HAM ISI Damping Loop Turn-On Procedure

T080125-00-E

Jeff Kissel

May 19, 2008

Since this will need to happen 14 more times, I figured it would be nice to have this in place. I make several references to the coordinate drawing (see `http://tinyurl.com/3vtnzx`). As usual, when cabling, always have the wiring schematic (see `http://www.ligo.caltech.edu/~babbott/Single_Stage_ISI.pdf`) in hand.

Note this procedure does not include exit procedure, i.e. for close up of chamber.

1. Close gate valves 1 and 2.
2. Vent HAM chamber.
3. Take of both side doors.
4. [Specific to HAM6 ISIs] Cover septum window with aluminum cover.
5. Figure out mass budget, make sure there is enough mass on the table for a rough float. (One can also tell this from the stiffness of the lockers when unlocking, but it's good to confirm analytically before just unlocking willy nilly.
6. Discuss with resident expert of the optics in current HAM chamber on optimal placement of adjustment mass (hockey pucks) on optics table.
7. [Specific to HAM6 ISIs] Ask resident OMC'er to lock down the OMC.
8. Get a CDS workstation setup near HAM chamber.
9. Put four (4) dial indicators in the four (4) near-locker positions (see diagram linked above), measuring the vertical motion of the table. One or two dial indicators checking horizontal motion couldn't hurt.
10. Re-arrange any adjustment mass according to the results of steps (1) and (2).
11. Float the suspended stage by releasing the lockers (i.e. screw them in toward the center of the table). Unlock them in the following order: D, then C, then B, then A.
12. Re-level the table by moving the adjustment mass around the optics table, being mindful of the results of step (2).
13. Lock down table (i.e. screw lockers out from center of table). Lock in the following order: A, then B, then C, then D.
14. Bolt down adjustment mass with class A, vented, Ag plated, 1/4-20 SHCSs.
15. Connect six (6) actuator (ACT) D3 pins, six (6) displacement sensor (DISP) BNCs, and three (3) geophone (GEO) D25 pin in-vacuum cables to feedthroughs. Remember to follow the diagrams linked above and pay attention to keying of D connectors!

16. Setup / build bench for satellite electronics. Set CPS satellite boxes (and any support power supply if needed) on bench.
17. Connect six (6) ACT D3 pin, six (6) DISP BNCs, three (3) GEO D25 pin in-air cables to feedthroughs. Remember to follow the diagrams linked above and pay attention to keying of D connectors!
18. Plug in two (2) D15 pin DISP from-rack cables (and any support power supply if needed).
19. Open dataviewer template on CDS station near HAM that shows DISP and GEO channels.

```
DISP channels: [ifo]:ISI-[optic]_DISPPF_[H,V][1,2,3]_IN1_DAQ
GEO channels: [ifo]:ISI-[optic]_DAMP_[H,V][1,2,3]_IN1_DAQ
```

20. Pray.
21. While watching dataviewer, and being aware of whether the DISP satellite boxes need power from rack, or from auxilliary power supply, turn on power to ACT and GEO (at rack) and to DISP (where appropriate).
22. In dtt, take a power spectra of the GEOs to use as locked reference. (range: 0 to 100Hz, bw: 0.05 Hz, avgs: 10)
23. Unlock GEOs at flange, watching the time series on an oscilliscope.
24. Take another power spectra of GEOs, confirm increase in low (¡30Hz) noise.
25. Float suspended stage, unlocking lockers D, then C, then B, then A. Give the table a wiggle, watch for 1 Hz resonance in DISPs and GEOs in dataviewer.
26. Take power spectra of GEOs, compare with out-of-chamber measurements and confirm they're unlocked.
27. Optimize DISP gaps, if not within 15k cts.
28. Place offsets in X, Y, Z, RX, RY, RZ, drive to confirm actuators work ad obey conventions by eyeballing dial indicators and watching dataviewer channels.
29. Take off dial indicators.
30. Record position of DISPs to use as "this is level" reference.
31. Check that smart watchdog is working correctly.
32. Take colocated transfer function from 0.5 to 25Hz (bw/res: 0.5Hz, avgs/reps: 10). Use Matlab schroeder phase stuff first, but if there're too many bugs, just use DTT.
33. Design damping loop for horizontal and vertical directions.
34. Implement damping loops into medm, turn 'em on. Check that they're stable.
35. Turn damping loops off.
36. [specific to HAM6 ISIs] Ask resident OMC'er to unlock the OMC.
37. Turn on damping loops, check that they're stable.
38. Move on to exit procedure, 'cause you've turned on Frankens...*AHEM* the HAM ISI!