

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
Space Culture – Public Engagement in Space through Culture (9)

Author: Ms. Abigail Hoover  
University of Alberta, Canada, anhoover@ualberta.ca

Ms. Katelyn Ball  
University of Alberta, Canada, ksball@ualberta.ca  
Prof. Ian Mann  
University of Alberta, Canada, imann@ualberta.ca

NORTHERN SPACE PROGRAM FOR INNOVATIVE RESEARCH AND INTEGRATED TRAINING  
(NORTHERN SPIRIT) - A CANADIAN COLLABORATION DESIGNING TRANS-DISCIPLINARY  
CUBESAT PAYLOADS FOR CULTURAL OUTREACH**Abstract**

“Space is for everybody. It’s not just for a few people in science or math, or for a select group of astronauts. That’s our new frontier out there, and it’s everybody’s business to know about space.” -  
Christa McAuliffe

The Northern Space Program for Innovative Research and Integrated Training (Northern SPIRIT) marks a unique collaboration of three Canadian post-secondary institutions that will design, build, test, and operate a constellation of three cubesats. The Northern SPIRIT consortium, founded in 2017, comprises Yukon University (YU), Aurora College (AC), and the University of Alberta (UofA). In 2022, the constellation of three cube-satellites: YukonSat (2U), AuroraSat (2U), and Ex-Alta 2 (3U) will be deployed from the International Space Station. Each hosting payloads designed and built by students from their corresponding institutions. Supported by the Canadian Space Agency (CSA) through the Canadian CubeSat Project (CCP), the Northern SPIRIT consortium advances the CSA’s ambition to increase student interest and hands-on experience within science, technology, engineering, arts, and mathematics (STEAM), particularly in space domains. The project marks a major milestone for a student-led, licensed constellation, fostering institutional partnerships in satellite design and future operations. Furthermore, AuroraSat and YukonSat will fly payloads exploring high level trans-disciplinary research through sharing Northern arts, languages, and history.

Both AuroraSat and YukonSat support missions providing immersive, trans-disciplinary experiences to Canadian students ranging from kindergarten to highschool, as well as outreach to the general public. Another AuroraSat Payload: Northern Voices allows downloads of sound files with regional cultural significance. Each satellite will accommodate an electronic screen and camera that will display and photograph student-made Northern art with the Earth and space in the background. Alongside other scientific and educational payloads included on the three satellites, the constellation will deliver a unique and personalized learning experience that not only develops student expertise in STEAM, but inspires students of all ages from a unique vantage point 400km above our planet.

Through national partnership of YU, AC, UofA, and CSA, Northern SPIRIT partakes in a transdisciplinary approach, establishing a systemic view combining technological systems with social and educational ones. The mission’s objectives strive to trigger creative curiosity, enable breakthrough thinking, and forward the next generation into the new frontier of space. The Northern SPIRIT consortium completed its critical design review (CDR) in February 2021 and will begin flight model manufacture and test in Summer 2021. The constellation is scheduled to launch in Winter 2022.