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Simultaneous Operation and Control of about 100 Telescopes for the Cherenkov Telescope Array

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The CTA (Cherenkov Telescope Array) project is an initiative to build the next generation ground-based very high energy (VHE) gamma-ray instrument. Compared to current imaging atmospheric Cherenkov telescope experiments CTA will extend the energy range and improve the angular resolution while increasing the sensitivity by a factor of 10. With these capabilities it is expected that CTA will increase the number of known VHE gamma-ray sources from O(100) to O(1000), and will raise the field of ground based VHE gamma-ray astronomy to the level of astronomy with radio waves or X-rays. With about separate 100 telescopes it will be operated as an observatory open to a wide astrophysics and particle physics community, providing a deep insight into the non-thermal high-energy universe. The presentation will give an overview on the principles of the CTA Array Control system (ACTL), responsible for several essential control tasks including the evaluation, selection, preparation, scheduling, and finally the execution of observations with the array.

A possible basic distributed software framework for ACTL being considered is the ALMA Common Software (ACS). Used by several projects, this open-source software was originally developed for the Atacama Large Millimeter Array (ALMA), a joint project between astronomical organizations in Europe, North America, and Asia for a millimeter and sub-millimeter array. ALMA is presently being commissioned in Chile and will consist of at least fifty-four 12 meter antennas and a further twelve 7 meter antennas.

The ACS framework follows a container component model and contains a high level abstraction layer to integrate different types of device. To achieve a low-level consolidation of connecting control hardware, OPC UA client functionality is integrated directly into ACS, thus allowing interaction with other OPC UA capable hardware.

In addition to the presentation of the ACS middleware, new techniques for automatic code generation based on an UML representation of the ACS components will be introduced and illustrated with first examples.

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