DEVELOPMENT OF A FULL SLR SOFTWARE STACK BASED ON REAL TIME LINUX AND A NEW VERSION OF THE POTSDAM RANGE GATE. André Kloth[1], Jens Steinborn[2], Jyri Näränen[3], Arttu Raja-Halli[4]. [1]SpaceTech GmbH, Head of Terrestrial Applications, andre.kloth@spacetech-i.com, [2]SpaceTech GmbH, System Engineer, jens.steinborn@spacetech-i.com, [3]Finnish Geodetic Institute, Senior Research Scientist, jyri.naranen@fgi.fi, [4]Finnish Geodetic Institute, Research Scientist, arttu.raja-halli@fgi.fi

SLR Software Stack: In 2011 SpaceTech was contracted by the GFZ German Research Centre for Geosciences in Potsdam to redesign and re-engineer their SLR operation software to a modern kHz SLR system with the aims to enhance performance and maintainability, and to ensure SLR operation for the next decade(s) by using commercial off-the-shelf hardware and a state-of-the-art operating system with continuous long-term support. The former existing mix of MS-DOS/Windows software on distributed hardware systems was superseded by a real time Linux operation software system on a single hardware platform with a simplified workflow and a central user interface for observations and complete station control. The newly developed, Linux based SLR operation software, called "Scope", is now actively running in Potsdam for two years and has provided a more efficient operation and increased number of observed satellites through an easier timeline optimization. [1]

Now, in 2014 SpaceTech was awarded a contract by the Finnish Geodetic Institute (FGI) to adapt, extend and commission the Scope software for the new kHz SLR system in Metsähovi Geodetic Research Station which is currently being established. The first engineering activity of identifying and specifying necessary hardware interface adaptations and software extensions has been completed. In the next phase these adaptations will be implemented into the Scope software stack.

As a major component, the Scope software stack also includes a SLR station hardware simulator. The Scope Simulator will serve as an early working base for the new SLR system in Metsähovi. It allows to verify all hardware drivers and interfaces against a hardware simulation, and to exchange the simulated devices step by step with real hardware components when they become available and are installed in the new SLR system. Also, demonstrations and training of operators will be performed with the simulator before commissioning of the complete SLR system.

Range Gate Upgrade: In addition to the integration of Scope, GFZ and SpaceTech cooperate in upgrading the range gate which was initially designed at GFZ [2]. This upgraded range gate will be integrated at the GFZ SLR station and also delivered to FGI for the new Metsähovi SLR system. This range gate will include an ARM Cortex-M4 processor for a higher performance and a new firmware which will remove some limitations of the current version as well as allow a more flexible operation.

References:

[1] http://www.spacetech-i.com/SLR.html

[2] Grunwaldt, L., Weisheit, S., Steinborn, J., Upgrade of SLR station 7841 Potsdam, 18th International Workshop of Laser Ranging, Paper 13-Po56, Fujiyoshida 2013.