

Akshay Hinduja

Week 52

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 51

- 901809 - Deep Sea Bioinspiration
 - Sync up and attend OceanShot 3d meetings with CVision, prep work for the same
- 902101 - LRAUV Technology Development
 - Analyze potential issue with frame of reference assumptions, looks ok and normal
- 902204 - Scalable Robotics
 - Assist team with s7k conversion of harbor survey lcm-logs
 - Improvements made to 7k-writer and mbs-tools yaml file read for sonar settings
 - Converted data to s7k to meet EOW deadline for DMO using 7k-writer, and fixed bugs in lcm-logs from 11/26
 - Resume ironing out sonar based navigation troubles with loop closure detection and optimization.
- Overhead
- Out of Office

Week 50

- 901809 - Deep Sea Bioinspiration
 - Meetings with CVision to kickstart Oceanshot bigelow grant work
- 902101 - LRAUV Technology Development
 - Finished v1.0 of tethystales, completing initial requirements from LRAUV dev team
 - tagged in mbari-org github
 - Pushed to dockerhub mbari/tethystales
 - Tested on lrauv lab computers, pending announcement for broader mbari users
- 902204 - Scalable Robotics
 - Refined and finished getting data for ASV surveys of MBARI dock, assist with data verification

- Getting back into Sonar based navigation, looking at data from sponge ridge for localization and loop closure detection
- Overhead
- Out of Office

Week 49

- 901809 - Deep Sea Bioinspiration
 - Preparations for kick-off meeting with CVision for DeepPIV pipeline automation
- 902101 - LRAUV Technology Development
 - Finished v1.0 of tethystales, pending feedback on install and runtime from users
 - Meet with LRAUV team to scope next iteration requirements
- 902204 - Scalable Robotics
 - Test data collected last week for harbor surveys
 - Resume Sonar based navigation development
- Overhead
- Out of Office

Week 48

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
 - Improvements to tethystales - lrauv log visualization.
 - Added panel for playback, scrubbing and log selection
 - Added panel to visualize attitude
 - Added realistic mesh for lrauv from osrf files
 - Working on simplifying package setup for end user
 - Spoke with Mike about possibly adding Monterey Bay geotiff to rviz map
- 902204 - Scalable Robotics
 - Tie up loose ends on config read/write between driver, gui config client and console config client
 - Assist survey of dock
 - Assist in lcm log conversion to s7k
- Overhead
- Out of Office

Week 47

- 901809 - Deep Sea Bioinspiration
 - Meetings with the team to discuss next plans for OceanShot project milestones and approach.
- 902101 - LRAUV Technology Development
 - Finished matplotlib based visualizer

- Tried out HoloOcean and Unreal Engine based simulator for log playback, ran into physics issues as velocity estimates from LRAUV were incomplete and cause the simulator to show no pitch or yaw motions.
- Started working on RVIZ and ROS2 playback. Finished stage 1, works well with faster than realtime playback achieved. Working on making improvements to visuals, and playback control. Facing random issue of RVIZ flickering, seems to be internal QT related bug.
- Plan to wrap up by end of month
- 902204 - Scalable Robotics
 - Support ASV deployment for dock surveys
 - Found hardware issues with Norbit dropping out frequently. Cause currently unknown
 - Driver remains to work as expected
- Overhead
- Out of Office
 - Thursday 11/20 WFH apart from 3:30-5:30 daughters appointments @Stanford
 - Monday 11/24 WFH apart from 8:30-10:30 am for daughters appointments @Stanford

Week 46

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
 - Have v1 matplotlib based simulated LRAUV log playback ready. Downsides are slower performance, but good for diagnosing vehicle issues, and observing state behaviour visually
 - Working on quick tangential option of using holoocean simulator using Unreal Engine for higher fidelity animations
 - Diving into LRAUV codebase to integrate with gazebo
- 902204 - Scalable Robotics
 - Worked with Johann to checkout latest versions of norbit driver for ASV operations, setup scripts to enable single operator modes
 - Random issue with image display is unresolved, perhaps a change in system packages caused a break? Was working a day before
 - Help Johann with dock survey on Thursday 11/13
- Overhead
 - Trailant training
 - Project updates
- Out of Office

Week 45

- 901809 - Deep Sea Bioinspiration
 - Waiting on CVision contract to resume work on OceanShot project for DeepPIV
- 902101 - LRAUV Technology Development

- Working on developing a log playback visualizer to replay vehicle dynamics
- Setup log reader which extracts variable values from nc4 files
- Using tethysdataviz repo to try plug in visualization in same WebGL app.
Animation causes crashes in browser window, will pivot to standalone viewer
- Setup simple orientation animation viewer using matplotlib, will use as backbone for more intricate animation in 6DOF
- 902204 - Scalable Robotics
 - Meet with Johann and Michael to migrate ASV framework to single user system
 - Update drivers on ASV to latest versions and test.
- Overhead
- Out of Office

Week 44

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 43

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 42

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 41

- 901809 - Deep Sea Bioinspiration
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- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 40

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
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- Overhead
- Out of Office

Week 39

- 901809 - Deep Sea Bioinspiration
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- Out of Office

Week 38

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 37

- 901809 - Deep Sea Bioinspiration
 - Met with CVision for project update meeting and to touch base on further development on OceanShot 3D pipeline
 - Identified approach for image stabilization, installed several SOTA models to test with DeepPIV data
 - Concluded that no current SOTA model works for the kind of data we have
 - Proposed using segmentation models with fixed aspect ratio framing works 80%
 - Identified potential approach for data denoising and masking for 3D slicer
 - Testing Diffusion models for automated image masking
 - Testing with a small dataset to train model on DeepPIV data
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
 - Attended project management workshop
- Out of Office

Week 36

- 901809 - Deep Sea Bioinspiration
 - Testing deepPIV data on GaVS pipeline which involved
 - Setting up COLMAP and GLOMAP
 - Setup SAM for foreground masking
 - Setup ProPainter
 - Tested with GaVS sample dataset
 - Testing with DeepPIV data, running through entire pipeline to generate the specific dataset
 - Literature review on other options
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 35

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 34

- 901809 - Deep Sea Bioinspiration
 - Begin testing video stabilization models for DeepPIV pipeline
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Finished technology transfer before Arctic cruise deployment
 - Working on LCM→FBT converter addition to 7k-writer.
- Overhead
- Out of Office

Week 33

- 901809 - Deep Sea Bioinspiration
 - Prepare plan for testing pipelines for OceanShot project
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Prepare and push deployment ready versions of sen_norbit, 7k_writer, and mbes_localization
 - Facilitate technology knowledge transfer for team travelling to arctic cruise
 - Update Atuncita with latest versions, verify modules work
 - Update readmes and write guides for offshore team

- Overhead
 - Intern support
- Out of Office

Week 32

- 901809 - Deep Sea Bioinspiration
 - Literature review for DeepPIV ML based improvements
 - Prep work for ML@MBARI workshop
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Feature adds and deployment readiness for sen-norbit, 7k-writer in preparation of arctic cruise
 - Improvements to mbes_localization pipeline for UTM coordinate reference frames
 - Continue improvement on mbes_localization system using older data, might be not ideal due to possibly poor overlap.
 - Improvements to reference_preprocess submodule to move from mb-grid → submap database
- Overhead
 - ML@MBARI-workshop
- Out of Office

Week 31

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 30

- 901809 - Deep Sea Bioinspiration
 - Meet with Joost to go over DeepPIV objectives
 - Start initial research on video stabilization and image denoising pipelines
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Worked with Sebastian to get the GIM robotics front end submap generator
 - Searched for MBSYSTEM grids to test with as reference grids
 - Wrote scripts to generate and assess databases made from grd file generated pointclouds
 - Generated s7k records for recent BlueBoat data to test for heave data
 - Made changes to 7k-writer's snippet record generator based on Norbit feedback, however their feedback seems to conflict with data

- Overhead
- Out of Office

Week 29

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 28

- 901809 - Deep Sea Bioinspiration
 - Test lcm broadcasting
 - Implement bug fixes on thread safe shutdown
 - Intern support for setting up detection pipeline
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Continue with setup of GIM tool for Arctic Sled data from 26 June, 2025
 - Intern support
 - Meet Dave and Jenny to investigate issues with seismo sands survey s7k data
- Overhead
- Out of Office

Week 27

- 901809 - Deep Sea Bioinspiration
 - Implementation of LCM broadcasting into Triton camera driver
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Testing localization system with older logs from LASS,
 - Testing new reference database generated from MBSYSTEM grids
- Overhead
- Out of Office
 - July 3 - July 7 Vacation

Week 26

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Testing Sonar based navigation stack
 - Improved matching metrics with Hausdorff distance implemented
 - Wrote new lcm publisher for state estimate
 - Wrote MB system point cloud to database script

- Bug fixes to Norbit driver + standalone gui
 - Cruise preparations for Thursday 26th June
- Overhead
- Out of Office
 - July 3 - July 8 Vacation

Week 25

- 901809 - Deep Sea Bioinspiration
 - Refactored triton camera driver to be more modular
 - Fixed bugs with saving images in different formats
 - Added offset configuration and set cropping for 2K res for all 3 cameras
 - Added video recording in h264 and h265. Files are chunked as per config
 - Halfway through setting up rtsp streaming of video
 - TODO: Finish RTSP streaming, add lcm broadcast
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Finished the Pose Graph manager module
 - Finished integration script to run localization
 - Testing on parameter tuning
 - Added visualization of trajectories
 - Working on fixing bugs with ground truth trajectories
 - TODO: Final map visualization, lcm channel broadcast, test with larger datasets, MBSys→DB
- Overhead
- Out of Office
 - July 3 - July 8 Vacation

Week 24

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office
 - July 3 - July 8 Vacation

Week 23

- 901809 - Deep Sea Bioinspiration
 - Alpha version for AVT multicam driver complete, tested with external triggering
 - Working on beta version which modularizes the framework and will add config changing and video streaming features
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics

- Working on MBES localization framework. Finished modules on database management, submap matching and registration management.
 - Working on backend pose graph optimization framework
- Overhead
- Out of Office
 - July 3 - July 8 Vacation

Week 22

- 901809 - Deep Sea Bioinspiration
 - Worked on Multicam driver for allied vision CSI/2 MIPI cameras.
 - Migrated to VmbPy backend to have better control over camera settings.
 - Driver can now run at max frame rate and resolution
 - Modularized driver to choose individual settings for each camera parameters and saving
 - Wrote profiles for setting + custom profiles
 - Working on video streaming
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Worked on MBES localization system.
 - Finished first module + unit tests for database management and submap query system based on location. This covers databases for both reference and query maps.
 - Working on registration system + pose graph backend next.
- Overhead
- Out of Office
 - July 3 - July 8 Vacation

Week 21

- 901809 - Deep Sea Bioinspiration
 - Resume writing VmbPY based driver for Triton.
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Changes made to 7k-writer, asv branch created for use with blueboat lcm channels to generate s7k records from seismosands survey
 - Updates to norbit driver, reverting back to vehicle frame for bathy messages
- Overhead
- Out of Office
 - July 3 - July 8 Vacation

Week 20

- 901809 - Deep Sea Bioinspiration

- Resume writing Triton drivers using VimPy as backbone instead of GenICAM. Will offer more control over settings.
 - Go through documentation on Orin setup again to prepare deployment ready version.
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Added an interactive console client to update norbit settings in real time without needing to restart driver.
 - 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.
 - Water tank testing for new changes, investigate why soundings were poor in last paragon off shore test. Possibly loose cable covering Norbit.
- Overhead
- Out of Office
 - July 3 - July 8 Vacation

Week 19

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Continued development of S7k translator tool, last missing pieces are Water Column and Snippet data
 - Assisted in dock deployment of blueboat and collected data
 - 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
 - Fixed a bug causing S7k logs to have some missing data.
 - Converted two logs with bathy + nav data to provide to Aaron Micallef before next Tuesday deployment.
- Overhead
- Out of Office
 - Flying to Pittsburgh for commencement Wed 05/07/2025 and return on 05/12/2025. Will work remotely when possible.

Week 18

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 17

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office

Week 16

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Finished bug fixes and updates to norbit lcm driver, now records in binary without lcm as option
 - Finished bathy translation in s7k translator, will finish water column and snippet by EOW
 - Test surface vehicle operations with blueboat on Thursday April 17
- Overhead
- Out of Office

Week 15

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Finish up changes to norbit driver for binary read and write
 - Work on s7k translator
 - Start MBES localization module work. Met with Sebastian to discuss action plan steps on 04/09/25
- Overhead
- Out of Office
 - Tue 04/08/2025- Sick leave

Week 14

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - 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.
 - 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.

- BlueBoat: Updated driver, wrote service scripts for gui and config mode
- Overhead
- Out of Office

Week 13

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Working on s7k conversion tool for Norbit WBMS
 - Met Dave to understand more details on MB system requirements
 - Focusing on record 7027 to reach minimal viable product to test in tank
 - Write module to tie in nav messages into 7027
 - Familiarize with mutlibeam submap module.
- Overhead
- Out of Office

Week 12

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office
 - WFH Feb 27 and Feb 28

Week 11

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office
 - WFH Feb 27 and Feb 28

Week 10

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Debug and test LCM to S7K tool
 - Scoping meeting for Norbit WBMS localization
 - Setup timeline analysis for Localization
- Overhead

- Out of Office
 - WFH Feb 27 and Feb 28

Week 9

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
 - Continue finding bug in Irauv application during sim
- 902204 - Scalable Robotics
 - Finished front end lcm subscriber for norbit + nav data
 - Wrote container classes for s7k datagram
 - Work on integrating front end with s7k writing
- Overhead
- Out of Office
 - WFH Feb 27 and Feb 28

Week 8

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
 - Continue working on finding log replay bug
- 902204 - Scalable Robotics
 - LCM→7K translation. Wrote subscriber to take in relevant lcm topics
 - Decode raw binary data to get required data fields
 - Current work on repacking to 7k datagrams
- Overhead
- Out of Office

Week 7

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
 - Finding simulator bug in LRAUV application
 - Causes some data to not be transferred through from gazebo from csv
- 902204 - Scalable Robotics
 - Met with Mauro to go over S7K conversion tool, and discuss with Dave
 - Get frontend lcm log reader reader and converge WBMS and Navigation data together
 - Start formal exploration of wbms based relocalization module to supplement visual SLAM and usbl readings
- Overhead
- Out of Office WFH Feb 13, Feb 14 Off

Week 6

- 901809 - Deep Sea Bioinspiration

- 902101 - LRAUV Technology Development
 - Meet with John Ryan and LRAUV team for IC listen hydrophone integration
 - Meet with brian to troubleshoot data stream errors in gazebo simulator
 - Finished writing nc4 to gazebo conversion tool pending test and integration
- 902204 - Scalable Robotics
 - Met Giancarlo to look at next steps for SLAM and localization using FLS and WBMS
 - Attended mapping meeting with Caress and Troni group for unifying mapping system for MBARI
- Overhead
- Out of Office WFH Feb 6

Week 5

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
 - Deep dive into ExternalSimGazebo class for LRAUV-applications
 - Understand code flow
 - Wrote new class to read nc4 log files, and translate to gazebo messages
 - Check logic flow manually and then run and debug
- 902204 - Scalable Robotics
 - Norbit c++ driver documentation writeup
- Overhead
- Out of Office WFH Jan 31

Week 4

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
 - Shit priority to LRAUV
 - Look through ExternalSimulator class
 - Plan for nc4 data extraction and conversion to gazebo messages for sim
- 902204 - Scalable Robotics
 - Beta driver development finished
 - Background/legacy research on s7k conversion tool
 - Go through Ocean Imaging repositories on reson and 7kcenter
- Overhead
- Out of Office WFH Jan 23

Week 3

- 901809 - Deep Sea Bioinspiration
 - Looking into VimbaPy to get better control over camera config setting
 - V4L system has issues where sometime settings are not registered as expected on startup

- 902101 - LRAUV Technology Development
 - Nc4 log reader looked at and extracted relevant information, Will contact Brian to meet to see where these data fields can be fed into simulator.
- 902204 - Scalable Robotics
 - Finished Norbit beta driver development to test on cruise days Jan 14 and 15 2025
 - Changes from alpha: Streamlined, and removed redundant features from alpha driver
 - Added verbose/debug modes to both drivers to limit console prints
 - Cruise days Jan 14/15
- Overhead
 - Performance review training (view recorded meeting)
- Out of Office Offshore Jan 14/15

Week 2

- 901809 - Deep Sea Bioinspiration
 - Fixed issues with allied cameras on CTI boards. First board was defective/damaged hence probably why there were issues with it. Unfortunately not covered by warranty.
 - Change code to access camera feeds. Currently using V4L-ctl, but not able to consistently set parameters for fps with it. Explore the use of Vimba Python library instead.
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - 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
- Overhead
- Out of Office WFH 01/08

Week 1

- 901809 - Deep Sea Bioinspiration
 - Finished maintenance and clean up of titanCAM repo
 - Completed new feature requests
 - Looked up cloning for CT BSP for Jetson Orin, seems a bit involved and requires opening up the bulkhead, will wait for next week.
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Cleaned up uncertainty estimation and base values for factor graph in SBN
 - Fixed localization matching with better method from above and verified performance is unaffected
 - Made modifications to loop closures, pending test

- Overhead
- Out of Office
 - 12/31 1:30-4:30, dropping family off at SFO