OLite 1 & 2 Progress Report

February 25, 2011

Notes

As part of OLite 2 development, OLite is being used as a development platform where modified designs are integrated with the payload and verified before being included in the O2 design. This includes a new flight computer design, updated radio and thermal controls. The OLite flight components are being kept separate from this development effort as to not interfere with the OLite system flight readiness. OLite 2 is progressing to production of flight boards, with boards scheduled to be sent for manufacturing in the next 2 weeks.

Team Activities

CDH

Flight software has all of its supporting modules finished (downlink, uplink, and watchdog). Downlink and watchdog is currently being tested, uplink ability is waiting on the ground station programs to be finished. The downlink end of the ground station program is about 80% complete, while the command uplink end of the ground station program is about 90% complete.

On the hardware side, our second CDH board is about 50% populated. We're currently verifying the functionality of the first CDH board. We're aiming to get revision 2 layed out and sent to manufacturing by beginning of Spring week.

COMM

The communication team received the REVISION 1 board in January. The team is currently completing populating and testing this board. The FPGA has been programmed successfully in last year's verilog and the team is working to get the VHDL code to work as well. The RF circuitry is in the process of being tested. The team has detailed Errata for the next revision board. Highlights include: no BGAs, smaller op-amp package, correct passive component sizes, and MMCX connectors replace SMAs. The REVISION 2 board will be sent out over spring break including all the adjustments learned from the prior revisions.

The antenna has been tested in the anechoic chamber and demonstrated correct magnitude plots expected from the simulations. The design is now being refined to resonate both in the 400MHz band and 1500MHz for GPS.

GNC

The algorithms for attitude determination are complete. Minor changes may be needed to be ready for flight, but the majority of the code is ready to go. The GPS board is in the middle of layout development, with a search being run for GPS receiver and LNA footprints. The MATLAB data analysis

for the magnetometer is essentially complete. The only thing left is formatting the output to be able to increase readability. One minor question remains to fully interpret the data, but it's more of a confirmation than it is an unknown. The sun sensor boards are in, cut out, and currently being populated.

PWR

All three major branches of the Power Subsystem (battery/charging board, regulation board, and solar panels) are currently in the board layout stage. The battery and charging board has undergone several schematic design revisions based on preliminary testing of the batteries. The layout is approximately 15% completed at this point. The regulation board's schematic design is also complete with high efficiency (>90% efficient) DC/DC converters and sensors. The layout is approximately 90% complete at this point. The solar panel boards include circuitry from several different subsystems (PWR, COM, GNC, THM) and the current status is a combination of integration of this circuitry and layout design. The schematic and layout designs are approximately 50% complete each.

THM

The majority of technology development and materials testing has been completed. The Thermal group has chosen a specific model of patch heater and temperature sensor, a specific general circuitry potting and an insulating foil. The regulation circuitry design for the patch heaters and temperature sensors has been finalized and parts for two prototype units are scheduled to be ordered by the end of the week, with integration into OLite 1 systems to follow. OLite 1 environmental testing to verify COMSOL models will commence on the 26th, barring equipment failure. Additionally, characterization of the general circuitry potting material will also be conducted that weekend. The Thermal group has begun work on battery placement and protection for OLite 2.

Remaining tasks for OLite 1 include prototype heater circuit integration, system testing and environmental simulation.

Remaining tasks for OLite 2 include completion of COMSOL models, final selection of required heaters and sensors, purchase of components required to protect the system, integration of thermal circuitry into OLite 2 systems, battery configuration, testing for battery-specific and alternative heat spreading materials, system testing, and environmental testing to verify COMSOL models.

Mech

The mounting system for the CubeSat Simulator (CSS) has been defined, along with mechanical interfaces. The machine drawing is ready and the prototyping of the bracket can begin when the facilities are available. The slotted rails in the CSS have been adjusted to accommodate five boards (down from six) and have shifted to adapt to the latest requirements for board clearances. Both the support box and CSS have begun prototyping and are nearing completion – progress was temporarily halted due to a facility malfunction. Errors found in the prototype and drawings have been updated to a

new revision. Ground paths have been investigated and changes have been made to a few components (e.g. sun sensor plugs) to connect the components to the star ground.

Design/Development Issues

N/A

Milestones

N/A

Current Leaders

Project Management	Allen Kummer
Mechanical	Matt Becker
Power Subsystem	Alex Hackett
Command and Data Handling Subsystem	
Hardware	Nate Butler
Software	David Zhang
Guidance Navigation and Control Experiment	Andrew Palski
Communications Experiment	
Radio	Steve Devore
Antenna	Scott Pfeiffer
Power Experiment	Alex Hackett

*Full list of participating students available on request

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