Development of Bandwidth Synthesis Software for K5/VSSP (IP-VLBI) System

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http://www2.nict.go.jp/ka/radioastro/index-J.html

A bandwidth synthesis processing is located at the step just follow a data correlation processing and plays an important role to derive group delay, which is one of direct observables in a geodetic VLBI, with the precision as same as that obtained using the data observed with a wide bandwidth by combining a number of narrow bandwidth data. We report the current status and future plans of bandwidths synthesis software developed for K5/VSSP (IP-VLBI) system.

National Institute of Information and Communications Technology has been developing K5/VSSP (IP-VLBI) system in which raw data are intended to be transferred to a data correlation site through the Internet (e-VLBI). A general flow from an observation to a bandwidth synthesis processing of K5/VSSP system is as follows. First, observations are carried out using the K5/VSSP system consisting of four PCs, each of which PC is equipped with a 4-ch sampler and then total 16-ch sampled data are acquired. Since a raw-data file is created on each PC, four raw-data files are created every scan. In the K5/VSSP system correlation processing is carried out by using a K5 software correlator. The software correlator correlates a pair of raw-data files and creates a correlator output file. Hence four correlator output files are created for one scan of observation. Following the correlation processing a bandwidth synthesis processing takes place. The current version of bandwidth synthesis software (KOMB) can process only the KSP correlator output data. Thus the four files of K5 software-correlator outputs are first merged and converted into a file that has the format of KSP correlator output, and then it is processed by the KOMB to obtain the precise group delay.

In order to skip the process of the format conversion from the K5 software correlator output to the KSP correlator output, the KOMB is being modified to handle the K5 software-correlator output directly. KOMB for KSP system was initially developed on an HP workstation for an HP-UX operating system using the FORTRAN language. KOMB was first ported to a C language program. At the same time it was developed for multiple operating systems, such as FreeBSD, Linux, and Windows as well as HP-UX. The function to identify the difference of endian automatically, which is refer to which bytes are most significant in multi-byte data types adopted by a computer's memory, is introduced to create an output file compatible with that created by the KOMB run on the HP-UX. At present the direct handling of K5 software-correlator output file is under the development. It is also planned to modify utility programs developed for KSP correlator output so as to process the K5 software correlator output.