

# Glasgow Monolithic Workshop Action List

## Action Tracking

Notes from Weekly SUS April 12, 2005

Notes from Weekly SUS April 26, 2005

Notes from Weekly SUS May 31, 2005

Notes from Weekly SUS June 21, 2005

Notes from Weekly SUS July 26, 2005

Notes from Weekly SUS Sept 20, 2005

Notes from Weekly SUS Nov 22, 2005

1. **DONE**
2. Small head for welding - CO2 team to investigate whether this is viable/feasible approach  
(CAC/GC/DC – next few months) *Caroline reports that this is under investigation. It may be the approach they adopt. Beam delivery is still an outstanding issue. Caroline is looking into a fiber optic beam delivery system. An articulated arm beam delivery system is still on the table. Ongoing.*
3. **DONE**
4. **DONE**
5. Mike Gerfen to suggest weld types on upper structure  
(TH – one week) Mike Gerfen will mark up the print in conjunction with SUS engineers. Ongoing. This action is complete
6. **DONE**
7. For noise prototype design – have review of ECD requirements, optimisation and accommodation  
(KAS with ALL – part 1 before controls prototype test and Part 2 within one month of tests) Ken has a preview of the revised parameters for the quads. He is in the middle of calculating all DOFs. He is hoping to have a documented to a small group in 7-10 days for the ETMs, ITMs, BSs and FMs. He hopes to have it ready for general distribution soon after that. *Ken sent out a document on this last week. He'll send a second version soon after feedback from Mark and Norna. Ken released to the DCC: T050093, Discussion Document for Advanced LIGO Suspension (ITM,ETM,BS,FM)ECD Requirements and T050109, Advanced LIGO: Note on Application of Eddy Current Damping Regarding Noise Requirements ETM/ITM/BS and FM Suspensions. His e-mail dated 23 Nov to aligo\_sus mail group asks for comments and includes additional information on this subject.*

8. DONE
9. DONE.
10. Extend FE analysis to silica/silica  
(EE/CAC –one month) DONE
11. Silicate bonding procedure has been drafted – this needs to be reviewed and then will be placed on DCC  
(HA/SR – two weeks) Helena sent a procedure to Sheila. Helena is using this as a master to the new procedure she’s drafting for ear bonding. **Helena sent it around this morning to Sheila and others.** Helena is waiting for comments. **No comments, yet.** **Caroline asked Sheila to respond.** Caroline reports no feedback from Sheila. She’ll make sure it is done by Helena’s visit in August. *Caroline talked to Sheila about this and will have more information next week. Caroline sent this to Helena and Janeen this morning. Helena will submit it to the DCC. Conclusion on this will wait until after Helena and Janeen’s visit in August. There is a procedure in place that works. This is the chemical procedure which does not address alignment and wiggle requirement. Pressure may reduce the wiggle requirement. Caroline will look into implementation for the requirements.***Ongoing. This will be finalized by the FDR.**
12. Should prepare a range of ear designs to match this range of sensitivities in advance  
(EE/CAC – two months) DONE
13. DONE
14. Draft a document for how we will achieve the required alignment – templates, fiducials and procedure  
(HA/SR/JR – one month) **This is the alignment for the ears to the flat. Not started yet.** Janeen submitted a preliminary draft to Helena yesterday. **Helena will send it to Caroline after marking it up. Janeen/Helena will send again.** Caroline hasn’t had a moment to read it yet. *Caroline will get to this soon. Caroline is working on this now. Geppo has done some calculations, some more number crunching needs to be done. This is ongoing. Caroline reports that they haven’t quite closed the loop yet but hope to have that done in a fortnight.* **Ongoing**
15. RAL need to determine whether they need to order maraging steel for the noise prototype now/soon.  
(RJSG – one month) DONE
16. Assess how many blades are required for noise prototype? (2 noise prototypes – convertible one for LASTI and one for RAL to hang on to)  
(RAL need to analyse blade test data (IW – two weeks) DONE
17. DONE

18. DONE
19. DONE
20. DONE
21. DONE
22. Geppo and 2 mRad. Welding is not critical because you match the starting lengths in the annealing. The welding and annealing will take out ear angular position errors. BUT if the fibres have different spring constants you have a problem. Can approach this by looking at the tolerances on violin modes and looking what effect such errors will have. Note that the tolerable errors in pitch are about 10 times those in roll; and the wire separation in roll is about 10 times that in pitch. (chalkboard calculation: 2 mRad corresponds to ~15% error in roll). Complete these sums and write them up.  
(GC – two weeks) Ongoing. Ditto. Ditto. Ditto. Geppo and Caroline have been discussing this issue. Geppo has written a document and Ken has looked it through. Ken assumes that Geppo will put it on the DCC soon. Ken said that Geppo hasn't address the whole question posed in #22, but gives data to do the evaluation. *Caroline reports – almost there but not quite. DONE*
23. Longitudinal (x) errors in ear position – because the pegs sit in grooves you cannot compensate in welding. So need to calculate the error in longitudinal (x) location gives the relevant pitch error (which is that error correctable with the mechanical adjustment). Do the calculation above.  
(CAC – two weeks) Ongoing. Ditto. Ditto. Ditto. The answer to this question may be addressed by Geppo's write-up referenced in #22 above. It will need some evaluation. *Geppo has just left Glasgow. Caroline reports – almost there but not quite. DONE*
24. Complete review of ear design based on silica downselect  
(CAC – one month to NAR/complete three month) This follows on the thermal noise in bonds. Ongoing. Ongoing, subject to meeting tomorrow. *Caroline will send ear drawing to Norna for review. Ear design moving along nicely, along with the ribbon design, Caroline reports.* This is ongoing. Caroline has ears on order and they will test them this summer. They are able to go ahead with the noise prototype design with the baseline. *Helena and Janeen will visit Glasgow this summer to support testing. By the end of August, they expect good feedback. DONE*
25. We have two options pegs or H-pieces. Generate a document to summarise the basis of the H-piece downselect to pegs/pins; the design basis of the proposed peg design; what would make us fall back to the H-pieces and should we do any more parallel work on H-pieces in the meantime.  
(GC/CAC – one month) *Caroline reports that this is not started yet but that they need to work 22, 23 and 24. She said that they are considering the pieces and the shape of the weld at the H pieces. Ongoing. Ditto. Caroline reports that they are still discussing the H pieces. The ears can accommodate the peg of a fiber or*

ribbon. H-pieces are not completely eliminated. The advantage is that you only align once but there will be tilt. This is still in discussion. The H-pieces are not in the design now. Between the ribbon and ear, there is one weld. There are advantages and disadvantages to H pieces. Caroline will review with Geppo. *Caroline reports that the H pieces are not the best way forward. They plan to pull ribbons with thick ends to weld to the horn. Caroline has drafted a note on H-pieces and why they are not needed. The note will be posted in the next couple of weeks.***DONE**

26. Organise a design review of quad design parameters based on silica downselect. Results of review to be incorporated into the models (including 2D/3D layouts) and the associated documentation leading to a revision of the relevant parts of the conceptual design (lengths of wires, blade lengths, angles of wires etc). (NAR/RAL/ALL – revision of design three months – ongoing revision for noise prototype) **Norna can summarize the parameter changes. The target for this design review based on the silica downselect is June 15<sup>th</sup>, so documents will be needed by the end of May.** This is not to be reviewed as part of the June 15 DRR Update. Norna said that it will depend on when this is required for the final design/noise prototype. Ken and Norna feel that things are currently on track. *It is agreed that there probably does not need to be an external review of the effects of the silica downselect, only an internal SUS review. Ken said that we may need to be more organized in the transfer from the conceptual design to the noise prototype (final design), via the conceptual design document. A Preliminary Design Review/Preliminary Design Document is due Dec 2005 and a Final Design Review is scheduled for early 2006. The noise prototype design review will document the silica downselect changes. We could have an internal review in early October or November. Review scheduled for February 2006*
27. Glasgow to conduct a full review of effect of silica downselect on monolithic suspension detail design (GC/CAC – three months) **Review target June 15<sup>th</sup>.** Norna had had other suggest that she update the conceptual design document with the new design parameters and note the items that need to be reviewed. She'll do that.  
**DONE**
28. **DONE**
29. Assembly & installation document for monolithic suspension to be drafted (CAC/GC – one month). **Ongoing. Ongoing. Ongoing. Must have draft done by June 15<sup>th</sup>.** Janeen thinks that this needs to be reviewed during the ribbon/fiber/ear review in fall 2005. Caroline feels that it needs to be drafted in the near future. Her goal for that draft is some time in July. This has been pushed out until the end of September. *Caroline reports that she has all of the components and it will be posted by Oct 5<sup>th</sup>.* **DONE**
30. **DONE.** Justin will write up a brief technical note on his conclusions about 6082 alum. *Justin will post the aluminium notes soon. A question has come up about*

*this: is cast tooling plate acceptable? Dennis says that it's an old wives tale to avoid it. How critical is still questionable. Dennis said that tooling plate is good stuff – stable and uniform. He'll ask John Worden, the vacuum expert. Radiographic analysis could be done to determine significant voids. Ian said he'd call Alcoa and try to get the max void size. **DONE; Justin will resubmit this to the DCC.***

31. Check optimum position for magnet with respect to coil  
(SMA – six months) Stuart is working on this now. The sweet spot is in the same location as Mark's calculations. **DONE. Stuart re-ran the calculation and his results matched Mark's. Mark will submit his optimum position work to the DCC.**
32. The stop offset was 0.5 mm in initial LIGO – this was the basis for the OSEM clearance of 1 mm all the way round  
(DC to confirm if this approach where we are now making the OSEM set a requirement for the stops is reasonable for Advanced LIGO). The determination of the stop offset requires a full tolerance analysis of all dimensions that affect the setting of the stops. Janeen estimates that this will need to be done around the end of June and will probably do the work herself. *Ongoing Ongoing*
33. Twenty- four connectors (one chambers worth) to be sent to Caltech (Helena) for vacuum testing. Numbers to be confirmed  
(SMA – April 2005) Jay ordered a bunch of 25 pin d connectors from Glenair for regular RGA clean and bake and subsequent vacuum compatibility testing. The vacuum compatibility test is about 2/3 through and looks good, according to Lee Cardenas. It is hoped that the connectors that Stuart has ordered may be used for the in-vacuum cabling for the quad, with the assumption that the connectors will pass their test. With Stuart's direction, Dennis ordered LEDs and photodiodes for vacuum compatibility testing. He is unsure of the queue for the testing chambers. Dennis thinks that these components are next in line, though. Dennis reports that the Glenair connectors will finish their optical cavity contamination test this week and Lee Cardenas reports that they look fine. Also, Dennis reported about the emitters and photodiodes that are currently being cleaned and baked prior to their optical cavity contamination test. The RGA test has been done for the load of emitters and photodiodes and it needs to be analyzed. Bob will drill holes in the cases and do another clean, bake and RGA scan. Then, they'll go into the contamination cavity for testing, maybe by the end of this week. *The Glenair connectors passed the vacuum test. Now, they'll test the flexi-circuits. The flexi-circuits passed their initial vacuum cleaning and baking but they didn't pass well. The final RGA was done at 60 deg C so Dennis asked that the operator put it back in the oven. Bob Taylor is back this week so he'll do it. Dennis's web page, <http://www.ligo.caltech.edu/~coyne/AL/SYS/default.htm>, lists the UHV Requirements and the latest information about optical contamination cavity testing.*

