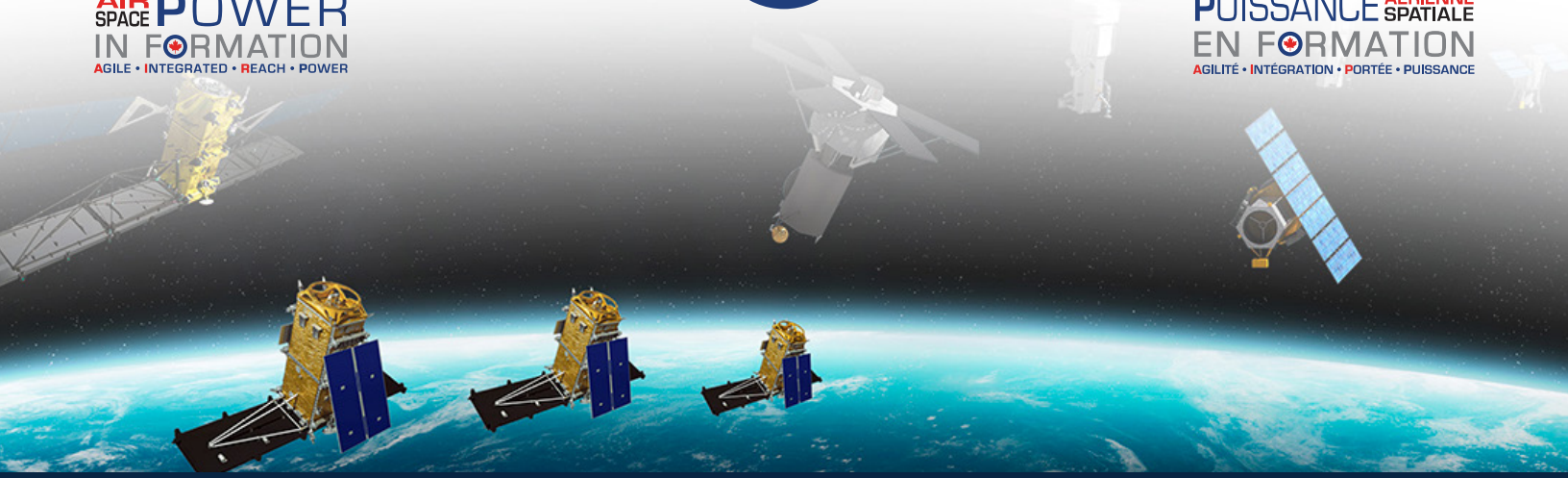




ROYAL CANADIAN
AIR FORCE



AVIATION ROYALE
CANADIENNE



RCAF STRATEGY FOR SPACE MISSION ASSURANCE



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ROYAL CANADIAN AIR FORCE
STRATEGY FOR SPACE MISSION ASSURANCE





FOREWORD

It is my privilege to introduce the RCAF Strategy for Space Mission Assurance. This Strategy reflects the increasing importance of Space to the success of Defence operations both at home and abroad. It is also closely aligned with Canada's Defence Policy: *Strong, Secure, Engaged*, which acknowledges increasing threats in the space domain and the vulnerability of Defence space assets to these threats, and commits to defending and protecting those space capabilities upon which the nation's security, sovereignty and prosperity depend.

The DND/CAF employs a broad range of space systems to fulfill its missions including space assets of its own, as well as those from the civil and commercial space sectors and from Canada's allies and partners. The totality of these systems, referred to as the Defence Space Enterprise, provide essential applications to Defence operations ranging from Global Positioning, Intelligence Surveillance and Reconnaissance, Space Domain Awareness, Satellite Communications, and Weather, amongst others. The organizations that provide these capabilities are key stakeholders in this Strategy and share a common need with the DND/CAF to protect their space assets from intentional and unintentional harm.

A key thrust of this Strategy is to establish a Defence Space Mission Assurance Program with an objective to increase the resilience of the Defence Space Enterprise. This Strategy also provides an opportunity for the DND/CAF to build and strengthen relationships with Canada's closest allies and partners, expand cooperative initiatives in the areas of joint capability development and research and development and leverage the immense expertise and potential that exists within this community to further our shared interests and equities in Space.

As the DND/CAF lead for Space, the RCAF commits to working closely with all stakeholders to advance this important agenda.



Lieutenant-General A.D. Meinzinger
Commander of the Royal Canadian Air Force

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INTRODUCTION

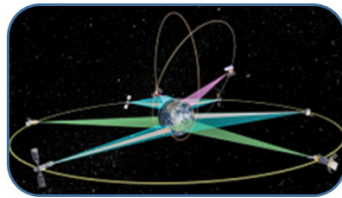
BACKGROUND

Space, as the ultimate high ground, has become an integral part of modern military operations. All military missions today depend on the persistence and precision provided by space-based capabilities enabling global surveillance, communication and the precise application of force in complex operating environments. As with the militaries of Canada's closest allies, the DND/CAF have become critically reliant on Space to conduct operations at home and abroad. No RCAF aircraft operates, no RCN ship sails, and no CA soldier nor SOF operator crosses a line of departure without having been enabled by a space-based system. Looking to the future, Space will remain a key enabler to DND/CAF fulfillment of its Mission Essential Functions and Tasks (MEFs/METs).



The range of space capabilities the DND/CAF employs includes not only dedicated military space assets of its own, but also space systems of other Canadian Government departments and agencies (OGDAs), allied governments, as well as the civil and commercial space sectors given the quality, affordability, availability and responsiveness of these systems.

Space is Critical to Military Operations at home and abroad



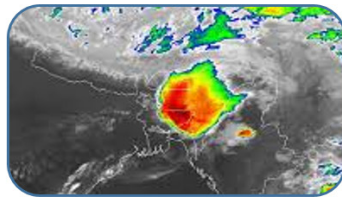
Missile Warning



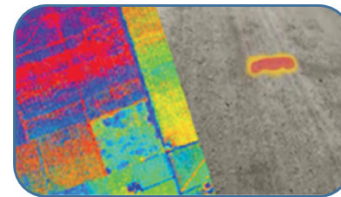
Intelligence, Surveillance, Reconnaissance (ISR)



Precision Strike



Weather



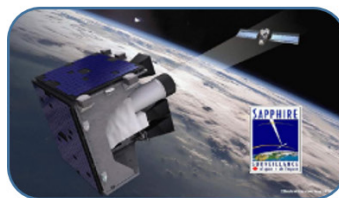
Improvised Explosive Device (IED) Detection



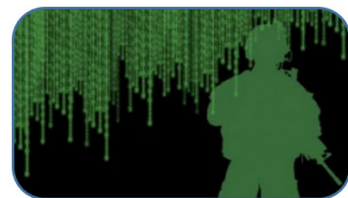
SATCOM



Position-Navigation-Timing (PNT)



Surveillance of Space



Command, Control and Communications (C3) Systems

Longstanding technological and cost barriers to Space are also falling, providing states, corporate entities and other actors with ready, affordable access to the space domain. Canada and its allies and partners must now navigate a future in Space that is increasingly congested, competitive, contested, and the convergence of these factors creates compelling strategic and operational urgency to assure access and freedom of action in Space. In addition, new and sometimes hostile players are challenging Western strengths and interests. Worrysome trends include:

- The increasing growth in the number of space systems in orbit and proliferation of space debris (Congestion);
- The increasing number of space actors with competing interests and a commensurate increase in intentional and unintentional Electro-Magnetic (EM) interference with negative impacts on space systems and operations (Competition);
- The increasing threat posed by potential adversary states and non-state actors in their development of capabilities that threaten other states' ability to access and exploit Space. These include counter-space weapons intended to exploit Western nations' dependence on space-based systems (Contention);
- The ease for potential adversaries and non-state actors to access the space domain as well as space data and information to advance their agendas. Norms of responsible behaviours in Space also remain largely undefined and commercial innovation is quickly outpacing Defence policy and procurement (Convergence); and
- The fact that these trends persist despite years of continued international efforts to develop international agreements or widely-agreed principles of responsible behaviour that aim to prevent miscalculation, escalation and an arms race in outer space as well as to ensure the safety, security and sustainability of the space environment.

Space; an Increasingly Congested, Contested and Competitive Domain



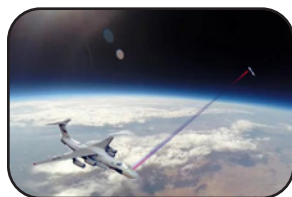
High Intensity Ground Lasers



Cyber Attack



Anti-Satellite Missiles



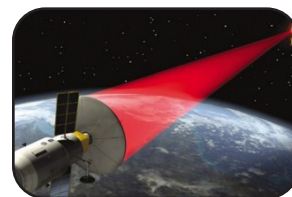
Airborne Lasers



Electronic Attack



Space Debris



EM Interference

In addition, Defence space systems are vulnerable to natural hazards in Space including space debris, space weather, radiation, and extremes in temperature. For the terrestrial segment, climate change and other natural phenomena constitute key threats.

Canada's Defence Policy: *Strong, Secure, Engaged* (SSE) recognizes the importance of Defence space systems as well as their vulnerability to both man-made and natural threats, and includes a commitment to defend and protect space capabilities. In line with ADM(Pol) guidance, the focus of SSE Initiative 83 - Defend and Protect Military Space Capabilities - is to be on protection and defensive operations in the space domain, with an emphasis on non-debris causing measures and reversible effects, and supported by Space Domain Awareness (SDA), resilience and reconstitution activities. This RCAF Strategy for SMA addresses execution of SSE Initiative 83 via the establishment of an innovative and comprehensive Defence SMA Program.

The recently signed DM/CDS Initiating Directive on Space Operations also identifies Space Mission Assurance as a key area of development necessary to ensure the ability of the DND/CAF to operate in an increasingly congested, contested, competitive and converging space environment.

GLOSSARY

The following terms and definitions apply to this Strategy:

- Combined Space Operations (CSpO) Initiative - Agreement amongst the FVEY, DEU and FRA to collaborate in the space domain to strengthen Defence cooperation, coordination, and information sharing with a view to enhancing individual and collective space capabilities;
- Defence Space Enterprise (DSE) - The entirety of space capabilities and assets upon which the DND/CAF relies to fulfill the Defence mission, as well as linkages between DSE stakeholders (both domestically and internationally). The DSE comprises space capabilities and assets operated by the DND/CAF, allies and partners, Government of Canada and the commercial sector (within Canadian jurisdiction and in other states' jurisdictions);

RADARSAT Constellation Mission - World Class Capability for Maritime Domain Awareness



- DSE space systems - The totality of DSE componentry spanning ground, transport and space layers including associated personnel, equipment, facilities, networks, information and information systems, infrastructure, and electro-magnetic spectrum;
- DSE stakeholders - The totality of organizations both internal and external to the DND/CAF with vested interests in the DSE, including military and civil entities across the Government of Canada (GoC), allies and partners, and commercial entities within Canada and elsewhere;
- Reconstitution - Actions involved in bringing new assets on line in order to replenish lost or diminished functions to an acceptable level for a particular mission, operation, or contingency, including after a non-recoverable critical system error/failure or following an attack or catastrophic event;
- Resilience - The ability to continue providing capabilities in the face of degradation or failure of a given system (e.g. due to manmade or natural interference) to ensure mission success;
- Reversible effects - Actions against space-related infrastructure that are non-destructive and temporary, and from which the space system remains capable of resuming normal operations after the incident;
- Non-reversible effects - Actions against space-related infrastructure that result in permanent degradation or physical destruction of a space capability;
- Space Mission Assurance (SMA) - A process to protect or ensure the continued function and resilience of space capabilities, assets and services, including personnel, equipment, facilities, networks, information and information systems, infrastructure, electro-magnetic spectrum, supply chains and contracted services; and
- SMA Risk Management Framework - Framework designed to assess threats, vulnerabilities and risks to DSE space systems and upon which to make informed decisions to determine and implement SMA solutions.



ASSUMPTIONS

Assumptions upon which this Strategy is based are as follows:

- The DND/CAF will continue to advance all elements of the Defence Space Program in close cooperation and collaboration with its closest allies and partners, including OGDAs, as well as the civil and commercial sectors;
- Potential adversary states and non-state actors will continue to have ready access to the space domain and will continue to attempt to gain advantage in this domain;
- The DND/CAF will continue to leverage space systems external to Defence to fulfill its mission and to maintain Space Domain Awareness;
- While DSE stakeholders have different charters and objectives, all stakeholders share in the need to protect their space assets from intentional or unintentional harm; and
- SMA is a prime consideration throughout the life cycle of DSE space systems, spanning Force Development (FD), Force Generation (FG), Force Employment (FE), Force Management (FM) and Force Sustainment (FS).

CONSTRAINTS

Constraints upon which this Strategy is based are as follows:



Enhanced Satellite Communications Project - Polar for Narrow and Wide Band Communications in Canada's Arctic

- SMA actions to be undertaken by the DND/CAF are aligned with current and future policy guidance;
- SMA actions to be undertaken by the DND/CAF must respect all applicable laws and existing agreements or arrangements;
- Successful implementation of this Strategy requires collaborative engagements with all DSE stakeholders;
- DSE stakeholders may have divergent interests, legal concerns, and risk appraisals, and their roles and responsibilities in SMA are distributed and shared;
- The DND/CAF has limited influence over the policies/decisions/actions of DSE stakeholders external to Defence (OGDAs, allies and partners, and commercial entities);
- Implementation of the RCAF Strategy for SMA and engagement with DSE stakeholders must be aligned with applicable legal and policy constructs; and
- Limited personnel and funding resources currently exist within the DND/CAF for SMA; resource requirements are managed through the annual Departmental business planning and DTEP processes.



STRATEGY



RADARSAT Constellation Mission Installation in Space-X Rocket Fairing

AIM

The RCAF Strategy for SMA aims to achieve enhanced resilience of mission-critical DSE assets and capabilities through judicious allocation of resources aligned with linking strategic risk to operational requirements and critical functionality.

SCOPE

The RCAF Strategy for SMA involves the stand-up of a broad Defence SMA Program spanning the DSE and its many stakeholders.

The Defence SMA Program will extend beyond terrestrial and space-based architectures to include DND/CAF space doctrine, organization, training and education, material, leadership, personnel, facilities/infrastructure and policy. The program will also extend to all elements of the Defence Space Program including space FD, FG, FE, FM and FS and will cover space systems under development, operational and/or undergoing modification.

The Assistant Deputy Minister (Information Management) (ADM(IM)) is considered a key strategic partner in assisting and supporting the Commander RCAF in delivering and achieving the space capabilities identified in this strategy.

LEADERSHIP

Commander RCAF assumes leadership over the Defence SMA Program. Execution of this Strategy and oversight of the Defence SMA Program will be carried out by Director General Space (DG Space).

EXECUTION

Steps to be taken in execution of this Strategy include:

- Define DSE architecture and prioritize component elements;
- Develop and implement comprehensive SMA Risk Management Framework, including Threat and Vulnerability and Risk Assessments;
- Develop optimized and prioritized SMA solutions;
- Implement SMA solutions across the DSE where risk is deemed unacceptable. This includes as an immediate step implementing SMA solutions for currently fielded DSE space systems as well as for new DND/CAF space systems in Identification and Options Analysis development phases; and
- Initiate, sustain, develop and improve DSE stakeholder engagements.

Within the DND/CAF this Strategy is to be implemented to the maximum extent possible via current governance and decision-making constructs. External to Defence, this is to be achieved via standing interdepartmental governance constructs, agreements, defence-industry relationships, allied and partner cooperative and collaborative memorandums of understanding (MOUs, plans and other engagements).



Maritime ISR, SAR, ASW and Strike Coordination enabled through Space

LINES OF EFFORT

The RCAF Strategy for SMA comprises five key Lines of Effort (LoE) as follows:

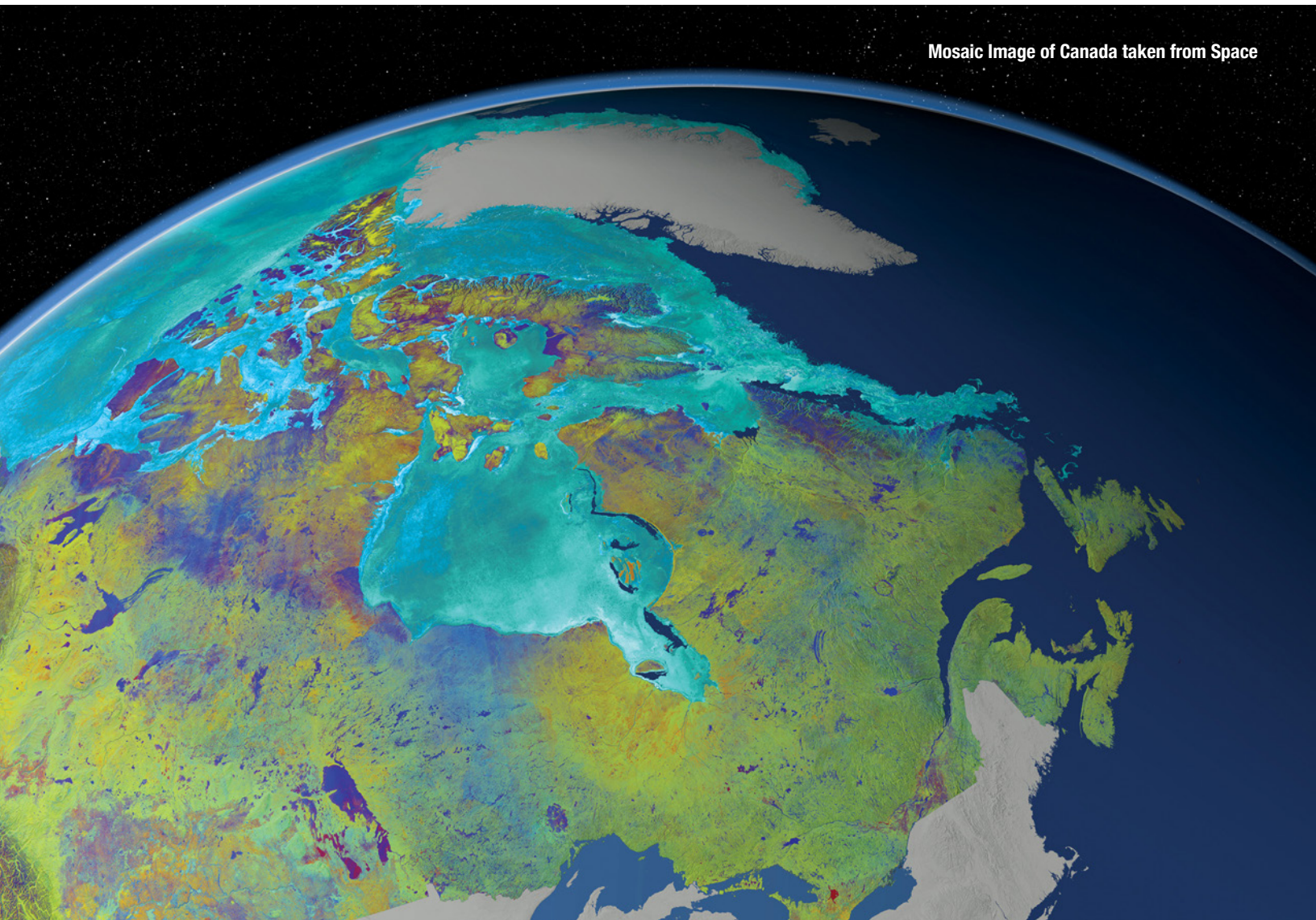
- **LoE 1 - Define the DSE Architecture and Prioritize Component Space Systems.** This LoE aims to accurately define the full range of space systems employed by the DND/CAF, their ownership and the importance of each system to the Defence mission across the spectrum of conflict, from peace to war. The following steps are to be taken:
 - Identify and prioritize DND/CAF Mission-Essential Functions and Tasks (MEFs/METs);
 - For each MEF/MET, identify and prioritize supporting space missions (Intelligence, Surveillance and Reconnaissance (ISR), Satellite Communication (SATCOM), Precision Navigation and Timing (PNT), Space Domain Awareness (SDA), Launch, On-Orbit Servicing); and
 - In order of prioritized space missions, define supporting space assets and capabilities. This includes determining ownership of each system, conducting an asset valuation (of systems/subsystems and data) to ascertain its intrinsic value and impacts if compromised, and detailing its underlying architecture, including describing functions and interfaces of component space/ground systems and subsystems. Architectural views include:



Canadian Space Operations Centre for Space Support to DND/CAF Operations Worldwide

- Connectivity View - concerned with the physical nodes that comprise the system mission operations data network; where the nodes are located; and how the nodes communicate. For ground-based systems this view also incorporates physical security;
 - Information View - concerned with how data within the system is protected, including how it is stored and transmitted between functional elements of a system;
 - Functional View - concerned with how the functional parts of a space system interact with each other and external systems to meet the security policy of the system;
 - Communications View - concerned with how elements communicate with each other and the layered protocols that support/enable communications among the network nodes in the system; and
 - Enterprise View - concerned with the concept of policies and trust between organizations where cross support and interoperability are required including contractual, MOUs, statutory or regulatory requirements.
- **LoE 2 - Develop and Implement a Comprehensive SMA Risk Management Framework.** This LoE aims to develop and implement a comprehensive SMA Risk Management Framework across all DSE stakeholders. Agreement and adoption is necessary to achieve a common understanding of risks as well as a mutual value proposition for partnering on risk mitigation measures. The framework is to consist of:
 - Threat and Vulnerability Assessment:
 - Identify and prioritize key threats and hazards to each space mission and associated DSE space system/subsystems. The effects of such threats can be reversible or non-reversible. Man-made threats include kinetic, non-kinetic, electronic (including EM emission interception) or cyber-attacks on/or interference with space systems. Natural hazards include, for the space segment, natural space debris, space weather, radiation, corona mass ejections and extremes in temperature and, for the terrestrial segment, climate change and other natural phenomena;
 - Identify the severity of man-made threats through an analysis of the intent and capabilities of the responsible actor, whereby, Threat = Capability x Intent;
 - For each DSE space system/subsystem and associated data, identify vulnerabilities that can be exploited;
 - Assess the effectiveness of current protections and defences - if threats are exploitable, vulnerabilities exist;

- Threats and vulnerabilities then undergo Risk Assessment and adjudication; and
- Threat and vulnerability assessment must extend beyond ground-based and space-based architectures to include doctrine, organization, training and education, material/supply chain, leadership, personnel, facilities, contracted services and policy (PRICIE framework - Personnel; Research and development / operations research; Infrastructure and organization; Concepts, doctrine and collective training; Infrastructure; Equipment and material).
- Risk Assessment:
 - For each DSE space system/subsystem at risk, analyze each associated threat and vulnerability to determine the likelihood of occurrence and potential to inflict harm;
 - Conduct valuation of DSE space systems/subsystems and associated data to ascertain their values and impacts if compromised/consequences of asset failure, capability disruption;
 - Identify the risk posed by a potential threat through careful analysis, whereby Risk = Likelihood of event x Impact; and
 - Identify DSE systems/subsystems not owned by the DND/CAF, noting single points of failure, reliance on outside providers, and associated risks.



Mosaic Image of Canada taken from Space

- **LoE 3 - Develop Optimized and Prioritized SMA Solutions.** For each DSE space system/subsystem at risk, stakeholder senior leadership is to use risk-informed decision making to collectively decide to either avoid, share, transfer, mitigate or accept risk and decide on adoption of preferred contingency plan(s). Where risk mitigation actions are to be pursued, stakeholder senior leadership is to identify priorities and decide on resilience needs (protections/defences versus redundancies). A wide range of mechanisms/actions in the following dimensions exist to counter and/or mitigate threats to space systems, including for ground and space architectures:
 - Personnel - security, reliability, training, and non-disclosure agreements;
 - Organization - governance, leadership, oversight, monitoring, contingency planning, safety programs, policies, and doctrine;
 - Equipment - redundancies and backups, contingency planning, configuration management, and system safety;
 - Facilities - security, inspections, testing, protections and defences, and redundancies;
 - Networks - protections and defences, access control, connectivity, redundancies and backups, and contingency planning;
 - EM Spectrum - protections and defences, and contingency planning;
 - Data/Information and Information Systems - protections and defences, and redundancies and backups;

Concepts Under Study for Space Infrastructure Servicing



- Infrastructure - redundancies and backups, protections and defences, and contingency plans;
- Supply Chain - trusted suppliers, ability to meet Defence SMA requirements, internal SMA processes, quality assurance, and supply chain integrity; and
- Operations - monitoring and assessment, communication, tactics, techniques and procedures (TTPs), Concept of Operations (CONOPs), sufficiency of tools, burden sharing and seamless integration with mission partners, continuity of operations, and ability to “fight through” a contested/degraded environment/domain.
- And specific to space architectures:
 - Disaggregation - separation of dissimilar capabilities into separate platforms or payloads;
 - Distribution - utilizing multiple nodes to perform a mission versus a single node;
 - Diversification - utilizing different platforms to conduct the same mission in multiple ways;
 - Protection - measures to be developed and implemented ahead of a threat being encountered, or measures to be used upon encountering a threat to ensure the continued functioning of space systems in any operating environment;
 - Proliferation - deploying large numbers of the same type of platforms, payloads, or systems to perform the same mission; and
 - Deception - measures to deceive the intent of actions and the purpose of space-based assets during the planning and execution of space operations.
- **LoE 4 - Implement SMA Solutions across DSE.** In coordination with DSE stakeholders, implement the SMA solutions and contingency plans developed in LoE 3 to address the identified risks in existing policies, plans, programs, resource investments, stewardship, burden-sharing, and other dimensions of the PRICIE framework. Where disagreements arise amongst DSE stakeholders, investigate alternative approaches to mitigate risks.
- **LoE 5 - Sustained DSE Stakeholder Engagement.** Sustained DSE stakeholder engagement is key to the success of this Strategy and execution of component LoEs. While stakeholders may have divergent interests, legal concerns, risk appraisals, and means to contribute and implement SMA solutions, they all share in the need to protect their space assets from intentional or unintentional harm.



Unclassified Remote-sensing Situational Awareness for Space Support to DND/CAF Operations

ROLES AND RESPONSIBILITIES

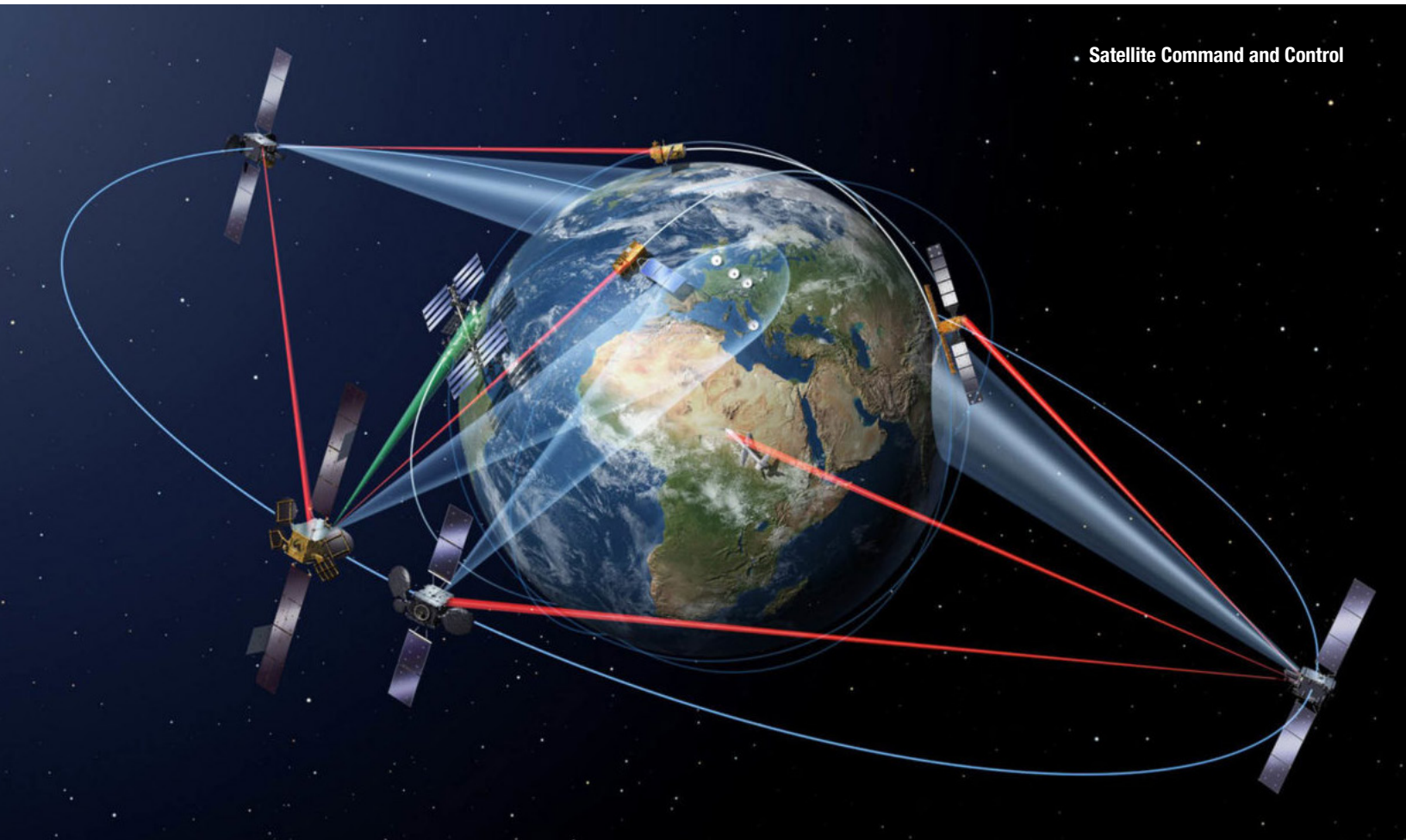
DG Space will oversee execution of the RCAF Strategy for SMA as well as oversight of the Defence SMA Program. Key roles and responsibilities include:

- Communicate to DSE stakeholders the RCAF Strategy for SMA and Defence SMA Program including goals, objectives, roles and responsibilities;
- Lead implementation of the Defence SMA Program with participation of DSE stakeholders, leveraging to the extent possible existing governance and decision-making structures internal and external to the DND/CAF, and initiate necessary enabling processes;
- Advocate across all DSE stakeholders for SMA to be integrated into their policy, planning and resource decisions (SMA lens);
- Develop necessary tools for execution of the RCAF Strategy for SMA including:
 - SMA Risk Management Framework, including Threat & Vulnerability, and Risk Assessment methodologies. A detailed Threat and Vulnerability analysis with accompanying Risk Assessment must be carried out for each DSE space system to ascertain its mission security requirements. Consideration must also be given to threats against networks in addition to threats against the space system itself;

Polar Epsilon 2 Ground Stations and RADARSAT Constellation Mission for 24/7 Global Persistent Surveillance



- SMA Audit Checklist for DSE space systems. This checklist is to be based on recognized DND/CAF and GoC security standards, as well as standards and control frameworks used by the private sector with respect to space systems. E.g. ISO/IEC 27001 security standard identifies a security control framework for information that encompasses management, operational, and technical capabilities; and
- Measures of Effectiveness/Outcome metrics for SMA Program. Intended to ensure continuous relevance and effectiveness of the RCAF Strategy for SMA, bringing to bear required changes and updates in line with a changing threat environment in the space domain.



Satellite Command and Control

Execution of LoEs is to apply to DSE systems regardless of where they are in their life cycle, including those still in the design phase, in operation, or undergoing modification. As indicated previously in this Strategy, for DND/CAF space systems, SMA efforts are to span space FD, FG, FE, FM and FS. In particular, consideration is to be given to:

- **Force Development (Lead: DG Air and Space FD)**
 - Define and incorporate SMA requirements into project identification, options analysis, definition and delivery for future DND/CAF space systems;



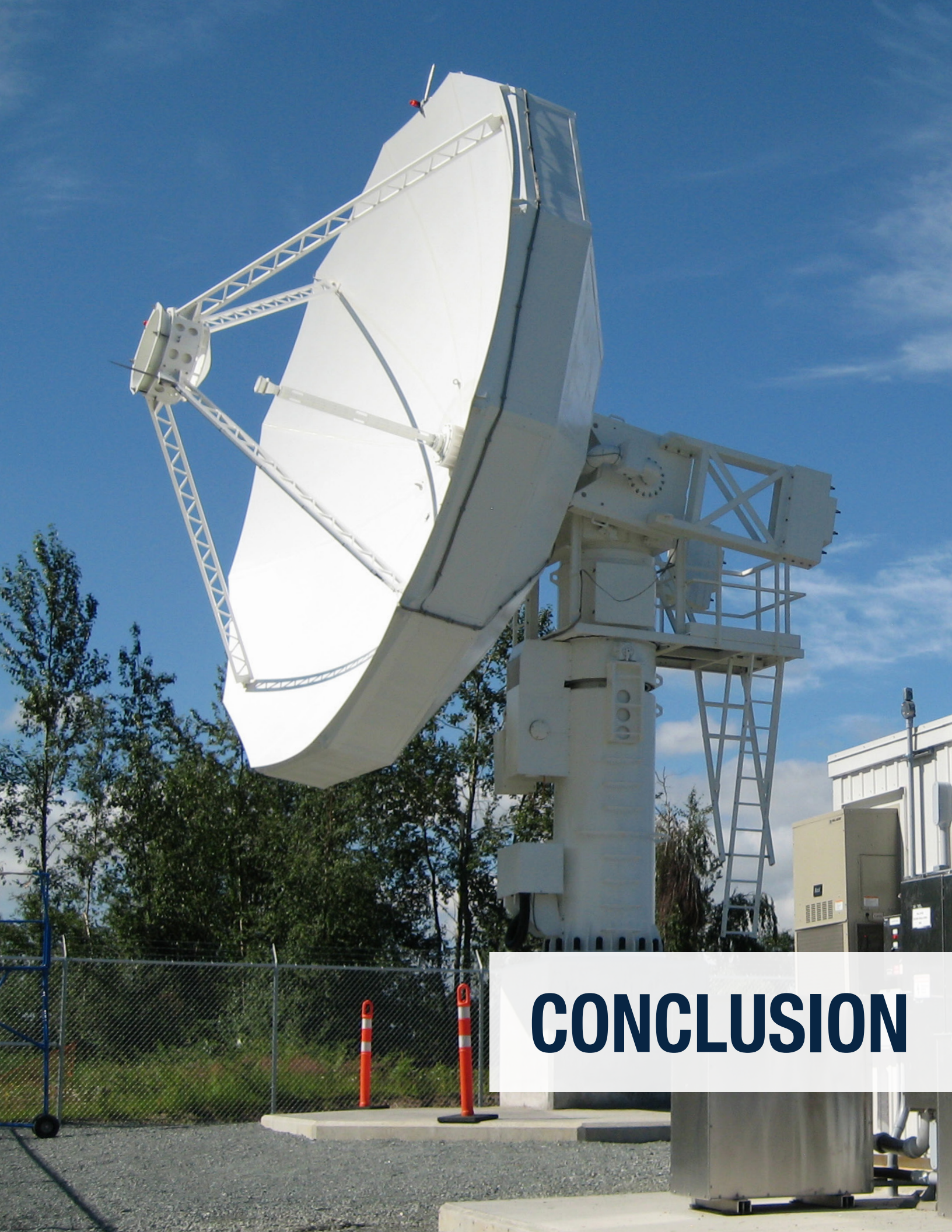
RADARSAT-2 image of Northwest Territories and Nunavut

- Leverage existing MoUs, and where necessary develop new MOUs, SLAs and other agreements for joint capability development with allies and partners, the commercial space sector, and OGDAs;
- Enhance and leverage to the maximum extent possible, Defence Research and Development (R&D), and the Innovation for Defence Excellence and Security (IDEaS) programs in the area of SMA;
- Communicate Defence SMA requirements to space industry contractors, evaluate contractors' plans, processes and capacity to meet these requirements; and
- Leverage the work of the Advanced Space Effects (ASE) Directorate to enhance SMA efforts.
- **Force Generation (Lead: DG Space)**
 - Build and incorporate SMA content into Defence space training and education curriculums including the Basic Space Operations Course (BSOC); Space Operations Course (SOC); and Space Operations Course - Executive (SOC-E);
 - Train and educate Defence personnel, particularly Defence Space Cadre, on SMA and associated Defence SMA Program; and
- Leverage external training sources for the purpose of SMA training and education including from allies and partners, the commercial sector, and OGDAs (GAC, CSA, and NRCan).
- **Force Employment (Lead: DG Space)**
 - Develop and incorporate pertinent SMA principles, technologies, and processes into Canadian Space Operations Centre (CANSpOC), SATCOM Operations Centre (SOC) and Canadian Joint Imagery Centre (CFJIC) TTPs, CONOPs, Standard Operating Procedures (SOPs), operational plans, contingency planning, and threat monitoring in cooperation with allies and partners;
 - Incorporate SMA themes into military exercises and war games;
 - Develop SMA techniques and processes that address prioritized operational deficiencies and enhance mission resilience; and
 - Ensure contractor partners provide SMA services in support of DND/CAF space operations as well as DSE systems and subsystems.
- **Force Management (Lead: DG Space)**
 - Provide oversight of RCAF SMA Program and RCAF Strategy for SMA, including execution of LoEs;
 - Spearhead development and implementation of Defence SMA Risk Management Framework, including associated processes and tools (e.g. SMA Audit Checklist) across all DSE stakeholders;

- Develop and implement SMA measures of effectiveness; conduct regular tests/assessments of effectiveness of the RCAF SMA Program; monitor LoE progress; compile Lessons Learned; and report to senior DND/CAF leadership on SMA matters, in particular relating to space system alerts, critical items and program non-compliance;
- Develop MOUs, SLAs and other agreements as necessary with external DSE stakeholders beyond those currently in place to fill any potential policy and/or legal gaps, to enable joint collaboration and cooperation on all aspects of SMA and to establish protocols where necessary for the use of SMA capabilities. In particular, leverage the CSpO MOU - of which Canada is a signatory - in the area of SMA to advance joint and combined capability development;
- Provide oversight of DRDC Defence SMA R&D program;
- Further SMA concept development and experimentation;
- Continue supporting Global Affairs Canada (GAC) efforts to develop international agreements or guidelines related to responsible behaviours/code of conduct in the space domain and to minimize the proliferation of man-made space debris; and
- Support GAC activities relating to the Government of Canada *Remote Sensing Space Systems Act*.
- **Force Sustainment (Lead: DG Space)**
 - Ensure the integrity of Defence supply chains for Defence space systems.

For DSE space systems of stakeholders external to the DND/CAF, ensuring SMA is to be executed with DND/CAF acting in a supporting, advisory role. In partnership with these stakeholders, DND/CAF actions are to include:

- Communicate the RCAF Strategy for SMA, the Defence SMA Program, and Defence priorities as appropriate;
- Establish a common understanding of risks to DSE systems/subsystems and a shared value proposition for partnering on risk mitigation. Establish minimum standards for SMA under denied and degraded circumstances;
- When invited, participate in external stakeholder forums or establish forums of our own. Leverage and enhance existing governance constructs, including procurement and industry forums;
- Collaborate with external DSE stakeholders to facilitate advancement of the RCAF Strategy for SMA and Defence SMA program; develop associated processes and tools; conduct joint risk and interdependency analysis; share information; plan continuity of operations; advance technological innovation; and develop outcome measurement and evaluation processes and tools; and
- Partner with Natural Resources Canada (NRCan), the Canadian Space Agency (CSA), Shared Services Canada (SSC), and Innovation, Science and Economic Development Canada (ISED) to establish a mutual value proposition with external stakeholders (industry) that supports investment and innovation in SMA.



CONCLUSION

The DND/CAF is increasingly reliant on the space domain to execute its mission. However, threats and hazards to operating in Space are also growing as Canada and its allies and partners look to navigate a future in Space that is increasingly congested, contested, competitive and convergent - where potential adversaries and new players are challenging the accessibility, sustainability, and security of this domain.

The RCAF Strategy for Space Mission Assurance charts a course to implement a comprehensive and innovative Defence Space Mission Assurance Program that will enhance the resilience of space assets that operate in this increasingly precarious domain. The Strategy lays out ambitious targets spanning all facets of the Defence Space Program and involves collaboration amongst all stakeholders, both internal and external to the DND/CAF.

To manage the execution of this Strategy, an implementation plan will be issued shortly that sets out estimated timelines and milestones. The RCAF Strategy for Space Mission Assurance will be periodically reviewed and updated so that it remains aligned with policy refreshes.



**RADARSAT Constellation Mission Ready for Launch
Onboard Space-X Rocket**

ABBREVIATIONS

ADM(IM)	Assistant Deputy Minister (Information Management)
ADM(Pol)	Assistant Deputy Minister (Policy)
ASE	advanced space effects
BSOC	basic space operations course
CA	Canadian Army
CAF	Canadian Armed Forces
CDS	Chief of the Defence Staff
CANSpOC	Canadian Space Operations Centre
CFJIC	Canadian Forces Joint Imagery Centre
CONOPS	concept of operations
CSA	Canadian Space Agency
CSpO	combined space operations
DEU	Germany
DG Space	Director General Space
DM	Deputy Minister
DND	Department of National Defence
DRDC	Defence Research and Development Canada
DSE	defence space enterprise
DTEP	defence team establishment plan
EM	electro-magnetic
FD	force development
FE	force employment
FG	force generation
FM	force management
FRA	France
FS	force sustainment
FVEY	Five Eyes
GAC	Global Affairs Canada

GoC	Government of Canada
IDEaS	innovation for defence excellence and security
IEC	International Electrotechnical Commission
ISED	Innovation, Science and Economic Development Canada
ISO	International Organization for Standardization
ISR	intelligence, surveillance, reconnaissance
LoE	line of effort
MEF	mission essential function
MET	mission essential task
MOU	memorandum of understanding
NRCan	Natural Resources Canada
OGDA	other government departments and agencies
PNT	position, navigation and timing
RCAF	Royal Canadian Air Force
PRICIE	Personnel; Research and development / operations research; Infrastructure and organization; Concepts, doctrine and collective training; Infrastructure; Equipment and material
R&D	research and development
RCN	Royal Canadian Navy
SATCOM	satellite communication
SDA	space domain awareness
SMA	space mission assurance
SOC	space operations course
SOC-E	space operations course - executive
SOF	Special Operations Forces
SOP	standard operating procedures
SSC	Shared Services Canada
SSE	Strong, Secure, Engaged: Canada's Defence Policy
TTP	tactics, techniques and procedures



National Défense
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