901902 - Unoccupied Aerial Vehicles for Science, Operations, and Outreach

Week 46

1. Tom O'Reilly
    a. Processing multispectral camera data acquired offshore of MBARI with Trinity VTOL drone (piloted by our NOAA collaborator JC Clark). The RedEdge-MX camera acquires images in ten spectral bands ranging from visible to near-infrared, optimized for chlorophyll detection. These same bands are acquired by satellite-borne sensors (VIIRS, MODIS, Sentinel). This flight was staged from MBARI's beach and also allowed us to determine that the drone can be kept in naked-eye visual sight out to a distance of ~1000 meters.

Week 33

1. Paul McGill
    a. Met with Tom O about processing of aerial images from Trinity UAV. Tracked down info about local survey markers to compare with Google Earth.

Week 31

1. Paul McGill
    a. Helped with Trinity flight over Moss Landing on Tue morning—all went well.
    b. Working with Tom O. on analysis of flight images.

Week 20

1. Rob McEwen
    a. Cleaning up Believer 3 build.

Week 17

1. Tom O'Reilly
    a. Working with project team toward first over-ocean flight by the end of May. We are frequently testing our low-cost fixed-wing *Believer-2* drone at an inland site near Hollister, refining vehicle design and operational procedures. Through numerous trials we can now reliably launch the drone by hand-tossing it from a slight elevation (e.g. a pickup truck bed), fly automated camera surveys, then land the vehicle via parachute or "belly landing". We're developing a water-proofing process for the drone, such that it can land in the ocean with no damage to camera payload, flight computer, and other onboard electronics, verifying in MBARI's test tank. We're now assembling *Believer-3* and *Believer-4*, which will be waterproof and are intended to be our primary science vehicles for use over the ocean.

Week 16

1. Rob McEwen
    a. Motors and ESC's now responding.
    b. Painting Believer 3 this week.
    c. Setting up telemetry.
2. Paul McGill

a. Found design issue with UAV's external barometer board and had Jose make some mods to correct the problem.

Week 15

1. Paul McGill
    a. Tested UAV barometer on bench, trying to figure out why it won't talk to Pixhawk4.
    b. Helped team with 3 successful flights at Hollister airfield on Wed.

Week 14

1. Rob McEwen
    a. Working through the Pixhawk 4 setup for Believer #3.
    b. Re-installed Mission Planner and got it to work on Blackhawk-VM.
    c. Put on the linkages, verified that they work.
    d. Rehinged the Stbd elevator with improved hinge locations.

Week 12

1. Rob McEwen
    a. Tom O and I were finally able to reflash the transmitter, the embedded radio, and the receiver and get them to bind. So the transmitter will now bind to either B2 or B3.
    b. The next step is to zero the servos and connect the linkages.

Week 10

1. Rob McEwen
    a. Believer 3 now contains all major electronic components (receiver, telemetry radio, GPS, etc.) necessary for flight (no payload), except the parachute servo.
    b. Starting the bring-up and checkout process today.
2. Paul McGill
    a. Released v1.0.0 of Believer UAV schematic.

Week 9

1. Rob McEwen
    a. Obtained Frsky receiver.
    b. Most electronic components are plugged into the Pxhawk, but not mounted. These include the receiver, the telemetry radio with embedded Max3232,, the power distribution board, and the servos.
    c. James is mounting the pitot tube and board.
    d. Next is to power it up, test the receiver and telemetry, center the servos, and attach the linkages for the ailerons and rudder/elevators.

Week 8

1. Rob McEwen
    a. Assisted Jose with monokoting Believer 3.
    b. Hinged the ailerons and rudders/elevators.
    c. Remounted the Pxhawk.
    d. Working with James (and others) to get the receiver cable made with the embedded MAX3232 inverter.
    e. All the components save the pitot tube and parachute release are plugged in and ready to test. Will try the first power-up this afternoon.
2. Paul McGill
    a. Resolved some final details on the Believer UAV schematic.

Week 7

1. Paul McGill
    a. Started drawing schematic of Believer UAV wiring and am 95% done with system interconnect diagram.

Week 6

1. Rob McEwen
    a. Discovered that the plane had an unusually large angle of attack on the unsuccessful catapult launch. It was 25 degrees. This implies that the main wing was stalled, which would explain why the plane didn't fly. However, the plane is held securely by the launch mechanism.
    b. Exploring the theory that the launch flange tore off the plane during the catapult, or partially tore off, explaining how the plane could pitch up while still attached.
    c. Assisted in repairing Believer 2 by relaminating (re-covering) the nose.
    d. Got Mission Planner to run on my VM, and talk to the 915 radio and to the plane.
    e. Now running some whole system checks in the lab.

Week 4

1. Ben Erwin
    a. An at-sea trial of a multi-rotor drone to test a shore based radar tracking system was canceled due to COVID related issues.
    b. Work continues on Believer 2 repair and tuning, as well as a construction of new Believer 3 fixed wrong aircraft.
    c. An over land trial flight for Believer 2 plane is scheduled for sometime this week.
2. Rob McEwen
    a. Preparing for flight tomorrow

Week 3

1. Rob McEwen
    a. Believer 3

Week 2

1. Rob McEwen
    a. Meeting + working on Believer 3 build.
2. Paul McGill
    a. Starting UAV schematics

Week 1

1. Rob McEwen
    a. Preparing to switch from Believer 3 build to repairing Believer 2
2. Tom O'Reilly
    a. Held project kickoff meeting with team to review goals, milestones and schedule. Renewed commercial UAV license.