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INVITED TALK: An Overview of the Japanese GALA-V Wideband VLBI System

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Content :

We are developing a new broadband VLBI system, named GALA-V with aim of frequency comparison between atomic time standards over intercontinental distances. The development of broadband GALA-V system is coordinated to be as compatible as possible with the VGOS system. Kashima 34m antenna that had modified Cassegrain optics was enabled to carry out broadband observation with originally developed two types of prototype broadband feeds named IGUANA-H and NINJA. Two ways of data acquisition modes; broad channel mode and narrow channel mode, are employed in the project. Narrow channel mode acquires multiple channels of 32MHz bandwidth, and this mode is compatible with the observation mode developed by MIT Haystack as the 'NASA proof of Concept' (PoC) system. Broad channel mode acquires four channels of 1 GHz bandwidth signal. RF Direct sampling technique is applied in this mode as a new approach for broadband observation by using high speed sampler K6/GALAS. This technique has several advantages in precision delay derivation by broadband bandwidth synthesis. Ishioka 13m VGOS station has constructed by GSI in Japan, and the first broadband observation over 8 GHz bandwidth was successfully performed in early 2015 on Kashima 34m - Ishioka 13m baseline. We have achieved super broadband bandwidth synthesis over 8GHz bandwidth for the first time in the world. The theoretical delay precision has reached about 30 femto seconds in this experiment. This presentation will report about recent progress of the broadband GALA-V developments.

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