

The last decade has witnessed a steady and progressive realization that space is no longer a sanctuary, but it was during this time that space capability has become a foundation for our very way of life. In the past, governments had freedom of action in space, the safety and security challenges were relatively benign, and the number of actors limited. Today none of these assertions are true. Many analysts would suggest that space as a sanctuary has not been true for decades. The current evolution of military space programs around the world is a recognition that space is a domain that requires protection and defence just like any other.

Any discussion of the Canadian Armed Forces (CAF) military space program needs to be viewed through the lens of coalition space operations. The CAF's efforts in space, from its earliest contributions in the 1960s, to space situational awareness with Baker-Nunn cameras, to its recent

reorganization within the Royal Canadian Air Force (RCAF) as a fully developed operational domain, needs to be measured against the three enduring pillars of the Canadian defence policy: Defend Canada, Defend North America and Contribute to International Peace and Security. And given that the United States is Canada's key military ally, Canada's military space relationship with the United States is of paramount importance. The CAF's relationship with US military space can trace its origins through NORAD and this, in many ways, is true today. However, the relationship now goes well beyond NORAD.

To understand how the RCAF brings space power to support traditional military domains, one must understand the relationships between the allied and partner military space forces. The growth in the CAF's ability to conduct space operations draws directly from the international agreements it has signed over the past several years, culminating in the Combined Space

Operations Memorandum of Understanding (MOU). The effort to bring together initially four allies was officially announced on February 23, 2012, by Gen. Robert Kehler, then Commander of US Strategic Command. In a speech to the Air Force Association, Kehler announced that US Strategic Command had entered into a "Period of Discovery" to define concepts around a Combined (multinational) Space Operations Center (CSpOC).

The United States policy driver to bring together its closest allies in enhanced space operations was the release of the Department of Defence and Intelligence Community's National Security Space Strategy, which fundamentally changed the United States perspective on collaboration with allies — from heavy reliance on US capabilities to exploring "the development of combined space doctrine with principles, goals, and objectives that, in particular, endorse and enable the collaborative sharing of space capabilities in



SPACE

is a team sport

crisis and conflict". Over the years, New Zealand, France, and Germany joined the Combined Space Operations initiative. The CSpO MOU and the establishment of the CSpOC had a significant, fundamental impact on the future conduct of combined military space operations. With formal structures in place, cooperation at the strategic, operational, and tactical levels was possible, and space capabilities could be seamlessly brought to bear with greater resilience in support of traditional military operations. And as form follows function, the CSpO allies and partners are now reorganizing and expanding their space cadres from ad hoc to deliberate military organizational structures.

The United States Space Force

The most dramatic and perhaps least understood of these reorganizations and expansions occurred in the United States. All Branches of the United States Armed Forces (USAF) had a space cadre, with

USAF being the largest. A major initiative of the Trump administration was to reorganize the US military space cadre under a single Service. The US Space Force (USSF) is a new Service, reporting to the Secretary of the Air Force. The mission of the USSF is to organize, train, and equip the US space cadre and ensure the force is ready to conduct operations in support of US combatant commanders and combined forces. As a service commander, the USSF's Chief of Space Operations has roles and responsibilities very similar to the Commander of the RCAF.

As part of collapsing two levels of structure, the USSF is standing up three new field commands: Space Operations Command (SPOC) that just formed is responsible for the generation, presentation, and sustainment of intelligence, cyber, space and space support forces; Space Systems Command (SSC) will be responsible for developing, testing, acquiring, fielding and maintaining space systems to include space

launch; and Space Training and Readiness Command (STARCOM), which will be responsible for the training and education of space professionals. Viewed from an RCAF perspective, SPOC is roughly equivalent to 1 Canadian Air Division, SSC to an ADM Mat for space capability, and STARCOM will be analogous to 2 Canadian Air Division and the RCAF Aerospace Warfare Centre accountabilities.

While the USSF provides combat-ready space capabilities, it is the United States Space Command (USSPACECOM) that actually plans and conducts space operations, both in support of traditional military operations and in space itself. USSPACECOM has two subordinate commands: Combined Force Space Component Command (CFSCC) and Joint Task Force Space Defence (JTF-SD). USSPACECOM is roughly equivalent to Canada's Joint Operations Command but solely focused on space operations and space support to Joint forces.

RCAF Air and Space Power

From its earliest days, the CAF Joint Space program resided within the Chief of Force Development (CFD) and its predecessors as a joint capability enabler. Its primary focus was on program formulation and project delivery. The scope of the responsibilities grew over time, and by 2014 the Director General Space was responsible for the full range of Force Development (FD), Force Generation (FG), and Force Employment (FE) functions for space capabilities. However, it became increasingly clear there was a mismatch between the evolving role of DG Space and that of CFD under the Vice Chief of the Defence Staff. As a result, in 2016, the functional authority for the CAF’s military space program was transferred from the CFD to the Commander RCAF.

In the intervening years, the RCAF has carefully laid the groundwork to fully integrate space capabilities into the broader RCAF force structure and pan-domain operations. Strategic direction from the Commander in 2017 kicked off a two-year evaluation, culminating in a new space structure proposed in 2019. At its core, Joint Space FD, FG, and FE now follow traditional lines within the RCAF as described in the Concept of Operations (CONOPS) for the CAF Joint Space Program, signed by the LGen Meinzinger earlier this year. To meet the demands of the emerging space domain, the CONOPS re-distributed the functions previously centralized under DG

Figure 1: Canadian Space Division HQ ~2024

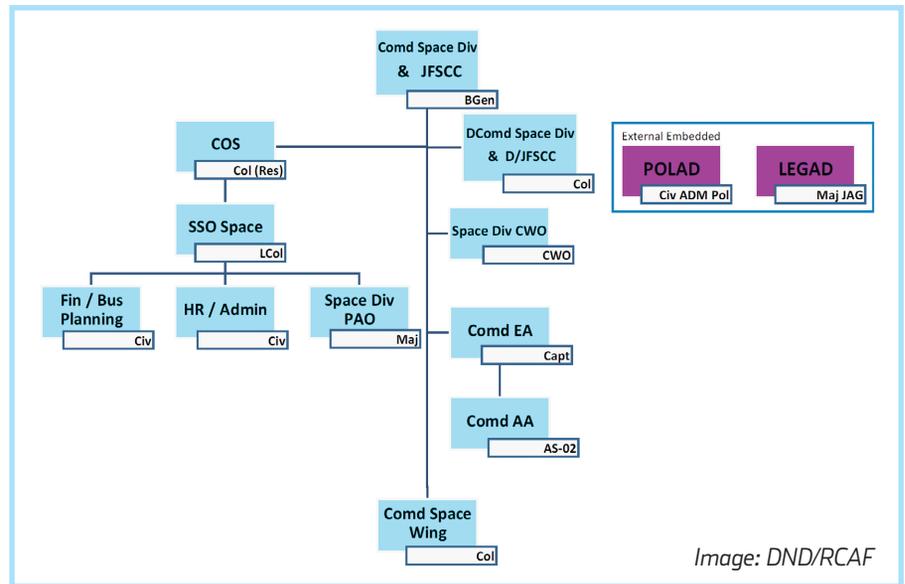


Image: DND/RCAF

Space into new and existing RCAF and Air Staff structures. In addition to the redistribution of functions, more than 275 positions, regular force, reserve force, and civilians, will be evolved or established across the enterprise throughout the implementation period.

Space FD activities have moved from Director General Space, under BGen Adamson to the newly renamed Director General Air and Space Force Development under BGen Kiever. Under BGen Kiever’s leadership and with DG Space in

support, the RCAF is responsible for program formulation and delivery of space projects. The current program is described in the Defence Capabilities Blueprint and includes the Defence Enhanced Surveillance from Space Project (DESSP), Satellite Communications projects, and the Surveillance of Space 2, which total more than \$8.2B in potential program spending. Arguably, with these investment levels in military space programs, Space FD will greatly benefit from the institutional depth provided by the RCAF.

Figure 2: Canadian Space Wing ~2024

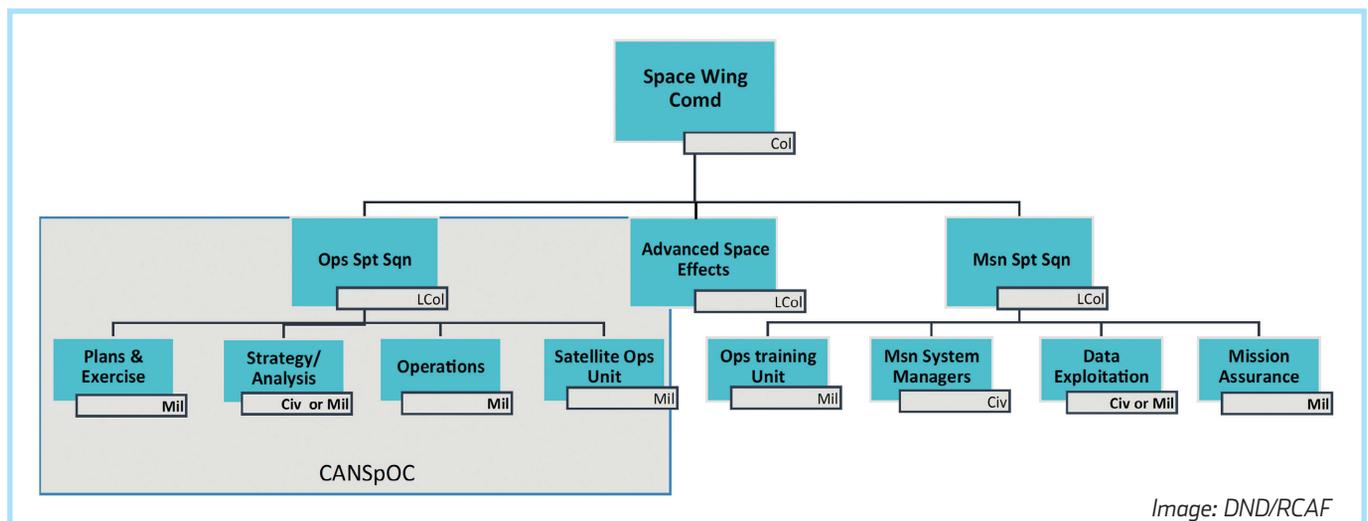


Image: DND/RCAF

Day to day mission support to the Commander CJOC and integration into combined operations are performed by the Canadian Space Operations Center (CANSpOC) and by Joint Space Support Teams (JSST). The JSST's come from the CANSpOC and deploy as members of a Task Force.

Besides divesting itself of FD roles, DG Space's Space Readiness and Plans Directorate will move to DG Air and Space Readiness. Although the basic functions have yet to move out of DG Space, the RCAF believes these will migrate into their new home in the next nine to 12 months. As they have been for many years, Space FG needs are met by 2 Canadian Air Division. 2 CAD provides space operations courses for all CAF members newly as-

signed to space positions, both in Canada and the United States. Canadian personnel employed at US Space units usually require additional job-specific training from American Air Education Training Command (AETC) units (which will become STARCOM units within the next 12 months). Lastly, the Canadian space cadre's advanced professional development also includes sponsored graduate degree programs and attendance on U.S. AETC/STARCOM Space 200 and Space 300 advanced space operations courses.

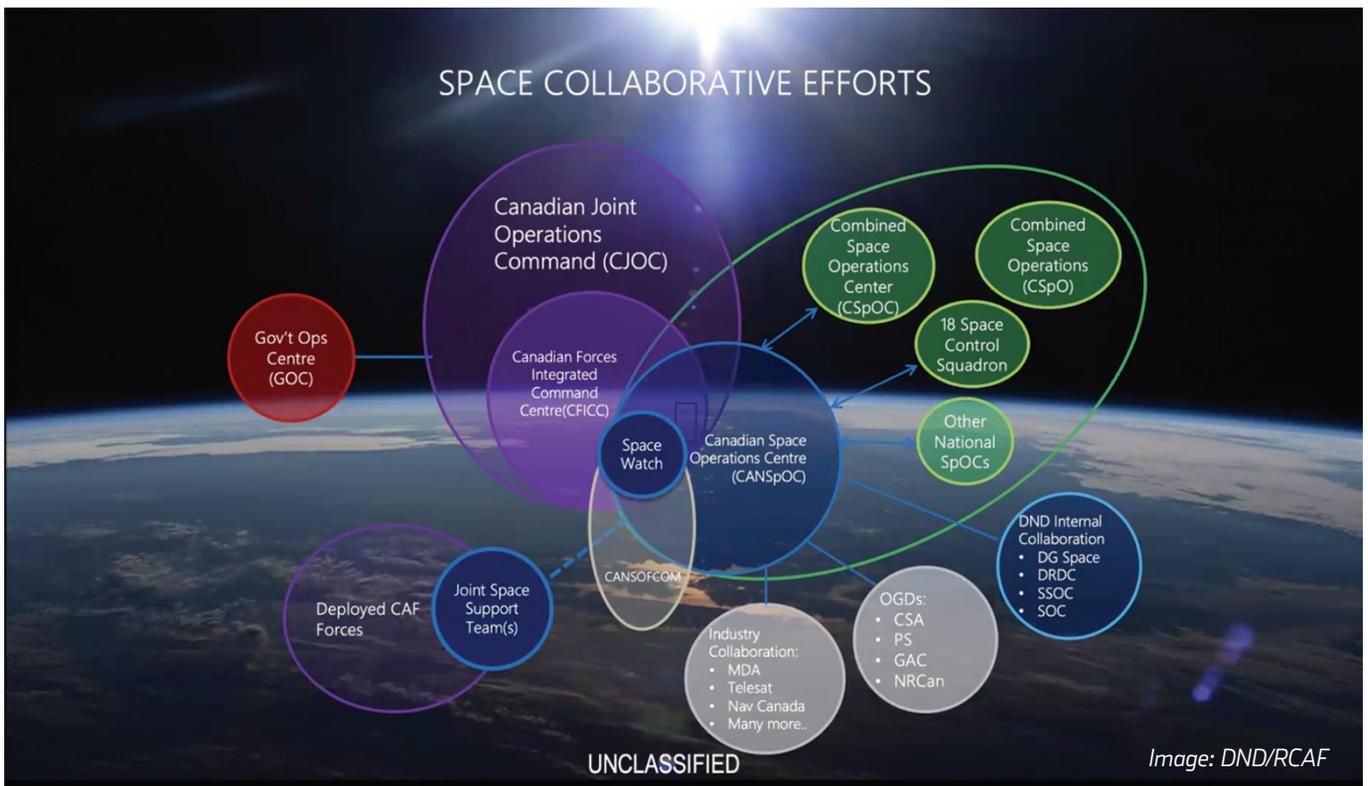
Space FE will be reorganized into a lean but familiar RCAF structure of Divisions, Wings, and Squadrons. DG Space will transition over the next few years to become the Commander of a Space Division. The Space Division will be organized around a traditional structure. The CONOPS a single Wing under the division, which is a less traditional RCAF construct. The mission of the Space Wing is to maintain Space Domain Awareness and deliver space-based capabilities to enable the Joint warfighter. The Wing will have three Squadrons; Advanced Space Effects Squadron, Operations Support Squadron, and a Mission Support Squadron. Each of these Squadrons would have clear and distinct missions and facilitate the integration of space capabilities into the overall CAF

operational planning and FE process. For the time being, however, BGen Adanson describes his role as follows:

"From the Force Employment perspective, we're actually going out and actually meeting the mission and operational requirements for the Canadian Forces. To that end, I'm responsive to the Commander of CJOC as the Joint Force Space Component Commander, just like he would have his Air Component Commanders and Maritime Component Commanders."

The integration of military space into the Joint Component structure is a significant and important part of normalizing space capabilities into the overall FE construct.

Day to day mission support to the Commander CJOC and integration into combined operations are performed by the Canadian Space Operations Center (CANSpOC) and by Joint Space Support Teams (JSST). The JSST's come from the CANSpOC and deploy as members of a Task Force. They provide space capabilities expertise to the Task Force Commander and his or her staff. CANSpOC provides a 24/7 capability to CJOC headquarters and, through the JSSTs to deployed forces. CANSpOC can support on-going operations with CAF indigenous capabilities in space-based ISR or Space Domain Awareness but can also reach out to our





BGen Kevin Whale.
Photo: Space Operations
Command

When asked what impressed him the most during his first few months at the SPOC, BGen Whale highlighted the strong theme that runs through all US national security policy and strategy directives emphasizing the critical nature of working closely with allies and partners to build strong partnerships. The US clearly understands, as do all the CSpO partners, that, in BGen Whales words, "Space is a team sport."

Combined Space Operations allies. Close cooperation with our military space allies allows all partners to share, assure, and protect their space capabilities. A structured approach, leveraging a process called a Space Support Request, facilitates that international cooperation.

Under the umbrella of the Combined Space Operations initiative, the JFSCC is supported by CANSPOC to access the collective capabilities coordinated through the CSpOC in Vandenberg AFB, CA and the allied Space Operations Centers of the United Kingdom, Australia, France, and Germany. This close collaboration provides significant and essential access for the CAF to a robust set of space capabilities while fulfilling allied burden-sharing. BGen Adamson describes the support Canada receives as "excellent."

Since the mid-1980s, over 35 CAF space professionals have been stationed in the United States under NORAD, embedded in many of the United States Air Force space units, from Thule Greenland to Beale AFB in California. CAF personnel supported missions ranging from missile warning, space surveillance, instructional positions at the space cadre training establishments, and staff positions within USSF (and its predecessors) headquarters.

In keeping with the significant transformation of the CAF Joint Space Program, 2020 saw the first CAF General Officer posted to the U.S. SPOC with the appoint-

ment of BGen Kevin Whale as the Advisor to the SPOC Commander, Lt General Stephen Whiting. Like all elements of the forming USSF, the SPOC headquarters is a very lean organization, and BGen Whale has significant responsibilities in supporting the stand-up and evolution of this Field Command level organization. BGen Whale's priorities are to champion and coordinate cross-cutting projects and innovation; coordinate the presentation of forces for employment by US Space Command; support the requirements and strategy element within the headquarters; and, to lean into international partner cooperation (Mil to Mil) at the SPOC level, consistent with the CSpO initiative. When asked what impressed him the most during his first few months at the SPOC, BGen Whale highlighted the strong theme that runs through all US national security policy and strategy directives emphasizing the critical nature of working closely with allies and partners to build strong partnerships. The US clearly understands, as do all the CSpO partners, that, in BGen Whales words, "Space is a team sport."

The year 2020 is perhaps the most significant year to date in the history of the Canadian military space program, when the Canadian military space cadre earned its place among the traditional operational domains in line with the 'defend and protect' mandate outlined in the 2017 Canadian Defence Policy. The foundation has

been laid for a highly trained, capable, and effects-focused team of military space professionals to deliver space-effects and provide a proven combat edge to the men and women of the CAF and our allies, wherever and whenever needed.



André Dupuis has over 35 years of experience in the Canadian Armed Forces in air defence, space operations, mission execution, and strategic planning. Throughout his career, he was selected to lead a number of highly-visible transformational initiatives, which include: a member of the North American Air Defence Modernization, which managed the North Warning System; led the team that established the Canadian Forces Aerospace Warfare Centre; transformed the Canadian Armed Forces' Directorate of Space Development, into a fully-functional military capability, spanning the entire spectrum of force development, force generation, and force employment. Upon retirement from the RCAF in July 2014, André founded Space Strategies Consulting Ltd (SSCL), a company that focuses on providing trusted third-party advice to commercial, civil, and national security space enterprises.