

Senior Design Project Data Sheet

Project #	Project Name	Project Track	Project Family
08101	Instrumentation Platform	Aerospace Systems Technology	METEOR
Start Term	Team Guide	Project Sponsor	Doc. Revision
2007-1	Dorin Patru	Harris	C

Project Description

Project Background:

The METEOR project has been in existence for 4 prior senior design groups. A low-cost, annual small-satellite launch system would benefit university students who have a limited amount of time to design, launch, and then analyze the results from a small satellite.

Problem Statement:

To address hardware and software issues in the previous instrumentation platform design and rebuild the platform with these improvements. Hardware upgrades need to be made to the following subsystems: sensors, on-screen text overlay, video transmitter, and GPS unit. Additionally, updates to current software versions are necessary to accompany hardware revisions.

Objectives/Scope:

1. Redesign faulty systems of the previous platform design and rebuild the platform to complete a successful test launch with a burst balloon.
2. Test and improve previous Video Transmitter revision to be implemented in the Instrumentation Platform.
3. Update the current power system to meet current and future needs.
4. Complete the hardware and software design of the On-Screen Text Overlay system.
5. Complete and test current software for MSP430 control board.
6. Complete interface and test 2m transceiver and GPS unit.
7. On ground testing of complete Instrumentation Platform.
8. Successfully complete a launch with the finalized design utilizing a zero-pressure balloon.

Deliverables:

- Updated PCB designs, schematics and necessary software revisions for any updated systems.

- Ground control and Instrumentation Platform software with complete documentation.
- Two working, ground tested, instrumentation platforms ready for flight.
- Manuals for manufacturing, assembly, and ground-testing of the Instrumentation Platform.

Expected Project Benefits:

- The overall project goal is to have a fully functional instrumentation platform, for project METEOR, capable of assisting in the launch of small satellites into low Earth orbit.

Core Team Members:

- Christopher J. Fisher
- David J. Semione
- Brian A. Hanna
- Gabriela E. Pereira Nunes
- Sergey A. Yekimenkov

Strategy & Approach

Assumptions & Constraints:

1. Weight constraint of 8 lbs.
2. Must meet all FAA and FCC government regulations.
3. Comply with all RIT Policies and Procedures.
4. Monetary budget of \$5,000.
5. Existing platform and system architecture must be used in design.

Issues & Risks:

- Risk of balloon bursting before it reaches desired altitude.
- Failure of parachute deployment.
- Insufficient range for the radio equipment.
- Interference of any kind with electrical equipment (mainly RF).
- Exposure to radiation at high altitudes, which cannot be accounted for until after flight.
- Sufficient power for all systems.
- Potential delays due to improper/inadequate documentation of previous design teams.