Update on the STAKEHOLDER CONSULTATION for Modernizing and Re-Tooling the Applications Development Program

INTRODUCTION

The Canadian Space Agency (CSA) is in the process of modernizing its space applications development program. The intent is to redesign the approach to accelerating innovation in the delivery of new or improved space based applications targeting the issues and priorities important to Canada's future success. It will involve the creation of appropriate and flexible components to effectively encourage and support the realization of innovative concepts leading to operational and commercial products. The ultimate goal is for stakeholders in the space domain, including governments; industry and academia, to build applications meeting the needs of Canadians, and the development of a competitive value-added space economy based on collaborative initiatives and shared resources.

The Earth Observation Applications and Utilizations (EOAU) Division of the CSA manages initiatives that support and promote the development and use of Earth Observation (EO) technologies and applications. As technologies have evolved to include improved capabilities and functionality, it is recognized that a renewed perspective on the applications of these technologies is needed to meet the emerging needs of modern society.

The renewal of EOAU initiatives will be implemented in order to ensure that this program continues to evolve and adapt to the emerging trends within the space sector. It also follows recommendations to improve the current EOAU by reviewing its design and funding options to further support capacity building of governments, academia, and the development of a competitive value-added space industry, as articulated in the Earth Observation Business Line (EOBL) audit report, along with the Space Advisory Board (SAB) recognition of the importance for enhancing Canadian capacity in applications development from an industry and academic perspective.

THE CONSULTATION

In order to inform and broadly engage Canadian downstream stakeholders and to seek their input to support the modernization of the applications development activity a stakeholder consultation process is being conducted with the Canadian downstream space sector. Previous to the consultation an Environmental Scan was delivered in April 2018 involving the scan of over 25 similar programs both nationally and internationally. It provided findings on CSA applications programs, foreign programs, trends and characteristics of the downstream sector, in addition to identifying concerns and opportunities.

The consultation began in July 2018 employing a three-tiered approach as follows:
1) A **Prospective Client Survey** targeted at all levels of government, industry and academia to ascertain current and future use of, and need for, space based products and services was sent to 700 persons with a 27% (145) response rate.
2) A **Challenge Paper Survey** based on the Challenge Dialogue System™[1] designed specifically to address complex, often ambiguous challenges, such as this stakeholder consultation that cross

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[1] . For more information on CDS please see http://www.challengedialoguesystem.net/the-challenge-dialogue-system/ .

boundaries and require innovative solutions was sent to 400 current CSA stakeholders with a 33% (131) response rate.

3) **Telephone interviews** targeted at key CSA Application Development Program stakeholders were undertaken with 22 persons to facilitate and ensure their feedback on critical questions.

The three-tiered consultation was completed in August 2018. The intent is to define and develop a Program with the right set of tools that best addresses both **"what we learned"** through the Environmental Scan and **"what we heard"** from our stakeholders from the consultation.

The proposed modernized Applications Development Framework will be presented on Day 2 of the National Forum on Earth Observation from Space (the Forum) in Montreal on November 21, 2018. The intent will be to receive feedback on what is proposed with a focus on what might be improved in the proposal to better meet the needs of CSA stakeholders.

WHAT WE LEARNED AND WHAT WE HEARD – KEY THEMES

What we Learned From the Environmental Scan

CSA Applications Development Programs: The space applications projects and activities that the CSA supports is the only central program in Canada of its kind. However,
- The emphasis to date, understandably, has largely been focused on RADARSAT data and SAR applications. Optical EO imagery has been supported, but usually in a secondary role.
- Although there have been recent integration initiatives, there is no program that specifically addresses the integration of other space technologies, such as SatCom, GNSS and AIS, for development of downstream applications.
- Government programs do not have a regular calendar of activities (e.g. RFPs published at the same time each year) and the project funding is modest with short term durations.
- Limited incentive for government departments to become first customers for industry-built operational applications.
- The importance of the CSA Applications Development Program is widely recognized as a necessary contributor to the success and sustainability of the downstream sector.

Foreign Programs:
- All foreign downstream programs reviewed operate by applications themes or domains and are not technology driven.
- Foreign programs encourage integration with non-space technologies to develop "solutions" for users.
- Some ESA and NASA programs have a phased approach, which removes the requirement for subsequent RFPs/proposals.
- Exploitation of free, full and open data available from foreign RS systems is a strong incentive for the downstream sector to migrate to these sources of data.

Trends and Characteristics of the Downstream Sector:
- Canadian space downstream sector is composed of approximately 230 active companies, primarily small SMEs.
- Canada's SMEs would like to see support available throughout all ARLs in the value chain to improve potential in the export markets.

- Space downstream market increasingly characterized by users who are not satellite or space specialists, but want information solutions and are less concerned about the data sources or background technologies behind the service or product.
- Increasingly adopting "new space" business models using big data analytics, AI technologies, along with a variety of new funding approaches.
- The integration of data and technologies into customer-specific "information solutions" is a key growth segment in the SatCom, PNT and EO downstream market.

Concerns:
- Increased foreign industry competitiveness resulting from larger investments in AppDev, relative to Canada and access to free and open satellite data.
- Potential complications with the Remote Sensing Space Systems Act (RSSSA) regulations and the RCM data policy.
- Lack of a plan for downstream big data infrastructure (e.g. similar to EU DIAS, ESA TEPs).
- Growing need for HQP.

Opportunities:
- Partner with GoC organizations that are primary EO-PNT-SatCom applications users to develop joint AppDev strategies to increase space-based applications use and improve industry competitiveness.
- Increase opportunities for the creation of innovative new integrated EO-PNT-SatCom solutions and applications in a renewed Applications Development Program.
- Encourage government organizations at all levels to improve skills for joint AppDev with industry/academia partners and for assessment and implementation of industry-developed applications as "first buyers".
- Increase participation in international cooperative initiatives that hold good potential for Canadian involvement.

What we Heard from the Consultation

1. **Dialogue meets with approval:**
   - In general most respondents agreed that a dialog with stakeholders (industry, academia and government) to seek their views on the Applications Development Program is a good idea and an important vehicle for modernizing CSA's new support initiatives.
   - Strengthening and increasing the current levels of collaboration and partnership in delivering space programs and projects across government agencies, jurisdictions and internationally was viewed as a necessary on-going role for CSA.
   - But there was concern that this Dialogue not just be a consultation but does actually result in action.

2. **Needs and key drivers:**
   - Industry, government and academic stakeholders all confirmed addressing policy priorities, accelerating innovation, supporting knowledge creation, and accessing data are all important needs and key drivers for setting priorities for applications development.
   - Government stakeholders identified access to timely, accurate and relevant data as their most critical need in addressing the key issues facing government.
   - Academic stakeholders stressed the need to support education and the development of HQP.
   - Industry stakeholders identified innovation as the most important need to ensure Canada remains competitive in international markets.
   - Industry is also concerned key drivers will remain unclear without strong national leadership and a clear long-term space strategy. This would serve the CSA and industry with clear directions on

needs. The CSA should provide leadership today on what we envision the future of Canada's space industry over the next decade will be.

3. **Need a Strategy for Space:**
   - Of concern is that consultations and strategies concerning Canada's space 'challenge' have been pursued many times over the past couple of decades, to little effect primarily due to the lack of federal government direction and support aimed at addressing the core, systemic challenges faced by the Canadian space sector.
   - Industry is concerned Canada no longer has a strong foundation to drive and support space applications developments due to this inattention and the government not recognizing space as a sector of strategic importance. Lack of both a space strategy and budget with a significant focus on innovation is at issue.
   - The Strategy should clarify the "strategic value" of the space sector and what the future of the space sector will look like. Some of the questions the Strategy needs to address are:
     a. a clear plan for Canadian government investment in space, including infrastructure, old and new space investments, applications development and applications adaptation bringing in the new realities of big data, open data, AI, GIS and associated implications.
     b. a clear data policy on RCM, consistent with European and American data policy.
     c. a clear direction on where CSA is headed in the context of the follow-on to RADARSAT missions and other legacy space missions.
     d. a clear approach of how to i) work with current stakeholders and clients and ii) recruit and develop new stakeholders and clients.

4. **Current initiatives (GRIP, EOADP and SOAR) positively perceived:**
   - Feedback on the current programs (GRIP, EOADP and SOAR) was generally positive suggesting the programs should be continued, enhanced and possibly combined.
   - **EOADP** was most positively perceived with a number of companies suggesting the program has been a key element to their company's success. It could benefit if the calls for proposals were regularly scheduled, better funded and allowed industry to aid in defining areas of focus as a catalyst for innovation. The Innovation for Defence, Excellence and Security (IDEaS) program was suggested as a model to consider.
   - **GRIP** has proven successful in delivering space solutions to address deparment level issues. The concern is once completed the department is often not in a position to implement the solution. Focus has been working with established clients and not building broader government clientele.
   - **SOAR** has met with mixed reviews with main concerns being the limits to the number and location of scenes made available and having MDA in the driver's seat both being viewed as limits to innovation.
   - In terms of improving the current programs CSA might look to emulating and possibly incorporating some of the concepts incorporated into the international programs for space investments.

5. **Beyond a "Whole of government approach" by putting the "best minds to work on a problem":**
   - There is concern that with the current programs (GRIP, EOADP, SOAR) being separate there is a tendency to segment stakeholders/clients into their respective groups (government, industry and academia) thus hindering implementation of an integrated approach to addressing problems or issues.
   - In addition, the current programs have fostered a view of CSA as a federal government solutions provider and not a national solutions provider.
   - Solutions to larger environmental or social issues facing Canadians might be achieved by combining these programs or leveraging "a whole of government approach" and doing a better

job of leveraging the capabilities of government, industry, and academia in jointly addressing and developing the solutions by putting the "best minds to work on a problem".
- However, there was concern that this type of more "holistic" approach" to addressing problems would be a challenge for CSA:
  a. due to overlapping responsibilities and lack of cooperation across government departments;
  b. because CSA's mandate is too narrow and as an agency of the government, it does not have the political clout to get other departments to align themselves behind a CSA program.
- Given these issues it might make sense at the federal level to aggregate the requirements that space can enable with adequate funding and have CSA deliver a program or series of programs to address the "whole of government" portion and facilitating with industry and academia directly on behalf of its government clients.

6. **Need to balance perspectives:**
   - Both government and academic respondents suggested focus should not be limited to growing Canada's space economy, but should focus on improving Canadian interests such as addressing Canada's environmental and social challenges.
   - Industry focus is the basis of Canada's space economy; both nationally and internationally, along with the commercialization of space related products and services.
   - Although both industry and academia share an innovation and R&D agenda, they do so at different ends of the Application Readiness Level spectrum.
   - There is a need to balance these differing perspectives in focus.

7. **Address industry diversity:**
   - The commercial space sector is characterized by some large companies, several SMEs and new technology companies.
   - The applications activity framework needs to respond to this diversity. Greater support is needed for Canadian SME's that house or are attempting to recruit young talent.
   - SME's, which ESA has long recognized as a key driver of the space economy in Europe, are not sufficiently funded in Canada. They are losing talent to other countries, large companies or government agencies.

8. **Focus on RADARSAT data is limiting**:
   - Industry emphasized that the focus on radar data in developing applications is too restrictive and limits innovation and commercialization, export, and collaboration.
   - A greater balance with EO applications would benefit the community.
   - Also, non-Canadian data sources are often most relevant to the needs being addressed.
   - Funding mechanisms should support and favour the development of applications that use data from a number of sources, including international sources to meet the needs of Canadians. Applications resulting from this type of approach are more likely to be commercially attractive.

9. **Invest in New Space and Data Analytics:**
   - There is significant opportunity for the CSA in areas where Canada has competitive advantage including New Space and Data Analytics.
   - Canadian companies have excelled in both these areas and the CSA could provide a significant investment including leveraging government procurement to support innovation in both these areas to extend Canada's technical expertise and international competitiveness.
   - It was also identified that with respect to supporting the Canadian economy even though platforms are important, application development is where the true value lies with respect to competitive advantage and commoditization.

10. **Need to invest in Highly Qualified Personnel (HQP)**

- Challenges continue with HQP and the new skills required by industry and organizations to exploit satellite technologies and related data, reflecting the need for academic institutions to continue to expand their research programs in this area and for CSA to support this.

11. **RCM data Policy and Pricing:**
    - Challenges remain with current data policy viewed as a key deterrent to data exploitation and related applications development.
    - It is not clear what the RCM data policy will be and whether it will encourage data exploitation. Industry was of the position that CSA policies and application development initiatives should follow suit with the current trends in access to data, data policy and the new space - meaning that access to data should be free and open.

12. **Access to data still remains an issue**: There are still major challenges in being able to access and download space-related data using existing tools which discourages data use.

13. **CSA role with respect to innovation:** The following are suggested innovation roles for CSA captured by a knowledgeable stakeholder, in general reflecting the broader response:
    a. CSA should continue to play its role as an enabler (mandatory), providing organizations with funding and data resources to support and build on Canadian EO expertise and applications.
    b. CSA should continue to play its role as a convener (mandatory), supporting conferences and workshops and bringing researchers together for knowledge sharing.
    c. CSA should significantly increase its role as an integrator (mandatory). In the past CSA could have been more effective at building partnerships and creating collaborative opportunities between Federal departments / research groups, as well as beyond. CSA could do much better at working towards this, for example by funding Federal research groups as collectives given similar goals/themes (example Land cover characterization) and perhaps being open to supporting collaborative research environments where researchers from different departments as well as non-federal researchers could come and go, share, contribute and all together work towards solutions for common research themes.
    d. CSA should play a small role as a motivator, but really the motivator role is / should be encompassed within the enabler role via funding provided to high quality research applications. Perhaps providing larger amounts of money to those groups interested and willing to support and build partnerships and collaborative research with other federal research groups as well as beyond.

The EOAU Division of CSA wishes to thank all stakeholders who provided comment and advice in response to the consultation for modernizing and re-tooling the Applications Development Program. That feedback is the key consideration being used to mould the proposed modernized Applications Development Framework that will be presented on Day 2 of the National Forum on Earth Observation from Space (the Forum) in Montreal on November 21, 2018.