

Akshay Hinduja

Week 30

- 901809 - Deep Sea Bioinspiration
 - Triton deployment support
 - LRAUV pilot training
- 902101 - LRAUV Technology Development
 - Dev for lrauv-terrain-awareness, tie up with mission structures and setting terrainavoidance as an insert
 - Closed out sim testing of lrauv-terrain-awareness on yoyo missions
 - ToDo: More testing in other scenarios, default Portuguese ledge is very flat.
- 902204 - Scalable Robotics
 - SBN improvement efforts:
 - Terrain correlation branch completed and tested. No consistent improvement seen, likely a no-go
 - Continue improvement on degeneracy branch. Improve smoothness, and GNC factor pruning in backend. Improve odometry factor setup
 - PR review for sen-norbit split comms
- Overhead
- Out of Office

Week 29

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office
 - PFL/Vacation: Jul 13, 2026 - Jul 17, 2026

Week 28

- 901809 - Deep Sea Bioinspiration
 - Continue supporting triton deployments
 - Implement new syslog capabilities to understand vehicle behavior during dives.
- 902101 - LRAUV Technology Development
 - Setup lrauv gz sim
 - Setup plugin for fls multibeam in sim

- Test mission parameters for pitch and depth commands in sim
- Wrote terrain avoidance module to interface over lcm and slate
- Testing
- 902204 - Scalable Robotics
 - Finished degeneracy aware SBN pipeline implementation.
 - Empirically found that Portuguese ledge surveys are a poor choice to test SBN, and may never be a good location for it to work at LASS survey altitudes.
 - Testing in Sponge Ridge datasets
 - Implementing new bounded terrain correlated correction, should help provide a coarse estimate as vehicle moves over larger distances.
- Overhead
- Out of Office
 - PFL/Vacation: Jul 13, 2026 - Jul 17, 2026

Week 27

- 901809 - Deep Sea Bioinspiration
 - Improvements to the integrated backseat app for tritoncam, mainly in the detector node.
 - Push updates to triton and getting it ready for deployment.
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Ran audit on SBN repo to identify overlooked bugs
 - Implemented bug fixes on SBN pipeline.
 - Identify areas of improvement mainly for place recognition
- Overhead
- Out of Office
 - PFL/Vacation: Jul 13, 2026 - Jul 17, 2026

Week 26

- 901809 - Deep Sea Bioinspiration
 - Integration of new backseat app on test bench
 - Improvements in configs for easier operator control
 - Install deployable version on Triton backseat
- 902101 - LRAUV Technology Development
 - Work plan for terrain awareness work for proposal
- 902204 - Scalable Robotics
 - Literature review on SOTA place recognition techniques
- Overhead
- Out of Office

Week 25

- 901809 - Deep Sea Bioinspiration
 - Triton deployments and TritonCAM dev
 - Setup new backseat app from collaborators on Triton, failed to work
 - Debug on test bench while being on support for Triton 57 deployment,
- 902101 - LRAUV Technology Development
 - PIC training
- 902204 - Scalable Robotics
 - Resume looking at sonar SLAM pipeline improvements
- Overhead
- Out of Office

Week 24

- 901809 - Deep Sea Bioinspiration
 - Setup pipeline to convert Triton lcmlogs to hevc using gpu encoding. Might have to think about on device/share conversion as it copies files over network and back to convert which is the main bottleneck.
 - Prepare for next weeks deployment, get new detection/backseat module tested and installed on Triton backseat.
- 902101 - LRAUV Technology Development
 - Meetings
- 902204 - Scalable Robotics
- Overhead
 - OCEANS reviews.
- Out of Office

Week 23

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office
 - Jun 1, 2026 - Jun 6, 2026 Vacation

Week 22

- 901809 - Deep Sea Bioinspiration
 - Triton setup for deployable AI, improvements to comms between detection and backseat helper modules
 - Improvements to logging for lcm
 - Modifications to start scripts, and testing
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics

- Improvements to registration workflow in SBN
- Finished degeneracy aware ICP workflow
- Tested against self with offset, works
- Testing with LASS maps ongoing
- Overhead
- Out of Office
 - Jun 1, 2026 - Jun 6, 2026 Vacation

Week 21

- 901809 - Deep Sea Bioinspiration
 - Meetings
 - Improved lcm mjpeg support, modified helper scripts to accept mjpeg lcm messages
 - Give ~20Mbps write saving allowing about ~23hrs per TB
 - Fix INFO and FAULT bugs in communications of triton-detection to lrauv-backseat-helper
- 902101 - LRAUV Technology Development
 - Meetings
 - Setup lrauv-application docker
- 902204 - Scalable Robotics
 - Test recent changes for eigenvalue analysis supported ICP registration pipeline
 - Test point-cloud-accumulator
 - Survey state of the art place recognition/point feature descriptors for more robust candidate selection in SBN
- Overhead
- Out of Office
 - Jun 1, 2026 - Jun 6, 2026 Vacation

Week 20

- 901809 - Deep Sea Bioinspiration
 - TritonCAM improvements and backseat computer back up creation
 - Intern meeting
 - Deployable AI meeting
 - Dev meeting
- 902101 - LRAUV Technology Development
 - Group meeting
- 902204 - Scalable Robotics
 - Spring meetings
 - Made improvements to mbari_deploy_mbes pipeline mainly to point_cloud_accumulator. Fixes and allows more consistent submap sizing based on spatial distance rather than temporal. Also makes

- distance between submaps more accurate, leading to 20x space savings from avoiding subamps with 99% overlap being written continuously.
- Found bug in registration transformation composition in mbes_localization. Bug was masked by another bug in DR pertubance modes, and was only caught during last cruise. Took a while to find, but fix is in progress, but will require a lot of tuning later.
- Overhead
 - ML advisory group meeting
- Out of Office
 - Jun 1, 2026 - Jun 6, 2026 Vacation

Week 19

- 901809 - Deep Sea Bioinspiration
 - Lab meeting
 - Resume setup of backup orin for Deployable AI
- 902101 - LRAUV Technology Development
 - Setup lrauv-app and lrauv-tools for gazebo sim
- 902204 - Scalable Robotics
 - Abstract for OCEANS poster session submitted
 - Tweaks and experimental improvements to SBN pipeline
- Overhead
 - Attended internal proposal presentations
- Out of Office
 - Jun 1, 2026 - Jun 6, 2026 Vacation

Week 18

- 901809 - Deep Sea Bioinspiration
 - LRAUV-DSBI meeting
 - Setup Orin clone for TritonCAM. Working well.
 - Testing archival code to find delete bug seen in deployed version, but none found
 - Made improvements and bugfixes
 - Wrote lcm logger to use instead of image saving and archival.
 - Push some updates to Triton and test
- 902101 - LRAUV Technology Development
 - Wrote and tested terrain following and awareness module in holoocean sim
 - Ready to port into gazebo for tuning, need to first setup plugins and example scenarios
- 902204 - Scalable Robotics
 - Test portuguese ledge data for SBN
 - Write abstract for Oceans for SBN, assist abstract for ASV shallow surveys

- Overhead
- Out of Office

Week 17

- 901809 - Deep Sea Bioinspiration
 - TritonCAM backseat computer backup system being prepared
 - Also making a new version with latest deepstream version with intent to update all eventually
- 902101 - LRAUV Technology Development
 - Write scripts to control holoocean simulator to keep constant altitude using dvl + sonar inputs
- 902204 - Scalable Robotics
 - Test data from LASS cruise with parameter tuning.
 - Focus on quality matches rather than quantity
 - Look at possibility of very densely packed reference databases
- Overhead
 - Proposal abstracts
 - OCEANS abstract
- Out of Office

Week 16

- 901809 - Deep Sea Bioinspiration
 - Debug archiving issue with tritonCAM. Seems to delete everything which should not be happening.
 - Setup test bench to run on desk and observe behaviours.
- 902101 - LRAUV Technology Development
 - Been on standby due to other projects, but will resume sim development soon
- 902204 - Scalable Robotics
 - Tested data from Portuguese Ledge on SBN, results were iffy, not a good dataset
 - Spong Ridge data tests performed well, with complete surveys to test against. Still limited in terms of height variability
 - Got successful matches on RC cruise April 14 for a short while before hardware troubles with the Reson
- Overhead
 - Watched proposal workshop
 - Working on a potential abstract
- Out of Office
 - Apr 14, 2026 Rachel Carson LASS
 - Apr 16, 2026 Possibly RC LASS again

Week 15

- 901809 - Deep Sea Bioinspiration
 - TritonCAM, triton-detection and Irauv-backseat communication debugging.
 - “Important” messages relay frames processed, but inexplicably don’t relay counts
 - Would need to setup pipeline to test offline and offshore
 - DeepPIV support for setting up pipeline on lab computers, and meeting with CVision
- 902101 - LRAUV Technology Development
 - Meeting to discuss current standing for TFTA, future requirements of hardware, possible proposal to write
- 902204 - Scalable Robotics
 - Test SBN pipeline with Packard cruise data
 - Setup Atuncito with pipeline
 - Generate new profiles for docker mbari_deploy_mbes
- Overhead
- Out of Office
 - Apr 14, 2026 Rachel Carson LASS

Week 14

- 901809 - Deep Sea Bioinspiration
 - Bug fixes on TritonCAM
 - Added new information logging for frames processed per camera to get understanding of how the cameras worked and basic settings after each run
 - New Irauv-backseat-helper branch for sending INFO and FAULT syslogs to improve logging on dash to understand if systems are working properly at comms events
 - Modifications to triton-detection to send frame counts to backseat helper.
 - Troubleshooting camera connection issues with Paul
- 902101 - LRAUV Technology Development
 - Reading into backseat-helper and preparing insert for terrain avoidance behaviour. To be used with main algorithm running on backseat
- 902204 - Scalable Robotics
 - Test SBN with Sponge Ridge data from Packard Cruise. Works well, even with a small dataset not optimal for SBN purposes.
 - Test SBN on Portuguese Ledge data from Packard cruise, need to first prepare reference database tuned to general survey area.
 - Setup plan for April Carson cruise for SBN test run
- Overhead
- Out of Office

Week 13

- 901809 - Deep Sea Bioinspiration
 - Meeting with Brian from CVision to go over final changes as this stage of collaboration ends
- 902101 - LRAUV Technology Development
 - LRAUV group meetings + meetings with Brett to go over Imagenx sonar data and documentation, discussion on how the module might work
 - Go through LRAUV app and understand how missions and behaviours work
 - Finished setting up basic simulation with dvl and profiling sonar, will be useful to test algorithms before integrating with LRAUV-app
 - Prepare setting up nvidia orin nano as backseat computer to test with
- 902204 - Scalable Robotics
 - Test packard cruise data with sonar based navigation stack, figure out which surveys are actually relevant first, and run the system
- Overhead
- Out of Office

Week 12

- 901809 - Deep Sea Bioinspiration
 - Review of latest version pushed to oceanshot repo by CVision
 - Attend meetings for deployable AI/LRAUV work with Bioinspiration lab + Ivan's lab
- 902101 - LRAUV Technology Development
 - Ready requirements doc, and organize meeting with LRAUV team to go over terrain following project needs and inputs.
 - Brief chat with Piscivore post doc Ciara on data prep for shark behaviour paper, use of tethystales and animation/chart generation to help the project
- 902204 - Scalable Robotics
 - On shore support to CompasLab team out on packard cruise.
 - Wrote pipeline to tie in raw bin files from norbit to a final lcmlog compatible with mbs-tools. Merged these tools into mbs-tools with new pip installable package mb-rawtools to complement mb-convert.
- Overhead
 - ML advisory meeting
- Out of Office

Week 11

- 901809 - Deep Sea Bioinspiration
 - Meeting with CVision, get upto speed on current status
- 902101 - LRAUV Technology Development

- LRAUV dev meeting, discuss terrain following and awareness project
- Setup simulator on omega for algo development
- Prepare requirements document for TFTA (terrain following, terrain awareness)
- 902204 - Scalable Robotics
 - Support sur ridge cruise from shore
 - Wrote log splicing script to merge dive logs missing raw channels with norbit binaries broadcasted to lcm
 - Added lcmlogging functionality to sen_norbit as a flag
- Overhead
- Out of Office

Week 10

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office
 - Feb 9 -March 9 parental leave

Week 9

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office
 - Feb 9 -March 9 parental leave

Week 8

- 901809 - Deep Sea Bioinspiration
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
- Overhead
- Out of Office
 - Feb 9 -March 9 parental leave

Week 7

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

- Feb 9 -March 9 parental leave

Week 6

- 901809 - Deep Sea Bioinspiration
 - Tie up meetings with CVision to end first stage
 - Verify and demo deliverables from contractors
 - Found areas for improvements on intermediary outputs to help modularize efforts to pickup from the middle.
 - Asynchronous meetings with BiL team to discuss next steps in March
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Got localization against MBSysmap maps working (!)
 - Good success with 5cm scale maps and 1m scale maps (upscaled using ML sampling methods <https://github.com/Holmes-Alan/PUFM>)
 - Implemented NDT matching, global FPFH search to speed up matching performance.
 - Implemented standalone localizer, which does not use pose graph optimization
 - Added LCM publishing for pose data updates.
 - Improved NDT matching voxelization pre process, which gives better results so far.
- Overhead
- Out of Office
 - Feb 9 -March 9 parental leave

Week 5

- 901809 - Deep Sea Bioinspiration
 - Meetings for lab, deepPIV and dev
 - Testing Sam3 for deepPIV image segmentation
 - Looking at using pre-available masks as prompts to segment similar organism scans
 - Go through CVision implementation
- 902101 - LRAUV Technology Development
 - Attended bi-weekly meetings, brief discussion on terrain following using multibeam sonars
- 902204 - Scalable Robotics
 - Attended meetings
 - Have working solution for live $\longleftrightarrow$ live loop closures + reference matching. Need to test out coordinate frame shift for matches, transforms might need a slight tweak.
 - Test system with grd conversions to databases for 3cm, 5cm and 1m res
- Overhead
- Out of Office

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Week 4

- 901809 - Deep Sea Bioinspiration
 - OceanShot Bigelow Meetings
 - Prepare tool to use SAM3 for segmentation with presegmented image prompts
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Found that databases for the submaps store the point cloud in local coordinates, which may create issues when trying to match up against grd file conversions to db
 - Looking at sponge ridge data over multiple days to test SBN with.
- Overhead
- Out of Office
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Week 3

- 901809 - Deep Sea Bioinspiration
 - Set up and run NNInteractive in Slicer 3D to determine suitability of the method for segmentation tasks
 - Conclusion is that it can be great manual segmentation tool as long as binary masks are good.
 - Look at SAM3 suitability towards segmentation
- 902101 - LRAUV Technology Development
 - Attended kick off meetings, learn more about the years tasks
- 902204 - Scalable Robotics
 - Continue refinements on loop closure and factor graph implementation for Sonar Based Navigation stack
 - Made key fixes and improvements on system.
 - Optimized database look up for reference search, uses 65% less time for the task
 - Unified and tested loop closure and reference matching pipelines to be similar for ease of understanding and changes.
 - Loop closures starting to look better behaved
 - Implementation of NDT matching to complement/replace ICP for more robust multi resolution matching
- Overhead
- Out of Office
 - Friday, Jan 16, daughters drs appointment 9am -12 pm

Week 2

- 901809 - Deep Sea Bioinspiration

- Meeting with CVision, Joost and Emily to track progress for DeepPIV pipeline automation
 - Look at NNInteractive plugin in Slicer, tryout with deepPIV data
- 902101 - LRAUV Technology Development
- 902204 - Scalable Robotics
 - Made sweeping changes towards handling constraint addition to graph, unified to be std dev instead mishmash of std dev and covariances.
 - Bug fixes and cleanup
 - Unified logic for reference match and loop closure match checks to be the same workflow
 - Use std dev to weaken or strengthen constraint type.
- Overhead
- Out of Office
 - Thursday 8th, daughter's dr's appointment in Palo Alto.