Autonomous Robot Reactions on Other Planets: the Space Probes Rosetta, Huygens & Co.

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Abstract

Interplanetary satellite missions raise extreme challenges for autonomous, adaptive reaction capabilities: due to the huge distances and related signal propagation delays a remote control of these robots is impossible, nevertheless the space probes need to adapt to the poorly known working environment. Concrete autonomous control approaches will be presented at the examples of the European missions HUYGENS (crossing 2005 with a parachute the atmosphere of the largest Saturnian moon Titan for a successful landing on the surface) and ROSETTA (approaching now the comet 67P/Churyumov–Gerasimenko to land in November 2014 to acquire material samples by drilling). Further application areas of related advanced adaptive control technologies concern also Mars rovers and formations of unmanned vehicles (in space, in air and on Earth).

Prof. Dr. Schilling participated in space industry in responsible positions at realization of interplanetary satellites (like HUYGENS to the Saturnian moon Titan or ROSETTA for cometary exploration), before he was appointed Ordinarius for Robotics and Telematics at University Würzburg. In parallel he is president of the non-profit research company „Center for Telematics“. He is corresponding member of the der International Academy of Astronautics and was at Stanford University 2002-2006 as Consulting Professor. He received 2012 an ERC Advanced Grant (highest valued European research grant), as well as the Walter-Reis-Award for Innovations in Robotics in 2008 (for work on mobile robots) and 2012 (for medical robotics applications). In IFAC he supports as Chairman since 2008 the „Technical Committee on Telematics: Control via Communication Networks“ and IEEE appointed hi,m 2006 - 2012 as chairman of the „Technical Committee on Networked Robotics“.