

April 23, 2012

ITM Elliptical Baffle FDR Meeting 30 March 2012

ITM Elliptical Baffle FD

Questions and Comments from the Committee *with responses*

Committee

Jeff L, Kurt B, Eric G, Calum, Marty Levine, Peter F, Ed Chavez (layouts), Brian L, Fabrice

Responses

Kurt Buckland

1. Add torque requirements to all fasteners - add a general note like "TORQUE ALL FASTENERS IN ACCORDANCE WITH T1100066 TORQUE VALUES" **Tim**
2. Some part drawings have the title block general notes removed. **Tim**
Title block notes were moved to upper left-hand corner.
3. Some part drawing are missing units and tolerances. **Tim**
4. D1101298 blade spring bending hook assy doesn't have a BOM or any dims **Tim**
5. Full set of red-line drawings submitted to Lisa Austin (Calum) **Tim**

Jeff Lewis

- Should add torque spec for all fasteners in the assembly drawings **Tim**
- Need to verify ISI stage 0 threaded hole availability for the Baffle and pusher tooling. **Eric James**
- Could the upper (D1002612) and lower (D1101889) tubes be combined into a single (more rigid and straight) tube? An attachment for the eddy current damping hardware would be needed on the tube but that would be a simple design.
This design is using majority of the parts from the ACB. The Down Tube (referenced) and the Spring Blade are the only exception. This modification would require too much effort.

Questions from Eric Gustafson

The ITM Elliptical baffle is positioned to within + or - 7 mm. Does this and the size of the aperture give the commissioners sufficient range for moving the beams on the optics looking for the best operating alignment.

- 1) **The ITM elliptical baffle will be aligned to within +/- 0.5 mm of the global beam line by means of sighting with the theodolite on a target placed at the center of the baffle hole. Likewise, the BS elliptical baffle will be aligned to within +/- 0.5 mm of the BS mirror optic center. (see [M1200268](#), RODA).**

Can V. Sannibale do FEA of the modes of vibration of the ITM Elliptical Baffle.

It would be more efficient to have Calum et al do the FEA.

Find the document that tells the resonant frequencies of the large cylindrical down tube that is part of the suspension and include a reference to it in T1100446 .

Virginio TBD?

Are the view holes in this cylinder large enough for the installation teams in their bunny suits.

Yes; this was demonstrated during the assembly and installation of the BSC8 ACB, which uses the same suspension structure.

Find the Yamamoto calculations for the aperture size (210 mm by 260 mm) and include a reference to the document describing the calculation in T1100446.

T1000090

Do a simple back of the envelope calculation of the effect of rotating the baffle on clipping.

The elliptical horizontal radius will change by approx +/- 3 mm for each 1 deg of baffle rotation. This will cause a clipping of the recycling cavity beam of <10ppm for 1deg rotation. The baffle will be aligned within 1 deg of the beam tube axis.

Is there a simple back of the envelope type of sanity check that can be done on the estimate of the noise.

The scattered light will change by approx $1E-26$ m/rtHz for a 1 deg rotation.

Do you have a list of resonant frequencies and Q's. Could a few well placed oring like dampers spoil the highest Q resonances.

Virginio will measure the vibration characteristics of the ITM Elliptical baffle.

Notes and Questions from Calum Torrie

At the FDR for the ITM Elliptical Baffle yesterday the SLC team were asked about the frequency results on BOTH the ACB and the ITM elliptical baffle.

The committee came up with the following plan: -

- 1) ACTION on Virginio to gather and (re-)present all work so far on ACB –

Virginio TBD

- 2) ACTION on Calum / Lisa to find out what if any relevant frequency results we can get from: -

- i) LHO Seismic transfer functions on WBSC6 ACB (Michael L and Fabrice)

- ii) Plan (if needed) LHO Hammer tests on WBSC6 ACB at LHO (Michael L and Jeff Garcia)

Virginio is remeasuring the ACB vibration characteristics TBD

- 3) ACTION on SLC team to plan frequency work (hammer testing) on upcoming ITM Elliptical Baffle (work can be supported by Calum's students if needed.) *The SLC team already have this planned, just included for completeness.*

Virginio TBD

- 4) (Possible) ACTION on team to consider deployment of viton washers (to existing design). If needed. This will depend on items 1,2 and 3 above. ALSO this will NOT hold up design of either ACB or ITM baffle (would be in parallel.) Help on this will come from Damping Tiger team (chaired by Brian Lantz and among others has Calum, Jeff K, Norna, Kurt, Fabrice as members as well as guests.)

Additional damping is not needed because the BS Elliptical baffle is the limiting aperture and the ITM Elliptical baffle is no longer vignetting the recycling cavity beams and causing modulation.

Cheers, Calum

More notes and questions from Calum

Notes

210mm horiz and 260mm vertical

Place baffle to within +/- 7mm from beam center.

No prototype - presented as per arm cavity baffle.

Questions

- 1) Tooling missing, reviewed separate? (Lisa)
- 2) Layout - add X, Y information (Ed)
- 3) Layout - show chamber (Ed)
- 4) Layout while done by systems - interface holes - should be checked by SLC and signed off by install and seismic. (Lisa / Mike) **Eric James**
- 5) Would like to see reference again to ACB - FEA, measured response, damped / un-damped etc ... (Virginio TBD) – See main section above from Calum
- 6) Have install team confirm access holes large enough for viewing (Lisa / Mike) **Confirmed with the installation of BSC8 ACB.**
- 7) FEA of suspended portion (Calum TBD)

Calum

Questions/comments on the Production Plan from Marty Levine:

1. Sec 2.1 Fabrication: There is no reference that relates the Final Design (FD), [T1100446-v3](#), the final assembly, [D1003238-v2](#) to the 'complexity' of fabrication, e.g. the number of parts needed to be made from the selected machine shops. The magnitude of this job should be mentioned, e.g. number of drawings, etc.
2. Section 3-Baffle Estimated Unit Cost: There is no reference or backup information that justifies this cost. You might relate the unit cost to the Bill of Materials (BOM), [E1101039-v1](#) or some other document.
3. Section 3.1 Total Cost for all Signal Recycling Cavity Baffles: There are references to the FM Beam Dump, FM Elliptical Baffle, and Manifold Flat Baffle that are not part of this FDR. Shouldn't they be removed from this Production Plan
Original plan (and FDR) included all listed baffles and beam dumps as presented in Cost Book. Current plan is listed as "Procurement Plan".
4. Section 3.2 Comparison with Cost Book: This section talks to Baffles not connected with this FDR. Could this section be eliminated? If not then suggest replacement with the previous estimate for the ITM Elliptical Baffle and cost delta based on the current design.

Original plan (and FDR) included all listed baffles and beam dumps as presented in Cost Book.
Current plan is listed as "Procurement Plan".