„Pi of the Sky" software modernization.

The "Pi of the Sky" project is active since many years. In parallel with routine observations done with use of robots installed in San Pedro de Atacama, Chile and INTA Centre in Spain the maintenance and modernization of the hardware and software is carried out systematically by the inter-institute group of scientists. Among others following tasks partially supported by SWISS grant are worth mentioning here.

1. The first of the implemented sub-projects was the analysis of available software packages for computer systems control with the objective to use one of them in "Pi of the Sky" project. Several systems were tested with no positive result. Due to that it was decided to build from the ground an own, dedicated application. Experience was acquired allowing for optimal design of such a system.
2. Another of the major sub-projects was virtualization. Again, we analyzed the available methods. The chosen solution has been tested and implemented in computer systems of the "Pi of the Sky". Thanks to these efforts a new tool for testing the new system solutions has been acquired avoiding the need for additional hardware and easing the development process. Due to aggregation in the form of virtual machines, systems and services that have worked on many physical computers need less time for administration. In addition, it was made possible to use modern multi-processor servers more efficiently .
3. Important for the further development was the replacement of the obsolete source code repository based on the SVN software by a new one based on a distributed revision control system GIT. It allows to develop software packages within the project "Pi of the Sky" faster and easier.
4. One of the key modifications that are important for the further development of the "Pi of the Sky" was the adaptation of the driver controlling the communication with cameras k20 via USB with the aim to work with modern Linux kernels (not older than 2.6.32 version).
5. Adaptation of the existing software allowing to work with the latest stable versions of libraries together with stable distributions of Linux must be mentioned here also . As part of this work, the code has been set in order and cleaned from many unnecessary files. The modified software was used to control the four robots installed in 2013 at the observatory at INTA in Spain and the telescope on the desert of San Pedro de Atacama in Chile.

We currently are working on the improvement of precision of exposure start time measurement. The first changes have been introduced to the protocol NUDP and to the driver for communication with k20 camera via Eth. Tests of these corrections are running presently. Expected significant increase in precision will allow to extend the research area on objects with much more rapid variability than those previously studied.

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