

TransGo

Technology Readiness Levels of Intelligent Robotic Systems in Space and their Transferability to Other Domains

Analysis of the potential to space-qualify core technologies at DFKI for long-range planetary surface exploration

Against the background of increasing mission durations of robotic systems in increasingly complex planetary exploration scenarios, TransGo aims at heightening the technology readiness level of individual exemplary core technologies at the DFKI (joint actuator) as well as establishing plans for future TRL enhancements of complete robotic systems. Furthermore, TransGo evaluates options for the space qualification of up-to-date artificial intelligence methods in robot control and possibilities for the transfer of the TRL system to terrestrial robotic application scenarios in SAR, rehabilitation and underwater robotics.

New intelligent robotic concepts needed for increasingly complex and long space missions

In the future, new robotic concepts are needed to tackle the challenges of increasing mission durations and at the same time ever more complex robotic tasks in space. The Robotics Innovation Center of the German Research Center for Artificial Intelligence has identified and demonstrated in different past projects, how this challenges could be approached under lab and outdoor conditions, with a focus on walking and cooperative robots.

With regards to future participation in national or international space missions, TransGo will prepare the implementation of policies and procedures for the space qualification of above mentioned robotic technologies and their technology readiness level progression.

Technology readiness level assesment of robotic joint actuator

Technical objectives are the re-design and development of the control electronics for the robotic joints developed at DFKI RIC to achieve the next technology readiness level, the integration of a space-qualified

LEON3 processor on the control electronics' FPGA and the porting of localization- and navigation algorithms to space qualifiable hardware.

Evaluation of possibilities to qualify and use state of the art algorithms in robotic space missions

Scientifically, TransGo has the objectives to evaluate space qualification possibilities for up-to-date artificial intelligence methods for robotic control and to transfer the maturity level system of TRLs to terrestrial robotic application scenarios like SAR, rehabilitation and underwater robotics as well as identify scenario-specific test and proof opportunities.

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