Canadian Space Agency

Regional Space Health Information Sessions

Summary Report

Held between October 11 and November 10, 2017 in Halifax, Montreal, Toronto, Calgary and Vancouver

Summary

From October 11th to November 10th, a total of five CSA Space Health Information Sessions were held in Halifax, Montreal, Toronto, Calgary and Vancouver, and gathered approximately 300 participants from the health and biomedical sectors in Canada. There was a good mix of researchers and industry representatives. This activity was organized in partnership with NRC-IRAP and regional organisations such as CRCHUM and Medteq (QC), MaRS (ON), BioNova (NS), BioAlberta (AB) and LifeSciencesBC (BC).

- ✓ Sessions' objectives:
  - To raise awareness, provide information on current CSA activities related to space medicine and life sciences as well as background information on the needs and challenges of conducting research and technology development for human spaceflight;
  - To engage with participants and get their inputs through breakout sessions on the future trends in health research and technology, and innovation models.
- ✓ In addition to CSA's presentations, researchers and companies with space-related experience presented their work. They provided concrete examples to the participants and highlighted the opportunities, benefits, and challenges of engaging in space related activities.

A survey was also distributed to participants to gather their feedback and interest in future similar activities.

- ✓ Preliminary analysis of attendees' feedback suggests enthusiasm and a willingness to contribute to Canada's effort in future human deep space missions;
- ✓ Participants highlighted the usefulness of the information provided and were thankful to meet with CSA representatives to discuss ways to engage in doing business in the space health domain;
- ✓ Most of the participants were not aware of CSA's activities and what it entails to be a part of the space community and engage in space related activities.

Perceived benefits for participants from private sector. What's in it for them:

- ✓ **Synergies:** Numerous synergies between their market and space. Opportunities for technology and knowledge transfers to terrestrial markets (spin-in and spin-off);
- ✓ **Value added:** Value added of engaging in space related project, such as visibility, creativity, technological innovation, collaboration and credibility.
- ✓ **Networking.** Connection with other players and opportunities for collaboration; such co-creation has the potential to support a competitive market and accelerate innovation

Perceived benefits for researchers. What's in it for them:

- ✓ **Synergies & Opportunities:** Space research can feed both space exploration and terrestrial challenges and offer unique advantages; possibility to address complex research questions with applications for both space and terrestrial context;
- ✓ **Applied research:** Researchers' role in supporting industrial activities to push the state-of-the-art and contribute to the design and commercialization of advanced health technologies. (This is consistent with the willingness to bridge the gap between ideation and market, a gap identified in Canada's innovation ecosystem.);
- ✓ **Networking**: Connection with other researchers and industrial players which could lead to joint effort in the support of R&D for applied research and development of solutions for space exploration.

What was missing?

- ✓ More information on CSA funding mechanisms and opportunities. This was proposed to be addressed in National Forum and upcoming webinars;
- ✓ Strategy to support innovation for companies at different stages of development: participants have provided ideas during the breakout sessions (see below);
- ✓ Alignment with other funding opportunities.

Breakout sessions

The afternoon sessions were dedicated to small group discussions on the future of health research and technology and innovation models. The main three takeaways were:

1. **There is a strong interest from non-space biomedical players to engage in space-related activities, which are in line with their terrestrial focus/market. This addresses both research and technology elements.**
   - Numerous synergies between space and terrestrial needs: remote care, point of care, aging, patient centered healthcare, personalized medicine, military and tactical medicine (e.g. prolonged field care), etc.;

   - Synergies in technology trends: augmented and artificial intelligence, miniaturization, multisensing devices, digital health, human-machine interaction, genomics (and all the –omics), bio-analysis, 3D-printing, etc.
     - Advanced biosensors – EEG, MEMS, optical;
     - Data analytics, decision support tools;
     - Precision & personalized medicine;
     - Medical training with AR/VR, wearables, etc.;
     - Advanced bioanalysis, organoids;
     - Integrated system;

- For both space and terrestrial settings, future health technologies will aim at 1) reducing cost, sharing risks, and improving access to and performance of the health care system and 2) improving the power and performance of technologies to improve our understanding of the health problems and solutions.

- The conversation enabled us to better understand their terrestrial market. As there is no space health market per se, space experience could be a value added to their core competencies. Such space health projects call for collaboration which could accelerate innovation and stimulate Canadian health ecosystem and economy.

2. **There is a call for new innovation and funding models that are better adapted to the size, growth and timeline of the health and biomedical businesses and researchers in Canada:**
   - Technology development RFPs are good when technology and design requirements are already well-defined. While Canada is defining the needs and requirements with the International Partners, alternative procurement processes could stimulate innovation and help build capacity;

   - Participants identified space as a potential niche, in addition to their core activities dedicated to terrestrial markets. As there is no space health market per se, adequate support is required to mature their space-relevant solutions;

   - Adopt a balanced portfolio to address different types of technology/concept/solution development but also to offer better funding opportunities to businesses at different stages (start-up, incumbent, established, multinational, etc.):
     - CSA as a hub (expertise and knowledge of space opportunities)
       - Gatekeeper/central node in Canada's Space health ecosystem;
       - A gateway to international market.
     - Multiple phase approach (ref DND);
     - Consortium to tackle high level challenges while reinforcing collaboration (ex. Concept studies, requirements definition);
     - Innovative procurement focusing on problems (not solution driven);
     - Space Health Cluster to stimulate collaboration;
     - Simulation and analog missions to provide hands-on experience;
     - Challenges and hackathon to stimulate creativity and new idea generation;
     - Co-funding with OGDs (e.g. NSERC, CIHR, NRC-IRAP) to leverage their expertise and support for research and technology maturation with terrestrial benefits;
     - NASA Small Business Innovation Research (SBIR) and European Eureka – like program;
     - Partnership with incubators (Ex. PHAC match-funding to incubators);
     - Accelerator program.

3. **There is a willingness to develop a Space Health Ecosystem to improve connectivity amongst the various players and facilitate collaboration in order to better support CSA in the delivery of its mandate.**

    - A series of initiatives could be developed to build capacity and stimulate Canada's innovation culture in the health and biomedical sector.
        - Set up national working groups in key technology areas (list of CSA priorities);
        - Hold annual workshops/conference;
        - Host webinars;
        - Develop a CSA mentorship programs to accompany companies and researchers.