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Models for Successfully Applying Space Technology Beyond Its Original Intent (2)

Author: Mr. Detlef Wilde
Airbus DS GmbH, Germany, detlef.wilde@astrium.eads.net

FROM SPACE TO UNDERWATER : AIRBUS D&S AND DEEP SEA ROBOTIC EXPLORATION

Abstract

The exploration and utilization of Space and Deep Sea has important similarities. As in space, the exploration and utilization of the deep sea is performed under extreme environmental conditions. Also, deep sea systems are becoming increasingly autonomous, resulting in challenges that are similar to autonomous space systems in terms of e.g. limited energy, communications, navigation, etc. The analogies between space and deep see motivated the German Helmholtz Association to setup the joint research program ROBEX (ROBotic Exploration under EXtreme conditions). In ROBEX space and marine scientists and engineers cooperate to find solutions to similar challenges and mutually benefit from each other's technologies and capabilities. The programme objectives are to identify, develop and verify technological synergies between the robotic exploration of the Moon and the deep sea. ROBEX consists of a consortium of German maritime and space research institutions. The consortium is led by the Alfred-Wegener-Institute Helmholtz Center for Polar and Marine Research (AWI) in Bremerhaven, DLR German aerospace center is the co-leads. Airbus DS participates as associated partner, introducing spin-offs from space technology into deep sea into two ROBEX design teams : • CRAWLER • GLIDER Within the CRAWLER project an existing under water rover, WALLY, of the Jacobs University Bremen, will be used to step-wise enhance into autonomous systems for various scientific missions. The GLIDER aims at developing a demonstrator for underwater gliders, i.e. unmanned un-propelled diving robots similar to sailplanes in air. Since no energy is needed, gliders can dive over long periods of time and are used for different types of long term under water observations and monitoring. Airbus DS contributes with competencies from numerous space robotic projects like the German satellite mission DEOS, the ESA Lunar Lander as well as the X38 and Phoenix atmospheric flight demonstrators, specifically: • System control for autonomous robots • Flight control (GNC) • Image based docking navigation • Remote control station The system developments and verification tests will be performed mainly in 2015 and 2016. This will also include water tests at the DFKI test pool in Bremen and open water tests in the Baltic Sea using German research vessels. The final demonstration 'mission' will be performed in summer 2017 aboard the German polar research vessel POLARSTERN, through a cruise into the arctic FRAM Straight between Greenland and Svalbard. The paper proposed will give an overview about the synergies and mutual benefits resulting from the technology transfer.