



National Research Council of Canada

Office of Technology Foresight

Proteus: US-CAN Security Foresight Partnership

By Jack E. Smith and the Proteus Foresight Team

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*National
Research Council
Of Canada*

In Partnership with:

- *Foreign Affairs International Security Branch*
- *Defence Research & Development Canada*
- *Communications Security Establishment*
- *Public Security and Emergency Preparedness Canada*
- *National Defence VCDS Strategic Change Branch*
- *Canadian Defence Academy*
- *Royal Military College*

Foreword 2004

This research report is part of a series of several reports that have been produced for the benefit of sponsors, participants and professionals interested in how emerging and prospective developments in global science and technology might impact Canada's future. The Office of Technology Foresight was launched at NRC in 2002 as a resource center for introducing and advancing the practice of science and technology foresight in Canada.

The Office operates as a collaboratively structured partnership activity within the Canadian Government undertaking projects with multiple partners and stakeholders that have included Federal science-based departments and agencies, Provincial ministries and agencies as well as universities and private partners. These partnerships are developed around specific themes or projects. They are designed to explore the application of foresight tools to help stimulate longer term thinking and build shared R&D awareness and capacity for engaging broad and horizontal challenges for which the Canadian S&T and policy communities should be better prepared.

It is useful to recall the definition of S&T Foresight that is used to define the scope and focus for the Office:

S&T Foresight involves systematic attempts to look into the longer-term future of science and technology, and their potential impacts on society, with a view to identifying the emerging change factors, and the source areas of scientific research and technological development likely to influence change and yield the greatest economic, environmental and social benefits during the next 10-25 years.

S&T Foresight is necessarily speculative, creative and analytical because it must rely both on the interpretation of S&T change drivers and on how, if and when these could become significant factors in Canada's prospective social economic and political realities. Since these are highly uncertain, foresight is inherently about attempting to understand, dimension and reduce or at least prepare for significant risks.

The following statement has been used to caution foresight participants and stakeholders not to take these reports as fact or prediction. They represent collaborative research that was conducted primarily for learning purposes, with the understanding that if a consensus emerged regarding possible application of these insights, then one or more of the domains studied might eventually warrant a further, more detailed examination in that context.

The approach we are taking relies upon consulting a wide range of expertise, with the expectation that through our collective experience, imaginative abilities and

interactive knowledge of technological development pathways, we can begin to construct a coherent view of some of the major developments that can be anticipated within a 10-25 time horizon. Foresight is therefore research that can inform planning, policy and strategic choice amidst uncertainty.

This is the nature of foresight - creating a range of plausible future scenarios that in their diversity should alert readers to the kinds of issues and perspectives they may not have initially considered in longer term research planning and contingency thinking. Accordingly, this report reflects the combined views of the participants, and the best wisdom and creative thinking that we could stimulate with the tools of foresight, but it clearly does not represent an official view of the partners unless explicitly stated in those terms. Although this work is undertaken under the leadership of the Government of Canada it does not signify endorsement by its Departments and or Agencies, unless so indicated.

In foresight each player, sponsor or participant takes away some collaborative learning and experience that is tacit and more deeply resonant than the descriptive or analytical accounts contained in the reports. These indicate how various foresight approaches and tools can be applied to help readers become better prepared or at least more capable of contingent planning and action in these turbulent times.

Please contact us if you would like to become part of the network of S&T foresight professionals that will be contributing to this area in the future.

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Proteus: Creating Opportunity for Strategic Leverage by the Canadian Government into Global Security Planning by the US and its Allies within the Context of Innovative Foresight Approaches to Global Change.

I. Introduction

This report is the result of a series of several meetings and strategic collaboration amongst US and Canadian stakeholders who have complementary reasons for being involved in a learning process and modeling exercise that addresses key challenges associated with global threats that emerge from within complex factional environments.

More detailed information on the OTF and its foresight projects can be found at: www.techforesight.ca;

II. Why Undertake Foresight?

- Canada has to start improving its capacities for anticipating global change;
- Canada has to develop a better understanding of the likely advances in S&T that will influence future prospects for economic and social development;
- Foresight is a tool for developing better public policy formulation;
- Foresight contributes to better informed decision-making;
- Foresight enables strategic preparedness and avoidance of major surprises.
- Foresight provides an ability to discriminate among different futures, and to discern those that are most congruent with national aspirations.

What Foresight Is -Is Not	
<i>Foresight is.....</i>	<i>Foresight is not.....</i>
<ul style="list-style-type: none"> • Advice and research, which may be used as one input to policy • Plausible situations which may require preparedness • An open ended learning process • A collaborative, iterative process • Aimed at understanding multiple, plausible futures • Actionable strategy that is always contingent on unfolding developments 	<ul style="list-style-type: none"> • Predictive or prescriptive • A linear, prior determined process • Directed toward immediate actions and priorities • Trying to determine specific policies, plans or choices within immediate future • Dependent upon extrapolations of the present trends • Seeking agreement, concurrence or validation from today’s leading authorities

- Foresight helps define the R&D that will be required and it raises the capacity of policy advisors, many of whom are not S&T conversant, about the prospective innovations, adjustments and threats that could shift strategy and priorities;
- Foresight creates the ability to test policies, strategies and regulatory frameworks across a range of future plausible scenarios to evaluate efficacy and elicit new ideas and proposals;
- Foresight creates a network of experts that build a common understanding and develop longer term perspectives that can address broad policy challenges from a vantage point of social, economic and technological change;
- Foresight can indicate opportunities and anticipative actions that rely upon strategic alignment, inter-organizational strategy and regulatory awareness;
- Foresight can help prepare Canada for collaboration in national, international technology and for continental and global action on the management of science and technology for social and societal benefit.
- Evaluating foresight can provide valuable indications of where and how the process has been effective as an education, planning and learning tool for enhanced preparedness for complex challenges.

III. The Proteus Context

Proteus consists of a series of intelligence insights, lenses or perspectives that have emerged from many focus groups of US intelligence professionals and military strategists starting in 1999, with further refinement subsequent to 9-11, US Homeland Security and challenges associated with the reshaping of global alliances and operations in Afghanistan and Iraq.

Proteus as a strategic concept is derived from Greek mythology. Proteus, the son of Oceanus and Tethys was endowed with a capacity to assume different forms and to prophesy. Proteus originated as an advanced concepts research initiative at the US National Reconnaissance Office employing commercially proven scenario-based methodology provided by The Futures Strategy Group LLC. In the course of exploring alternate future scenarios and considering possible national security issues, the project team¹ published interim results of the work in a book: Proteus Insights from 2020 The book has been used as a basis to enable further strategic research and has inspired the initiative of the Proteus Network and the Proteus Media Project described below.

Canada because of its unique strategic relationship with the US in general and because of its special capabilities for peace-building, peace-making, multi-cultural issues

¹ Original NRO Proteus Project Team: Pamela Krause, National Imagery and Mapping Agency; Charles W. (Tom) Thomas, The Futures Strategy Group, LLC; Michael S. Loescher, The Copernicus Group Inc.; Christopher Schroeder and Thomas Simpson, Northrop Grumman Information Technology; Thomas Witherell, General Dynamics.

management and strong intelligence and military links with key US organizations is being accorded a unique opportunity to contribute to a new tool for managing security complexity led by the *Proteus* Network.

IV. Background to Canadian Connection

In June 2001, Jack Smith, Leader of the Office of Technology Foresight for the National Research Council of Canada attended a briefing on *Proteus* led by the US National Reconnaissance Office (NRO) of the National Security Agency.

In December 2002, David Harries of the Royal Military College and Jack Smith visited the NRO and met with the *Proteus* team as part of the international scoping effort for the NRC's interdepartmental pilot project on S&T foresight.

In March 2003, Pamela Krause, the *Proteus* Leader visited NRC to participate in the Canada@2025 Scenarios Workshop. The NRO reported that the Canadian scenarios were very useful in helping them to refine their forward views about the nature of threats and conflicts looking ahead toward 2025.

In September and December 2003, Jack Smith was invited to attend *Proteus* II development symposia at the US Navy Postgraduate School in the company of the key US intelligence-military organizations involved with *Proteus* II development, as well as the formulation of intelligence strategy for Iraq and subsequent threat environments in a post 9-11 world.

At these meetings strong interest was expressed in having Canadian foresight, intelligence and military organizations become part of the *Proteus* II development process because of the unique perspectives Canada could bring to the tools being considered. More specifically, Canada has strong experience with peace building and peace keeping and in how to develop a sustainable institutional base for motivating diverse populations and factions toward civic pride, peaceful and vibrant economic and social activity and self reliant good governance.

The US offer is premised on Canada being able to engage both organizations and key individuals who could add value to the development process and help strengthen North American security horizons through some strategic alignment of knowledge, intelligence and capacity for understanding uncertainty as defined by the *Proteus* insights.

The US organizations indicated that it would be desirable if Canada could contribute up to 10% of the expected costs for the *Proteus* II development, then our designated stakeholder organizations would have full access to the opportunity and would also be asked to play an active role in the formulation and elaboration of the strategies.

The US agencies are presently intensifying their search for funding for *Proteus* development under the aegis of various mechanisms that are being aligned for the purpose of advancing the *Proteus* approach: Forces Transformation, CIA Analysis and

Production, US Military War Colleges curricula, and National Science Foundation and National Security Agency cooperation on advanced S&T projects.

V. The Canadian Security Challenge

Canada faces several distinct domains of challenge and preparedness as it fully contemplates the new global security threat and its impacts upon our strategic partner the US. In this context there are several questions that the opportunity *Proteus* involvement raises for prospective Canadian security organizations:

- What is Canada's current national security strategy and how could this alignment enable, strengthen or help elaborate such a strategy?
- From what base of knowledge, resources and operational positioning could Canada's intelligence and military organizations learn from and become active players in a pan North American *Proteus* network?
- What can we say about our present state of readiness, involvement and capacity for contributing to the US *Proteus* network?
- What are the prospective benefits of a Canadian contribution that could be shared amongst several federal Departments and Agencies?
- Who should champion the interface and what expectations would other partners have for this leadership initiative?
- What is the Canadian element that could be uniquely contributed and how definitively should it be defined in advance of the experiential learning and development work that is being contemplated?
- Can four or five partners be identified who would see strategic benefits from a modest investment into the development of a Canadian perspective and contribution to *Proteus*?

VI. Prospective Costs, Elements and Collaboration

The estimated cost for Canada to fully access the *Proteus* network, project and its US sponsors is \$ 50 K Cdn. This could and should be divided between 4-5 partners to achieve the substantial leverage and diversity that Canada would need to effectively realize the prospective benefits.

The *Proteus* approach is based on several aligned elements:

- Ongoing R&D under the leadership of NGA, NRO, NPS and the AWC, with NSF and DARPA potential sources of funding;
- Strategic feedback and regular interaction with Pentagon, CIA and NSA senior strategists and operations leaders;
- Migration of the *Proteus* approach gradually into US training curricula for Officers and Agents;
- Interaction with key defence and intelligence contractors who can provide agile deployment and adaptive updates to the methodologies;

- A network of several layers of expertise and insights derivation that reaches across all of the stakeholder organizations, with intersections at many levels;
- A tested set of tools for projecting challenges of future environments, and in motivating simulated, adaptive or anticipatory behaviour;
- An initial software media project described in an attachment
- A plan to engage senior military and intelligence leaders, generals, and advisors in working through the learning, insights and application tools of *Proteus*;
- A series of regular meetings (3 times yearly is proposed) of the *Proteus* network, consisting of the founding core group and accepted, and self motivated members.
- A defined set of project deliverables for each assembled investment involving more than a single investor-partner.

VII. Proposed Proteus Network Benefits

The development of a Canadian presence in the *Proteus* approach could deliver several benefits to Canada:

1. It would demonstrate to the US and our other Allies that Canada has a strong capacity for strategic engagement in future military-intelligence priorities;
2. It can signal and help define a new , more horizontal and aligned approach to internal Canadian foreign policy for global security;
3. It provides a mechanism for direct linkage between key Canadian stakeholder organizations that is presently weak with regard to agile action in the domains being developed, and it could be catalytic in terms of strengthening Canada's internal security strategies;
4. It is a moderate cost-high prospective benefit activity that leverages talent as well as resources and functions as a learning vehicle for strategic anticipatory threat alignment;
5. It will enable Canadian S&T knowledge and foresight capacities to be extended and applied in new ways;
6. It presents a new context for examining and understanding threats from network terrorist sources and their global and national factional allies.

VIII. Objectives of a Canadian *Proteus* Network

If the core group decides to proceed to the next stage of engagement, what should be their objectives? Here are a few for consideration:

- To demonstrate to the US *Proteus* proponents that Canada has substantial contributions to make to North American and global security
- To use the *Proteus* network and project opportunity as a catalyst for defining new approaches, stronger alignment and greater strategic coherence for a Canadian security strategy, both internally and with respect to our role as a key US ally;

- To learn from the *Proteus* network new insights and relationships that should be factored into Canada's strategic readiness, its security surveillance priorities and its overall intelligence contributions to global security;
- To leverage the knowledge gained from *Proteus* involvement, its contacts and training vehicles, into a more effective and aligned institutional capacity for ensuring Canadian security leaders are aware of US motivations and developments;
- To strengthen Canada's capacity for foresight in security and intelligence affairs and related social, technological and economic factors.

IX. Moving Ahead

The current dilemma is that Canada remains relatively unprepared for organized strategic interventions of this type involving direct collaboration of diverse federal authorities and agencies. With the organization of a new Public Security Ministry, this may prompt new possibilities, and consequently this opportunity for early involvement in the development of advanced foresight and simulation tools could be catalytic – a way to motivate interaction, mutual learning and strategic choice simulations around real life factional threats in conflict prone environments.

Accordingly the following course of action is proposed for consideration by the core group:

- Core group to identify key contacts and prospective investors and affiliates within the federal system and develop a contacts or presentation strategy;
- Raise the possibility of a briefing on *Proteus* from US sources in Ottawa that could be arranged through Jack Smith's sources and the Embassy, DFAIT or military attaches networks mechanisms;
- Jack Smith of NRC to continue to provide the core group with updates on the progress of the US *Proteus* group's progress in securing its project funding;
- DFAIT International Security to define a policy challenge that would context the *Proteus* approach as part of a larger effort to strengthen Canada's security strategy and alignments;
- DFAIT and NRC to define a security foresight project that could attract other federal investors for commencement in 2004;
- Core group members to advocate and define the developmental opportunity offered by *Proteus* for the new administration;
- Northgate Group be retained by DFAIT to develop the detailed investment case/proposal for a collaborative, multi-partner Canadian contribution and ongoing investment in the US led *Proteus* approach and its related projects.
- Potential first demonstration of the *Proteus* Media in Ottawa in March 2004.

Appendix A.

Proteus: A Network for 21st Century Foresight Strategies

Proteus is a largely informal and voluntary association of strategic foresight practitioners concerned with the challenges of anticipating and understanding global change, and exploring the related implications for intelligence and global security.

The vision of Proteus is to build a network that can make practical and innovative contributions to a safer and more stable world through the development and sharing of advanced knowledge applications derived from insight and foresight.

Proteus network members are affiliated by a mutual recognition of collaborative opportunity and the prospective benefits and new vantage points offered by the leverage their diversity brings in terms of awareness, capabilities and elaboration and exploration of new ideas, technologies and methodologies for strategic foresight.

Their common ground and shared developmental commitment is based on the *Proteus* perspective. It is an innovative system of foresight forces, insights and global scenarios developed by the *Proteus* Project Team at the US National Reconnaissance Office in 1999-2000.

The *Proteus* network will undertake follow-on research based on the original work. The work will further develop and improve the power and efficacy of the approach so that it can be used as a strategic mechanism to support global stability and positive development pathways and adaptation to global change.

As an integrated approach, *Proteus* creates innovative potential in the following ways:

- Elaborates strategic knowledge that positions global change forces within a dynamic and interactive context that can reveal unintended consequences of actions being adopted by factions within a complex environment of uncertainty and conflict;
- Builds new media to carry *Proteus* knowledge of strategic choice structure, interactions and implications in the form of a complex cognitive representation. This will enable human-driven autonomous actors to simulate and interpret irregular warfare and prospective terrorist conditions and strategies. This representation could also evolve into the production of one or more innovative products that could have commercial potential.
- Advances the technology of multi-dimensional scenario construction and contingency planning, and connects affiliated players for collaborative learning applied to real challenge situations.
- Develops the base for a multilateral stakeholder foresight network starting with the bilateral US-Canada strategic relationship.

I. Introduction

As the 21st century has started to emerge, it is apparent that we are in a transition era of intense change, with relative discontinuities present in most domains of civilized organization. The pace of past eras seems a distant luxury; instead planners talk of paradigm shifts in how complex affairs of state, security, business and society are evolving. In this environment, strategy has to become more inductive, collaborative and creative to contend with emergent trends, surprise drivers and high impact shocks.

This proposal is directed toward building a more extensive institutional and methodological network to guide the next adaptation of Proteus as a complex adaptive system for anticipating change in global society. In particular, the urgent realms of national security and global intelligence about non traditional adversaries are demanding new and more robust structures for forward strategy.

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II. The Proteus Perspective

Proteus explores strategic capacities and collaborative learning tools for anticipating and understanding global change. As a foresight facilitator it comprises a set of structural insights or perspectives – i.e. lenses - about the nature and directions of global change. The focus is on threats, opportunities and technological innovations. It can be used to construct complex scenarios of how societies and institutions are adapting. The ten insights or perspectives summarized below were identified in the initial phase of Proteus that took place 1999-2003. Additional ones are likely to emerge as the network evolves in the context of the Proteus Media project.

The Proteus approach offers a context for and an elaborative description of the uncertainties and the resulting implications and environments that are being shaped by the emerging new challenges and realities.

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Central to Proteus are ten original perspectives about the propensity of threats to the stability and resilience of 21st century global culture and societies:

- *Starlight*: Most current intelligence is derived from retrospective insights, however real predictive foresight capacity is turning toward the recognition of need for strategic information from a confluence of multiple planes of influence in time, space, meaning and cyber systems.
- *Sanctuary*: They can run and they can hide. Information about movements may be more valuable than secrets tied to stable locations, and luminosity may be more important than stature.
- *Small Stuff*: From biotech to nanotech to internet supported infotech appliances and cognitive systems, technologies are converging to create distributed and diverse threats. The world of the small (including cellular or networked organizations) and the relatively autonomous is creating ambiguity and potential threat.
- *Veracity*: Truth and knowledge are not as absolute and fixable as previously believed. Empiricism, authentication and revelation may be relative and difficult to determine when viewed in the context of their creation in the dynamic environments able to be modelled by Proteus.
- *Herds*: People and ideas are on the move - affecting loyalties and affinities in complex space-time and idea-belief situations. Herds have inherent capacity for malevolence or benevolence, and Proteus can elaborate the distinctions.
- *Wealth*: It's not just money – non traditional currencies are entering the influence planes and creating substantial shifts in global value. New currencies expressed as capacities for influence can alter strategic positions and create vulnerabilities. Proteus creates perspective upon these complex interactions and transactions and examines prospective impacts.
- *Power*: As values change, the distribution and instruments of power can shift. Power is temporal, dimensional and erodable in the emerging cellular environment.
- *Bedfellows*: The significance of teaming increases as global complexity is accelerating even where the US is disengaging. Intelligence and security demand agility and new partners internationally in diversified arenas of information, access and alliance.
- *Parallel Universe*: From networks to cyber realities and avatars, the flows of information capability and configurations of prospective threats are becoming more extensive as cyberspace assumes new and highly strategic relevance in all domains.
- *Threat-Opportunity*: Watchfulness in all venues is necessary because every threat is someone else's opportunity. Anticipation of threat requires understanding the ecology of the continuum – accounting for both the pre-conditions and the manifestation of threat in terms of capacity and technology in context.

These perspectives were derived from a set of general scenarios for plausible, prospective global change situations that imply significant challenges for global leadership and civilized development in the 21st century.

A key task for the Proteus network is to further develop, adapt and formulate new scenarios appropriate to the shifts that can be seen or anticipated using the vantage points of the Proteus perspective. Work has already begun on elaborating the next generation of Proteus perspectives and scenarios. As detailed below, the Proteus Media project is directed toward capturing these new abilities in an advanced cognitive representation.

III. Developing the Proteus Perspective

The Proteus network is structured as a self-sustaining voluntary association of affiliated organizations and skilled individuals who bring diverse but complementary capabilities together in search of broader knowledge and insights. The initial members are connecting informally.

The informal assemblage and their relevant networks of prospective affiliates currently include:

1. **National Imagery and Mapping Agency:** - affiliated with other reconnaissance, foresight and strategic analysis groups within the US Intelligence Community, and the US National Science Foundation;
2. **National Research Council of Canada:** Office of Technology Foresight; - affiliated with Department of Foreign Affairs and International Trade International Security Branch, Department of National Defence R&D and Disruptive Technologies Working Group, Royal Military College and Canada@21 Foresight Network.
3. **Naval Postgraduate School:** Cebrowski Institute for Innovation and Superiority and Centers for Modelling and Virtual Environments, and Terrorism and Irregular Warfare – affiliated with relevant foresight capabilities of the Departments of Defence and Homeland Security;
4. **US Army War College:** Center for Strategic Leadership and the Center of Excellence on Information in Warfare

This represents a unique array of complementary and expert skills and diverse knowledge bases grounded in advanced technology, innovation strategy, policy formulation and conflict analysis and strategy that jointly can be combined to extract value and perspective from foresight findings and scenarios. The group has a strong ability to connect in any way appropriate to the challenges being examined within key centers of influence and action in the US and Canada.

IV. Vision, Mission and Facilitation of The Proteus Network

Nobody owns or leads Proteus. It is a voluntary, dynamic network for strategic insight and leverage of foresight knowledge and applications.

The Proteus mission has several concrete elements:

1. Create a learning system for network members and affiliates;
2. Invest in new knowledge, and apply this to formulating additional insights and foresight perspectives;
3. Construct additional global or regional scenarios as determined in conjunction with sponsors and partners;
4. Develop knowledge applications and innovations that could have professional, public, security and/or commercial prospects;
5. Build the network so that it continually integrates diverse capabilities and expertise, touching and influencing policy, research, security & intelligence decision makers

Network administration will be decentralized and decision making distributed. Network members will meet regularly and a community-of-practice web portal will be employed to facilitate information exchange and network communication. Some administration may be outsourced as necessary.

V. Networked Activities

Networked activities represent the collective interests and sponsorship priorities of the network. These are fully dynamic requiring no regular cycle of planning or deployment.

Any member can initiate proposals for consideration by the network at any time.

The Proteus network will initially pursue the Proteus Media project as described in the attachment.

***Proteus Media:** A new media for revealing and capturing unintended consequences of factions and security actors in a dynamic, interactive environment using the Proteus perspective.*

In sum, the Proteus network will position itself as a flexible, rapid and innovative source of strategic perspective and foresight for the benefit of the members and their affiliates and stakeholders.

John Arquilla	Dorothy Denning	John Hiles	Joanne Kim
Pam Krause	Jack Smith	Tony Szalkowski	William Waddell