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Atmospheric Measurement Techniques Discussions

Interactive comment on "Coded continuous wave meteor radar" *by* J. Vierinen et al.

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> Regarding the anonymous referee comments on height and angular resolution: "I could not see where the authors have discussed the height resolution of the CW system. Because they mainly use low elevation signals, due to the large distances between transmitter and receiver, the height resolution becomes critically dependent on the accuracy of determination of phase differences on the receiver antennas, and at elevations below 20 degrees (and maybe even 30 degrees) errors in phases lead to uncertainty in angular positions of the meteors, which manifests itself as uncertainties in height (e.g. see , Hocking, "Radar meteor decay rate variability and atmospheric consequences", Annales Geophysicae, 22, 3805-3814, 2004.) An interesting test of this would be to see the plots of inverse decay time vs height - these should be presented. It is noticeable in other systems that the plots of inverse decay time vs height are much more tightly clustered for systems with higher gain anntennas, which obtain

a higher percentage of meteors closer to overhead (and so which have better height resolution). Another point of note is that because the new design relies more critically on low elevations, (or at least I assume it does) then it is also potentially more susceptible to ground-level interference. I am not sure if this is important, but some discussion might be warranted."

This is a valuable point, and we will address it in the paper. We agree that low elevation measurements result in degraded performance of the interferometer, which is a consequence of the fact that antennas are usually placed on a horizontal flat surface with spacings that well suited for the said overhead meteors.

However, the assumption that our radar concept "critically relies on low elevations" incorrect. We will clarify this in the next draft of the paper. It is also possible to use a significantly shorter distance between the transmitter and receiver to obtain a configuration more similar to a mono-static radar. We have demonstrated a very short spacing between the transmitter and the receiver in the past with an HF radar operating with similar transmit power.

Our paper focuses on the signal processing of pseudorandom phase coded continuous signals transmitted from possibly multiple transmitters simultaneously. We believe adding the new figures to this already long paper is out of the scope of this paper. The requested figure would mainly show what is already known: low elevation angle interferometry for a fairly compact sparse planar array is significantly worse than high elevation angle interferometry.

> Regarding response that we missed to referee comment: "I did not see much detail about the specifics concerning the codes used - not even a table of codes. The discussion of codes is kept as an overview - more specific details should be given. The only detail is in fig. 2, and it is very generic. How long were the bauds? Were the code pseudo-random? etc. It is hard to assess the paper without such details."

This information is in the paper. The details about 10 microsecond baud length and

1000 bit pseudorandom binary phase code and Gaussian pulse shaping filter are on page 7890, lines 10-14.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 7879, 2015.