

CALIFORNIA INSTITUTE OF TECHNOLOGY
Laser Interferometer Gravitational Wave Observatory (LIGO) Project

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Refer to: LIGO-M010274-00-P
Date: October 9, 2001

Subject LIGO Change Control Board (CCB) Meeting Minutes - October 9, 2001

Keywords: Change Control, Change Control Board, Civil Construction, Hanford, Contingency Analysis, Detector, Pre-Stabilized Laser, Optics

References: CR-010006 - WBS 1.1.4 Roof Shelter for Concrete Pad (Livingston)
CR-010007 - WBS 1.2.4 Re-coat and Repolish Beam Splitter Optic
CR-010008 - WBS 1.1.4 Five Ton Crane for Hanford Staging Building
CR-010009 - WBS 1.4.2 Additional 10-W Laser for PSL Lab
CR-010010 - Advanced R&D, Increased Scope and Cost Growth for ETF Demonstrator

Attendees included:

M. Coles (tel.)	D. Coyne	E. Jasnaw	F. Kaufman
P. Lindquist	O. Matherny (tel.)	I. Petrac	F. Raab (tel.)
G. Sanders	D. Shoemaker (tel.)	S. Whitcomb (tel.)	

Agenda:

A LIGO Change Control Board (CCB) was held on Tuesday, October 9, 2001. The following Change Requests were discussed

Change Request No.	WBS	Description	Submitted By	Date
CR-010006	2.2 (Ops)	Roof Shelter for Concrete Pad (Livingston)	M. Coles	June 14, 2001
CR-010007	1.2.4	Re-coat and Repolish Beam Splitter Optic	S. Whitcomb	August 16, 2001
CR-010008	1.1.4	Five Ton Crane for Hanford Staging Building	O. Matherny	August 27, 2001
CR-010009	1.4.2 (Ops)	Additional 10-W Laser for PSL Lab	S. Whitcomb	September 5, 2001
CR-010010	AdR&D	Increased Scope and Cost Growth for ETF Demonstrator	D. Coyne	September 10, 2001

General Comments

The Change Request Log is attached.

CR-010006 - WBS 1.1.4 Roof Shelter for Concrete Pad (Livingston)

The request is for a roof shelter over the concrete pad adjacent to the erosion control pond in Livingston. A roof shelter was originally envisioned as part of erosion control effort but was deleted from the scope of that contract due to cost. The currently proposed pre-fabricated solution is more cost effective. A pointer to a picture of the proposed roof is provided on the change request.

This roof will provide an outdoor covered area for dining and informal discussion that can accommodate a large number of visitors as well as staff. We currently use a tent that is physically unattractive and will not have a long life. The area will also support outreach activities.

The roof has a low mass and, therefore, is not expected to be a source of seismic noise. If necessary, it can be moved.

The request is for less than \$50K, will be paid from existing operating budgets, and therefore does not require formal approval.

CR-010007 - WBS 1.2.4 Re-Coat and Repolish Beam Splitter Optic

We discovered scratches on the high-reflecting and anti-reflecting surfaces of the beam splitter optic originally installed in the LIGO Livingston Observatory (LLO). Since the recycling cavity is sensitive to resonance, we decided to replace this optic with the only spare. This request repolishes and re-coats the optic removed to replace the spare. The change request also proposes that we complete the polishing of a partially finished substrate since we can coat two optics as cheaply as one.

The original construction project scope include the delivery of certain number of “yield” spares. Therefore, this effort will be charged against the Construction Project.

This change request is approved.

CR-010008 - WBS 1.1.4 Five Ton Crane for Hanford Staging Building

The amount requested is \$60,000. The request has been modified from the original request in that a “cantilever bridge” would reduce the 26 foot hook height, and guidance is that as much hook height should be preserved as possible. Therefore, Hanford will propose alternatives for access to the mezzanine.

This change request is approved and will be paid by Construction funds.

CR-010009 - WBS 1.4.2 Additional 10-W Laser for PSL Lab

Currently there is no laser in the Pre-Stabilized Laser Lab at Caltech. This change request pro-

poses an additional laser to support the mission of this laboratory. Currently we have deployed eight lasers, five at the sites, one at LASTI, one at Stanford, and one at the 40-meter facility. The proposed laser can also be used as a spare as needed.

This change request is approved and will be funded out of Operations.

CR-010010 - Advanced R&D, Increased Scope and Cost Growth for ETF Demonstrator

We have a contract with High Precision Devices (HPD) to do this work. HPD has recently completed the design phase. We now have a better understanding of the scope of the fabrication effort. The scope has increased (for example, features relating to the adjustment of sensors, etc.) and the cost of the in-scope effort has also increased. The proposed change provides funding needed to cover this growth.

This change request is approved. The HPD subcontract is currently funded by Advanced R&D, and this change request will also be funded by Advanced R&D.

PEL:pel

Attachments: CR-010006 - WBS 1.1.4 Roof Shelter for Concrete Pad (Livingston)
CR-010007 - WBS 1.2.4 Re-coat and Repolish Beam Splitter Optic
CR-010008 - WBS 1.1.4 Five Ton Crane for Hanford Staging Building
CR-010009 - WBS 1.4.2 Additional 10-W Laser for PSL Lab
CR-010010 - Advanced R&D, Increased Scope and Cost Growth for ETF Demonstrator
LIGO Change Request Log (pages 28 and 29)

Distribution:

R. Bork	M. Coles	D. Coyne	E. Jasnow
F. Kaufman	L. Jones	A. Lazzarini	O. Matherny
I. Petrac	F. Raab	D. Shoemaker	G. Stapfer
R. Weiss	S. Whitcomb	J. Worden	

cc:

B. Barish	Chronological File
G. Sanders	Document Control Center

LIGO CHANGE REQUEST

Change Request No: CR-010006

Date: June 14, 2001

WBS Element and Title: Roof Shelter for Concrete Pad Adjacent to Erosion Control Pond (Livingston)

Originator: Mark Coles

Telephone: 225-686-3113

CCB Sponsor:

Technical Change Description: Roof Shelter over Concrete Pad (Livingston)

Place roof shelter over concrete pad adjacent to erosion control pond. This will provide an outdoor covered area for dining and informal discussion that can accommodate large meetings, such as the LSC.

Background: A roofed pavilion was proposed for this area as part of the preliminary design concept for the site erosion control and landscaping work. However, the pavilion was deleted from the scope of work since the cost proposed, based on a custom design, seemed excessively expensive. The concrete pad, with dimensions of 40 x 60 feet, was installed. Since that time, we have evaluated various vendors of pre-fabricated shelters and looked at various styles. The quotation and drawings attached are for a durable metal shelter with eave dimensions of 40 x 64 feet. Color will be matched to the existing LIGO color scheme. The price includes installation. A photo of a typical shelter is at

<http://www.poligon.com/products/shelters/reks.htm>.

Cost Impact: \$ 38,047.00

Schedule Impact: No schedule Impact.

Concurrence Signatures:

Technical and Engineering Support:	Date:
Detector Group:	Date:
Integration Group:	Date:
Quality Assurance:	Date:
Project Controls Manager:	Date:

CCB Approval/Disposition

CCB Chairman:	Date
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LIGO Change Request

Change Request No.: CR-010007 Date: August 16, 2001

WBS Element and Title: 1.2.4 Core Optics Components

Originator: Stan Whitcomb Ext: 2131 CCB Sponsor: _____

Technical Change Description: **Re-coat and repolish beam splitter optic**

The beam splitter originally installed in the LLO interferometer was discovered to have a few scratches on the HR and AR surfaces. It was decided to replace this optic with a spare. We propose to repolish and re-coat this beam splitter. In addition we have a partially finished beam splitter substrate; since the coating is most efficient doing two optics at a time, we propose to complete the polishing of the spare substrate and coat it with the reworked beam splitter.

Cost Impact: \$105,000

CSIRO cost to repolish BS and finish polishing spare blank:	\$59,000
REO cost to coat two BS:	\$40,000
Shipping, misc. costs	\$6,000

Schedule Impact:

No expected impact.

Concurrence Signatures:

Facilities Group: _____ Date: _____

Detector Group: _____ Date: _____

Integration Group: _____ Date: _____

Integration Scientist: _____ Date: _____

Quality Assurance: _____ Date: _____

Technical Configuration Manager: _____ Date: _____

Project Controls Manager: _____ Date: _____

CCB Approval/Disposition:

CCB Chairman: _____ Date: _____

LIGO Change Request

Change Request No.: CR-010008 Date: August 27, 2001

WBS Element and Title: WBS 1.1.4--LIGO Hanford Observatory Facilities

Originator: Otto Matherny Ext: (509)372-8118 CCB Sponsor _____

Technical Change Description: **Install a five ton crane in the Hanford Staging Building**

Install a five ton crane in the Hanford Staging Building. There must be a cantilever bridge to reach the mezzanine floor from the main floor.

Cost Impact: **\$60,000**

Request for EAC:

Crane and installation **\$55k**

Electrical work **\$5k**

Total **\$60k**

Schedule Impact:

A crane is needed to lift items from the floor to the mezzanine.

Concurrence Signatures:

Facilities Group Leader: _____ Date: _____

Deputy Facilities Group Leader: _____ Date: _____

Detector Group Leader: _____ Date: _____

R&D Group Leader: _____ Date: _____

System Engineer: _____ Date: _____

Integration Scientist: _____ Date: _____

Project Controls Manager: _____ Date: _____

CCB Approval/Disposition:

CCB Chairman: _____ Date: _____

LIGO Change Request

Change Request No.: CR-010009 Date: September 5, 2001

WBS Element and Title: 1.4.2 Detector Support Operations (non-recurring)

Originator: Stan Whitcomb Ext: 2131 CCB Sponsor: _____

Technical Change Description: **Additional 10-W Laser for PSL Lab**

To date, LIGO has purchased eight 10-W lasers from Lightwave. Five are deployed at the sites (three installed in interferometers, one at each site as a spare). One is in the 40 m lab, one is at Lightwave for repairs, but is destined for LASTI, and one is currently in use at Stanford supporting high power laser development for Advanced LIGO. This CR adds one additional laser to be installed in the PSL lab in Lauritsen for continuing development of PSL electronics and other components.

Without it, there is no convenient testbed for the continuing PSL activities. In addition, this laser can be used as a replacement for the 40 m or LASTI laser in the event of a failure at one of these sites.

Cost Impact: **\$125,000**

Schedule Impact:

No schedule impact

Concurrence Signatures:

Facilities Group: _____ Date: _____

Detector Group: _____ Date: _____

Integration Group: _____ Date: _____

Integration Scientist: _____ Date: _____

Quality Assurance: _____ Date: _____

Technical Configuration Manager: _____ Date: _____

Project Controls Manager: _____ Date: _____

CCB Approval/Disposition:

CCB Chairman: _____ Date: _____

LIGO CHANGE REQUEST

Change Request No: **CR-010010**

Date: **September 10, 2001**

WBS Element and Title: **Advanced LIGO.4.02.3.2.1.3.3 SEI PD ETF Mechanical Contract**

Originator: **D. Coyne, G. Stapfer**

Telephone: **2034**

CCB Sponsor:

Technical Change Description: **Increased Scope and Cost Growth for the ETF Demonstrator**

The advanced LIGO seismic isolation system development includes a technology demonstrator and controls test bed, which is installed into the Stanford Engineering Test Facility (ETF). The similarity of the ETF chamber and the LIGO HAM chamber is used to develop early prototypes for the mechanical aspects of the SEI design, many of which are common to both the BSC and HAM systems. The ETF system then serves as a test bed for controls development.

A competitive design and fabrication contract was awarded to High Precision Devices, Inc. (HPD) on a Time & Materials basis for the design phase. Recently a final design review was successfully conducted. We wish to enter into a Cost Plus Fixed Fee arrangement with HPD for the fabrication phase. HPD's proposed costs are attached. Also attached is an explanation of the source of the cost and scope growth.

Cost Impact: **\$142,000 from contingency to account LIGO.SIDEM-1-NSFLIGO.SEISMI**

The provisional baseline cost allocation for this task is \$450K, plus a 20% contingency (\$90K) for a total of \$540K (see attached). We think that the contingency may be sufficient, but the baseline cost has grown to \$592K. Further discussions are planned with HPD to understand the potential fabrication cost growth risks and measures to contain further cost growth.

Schedule Impact: No schedule impact.

Concurrence Signatures:

Technical and Engineering Support:	Date:
Detector Group:	Date:
Integration Group:	Date:
Quality Assurance:	Date:
Project Controls Manager:	Date:

CCB Approval/Disposition

CCB Chairman:	Date
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LIGO Project Change Request Log

Change Request No.	Description	Submitted By	Submittal Date	Current Status	Disposition Date	Baseline Date	Net Contingency
CR-000018	1.1.4--Erosion Control, Livingston	Mark Coles	October 20, 2000	Approved \$95,000 (to be paid from OPs)	May 8, 2001 M010087	May 2001	\$3,993,933
CR-000019	1.2.2--Additional Electronics Lab Equipment for the Bridge Lab	Dennis Coyne	October 25, 2000	\$49,000	May 8, 2001 M010087	May 2001	\$3,944,933
CR-000020	1.1.4--Livingston Staging Building, Brunt Contract and Allowance for FCOs	Fred Asiri	December 20, 2000	Approved \$2,186,500	May 8, 2001 M010087	May 2001	\$1,758,433
CR-010001 Rev A	1.1.4--Closeout of Civil Construction Accounts	Fred Asiri	January 25, 2001	Approved (\$445,174)	May 8, 2001 M010087	May 2001	\$2,213,607
CR-010002	1.2.1.1.6-.7 ISC Design Account Closeout	Stan Whitcomb	April 17, 2001	Approved (\$329,000)	May 8, 2001 M010087	May 2001	\$2,542,607
CR-010003	1.2.1.1.9 Detector Systems Engineering Account Closeout	Stan Whitcomb	April 17, 2001	Approved (\$205,000)	May 8, 2001 M010087	May 2001	\$2,747,607
CR-010004	1.2.3.1 Pysics Environment Monitoring Closeout	Stan Whitcomb	April 17, 2001	Approved (\$237,000)	May 8, 2001 M010087	May 2001	\$2,984,607
CR-010005	1.1.4 Office Laboratory Building at Hanford	Otto Matherny	May 21, 2001	Approved \$2,500,000	May 29, 2001 M010167	May 2001	\$484,607

LIGO Project Change Request Log

Change Request No.	Description	Submitted By	Submittal Date	Current Status	Disposition Date	Baseline Date	Net Contingency
CR-010006	2.2 Roof Shelter for Concrete Pad (Livingston)	Mark Coles	June 14, 2001	Approved \$38,047 (to be paid by Operations)	October 9, 2001 M010274	October 2001	\$484,607
CR-010007	1.2.4 Re-coat and repolish beam splitter optic	Stan Whitcomb	August 16, 2001	Approved \$105,000	October 9, 2001 M010274	October 2001	\$379,607
CR-010008	1.1.4 Install Five Ton Crane in Hanford Statging Building	Otto Matherny	August 27, 2001	Approved \$60,000	October 9, 2001 M010274	October 2001	\$319,607
CR-010009	1.4.2 Additional 10-Watt Laser for Pre-Stabilized Laser Lab at Caltech	Stan Whitcomb	September 5, 2001	Approved \$125,000 (to be paid by Operations)	October 9, 2001 M010274	October 2001	\$319,607
CR-010010	AdvR&D Increased Scope and Cost Growth for the ETF Demonstrator	Dennis Coyne	September 10, 2001	Approved \$142,000 (to be paid by Advanced R&D)	October 9, 2001 M010274	October 2001	\$319,607