INTERFEROMETRIC CALIBRATION TECHNIQUES FOR THE PLATTEVILLE, CO MEDAC METEOR RADARS

de la Pena, S[12], Avery, S.K.[1], Avery, J.P.[2] , Lau, E.M.[12]

[1]Cooperative Insitute for Research in Environmental Sciences
[2]Department of Electrical and Computer Engineering

Meteors falling into the earth atmosphere, at the rate of several thousands per day, leave a trail of ions that reflects electromagnetic waves. In the presence of a wind field, this trail drifts and causes a Doppler shift in the frequency of electromagnetic wave reflecting from it. This frequency shift, can be used to estimate the winds in the mesosphere and lower thermosphere (MLT) region. The Meteor Detection and Collection (MEDAC) systems at the Platteville Atmospheric Observatory in Colorado currently uses an improved five receiver interferometer in order to estimate the location of the trail, and record its Doppler frequency. An accurate measurement of the phase of the signal recorded at each receiver is needed for the correct estimation of the angle of arrival of the signal. Errors in antenna placement, differences in transmission lines length, and instrumental phase differences in the system produce error in the phase that may result in erroneous spatial location estimates of the trail, which is needed for the correct estimation of the wind field, since the radars usually operate under a quasi all-sky mode, which requieres the location of the source of the reflected signal. Different techniques are used to reduce these errors and improve estimations. We present and discuss a tecnhique previously used with the MEDAC system radars, which involves the use of beacons at known locations. We will talk of other techniques used with different meteor radars, which uses meteors for the calibration, and we will present advances in recent attempts to obtain better results where other techniques have failed.

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1. (a)
Santiago de la Pena
Cooperative Institute for Researc
216 UCB
Boulder, CO
80309-0216 USA
santiago.delapena@colorado.e

(b) (303)735 6621

(c)

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3. (a) G/H

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