

Strategic War Game

Toril Ringholm, May 2011

1. Project/publication	<p>Billyard, A.P., Collin, I.A. and Hrychuk, H.A. (2010): <i>Strategic War Game – Arctic Response</i>. Canadian Forces Aerospace Warfare Centre Operational Research Team, DRDC CORA Technical Memorandum TM 2010-240. Ottawa, Ontario: Department of National Defence, 44 pages.</p> <p>http://pubs.drdc.gc.ca/PDFS/unc102/p534072_A1b.pdf</p>
2. Initiator	Chief of the Air Staff, Canada
3. Objective	<p>The aim is to provide a knowledge base for the Canadian Air Force when it comes to identifying appropriate strategies to protect the Arctic areas of Canada.</p> <p>From the report: ”The aim of this study is to determine the range of actions that the Air Force, when it considers itself to be acting in its own best interests, would most likely be required to take in response to combinations of scenario (environmental, economic and political climate) and counter-action (from Canadian government policies or adversarial actions). Furthermore, the document also assesses how well Game Theory can be used to support these types of table-top exercises. ”</p>
4. Geographical delimitation	The report focuses on Canadian territory; without being more explicit on what this geographical delimitation means in this context.
5. Time horizon	No explicit time horizon is given for the game. The analysis may indicate that there has been a 10 years perspective.
6. Thematic focus	The study deals entirely with adaptive actions for the Canadian Air Force.
7. Images of the future	<p>A best-case and a worst-case scenario are sketched.</p> <p>In the best-case scenario, the outcome is that there are no challenges to the Canadian boundary declarations. This is due to a colder climate that does not open the Northwest Passage as a practical transport route so very few challenges to Canadian sovereignty have occurred. While interest in northern commodities such as oil and gas are still prevalent, the costs to extract them from a frozen Arctic have made this process economically unfeasible. Costs, coupled with the harsh weather conditions, have resulted in a lack of economic development. The government also has an ongoing commitment to develop agreements and cooperation with other nations. Most Arctic intelligence, surveillance and reconnaissance are accomplished by space and near-space assets; however, these requirements on the whole have been decreasing. Consequently, the Air Force can reduce its efforts and presence, while the Canadian Government can be engaged in diplomacy with other nations.</p> <p>In the worst-case scenario, the Arctic will be an area of increasing activity, articulated as a “gold rush.” Increased global warming has led to continuous melting of sea ice and rising sea levels. In turn, the Arctic areas once deemed impassable are now appealing routes for international shipping, along with various illegal activities such as human trafficking. While the Canadian Government continually declares the Northwest Passage to be within its territorial waters, its limited capability to enforce its sovereignty has resulted in frequent intrusions into this sovereign territory. Cooperation between Arctic nations is limited, while tensions between Russia and the West over Arctic political boundaries have developed into a serious crisis. Referred to as Cold War II, North American</p>

	Aerospace Defense Command (NORAD) assets are constantly tested by Russian manned and unmanned vehicles, while submarines and nuclear-powered ice-breakers have violated Canada's territorial waters. Furthermore, the warmer climate has increased human activities related to mineral and oil exploration, fishing and tourism. Unfortunately, the rush to extract oil and other lucrative resources has prompted many corporations to show complete disregard for Canadian laws and environmental concerns. Five equilibrium situations are outlined as a result of the actions of the Canadian Government, Air Force and Adversaries. Four of them mention the 2009 status quo as a consequence of the Air Force, while the fifth has increased "situational awareness capability" as a consequence.
8. Key driving forces	Driving forces are defined as variables and include environment (colder or warmer, respectively), political state (co-operative or hostile, respectively) and economic conditions (stable or competitive, respectively)
9. Uncertainties / wildcards	It is difficult to point at external wildcards. Main sources of uncertainty are introduced by the assumed actions of the three players in the game: the Air Force, the Canadian government, and adversaries that challenge the Canadian territorial boundaries. Their assumed mutually dependent actions determine the multiple outcomes of the games.
10. Accomplishment and collaboration	This is an expert-based table-top exercise.
11. Method	The study is built on a game-theoretical approach. N-person non-cooperative Game Theory was chosen as the multi-criteria decision support tool. The method is described in the report.
12. Sources of information	The publication is not based on an analysis of different sources of data. In total, it refers to ten publications, mainly publicly available memos and reports, as well as a few scientific books.
13. Strengths	The analysis is systematically carried out, based on the chosen criteria. It does not add new basic understanding to game theory, but the analysis of the outcomes is interesting. It is also interesting to see the use of game theory linked to scenario development, performed in a context (military planning) that has been important for the development of both tools.
14. Weaknesses	Even though the work is well done, it can be considered a weakness that the circumstances that create acting conditions for the Canadian government are not included as variables. For this reason it appears somewhat "closed".
15. Attention and significance	We have not registered that the study has attracted particular scientific or media attention, but it might have contributed to the Canadian discussions on the role of the Air Force in the Arctic area.
16. Relevance for the Fram Centre	The work is relevant as an example of how military-strategic analyses based on a game theoretical approach to the Arctic may be carried out.