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Date:	27 Jun 2010; 24 Sep 2010
Refer to:	M1000142-v2
Subject:	Advanced LIGO Review Committee Report: Test Mass Optical Lever PDR
To:	David Shoemaker, Carol Wilkinson
From:	Optical Levers Review Committee: Rana Adhikari, Michael Landry (chair), Ken Mason, Hugh Radkins, Brian O'Reilly,
cc:	Optical Lever Design Team (AOS), Eric Gustafson, Dennis Coyne, David Nolting, Mick Flanigan

## **Response to the review committee's report**

The report is accepted; thanks to the committee and team.

David Shoemaker, aLIGO Leader

## ***Recommendation***

The optical lever review committee, as part of the PDR for test mass optical levers, recommends that iLIGO visible light lasers be incorporated as the baseline light source.

## ***Background***

The optical lever review committee read through T1000219-v2, the test mass optical lever Preliminary Design document. Questions were formulated (L1000275-v1), responded to by the oplev design team (L1000279-v1), and a PDR telecon was struck (minutes L1000289-v1). This document is the committee recommendations resulting from the Preliminary Design Review.

All documents noted here are included at the "Optical Lever Subsystem (OptLev)" section of the AOS page of the Advanced LIGO wiki:

[http://lhocds.ligo-wa.caltech.edu:8000/advligo/Auxillary\\_Optics\\_Stuff/OptLev](http://lhocds.ligo-wa.caltech.edu:8000/advligo/Auxillary_Optics_Stuff/OptLev)

## ***Findings***

- 1) The committee recommends re-using Initial LIGO visible OpLev lasers. The lifetime of the current iLIGO oplev lasers is sufficiently good such that they can form the light source for the baseline design. The committee does not find the reasons given for IR SLEDs (lifetime, spot interference) sufficiently good to justify their inclusion into the

design, in light of their subsequent safety and convenience issues, and lack of proven performance.

- 2) Visible SLEDs can be tested, time-permitting, in bench settings and at the 40m lab for example, for future retrofit in aLIGO if their performance and lifetime warrants this.
- 3) The choice of Hamamatsu QPD looks workable, provided there is close coupling with the CDS group regarding amplifier and readout electronics.
- 4) Electronics descriptions and drawings are required for expected signals and noise levels, readout, sign conditioning, DAQ etc. These must be provided to the CDS group (working in concert with the CDS representatives to the oplev design team).
- 5) Mechanical design. The review team would like to clarify with the design team regarding the robustness and flexibility of the following mechanical issues in the test mass oplev design: i) adjustability of the pylon attachment at the floor, ii) clearance/stay clear issues when setting the pylons, and iii) mechanical rigidity of the pylon once the mass of the optical table and launching hardware is mated to the thinner apex region of the triangular structure.