

## **Robotic Components for Space ROKVISS and DEXHAND**

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### **ABSTRACT**

ROKVISS, Germany's space robotics technology experiment, was successfully installed outside at the Russian Service Module of the International Space Station (ISS) at the end of January 2005. Since February 2005 the two joint ROKVISS manipulator can be operated from ground via a direct radio link. The aim of ROKVISS is the in flight verification of highly integrated modular light weight robotic joints as well as the demonstration of different control modes, reaching from high system autonomy to force feedback tele-operation (tele-presence mode). Meanwhile the experiment was operated for more than five years in free space, delivering lots of interesting data concerning the joints reliability and the tele-presence mode performance. This presentation describes the design of the robotic joints as well as the results and experiences gained from tele-presence mode experiments. It is planned that the ROKVISS hardware will be returned to ground in a Soyuz Capsule in spring 2011 for a diligent analysis of bearings, gears and lubricant.

This presentation further presents the development of a space qualifiable dexterous multi-fingered robotic hand (DEXHAND, ESA contract) and highlights the most interesting challenges. Size and performance of the hand shall be as close as possible to a human hand, whilst the overall power consumption of 100 Watt calls for a thorough investigation of the thermal concept. The design concept, the mechanical structure, the electronics architecture and the control system are presented throughout this global overview.