

Brent Roman Sorted By Project

706005 - eDNA Grass Carp Sandusky

- Virtual kick off meeting (Week 7)
- Postponed until 2022 (Week 9)
- Purchased sim card (Week 20)
- Working w/Scott to power the modem from the new terrestrial 55gal drum ESP “can” (Week 20)
- Readyng 2 ESPs for deployment (Week 23)
- These were to be the first using the Linux 3.18 Kenrel with “Wireguard” VPN (Week 23)
 - Discovered a slow memory leak due to the 3.x kernel (Week 23)
 - May have to revert to the 2.x kernel and ditch Wireguard for now :-((Week 23)

708143 - NOAA ECOHAB

- Both ESPs worked! Even SPR worked! (Week 17)
- Created scripts for Chris Preston to investigate Lysate recovery (Week 18)
- Agreed to investigate adding a contact sensor to the lysate syringe rod. Researching this. (Week 18)

708146 - NOPP Saildrone

- Working with Dave Peacock to iron out comms and conops issues (Week 8)
- Working with their engineers to identify source of sat comms disconnects (Week 9)
- Initial mission completed. Successfully archived 10 ESP samples But.... (Week 10)
 - Problems with satcomms, air in ESP water feed and sudden roll changes bumping the ESP carousel out of position. Lots of work to do :-) (Week 10)
- Wrote a script wrapper around GNU “screen” to automate recovery after Iridium Next link’s routine failures (Week 12)
- Satcomms has gotten so bad as to be unusable. Disconnects every few seconds. (Week 15)
- Pushing to get access to their VPN, as that seems the only practical option remaining. (Week 15)
- Worked with their network engineer on Certus comms stability (Week 16)
 - No indication of when Surveyor will leave Alameda (Week 16)
- They kindly provided us access to one of their servers, however... (Week 17)
- We still cannot hold up a connection more than a few seconds on Certus (Week 17)
- Jim Birch is trying to get the problem more visibility at Saildrone (Week 17)
- Suggested networking fixes did not work. No response to latest plea for help. (Week 18)
- Helped Doug design a new seawater intake (Week 19)
- Started testing a new SSH tunnel (Week 19)
- Saildrone finally came through with a networking architecture that works over Certus!! (Week 20)
- Tweaks our SSH tunneling to play by their new rules (Week 20)
- Rejiggered IP address assignment so ESP works with or without DHCP on Saildrone Surveyor (Week 23)
- Wierd network change on Surveyor required rejiggering ssh tunnel configurations on the fly (Week 26)

708165 - NOAA-MERHAB

- Added Coulomb counter to ESP2G “sleepy” firmware (Week 1)
- Added modem power cycling schedule to “sleepy” firmware (Week 1)
- Exchanged to email with APL expressing concern with Falmat’s proposal to avoid work hardening related failures by strengthening and stiffening cable. (Week 3)
- Conference with APL determined that they would not use Iridium comms for ESPs off La Push (Week 5)

- They are set to deploy their ESP in August. (Week 20)
- Working with Kevin Zack of APL to integrate his new pump/external valve controller (Week 20)
- NOAA deployed their new, larger ESP telebuoy off La Push, WA (Week 25)
- Telecon with NOAA (Week 26)
 - Updating their ESPs, testing telebuoy, integrating new pump controller (Week 26)
- Updated their ESP's software. (Week 27)
- Shipped Steph USB programming dongles so she can update firmware. (Week 27)
- Worked with APL engineer to bring up new combined Pump / Valve control board (Week 29)
- Supporting their upcoming deployment of two ESPs off Lapush, WA (Week 30)
- Helped APL's EE diagnose a cable wiring issue causing intermittent comms failures (Week 31)
- ESP deployed with APL's new FlowController board that regulates external pump flow rate (Week 33)
 - Failed within 30 minutes due to processor oscillator drift in the cold water :- (Week 33)
 - I used a new Linux kernel API to request a non-standard baud rate of 10400 baud (Week 33)
 - Joy! (as long as the ESP temperature remains stable :-) (Week 33)
- Baud rate hack continues to hold (Week 34)
- Deployment should complete this week (Week 38)
- ESPeddie recovered after what appears to have been a perfect 6wk deployment of La Push, WA (Week 39)

901205 - ESP SURF Center

- Wrapped up analysis of GoMex power consumption (Week 2)
- Implemented scheduling of modem power scheduling to reduce consumption (Week 2)
- Worked with Preston to understand 3G lysis processing and how we might improve it. (Week 3)
- Proposed using an electro- or electropermanent magnet to avoid losing control of Lysis syringe plunger. Still in the "hair-brained" idea stage, however :-) (Week 3)
- Working with Preston on improving Lysate recover in ESP 3G for EcoHab (Week 4)
- Worked with Preston to improve ESP 3G lysate recovery (Week 5)
 - Now can detect when syringe plunger sticks in the barrel (Week 5)
- Continued support of WHOI (Week 5)
 - Updating ESProman (Week 5)
- Preston and I finally managed to get an algorithm cobbled together that reliably recovers lysate from the ESP3G cartridges, detecting and correcting when the plunger sticks in the syringe barrel. It's a thing of beauty ;-) (Week 6)
- Implemented deferred motor configuration changes. It works and avoids the errors I'd intended, but the system is now producing ominous warning messages that need to be investigated. (Week 7)
- Working on associating absolute encoder "absSkew" with the axis rather than with each of its trajectory configurations. This will allow recalibration without needing to alter all those configs. (Week 8)
- Associated motor config updates with movement commands to avoid races (Week 8)
 - Helps, but this uncovered another race condition (Week 8)
 - I'll be restructuring the older motor control firmware to handle events and messages like the newer temperature control boards do. This should eliminate the races at their source. (Week 8)
- Brought up ESPtower (portable ESP configured for deep sampling) (Week 9)
- Chris Preston says the new Lysate recovery procedure is working very well (Week 9)
- Preston noticed that ESP was not detecting clogged filters reliably. (Week 10)
 - I discovered that pulsations in ESP 3G sample pump pressure can cause the ESP firmware to fail to detect clogs. (Week 10)
 - Worked with Doug to characterize pump pulsations (Week 10)
 - Tweaked digital filter in ESP firmware to ignore those pulsations (Week 10)
 - Preston is testing now (Week 10)
- Worked with Scott Jensen to diagnose environment sensor failures on our 3G hostgate boards (Week 12)
- Last-minute, inadequate testing before ECOHAB (Week 14)
- Finally bringing up replacement for 13 yr old ESPshore server. (Week 14)

- Finally got WireGuard VPN working with low-power ESP CPU and a new tiny ESPshore server! (Week 15)
- Working with IS to resolve problems I believe are being caused by blocked UDP ports in the DMZ (Week 15)
- Brizo/mv1 ESP archival only run seems to be going well. (touch wood) (Week 15)
- Fixed bug in onESPclient script. Pushed fix to LRAUVs running ECOHAB (Week 16)
- Fixing minor bug unearthed during ECOHAB (Week 17)
- Demonstrated that SPR data can easily be compressed 14:1 (Week 17)
- ESPshore2.mbari.org is up and supports the Wireguard VPN in addition to PPTP and ssh tunnel (Week 17)
- Working with Chris Preston and Bill Ussler on automating cartridge chemistry “standards” (Week 18)
- Improved cartridge slot status reporting (Week 18)
- ESPshore2 with Wireguard VPN support is up and running. (\$40 hardware investment :-) (Week 18)
 - Cloning its image to have a physical backup (another \$40 splurge) (Week 18)
- Built up replacement for ESPshore server based on OpenWRT 19.07 (Week 19)
- Helped Bill Ussler get SPR running again in the lab with compressed output files (Week 20)
- Added chrony to ESP linux distro to support time sync required for Wireguard VPN (Week 20)
- Finally found and fixed a nasty bug in libreadline5 (Week 20)
 - Where multibyte character support allows moving input cursor past end of string (Week 20)
- Created a cartridge leak test script for Doug Pargett (Week 23)
- Ensure that 2G’s big carousel motor shuts down entirely when not in use (Week 23)
- Helped Nadia tension the finicky carousel drive belt properly (Week 23)
- Temperature testing alpha2.2 cartridges indicates need to insulate metal back (Week 25)
- Helping Nadia pressure test mv2 (Week 26)
- Testing puck heating issues with Function cartridges (Week 26)
- Working with WHOI to restore VPN access to their network so I can update their ESPs (Week 27)
- Installed tunnel2shore script on the old laptop Bill Ussler will take to GLERL (Week 27)
- Supporting NOAA deployments in Great Lakes and Puget Sound (Week 29)
- Deployed 2 ESPs in stream gauges (Week 29)
 - First using WireGuard VPN and Solar time specifications (Week 29)
- Writing ESP device driver for UW/APL’s new Pump/Valve control board (Week 29)
- Helped diagnose ESPwaldo after Sampler Syringe failure (Week 30)
- Rewrote the “Daily” ESP mission structure (Week 30)
 - Factored all logic out of mission files (Week 30)
 - Detects processing that overruns next timed start (Week 30)
 - Allows for computed time of day values (Week 30)
- Improved “Daily” mission framework to detect phases that run over time. (Week 31)
- Updating development machines from Debian Stretch to Bullseye (Week 33)
- ESP firewall now separates ESPs into groups (Week 34)
 - e.g. NOAA ESPs cannot “see” MBARI’s on the VPN (Week 34)
- Found and fixed a configuration bug in ESPmv3 (Week 38)
- Working on getting all the ESPs moved over to Wireguard (Week 38)
 - Because IS has a new insurer that doesn’t like PPTP (Week 38)
 - Must complete by end of month (It will be tight) (Week 38)
- Scrambling to update all remote ESPs to comply with IT’s request to terminate PPTP services (Week 39)
 - ESPs now use WireGuard instead. IT considers IOT to be ‘niche’. (Week 39)
- Considering how to protect against stepper motor overheating so we can safely overdrive them occasionally. (Week 39)
- Fixed bug in motor config. Need to revisit this to allow motor and unrelated pressure sensor to share the same hardware channel. (Week 39)
- Helped Preston prepare ESPmv3 for deployment on this week’s Ken Smith cruise (Week 40)
- Updated portable ESP configurations to support an optional Plunge Valve (Week 40)
- Refactored ESP Ruby application to support 3G machines lacking Carousel with Toroid valve (Week 41)
- Updating ESP laptop for Doucette’s lab to utilize the Wireguard ESP VPN (Week 42)
- Fixed a bug in handling old-style Flow meter still used at GLERL (Week 42)

- Working with Nina and Chris on tweaks to motor control for 3G cartridges (Week 42)
- Supporting troublesome ESPdennis 2G deployment at WHOI (Gripper failures) (Week 43)
- Hacked together a set of scripts that enable us to release DHCP leases of ESPs removed from the wired network. (Week 43)
- Finally worked through all the networking issues at Ducette's NOAA lab to update ESPchris there (Week 45)
- Investigating a nasty race condition I caused by trying to configure ESP dwarves lazily (Week 45)
 - Multiple threads can end up initiating interleaved configuration sequences (Week 45)
- Tested ESPbetty: verified it could shuffle and heat short pucks. (Week 46)
- Started refactoring ESP core elf code in preparation for adding in-situ programming capability (Week 48)
- Supporting ongoing deployments / lab work at GLERL and WHOI (Week 48)
- Upgrading ESPshore server to ARM based CPU (~8x faster processor) (Week 52)

901913 - Demonstrating high-speed communication with a submerged AUV

- Working with Oceancomm to validate modem mechanical designs (Week 1)
- Working with James Younce and Brett Hobson to determine whether Oceancomm's existing modem housing can fit into our LRAUV (Week 2)
- Working through details of equipment loan agreement (Week 7)
- Arranging delivery of a pair of modem board sets and dummy load (Week 8)
 - Dealing with ITAR (Week 8)
- Learned that Oceancomm's modems will likely have to be treated at ITAR :-((Week 9)
- Working through ITAR/EAR classification issues with OceanComm modems (Week 10)
- Still in ITAR limbo. Oceancomm themselves are not yet sure how modems should be classified (Week 12)
- Suggested we leave the modem at Oceancomm for now, but provide MBARI net access to it. (Week 12)
- Working with MBARI legal and OceanComm on loan of, possibly ITAR restricted, modems (Week 14)
- Waiting for docs from OceanComm... (Week 15)
- Continuing to wrestle equipment loan agreement and NDA (Week 16)
- Got an acceptable loan agreement from OceanComm (Week 17)
- How a couple options for where we can secure the ITAR equipment at MBARI (Week 17)
- OceanComm says they are ready to ship! (Week 17)
- Waiting on signatures from MBARI side. (Week 17)
- Agreements in place (I think) (Week 18)
- Still squabbling over the loan agreement and arranging to receive equipment (Week 19)
- Still stuck in ITAR Limbo... (Week 20)
- Finally received modem electronics and dummy load (Week 23)
- Installed in the corner of B137 near roll up door (Week 23)
- Modems should emulate an ethernet bridge (Week 23)
 - But they do it imperfectly. Need to investigate TCP tuning parameters. (Week 23)
- Linux large TCP windows were not compatible with these ethernet modems (Week 25)
 - Reducing the TCP window size and MTU yields solid 20 Kb/s TCP throughput (Week 25)
- Managed to transmit hires video at 5 frame/second via H150 acoustic modems in LRAUV lab (Week 26)
- Pinging Badwolf to learn how to adjust video encoding for low bandwidth links (Week 27)
- Met with LRAUV and Waveglider folks to plan integration modem integration (Week 29)
 - Shooting for deployment in early October (Week 29)
- OceanComm to deliver modem pair mid August (Week 29)
- Gave Chris Wahl parts for high-speed cellular "hotspot" link to WaveGlider (Week 30)
- Bret Hobson and Chris Wahl are working with OceanComm on modem wiring (Week 30)
- Configured LTE router to serve video on the public internet inside a Wireguard tunnel (Week 31)
- WG Tiny is touring the Monterey Bay with the USB cell modem we intend to use for modem test (Week 33)
 - Uploading data on this cell link at 700KB/s to 1.5MB/s (Week 33)
- Chris Wahl mounted high speed cell modem on WG-Tiny (Week 34)
 - Delivered upload rates >400KB/s within 7 miles of shore (Week 34)

- M1 comms are spotty, but 250KB/s when available (Week 34)
- Modems reportedly assigned EAR export regs -- no more ITAR headaches! (Week 38)
- Got word from OceanComm that the H150 modem will not be ITAR (great news!) (Week 39)
- Preparing board bullets (Week 40)
- OceanComm has committed to delivering MBARI deployable modems by 9/1 (Week 41)
- OceanComm has confirmed that they will be shipping us a pair of H150 modems by Friday. (Week 43)
- Pair of modems have arrived (Week 45)
- Having cabling made by EE techs (Week 45)
- Hope to do some in tank tests late this week (Week 45)
- Tested modems in bucket and MBARI test tank. (Week 46)
 - Unfortunately, they will not work in either scenario due to reverberations (Week 46)
 - Working with Brett and Chris Wahl to sink a modem in the tank to test vertical channel (Week 46)
- Transferred @10kB/s within the test tank between two laptops alongside (Week 48)
- Kudos to James McClure for quickly potting cables from Brett Hobson's drawings (Week 48)
- Verified with Chris Wahl that Waveglider modem cable is properly wired and ready to pot. (Week 48)
- Demonstrated streaming video from LRAUV camera over internet cellular network (Week 49)
 - Ready for test of Waveglider in the test tank late this week (Week 49)
- Sustained data transfer at 19KB/s between Waveglider and modem hung 2m below it in test tank (Week 50)
- Demoed smooth 15fps 640x480 video from LRAUV below Waveglider in test tank (Week 50)
- Next steps are to pot cable to mount modem permanently in LRAUV (Week 50)
- Combined LRAUV<->Waveglider test deployment in January 2022. (Week 50)
- Confirmed modems work in our test tank. Tweaked gstreamer pipeline parameters to improve video stability over internet – at the cost of increased latency. (Week 52)

DQ2025 - L. Erie HAB

- Testing new comms scheme with espshore2.mbari.org (Week 23)
- Put 3.18 Linux kernel with ethernet driver fixes onto ESPs destined for deployment (Week 25)
- Fixing bugs and config problems uncovered by the team prepping for deployment. (Week 31)
- Last minute features added just before deployment (predictably) necessitated a couple patches to ESP Ruby while deployed on the LRAUV. Only lost 2 of sixty cartridges due to software. (Week 33)

Out of Office

- March 29-April 2 + 2wk away from the office due to quarantine
 - Traveling up to Oregon & Washington to visit colleges.
- March 29-April 2 + 2wks away from the office due to quarantine
- August 16 - September 10
- August 18 - September 10
- August 23 - September 10
- August 25 - September 17

Overhead

- Updated a bunch of desktop Linux machines from Debian "stretch" to "buster" and "bullseye" (Week 12)
- Stopped using the xfce4-power-manager (Week 12)
- Configured new router at home to support IT's change from PPTP to IPSEC L2TP VPN (Week 40)
- Replaced home router with 8x faster processor to support MBARI's L2TP/IPSEC VPN (Week 41)