

9 Science (10FI)

Learning Opportunities

June 1 – 5

Canada's Involvement in space exploration

The Canadian Space Agency (CSA) was established in 1989. It is responsible for coordinating all government-funded space activities in Canada.

Canada has been involved in space exploration for many years. The first item listed on the Canadian Space Agency's webpage titled "Canadian Space Milestones" is the establishment of the first magnetic observatory in 1839 to study whether northern lights were formed according to the Earth's magnetic field.

<https://www.asc-csa.gc.ca/eng/about/milestones.asp> accessed May 28, 2020

Canada's most famous contribution to space exploration is probably the Canadarm that was launched aboard Space Shuttle Columbia on November 13, 1981. Because Canadarm performed so well, NASA offered to fly a Canadian in space. This was the beginning of the Canadian astronaut program.

The Canadarm was designed to deploy and retrieve space payloads. It worked flawlessly for 90 Shuttle missions, a total of 944 days in space travelling the equivalent of over 624 million km.

Some of the Canadarm's most famous achievements include retrieving the **Hubble Space Telescope** for repair, connecting the first two modules of the **International Space Station (ISS)**, and inspecting the Shuttle's heat shield to ensure its safe return to Earth.

The Canadarm was retired in 2011 but there are still several Canadian robots on board the ISS. The Canadarm has inspired several generations of scientists and engineers to develop new technologies for industry, medicine, and other applications, such as a robot for neurosurgery.

After its last flight, the Canadarm returned to Canada to be displayed at the Canada Aviation and Space Museum in Ottawa.

<https://www.asc-csa.gc.ca/eng/about/milestones.asp> accessed May 28, 2020

The CSA has a Canadarm2 simulator located here <https://www.asc-csa.gc.ca/eng/multimedia/games/canadarm2/default.asp>

RADARSAT

RADARSAT are Canadian observation satellites overseen by the Canadian Space Agency (CSA).

On September 13, 1989, an agreement was signed between nine provinces for the RADARSAT Program. Quebec, Ontario, Saskatchewan and British Columbia agreed to invest \$52.9 million into the program. The federal government announced that its investment in RADARSAT had reached \$330 million.

On November 4, 1995 RADARSAT-1 was Canada's first Earth-observation satellite to be launched and placed into orbit 800 km above the Earth. This was the beginning of the RADARSAT Program.

On December 14, 2007, RADARSAT-2 was launched.

On November 14, 2008, it was announced that a 16-month contract valued at \$40 million was awarded to begin the design of the RADARSAT Constellation Mission (RCM). The three-satellite configuration would provide complete coverage of Canada's land mass, oceans and coastal approaches, at least once per day. The RADARSAT Constellation Mission project was led by the CSA and use by: the Department of National Defense, Fisheries and

Oceans Canada, Agriculture and Agri-Food Canada, Environment Canada, Natural Resources Canada and Public Safety Canada.

<https://www.asc-csa.gc.ca/eng/about/milestones.asp> accessed May 28, 2020

See the scanned copy of a case study on RADARSAT from the text

Canadian Astronauts

In December 1983, the first six Canadian astronauts were selected: Roberta Bondar, Marc Garneau, Steve MacLean, Ken Money, Robert Thirsk, and Bjarni Tryggvason.

In October 1984, Space Shuttle Challenger lifted off from the Kennedy Space Center in Florida with Canadian astronaut Marc Garneau aboard. Marc Garneau was the first Canadian in space and was responsible for a set of Canadian experiments. From October 1984 to December 2009, Canadian astronauts took part in numerous scientific experiments and helped assemble the ISS. Three Canadians perform spacewalks and Robert Thirsk broke a Canadian record for the longest mission ever as he spent 6 months in space.

In March 2013, Canadian Astronaut Chris Hadfield became the first Canadian Commander of the International Space Station.

<https://www.asc-csa.gc.ca/eng/about/milestones.asp> accessed May 28, 2020

One of Canada's current astronauts is Jenni Sidey-Gibbons. You can see a video by Astronaut Sidey-Gibbons recorded on May 7, 2020 here <https://www.youtube.com/watch?v=L41BYU3Cy00&t=48s> (29:37)

Activities:

1. If you were going to interview an astronaut, what are the top 10 questions you would ask?
2. Pretend you are an astronaut preparing to go to the International Space Station. Write a 10 day diary about your preparations as you get ready for this adventure.