RRR READINESS REVIEW

NOTES BY RJSG

Many thank to all who took part in this marathon telephone session. I think it was a very useful meeting and should stand us in good stead for the review in June.
Ken observed that we were looking to classify all aspects of the design in broad categories:

A. Complete or nearly so, minor work required
B. Needs work but all information is available
C. Needs input from elsewhere (in which case who and when?)
D. Needs substantial work (in which case who and when?)
E. There's a problem (in which case what is our strategy to solve it?)
F. There are options (how to choose and when)
G. Overlooked (who, when)

In the list below I have tried to capture the classification and agreements for action. In the case of the compliance matrix E050217-00-K I have not repeated action items where they were unambiguous and still current – so please check that document as well.

I have already had a couple of responses; the one from Norna is reproduced here:

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Hi Justin

Here is response to your query on section 4.2 "noise performance".

Suspension longitudinal thermal noise and vertical thermal noise are
covered in the conceptual design T010103-04. They appear summed
rather than separate.
Longitudinal and vertical seismic are also covered (presented
separately, but when summed satisfy requirements).

Pitch noise, yaw noise and transverse thermal and seismic are not
covered in the conceptual design document, nor explicitly anywhere
else to my knowledge. They could be added in an updated version.
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NORNA

	Cat	Action items/notes
1 Compliance matrix pre check E050217-00-K	A	Justin: various editorial changes
	B	Earthquake stop design document, (T0100007 3.5.2) also needs to cover transportation shock loads (when stops will be wound up with no gap) T000053 2.6.1. Also fatigue of stops, ibid 2.4.
	A	Argument for t010007 3.7 control noise is that if main is OK and coupling is <1, then must be OK. Cite Ken's recent note on reaction chain coupling written for the OSEM pigtails discussion.
	A	Find various documents from near the OSEM review to cite (eg ibid 2.6.1.3 is T050271 and responses, etc)
	B	Short note on technical noise sources: local controls couplings from electronics PDR; creep & creak; OSEM parasitic ECD; noise in ear bonds.
	A	Ensure that blade process spec includes reference to hardness testing of maraging steel to verify heat treatment
	A	T000053 2.4 mention ribbons? Consider fatigue of stops?
	A	Add baffles to E050169 1.1.1.1.2 box
	A	Complete RODA list in E050217-00 eg "no sensors" RODA
	A	Note blade internal modes are a performance requirement – see conceptual design doc.
	A	Blade matching – no requirement – see Mark's document
	B x n	Ian: Various items highlighted in the text of E050217-00.
	D	Lead production of assembly procedure
	B	T000053 2.6.1.2 produce FEMA
	C	Discuss with Janeen et al what magnetic materials are allowed in vacuum (or get derogation).
	C	Ibid 2.9.1 needs spec for how samples will be taken (part-specific). Input from Dennis/Janeen.
	B	Tim: T000053 2.6.1.2 produce earthquake document as regards stresses in structure
	B	Other items highlighted in text of E050217-00.
	B	Stuart: (Or Dave) write suspension controller manual based on doc to be supplied by Mark(?) (T000053 2.9.5)
	B	T010007 3.7 Actuator noise statement
	A	T000053 supply update on testing of OSEM emitters
	A	Produce note for review on latest vacuum testing results at that time
	B	Further update of UK/US ICD with new diagram
	A	Identify definitive statements of force and noise reqmts in OSEMs
	A	Norna: (already done) respond to T010007 4.2 – Justin to include in matrix.
	B	Dennis: Lead response to M050438 UK comments on DRDs and ICDs – discuss with Justin during LSC week.
	A	Check laser safety requirements
	A	Clarify requirement for suspension testing manual
	A	Caroline: List what brittle structures and bonds have already been covered by ribbons etc PDR, suggest omissions (E010613 6.5.4.1.1)

2 Top Stage	B	Ian	Sort out sag when bolts loose
2.1 Rotational adjuster	A		Discuss stripped bolts with Calum
2.2 Interface to Upper structure			
2.3 Sag under load			
2.4 Provision to corect translation			
3 Top Mass	A	Ian	Check off-axis moments OK with Norna
3.1 OSEM interface and location	B		See notes in Calum et al assembly document re positioning and adjustment of blade tip and wire clamp
3.2 ECD positions and interface	B		Test z-tip adjuster clean
3.3 Blade tip Z position adjuster			
3.4 Moments of inertia			
4 Tablecloth	B	Ian	Consider remaining adjustability of OSEM on plate.
4.1 Adjustment range			Make test soon to avoid holding Stuart up
4.2 Stop function	B		Check mode frequency from MIT results. Requirement is 100Hz
4.3 OSEM-ECD adjustment			like everything else.
4.4 Stiffness?	A		Present design of tablecloth at SUS meeting (?)
5 UI mass	A	Ian	Consider need to split chain for OSEM swapout
5.1 Moments of inertia	A		Must be able to lock masses in all directions
5.2 Blade tip Z position adjuster	A		Take care over access to adjust clamps
5.3 OSEM positions and adjuster			
6 Pen Re Mass		Ian	With Norna and Garilynn, check CP mass
6.1 OSEM adjustment			
6.2 Pitch adjustement			
6.3 Mass adjustment			
6.4 ITM ETM varient			
6.5 OSEM replacement			
7 Dummy test chain masses		Ian	Consider handling
			Include facility for auto-collimation – discuss with Calum
7.1 Moments of inertia			Include through hole on centre
7.2 Mass adjustement			Note size of flat may change (CAC)
8 Dummy Re chain masses	A	Ian	needs to know masses (CAC)
8.1 Moments of inertia	G		Dummy compensator plate
8.2 Mass adjustement			
9 CAC	G	Justin	Ensure ear bonding jig is progressed
9.1 Glass Masses			
9.2 Ears			
9.3 Ribbon Welding			
10 Discuss review scope		NOTE PDR #3 will not go over ground covered by OSEM and ribbon/ear/etc reviews unless things have changed eg OSEM force etc.	
	B	Justin	List areas covered in PDR 1 and 2 which have since changed
	A		List areas changed from C Ptype
11 Blades	B	Justin	Sort out heat treatment of blades vs vacuum cleaning treatment. NB maraging steel not treated same as other steel; use aluminium bake temperature.
11.1 Blade Clamps			
11.2 Pitch and Roll Flexure points			
11.3 Wire flexure point			
12 Wire clamps (inc wires)			
13 Upper Structure	B	Ian/Tim	Note interface piece not same as controls; drawing on DCC within a week, discuss with Calum
13.1 Welding procedure			
13.2 Interface piece design			
13.3 Implementation ring			

14 Lower Structure 14.1 X braces 14.2 Light weighting 14.3 Should it self support?	B	Justin Lead rational discussion of pros/cons and removing structure split once more facts known form structural work.
15 Earthquake stops 15.1 Contact to optic material 15.2 Times when stops need to be rigid and acurate 15.3 Times when stops need to be flexible in location		Needs agreement of assembly procedure and on earthquake stiffness requirements.
16 Lever arm clamp 16.1 How much clamp is left in place after installation		Note now stretching to known location rather than with known force
17 Overall assy procedure 17.1 Possible changes from c ptype 17.2 Hold the PU solidly during fibre stretching 17.3 Discuss split structures 17.4 How to support the structure during assembly	B	Need to consider carefully document of Calum et al before proceeding.
18 OSEMs 18.1 Mechanical Interface 18.2 Force requirements 18.3 Noise performance 18.4	B/C	Stuart Update UK/US ICD, add more detail on wiring, include wiring for LIGO 1 OSEMs with extra tap on PU mass – plugs or not?
19 Wiring routing 19.1 Proposed mechanical route 19.2 Number of wires at each stage 19.3 Wire stiffness	B/C	Stuart Get to bottom of requirement for 1064 filter Wiring for ring heaters No shielding for UIM + PU OSEMs Does anyone understand this note: “Thing from meeting, extra ICD required”?
20 Other items	A	Ian At review, list assembly tooling required Justin Sort out requirements for baffles at LASTI on Noise prototype Stuart document latest requirements on OSEMs (force, noise etc) and circulate to verify consensus.