

India-Canada space collaboration

International collaboration is an important feature of the global political landscape. Political leaders, policy-makers, and economists view such collaborations, particularly in the field of science and technology, as an engine of progress and growth. International science and technology collaboration has long been known to offer various benefits to states. Examples of such collaborations are found successfully working at both multilateral and bilateral levels. These partnerships involve joint research and experimentation, project development, the sharing of technological know-how and research data, and the building of databases and sharing of equipment.

INDIA AND CANADA: THE BACKGROUND

India and Canada have a long history of scientific and technological (S&T) collaboration. The two nations have collaborated on specific areas of research and addressed issues that demand global attention, such as climate change and infectious disease control. In 2017, the India-Canada Collaborative Industrial Research & Development program was established. Collaboration between these two countries is also happening in arenas of strategic relevance, such as space and nuclear technologies. This article focuses on India-Canada S&T collaboration and argues that outer space is one area that offers major scope for bilateral collaboration.

RECENT DEVELOPMENTS

A fresh stage in technology collaboration between India and Canada began in 2017. There was a joint technology summit held in India, which was attended by the ministers in charge of science, technology, and innovation in both countries. It was highlighted during this summit that Canada and India are partners in the 21st-century knowledge economy and that they share common beliefs in the power of science and technology.

BY AJEY LELE

Ajeay Lele, PhD, is a senior fellow at the Institute for Defence Studies and Analyses, New Delhi.

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Collaboration in the arena of outer space has been at the forefront of the bilateral relationship between India and Canada for some years now. Individually, each country has made reasonable investments in the outer space activities. India has established the capability to develop and launch satellites, while Canada has expertise, particularly in the field of earth observation (remote sensing). At the global level, Canada contributes to various activities of the International Space Station (ISS). Canada has specifically developed a robotic arm for the space station. The Shuttle Remote Manipulator System (SRMS), also known as the Canadarm, is a series of robotic arms that were used on the space shuttle orbiters to position, manoeuvre, and capture payloads. (The first robotic arm was delivered during February 1981; to date, five arms have been built and delivered to NASA for use on the space shuttle.) As part of the ISS program, Canada has also been involved in research on microgravity and related aspects of space habitation. Obviously, Canada has significant understanding about the conduct of human activities in outer space.

INDO-CANADIAN PARTNERSHIP

Since 2003, India and Canada have collaborated on various aspects of research related to the space sciences. The Indian Space Research Organisation (ISRO) signed a memorandum of understanding with the Canadian Space Agency (CSA) on March 27, 2003 pertaining to international space cooperation for peaceful purposes. Canada also uses some Indian space platforms to undertake scientific experimentation. Canada has contributed to the Indian astronomical satellite program. (ASTROSAT, India's first orbiting astronomical observatory, dedicated to the study of celestial objects, was launched in 2015.) From 2008 to the present, India has launched 12 satellites for Canada, mostly small (nano) satellites.

The ISRO has gained global credibility over the last decade. The CSA, established in 1989, is known for its professionalism. Both countries are well respected in space science, particularly in the field of remote sensing. This status provides an opportunity to undertake various joint programs where they can share expertise. Both India and Canada are developing a special disaster management mechanism based on inputs from their remote sensing networks.

FUTURE COLLABORATION POSSIBILITIES

India has already successfully undertaken missions to the moon and Mars, and plans for second missions are under way. There is an opportunity for Canada to use Indian platforms to send their scientific instruments to these places to collect useful research data. India is also looking to develop a human space program. Canada could play a role in helping to train Indian astronauts and allowing them to work on the ISS. This could give India a head start and experience in developing their human space program.


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At the global level, activities in space are increasing. The problem of debris is also becoming more acute. Mechanisms for debris tracking and providing advanced notice for the conduct of space launches are in development. These mechanisms provide space situational awareness (SSA). There is a strong need to develop global networks for this purpose. Such networks require a range of support systems including

satellites, radars, telescopes, and other ground support equipment.


India and Canada are well placed to work together to develop such a global mechanism and to join with other countries in developing SSA technology. These partnerships could enhance our knowledge of space meteorology—knowledge that is essential to various activities in space, particularly interplanetary missions. There is also scope for

both countries to coordinate at the policy level. India shares a significant cultural and social affinity with Canada, including the legacy of the large Indian diaspora in Canada. The time has come to take the India-Canada relationship to a next level. Collaboration in outer space offers multiple options in that direction. 

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great work of our guest editors, Dr. Nivedita Das Kundu and Prof. Maria João Dodman, the contributions found here highlight key connections between the two countries as well as significant developments in India and South Asia that are important for Canadians to learn about, engage with, and integrate into their worldview and practice.

Special thanks are due to the issue's guest editors for their commitment to sustaining such fruitful collaborations, to the Robarts Centre coordinator Laura Taman, and to all the contributors to this issue of *Canada Watch*. I salute their dedication not only in maintaining research and partnerships between Canada and India, but also in sharing

their work in a way that makes it accessible to a wider audience, and that serves as a great pedagogical tool to our community. 

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