

ABC Fluid Experiment (AFE) Avionics Unit

BACKGROUND

The ABC Fluid Experiment (AFE) had previously operated successfully on the International Space Station in the Microgravity Glovebox. Additional investigations are being proposed to utilize the ABC Fluid Experiment hardware; however, upon completion of the experiment in the Microgravity Science Glovebox (MSG) and during de-integration, it was determined that the avionics unit was damaged. The AFE Avionics Unit has been returned from the ISS and has been evaluated by NASA. The success of the future experiments is dependent on the avionics unit. The AFE hardware provides a primary platform for obtaining key fluid behavior data in microgravity for future Lunar and Mars missions. The original hardware was developed and built in-house at NASA GRC. The damaged avionics unit will be used to provide the MSG interface plate and the overall enclosure. However, all other parts have been determined to require to be rebuilt and qualified. NASA GRC will provide the drawings and process plans to build the AFE Avionics Unit to print and perform functional checkout tests utilizing the AFE checkout unit located at NASA GRC, along with environmental testing, prior to turn-over to NASA.

TASK DESCRIPTION

This is a Build-to-Print task to produce one (1) ABC Fluid Experiment Avionics Unit. The AFE Avionics Unit will be validated that it meets proper functional operations, along with completing environmental testing (EMI, workmanship vibe and thermal).

The contractor shall perform the following tasks:

1. Determine if any discrepancies or missing documentation provided by NASA that needs to be resolved prior to building the unit.
2. Procure and/or manufacture all needed parts to build one unit.
3. Identify any long-lead items (over 3 months) that will impact schedule.
4. Build the AFE Avionics Unit according to drawings and process plans provided by NASA GRC.
5. Perform functional test for Avionics Unit.
6. Notify NASA GRC of any functional test failures and identify resolution plan.
7. Support NASA Inspections and Acceptance.
8. Deliver Avionics Unit to NASA GRC.

To accomplish this task, NASA GRC shall provide:

1. Configuration-controlled AFE drawings, process plans, assembly procedures, previous unit Build Books, in addition to functional test plans no later than 10 business days after task initiation.
2. AFE subject matter expertise during the unit build, including in-person support, as needed.
3. Damage AFE Avionics Unit will be made available from NASA Bonded Storage as Government Furnished Equipment.
4. AFE Project documentation that is available consisted of the following:
 - a. Mechanical and Electrical Drawings
 - b. Drawing Change Requests used to build flight unit but not incorporated into the drawings
 - c. Pro-E CAD Models

- d. Wiring Diagrams
- e. Bill of Materials
- f. Assembly Process Plans
- g. Functional Test Plans
- h. Any other documentation, as needed, to build the unit.

GOVERNMENT PROPERTY

NASA has the following items in Bonded Stores that can be made available for build of the spare:

- AFE Avionics Unit (S/N-001)
- Residual Hardware available – All Fasteners are available in NASA Bonded Stores

DELIVERABLES AND REVIEWS

The contractor shall deliver to the Government the following upon delivery of the hardware:

1. AFE Avionics Unit, quantity = 1 (DD-250)
2. Acceptance Data Package per DID# V-05
3. As-Run Functional Test Report
4. Closeout Photos

KEY MILESTONES

The Contractor shall meet the following milestones in performance of this task:

1. Task Kick-off Meeting (NLT 5 working days from Task Initiation)
2. Schedule and Long-lead Item Review (NLT 20 working days from Task Initiation)
3. Mid-Point Schedule Review (per Contractor schedule)
4. AFE Avionics Unit – System Acceptance Review (per Contractor Schedule)

MILESTONE PAYMENTS

Contractor shall propose milestone payments and the criteria for those payments.