

9th SYMPOSIUM ON STEPPING STONES TO THE FUTURE: STRATEGIES, ARCHITECTURES,  
CONCEPTS AND TECHNOLOGIES (D3)

Strategies and Architectures to Establish a “Stepping Stone” Approach to our Future in Space (1)

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AUTOMATION AND ROBOTICS IN THE GERMAN SPACE PROGRAM - ORBITAL  
APPLICATIONS, THE EXPLORATION OF OUR SOLAR SYSTEM AND SPIN-OFFS INTO  
TERRESTRIAL APPLICATIONS -**Abstract**

Since over 2 years the German Federal Ministry of Economics and Technology together with DLR grand special support to Automation and Robotics for space applications. The field was declared as major cornerstone within the German space program. The A&R program focuses on two main topics. One of them is the exploration of bodies in our solar system. Here the earth's moon has the highest priority. The other focus of A&R for space applications will be the unmanned servicing of satellites and the robotic on-orbit assembly and maintenance of large space platforms as carriers of a variety of payloads. Also the mitigation of larger remnants of space crafts and upper rockets stages using robotic technologies becomes more and more an issue in order to secure safe access to space. Both application areas call for the same set of basic technologies and capabilities necessary to perform successful missions. Standardization and Modularization are major catchwords in this context. The development of a set of basic building blocks and tools will result in high system reliability at reduced risk and costs. Supporting infrastructures consisting of transporters, robotic vehicles, storage facilities etc. will lead to dramatically increased mission flexibility. Future missions will no longer depend on the direct launch of a space asset to its operational orbit or planetary surface. On site assembly and maintenance of the systems will become a routine. In future GEO transponder parks, planetary research facilities for astronomy, industrial parks for communication, navigation or earth observation will be furnished to pave the way to industrialized and commercialized space flight around the earth. The paper presents the motivation of the German Government and DLR to put special emphasis on Space Automation Robotics. It describes the political, economical and technological goals to be achieved for Germany and the national Space Program within the coming years. After summarizing the heritage in the field it shows a roadmap to accomplish the goals. On the basis of the reference scenarios DEOS (German On-Orbit Servicing Mission) and MPE (Mobile Payload Element for a planetary exploration Mission), it assesses technological sectors with respect to their application potential for multiple mission elements and their technology transfer potential to terrestrial applications. As a major result of this assessment the criteria for the selection of activities and projects are presented. Finally the paper gives an overview over current German space projects in the area of automation and robotics.