

Collected comments from UK team on ICDs and DRDs

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Version 00 October 2005

Version 01 March 2006 with actions indicated *thus (note DCC = Dennis Coyne)

E050169-01 SUS/UK to AOS dated June 21 2005

1.1 Extra bullet *DCC

Last sentence on page 2: four --> six *DCC

1.1.1.1.1

Perhaps we should say "wire loops"? *DCC

1.1.1.1.2 note that these plus the baffle (1.1.3.1.1) comes to 4.5kg – we need to check with Tim what effect that has on the 100 Hz. *TMH pas info to DCC, who will put it in the ICD

1.1.1.2.1 Stuart/Dave - can we really put the ring heater power (I think we talking tens of watts) through a couple of wires on a D connector? Why not let the ring heater have a dedicated connector (in which case Table 1 is no longer an interface involving SUS/UK) *SMA think about routing and tell DCC *DCC chase Phil for V and I

1.1.3.1.2. Does the optic beam clearance volume include the region subtended by the chamfer at the edge of the optic? This is important for the earthquake stops. *DCC to clarify in document: exclusion zone is from inside of chamfer.

1.1.3.1.3.2 IW and TMH take note! *IW, JO, TMH to note and act on

1.1.6.1.1 paragraph 7 – to what precision do we need to provide the location of the test mass wrt the alignment marks? *DCC to modify text to say that SUS-UK will provide the methodology but will actually do the task for most suspensions *DCC to define the precision with which this measurements should be made.

E050168-00 SUS/UK to COC dated June 14 2005.

1.1 third para: Note the COC blanks provided by the UK (for clarity). *DCC

1.1.1.1 Still awaiting the SYS ICD. *DCC

Table 1 . Does this supercede the RODA? In principle yes – but the RODA cannot be obsolete until everything in it has been put in to an ICD. In this case check the RODA. Garilynn can give the definitive wedge angles and barrel angles for the N Ptype.

*CAC to check with Garilynn.

*DCC to include a line in this table for barrel angles.

*DCC to give typical range of barrel angles and wedge angles (for tooling design)

Is a 1.1 degree symmetric wedge 1.1 each side or 1.1 total angle subtended? *DCC

Note abbreviate of symmetric is "(sym)" not "(symmetric)" *DCC

Halfway down page 2: ... examining the SP dimensions... should be CP? *DCC

1.1.1.4 Electrostatic coating is not on COC – only on the ETM reaction mass. *DCC Reword.

1.1.1.5 Etching does not seem to be an issue (Jim/Shiela) *DCC remove question.

1.1.1.6.1 These need to fit in with the supporting structure and assembly procedure. Drawing ref? *Justin to ask Helena and if no result, IW to make a sketch.

1.1.1.6.2 – Is there a drawing or model of the ergo arm (would be nice to include in models of assembly procedure). *no there isn't. *CIT to keep looking.

How many of these will COC provide? One for each site? *DCC to clarify text (at least one for each site).

E050159-00 SUS/UK to SEI dated June 14 2005

1.1 Diagrams – why not refer to the diagrams in the SUS/US- SUS/UK ICD to avoid duplication? *yes – DCC to modify to suit once SUS/UK – SUS/US ICD redone

1.1.1.3 3/8-16 UNC-2B threaded holes. Do we need oversizing as well as inserts? And isn't 2B a tolerance band which would conflict with the +0.005" oversize requirement? *DCC to remove the requirement for 5 thou oversize.

Bottom of same section: "LAST" --> "LASTI"? *DCC typo

1.1.1.7 Is this the gazebo? If we provide a frame for assembly testing (before cleaning, say) then is it acceptable for us to use the frame referred to here as part of the final assembly tooling? (I'm trying to clarify the scope of the tooling we need provide) *RJSG note we have to provide a separate stand. *RJSG to discuss who is buying what with Janeen. (done)

1.1.2.2 refer to UK/US ICD? *DCC cross-refer

1.1.4.1 Is it a good plan to flow air over everything else and then the optic? *DCC to lead a decision.

1.1.4.4 Alberto and Stuart NB! *RJSG to lead production of a thermal budget document: how much heat will we dump onto SEI? *SMA to check temperature rise of OSEM in vacuo and report to DCC.

1.1.4.5 I need to check with KAS about this. *RJSG to check.

1.1.6.1 If I read this right it is an implied tolerance on the assembly of the test-mass/ribbons/PU mass structure of less than 0.5mm – is that right? Does this requirement appear elsewhere? *RJSG to stop whining. But note that a repair to a ribbon should leave the optic within 0.5mm of where it was before. *RJSG to discuss with CAC.

E050161-01 SUS US/SUS UK ICD,

* In summary, SMA will modify and send to DCC for final changes.

Most of the comments reflect the fact that, since the document was drafted, our understanding has changed in two areas and those changes have not fully permeated the text. The changes are
1 - that the UK is supplying all the drive electronics for all OSEMs, quad and triple.
2 - the the "satellite boxes" will only house electronics to amplify the LED/detector signals; the drives for the coils and (likely) the ESD will be sited outside the LVEA.

To details:

The version we used was draft 3 of E050161-01 which we got from the Birmingham web site:

www site:- <http://www.sr.bham.ac.uk/research/gravity/rh,d,2.html>

document link:- http://www.sr.bham.ac.uk/research/gravity/rh,d,2_file/docs/E050160-01_SUS-UK_SUS-US_draft3.doc

Page 4. This diagram captures the location of the various bits of electronics, but is not clear on, for example, how the harnessing will deal with splitting out the coil driver wires from the detector wires. Minor point - we agreed to call the "upper" masses, top masses (See T040072-01-R)

Page 5. This diagram conflicts with the one on page 4, and does not show clearly enough the exact location of the interfaces.

Page 6. first line: "...version of the OSEM *may* be used by SUS/US..." *DCC or SMA to reword
line 5 "...SUS/US will likely use the same OSEM electronics" we are certainly supplying it, you SUS/US will use it or throw it away unless I misunderstand. *DCC or SMA to reword

Page 10. First paragraphs. Need to think about shielding at feedthroughs etc. *DCC to add words on grounding plan.

Table 1. Under discussion at present. *SMA revise.

Last paragraph on page 10 - mention that the outgassing at service temperature is a potential issue. *DCC.

page 12. sixth line of text: Is the actuator drive current that sensitive? it will be amplified already... *SMA to reword.

bottom of page: SUS/US will likely use the same interface box... See comment for page 5. *DCC or SMA

Page 13: first line: The actuator signals are relayed through the box. *SMA
second table on that page - +/-78V not required for PD. Is it really +/-78V or is it +/- 150V? *SMA icw DH to revise

Page 14, second para. Perhaps clarify who will regulate and limit the supplies. *SMA or DCC to clarify.

further down: the +17V line has 4A but the -17V line only 3A... *SMA to fix.

heading 1.1.2.2.2 is this really command input? Need to decide to which of the places (A, B, C etc in Justin's diagram) this refers. *SMA to check.

page 15, last paragraph. At what frequency is this requirement? Whereabouts (physical location) does this apply? *SMA to incorporate Rana's stuff.

page 16, halfway down, reference to "Satellite box" - is this the same as the Interface Electronics? Ideally, settle on a single name (and in the figures). *SMA to fix. Use "satellite box".

Table - please refer to where this applies in the diagram (A, B, C etc in Justin's diagram)
Same comment for remaining tables. *SMA to do.

page 19, 1.1.3.1.1
Under discussion. *SMA to document.

page 22, table 3 (but this isn't the third table in the document!). Needs a fifth channel, and maybe tellback lines. *SMA.

Comments on DRD document E010613-01

page 16 section 4.1: requirement for all documents to be in acrobat might conflict with drawing requirements document (we are doing that one tomorrow!). Acrobat 3.0 is obsolete. *DCC to fix.

section 4.2 might need updating in the light of the drawing requirements document. *DCC to review

Page 19, footnote. Document sounds interesting - Ian will try to get a copy! *IW to do it.

page 21 section 6.7.1. The sentence in the first paragraph about OSEM cleaning has I think been overtaken by subsequent discussions. Does it in any case belong in here or in E96022-B or E030084? Does the final paragraph repeat (and hence potentially conflict with) E96022-B? *DCC to clarify the sentence about OSEM wire. *SMA to check E030084-02 to see if it makes sense for the BHam OSEMs.

page 21 section 6.7.2 I note the [TBR] on "the load must then remain applied to the maraging steel". I will raise this with the blade committee. *RJSG to check blade process spec and report back to DCC.

Page 22 6.8.1 Tim may well have asked you this already, but he may seek to allow enclosed volumes in welds provided they are really enclosed - we would need to figure out how to test these for leaks. Already answered.

Page 22 section 6.9. We assume the corrosion prevention really refers to stuff outside the vacuum. Ian points out that boat-builders avoid contact between al and stainless; surely we don't need to do that? *DCC to mod wording.

page 24 section 6.16.2. Passive shock witness gauges on all shipments - why? Maybe only on shipments "where appropriate"? *DCC to add.

Comments on Design requirements document (referring to E030350-A-D)

Page 5, item 8) and page 8 item 8) Drawing trees, BOM and overall BOM: After much discussion we see the merits of a drawing tree in addition to the traditional BOM on the drawing - however we wondered whether we had misunderstood the requirement (page 5) for a drawing tree for every assembly and sub-assembly. Surely a single tree for every major assembly, which would include nests down to sub-assembly level, would be more useful? (*yes – DCC to mod wording.) I am thinking of E030507 which was in the information pack Calum provided for the triple assembly. Should these have "E" numbers or "D" numbers, by the way? *should be an E – no action. *CEIT to check out wording.

Page 6, item 9) paper sizes. Ian is going to make a list of the metric and imperial sizes; I would hope we may use metric paper. *we do need to use imperial paper sizes. (No action required)

Page 6, item 13) It would be useful to have a current blank DCN in a place we can get at it - you could simply make it a document on the DCC and include the word format. *CEIT to do it (maybe on Dennis's page)

Page 7, item 5) To avoid confusing our EU suppliers too much, we will use upper and lower limits with a single global default in the tolerance table. This is ANSI-compliant. We will endeavour to place all dimensions so that they read left-right as per the example given even where turning them 90 degrees for neatness would be our more normal practice. *no action required

Page 7, Item 7) Inches and mm - see earlier correspondence. *UK will use mm with key dimensions dual-dimensioned.

Page 8/9, item 12) We do not want to engrave numbers on ears (or fibres!!). Presumably it will be OK to bag and tag optics parts (using suitably clean-compatible bags)? Also on page 5, item 5). *Calum to add the document where the bag and tag option is referred to?

Page 10 etc, various places, drawing release etc: It would be very helpful to duffers like me to see a flow chart or something indicating the relationship between:

drafts; checking of drawings; drawing release; approval; signing of DCN; configuration control; archival; revision; etc.

*Calum to add?

Page 10. Item 4 generally - we assume you can use a single DCN for a coherent set of drawings. A change to any one of them could be handled by a further single DCN. *OK. Calum to make explicit in text?

Page 11 item 4.5.2. We propose the following people for the roles named:

- 1) originator: Tim, Ian, Stuart, Dave, or Russell.
- 2) subsystem cognizant engineer: Justin (RAL parts), Alberto (B'ham parts), Caroline (Glasgow parts) (Formally, I think this is Dennis but he gets to sign anyway below)
- 3) subsys cog scientist: Norna
- 4) subsys leader: Justin
- 5) systems engineer: Dennis

Do you have suggestions for who to include under 6) for electronics and optics aspects? Jay?

Page 14, section 4.9 Collaborators: We propose to follow the LIGO system as far as possible, but we note that we do not normally expect to have all drawings in change control before talking to vendors (page 13 paragraph 5). For archival, we will supply native and pdf versions of drawings and native solid models, with STEP files if required. An option might be to translate to Solidworks but that would need to be done later in the project once our resource uncertainties are smaller. *No action required.