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Space debris

National research on space debris, safety of space objects with nuclear power sources on board and problems relating to their collision with space debris

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National research on space debris, the safety of space objects and problems relating to their collisions with space debris – 2014

CANADA

Space debris threatens the long-term sustainability of space activities of all nations. Canada remains convinced of the importance of the international community's work in the coordination of space debris research activities, operational good practices and mitigation strategies, and will continue to actively work with its partners. The following captures the salient points of Canada's activities in 2014:

Space Situational Awareness: The Canadian Armed Forces (CAF) space situational awareness satellite, Sapphire, completed its operational testing in early 2014. Since then, Sapphire has been monitoring space objects orbiting between 6,000 and 40,000 kilometres above the Earth's surface on a 24-hour basis. Data from this satellite is contributed to the U.S. Space Surveillance Network and incorporated into an international catalogue that is used to help prevent collisions in space. Sapphire is a space-based, electro-optical sensor designed to track man-made space objects in high Earth orbit in order to improve Canada's Space Situational Awareness.

Canadian Space Debris Mitigation Research Activities: Working with academia and other government departments, the CSA leads space debris science & technology initiatives within Canada. In 2014, the CSA enabled research activities with partners in industry and academia to explore novel de-orbit technologies for micro and small satellites, and the development of a general purpose satellite tool to capture the Launch Adaptor Ring of a defunct satellite. Canada is also developing hypervelocity launch capabilities beyond 10 km/second in order to better understand the threats of space debris impacts on satellites and space platforms.

Operational practices: Throughout 2014, the CSA refined its Conjunction Risk Analysis and Mitigation System (CRAMS) and improved the associated procedures related to space debris close approach. The CSA also extended its links with satellite operators in Canada, providing value-added analysis within minutes of reception of close approach warnings. Close collaboration with the Department of National Defence Canadian Space Operations Cell (CANSPOC) has been maintained in the context of space debris threat analysis whereby relevant information is provided to strategic partners within the Canadian government in close cooperation with international partners around the world.

Envisat Deorbit Mission: At the last European Space Agency (ESA) ministerial conference in December 2014, Canada confirmed funding to support Phase B1 of the Envisat Deorbit mission (eDeorbit). Envisat is one of the largest Earth Observation spacecraft ever built. Launched in 2002, it operated successfully until loss of communications in 2012.

Compendium on Space Debris Mitigation Standards: In 2013, Canada and the Czech Republic, with the support of the German Aerospace Center (DLR), initiated the development of a compendium of standards adopted by States and international organizations to mitigate the creation of space debris. This activity is a contribution to the space debris related initiatives pursued by the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS). The initial version of the compendium was made available to the Legal Subcommittee at its fifty-third session (March/April 2014) and an updated version was provided to the its fifty-seventh session of COPUOS in June 2014. The compendium is now maintained on a dedicated page of the website of the Office for Outer Space Affairs (link).

Inter-Agency Space Debris Coordination Committee (IADC): The IADC is an international governmental forum comprised of 12 member agencies for the worldwide coordination of activities related to the issues of man-made and natural debris in space. Since joining the IADC in 2011, the Canadian Space Agency (CSA) has been collaborating and exchanging information with IADC members to facilitate cooperation in space debris research and activities. Canada's priorities as a member of the IADC are to share information on space debris issues, to establish cooperative activities in space debris research, and debris mitigation options. The CSA contributes actively to the Steering Group and its Working Groups and is the current Chair of Working Group on Protection from Space Debris. Canada is committed to remain an active member of IADC and collaborate with all other member agencies.