

Heilig, John A

From: Clark, Craig S
Sent: Monday, December 20, 2010 9:54 AM
To: Rickman, Steven L. (JSC-C104); Marco Molina
Cc: Porter, Stephen (JSC-EA321); Tutt, John C; Mott, Phillip B; Martin, Trent D. (JSC-EA321)
Subject: RE: Follow Up From the AMS Design Review (RID 44)

Hi Steve,

Thanks for your comments. Your points are completely valid, but we are where we are. I will defer to Marco for any detailed response.

Craig

Craig S. Clark

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From: Rickman, Steven L. (JSC-C104) [mailto:steven.l.rickman@nasa.gov]
Sent: Friday, December 17, 2010 2:24 PM
To: Clark, Craig S
Cc: Porter, Stephen (JSC-EA321); Tutt, John C; Mott, Phillip B; Martin, Trent D. (JSC-EA321)
Subject: RE: Follow Up From the AMS Design Review (RID 44)

Craig, Trent, All –

I took some time to read through the Carlo Gavazzi Space (CGS) updated analysis (AMSCD-RE-CGS-003, AMS-02 Permanent Magnet Configuration System Thermal Analyses Report, 07/10/2010). It wasn't clear to me which portions of the model were correlated using the TVT data. However, I wanted to offer the following comments for your consideration.

- a. Throughout the report, temperature violations were reported and in many cases, it was reported that "This requirement violation has been presented to payload responsible for approval." It wasn't clear whether or not those violations were ultimately deemed acceptable.
- b. Table 9-2 offers a summary of temperature limit violations and it also lists margins determined from the analysis. While the violations are clearly flagged, I also looked at cases with low margins – in some cases 2 or 3 or 4 deg C, some for hot cases, some for cold cases, some with violations at one extreme and minimal margin at the other. Without knowing how well the model was correlated to the TVT, one runs the risk of models inaccurately predicting margin when none exists. This would be less a concern had the models showed considerable margin (such as 10-15 deg C). In that case, inaccuracies and uncertainties in the model might be more reasonably absorbed in the temperature margin.
- c. While it may just be a typo, I also noticed on page 15, section 6.3, at the bottom that it is stated "In particular when the beta -75° occurs, the sunlight comes from port side, and the shadow effect of ELC2 makes this to be a

cold case for AMS.” From what I understand about the configuration when flying in +XVV, +ZLV, it is true that at beta = -75 deg that the ELC2 shadows the AMS but, in this case, the sun is coming from the starboard side, not port. I think they have it correct but it is probably mis-stated in the text. (They also have a sign switched on the solar declination, listing it as -23 for the summer solstice at the bottom of page 16 in section 6.4).

- d. There were numerous places where they show bar charts of predicted heater on/off cycles (see Figure 8-74, for example). If I read this and other similar charts correctly, does this imply a 100% duty cycle (save for the ~4 hour no power case?). Does this imply heater sizing issues? Perhaps I’m misinterpreting the data presented.
- e. There are mitigations discussed that suggest powering various detectors off for the range of beta angles where temperature violations are expected to occur. However, has anyone assessed the impact of doing so? For example, where hardware will be powered off above, say, beta = 50 degrees, do you know how much time that entails? (I remember from a separate calculation, ISS spends approximately 50% of the year between bets = -30 and +30 degrees and about 10% of the year above magnitudes of 60 degrees). So will this be a big operational impact? Also, given the coarseness of the analysis (only every 25 degree of beta was sampled), do you know that the cross-over point is truly at 50 or somewhere between 25 and 50 degrees? This could further impact operations. (See, for example, the ECAL hot case analysis on page 47, section 8.7.2).

I would be happy to discuss these items if you wish.

Thanks for the opportunity to review these reports.

Steve

Steven L. Rickman

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<https://nen.nasa.gov/web/pt;jsessionid=D453D58E33A7FBC8CC6ED84E261957B7.jvm137>

From: Clark, Craig S [mailto:Craig.Clark@escg.jacobs.com]
Sent: Friday, December 17, 2010 8:24 AM
To: Rickman, Steven L. (JSC-C104)
Cc: Porter, Stephen (JSC-EA321); Tutt, John C. (JSC-EA2)[Jacobs Technology]; Mott, Phillip B. (JSC-EA2)[Jacobs Technology]; Martin, Trent D. (JSC-EA321)
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Steve,

Sorry this slipped my mind. Attached are two analysis reports for AMS-02. We (Jacobs) performed analysis for shuttle operations pre-docking. Carlo Gavazzi Space (CGS) performed the docked and ISS analyses. Both analyses used the same updated model for the Permanent Magnet configuration that was partially correlated with TVT results. CGS is still working on the TVT correlation report. I will fwd that as well when I receive it.

Please confirm if you get these, as the files may be too big for email.

Craig

From: Martin, Trent D. (JSC-EA321) [mailto:trent.d.martin@nasa.gov]
Sent: Friday, December 17, 2010 8:03 AM
To: Rickman, Steven L. (JSC-C104)
Cc: Porter, Stephen (JSC-EA321); Clark, Craig S; Tutt, John C; Mott, Phillip B
Subject: Re: Follow Up From the AMS Design Review (RID 44)

Craig,
Can you get a report for Steve.

Trent Martin
AMS and JSC JWST Project Manager
Sent from iPhone

On Dec 17, 2010, at 7:58 AM, "Rickman, Steven L. (JSC-C104)" <steven.l.rickman@nasa.gov> wrote:

Steve, Trent – I'm following up on a RID that was accepted during the 04-05 May AMS Design Review. It is listed as OPEN and I've never received the thermal analysis report. May I ask you to provide a copy, please?

The RID is attached for your reference.

Thanks,
Steve

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