V124b Flow-down from the Top-Level Requirements to System Requirements for the ALMA Development

Hiroshi Nagai (NAOJ) and ALMA Frontend & Digitizer Requirements Update WG

ALMA Development Roadmap document (Carpenter et al. 2018) defines a new long-term development strategy for the upgrade of hardware, software, and analysis tools to enhance the ALMA observation capabilities for next decades. The Working Group proposed three science drivers or "Top-level science requirements" for the development. The ALMA observatory is now constructing a concrete upgrade plan engaged with these science drivers. The ALMA Frontend & Digitizer Requirements Update WG is charged to make a flow-down from the top-level requirements to system requirements, which would be a matrix for the new development, especially for the ALMA frontend and digitizer system.

In this poster, we report a study of requirements to the future ALMA system in line with the flow-down tree. For short-term capability enhancement, we require more than twice of IF bandwidth increase with 4×4-bit quantization of digitizer and correlator. We also require an increase of number of spectral channels to realize the current highest frequency resolution even with the spectral setup of the widest IF bandwidth. For a longer term, we require an increase of number of antennas and an extension of baseline length.