

# **THE NORAD EXPERIENCE:**

*Implications for*

*International Space Surveillance Data-Sharing*

## **Executive Summary**

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## Project Overview

This study examines the formation, operations, and continuing adaptation of the North American Aerospace Command (NORAD) as the basis for the guidance for current and future efforts to enhance Space Situational Awareness (SSA), data sharing, and collaboration. The study's principle investigator was James C. Bennett and it was conducted and published by the George Washington University's Space Policy Institute under a contract with the Secure World Foundation. The study methodology includes a literature review and in-depth interviews with several American and Canadian military officers with current and former NORAD experience.

The NORAD experience was chosen because of its unique qualities which relate to SSA. NORAD is a bi-national military command, consisting of members from both the United States and Canada, which has been tasked to provide warning of aerospace attacks on North America to both governments. The significance of these two States choosing to cooperate to provide critical information of the highest national security nature because of the inherent benefits of such sharing cannot be understated.

The similarities between the NORAD mission and SSA data sharing are strong. Both involve missions which began as military in nature, but over time developed civil and safety aspects. Moreover, both deal with various levels of classification and trade-offs between data sharing and protection. Furthermore, both have missions which require data collection from a geographically distributed network of sensors, outside of *any one* nation's borders, and impact on national security at the highest levels.

Although the study found many areas of commonality, there are three critical differences between the NORAD experience and SSA data sharing which should also be kept in mind. The first, and most significant, is that the rationale behind the formation of NORAD was the specter of nuclear war, as powerful a driving force as any in the history of humanity. No motivation of that magnitude is currently foreseen for SSA. The second major difference is that NORAD involved cooperation between two States that had a lengthy (albeit not always peaceful) history. Unlike NORAD, SSA data sharing is very likely to involve a large number of States, some of whom may not have any past experience in sharing data of a security nature or cooperating in general. The third difference is that NORAD is a military organization performing a military mission. Future SSA data sharing and warning efforts are likely to contain a mix of military and non-military organizations and provide data in support of both civil and military missions.

## **Study Conclusions Relevant to Future SSA Data Sharing Efforts**

- 1. It is possible to collect and share data of an extremely sensitive security nature with other States in a trustworthy fashion while still protecting certain national secrets, even if the States in question are not the strongest of allies.**

The United States and Canada often boast about having the "longest, undefended border in the world" and are currently close allies. However, this has not always been the case. The strong differences in situations, concerns, and state agendas have in the past led to armed conflict and mutual aggression. Both have had their national capitals burned by the other, and until the end of World War II, viewed each other with suspicion. However, the urgent necessity for cooperation on the aerospace warning mission brought the two together, and the collaboration since, has been a fundamental underpinning to their alliance.

Certain space systems are among the most closely protected national secrets, and many have been deemed vital to national security of various States. Any SSA data sharing system will need to tackle this issue and provide participants with an appropriate balance of data dissemination and data security. NORAD's success is an existence proof that such a task is feasible.

- 2. International cooperation can help provide lower cost solutions to problems which require geographically disperse information collection.**

The primary rationale for cooperation between the United States and Canada on the issue of strategic warning was that Canada had the geography needed to base the warning and interceptor network, while the United States had the required funding, technical and industrial capability, and manpower. Neither country acting on its own could have built a unilateral warning network with sufficient capability for the same cost as a joint network.

A similar situation exists with SSA. Ground-based sensors, particularly phased-array and imaging radars, provide an essential source of SSA data. To provide the necessary spatial coverage, these facilities need to be geographically distributed around the Earth, largely located outside the territorial control of any one country. Although it is theoretically possible for the United States to unilaterally build the network of SSA data sources it requires, it is unlikely to have the fiscal capability to do so in the near future. Leveraging existing data sources and sensors at key locations around the globe, in multiple countries, is a cost-effective way to solve this problem, albeit one that trades economic challenges for political challenges.

**3. Planning will far outrun the political will and motivation for actual implementation. Significant political action is only likely to follow precipitating incidents.**

In the case of NORAD, the Air Interceptor and Warning Plan produced in 1946 contained the basic elements that would become the NORAD warning network, and outlined the essential need to "defend the continent at the perimeter." However, economic and political constraints largely shelved the plan until the long range nuclear bomber threat finally created the political will for NORAD in 1957 after ten years of procrastination, denial and painful adoption of quickly-superseded half-measures. It was only Soviet testing of an aircraft-deliverable, thermonuclear weapon in advance of prediction that finally drove home the desperate need for NORAD.

The January 2007 Chinese anti-satellite test and the February 2009 first-ever collision between two satellites were both watershed moments that have significantly raised the political awareness of the need for SSA and some level of data sharing.

**4. When significant political action is taken, it is usually done in a very expeditious manner and without in-depth background research and intensive policy formulation.**

The successful formation of NORAD was helped tremendously by the early thinkers who worked out critical technical and military issues and developed strong policy and strategic fundamentals long before NORAD was formed. However, this was not entirely sufficient, and after many years of political foot-dragging, the NORAD implementation was implemented quickly because the political will swung quickly from non-existent to overbearing.

Those working on SSA data policy have seen a somewhat similar shift recently, as a result of the events of the 2007 Chinese anti-satellite test and the 2009 collision between the Iridium and Cosmos satellites. Both of these events exposed significant problems with space operations and the lack of global SSA. In response to the collision, the U.S. military made significant changes to its data sharing practices and operational procedures. However, the underlying policy formulation to support these changes was not put in place until well after the event.

**5. Organizational champions and individual leaders are essential to development of and implementation of international solutions.**

NORAD's original organizational champions, General Earle Partridge and Air Marshall C. Roy Slemon, were key to its success. Partridge was the Commander in Chief of Continental Air Defense Command in the United States and Slemon was the Canadian Air Chief of Staff during the NORAD formational period. Both strongly advocated for NORAD within their own national militaries and governments, and would go on to become the first CINC and Deputy CINC for NORAD.

**6. Generational change will drive the solution towards a more international and cooperative approach regardless of resistance from current leaders.**

One of the original roadblocks to the formation of NORAD was the generation of leaders within both America and Canada which had developed during the pre-World War II era. They still had strong memories of the historical periods of aggression and hostility between the United States and Canada, as well as the long period of post-World War I isolationism on the American side. However, the generation of leaders that came into power after World War II brought a radically different perspective, one forged through the Allied cooperation and success that the war had brought about. It was this formative experience, and resulting worldview, which laid the organizational foundations for NORAD's acceptance with policymakers in both the U.S. and Canada.

Similarly for SSA, the current generation of American leaders was formed during the Cold War, when U.S. space power reigned supreme and the single, main adversary was the Soviet Union. A new cohort of military leaders is coming of age with experiences in Iraq and Afghanistan, both theaters in which collaboration and cooperation between allies critical to mission success was hampered by excessive secrecy and data protection. This new cohort has also seen the bi-polar security regime in space replaced by a collective security regime with many actors and motivations, and is likely to bring these same lessons of sharing and cooperation to the space world.

**7. Flexibility in initial SSA data sharing agreement(s) will likely provide the flexibility needed to adapt to future, unforeseen crises and situations.**

Key to the long term success of NORAD was the flexibility and deliberate imprecision of the original charter. This enabled NORAD to adapt to rapid shifts in threats and mission requirements over time without the need for significant political or diplomatic re-negotiation. The on-the-ground cooperation between the U.S. and Canadian militaries far outran the civil authorities of both countries.

It should not be the goal of any SSA data sharing agreements to precisely define all the potential future scenarios, nor focus too narrowly on one or a few mission areas. Either of those paths will almost certainly result in an agreement or entity that will be too rigid to deal with the unforeseen future and stand the test of time.

**8. The COSMOS 954 incident should be studied further for lessons learned applicable to future SSA data sharing efforts.**

The crash of the Russian COSMOS 954 satellite in Canada in January, 1983, and the resulting radioactive debris field, is particularly relevant to future SSA data sharing agreements. Although the U.S. military knew about the impending crash months beforehand and warned the Canadian Federal government, the warning information was not provided to

provincial or local Canadian officials nor to the Canadian public. In addition, the exact flow of information after the event happened, and who was notified when, is still unclear to this day.

Some have claimed that the United States requested the information not be disclosed because of intelligence security concerns, and that this request hampered dissemination to critical agencies and the public. These claims are bolstered by the nature of system which would have provided data on the actual impact, the American Defense Support Program (DSP) satellite constellation, whose existence at the time was highly classified.

Further research into the information flows and policy decisions regarding COSMOS 954 will likely prove valuable for future SSA data sharing agreements, which are almost certain to at times involve information and intelligence from highly classified or otherwise sensitive sources. In particular, prior agreement on how certain information will be handled or disseminated could improve the success of such agreements.

**9. The vast majority of political controversy and tension is likely to arise over decisions based on analyzed data; thus, data sharing agreements should focus on data collection and analysis and leave decision making and responses to the individual participating States.**

Throughout the history of NORAD, a consistent point of contention between the United States and Canada has been what the response should be to aerospace threats to North America. In the beginning, it was controversy over the need for nuclear-tipped anti-aircraft weapons based in Canada, which were in direct conflict with Canada's stated policy against any nuclear weapons on Canadian soil. Later, political tension rose again from the use of NORAD warning for U.S. missile defense plans, which included the consideration of space-based interceptors, a move that would have again gone against Canadian policy and popular sentiment in Canada against the weaponization of space. In both cases, there was virtually no controversy over the need for aerospace situational awareness or the means to do so, only the response that was to be taken from the information.

SSA data sharing agreements and entities that strictly focus on collection and dissemination of data, without the additional requirement or authority to take actions in response to specific warnings and situations, will likely have the highest odds of success.

To this end, based on the NORAD experience, initial SSA data sharing agreements should not be focused on dealing with space objects or situations once a problem has been identified. After trust and confidence have been established through the success of data sharing, additional agreements for coordinated response or decision making can be considered.

**10. Personnel from multiple nations working together in an operational job, creates mutual familiarity and a network of relationships and personal ties, which can serve to build transparency and confidence between nations.**

Throughout the history of NORAD, it has become evident that the American and Canadian militaries have unique organizational cultures, and that these separate cultures provide broad benefits to the organization as a whole. Additionally, the organizational culture of NORAD is itself unique and different from either of its two military components, and this has become a source of pride.

There is currently a strong push for transparency and confidence building measures (TCBMs) within the international space community. Based on the NORAD experience in this area, potential SSA data sharing centers involving personnel from multiple countries could be a significant TCBM that helps establish the trust and relationships necessary for other space security endeavors.

## About Secure World Foundation

*Secure World Foundation is a private operating foundation dedicated to maintaining the secure and sustainable use of space for the benefit of Earth and all its peoples.*



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