

SPACE EXPLORATION SYMPOSIUM (A3)
Space Exploration Overview (1)

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PREPARATORY EXPLORATION ACTIVITIES: CSA EXPLORATION CORE PROGRAM

Abstract

In May 2007, the “Global Exploration Strategy (GES): The Framework for Coordination” document was published by 14 space agencies to present a vision for a coordinated approach to robotic and human space exploration, with a focus on destinations within the Solar System where humans may one day live and work. In parallel with the development of the Global Exploration Strategy, the Canadian Space Agency (CSA) initiated a reflection on a Canadian Space Exploration program. This program highlighted the need for an Exploration Core (ExCore) activity to reduce risk and to ensure that Canada is ready to embark on exploration activities beyond the ISS. Exploration Core focus is on the initial studies for potential space exploration missions and on the prototyping of key technologies and their deployment in end-to-end terrestrial mission scenarios that includes scientific and operational aspects.

ExCore was established in 2007 and get additional funding in 2008. In the budget 2009, the Canadian government announced a Stimulus Initiative of 110M\$ over three year to further advance space robotics and related technologies.

This paper will present an overview of ExCore including the stimulus activities. The CSA is currently focusing its ExCore activities on Moon and Mars rover development, on-orbit servicing, active vision systems for rendezvous, navigation and scientific investigations, manipulators, in-situ resource utilization (ISRU) technologies (including drilling), science instruments and supporting technologies such as surface communications and power system. The paper will describe in more detail the Next Generation Canadarm (NGC) and the Exploration Surface Mobility (ESM) that are the two stimulus projects.

NGC objective is to develop the next generation of on-orbit servicing robotic systems. This is in line with past Canadian investment in the Space Shuttle arm and then in the Mobile Servicing System on the ISS. This new Canadarm generation will have more autonomy, will be tele-operated from ground and will benefits from advance in technology. It will also have refueling capabilities.

ESM objective is to develop terrestrial prototypes of rovers and associated payloads. These prototypes will be deployed in realistic terrestrial analogue scenarios reproducing some aspect of Moon and Mars surface missions.

The paper will conclude with a brief overview of the joint CSA-NASA-DLR ISRU terrestrial deployment that took place in Hawaii in January-February 2010. This deployment saws 6 Canadian rovers with associated technologies, an advanced medical support test and scientific investigations all supported from an operation center located at CSA HQ in Montreal area.