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Atmospheric Measurement Techniques Discussions

Interactive comment on "The mechanical and thermal setup of the GLORIA spectrometer" *by* C. Piesch et al.

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General comments ————————-

This paper continues the excellent series of articles that describe the GLORIA instrument and covers the aspects of the mechanical and thermal setup. These are critical aspects because the instrument operates in the difficult environment of an aircraft pod and also because the interferometer needs to be cooled for proper operation. Hence, this paper provides very important information. It does so brilliantly, and the subject is so thoroughly covered that one feels enough information is given to duplicate the experiment, a very rare quality.

Since GLORIA is an instrument designed to measure the composition of the atmo-

sphere, it is on-topic for AMT. I very strongly recommend this paper for publication in AMT.

Specific comments ——————

These comments are really minor points that don't affect seriously the quality of the paper, but I think they should be addressed.

Page 10969 paragraph about vibrations does not make it clear if the requirement is driven by the performance of the FTS or by concerns for the aircraft safety.

Page 10976, line 3: "the detectors full field of view (FOV) at this location" is an incorrect use of the term field of view, given that the scene is not imaged on the optical windows. Suggest instead to say "the optical beam at this location".

Page 10978, lines 19, 23, 27, 28 and also Figure 6. I think the use of the word "thread" is incorrect. The thread is the ridge or groove that winds around a screw. The correct word to use here is "leadscrew" (see: https://en.wikipedia.org/wiki/Leadscrew).

The velocity stability requirement of 5% (page 10968 line 24) is mentioned with a rather obscure reference of (Kimmig, 2001). Page 10986 line 4 gives a measured 9% velocity stability: I think it would be good to state the effect this had on the recorded atmospheric spectra, and if none maybe the 5% requirement was too pessimistic.

Page 10969, line 18 and 5 places in Table 1: This is actually a typesetting comment. The symbol "g" is used here to denote the acceleration due to Earth gravity. To differentiate it from the SI symbol for gram, it should be typeset in italics, or maybe in a different font. (See https://en.wikipedia.org/wiki/Standard_gravity)

Technical corrections ——————

Only a few of these correct real mistakes. Most of these comments are actually suggestions.

Page 10966, line 22: Is "(MDB, 1996)" a reference? If yes, it is missing from the

AMTD

7, C4211–C4215, 2014

"References" list, if not this should be clarified.

Page 10967, line 1: as already proved in the former –> as already proven in the previous

Page 10967, line 5: at good signal to noise –> at good signal to noise ratio

Page 10967, line 19: Overall instrument operating –> Overall instrument operation

Page 10967, line 22: number of housekeeping data –> number of housekeeping data channels

Page 10968, line 12: The mechanical construction –> The mechanical structure

Page 10968, line 18: not shear compensated and needs –> not shear compensated and requires

Page 10968, line 20: sufficiently stiff enough –> sufficiently stiff

Page 10968, line 21: during turning –> during gimbal rotation

Page 10969, line 14: measurements of different locations –> measurements at different locations

Page 10969, line 14: Is "(MDB, 1996)" a reference? If yes, it is missing from the "References" list, if not this should be clarified.

Page 10969, line 24: Is "(MDB, 2002)" a reference? If yes, it is missing from the "References" list, if not this should be clarified.

Page 10969, line 25: is inside in the fuselage –> is inside of the fuselage

Page 10970, line 17: The working time –> The working duration

Page 10971, line 3: which are fixed –> which are attached

Page 10971, line 4: silicone mounts –> silicone vibration isolators

AMTD

7, C4211–C4215, 2014

Page 10971, line 27: store a liquid with 70K –> store a liquid at 70K

Page 10972, line 26: "an acoustic sensor" the rest of the paper uses the word "microphone" for this, which I think is a better choice.

Page 10973, line 10: "on its inner side" could probably be removed.

Page 10975, lines 9 and 10: I would mention the "entrance window assembly" before the interferometer, just to follow the light path.

Page 10976, line 2: assembly which is hermetically seals –> assembly which hermetically seals

Page 10978, line 6: are gained on the cost of –> are gained at the cost of

Page 10981, line 25: the filling pipe installation –> the filling pipe

Page 10982, line 13: a relative constant –> a relatively constant

Page 10982, line 23: and the flights 8 and 19 –> and flights 8 and 19

Page 10983, line 1: altitude, flight duration, and flight velocity –> altitude, duration, and velocity

Page 10983, line 10: cooled optic module works around 210 K –> cooled optic module operates at a temperature of about 210 K

Page 10983, line 16: during the flight 8 –> during flight 8

Page 10983, line 19: pointing in aircraft longitudinal axis –> pointing along the aircraft longitudinal axis

Page 10983, line 27: sentence ends with a coma instead of a period.

Page 10985, line 1: Eigen-frequencies –> resonant frequencies

Page 10985, line 2: have considerable smaller amplitudes –> have considerably smaller amplitudes

AMTD

7, C4211–C4215, 2014

Page 10987, line 27: temperature behaviour is with 1 Kh-1 –> temperature drift is 1 Kh-1

Page 10987, line 28: in accordance to the requirements –> in accordance with the requirements

Page 10988, line 4: temperature drifts over the requirements –> temperature drifts that exceed the requirements

Page 10988, line 10: shown in Fig. 14d –> shown in Fig. 15d

Page 10989, line 18: will be adapted for improving –> will be adapted to improve

Table 2, last line: Stand-alone time –> Holding time

Figure 2: add units to the dimensions ("mm")

Figure 4: would be nice to identify the orange, yellow and purple pipes (there is enough room to do so).

Figure 6: "Thread" –> "Leadscrew"

Figure 6, caption, line 2: was chose to get –> was chosen to get

Figure 11: red and magenta trace are hard to distinguish, use colours that are further apart.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 10965, 2014.