

MDA Update

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CEO

MDA

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PROUD MISSION PARTNER SINCE 1969



300+

MDA satellite antennas, payloads and electronics have flown on more than 300 space flight missions

MDA space robotics were carried on 100 Space Shuttle mission

Over its 17-year life RADARSAT-1 collected 72 billion square kilometers of imagery, equal to 141 times the surface area of Earth

MDA space robotics have been in use on the international Space Station (ISS) for 18 years

MDA sensors have been operational on eight Cygnus missions to date

MDA meteorological system for JAXA Astro-H X-ray observatory

MDA personnel embedded at the Canadian Space Agency support all ISS robotics in real time

MDA sensors and robotics have been operational on Mars for 10 years

To date, RADARSAT-2 has collected an additional 72 billion square kilometers of Synthetic Aperture Radar imagery



Geointelligence

Satellite radar imagery from RADARSAT-2
Multi-source ground stations
Geospatial software systems
Defence intelligence systems



Robotics & Space Operations

Canadarm, Canadarm2, Dextre Space robotics
On-orbit robotics mission support
Commercial On-Orbit Servicing products
Space Cameras, Sensors, Lidars, and TRiDars



Satellite Systems

Antennas and Electronics Products
Payloads for Communication and Radar Satellites
Full satellite build for Canada and Canadian Financed Customers



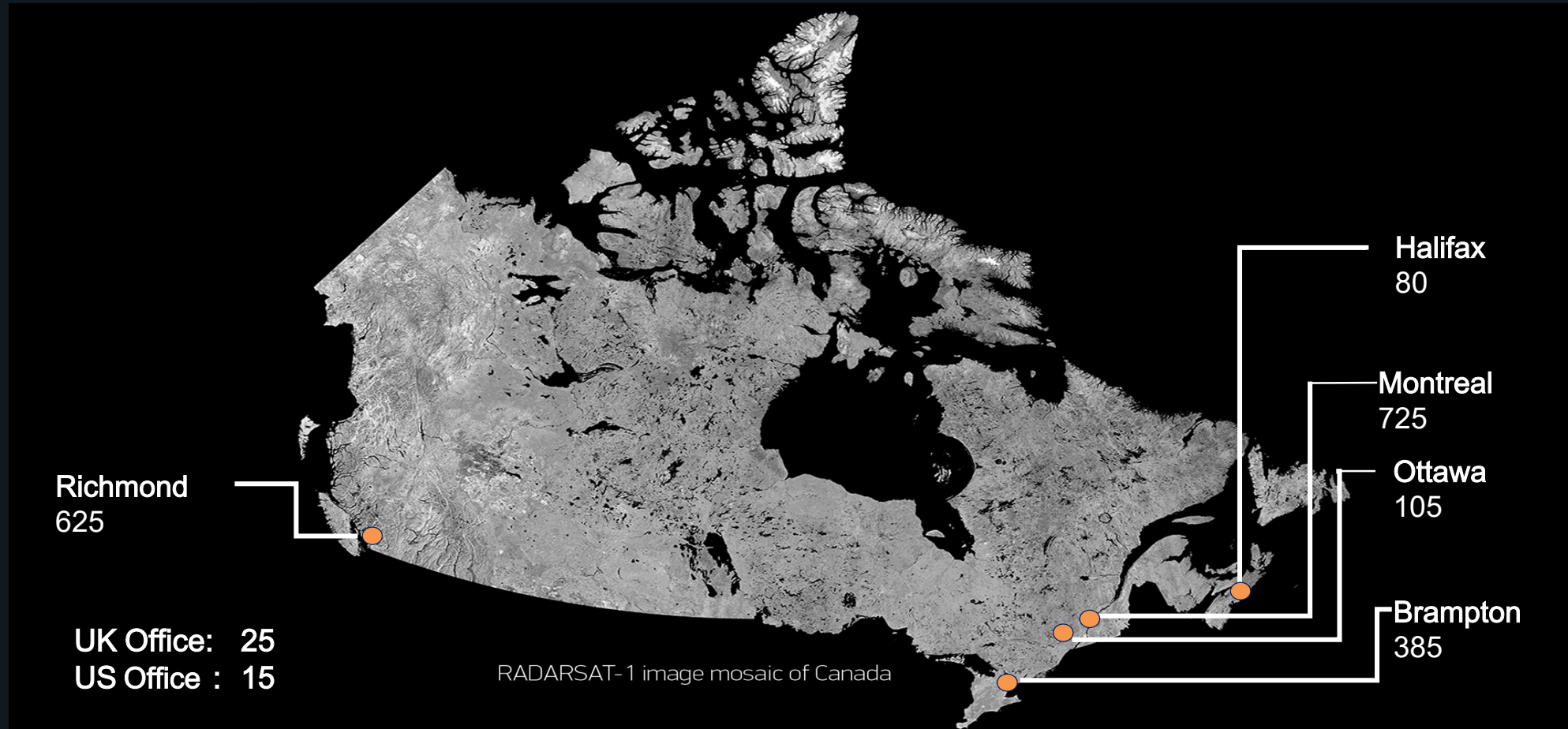
ONE OF CANADA'S ORIGINAL SPACE PIONEERS

- Canadian Space Prime Contractor with decades of experience
 - 50+ years on telecommunications satellites
 - 40+ years on Canadarm Space Robotics programs
 - 30+ years on Radar Satellites
 - Long term provider of space solutions and mission operations to the Canadian government
 - Global merchant supplier of satellite systems products, robotics technologies, and geointelligence solutions to customers around the world





OUR PEOPLE MAKE IT HAPPEN



CROSS - COUNTRY SUPPLY CHAIN PARTNERS



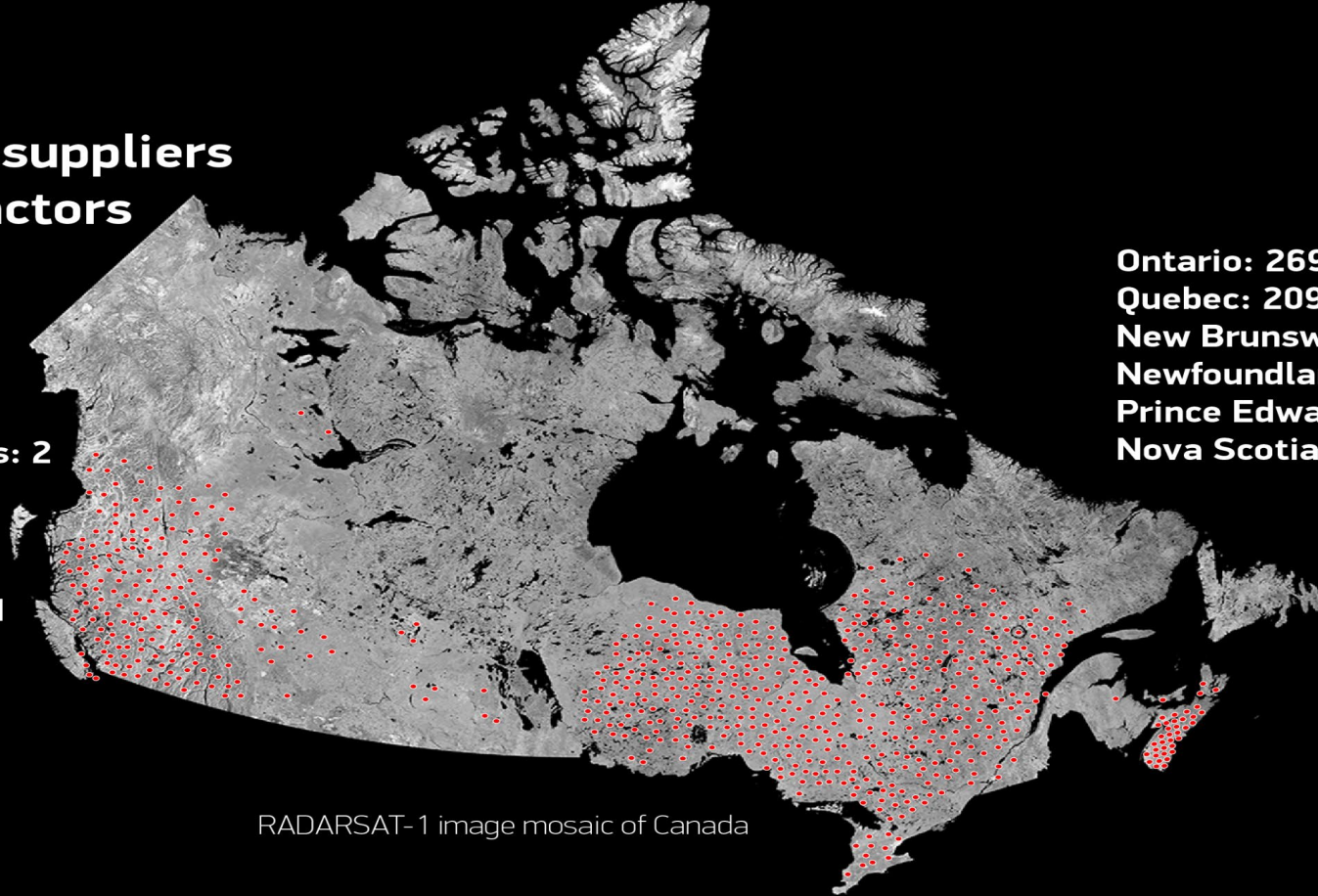
MDA is a Leading Player and Significant Contributor to the Canadian Space Economy

**714 Canadian suppliers
and subcontractors**

Yukon
Northwest Territories: 2
Nunavut

British Columbia: 171
Alberta: 16
Saskatchewan: 6
Manitoba: 3

Ontario: 269
Quebec: 209
New Brunswick: 1
Newfoundland and Labrador
Prince Edward Island: 1
Nova Scotia: 36

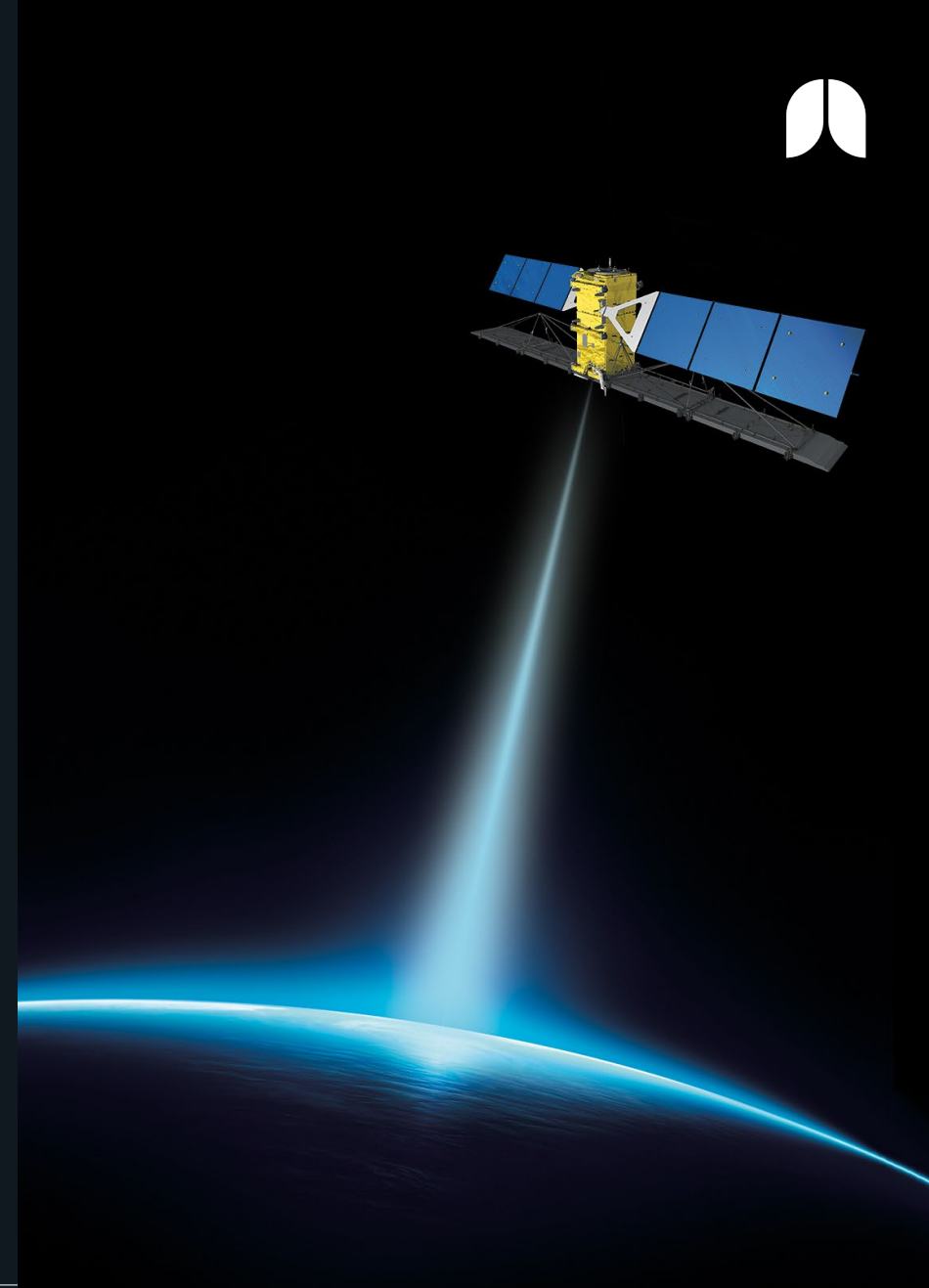


RADARSAT-1 image mosaic of Canada



Geointelligence Overview

- **RADARSAT-2** - As a world leading provider of broad-area radar imagery, our all-weather radar satellite offering helps customers with their missions around the world
- **Mission Operations** - We manage global missions at customer sites and in-house, drawing on decades of experience running Earth and space observation missions
- **Multi-Source Ground Stations** – With faster and more secure access to satellite imagery from a broad range of sensors, we showcase the Earth to customers worldwide
- **Geospatial Analytics** - With tools that detect change, identify objects, classify events and examine trends, we can track ice floes, route ships, monitor crops for growers, map wetlands for ecologists, detect pollution, and more



Satellite Systems Overview

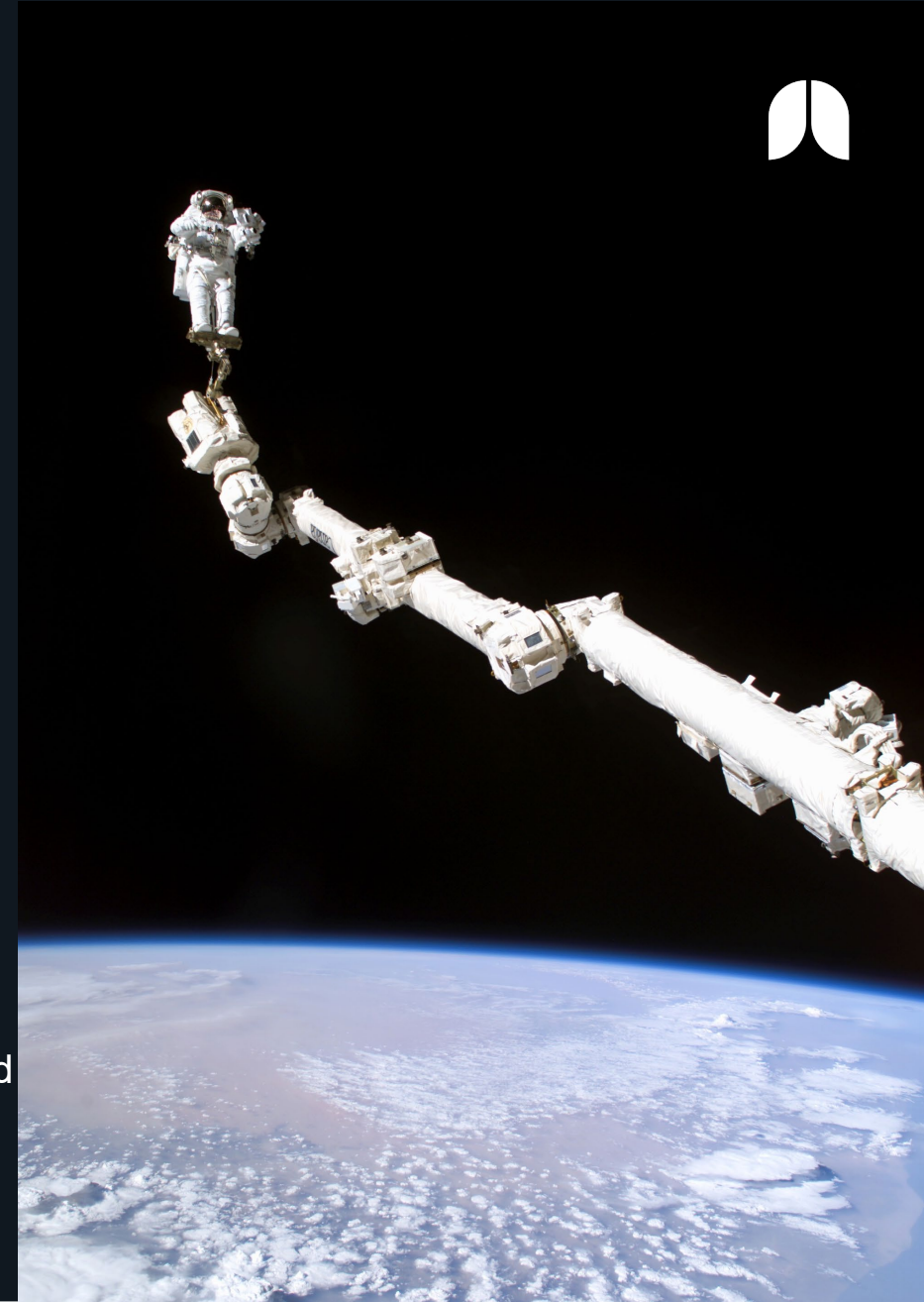
- **Communications Subsystems** – As the largest independent supplier of satellite subsystems, we have decades of experience designing, manufacturing and testing antennas, electronics and payloads for communication satellite missions
- **Exploration Communications** – We work to keep explorers connected with communications capabilities on the International Space Station, the upcoming DreamChaser spacecraft, and NASA's Lunar Gateway mission
- **High Volume Constellations** – As a key partner of Antennas on high volume constellation missions for communications, our advanced manufacturing facility has produced thousands of antennas
- **Full Satellite Build** – For Canada, and for Canadian-financed customers, we have built full satellite solutions in-house for Communications and Earth Observation





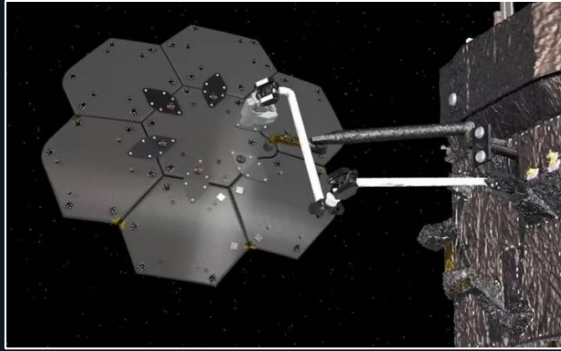
Robotics & Space Operations

- **Space Robotics** - With 40+ years of Canadarm expertise, and over three million hours of engineering support to on-orbit robotic operations, we are proud to enable the space ambitions of our partners.
- **On-Orbit Servicing** - As the commercial space market grows, we're developing on-orbit servicing technologies and services to help our customers seize every opportunity.
- **Space Sensors** – Our space cameras, range finders, Lidars, and TriDARS provide the eyes and ears to our partner's missions to accurately control spacecraft and payloads.
- **Exploration Missions** - Since touching down on the red planet in 2008, we've helped to detect snow in the Martian atmosphere, and analyzed soil samples from the Martian surface. And we're on our way back with the upcoming ExoMars mission.

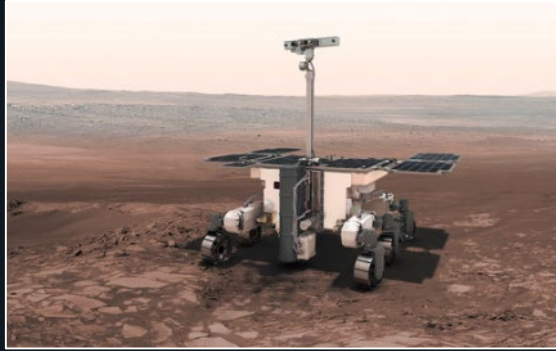




Robotics & Space Operations Past Performance



SPIDER



EXOMARS



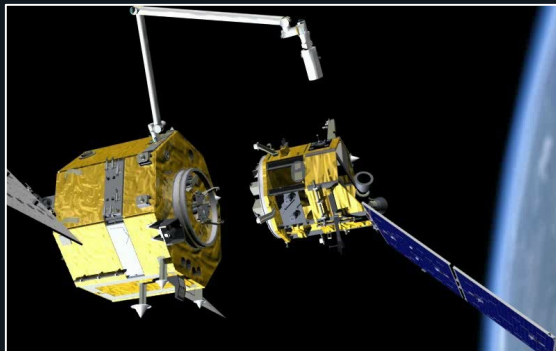
Canadarm2 Mobile Serving System



Dextre



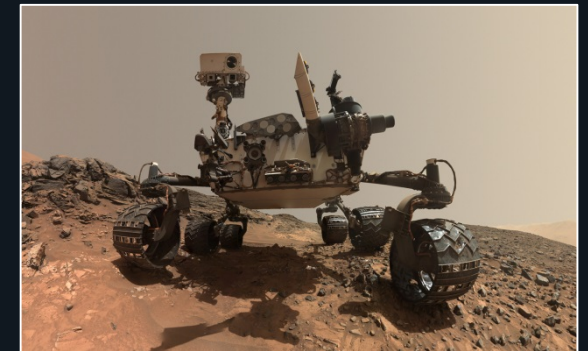
Osiris-Rex L
Laser Altimeter (OLA)



Orbital Express



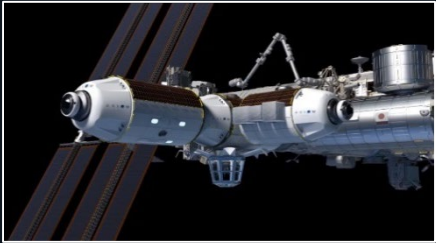
Canadarm



CURIOSITY



Robotics & Space Operations Growth Thrusts



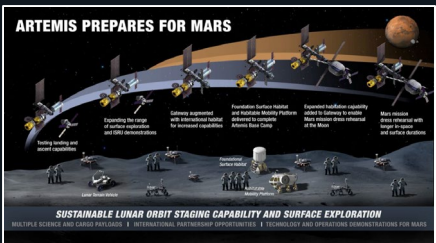
Space Station Operations

- Commercialization of ISS
- Canadarm3 Operations
- Commercial Station Operations - Tourism



On-Orbit Servicing, Assembly, Manufacturing

- Robotics and sensor solutions
- Operations support from MDA control centers
- Business partnerships with recurring revenue



Deep Space Operations

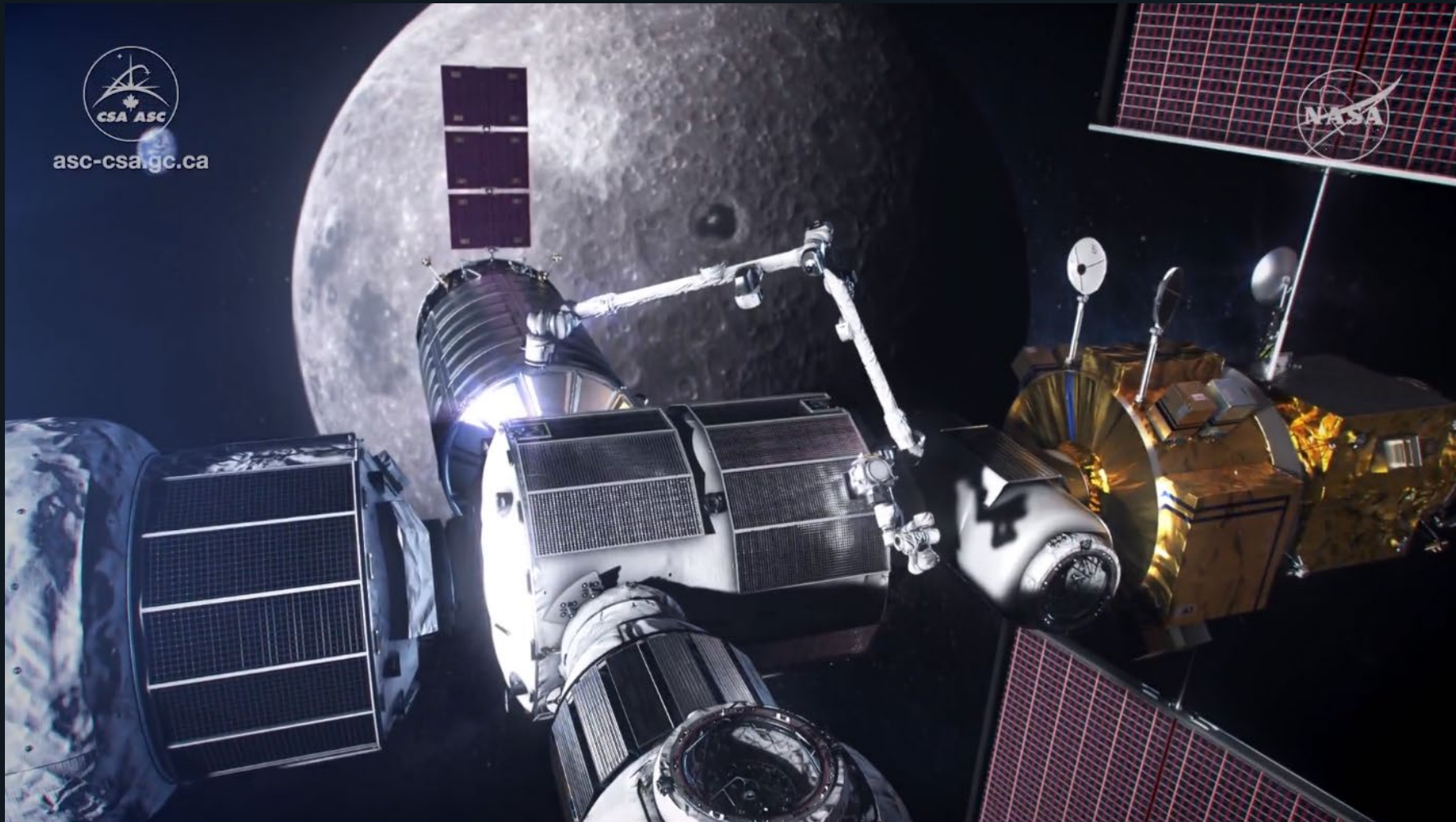
- Gateway Operations
- Artemis Lunar – Canadian Role
- Mars Exploration – Rovers, Observation

Strategic Interests

- Low-cost / commercial space robotics technologies
 - Sensors, robotics, grapple fixtures
- AI robotic control algorithms
- Innovative mission concepts
 - On-orbit servicing, assembly, etc.
- Adjacent interest:
 - Medical tech and agriculture tech for lunar missions

Canadarm3 Gateway

– Artificial Intelligence Based Robotics for



Brampton Growth 2021 - 2025



- New Programs Expected in Brampton:
 - Canadarm3 – AI Robotics for Gateway, new Lunar Space Station
 - Commercial Robotics Systems for On Orbit Servicing and Tourism
 - Mission Control Centers for On -Orbit Operations
 - New Mars Rover Programs
 - New Moon Rover Programs
- Significant Hiring of High Quality Positions
 - Workforce transition in the area from ~450 to ~700+ through MDA and partner hires.
 - Significant growth in systems engineering, mechanical engineering, guidance and controls engineering, and space mission operations engineering.
 - Moderate growth in project management, contract management, quality, and production.

THANK YOU

Videos: MDA Video: <https://www.youtube.com/watch?v=QOZD7seAz6Q>
CSA Canadarm3 Video: <https://www.asc-csa.gc.ca/eng/canadarm3/about.asp>

