

Thom Maughan Sorted By Project

300078 - DMO Support - AUV

- Hyperion: parts ordering and pref for assembly by EE-Techs . PCBs and parts expected in the next day or so. (Week 5)
- Hyperion: started environmental board design (Week 5)
- Hyperion Power Supply parts are in (delayed by weather). Parts kitting, assembly documents for handbuild by EETech of a) 24 supply only, then b) qty 3 of complete board. Using Erik's python script to change placement file formatting per Jose's request. (Week 6)
- Hyperion Environmental board design (Week 6)
- Various design discussions with Erik (Week 6)
- Hyperion meeting (Week 7)
- Kitting, BOM and placement file for partial assembly - 24v supply (Week 7)
- Hyperion environmental board design (Week 7)
- Hyperion power supply partial build to test GaN FET 24v buck converter. Initially there were issues, but after swapping the controller the converter was working. 30v input was running ~96% efficient at 180W! Characterizing efficiency in 10v steps to 60v, one of the FETs blew when the input was at 60v and it took out the pads on the board. The design as is will work for development. (Week 11)
- Working on an design update which will have automated assembly (Week 11)
- Working on Hyperion power supply design update and pcb layout. Manufacturing plan is JLCPCB and LCSC for automated assembly. (Week 12)
- Parts kit, BOM and centroid for EE Tech partial stuff of power supply board to enable Erik's development (Week 13)
- Finished updating next rev of power supply design, layout is complete, preparing fab and assembly package for JLCPCB (Week 13)
- Hyperion power supply design update. Fab at JLCPCB. Parts ordering, etc. (Week 14)
- Partial build of first board (Week 14)
- Hyperion Power supply design update finished. BOM uploaded for fab and assembly at JLCPCB. Holding off submitting the order until partial build assembly issues are resolved. (Week 15)
- Hyperion Power Supply, second partial stuffing. Most of the small form factor chips had solder issues. Many iterations of reflow and reattach. The 6 layer PCB has lots of copper for high current and thermal dissipation and this is believed to be the culprit. (Week 15)
- Reviewing next steps with Paul and Erik. Recommendation is to modularize and for the near term violate the 11mm component height goal. (Week 15)

- Decided against producing the updated Hyperion Power Supply due to issues with hand assembly likely stemming from too much copper for heat dissipation on the 400W PCB. Redesigned the power supply to use modules modeled after Polulu. Preparing for fab and assembly. (Week 16)
- Project proposal abstract / presentation (Week 17)
- Wrapping up modular power supply board, preparing for fab and assembly (Week 17)
- Review, discussions regarding backplane, etc. (Week 18)
- Helped with Hyperion proposal abstract (Week 18)
- Signed up for project manager (Week 18)
- Hyperion power supply, environmental board (Week 19)
- Discussions (Week 19)
- Hyperion power supply board is in fab and assembly at jlcpb. Connectors and a cap will be assembled at MBARI. This version defines a footprint in the form established by Polulu with the addition of EXTVCC. (Week 22)
- Hyperion Power supply assembly (Week 24)
- Review / feedback on designs (Week 24)
- Proposal review (Week 24)
- EE Techs finished Hyperion power supply board assembly, adding parts not available at LCSC. (Week 30)
- Hyperion power supply board testing. Found a minor problem related to BackupBatteryFlag detection circuit. (Week 30)

300083 - DMO Support - LRAUV

- BPC2 Batteries packs are installed in Galene. There are resistors in series with the RS232 ground and we are seeing an occasional garbage character, likely a termination problem with the multidrop transceiver. (Week 4)
- BatMan BPC2 packs integrated on Galene. One of the packs had a serial noise char. Root cause due to cable cross talk and tri-state RS232 transceiver. Worked through options and decided to enable RS232 transceivers since we are not need RS232 multidrop. Recommendations are for better cables (ground twisted with rx, ground twisted with tx), lower value pull down resistor (10K) when transceivers are tristate. (Week 5)
- Started multiday discharge test (Week 5)
- Gemini AI code review of batman firmware. Implemented the suggestion to use fixed point instead of floating point on Cortex-M0. (Week 6)
- BPC2 BatMan integration test, specifically the discharge test surfaced a couple problems. LRAUV power cable modified for Galene, moving forward, we will make the change on BPC2 connector. Firmware bug affecting 'S', aka stick status command. Found and fixed. New firmware uploaded and test re-started with charge until end of day, then discharge until 'reserve' voltage behaviour is observed. (Week 6)
- Batman integration testing on Galene. Finding and fixing issues ranging from cable harness to firmware bugs. (Week 7)

- Released v0.9.14 and started discharge test (Week 7)
- Battery testing is in progress, charge / discharge. No bugs or odd behavior. Calibrating capacity as measured by the electronic load vs what is reported by the sticks. (Week 11)
- Galene is intended for high current (5 to 6amp) payloads and testing at 6amps has a 2v drop in the wiring harness. Varsha is out so I'm working to get Galene to the EE-Techs for wiring upgrade pending finding the right schematic. (Week 11)
- Helping coordinate Galene wiring upgrade. (Week 12)
- Working with Jim M on wiring modifications for Galene. (Week 13)
- Jim M upgraded the wires, retired. There was some confusion on what was done in the schematic, errors were found, corrected. Varsha is making sure the schematics are correct. Battery testing will resume and we plan to be in the test tank in 2 weeks. (Week 14)
- Wiring upgrade on Galene is nearly complete. Tested the optimum camera / lights port and the drop is now 1v at 6v instead of 2v. (Week 15)
- Battery discharge, charge cycle with no issues. It's ready for closeout in prep for tank test. (Week 15)
- Ahi+Planktivore has 28 out of 62 sticks not reporting. It's a contender for battery upgrade after we qualify Galene with at sea testing. (Week 15)
- Ahi has two of the banks of 8 sticks not reporting. Ahi finished the science mission but ran out of battery on the transit home from the CFE deployment. Running battery diagnostics show 25% are bad of the sticks that are reporting. (Week 16)
- Discussed plans with DMO and LRAUV team and then consensus is to fly Ahi next week for MBTS and then immediately afterwards swap in two BPC1 packs. Working on the BPC1 packs removed from Galene to make sure they are tested and ready for swap into Ahi. (Week 16)
- Battery testing on Ahi. 25% of the batteries are not reporting due to SMBus hang on two banks of 8. 25% of the batteries that are reporting are bad. Bad being defined as not charging to at least 80% of capacity. (Week 17)
- Various meetings to determine a plan for Ahi. Conservative plan is to use BPC1 battery packs from Galene. Charge, Discharge, connector cycle on a couple sticks. All 62 sticks are reporting and charging as expected, delivered to LRAUV lab. Ahi rebuild is planned this week. (Week 17)
- Evaluation of Ahi battery pack (Week 18)
- Rebuild of Ahi battery pack using BPC1 / Oceanserver with help from BPC2, delivered to DMO ASO (Week 18)
- Rebuild of Brizo battery pack using BPC1 / Oceanserver with help from BPC2, delivered to DMO ASO (Week 18)
- (Week 18)
- Battery rebuild for Ahi and Brizo (Week 19)

- Adding SMBus alarm flag management to BPC2. Modifying the trickle charge behavior to add user intervention to force trickle charge on. Temporary hold on closing Galene until I've got the alarm flags managed (safety). (Week 19)
- Galene's battery firmware is updated, tested, awaiting housing closure. I did not test the SMBbus over temperature with an actual battery that was over temperature - it was tested by forcing the condition with test code. (Week 22)
- BPC2 battery packs are ready to go in Galene, awaiting ASO closeout (Week 24)
- BPC2 battery packs have been installed in Galene and Galene is getting buttoned up and ready for tank test. Batteries will be fully drained then recharged and if all goes well Galene will be deployed thereafter. (Week 30)

901217 - Chemical Sensors

- Merged and reviewed Irene's changes for the sampfast command. Advised modifying the arguments to make MoSoS v5.2 table driven command processing easier. Merged and tested the update. (Week 4)
- Making good progress on the new MMS2 Analog and Digital board designs. (Week 4)
- Finalizing MMS v2 Analog board design (new spectrometer interface). Started layout (Week 5)
- Prelim MMS v2 Digital board design. Processor selection, power supply, ADC (Week 5)
- Working on design of new MMS interface analog and digital boards, aka, MMS2 (Week 6)
- Captured logic analyzer signals of existing FPGA design - very interesting that continuous photodiode read clocking and ADC conversion is happening when the MMS is idle. (Week 6)
- Manufacturing support, discussions with Ben Davis on MMS board checkout and tuning. (Week 6)
- Logic analyzer capture of MMS interface signals and timing. (Week 7)
- Ordered STM32HU585 processor boards for evaluation as timing generator (Week 7)
- Photodiode interface opamp selection for high gain transimpedance amp. (Week 7)
- Setting up a thermal cooling / heating surface for testing MMS Analog board across 0c to 35c for eventual comparison to new MMS2 (Week 7)
- Looked into a minor bug on MSC3 MoSoS v5.1.8 (Week 7)
- Supporting the lab. There have been two units that have had what appears to be a sleep problem that happens once in the 4 day cycle. Not sure if it's hardware / silicon errata related. Rerunning the K0 cal on the board that failed to try and reproduce. I've added an error log entry in the event HIB fails to sleep in the next release. (Week 11)
- Support (Week 12)
- Proof of concept prototype using an STM32u585 processor gpio to replace the fpga in the spectrometer interface boards. (Week 13)
- Schematic design of improved mms2 analog board (Week 13)
- In progress on MMS v2 Analog and Digital board design. Prototyped (Week 14)

- Presented to the science group in Chem Sensors on the inner workings of the ISUS sensor. (Week 14)
- (Week 14)
- Investigating a Bug where the MSC3 fails to sleep. This has happened 3 times out of 50 4 day K0 calibration runs. Jess has setup a sampling / sleep interval test program to run on one of the test boxes to try and reproduce. Implemented an error log and reset handler in case of sleep fxn fail. (Week 15)
- Working on MMS v2. Jess analyzed hundreds of floats including Seabird Suna to get the integration time setting from 2014 to 2025. As expected, SUNA required much less integration time due to higher optical signal. Reducing integration time will reduce power consumption and increase float battery life - the goal is to halve the power consumption of ISUS. Planning another lab talk on April 30 to go over the details and timing of an ISUS sample. (Week 15)
- Wahoo! MSC3 based GoBGC floats are now being deployed. This after nearly a year long four float engineering test. (Week 16)
- Working on MMS interface v2. (Week 16)
- (Week 17)
- ISUS sample timing presentation prep for science meeting. Postponed until May (Week 18)
- Prep'd then postponed the ISUS timing talk. (Week 19)
- Trouble shooting 4 ISUS resulted in 3 problems due to bubbles/droplets affecting optical path. 1 was due to a failed lamp. (Week 22)
- Presented ISUS timing to the Carbon Lab. Lobbying for restructuring the routine and cutting down on the sample time with lamp on - hopefully going to save about 30% in power for ISUS sample while maintaining accuracy. (Week 22)
- Worked with Josh on failed deuterium lamp analysis. (Week 24)
- MoSoS v5.2 for MSC3 (Week 24)
- Ordered upduino, Lattice UltraPlus ICE40UP5K FPGA dev board, for MMSv2 digital board pda and a2d logic implementation. (Week 30)

901513 - Targeted Sampling by AUVs

901805 - Coastal Biogeochemical Sensing Program

- PO for Jim Davis (Week 5)
- Started MoSoS v5.2 command testing on nanoFET, MFET, MpHOX. (Week 5)
- MoSoS v5.2 for nanoFET, working with Jim on git merge to main branch (Week 6)
- CCS support for Brent Jones who is bringing up his new formfactor nanoFET. (Week 6)
- Merged MoSoSv5.2 into the mainline. There are a few issues, notably with serial that will be resolved soon. New development will be on main from now on. (Week 7)
- (Week 7)

- (Week 7)
- Setting up for testing MoSoS v5.2 on nanoFET after merging Jim's latest update. (Week 11)
- Providing support for mini-ISUS. Luke is experiencing a spurious byte on wakeup with his setup. Jess has a test setup that does not reproduce the problem with the protocol analyzer. Likely culprit is floating TX signal when sleeping for more than a few minutes. (Week 11)
- MoSoS v5.2 command testing on nanoFET. (Week 12)
- MoSoS v5.2 serial command testing on nanoFET (Week 13)
- MoSoS v5.2, not much this week. (Week 15)
- Installed CCS on a loaner laptop in an effort to help Brent Jones. (Week 15)
- MoSoS v5.2 is being requested for test and validation and then use on the Spray2. (Week 16)
- Started command eval of MoSoS v5.2 on nanoFET, interrupted by LRAUV battery needs (Week 18)
- MoSoS v5.2 on nanoFET. Working thru and testing the command set. (Week 19)
- Working on MoSoS v5.2 release for nanoFET, integration on Spray Glider. Expecting to release without NAND support (not needed for Spray2) but will follow in the next month or so with logging to NAND flash. Spot checking, not full testing / support for the release on MFET and MPHOX (Week 22)
- Released MoSoS v5.2 for NanoFET, working with Jess on test (Week 24)
- Working with Jim Davis for NAND low footprint filesystem (Week 24)
- Working with Jim Davis on 'batFS', ultra low power and small footprint file system for nanoFET. (Week 30)
- Reviewed Jess's bug list for MoSoS v5.2. (Week 30)

901904 - Deep-Sea Coral-Sponge Community Observatory

- ROVVOR, planktivore attached to the ROV Ricketts. Barry Lab is encouraging the enhancement of our phase 1 proposal to included a deep, 4000m, capable housing dedicated to the ROV. (Week 22)
- Planktivore V1 is being readied for deployment on upcoming Barry Lab cruise on the Packard. (Week 30)

902004 - Planktivore

- Weekly meeting (Week 5)
- Working Planktivore v2 'B', aka second build (Week 5)
- Worked with Paul on Planktivore V2 maintenance. Paul disassembled the housing, found screws had galled. Need to service screws yearly. (Week 6)
- Removed backup battery, lightened by 480 grams. (Week 6)
- DMO ASO group is preparing Ahi for deployment next week. (Week 6)
- Poster for OSM26 (Week 7)
- Board Bullets (Week 7)

- Talked with Kobun on his proposal to gather eDNA on Planktivore. It's easy to add the eDNA 'sponge' as it would be zip tied to the optical extensions. (Week 11)
- Denis is making good progress on final assembly of Planktivore V2 'B' (Week 11)
- Planktivore v2 'B' build. (Week 12)
- Weekly meeting, coordinating with Denis (Week 13)
- Working on options for project proposal (Week 13)
- One of the DeepRip2 guest users was running a high cpu compute job that caused alerts on the UPS and had spooled the fans up loud. Trying to figure out if the fan noise is normal... (Week 14)
- Planktivore build is pending work by Denis (Week 14)
- Weekly meeting. Build is on hold waiting for Denis's time (Week 15)
- Meetings with science users to get input for Planktivore abstract. (Week 15)
- Weekly meeting. No progress on Planktivore v2 B build (Week 16)
- Working on the Planktivore proposal. Meetings with Monique, Steve H, Francisco, Colleen have all surfaced the need an institutional plankton image data pipeline. Met with Kevin who recommended adding the pipeline effort to the Planktivore proposal (Week 16)
- Final assembly is finished on Planktivore V2B for Opah. Helium leak test was not conclusive due to limits on vacuum inside Planktivore. (Week 18)
- Revised leak test is to put on bottom of test tank for a few days while monitoring humidity. (Week 18)
- Met with planktivore users, met with Alana, submitted 3 year Planktivore abstract (Week 18)
- Planktivore abstract and presentation (Week 19)
- Finalized build of Planktivore V2 'B' for Opah. Helium leak check needed more vacuum that we were comfortable pulling. Did not fill with helium due to potential oscillator risk. (Week 19)
- New plan for leak check is to put in test tank for several days while monitoring humidity (Week 19)
- Planktivore V2 'B' for deep LRAUV Opah has completed leak testing. It will be scheduled for deployment in the next month or so. (Week 22)
- Trip prep for MidSEC conference in Sweden followed by salmon lice detection experiments in Bergen Norway. June 11 to June 27. (Week 22)
- Planktivore V2 'B' is ready for integration on Opah (Week 24)
- Prep and packaging of Planktivore V1 for trip to MidSEC conference and follow on collaboration with Tidal at Salmon Farm in Bergen Norway (Week 24)
- Proposal discussions (Week 24)
- Attended MidSEC conference. Demonstrated Planktivore V1 with swim tow and live feed from small stream. Conference was excellent with lots of discussion, connections. (Week 26)
- Deployed Planktivore V1 in a research salmon pen near Bergen Norway, collaboration with Tidal. (Week 26)
- Planktivore proposal (Week 26)

- Demonstrated Planktivore twice at MidSEC conference (Week 27)
- Deployed Planktivore in research salmon pen near Bergen Norway (Week 27)
- Met with NTNU AURLab team members looking into opportunities for collaboration. (Week 27)
- Worked with Paul R. on disassembly of Planktivore V1 to diagnose imaging problem that occurred after airline handling. Prism holder was glued to prevent rotation. Paul upgraded XavierNX to OrinNx. Worked with Denis on re-assembly. (Week 30)

Out of Office

- Vacation Jan 5 - 9
- Photonics West, 1 day, likely Jan 20
- Vacation Feb 16 to 20
- OSM Feb 19 to 23
- One week vacation planned in Apr / May, not sure yet
- Mon 3/16 and Tues 3/17 vacation.
- A week vacation in second half of April (TBD)
- Ten days mid-June (dates tbd) for Norway Planktivore collaboration with Tidal and imaging workshop in Sweden.
- April 6th, appointment. Depending on length, will make up the time on off friday
- A week vacation in May (TBD)
- Two week vacation in July around the 4th
- Dental appointments. Two in June, One in July.
- Fifteen days mid-June (dates tbd) for Norway Planktivore collaboration with Tidal and imaging workshop in Sweden.
- Two week vacation July 6 to July 17, Colorado
- Fifteen days June 12 - 29 for Norway Planktivore collaboration with Tidal and imaging workshop in Sweden.
- Vacation Sep 8,9,10

Overhead

- Photonics West Jan 20 (Week 4)
- Employee feedback and Review prep (Week 4)
- Performance review (Week 5)
- CANON HiPP. Received DeepEdna3 server. Working with IS on install of 61TB drives. Ran into a snag and need to order PCIe U2 cards to mount the drives. (Week 6)
- Working with IS on DeepEdna3 install. (Week 7)
- Peter installed the 61TB drives on DeepEdna1 and 2 and implemented the storage naming convention. Absorbed the cost of the PCI cards into Planktivore. (Week 7)
- Helped Guillaume Liniger get setup on deepedna 3 for a neural net / monte carlo simulation job. Matlab install. Many thanks to Doug and Daniel for the

guidance on Mac Windows App for shared screen on Ubuntu and Matlab install support (Week 14)

- MBARI Tour for MLML, Tom Connolly's python class. Thanks to Jess Metter and Logan Grady for helping. (Week 17)
- Project proposal season (Week 18)
- May 5 Proposals, May 6 Proposals (Week 19)
- Attending MidSEC conference in Sweden. Excellent presentations and discussions. Swim net tow and demo of Planktivore. Also ran samples thru Manu Prakash's Planktiscopes. Many discussions on eDNA and interest in the 'lunchbox' (Week 25)