LIGO FDR notes

1. Add vents for the bolts that hold the optical table to the ribs. This could be a set of grooves intersecting the bolt holes.
2. Gull wing structure integrity to be reviewed by LIGO.
3. Spring access covers should be sub-flush by .010” or more sub .
4. HPD will do a calculation on the lateral stiffness of the GS-13 by analyzing the stiffness of the GS-13 can. The flexure should triple or quad that stiffness.
5. Cabling issues to be discussed by Ken.
6. Make the clearance between the post and the hole in S1 .2” to .25”
7. Mu metal shield inside of the GS-13 cans? LIGO will measure the sensitivity of the GS-13 to stray fields.
8. Brian suggested covers for the actuators to be put in place for assembly and then removed later. They don’t have to allow inspection of the gaps while installed.
9. Heli-coils in the actuator coil-side brackets. (Dave must model this)
10. Discuss the horizontal actuator mounting.
11. Review the surface finish/flatness requirement of the displacement sensor target. BH will get this info (talk to Hans). This should be an 1100 series aluminum attached to some backing. Flatness is more important than surface finish.
12. Make the GS-13 installation fixture from Teflon or PFA.
13. Negotiate with Dennis and Mike on the lubrication and vacuum requirements of the spring compressor screw, nut, thrust bearing, rod ends, etc. Use Ball moly lube process? Allow lubrication with Krytox?
14. Make the upper flexure clamp lighter weight. Possible eccentric shape, or maybe aluminum?
15. Make a pre-tensioner for thightening the lower flexure clamp on the bench while the flexure is pulled.
16. Can the locker/locators be rotated by 15 degrees (to 45 degrees) to protect the vertical forcers better?
17. Review H limit on stainless to stainless fasterners. What is the approved H limit
18. Make throw-away corner posts with threads in aluminum. To be replaced by heli-coiled posts.
19. Remove the flats on the barrel nuts. Keep the slots on one end only.
20. Make the conflat clearance through the GS-13 adapter plates (eliminate the DB-25 close-fit holes.
21. Make the pads for the GS-13 adapter to conflat as six individuals rather than three to ensure pumpout of the conflat screws.

22. Look into obtaining M-300 in short lead time from Ken's suppliers.
23. HPD to provide the spring analytical model/FEA to Ken so that LIGO can run the analysis again at a later date.
24. Jonas will check the calculation on the spring performance as a function of the machining tolerances.
25. Brian Lantz and Jonas will review the locker/locator rotational position to optimize for travel while protecting the actuators and displacement sensors.
26. LIGO will get back to HPD on the tightening/lubrication issues for the bolted connections.
27. LIGO will provide GS-13's (at least 2) plus four more GS-13 pods will dummy masses inside for the dirty test assembly.
28. Make sure the GS-13 insertion tool can't be left in place.
29. Add a lifting hook on the top of the spring compressor to get it out after the assembly.
30. Add clearance for the S0 to tube boss bolts in order to clear the locker/locator base plates.
31. Add depth mic hole in Optics Table above spring base to measure relative to spring tip through spring compressor access hole.
32. Resolve the sensor target flatness requirement.
33. LIGO will review the spec (Ken and Mike and Dennis) on the table top flatness: part spec, system requirement, whatever, since it potentially has a large impact on cost.
34. Dependent of the answer to 33 above, Jonas will analyze the static distortion of the S1 while hanging from the three flexures.

-- Brian's additions –

35. Pick a lubricity number for the bolt tightening
36. LIGO will calculate a tolerance for the vertical actuator mounting
37. LIGO / Brian to write a test plan for the testing at HPD.
38. LIGO will try and get 1 operator from each site to help with dirty assembly at HPD, and probably support the testing, and help with disassembly and shipping.
39. LIGO /Dennis will check the 78 cm table height requirement.