

Brent Roman Sorted By Project

901205 - ESP SURF Center

- (Week 6)
- Worked with Scott and Chris Preston to plan 3G heater tests (Week 7)
- Helped Bill Ussler get ESPbruce working (fixed carousel binding issue) (Week 7)
- Found and fixed faulty I2C cable that had been plaguing ESPgordon for months! (Week 7)
- Identified binding in ESPwaldo's gripper mechanism (another months old problem) (Week 7)
- Wrote up procedure for replacing RTC batteries, as requested by ESP users in Denmark. (Week 7)
- Working with Preston on calibrating ESP3G cartridge heater boards. (Week 8)
- Replaced sampling pump at Scott Creek with Dack. (Week 8)
- New pump still exhibits occasional sampling failures. Probably do to gas in water. (Week 8)
 - Discussing how to eliminate air bubbles by reorienting pump head in stream. (Week 8)
- Supporting McLane Labs visit (Week 9)
- Converted a few more ESPs to new, more compact configuration file format (Week 9)
- Characterizing 3G cartridge heater boards (this will be a slow process) (Week 9)
- Working with Doug Pargett to bring up 2 3G ESPs (Week 10)
- Working with Chris Preston to improve accuracy of 3G puck heating (Week 10)
- Participating in meeting with Function (mech design consulting firm) (Week 10)
- Continuing to investigate heating accuracy on the 3G ESPs (Week 11)
 - Delays for temperature to stabilize makes this a slow process (Week 11)
- Updated software and calibration on the 3G ESPs slated for CANON (Week 11)
- Supporting ESP 2G users in Denmark and Great Lakes (Week 12)
- Characterized ESP 3G temperature sensors (Week 12)
- Implemented Piecewise-Linear control of 3G puck water temperature (Week 12)
 - Repeatable and accurate to +/- 0.05C for reference test puck! (Week 12)
- Smuggled an ESP 3G out of MBARI. Set it up in my home office/lab. (Week 13)
- Developed a procedure to "tare" the heaters in absence of store configuration data (Week 13)
 - Gets us within 1C of target temps, which is within the +/-2C error allowed. (Week 13)
- Supporting Chris in her efforts to figure out why GLERL's ESP's are all failing assays (Week 13)
- Supporting Technical University of Denmark in the effort to get a modem working with their ESP (again, sigh). (Week 13)
- Supporting Chris Preston in her efforts to get GLERL's ESP's up and running again (Week 14)
- Working with DTU Denmark to find a new cell modem for their ESP. (Week 14)
 - 3G service appears is apparently being sunsetted in Denmark! (Week 14)
- Debugging in-situ reprogramming of ESP3G cartridge elves. (Week 14)
- Finished with in-situ flash programming of cartridge elf microcontrollers via I2C bus (Week 15)
 - Separated firmware app into bootloader and "booted" flash partitions (Week 15)
- Working on backporting driver for Huawei USB modems to support ESPs in Europe (Week 15)
- Designing involatile key->value storage in EEprom or cartridge configuration data (Week 15)
- Supported recovery of ESPgordon from Scotts Creek (Week 16)
- Finally managed to tame the Sara-R410M LTE-M1 USB modem (Week 16)
 - Lots of low-level shell scripting to recover from firmware crashes (Week 16)
 - Confirmed that Raspberry Pi users see the same lockups I do (Week 16)
- Swapped ESPtower for ESPstumpy in my home office (Week 16)
 - Fun times reassembling the internal plumbing :-) (Week 16)
- Wrote a 15 page "cheatsheet" to help new users of the ESP3G (Week 17)
- Incorporated Linux "backports" into ESPlinux (Week 17)

- Gives our 2.6.31 kernel access to networking drivers from 3.14.30 (Week 17)
- We finally have 5GHz WiFi support (Week 17)
- Working on added hostapd so ESP can act as WiFi access point (Week 17)
- Got ESP Linux to function as a WiFi “hotspot” (Week 18)
- Reading long (>10Kbyte) data streams from microcontrollers was causing time-out errors (Week 19)
- Finally tracked this to throttling by the Linux host system. (Week 19)
 - Ruby on the slow ARM processes at a rate of <7kBytes/s! (Week 19)
 - Lowered baud rate and increased timeout delays to allow for this (Week 19)
 - Investigated rewriting the byte-level processing in ‘C’ to remove this bottleneck (Week 19)
- Ongoing support of DTU Denmark and Function mechanical engineering consulting (Week 19)
- ESP 2G successfully deployed by DTU Denmark (Week 21)
 - (running lots of PCRs looking for fish pathogens) (Week 21)
- Took a deep dive into debugging the vi-clone texteditor included in busybox (Week 21)
 - Lots of bug fixes, added features like window resizing via serial link, etc. (Week 21)
- Added ability to defer exceptions using pure Ruby (Week 22)
 - Needed this for atomic database updates (Week 22)
 - Might be a good talk topic for RubyConf 2020 (Week 22)
- Merged “function” protocol mods into the master branch (Week 22)
- Developed and documented install procedure for MacOS “Catalina” (Week 22)
- Calibrating 4 Lyse-n-Go cartridges for Chris Preston (Week 24)
 - Delivered (Week 24)
- Lots of testing and debugging of the new cartridge NVRAM handling code (Week 24)
 - Installed on ESPPhonu and ESPstumpy for science testing (Week 24)
- Investigating use of Bench-top thermal control system for ESP cartridge thermal calibration (Week 24)
 - See <https://mechanical-devices.com/portfolio-posts/flextc-temperature-forcing-system/> (Week 24)
 - Could our EE lab use one of these? (Week 24)
- Porting the Linux kernel for our ESP controller boards from 2.6.33 to 3.14 to get access to WireGuard VPN (<https://www.wireguard.com/>) (Week 25)
 - Quite the adventure. New kernel compiles but does not boot. JTAG debug time! (Week 25)
- Picked up new heater board calibration oven from Scott. (Week 25)
 - Connector soldered backwards. Returning part to Jose Rosal for repair. (Week 25)
- Worked a couple late nights supporting ESP deployment off Denmark’s coast (Week 25)
 - Lost comms a week ago. Visited with ship, but could not reestablish a link to ESP. We need a way to reset the mooring controller from the float! (Week 25)
- While setting up Scott Jensen’s new env chamber for ESP 3G heater board calibration, we discovered the board bracket was holding it upside down. Paul Coenen fabricated a new bracket. (Week 26)
- While updating ESP linux from 2.6.33 → 3.14.30, found and fixed an old bug in NXP’s SPI driver that was causing all devices to run at the slowest’s rate. (Week 26)
 - Linux used to take 15sec to load from SPI flash. Reduced this to 2.5sec! (Week 26)
- Updated ESP Linux kernel from 2.6.33 to 3.18.140 (Week 28)
- Incorporated WireGuard VPN patch into the kernel (needs testing) (Week 28)
 - Submitted upstream patches for ARMv5 and GCC 4.1.2 (Week 28)
- New kernel now properly handles I2C bus and LED drivers on it. (Week 28)
 - Needed for Embedded Artists dev boards. (Week 28)
- Set up test SPR test fixture for Bill Ussler using Linux laptop rather than an ESP motherboard (Week 29)
- Doing so uncovered a race condition in the SPR serial driver (now fixed) (Week 29)
- Prepped software for CANON (Week 29)
- Helping Chris Preston support CANON (Week 30)
- Supporting TU Denmark in debugging PCR issues (Week 30)
- Determined that air currents have a very significant impact on heating accuracy (Week 30)
- Replaced temperature calibration oven with much quieter fan (Week 30)
- Refined temperature calibration procedure (Week 30)

- Calibrating dozens of ESP3G heater controller boards (tedious) (Week 31)
- CANON support (Week 31)
- Set up thermal calibration with heating stage extracted from ESPtower (Week 33)
- Compared thermal calibration from that stage with ESPhonu's (Week 33)
- Tested new logic to retry leak checks when very slight leaks are indicated (Week 33)
 - Should eliminate false leaks reported due to plastic creeping (Week 33)
- Found and fixed a couple minor, but long-standing bugs causing unneeded reinitialization (Week 33)
- Found that one of the older 2G ESPs can pull out its Forearm wiring connector (Week 34)
 - Working with McLane on a mechanical fix (Week 34)
- Added code to automatically choose between InStage and InCarousel heating profiles (Week 34)
- Testing InCarousel heating on Honu in TTL "EasyBake" oven at ambient temperature (Week 34)
- Heater board calibration in LRAUV chassis ESPhonu (Week 35)
- Helping with bring up of first flower pot ESP (Week 35)
- Working with APL on integration of new Telit ME910 modem for comms test deployment (Week 35)
- Updated ESPrush and ESPniagara at GLERL (Week 35)
- Discovered and Documented ESP2 manipulator wiring working connector out of its socket (Week 35)
- Testing Linux 3.18 Kernel with all our modem variants. (Week 36)
- Helped test and calibrate ESPkoa and ESPmv1 (Week 37)
- Working with NOAA to gain reaccess to their ESPs after networking "upgrades" on their end (Week 37)
- Investigating intermittent carousel encoder failures on mv1 (Week 37)
- Helping to calibrate/debug ESPmv1 for use on Fall CANON (Week 38)
- Prepped electronics and software to APL comms test mooring off La Push, WA (Week 38)
 - Deployed 9/10. Lost contact with it after 3 days :- (Week 38)
- Ongoing thermal calibration of ESP3G smart cartridges (Week 38)
- Working with NOAA to set up conference call this Friday to understand their ESP deployment and networking plans (Week 39)
- Finished calibrating Lyse-N-Go heater boards (Week 39)
- Verifying calibrated cartridges in ESPhonu (Week 39)
- Delivered 50+ calibrated heater boards to Preston (Week 40)
- Ongoing support of DTU in Denmark (Week 40)
- Organized call with WHOI to discuss future of their 7 ESPs (Week 40)
 - Moved 2 of them to our ESPshore server, more to follow (Week 40)
- Helped diagnose grounding issue with analog pressure sensor on ESPmv1 for fall CANON (Week 41)
- Diagnosed and fixed Forearm calibration issues on GLERL ESPs (Week 41)
- Worked with WHOI and Gomes to add WHOI's ESPs to MBARI's ESPshore and ESP portal (Week 41)
- Fall CANON exposed minor bugs in toroid leak detection/retry logic (Week 43)
 - Not decrementing spare cartridge count on toroid leaks (Week 43)
- Help prepare ESPkoa for deployment on the Ken Smith Flyer cruise to M1 (Week 43)
- Installed ESP 3G on the Flyer with SSH reverse tunnel for comms (Week 44)
- Wrote mission scripting capability for ESP 3G as Unix command interpreter (Week 44)
 - Testing this now on the Flyer's Smith Cruise (Week 44)
 - The same scripting capability will be used for upcoming Saildrone deployments (Week 44)
- Working with Brian Kieft to figure improve SBD comms to ESP (Week 44)
 - Most of the trouble seems to be with quoting Ruby command arguments in shell scripts. (Week 44)
- ESPmer in Denmark, ESPdennis near WHOI and ESPkoa on the Flyer all sampling well. (Week 45)
 - Jinxed it! (Week 45)
- Working with Preston to revamp protocols for updated cartridges from Function. (Week 45)
- Fixed bug Chris Preston identified in ESP 3G puck heating code. (Week 46)
- Patched bug WHOI found with DA protocol (Week 46)
- Investigating bug GLERL identified in microcontroller initialization sequence. (Week 46)
- Used Kevan's old HP48GX calculator to reprogram memory cards for the ESP group's Saigene processors. (Week 46)

- TU Denmark's ESP deployment off Norway was successful. They are waiting to recover. (Week 47)
- WHOI's ESP at Bowdoin College failed due to puck misalignment (Week 47)
 - Recovered by tweaking the alignment remotely. It's been working for the last 5 days. (Week 47)
- Working with Chris Preston on optimizing 3G puck heating for lysis cartridges (Week 47)
 - Looks like we're going to need unique heat loss curves for each heater board :- (Week 47)
- Found and fixed a bug in 3G syringe pressure servo (for Chris Preston) (Week 48)
- Looking into a suspected problem with EEPROM data management on 3G Lysis Cartridges (Week 48)
- Continuing support of WHOI (Week 49)
- Helped Dack with en masse file name renaming on ESP share (Week 50)
- Worked with Doug Pargett to test temperature probes in Function's "alpha1" prototype cartridge (Week 51)
- Added code to support the "Frankentower" deep sampling ESP3G lab prototype (Week 51)

901913 - Wet Wifi

- Contacted by Thomas Riedl (our collaborator) about next steps (Week 17)
 - Not sure myself how best to proceed... (Week 17)
- Responded to (Week 18)
- OceanComm says they will have a product ready in June. (Week 19)
- Exploring other, more established options with Brett Hobson (Week 19)
- Scheduled call with OceanComm to discuss next moves (Week 24)
- OceanComm will send me modem simulator with Python source code I can modify. (Week 24)
- Submitted proposal for the final year where we integrate modem onto LRAUV and Waveglider (Week 29)
- Starting work on modifying modem simulator (Week 31)
- Spoke with Brett Hobson about integration into a video LRAUV payload next year (Week 33)
 - Scheduled call with OceanComm to discuss integration in detail (Week 33)
- Telecon with OceanComm to discuss LRAUV real-time video application next year (Week 34)
- Project approved for 2021 with very minor labor tweaks (Week 35)
- M-team's recommended phase I labor adjustments made (Week 36)
- Productive call with OceanComm and Brett Hobson on modem integration with the LRAUV (Week 43)
- Hosted virtual meetings with LRAUV and Waveglider teams for plan integration of modem onto those platforms (Week 44)
- Met with Chris Wahl to view Waveglider "Hansen" (Week 45)
 - Discovered that we could mount our transducer aft with no can height restriction (Week 45)
- Made OceanComm aware of more Waveglider modem mounting options. (Week 47)

At MBARI Tuesdays after 4PM

DQ1865 - Bryde Whale

- Successfully tested mooring in Test Tank with Iridium comms from bld B roof mounted antenna. (Week 6)
- Worked with Mark Chaffey, Aaron Schnittger, and Larry Bird to assemble Iridium antennas. (Week 6)
- Debugged (hopefully) lots of comms recovery logic. (Week 6)
- Worked with Scott Jensen to measure mooring energy use and estimate its endurance. (Week 6)
- Put together a kit with router and Verizon + T-Mobile cell modem for comms staging in Louisiana (Week 6)
- Worked with Scott Jensen and Jim Birch to prepare ESPmoe for shipment Louisiana (Week 7)
- Took a last minute trip this weekend to the Bayou to deliver repair parts. (Week 8)
- Swatted a couple coms bugs and lots of chiggers. (Week 8)
- Iridium satcoms is (finally) working as intended. (Week 8)
- R/V Pelican is deploying ESP as I write this. (Week 8)
- Mooring appears to be collecting samples like clockwork (Week 9)
 - Comms cost is about \$5 per sample (Week 9)
- Two weeks in without incident (touch wood) (Week 10)

- Confirm sampling flow rates were reasonable by using another ESP in lab (Week 10)
- Increased sample volume from 2 to 2.5L (Week 10)
- Increased sample volume from 2 to 2.5L (Week 11)
- Some concern about high humidity on the ESP can. (Week 11)
- Lost comms on Friday 3/13. Don't know why. (Week 12)
- Still no news. MetOcean cannot tell whether or not the satphone is registered on the Iridium. (Week 13)
- Still no response from mooring :-((Week 14)
- Still no contact with the mooring (Week 15)
- Still no contact :-((Week 17)
- Packed up a laptop to give me remote access for the GoMex ESP recovery on the 26th (Week 24)
- Prepped laptop for Scott Jensen to use during recovery (Week 25)
- Recovery delayed for weather (Week 26)
- Mooring recovered. Surface expression was submerged. ESP seems intact, but somewhat corroded to prolonged high humidity in the can. (Week 36)
- Mooring is being trucked back to MBARI (Week 38)
- The equipment is finally back at MBARI! (Week 41)
- Determined that Gulf of Mexico comms failed due to corrosion in can cause by bleach leak (Week 43)
 - There may have also been an underwater cable failure (Week 43)
- Remotely updated WHOI's ESPdon to latest and greatest (Week 43)
- More damage identified: 5 of the 13 conductors in the Falmouth tether broke (Week 44)
 - Shipping damaged cables back to APL this week (Week 44)
- The Iridium antenna was filled with water (this is not unexpected given that it was submerged) (Week 44)
- Iridium comms still working on the now defunct ESPmoe (Week 45)
 - The motherboard is getting worse. No serial command port now. (Week 45)
 - Supplied replacement motherboard for Scott to mate to the lid for satcomms tests. (Week 45)
 - Lost track of spare antenna. Sigh... (Week 45)
- Started disassembling ESPmoe for its retirement after corrosion damage (Week 47)
- Worked with Dack to remove cabling from moribund ESPmoe to test Iridium link (Week 50)
- Resurrected the GoMex satcomms off ESPmoe for testing in my home office (Week 51)

DQ1870 - NOAA Merhab

- Kickoff telecon with UW and APL (Week 18)
- Shipping NOAA/APL spares they loaned us for Gulf of Mexico deployment (Week 19)
- Discussing integration of LTE-M modem into University of Washington's ESP mooring (Week 31)
- Worked a couple feverish days with UW/APL to recover from a fried CPU board they intend to deploy this week. (Week 36)

DQ1904 - NOPP Saildrone

- Upcoming kickoff visit in Alameda, March 6th (Week 9)
- Met Saildrone engineers in Alameda. (Week 11)
 - They use the same, slow Iridium links we do :-((Week 11)
 - The "surveyor" vehicle we'll be on produces 9Kw of electricity! (Week 11)
 - Mostly for their advanced sonar package (Week 11)
- Working with their software lead to arrange access our Github repo so they can simulate an ESP (Week 14)
- Sent detailed instructions on how they can bring up an ESP simulator on their Linux dev boxes (Week 21)
- Saildrone managed to bring up an ESP simulation environment (Week 22)
- Fixing a Ruby Fixnum multiplication overflow bug due to new gcc-9.x optimizations (Week 22)
- Finally heard back from their lead software engineer. (Week 26)
- In a conference call we decided to interface with ethernet rather than PPP in large "Surveyor" saildrone. (Week 28)

- Decided to interface ESP via Ethernet rather than serial PPP on the large Surveyor drone. (Week 29)
- Conference call covering integration issues (Week 31)
- Still waiting on their VPN tests (Week 33)
- Helped to repackage ESPkoa in polycarbonate housing for use on Saildrone (Week 38)
- Testing ESPkoa (Week 39)
- Worked with Preston to implement sample line bleaching protocol (Week 40)
- Last minute calibration tweaks (Week 40)
- Mad scramble to backport SSH tunnel support to older ESP software (Week 43)
- Test fit ESPkoa onto Saildrone's 60ft long "Surveyor" (Week 49)
- Delivered ESPkoa to Alameda for one day of testing (Week 50)

DQ1925 - NOAA Ecohab

DQ1955 - Grass Carp

Out of Office

- First week of April (college prospecting)
- 2nd week of April (college prospecting) (6th - 10th)
- 2nd week of April (college prospecting) (6th - 10th) [postponed...]
- At MBARI Tuesdays after 4PM
- At MBARI Tuesdays after 2PM
- At MBARI Tuesdays and Thursdays after 1PM

Overhead

- Attending (virtual) Embedded Linux conference (Week 28)
- Repaired my fanless desktop computer by replacing no-name PSU with one from Meanwell (Week 34)
- Moved more MBARI equipment to my home (Week 51)