

# **Modelling & Simulation of a Complex System Using SysML in a Model-Based Design Approach**

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## **Abstract**

First, a brief overall overview of simulation work at ESA in the field of telerobotics & haptics is presented briefly. Then, the presentation will concentrate on outlining a way to model and simulate an entire complex robotic system. As an example, the payload of the ExoMars rover has been chosen, that prepares the Martian soil sample for later detailed analysis.

For the description of the architecture and functional aspects of the system the System Modelling Language (SysML) is used. The dynamical behaviour has been modelled in specialised tools and is also available to the system simulation. All parts are integrated into a real-time simulation using the SysML tool as an orchestrator. The development follows a model based design approach with the extensive use of automatic code generation. By using the Data Distribution Service (DDS) the execution as co-simulation is possible.