LIGO LABORATORY
California Institute of Technology
1200 E. California Blvd.
Pasadena, CA 91125

Statement of Work
Fabrication of Crossbeam Clamps and HEPI Adapter Plate for Advanced LIGO HAM-ISI

The following documents are incorporated into and made a part this purchase order. Click on the following LIGO Document Control Center (DCC) links to access these documents or go on line to the LIGO Public DCC at https://dcc.ligo.org/ to access the DCC#.

1.0 Terms:

DCC #	*Description*
C080185-v1	Laser Interferometer Gravitational Wave Observatory (LIGO) Commercial Items or Services Contract General Provisions California Institute of Technology "Institute", LIGO Rev 11/12/08
F0810001-v4	Technical Direction Memorandum.

2.0 Quality Control:

DCC #	*Description*
Q0900001-v4	Advanced LIGO Supplier Quality Requirements, dated 2/10/10, describes following contractor/supplier QA/QC actions for this procurement:

☐	3.1 Pre-Award Inspection	☒	3.9 Discrepant Material Storage	☒	4.4 Calibration Program
☒	3.2 Supplier In Process Quality Control	☒	3.10 Quality Records	☐	4.5 Critical Interface
☒	3.3 In Process Inspection	☐	3.11 Drawing and Specification Change Control	☒	4.6 Cleanliness
☒	3.4 Pre-Ship Inspection	☐	3.12 Welding Certification	☒	4.7 Packaging
☒	3.5 Receiving Inspection	☒	3.13 End Item Data Package (including Certifications of Compliance)	☒	4.8 Storage
☒	3.6 Discrepant Material	☐	4.1 Design Verification	☒	4.9 Transport
☒	3.7 Material Review Action	☒	4.2 Raw Material Procurement	☐	4.10 Customs
☒	3.8 Material Review Actions at Contractor	☒	4.3 Traceability of Materials		

For the above list the Supplier shall: 1) Identify the corresponding sections/paragraphs in their existing QA/QC system 2) meet or exceed the design requirements contained in the attached engineering documents for each area called out.

3.0 End Item Data Package:

At the time of delivery of the parts, the Supplier shall also provide the following data, as a minimum:

- Any as-built modifications (with approval of the LIGO Contracting Officer) as mark-ups to the drawings
- Material certifications
- Dimensional & QC inspection reports—this shall include a report showing that parts have been inspected and fall within specified tolerances.
- Certificate or statement of compliance with all contract and drawing process restrictions.

4.0 Included Documents:

The drawings cited below are only partially dimensioned. In addition to the drawings, the contractor will be provided with CAD solid models of the parts (SolidWorks Professional 2009, SP5.0)

DCC #	*Description*
D080374-v2	Clamp Base, HAM Support Tube
D080375-v2	Clamp Cap, HAM Support Tube
D080376-v2	Clamp Preload, HAM Support Tube
D080377-v2	Clamp Washer Plate, HAM Support Tube
D080378-v2	Clamp Sleeve, HAM Support Tube
D1000480-v1	Clamp Screw Guard, HAM Support Tube
D080465-v2	HAM Crossbeam HEPI Adapter
D080698-v2	Crossbeam Washer Plate #1
D080699-v2	Crossbeam Washer Plate #2
D080700-v2	Crossbeam Washer Disc

5.0 Scope:

This RFQ is for the fabrication of individual parts detailed in the ten (10) unique drawings included in this package. These parts will be used external to the vacuum chamber for the HAM ISI.

6.0 Quantity Required:

D080374-v2	Clamp Base, HAM Support Tube	total qty: 72 = 48 shipped to LHO and 24 shipped to LLO
D080375-v2	Clamp Cap, HAM Support Tube	total qty: 72 = 48 shipped to LHO and 24 shipped to LLO
D080376-v2	Clamp Preload, HAM Support Tube	total qty: 72 = 48 shipped to LHO and 24 shipped to LLO
D080377-v2	Clamp Washer Plate, HAM Support Tube	total qty: 72 = 48 shipped to LHO and 24 shipped to LLO
D080378-v2	Clamp Sleeve, HAM Support Tube	total qty: 72 = 48 shipped to LHO and 24 shipped to LLO
D1000480-v1	Clamp Screw Guard, HAM Support Tube	total qty: 72 = 48 shipped to LHO and 24 shipped to LLO

D080465-v2	HAM Crossbeam HEPI Adapter	total qty: 72 = 48 shipped to LHO and 24 shipped to LLO
D080698-v2	Crossbeam Washer Plate #1	total qty: 144 = 96 shipped to LHO and 48 shipped to LLO
D080699-v2	Crossbeam Washer Plate #2	total qty: 288 = 192 shipped to LHO and 96 shipped to LLO
D080700-v2	Crossbeam Washer Disc	total qty: 288 = 192 shipped to LHO and 96 shipped to LLO

7.0 Delivery Requirements:

The deliveries are FOB at these destinations, i.e. the contractor has responsibility for shipping title and control of goods until they are delivered and the transportation has been completed. The contractor selects the carrier and is responsible for the risk of transportation and for filing claims for loss or damage.

Shipping Location:
These items will be shipped to:

LIGO Livingston Observatory (LLO)
Attn: Joe Hanson and Tom Gentry
19100 LIGO Lane
Livingston, LA 70754

OR

LIGO Hanford Observatory (LHO)
Attn: Hugh Radkins and Jodi Fauver
127124 North Route 10
Richland, WA 99354

Shipping Containers:
The contractor is responsible for providing shipping containers and transportation which protects these parts from damage from the transportation environment (weather, handling, accidents, etc.). Mating edges of parts should be especially protected from damage during shipping.

8.0 Manufacturing:

8.1 Precedence

The Statement of Work (SOW) sections below regarding processing or fabrication of the parts are meant to convey the scope and nature of the requested work. If there is a conflict between the SOW and the drawing, the drawing has precedence.
The parts are to be produced using the CAD models which will be provided to the contractor upon award. If there are discrepancies between the drawings and the CAD model, the model takes precedence.

8.2 Restrictions

- Machine all surfaces to remove oxides and mill finish. Abrasive removal techniques are not acceptable.

- All machining fluids must be fully synthetic, water soluble (not simply water miscible) and free of sulfur, chlorine, and silicone.
- Thoroughly clean part to remove all oil, grease, dirt, and chips with soap and water. Follow with solvent (acetone) wipe. Pay close attention to tapped holes.

8.3 Materials

Material is specified on the drawings. All materials specified by drawings or SOW have been approved for use in or near the UHV environment in LIGO. No materials may be substituted or added without prior knowledge and testing by LIGO.

8.4 Machining

All parts are to be machined. No grinding or lapping with abrasive wheels, cloth or stones is permitted. No sanding of any type. No parts shall be cast or molded. Water soluble (not just water miscible) cutting fluid (lubrication) is to be used for all machining operations. The use of cutting fluids or lubricants, which contain sulfur, chlorine or silicone compounds is prohibited.

8.5 Finishing, painting, anti-rust

Any required surface finish is defined in the drawings.
Localized scratches, digs and blemishes should be minimized.
Part D080465 specifies painting on the drawing:
Plug all screw holes, both tapped and screws before finish work.
Paint surfaces except those indicated on drawings.
Prime: Sherwin Williams Industrial Wash Primer P60G2.
Paint: Medium Blue Sherwin Williams (Polane (R) T-PLUS Polyurethane Enamal).
Apply “Oxisolv Rust Inhibitor” to all unpainted surfaces, per manufacturer instructions.
Remove plugs from all holes.

8.6 Marking

Marking location is shown on the drawings.
All parts must be marked with a part number, revision code and serial number at the location indicated on the drawing. Marking is to be accomplished by mechanically scribing, stamping or engraving (no dyes or inks).
If not indicated in the drawing, mechanically scribe, stamp or engrave as follows:

<drawing number> - <revision code>, <type number if applicable>
<unique 3 digit serial number starting at 001 for the first part and incrementing thereafter>

As an example:

D0900026-v1
S/N – 001

The serial number must be a sequential 3-digit number, starting with 001, for each part.
Also where indicated, mechanically scribe, stamp, or engrave (no dyes or inks) any LABELS shown on drawing sheets.