## The KUT meteor radar: An educational low cost meteor observation system by radio forward scattering

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## Abstract

The Kochi University of Technology (KUT) meteor radar is an educational low cost observation system built at Kochi, Japan by successive graduate students since 2004. Starting by a 3-channel interferometer configuration, the system was constructed to use the forward scattering of the radio wave signal continously generated from Fukui station since 1996 to all over Japan (Maegawa, 1999). The initial system applied interferometry principle to detect the meteor echo directions and then was upgraded to 5 channels in 2007 to enhance the direction finding accuracy. To improve the observation process, a software was developed in 2008 to automate counting of meteor echoes, filtering noise, duration calculation, and direction detection. Optical observation by video cameras was also used in parallel to calibrate the radio measurements and test the interferometer accuracy. In 2009, a calibration device was developed to calculate the absolute reception power and estimate the meteor trails density. In 2012, two additional remote receiving stations were constructed at approximately 15 km far from the interferometer location at KUT to enable the observation of meteor trajectories and velocities. Lately in 2015, the meteors study at KUT was branched into three objectives: 1- Astronomy objectives, including meteor trajectories, radiants and velocity determination, 2- Atmospheric science objectives including ozone concentration and solar cycle activity observation, and 3- The meteor burst communication (MBC), which targets communication applications in uncovered areas by mobile networks such as deserts and maritime usage.

We present the history of development and the methodology used for observing meteors parameters at KUT. The performance of the system, accuracy, assumptions and limitations used are the key points targeted for discussion. A more detailed description on the system setup can be found in Noguchi and Yamamoto [2008] and Madkour et al. [2016]. A detailed explanation on the observation of meteor trajectories at KUT is presented separately in the session.

## References

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