



**Statement of Work  
 Provision of a Sealed CO2 Laser  
 for Advanced LIGO Thermal Compensation System**

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:**

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

**2.0 Quality Control:**

<u>DCC #</u>	<u>Description</u>
<a href="#">Q0900001-v5</a>	Advanced LIGO Supplier Quality Requirements, dated 2/10/10, describes following contractor/supplier QA/QC actions for this procurement:
<input checked="" type="checkbox"/> 3.1 Pre-Award Inspection	<input checked="" type="checkbox"/> 3.9 Discrepant Material Storage
<input checked="" type="checkbox"/> 3.2 Supplier In Process Quality Control	<input checked="" type="checkbox"/> 3.10 Quality Records
<input type="checkbox"/> 3.3 In Process Inspection	<input checked="" type="checkbox"/> 3.11 Drawing and Specification Change Control
<input checked="" type="checkbox"/> 3.4 Pre-Ship Inspection	<input type="checkbox"/> 3.12 Welding Certification
<input checked="" type="checkbox"/> 3.5 Receiving Inspection	<input checked="" type="checkbox"/> 3.13 End Item Data Package (including Certifications of Compliance)
<input checked="" type="checkbox"/> 3.6 Discrepant Material	<input type="checkbox"/> 4.1 Design Verification
<input checked="" type="checkbox"/> 3.7 Material Review Action	<input type="checkbox"/> 4.2 Raw Material Procurement
<input checked="" type="checkbox"/> 3.8 Material Review Actions at Contractor	<input checked="" type="checkbox"/> 4.3 Traceability of Materials
	<input checked="" type="checkbox"/> 4.4 Calibration Program
	<input checked="" type="checkbox"/> 4.5 Critical Interface
	<input checked="" type="checkbox"/> 4.6 Cleanliness
	<input checked="" type="checkbox"/> 4.7 Packaging
	<input checked="" type="checkbox"/> 4.8 Storage
	<input checked="" type="checkbox"/> 4.9 Transport
	<input checked="" type="checkbox"/> 4.10 Customs

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 device(s), the Supplier shall also provide the following data, as a minimum:
- o Installation, operation and performance check/verification instructions
  - o Pre-shipment test results (see Specification Document E1000065-v5).
  - o Engineering drawings of mechanical, electrical and optical interface(s).
  - o Engineering & procurement specifications for required interface equipment (such as connectors and adapters).
  - o Mass properties (including center of mass and mass moments of inertia).

- Principal construction materials of housings and interfaces.
- Unique serial number for each device.
- Warranted lifetime of operation.
- References for contacting past customers utilizing similar devices.
- Access to any operational and performance data for similar devices delivered in the past.
- Qualitative and quantitative description(s) of anticipated failure mechanism(s).
- Operations manuals for the laser, associated power supply and control unit or system, as applicable.
- Description or recommended water chiller for cooling the laser and power supply, as applicable.

#### 4.0 Included Documents:

The documents cited below must be considered by respondents.

<u>DCC #</u>	<u>Description</u>
<a href="#">E1000065-v6</a>	TCS Laser Specification

#### 5.0 Scope:

This RFQ is for the provision of a stable and reliable CW laser source emitting at least 50W at a wavelength of 10.6  $\mu\text{m}$  in a circular, well polarized and high quality mode. Specification Document (E1000065-v6) enumerates detailed requirements for the device.

#### 6.0 Quantity Required:

One laser source is required immediately. A priced option for eight additional units shall be furnished, valid for 90 days.

#### 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 three (3) locations:

California Institute of Technology  
 Attn: Mindy Jacobson  
 PMA LIGO M/S 100-36  
 391 S. Holliston Ave.  
 Pasadena, CA 91125

LIGO Hanford Observatory (LHO)  
Attn: Cheryl Vorvick  
LIGO Hanford Observatory  
127124 North Route 10  
Richland, WA 99354

LIGO Livingston Observatory (LLO)  
Attn: Chris Guido  
19100 LIGO Lane  
Livingston, LA 70754

#### 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 Delivery Schedule:

<i>Quantity</i>	<i>Purpose</i>	<i>Latest Date</i>	<i>Location</i>
1	Development of aLIGO TCS Projection System	24-Aug-2011	Caltech
5	Integration with aLIGO TCS Projection System	17-Mar-2012	LIGO Hanford
3	Integration with aLIGO TCS Projection System	24-Mar-2012	LIGO Livingston

### 9.0 Manufacturing:

#### 9.1 Marking

Serial number, model and type (if applicable) and manufacturing date shall be marked in a visually prominent location.