Atmos. Meas. Tech. Discuss., 4, C1606–C1607, 2011
www.atmos-meas-tech-discuss.net/4/C1606/2011/

Atmospheric Measurement Techniques Discussions

Interactive comment on "A sun-tracking method to improve the pointing accuracy of weather radar" *by* X. Muth et al.

Anonymous Referee #3

Received and published: 14 September 2011

The paper presents a valid method for regular checking of antenna pointing, especially for mobile radars. The method also makes use of the fact that many radar antennas fold over, and can measure at the same direction with two different antenna positions with respect to the antenna pedestal. The use of the theodolite analogy brings new insight into the theory. The paper is well written, contains significant new material on the field, and presents its conclusions clearly. It is certainly worth publishing in AMT. There are some concerns on the model and its presentation, which are detailed below.

The weakness of the paper is that the model and its parameters are not explained in sufficient detail to the reader. Those readers, with knowledge in radars, do not have the sufficient background to understand the teodolite terminology , which need to explained

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to more in detail. I have the following detailed remarks to make:

Page 5573: the index error E_0 should be explained to the reader. It is just said that it has to be distinguished from CV. It is possible to understand this with some thinking, but the reader should be helped

Page 5573: Notation CV and CH seems clumsy. What about C_V and C_H?

Page 5576: Egs.7 and 8 use symbols which were introduced on page 5573. It would be helpful to repeat some definitions here, unless the work is restructured so that these two parts are combined. It is now demanding to understand the equations as no description of the symbols are given. It may be that some of the comments below are caused by misunderstanding because of this.

Page 5576: Are E_i and A_i the elevation and azimuth observations? The symbols are explained on page 5572 which is faraway.

Page 5576: Are the formulas original or taken from literature? In the latter case a reference need to be given. I assume that the angle between vertical electrical and mechanical pointing is always small. This is assumed, as the angle appears as such without any trigonometric functions. It appears to me that the formulas as limited to small values of E_i and A_i, because second term of Eg.(7) goes to infinity, as E_i approaches 90 deg. There is a similar problem with $\tan(E_i)$. The limits of validity have to discussed. Measurements up to 60 deg of elevation are shown in Fig. 1.

Page 5578: States that collimation errors cannot be estimated with earlier methods. This is true is a sense. However, for radar applications the electrical pointing is what matters, and hence the antenna is pointed using e.g. the sun. The elevation collimation error is then easy to check by measuring the antenna orientation by e.g. using plumb line. But the horizontal collimation error is difficult to determine with earlier methods.

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 5569, 2011.