DEVELOPMENT OF A 5-CHANNELS HRO INTERFEROMETER AND A TRIAL OF MEASURING A TRAJECTORY OF EACH METEOR ECHO AT KOCHI UNIVERSITY OF TECHNOLOGYT. Tadayoshi Yamato[1], Tomotaka Yamasaki[1], and Masa-yuki Yamamoto[1], [1]Kochi University of Technology.(185, Miyanokuchi, Tosayamada, Kami, Kochi 782-8502, JAPAN, taiyoutobikini_rip_ty@yahoo.co.jp).

Introduction: Ham-band Radio meteor Observation (HRO) has an advantage of 24-hour continuous data-detection. In Kochi University of Technology (KUT), a 5ch HRO-IF was developed in 2009 and has been observing the meteor appearance position of every meteor echo, with operating an automatic meteor observation system that automatically publishes observational results on web in quasi-real time (Noguchi, 2009). Meteor parameters acquired by the observation system are: time of detection, elevation and azimuth of the echo, and the relative signal strength. In addition, we has developed a system of meteor trajectory measurement by multiple-sites observation with GPS time and the 5ch HRO-IF. Now, we are developing a calibration device for measuring absolute reception power of each HRO meteor echo for the next development of the observation system. .

5ch HRO-IF: In the 5ch HRO-IF, the appearance position of each meteor is monitored using interference technique. Multiple superheterodyne receivers are used for the 5ch HRO-IF, where a common local oscillator to put the same phase signal into each receiver is used, because there is a need to keep the phase difference at the time of frequency conversion. Since high time resolution is needed for interferometer, we calculate phase difference at every 0.1s, synchronizing the 5 channel input signal to an AD board with 1 PPS (Pulse Per Second) pulse signal provided by a GPS receiver every 1 s. In order to establish a meteor trajectory measurement with the multiple-sites simultaneous observation, high time resolution is also needed. So we develop a program to analyze the power trend with tracking a peak frequency of every 0.001s by FFT. We used IDL for developing software to operate the automatic meteor observation webcast with the dataset of the 5ch HRO-IF.

Meteor trajectory measurement: n order to verify the observation system of meteor trajectory measurement, we observed meteor echoes during an active phase of Geminids meteor shower in Dec. 13 to 16, 2011. We tried a simultaneous observation by optical video instruments (watec CCD cameras) and the radio interferometer with multiple-sites HRO observation for comparison. We observed 71 meteor echoes, however, only 1 simultaneously observed meteor echo at three radio sites as well as the camera site was obtained. As a result, though it was only 1 case, the azimuth angles of the meteor trajectory obtained by the both methods were nearly consistent with each other, namely, that by optical observation was 156°, whereas, that by radio observation at the same time was 159°, respectively.

Summary: We improved the KUT radio meteor observation system of measuring meteor trajectory**.** And we were successful in 3-sites simultaneous observation for 71 meteor echoes during a 4-days observational test for Geminids meteor shower. Although, we obtained only 1 case of optical/radio simultaneously observed meteor, resulting in a good coincidence with 3° error azimuth of the trajectory determination. Namely, it was within an error range of about 5° for radio observation. In order to verify the system performance we need more dataset to make a statistical approach. Here, we built a forward-scattering radar system with a capability of meteor trajectory measurement by using multiple-sites HRO with the 5ch HRO-IF, however, automatic observation and webcast was not established due to the lackage of observation sites for 2 points. In this paper, we will introduce current status and future of the KUT 5ch HRO-IF and a developing calibration device for measuring the absolute reception power of each HRO meteor echo.