

HUMAN SPACEFLIGHT SYMPOSIUM (B3)  
Utilization & Exploitation of Human Spaceflight Systems (3)

Author: Dr. Nicole Buckley  
Canadian Space Agency, Canada, nicole.buckley@canada.ca

Dr. Perry Johnson-Green  
Canadian Space Agency, Canada, perry.johnson-green@canada.ca

Dr. Luchino Cohen  
Canadian Space Agency, Canada, luchino.cohen@canada.ca

Dr. Valerie Gil  
Canadian Space Agency, Canada, valerie.gil@canada.ca

Dr. Isabelle Marcil  
Canadian Space Agency, Canada, isabelle.marcil@canada.ca

Mr. Denis Charlebois  
Canadian Space Agency, Canada, denis.charlebois@canada.ca

CANADIAN SPACE AGENCY UTILISATION OF THE INTERNATIONAL SPACE STATION IN 2015

**Abstract**

Utilization of the International Space Station supported by the Canadian Space Agency (CSA) is primarily in the domains of Space Life Sciences and Operational Space Medicine. The goal of life sciences is to identify, characterize and determine mitigation strategies for risks encountered by humans in space exploration. Operational Space Medicine includes life support, health diagnosis and monitoring, and therapeutics and rehabilitation. Along with on-going activities, four new experiments are being prepared for ISS. At Home in Space (AHIS) will study culture, value and psycho-social adaptation of astronauts in space. Because of the multinational aspect of crews on ISS and the likelihood that long-duration spaceflight will involve crews from all over the world, this research is very relevant. Vascular Echo is the next evolution of the studies looking at the adaptation and weakening of the cardiovascular system in space and will seek to establish countermeasures to mitigate this very real risk. Trabecular Bone (TBone) examines the impact of spaceflight on bone structure using novel image analysis techniques with state-of-the-art 3D imaging methods (high resolution peripheral computed tomography, HR-pQCT). The expected outcome is a more individualized prediction and treatment strategy to combat bone loss in astronaut populations. Bone Marrow Adipose Reaction: Red or White? (Marrow) builds on a successful bedrest experiment and is the first to determine whether fat accumulates in the bone marrow during spaceflight and whether this impacts blood producing cells. Along with science, Canada has been actively pursuing technology to support human exploration of space. CSA has undertaken a new initiative (Life Science Research Systems) in the area of bio-analysis and bio-monitoring technologies. Taken together, CSA is building on the science and technology capability of Canada to prepare for future human exploration.