LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

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Controls Prototype: - Schedule for the Advanced LIGO Suspension Workshop, Caltech October 13th – 17th 2003

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Distribution of this document:
LIGO Science Collaboration

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Rev 01: - Includes comments from NAR, JHR and CIT

Rev 02: - Includes updates and time changes + MAP

1.1 Introduction

At present there are approximately 8 people attending the Advanced LIGO Suspension Workshop. This is being held at Caltech from the 14th – 17th October 2003. However there are some related suspension discussions on Monday the 13th October.

The current plan is to split into 2 groups for the lab work. In advance of the workshop the Caltech members of the suspension team will disassemble and arrange all of the suspension parts of the 2 mode cleaner suspensions.

All aspects of the workshop will be held in the Synchrotron Laboratory. Please inform Janeen Romie of attendance. Several useful links are outlined below: -

http://admissions.caltech.edu/subpage/accommodations

http://atc.caltech.edu/CIT_parking/home.htm

http://admissions.caltech.edu/subpage/getting-here

http://www.ligo.caltech.edu/LIGO_web/sidebar/travel.html

1.2 Objectives

An extended team of Scientists and Engineers will be introduced to the Advanced LIGO Controls Prototype Mode Cleaner Suspension.

In order to do so we will: assemble two mode cleaner suspensions and their associated sub-assemblies from the individual parts using the assembly procedures and documents; make use of the adjustment mechanisms that are available; familiarize ourselves with the LIGO I alignment tools and procedures; assess how can make use of the adjustment mechanisms and the LIGO I alignment methods to correctly align the mode cleaner controls prototype.

Time permitting discussions will lead into the assembly and alignment of larger suspensions, suspensions with reaction chains and how to deal with the situation of two suspensions on one table?

1.3 Schedule

A proposed schedule with details outlining the various sections can be found below Proposed speakers are highlighted in red.

Monday 13th October

ECR Conference Room West Bridge (All day)

1. Preparation time for LIGO I installers.

   This is to allow Doug and Betsy time to test their equipment on a proposed Advanced LIGO Suspension

2. Optical layout and footprint discussions with Luke Williams, Dennis Coyne, Janeen Romie and Mike Lloyd.[1]

   Both the Mode Cleaner and the Recycling Mirror layouts have went through changes in the last year or so and the plan is to use this time to not only ensure that the simple footprint but also the areas where we lie outside the footprint with respect to the optical layout. Also, what space exists out-with the footprints?

3. MC and RM Structure discussions

   A summary of the work done on both the Mode Cleaner and the Recycling Mirror suspension will be presented by Janeen Romie and discussions should start about whether the current designs meet the requirements and if necessary what still has to be done.

4. Other discussions?

It should be noted that Monday is an informal day with no detailed schedule. Several people, including Calum, Justin and Norna will not be at Caltech on this day. The workshop starts Tuesday.

Tuesday 14th October

Room 248 Lauristen 8:00 am – 10:00 am

5. Introduction to Suspensions Talk (Norna and Calum) ¾ h

   Norna and Calum will introduce how a suspension starts life as a MATLAB model through the 3D layout in SolidWorks to the designs and concepts that are created by the various engineers at different locations.

   Questions ¼ h

6. Distribution of assembly procedures and documents 1 h

   Assembly procedures for various aspects of the mode cleaner suspension have been created as have SolidWorks assembly drawings that outline the components involved in a particular sub-assembly.

Synchrotron Laboratory 10:00 am

7. Building the Sub-Assemblies. 3 h

   Using the documents distributed and considered above it is our plan that 2 teams of ~ 4 people will work on building the various sub-assemblies involved in a mode cleaner assembly with help and input supplied by members of the suspension team. Including the wire assemblies, upper mass and choice of cantilever blades.

Lunch 11:45 – 1:00 pm

[1] Mike Lloyd can be contacted at the University Of Glasgow and will available on the telephone at 9:00 am PT.

Synchrotron Laboratory 1:00 pm

7. /CONTINUED … Building the Sub-Assemblies

West Bridge Conference Room 351 2:30 pm (Room booked from 2pm)

8. Management Talk and Discussion (Carol) 2 h

West Bridge Conference Room 351 4:30 pm

Discussions on issues and tasks related to the RM and ETM 1 h

Wednesday 15th October 8:00 am

Synchrotron Laboratory 8:00 am

9. LSC Triple Assembly Talk (Calum) ¼ h

Questions ¼ h

10. Suspension Assembly 8 h

    a. Walk through by suspension team

    b. 2 teams assembling 2 suspensions

Lunch 11:45 – 1:00 pm

    c. Introduction of assembly techniques

    d. Crude alignment with respect the optical table

    e. Controls to Noise (mimicking the addition of silica masses and fibres)

    f. Tour of Fibre Pulling Laboratory (Phil Willems) ¼ h

    g. Adding the local control, damping and controlling the suspension with a D-Space unit (Mark Barton)

Synchrotron Laboratory (if time permits, ITP)

ITP Eddy Current Damping Experiment + review of paper

ITP Transfer Function Measurements and comparison to Model

ITP MATLAB model revision control and Storage

Drinks in Lucky Baldwin's at 5:00 pm

Thursday 16th October

West Bridge Conference Room 351 8:00 am

11. UK team members potentially available on the conference phone for questions **1h**

Synchrotron Laboratory 9:00 am [2]

10. /CONTINUED … Suspension Assembly + (ITP subjects)

Lunch at Green Street Restaurant 11:30 – 1:00 pm

Room 248 Lauristen 1:00 pm [2] **(Room booked from 10am – 2pm)**

12. LIGO I Installation and Alignment
    a. Talk (Ken Mason) ½ h
    b. Talk (Mike Smith) ½ h
    c. Description and viewing of tools used (Doug and Betsy) ½ h
13. Discussion ½ h
14. Alignment and installation of MC assemble. 2 ½ h

    Using the tools outlined in section (1) and (2) it is our intention to apply them to the advanced LIGO MC multiple pendulum suspension using the adjustments described in the suspension assembly.

Friday 17th October

Synchrotron Laboratory 8:00 am [2]

15. Alignment and installation of MC assemble /CONTINUED …

Room 248 Lauristen 10:00 am – 12:00 pm (Room booked from 9am – 12pm)

16. Reaction Chain Assembly Assembly and Alignment
    a. Discussion (Janeen's Slide) ¼ h
17. 2 Suspensions on 1 Table Assembly and Alignment)
    b. Discussion (Janeen's Slide) ¼ h
18. QUAD assembly – ETM Assembly and Alignment

[2] Times could change depending on status of wrt to schedule

c. Talk (Calum) ¼ h

d. Discussion ¼ h

19. Modal Testing Unit Talk (Caroline) ½ h

Lunch 11:45 – 1:00 pm

Synchrotron Laboratory and Suspension Office 1:00 pm

20. QUAD Work

e. RAL involvement in coming months 1 ½ h

f. NAR available on conference phone from 3pm for questions

Close at 3:00 pm

Additional days linked to above workshop

Janeen and I thought this was a good place to list additional work items that came up as we compiled the schedule. At present our proposal is to suggest that these become possible visits to or interactions with Caltech?

1) Russell Jones to visit Caltech with GEO 600 catcher (Nov 2003)

- RJ plans to visit Caltech in mid-Nov for 1 week

2) Ian Wilmut to visit to start work on a section of the ETM suspension (Fall 2003 ?)

- Plans to visit Glasgow and possibly Caltech?

3) CAC, JHR, CIT Structure work and Modal Test facility for labs (Oct 2003)

- Talk included on Friday

4) MPL to visit Caltech in order to continue design and prototyping of the Recycling Mirror Suspension. (Dec / Jan 2003 ?)

5) NAR to continue work on the modeling of the suspension including updates to the MC, RM and investigations into QUAD the BS and Folding Mirror. (Fall 2003)

1.4 Summary

All comments, additions and suggestions are very welcome.


California Institute of Technology
40m Interferometer
Athenaeum
Bridge Laboratory
Synchrotron
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CATALINA AVENUE
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EVACUATION SITE
EMERGENCY OPERATING CENTER
FIRST AID
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EMERGENCY TELEPHONE
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