gemini imaging sonar driver; trying to grab visualization image frames along with raw ping data, which involves Qt and OpenGL - steep learning curve.

Week 34

- 1. Kevin Barnard
 - a. Got Kimera-VIO working on simulated dataset
- 2. Kent Headley
 - a. Working on image capture - climbing Qt learning curve

Week 33

- 1. Kent Headley
 - a. Working on prototype application/driver for gemini

Week 32

- 1. Kevin Barnard
 - a. Started a deep dive into Kimera-VIO
 - b. Working to evaluate Kimera-VIO out of the box on the PNW dataset
 - c. Continued development of stereo calibration library
- 2. Kent Headley
 - a. Looked at debug build support for Tritech Gemini sonar linux SDK; turns out unsupported, so requested windows SDK as a backup.
- 3. Eric Martin
 - a. Getting the tank stereocam together with intern Alex.

Week 31

- 1. Kevin Barnard
 - a. Finished initial stereo motion estimation framework
 - b. Rewrote chessboard corner correspondence clustering code
 - c. Started evaluating Kimera-VIO as alternative framework for visual-inertial SLAM
- 2. Kent Headley
 - a. Resolved some build issues with SDK examples (thanks to Bastian M for the assist!)

Week 30

- 1. Kevin Barnard
 - a. Continued development of stereo camera calibration library
 - b. Implemented stereo motion estimator via point cloud registration of triangulated matched keypoints
 - c. Workshop with GIM re: Stella VSLAM + IMU integration

Week 29

- 1. Kevin Barnard
 - a. Started integrating stereo camera calibration workflow

Week 28

1. Kevin Barnard
 - a. Created two Python/OpenCV tool libraries: [cv_tools_detection](#) and [cv_tools_calibration](#)
 - i. Integrating previous code
 1. Feature detection: ORB
 2. Feature matching: FLANN
 3. Homography/motion estimation: essential matrix decomposition
 4. Mono/stereo camera calibration
 5. Calibration validation
 6. Calibration visualization
 - ii. Writing new code
 1. AprilTag-based motion estimation
 2. Modular feature detection → matching → homography estimation → camera motion estimation pipeline
 3. Utilities for file IO, image manipulation, etc.
 - b. Set up BitBucket pipelines for unit tests, package builds, docs

Week 27

1. Kent Headley
 - a. Building Gemini Sonar SDK examples

Week 24

1. Kent Headley
 - a. Set up repo for Gemini scanning sonar driver/app code
2. Eric Martin
 - a. Lidar for paragon spec
 - b. Boxfish follow up
 - c. Gim Robotics calls
 - d. New intern onboarding and mentoring.

Week 23

1. Kent Headley
 - a. Looking at Gemini sonar SDK
 - b. Meet w/ GT and Bastian
2. Paul Roberts
 - a. Designing laser and LED pattern projectors for test tank platform

Week 21

1. Kent Headley
 - a. Trying to find protocol documentation for Gemini 720i imaging sonar
 - b. Looking at ZCM specs/doc
2. Eric Martin
 - a. Project management bits.
 - b. Lots of work with GIM robotics
 - i. presented the ASV concept and received feedback.
 - ii. Sprint #1 review last thursday.
 - iii. Prepared new dataset for GIM to try different SLAM on.
 - c. Coordinating with facilities for lab changes.

Week 20

1. Ben Raanan
 - a. Working on project update presentation
 - b. Testing 4D science data interpolation
 - c. Integrating simulation env with TethysDash
 - d. Integrating new battery simulation with LRAUV application
 - e. More work on DVL plugin
 - f. Intern project rampup

Week 19

1. Kent Headley
 - a. Scoping eval of ZCM interprocess communication middleware
 - b. Scoping driver development for

Week 18

1. Kent Headley
 - a. Met with Giancarlo re project goals

Week 17

1. Kent Headley
 - a. Met with Gian Carlo to discuss progress and next steps
2. Eric Martin
 - a. Paragon ASV data collection concepts
 - b. Discussing some added project management tasks.
3. Mike Risi
 - a. Working on FLIR camera driver

Week 16

1. Kent Headley
 - a. Met w/ Gian Carlo re project activities
 - b. Will scope some work related to writing driver for imaging sonar and evaluating ZCM communications middleware

Week 5

1. Mike Risi
 - a. Meeting with GIM to discuss interface
 - b. Meeting with GIM to discuss

Week 3

1. Eric Martin
 - a. Brief chat with GT last week, mostly advising on upcoming cruise work and moving.

Week 2

1. Mike Risi
 - a. Meeting with GIM to start work on SLAM framework
 - b. Working on getting getting data sets to GIM

Week 1

1. Mike Risi

- a. Working on development plan for boxfish test platform with GT.