



**LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY**  
**RECORD OF DECISION/AGREEMENT (RODA)**

Document	LIGO-M 040005-01 -Y	
Date:	24 November 2004	
Title:	RODA: CP to be the ultimate mass in the ITM reaction chain	
To/ Distribution:	AOS: Dave Ottaway, Phil Willems, Mike Smith SUS: Norna Robertson, Janeen Romie, Mark Barton, Calum Torrie, Ken Strain, Caroline Cantley, Jim Hough Systems: Shoemaker, Carol Wilkinson, Peter Fritschel cc: aligo_systems, aligo_sus	
From/ signatories:	Name/Title: Dennis Coyne (System Engineer) Signature: _____ Name/Title: Phil Willems (AOS Cog Sci) Signature: _____ Name/Title: Norna Robertson (SUS Cog Sci) Signature: _____ Name/Title: Justin Greenhalgh (SUS/UK PrjMgr) Signature: _____ Name/Title: GariLynn Billingsley (COC Leader) Signature: _____	
System(s) affected:	<input type="checkbox"/> Initial LIGO <input checked="" type="checkbox"/> Advanced LIGO <input type="checkbox"/> Other: _____	
Nature/ Scope:	<input checked="" type="checkbox"/> Design Decision <input type="checkbox"/> Requirements Decision <input type="checkbox"/> Work Scope Decision <input checked="" type="checkbox"/> Working Agreement between Groups <input type="checkbox"/> Other _____	
Subsystem(s) affected	<input checked="" type="checkbox"/> Relevant Subsystem(s)/Component(s): Auxiliary Optics System (AOS) subsystem: Active Thermal Compensation (ATC) assembly Suspension (SUS) subsystem: Input Test Mass (ITM) Suspension assembly: Reaction chain ultimate mass Core Optic Component (COC) subsystem: Compensation Plate (CP) component	
Primary Contacts	Group or Affiliation and Contact	Phil Willems, Norna Robertson, GariLynn Billingsley
Reference Documents:	<u>Relevant Suspension references:</u> 1) GEO Suspension Team, Advanced LIGO Suspension Reference Designs, T000012-00 2) N. Robertson, Advanced LIGO Suspension System Conceptual Design, T010103-03 3) P. Willems et. al., Cavity Optics Suspension Subsystem Design Requirements Document, T010007-01 <u>Relevant Active Thermal Compensation references:</u> 1) LIGO Lab, The LIGO Lab Renewal Proposal, M000352-00, pg. 146–147. 2) LIGO Lab, Advanced LIGO Project Description, M030023-00 3) R. Lawrence, M. Zucker, "Status Report: Adaptive Thermal Compensation", G020069-00	

**DECISION/AGREEMENT STATEMENT:**

The baseline configuration/design called for separate suspension systems for the Compensation Plates (CP) of the Active Thermal Compensation (ATC) system. It appears to be difficult to fit separate suspensions for the CPs into the system. In addition it is less expensive to incorporate the CP into the ITM suspension.

It has been agreed, that the Compensation Plate (CP) of the Active Thermal Compensation (ATC) system will be the ultimate mass in the Input Test Mass (ITM) reaction chain.

The CP assembly will be the same diameter as an ITM test mass, made of silica, 6.5 cm thick and therefore 11 kg. The sum of the penultimate reaction chain mass and CP mass would be 80 kg - the same as a penultimate and ultimate in the main ITM chain, so that the total weight on the blades is the same. The penultimate mass would then be a monolithic (likely stainless steel) cylinder of mass 69kg. The compensator plate can be suspended from wires and should have no flats.

The ITM suspension will make provision for mounting a ring heater and associated wiring as well as a thermal radiation shield for the ATC system. The ring heater and its shield are not suspended. Details of the interface provisions for both sides of this interface are to be determined and documented in an Interface Control Document (ICD) once more design detail is available.