

901805 - Coastal Biogeochemical Sensing Program

Week 46

1. Irene Hu
 - a. Finished first draft at non-iso Nano and caught some errors in other boards based on nanofet
 - b. Worked through circuit for alkalinity sensor from Scripps, generated list of questions
2. Brent Jones
 - a. Investigating ways to run SBE pump on Spray during a loiter

Week 45

1. Irene Hu
 - a. Working on non-isolated version of Nanofet

Week 37

1. Brent Jones
 - a. Helping diagnose errors in Spray CF card data

Week 35

1. Irene Hu
 - a. Continued testing of current draws

Week 34

1. Irene Hu
 - a. Continued testing of current draws
2. Brent Jones
 - a. Flying and recovering Spray 34 in support of Yui's experiment

Week 33

1. Irene Hu
 - a. Power measurements on entire suite of sensors using Yokogawa
2. Brent Jones
 - a. Deployed and flying spray29 in support of Yui's experiment

Week 32

1. Brent Jones
 - a. Helping prep Spray34

Week 27

1. Thom Maughan
 - a. Meeting with Yui / Ken / Irene on 2025 proposal for the various carbon and nitrate efforts (Chem Sensors, Coastal biogeo, GoBGC, SOCCOM)

Week 26

1. Thom Maughan
 - a. Received MSC3 processor and baseboard from Irene on June 26th. Will spend a few more hours debugging problems on MSC2 and will then start MSC3 board bringup
 - b. Troubleshooting ISUS for M1. ISUS had stopped working with OASIS and had a 'Wakeup Fail' message. Power cycling fixed the wakeup problem. Mooring deployment is Jun 27.

Week 25

1. Irene Hu
 - a. Solidworks model of Nanofet2 layout previously discussed with Yui - does not work
 - b. Discussions of circuit ideas w/ Thom
2. Brent Jones
 - a. Meeting with Kaya to go over WW deployment from Packard in 2025
3. Thom Maughan
 - a. (SOCCOM/GOBGC)
 - b. Mooring ISUS nitrate sensor ran successfully over the weekend. We are hampered by lack of schematics and docs, and Jessica working with Josh figured out the connection error. Calibration is in progress. Mooring turn ship day is 27 Jun. Dark currents are out of spec. Suggesting a change of the spectrometer module and electronics board pair.
 - c. Working thru wiring issues on MSC2 baseboard to MpHOX revB - getting close to running the nitrate driver and test.

Week 24

1. Irene Hu
 - a. Discussions and planning re: Nanofet v2
2. Thom Maughan
 - a. 901217 - Chem Sensors / GoBGC / SOCCOM
 - b. ISUS for M1 Mooring

- c. Corrosion on Spray Glider was minimal during last deployment - 'ground' strap between p-cases appears to be working. Hoping to get a plastic tank down at ESB to make some measurements and do root cause on the ground fault.

Week 23

1. Irene Hu
 - a. Troubleshooting new mini ISUS stacks, got them working
 - b. Started mini ISUS baseboard
 - c. Started planning for Nanofet v2
2. Thom Maughan
 - a. (901217) Getting close to having the ISUS driver stack running in pHFET-SOS on Tiva. Working thru board proto hardware issues.
 - b. Mini-Isus digital board works. New MMS Digital boards also work.
 - c. Rebuild of Mooring ISUS instrument.

Week 22

1. Irene Hu
 - a. Working on presentation / documentation of all sensor boards, for lab meeting next week
 - b. Setup and wiring harnesses for mini ISUS FPGA board programming and comms

Week 21

1. Irene Hu
 - a. Ongoing modifications and updates to MSC3 baseboard and TIVA modules
 - b. Circuit analysis for Dura board checkout procedure in Chem Sensor lab

Week 20

1. Brent Jones
 - a. Flying SN34 in support
2. Thom Maughan
 - a. Big push on getting ISUS Nitrate sensor running on Tiva processor. Its not realistic this week but should be running soon after return. Dev setup will go to Colorado.
 - b. Functions are in place and compiling, though some of the CF2 based functions are stubbed. Working i2c drivers. Persistent data is moving from RTC SRAM to FRAM.

Week 19

1. Thom Maughan
 - a. GoBGC/SOCCOM. New board for mini-ISUS digital is out for fab/assembly

- b. Irene is on vacation, working with Jose on MSC3_baseboard and MSC3 Tiva module layout.
- c. Blg push to get ISUS running on Tiva processor using MSC2 setup.
- d. Finalizing with contractor Bill Keeler. Received hardware and latest PSoC software. Forwarded his invoice to accounting.

Week 18

1. Irene Hu
 - a. Ongoing work on MSC3 baseboard and Tiva module schematics, coordinating with Thom
 - b. Power measurements on Fiberlight
 - c. Lioncaps and NC Nanofets sent out for assembly (plus more Nanofet circuit boards)
2. Brent Jones
 - a. Flying spray 34
 - b. Swap sn29 mid section pcase
3. Thom Maughan
 - a. PCO adjustment of hours is pending. 901805 hours will be GoBGC and SOCCOM
 - b. Proposed an alternative to PSoC using FPGA based design for mini-ISUS. Did a prelim layout chip floor plan in Kicad and presented options on Thursday. Worked with Jose on the layout and he was finished by Tuesday and sent the boards out for quote on Wednesday.
 - c. Jose finished the layout on Tuesday for the MMS Digital 'round board' for mini-ISUS
 - d. Review of Irene's MSC3 processor module and baseboard designs
 - e. Reviewed progress on PSoC contractor project, met with contractor, met with Ken and Yui. Based on forward progress with mini-ISUS, terminated further work on PSoC. PO updated for final payment. PSoC task is now done.
 - f. Working APF serial protocol per UW spec and protocol capture. Goal is m2m protocol implemented by end of May.
 - g. Setup linux computer for protocol testing.

Week 17

1. Irene Hu
 - a. Troubleshooting on "bad" MBARI digital board: based on logic analyzer, data coming from analog board is correct, scrambled somewhere on digital board. Code seems to be correct. Second board tested by Ben/Mari and works fine
 - b. Worked with Jose to coordinate assembly of new MBARI digital boards
 - c. Reviewed Chad's updates to the MUXer board
2. Thom Maughan

- a. Met with Ken regarding plans for Mooring and Dorado ISUS. Plan is to work on these sensors after porting for new processor is complete. Jared's request for mooring is ISUS ready to go by June 12.
- b. Resumed porting after hitting milestone with Irene on MBARI produced ISUS MMS digital and analog boards. Mari reported a successful calibration of a sensor on Tuesday. Wahoo.
- c. Porting is moving forward using MpHOX revB and MSC2 base board. Pin mux for smaller pinout part given to Irene and working to verify the proposed MSC3 processor module and baseboard hardware design by end of week.
- d. Working thru organizing the boards and supplies in the boxes removed from Lukes office. This has been hampered by having a frauded credit card - now resolved.
- e. PSoC contractor meeting scheduled. Have proposed an alternate solution using an ARM processor to implement timing sequence generated by MMS Digital.
- f. Reviewed status and plans with Ken. Yui returned from vacation early and we met to discuss schedule and priorities. Worked on proposed hours adjustment. A PCO request will happen in the next week or so. Gave Kent a heads up.

Week 16

- 1. Jon Erickson
 - a. No activity.
- 2. Irene Hu
 - a. Continue troubleshooting analog and digital boards for ISUS
 - b. Working with Jose for production of various boards (MBARI MMS digital, NC-nanofet, Lionfet, Nanofet, etc)
- 3. Thom Maughan
 - a. Congrats to Yui who was married on Monday.
 - b. Participated in the team lead by Irene that got the MMS MBARI Digital and MMS MBARI Analog boards built, fpga and pic programmed, pots adjusted, and tested with UV lamp and Zeiss spec - major milestone accomplished for being able to build ISUS for the float program.
 - c. Relocated the dura board pH test setup from A113 (Luke's old office) to the Chem Sensors lab. Walked Peter and Jessica thru the high level procedure for dura board checkout. Will meet next week and run thru the test procedure along with MSC1 baseboard test procedure.
 - d. Reviewed implementation and emails concerning PSoC implementation of for new MMS Digital for mini-ISUS. Bill Keeler, contractor, is out of hours on PO but still working. Planning to meet with Ken and Bill next week. Working an alternate implementation proposal.
 - e. Cleaned out and vacated A113. Finishing the sort of what's needed and what should be tossed in B108. Moved needed computers to Chem sensors lab and worked with Josh on locating data ingest computer.
 - f. Software porting has been on hold until we got the MMS ISUS build resolved, but that is now moving forward

Week 15

1. Irene Hu
 - a. Finished Thom's work figuring out programming for MBARI digital boards (for ISUS spectrometer) and confirmed working
 - b. Troubleshooting on MBARI analog boards (for ISUS spectrometer), various scoping / circuit analysis and traced issue to potentiometer tweaking
 - c. Interface with Bill Keeler (contractor) for PSOC boards

Week 14

1. Irene Hu
 - a. Picked up some boards at Indtec; probing and troubleshooting Analog MMS board
 - b. Started reorganizing MSC2 into MSC3
 - c. Bias battery measurements for lioncap, and update schematics for lioncap and NC-nanofet for new I_DS
2. Thom Maughan
 - a. (3 weeks weekly)
 - b. Finished software and hardware forensics. We have a solid plan for getting MSC1 back on track for delivery commits in 2024.
 - c. Worked with IS to backup the various computers and VMs. Active content moved to Titan.
 - d. MMS Digital: Quartus FPGA programming was assessed and the recommended path forward is to use digikey to copy a master configurator since no changes are planned for the fpga. The dependency on parallel port programming requires old PC hardware. PIC18F programming can be done onboard, however, recommend using digikey to pre-program.
 - e. MMS Digital PSoC design. Working with contractor Bill Keeler who took over from previous contractor. The state of the design is being assessed - there are issues in the ADC read timing. Duplicating Bills setup.
 - f. Persistor CF2 code. Binary and source diffs are done. Production binaries obtained from UW / Dana Swift so we good to go on programming remaining 45 CF2 MSC1 builds.
 - g. Evaluated state of Persistor CF2 replacement with STM32F413. First hardware revision was handed off to EE Techs however the software dev for STM32 had not yet been started. CubeIDE was installed and minor mods to an example were all that was found on 3 computers and 5 VMs. Recommended porting CF2 application to Tiva processor and using Carbon lab version of pH boards (MCAP).
 - h. Dana Swift (UW) drafted an interface spec. Recommending minor modifications to the serial protocol.
 - i. Irene delivered MpHOX revB wired to MSC2 for Tiva porting. Porting is in progress.
 - j. MSC3 processor module design recommendations provided to Irene.

Week 13

1. Irene Hu
 - a. mpHox - MSC2 prototype wiring harness specified; made by EEtechs
 - b. Troubleshoot mpHox rB setup (watchdog caused problems with JTAG); set up and delivered to Thom
 - c. Helping Thom investigate methods to program FPGA configurator EEPROM on MMS digital board
 - d. Set up NC-nanofet and Lioncap, prelim checks and delivered to Johnson lab to test

Week 12

1. Irene Hu
 - a. Chasing down MMS digital Cronin board files, set up for production

Week 11

1. Irene Hu
 - a. Various meetings
 - b. Help Thom with FPGA programming - cable mapping
 - c. mpHox - MSC cable mapping
 - d. List of parts to stock up on and their costs
2. Thom Maughan
 - a. GoBGC / SOCCOM ramp up to replace Luke. Meetings.
 - b. Working on duplicating Persistor programming environment (CodeWarrior etc.), Atmel Flex FPGA compile and programming, PIC18F programming.
 - c. Looking at implementation of FPGA and compatibility with MMS Analog board ADC. FPGA targets a different ADC than is used, but after datasheet compare, they are SPI sequence compatible.
 - d. Diff'ing sources and binaries to try and locate 'production' CF2 code
 - e. Meeting with Dana Swift and Aadu from UW. Very helpful in clarifying the functionality requested. UW will be providing an interface spec in the next couple weeks. Some changes in protocol and sequencing are ok (whew) as there are improvements we'd like to make.

Week 10

1. Irene Hu
 - a. Continued forensics, including visit to Indtec, especially focusing on different versions of digital and analog boards within spectrometer for ISUS
 - b. Various planning meetings
2. Brent Jones
 - a. Helping Carbon lab recover CF2 programming ability after personnel departure
3. Thom Maughan

- a. Starting Feb 19 and OSM, I've been working to understand MBARI Sensor Controller (MSC1) CF2 code. Upon return from OSM, there was a big push to identify source code, schematics, boards, parts inventories, etc. All the hardware, software, contractors, POs that had been managed by Luke Colleti.
- b. IS has been very helpful providing access to various mac desktops, laptops and Windows VMs
- c. Working with Irene, Yui, Ken and team we are starting to get on top of a plan forward.
- d. Working on FPGA source build and config eeprom programming.
- e. Phone call with contractor regarding status on new PSoC board development. Getting PSoC code to build.
- f. Brent and Yui helped me get up to speed on CodeWarrior, PicoDOS to start going thru the various code snapshots. Dana Swift of UW provided the binary executable in production, delivered by Luke and that is a big help.
- g. Too many activities to list, it's been a painful couple weeks but it's looking good and there is a plan. Next step is to slow down and move methodically.
- h. Hours for working the float challenge will be charged to 901805.

Week 9

1. Irene Hu
 - a. mpHox revB sent out for fab, Jose ordering parts
 - b. Discussions and information gathering re: MSC

Week 8

1. Irene Hu
 - a. Working with Jose on layout for mpHox revB
 - b. Evaluation of status of MSC boards
2. Thom Maughan
 - a. MpHOx RevB hardware design inputs to Irene.
 - b. Instrument driver for MpHOX RevB
 - c. Working with Irene on MSC2 hardware review, software task list

Week 7

1. Irene Hu
 - a. Discussions with Yui, Jose, and Yui/Thom re: mpHox revB; making a few changes and then should be ready for layout
2. Thom Maughan
 - a. Working with Irene on MpHOx rev B and instrument integration
 - b. Working with Joe on implementing a quick prototype ground fault data logger for Spray Glider. Option A is hacked MFET/MCAP and Option B is tweaked Current Ranger.

Week 6

1. Irene Hu
 - a. Made changes to schematic for mpHox revB, just waiting on some connectors for testing
 - b. Reviewed Jose's layout for NC-Nanofet, which is now ready to be sent out
2. Thom Maughan
 - a. Glider groundfault, prelim testing shows potential diff between aft and mid pcase can source 2.5uA. Working with Joe and Irene to craft a micro amp data logger out of either an MFET+modified MCAP or a CurrentRanger. Testing has been on the bench so far and next steps are to take measurements in seawater with the housing closed.
 - b. pHFET-SOS v5.0 testing on nanoFET and MpHOx
 - c. Working with Irene on MpHOx revB hardware and instrument drivers.

Week 5

1. Irene Hu
 - a. Evaluating mphox integrations
2. Brent Jones
 - a. Validating new NanoFET Spray software

Week 4

1. Irene Hu
 - a. Making n-channel isfet boards: small changes to Lioncap and sent off for fab; created NC-Nanofet and made changes. Explored diode idea
 - b. Discussions w/ Yui re: next gen Nanofet and next steps
2. Brent Jones
 - a. Looking at how to adapt Acusond+batt canister to Spray
3. Thom Maughan
 - a. Attended obs kickoff

Week 2

1. Irene Hu
 - a. Retested Nanofet B002008 and high bias current draw problem has mysteriously disappeared

Week 1

1. Thom Maughan
 - a. V5 pHFET-SOS release for MFET
 - b. QA box assembly
 - c. V5 testing on nanoFET