

Title: aLIGO Installation Acceptance Document for WHAM6

This document covers the technical content for acceptance review of a subset of the Advanced LIGO (aLIGO) installation. See document [M1300468](#) for an overview of the aLIGO acceptance process. Acceptance by Systems Engineering is to be indicated in the metadata for this document in the LIGO Document Control Center (DCC).

1 Installation Instance/Subset Definition

Insert a brief description of the subset of the aLIGO equipment which is covered under this installation acceptance document. Complete the entries in the following table. If elements of the table are not applicable, enter “not applicable”.

This installation covers the HAM chamber WHAM6 and all of the equipment within and attached plus associated electronics racks.

Interferometer [<i>L1 or H1</i>]:	H1
Building(s)/Room(s) : [<i>e.g. corner/LVEA</i>]	LVEA
Vacuum Chamber(s) :	WHAM6
Electronics Rack Designation(s) :	H1-ISC-C1 , H1-ISC-C2 , H1-ISC-C3 , H1-ISC-C4 , H1-ISC-R3 , H1-ISC-R5 , H1-SUS-C7 , H1-SUS-C8 , H1-SEI-C1 , H1-SUS-R4 Note that the Capacitive Position Sensor readout boxes, which sit on the cable trays do not have an official designation.
Optics Table(s)/Enclosure(s) Designation(s) , and other equipment/assemblies related to this installation:	H1-ISCHT6R drawing at D1201210

2 Procedures

If there are any caveats or explanatory notes regarding the procedure documentation cited in the table below, then add these notes to the table entries.

Baseline or initial Installation Procedure(s) : <i>[enter linked DCC document #(s); found under E1200023]</i>	E080012 was the initial procedure to install the ISI. E1200099-v4 was the baseline installation procedure. Historical note: E080187 was the eLIGO, base hazard analysis for the ISI Install. This “HAM6” install was in aLIGO HAM5, but the document forms the basis of the hazard analysis as executed.
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<p>As-Built/Installed Procedure(s), either:</p> <p>a) Enter hyperlinked DCC number for revised or red-lined baseline install procedure, and/or</p> <p>b) Enter hyperlinked DCC number for separate document with installation notes on deviations, changes in procedure, changes in tooling, etc., and/or</p> <p>c) Enter a list of hyperlinked electronic log entries detailing the experience in applying the baseline installation procedure</p>	<p>No as-built notes were recorded in document.</p> <p>The installation of The HAM-ISI was recorded in aLOG #7052 .</p> <p>Original installation of OMC: aLOG #8608.</p> <p>Original installation of tip-tilts is in aLOG #8612.</p> <p>The resumption of HAM6 installation is captured in aLOG #12215, cabling in aLOG #12282.</p>
<p>Baseline or initial Alignment Procedure(s): <i>[enter linked DCC document #(s); found under E1100734]</i></p>	<p>E1200955 was the initial procedure. This is just an empty file card as the WHAM6 alignment was not in the scope of the IAS subsystem. Alignment of the optical elements within HAM1 and HAM6 are handled by the ISC subsystem.</p>
<p>As-Built/Aligned Procedure(s), either:</p> <p>a) Enter hyperlinked DCC number for revised or red-lined baseline alignment procedure, and/or</p> <p>b) Enter hyperlinked DCC number for separate document with alignment notes on deviations, changes in procedure, changes in tooling, etc., and/or</p> <p>c) Enter a list of hyperlinked electronic log entries detailing the experience in applying the baseline alignment procedure</p>	<p>Optics on the table were aligned using interferometer beams.</p>

3 Drawings

Enter hyperlinked DCC document number(s) for each drawing in the table below. If elements of the table are not applicable, enter "not applicable". All chamber-level, assembly drawings can be found listed at [E1200562](#) and found linked under [D0901491](#).

Applicable Building/Room Top-Level Drawing(s):	D0901469 aLIGO Systems Layout LHO Corner Station
Top-Level Chamber Assembly Drawing(s):	D0901822-v5 aLIGO Systems, WHAM6-H1 Top Level Chamber Assembly
Electronics Rack Drawing(s):	All drawings for the racks can be found by navigating through the links given in Section 1 and in the rack and cable tray layout drawing.
Optics Table/Enclosure Drawing(s):	H1-ISCHT6R drawing at D1201210



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4 Serial Number Records

Serial numbers are used to track a subset of the parts, particularly active elements (see [M1000051](#)) and electronics (with S-numbered documents; see [T0900520](#)). Enter the hyperlinked DCC document number(s), and name(s) for the highest level assembly(ies) covered by this installation acceptance document in the table below. Also enter the hyperlink to the ICS entry for the instance of this assembly in the Inventory Control System (ICS). If elements of the table are not applicable, enter "not applicable". If elements of the table are not available/missing, then enter "not available".

Assembly DCC D-Number	Assembly Name	ICS entry.
D0901822	aLIGO Systems, WHAM6-H1 Top Level Chamber Assembly	ICS entry click here D0901822 . The ISI table was constructed for eLIGO and predates ICS.
D1000513	HEPI	The aLIGO HEPI assembly is at D1000514 . Some HEPI ICS records appear in the ICS entry referenced above.

5 Testing

All post-installation, stand-alone, in situ, checkout/testing (phases 2 and 3 per [M1000211](#)) must be completed, be successful and be documented:

- phase 2: pre-installed, post-storage, test results for the assembly (testable item)
- phase 3: stand-alone, in situ test results for the assembly (testable item)

Note that integrated testing (phase 4 testing per [M1000211](#)) is covered under the system acceptance review, not this installation acceptance review. In the table below, enter hyperlinked DCC document number(s) for all of the relevant testing for the major subassemblies/subsystems covered within this installation instance/subset. If elements of the table are not applicable, enter "not applicable". If elements of the table are not available/missing, then enter "not available".

Subsystem	Testable Item	DCC document numbers	
		Phase 2	Phase 3
SEI	HAM-ISI	E1200510	
SEI	HEPI	N/A	E1300832 Filecard currently has no content.
SUS	OMC Suspension Tip-Tilt Mirrors	E1400055 (under <i>Test Results</i>) E1300878 (under <i>Other Files</i>)	
AOS/SLC/ Viewports	Leak and pressure testing.	E1300447 . Leak and pressure testing was completed, refer to above link. All viewports were tagged at time of	Visual inspection in-situ not completed, refer to bug list.



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		inspection and testing.	
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6 Installation Completeness

If/as applicable, provide a hyperlink reference to a list of remaining tasks to be completed before the installation is finished (i.e. a 'punch' list).

Installation tasks remaining to be completed:	All items are installed.
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7 Installation/Integration Issues and ECRs

If/as applicable, provide a hyperlinked list of integration issues and Engineering Change Requests (ECRs) encountered during installation and which are relevant to the installation subset/instance covered by this acceptance document. See [M1300323](#) for a description of the Integration Issue and ECR Tracker.

The format of the url for the bug tracker is as follows e.g.

*https://services.ligo-wa.caltech.edu/integrationissues/show_bug.cgi?id=826

Tracker # [hyperlinked]	Title/description
#980	WHAM6 Issue Tracker