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Atmospheric Measurement Techniques Discussions

Interactive comment on "Development of a digital mobile solar tracker" *by* S. Baidar et al.

Anonymous Referee #1

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General comments

The authors successfully describe the rationale behind the development of their new mobile tracker. The construction and algorithm is well documented, as is the overall performance. Indeed the performance seems to be very good, and the authors should be congratulated on their success in integrating the various modern modules that comprise the bulk of the hardware.

The use of centre to limb darkening (CLD) as a method of evaluating tracker precision was demonstrated but I would have appreciated seeing a single clear plot of pointing error (in degrees) as determined from CLD vs. the error (in degrees) detected directly using the fit from camera pixels.

The final section (3.3: Comparison with MAX-DOAS), provides some further validation of overall system performance but is probably not needed.

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Specific comments

(1) In section 2.1, when discussing the motion compensation system, it was initially unclear whether the two motors referred to in line 104 are in fact the same two stepper motors referred to earlier when discussing the tracker. Perhaps replace “the two motors” with “the two stepper motors of the tracker” or similar.

(2) In section 2.2 there is no need to define optical resolution or explain how it is determined using the Krypton emission line. Consider deleting “(full width. . .FWHM)” in line 221 and part of 212 - 213.

(3) In section 3.1 “Evaluation”, I can understand why pointing precision becomes worse at increased vehicular speed, and with higher SZA, but I would be keen to see the author comment on the slight loss of precision seen at 10km/h and at 20 - 30 deg. SZA (figure 6).

(4) A larger size picture of the complete system is well justified. Consider replacing figure 2A with something showing more detail.

(5) The caption for figure 4 has a description with an order of 0, 25 and 50 pixel offsets, yet the figure has an order of (top to bottom) 50, 25 and 0. I suggest the figure order is reversed for clarity.

Technical corrections

For reasons of clarity I also make the following suggestions:

The use of “a.u.” in S5 and S6 should be changed to “arb. Unit” to avoid any (somewhat unlikely I admit) confusion with astronomical unit.

Line 105: I don’t think it is necessary to explain the acronym “GPS” as it is now in general uses. Conversely there is no need to introduce the acronym “INS” in the same sentence as it doesn’t appear again.

Eliminate unnecessary use of detailed make and model numbers (e.g. lines 114, 201,

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202 and elsewhere). I also recommend removing reference to PC speed (line 115). Such details can be added to an appendix if needed.

Line 129: Consider adding a hyphen “Camera-based”.

Line 165: Change “. . .lead indeed to measurable improvements of the tracking...“ to: “. . .lead to measurable improvements in the tracking precision. . .”.

Line 271: This URL could go in an appendix.

Line 310: Grammar: change “has” to “have”.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 11401, 2015.