

STATEMENT OF WORK

Contract Number: -N66001-09-D-0029

Task Order Number: DO ~~000X0004~~

Task Title: ~~————~~Electronics Design for Micro-Electro-Mechanical-Systems (MEMS) Based ~~Optical-Electronic~~~~Opto-electronic~~ Sensors, Accelerometer and Gyroscope: Phase II

Date: ~~07/29/05/05~~/2010

1.0 SCOPE

This statement of work provides the ~~electronic and mechanical engineering efforts~~ to design, document and fabricate ~~second generation AcXel Sensor Electronics~~ Printed Circuit Board Assembly (PCBA) Base Axes X, along with the two fundamental complementary axes Y,Z, Sensor Modules (PCBA) to interface the AcXel Sensor Electronic Printed Circuit Board Assembly developed in Phase I.

Extend AcXel Sensor Electronic Printed Circuit Board Assembly design to accommodate the additional control feature requirements of the SSC-Pacific Electronics Design for ~~optical~~ Micro-Electro-Mechanical-Systems (MEMS) Based Optical-Electronic Accelerometer. Utilize developed electronics to establish ~~accelerometer based on~~ an extended version of one sensor to the other. Leverage accumulated VCSEL Laser Diode design parameter control parameters from one sensor to the other. ~~already established PCB circuit design.~~

Support the development of deployable modules to support the maturing of sensor accuracy, and assembly miniaturization through laboratory and field testing of sensor electronics PCBA.

- 1.1 Background. The system electronics PCB design is to include several control loops including a heater driver and temperature control loop; a laser driver and monitor photodiode amplifier to control laser output and report this output; and a photo diode detector that will provide an error signal to close the proof mass driver. The output of the PCBA will be high resolution serial data back to the PC. The basic design schematics, PCB layout files, pertinent sensor datasheets, and bill of materials of the already established PCB circuit design is to be supplied by Government Technical Coordinator.

2.0 APPLICABLE DOCUMENTS

In the event of a conflict between the text of this SOW and the specification(s) and/or regulation(s) cited herein, the text of this SOW shall take precedence. Nothing in the Ads or the SOW however shall supersede applicable laws and regulations unless an exception has been obtained. The following Ads is for guidance only, except where invoked for a specific section of the PWS.

IMU Specifications.pptx dated June 3, 2010 SPAWAR, describes:~~Describes~~ optical accelerometer specifications and testing definitions. Questions and answers by R. Dao.

3.0 TECHNICAL REQUIREMENTS

3.1 PCB Closed-Loop Electronics Design, Fabrication and test based on previously demonstrated PCB designs

3.1.1 Description: ICI shall provide three (3) functional set of PCBAs to operate three independent electro-optical accelerometers. The PCBAs will be based on the already established design supplied by the Government Technical Coordinator. As part of this effort, ICI shall perform the following tasks:

- Fully understanding current government furnished electro-optical accelerometer PCBA design and insert enhancements where applicable. Enhancements shall be considered to be any improvement or modification, if applicable, to the existing design that improves existing performance and helps meet end requirements as specified in section 2.0. Enhancements, if necessary, are to be kept minimal during this phase of the PCBA development and should only be applied if the risk of doing said enhancement is considered low risk to the Government Technical Coordinator.
- Produce high quality, multi-layer PCB substrates, populated with vendor specified components
- Products to be tested electrically functional to agreed to parameters as set in the documentation supplied in section 2.0

3.1.2 Acceptable Quality Level: The design, fabrication, and assembly of PCB and components shall be complete, and approved by the Government Technical Coordinator, allowing for the successful completion of 30 Sep ~~1140~~ Phase II Project Objectives.

3.1.3 Method of Surveillance: ICI shall submit bi-weekly Progress Reports to the Government, in addition to direct daily/feedback/support to sensor and government POC.

3.2 Deliverables or Documentation:

3.2.1 The deliverables for this effort are as follows: Three (3) G2 ACXEL Sensor Assemblies, CD Electronic Data Files, Base and Sensor PCB.

3.2.2 Three (3) G1 GYRxO Sensor Assemblies, CD Electronic Data Files, ~~3.1.2~~ Base and Sensor PCB.

4.0 GOVERNMENT FURNISHED PROPERTY/MATERIALS/FACILITIES:

The government will furnish the already established PCB closed-loop electronics designs for the AcXel optical accelerometer including:

- 1) PCB files – PDF or Gerber – All electronic layers, Fabrication drawing, Assembly drawing, Silk and mask layers
- 2) Pertinent datasheets – i.e. specialized components specifically chosen for use with the sensor chip.
- 3) Datasheet for the sensor chip as applies to input output requirements including signal requirements such as impedance of pins, drive requirements, Photodiode characteristics to be used in the TIA design -- etc
- 4) PCB design requirements document, hardware requirements specification.

5.0 TRAVEL

For cost estimating purposes the contractor shall assume:

One trip, three persons, 2 days per month from Point Loma to San Diego and return for 12 months

Additional travel may be required at the direction of the Government. Prior authorization for additional travel shall be obtained in accordance with Clause H350 REIMBURSEMENT OF TRAVEL COSTS.

~~Local travel only to and from the government facility in San Diego, CA.~~

6.0 SECURITY

The work performed under this task order is unclassified.

7.0 PLACE OF PERFORMANCE

SSC Pacific, San Diego, CA.

8.0 INSPECTION AND ACCEPTANCE

All deliverables shall be delivered to SSC Pacific for inspection by the government technical coordinator and acceptance by the Contracting Officer’s Representative (COR). Deliverables shall include the following:

- 1) PCB Gerber files – All electronic layers, Fabrication drawings, Assembly drawings, Silk and mask layers
- 2) Pertinent datasheets – i.e. specialized components specifically chosen for use with the electro-optical accelerometer sensor chip.

3) Accelerometer:
Three copies of the PCBA fully tested and meeting specifications set in section 2.0.

Each includes Sensor electronic PCBA, and two Sensor Module PCBA

Gyroscope:

Three copies of the PCBA fully tested and meeting specifications set in section 2.0.

Each includes Sensor electronic PCBA, and two Sensor Module PCBA

Technical Coordinator:
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COR:
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 Tech. Coord. Signature Date

 COR Signature Date

 Contractor’s Signature September 15, 2010
 Date