

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)

Author: Mr. Bernd Sommer

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany

FROM ORBITAL APPLICATIONS OVER THE EXPLORATION OF OUR SOLAR SYSTEM TO SPIN-OFFS INTO DAILY LIVE AND INDUSTRY

Abstract

In 2009 the German Federal Ministry of Economics and Technology together with DLR declared Automation and Robotics (AR) one of the major cornerstones of the German space program. It 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. A number of current investigations will prepare Germany's contributions to further international mission to the Moon surface, to Mars, the cold planets and their moons or asteroids and comets. The other area of emphasis will be the unmanned servicing of satellites. This encompasses the robotic servicing and maintenance of satellites as well as the on-orbit assembly and operation of large space platforms as carriers of a variety of payloads. Lately a further focal point was set on the utilization of robotics technologies in order to mitigate the growing space debris problem. The same set of basic technologies and capabilities represent the prerequisites for successful missions in both application areas. Thus the mastering of the related capabilities are high priority tasks to be tackled and accomplished within the coming five to ten years. 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 and thus will promote and foster commercialization of space. 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. Large stations for multiple use in areas like communication, navigation or earth observation and planetary research facilities for astronomy will no longer be science fiction. Such scenario allows to get rid of the need to launch massive space crafts. Smaller and in future even reusable launchers can take over and do the job in a more economic way. The paper presents the motivation of the German Government and DLR to put special emphasis on Space AR. It explains the pursued goals and shows the roadmap to accomplish them. It further gives an overview over current German space projects in the area of automation and robotics. Finally it is going to be completed by elaborating on the technology transfer potential into terrestrial applications.