

9:30: Registration and Coffee

10:00: Land Acknowledgement, Welcome and Updates from the Director

10:30: **Keynote by Dr. Jessica West (Project Ploughshares)**

Putting people into space: making peace and security more inclusive

Space security is going through an upheaval. From artificial intelligence to the Internet of Things, debris removal, and satellite servicing, new technology and novel activities bring with them perceptions of threat and sources of vulnerability. Decades of inaction on arms control mean that anti-satellite missiles continue to pose a menace to the space environment. Private sector actors increasingly power space capabilities from warfighting to critical civilian services. And the threat of nuclear weapons once again looms overhead. Peace and diplomacy efforts can't keep up without new thinking. And new thinking can't liftoff without first recognizing the ways in which all people are part of the growing web of insecurity in outer space.

11:45-1:15: Lunch (provided by the Angry Goose)

1:15: Space security panel, moderated by Dr. Valerie Oosterveld

Panelists:

Dr. Peter Brown (Western University)

Using meteor cameras to monitor Low Earth Orbit Satellites

The region of low Earth orbit (LEO) includes all objects orbiting within 2000km of the Earth's surface. In the last decade, activity in LEO has grown exponentially, primarily due to the increasing number of space debris, and more recently, deployment of large commercial constellations of small satellites. These "megaconstellations" now include thousands of satellites, each the size of a table and weighing upwards of several hundred kilograms. Companies such as SpaceX, Amazon and Canada's Telesat have plans and permission to launch upwards of tens of thousands of satellites over the next decade. This explosive growth in LEO has led to concerns about increasing collisions which could cause a fragmentation cascade in LEO as well as impacts these satellites have on the night sky. To address these concerns the location and brightness of these satellites needs to be monitored. Building on Western's experience in developing cameras for meteor observations, a new project has begun to provide near real-time, persistent and comprehensive measurements of satellite constellations (SATCONs) and to make this information public using repurposed optical meteor cameras. The equipment to be used and early results from this project will be presented along with plans for future expansion.

Dr. Margaret Campbell-Brown (Western University)

Planetary Defense: Meteors

Small asteroids and comets can strike the Earth without warning; they can produce damage from broken windows up to global extinctions. Learning more about these objects can help us to plan for future strikes, and find the best ways to avert catastrophes. Dr. Margaret Campbell-Brown is a professor in the Department of Physics and Astronomy. Her research involves meteors of many sizes and their impacts on the Earth. She works with observational data including radar and optical observations, and models meteoroid interactions with the atmosphere.

Roohi Dalal (Princeton University)

Safety and Security at the Nuclear-Space Nexus

As humanity's uses of outer space have grown rapidly over the past few years, space and nuclear security have become increasingly intertwined. Many nuclear weapons states now rely on space systems for nuclear command, control and communications (NC3), including early warning of ballistic missile launches. These satellites face a number of threats, including both intentional attacks from adversaries such as destructive anti-satellite weapons, jamming, and cyberattacks, as well as potential collisions with space debris and impacts from space weather events. In this talk, I will discuss the risks posed to nuclear strategic stability by space debris, in terms of our ability to distinguish satellite failure due to debris impacts from intentional interference by adversaries, as the latter may be seen as preceding a nuclear attack, prompting a retaliatory strike. I will focus on the population of debris in orbits crossing through the geostationary belt, where many NC3 satellites are located, highlighting the potential for small, untrackable pieces of debris to cause debilitating and difficult to detect damage to satellites. I will then discuss potential rapid follow-up technologies that could be utilized to attribute satellite failures and preserve crisis stability. I will conclude by briefly discussing other related issues of nuclear safety and security in the space domain, including the resurgence of interest in nuclear powered satellites and the associated reentry risks, and the potential placement of a nuclear weapon, or a nuclear-powered anti-satellite weapon in Earth orbit.

General (ret'd) Roberto Mazzolin (RHEA Group)

Security Challenges at the intersection of commercial cyber and space capabilities and their impact on national strategic interests.

Strategic national interests increasingly depend on critical infrastructure supported by commercial space and cyber capabilities, which are increasingly subject to threats posed by strategic actors. The intervention will identify technological and operational security issues at the intersection of these domains and identify policy approaches to address these rapidly developing challenges.

3:00: Poster session

4:00: Reception

5:00: Close