



Security Environment Analysis and Scenario Development

**Presentation To
NPSIA Understanding State Fragility
Conference.**

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FSE and Time Horizons: Trends, Shocks and Futures

Today's
Realities

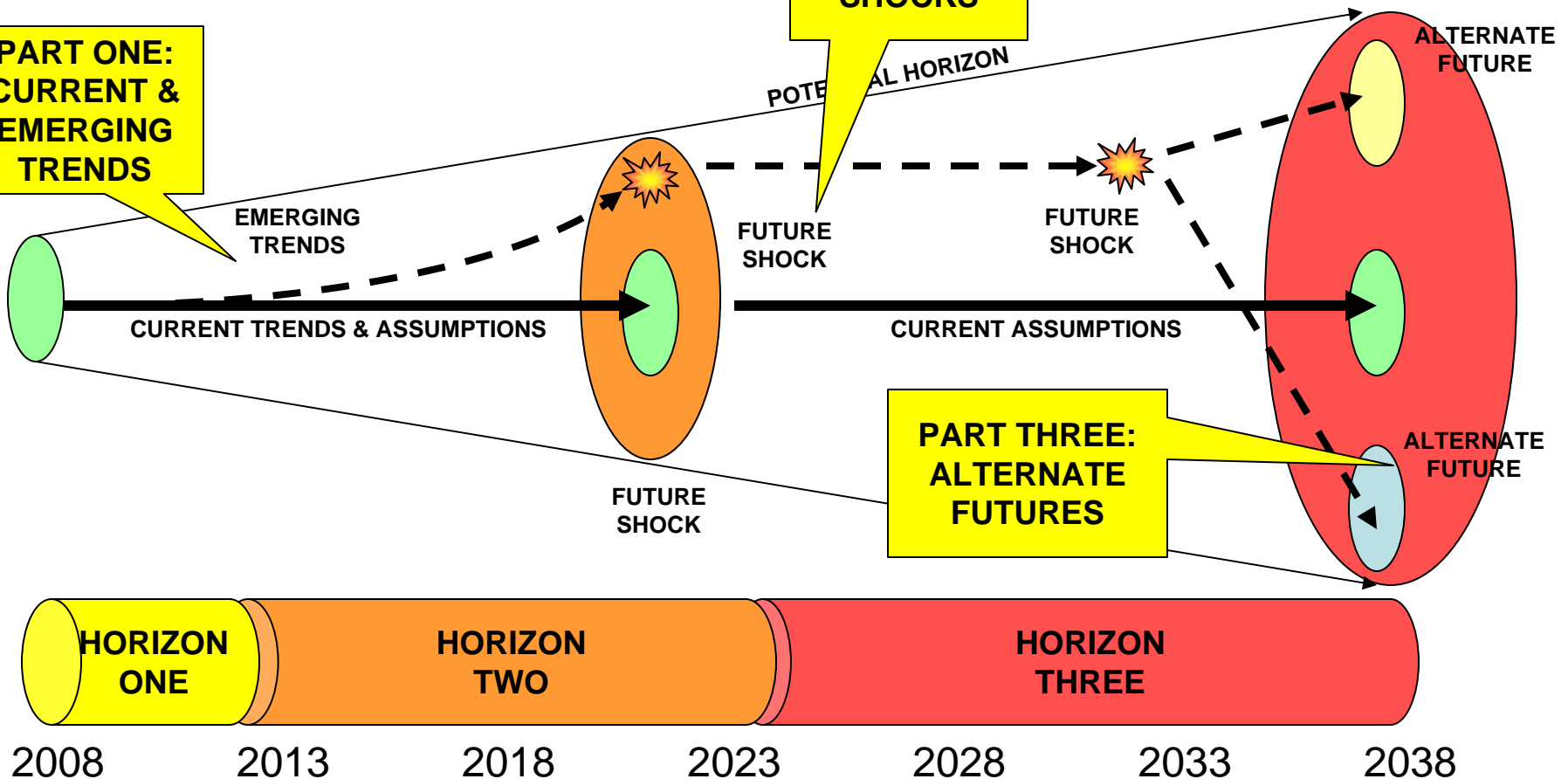
Tomorrow's
Uncertainties

Future's
Possibilities

**PART ONE:
CURRENT &
EMERGING
TRENDS**

**PART TWO:
FUTURE
SHOCKS**

**PART THREE:
ALTERNATE
FUTURES**



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FSE Part 1: Focus and Content

- FSE Part 1 is:
 - A functional view of social, economic, environmental, political, scientific, technological and military trends out to the Horizon 2 and 3 timeframe.
 - A reflection of broad research and analysis from a wide range of disciplines and institutions.
 - The first part of a larger body of work that will include shocks and alternate futures.
 - A means to develop shared understanding of future trends and implications within DND and the broader defence and security community.
- FSE Part 1 is not:
 - A regional analysis of likely or possible sources of conflict and therefore does not compete with the work of other DND/CF organizations studying/analyzing potential crises.
 - A study constrained to a single security sector.
 - A forecast of the nature of future warfare (this will be addressed in the Integrated Capstone Concept).



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FSE Part One: Sources and Consultation

- Internal DND stakeholders (CD Board membership +)
- Environmental Scanning Practice Group of 37 Other Government Departments and Agencies
- Allied network of 27 nations
- Academia and Industry
- Authoritative sources include:
 - US National Intelligence Council (NIC) *Mapping the Global Future 2020 Project*
 - RAND *The Global Technology Revolution 2020*
 - UK Development, Concepts & Doctrine Centre (DCDC) *Global Strategic Trends Programme 2007-2036*
 - UN *A More Secure World: Our Shared Responsibility*
 - DND D Strat A *Strategic Assessment*



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FSE Part One: Trends

Chapter Content

- Economic and Social Trends
- Environmental and Resource Trends
- Geopolitical Trends
- Science and Technology Trends
- Military & Security Trends

The rest of this brief will focus on highlights
and deductions



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Economic and Social Trends: Economic Disparity



While globalization will bring greater economic prosperity to more nations, the gap between rich and poor nations and individuals could possibly widen. Economic disparity will be a source of tension and potential conflict.



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Economic and Social Trends: Security of Oceans



- Developed nations will find it in their best interest to pursue diplomatic solutions for the protection of economic investments, trade, and transportation routes; however, aggressive responses to threats to trade or economic well-being are always a possibility.



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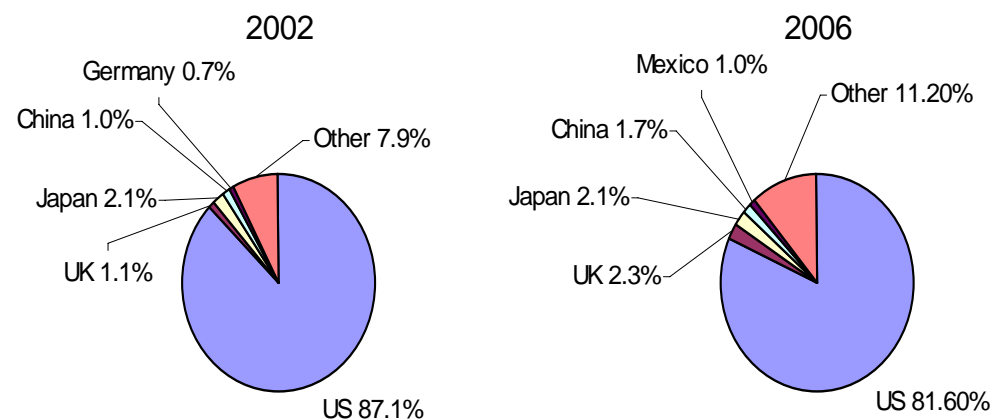
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Economic and Social Trends: Canada – A Trading Nation

- Protection of both continental and international trade routes from disruption will be essential to Canada's economic well-being.



Major Markets for Canadian Goods in 2002 and 2006.



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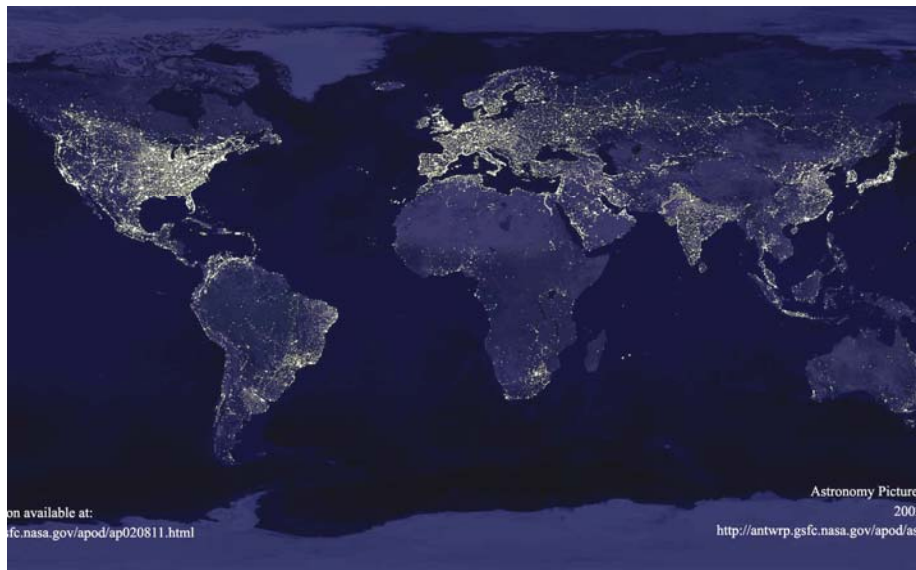
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Economic and Social Trends: Causes of Instability



The World at night – light clusters show increasing urbanization

2007 – UN Habitat marks milestone. Over 50% of world population is now urban.

- The mass movement of large segments of people is destabilizing and may result in civil unrest, regional clashes, or humanitarian crises
- The failure of the megalopolis in the developing world will increase the risk of disease, pandemic, and humanitarian crisis



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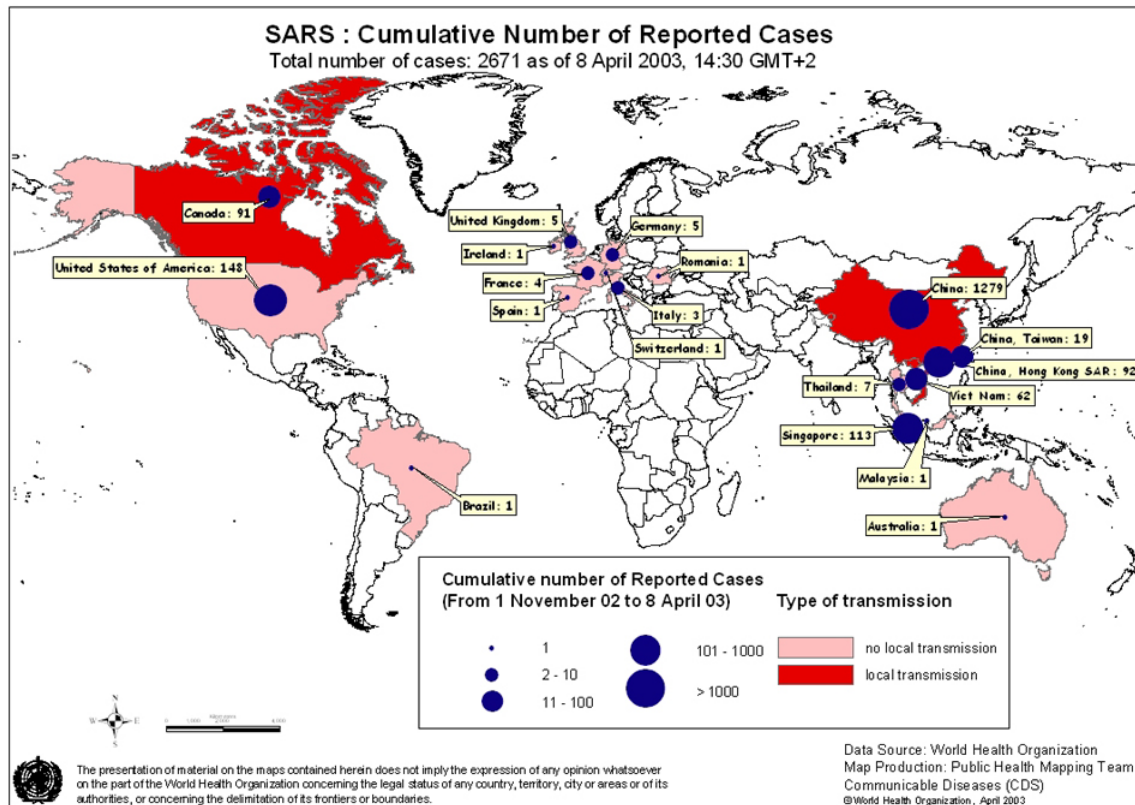
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Economic and Social Trends: Disease and Pandemics

- Nations will have to be prepared to respond to the consequences of the global outbreak of infectious diseases.



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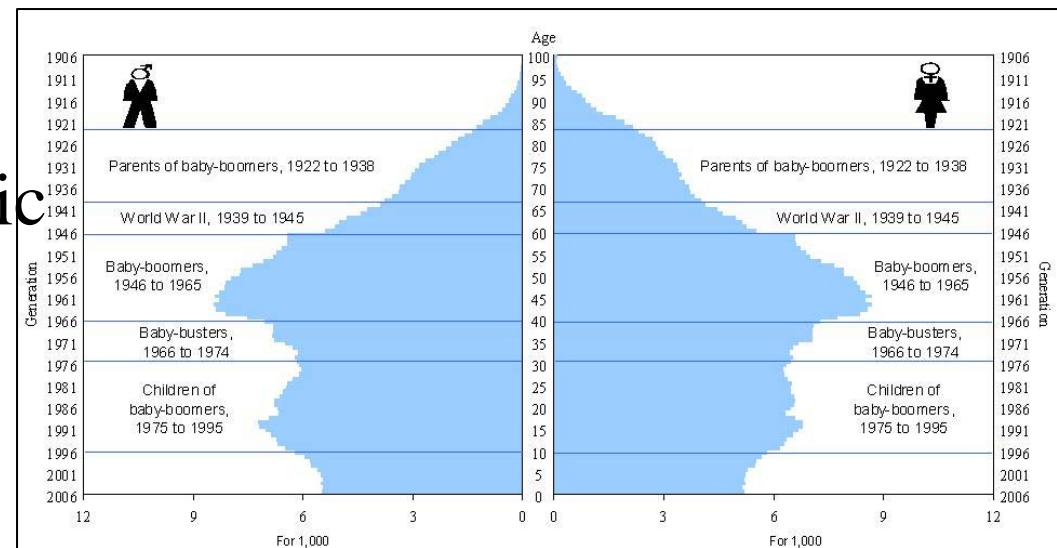
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Economic and Social Trends : Demographics

- Aging Western populations
- Young populations in India and 3rd World
- Pressures of the Canadian demographic

According a 2001 Census, India had more people under the age of 15 than the entire population of the United States.



Canadian Demographic Profile (2006 Census)



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Social and Economic Trends: Implications for DND/CF

- Globalization empowering non-state actors
 - How do we deal with legitimate non-state partners and legitimate & illegitimate non-state adversaries?
- Increasing conflict from migrations
- Increasing urbanization of conflict
 - Are our capabilities optimized for urban/littoral environments?
- Demographic challenges
 - How do we recruit and retain to sustain the force structure?



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Environmental and Resource Trends

Climate Change



- IPCC concludes increasing climate change is attributable to mankind and irreversible
- Increasing damage due to violent weather, drought
- Melting of the Arctic ice cap accelerating



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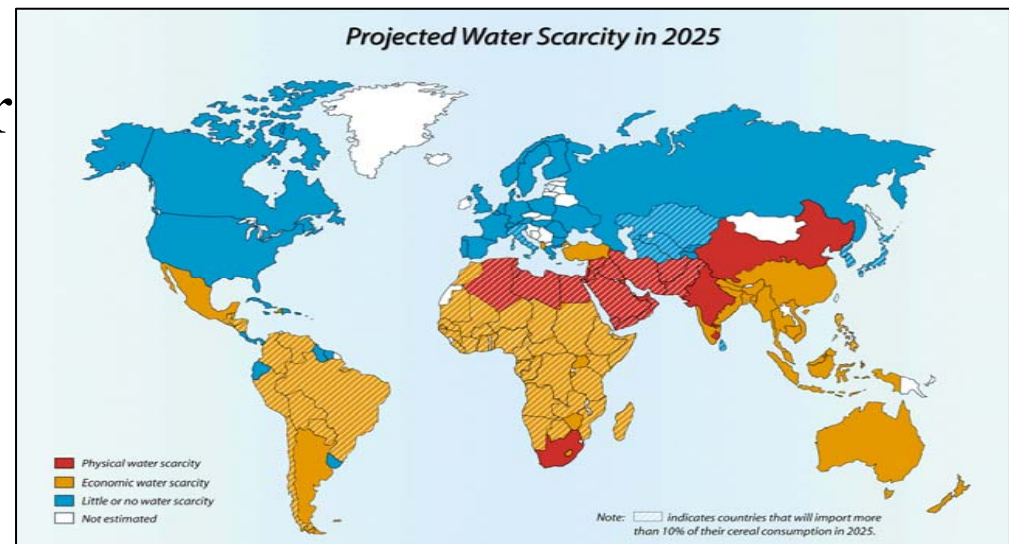
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Environmental and Resource Trends: Water, Energy & Minerals

- Increasing water and food scarcity is a potential source of conflict
- Increasing demand for energy & minerals balanced by new sources & materials



World Water Stress Concerns. Source: <http://www.iwmi.cgiar.org>



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Environmental and Resource Trends: Implications for DND/CF

- Climate change will worsen pre-existing water and food shortages
- Growing demand for humanitarian assistance and stabilization operations due to regional instability resulting from food shortages, natural disasters, etc.



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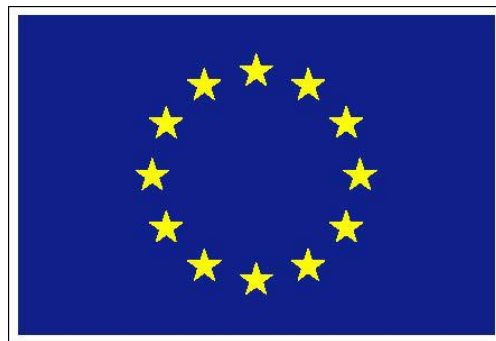
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Geopolitical Trends: Security Relations



Shanghai Cooperation
Organisation (SCO)



European Union

- Multilateral organizations will remain important
- Yet, coalitions of the willing will be a feature of the FSE
- Will see some new security partnerships in order to counterbalance US dominance
- So new competition and tensions will arise



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Geopolitical Trends: Hegemonic Powers

- US likely to retain conventional military supremacy
- But increasing economic challenges could erode dominant position
- And adversaries will focus on asymmetric ways & means



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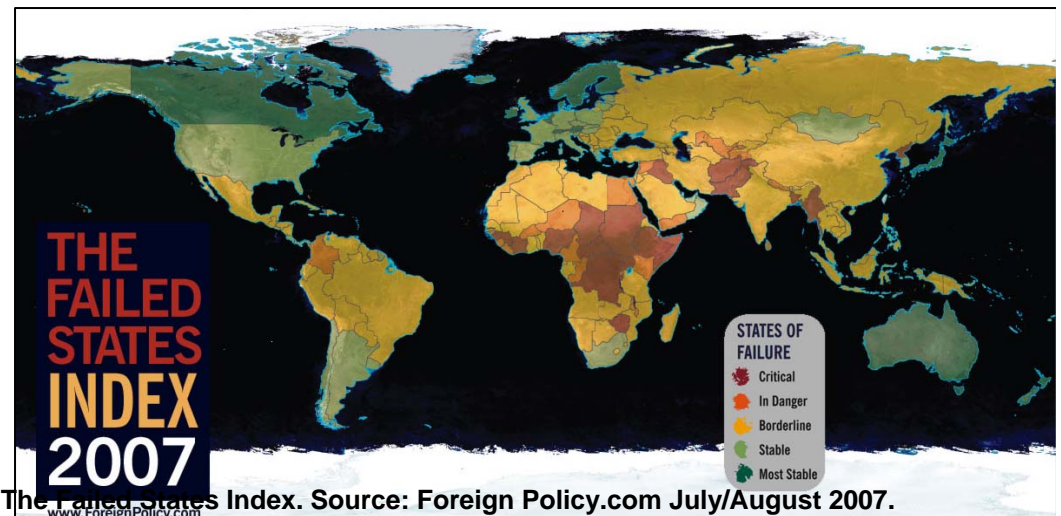
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Geopolitical Trends: Failed and Fragile States

- Trends show increasing fragility
- Major source of regional instability & fanaticism
- Responsibility to Protect



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Geopolitical Trends: Implications for DND/CF

- Potential for increasing fanaticism driven by failure of governance
- Potential for state-on-state conflicts will endure
- Interoperability with US still essential, but increasing pressure to provide more of our own enablers
- Multilateral cooperation still essential
- Expect increased demand for intervention in fragile and failed states (stabilization and reconstruction)



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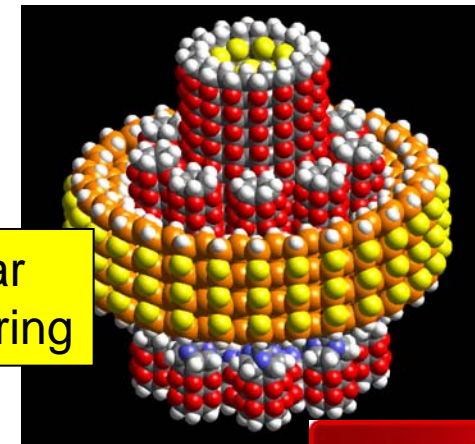
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Science and Technology Trends: Nanotechnology

- Most fundamental revolution in S&T
- New materials (carbon nanotubes)
- Miniaturization to new scale
- Key enabler of new defence capabilities:
 - Materials, processors, sensors, human performance

Molecular
Manufacturing



Nanobots

Nanoscale
Technology



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Science and Technology Trends: Information, Computers & Sensors

2007 DARPA Grand Challenge:
Autonomous vehicles negotiate
55km urban course successfully



- Rapid evolution to ubiquitous computing (network paradigm)
- Pervasive and persistent sensing
- Increased use of autonomous systems (artificial intelligence)



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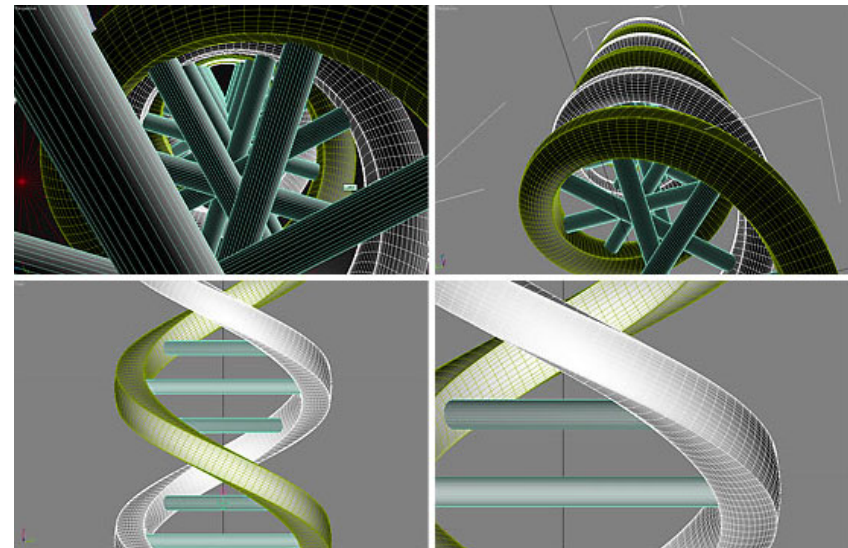
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Science and Technology Trends: Biotechnology

- New drug therapies
- Customized treatment based on DNA records
- New treatment technologies enabled by nanotech
- Fusion of man-machine
- Adversary exploitation = potential new bio hazards
- Significant policy challenges



DNA modeling & simulation reflects increasing research in genetic engineering



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Science and Technology Trends: Implications for DND/CF

- Innovation and rapid exploitation of new technologies essential
- Policy challenges of exploitation
 - How to use AI? Biotech?
- Opportunities and risks of new technology
 - Changes to organizations and structures due to application of information concepts & technologies (network versus hierarchy)
 - What current systems could become obsolete?
 - Potential for new adversarial dominance – the new arms race (commercial availability of sophisticated technologies erasing state military's edge) ?



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Military and Security Trends: Multi-nationals to Mercenaries

The growth of the knowledge-based economy has given rise to the “meta-national”: the virtual multi-national. This is a most troubling trend in the private military industry.



"Many PMFs (private military firms) operate as "virtual companies." Similar to Internet firms that limit their expenditure on fixed (brick and mortar) assets, most PMFs do not maintain standing forces but draw from databases of qualified personnel and specialized subcontractors on a contract-by-contract basis." Peter W. Singer, *Corporate Warriors: The Rise and Ramifications of the Privatized Military Industry*, 2002, p. 15.



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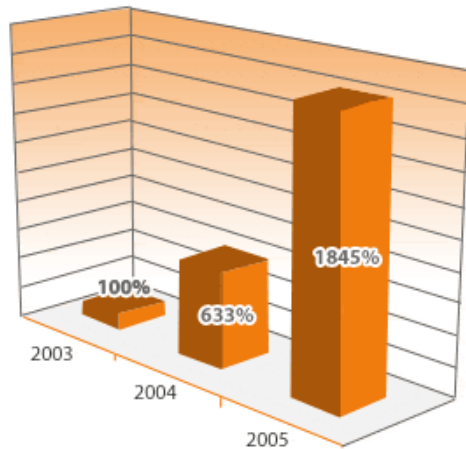
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Military and Security Trends : Asymmetric Threats

► New Bot variants detected



Over 1800% increase in **botnet** attacks in 2005

In April 2007, the first **botnet** attack of truly national proportions took place in Estonia, causing serious but temporary interruption to government, financial and commercial services.



- Impact of globalization and technology trends
- New vulnerabilities
- Terrorism



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Military and Security Trends : Weapons Proliferation

- Increasing commercialization (inc. space) provides military capability to non-state actors
- Proliferation of complex military systems
- Ubiquitous small arms, explosives and mines
- CBRN proliferation



639 million
small arms in
the World



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Military and Security Trends: Implications for DND/CF

- Wide variety of potential threats and adversaries:
 - State actors, benign NGOs, problematic non-state actors, etc.
- Expect increasing military capability of non-state actors and adversaries
- Need to understand opportunities and vulnerabilities in Cyberspace
- Asymmetric warfare will be tactic of choice to exploit state vulnerabilities



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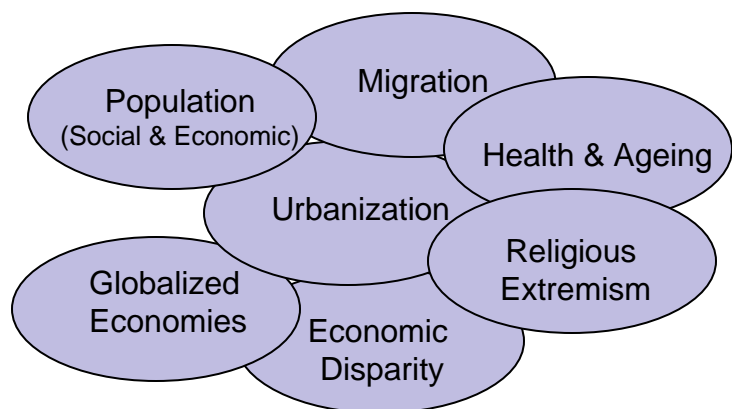
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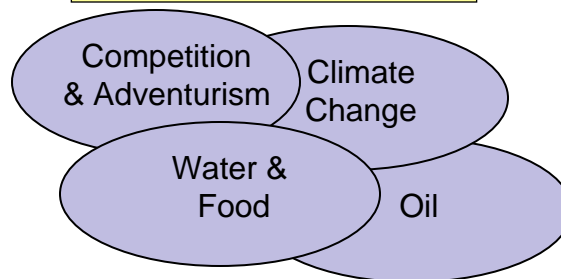


Implications for DND/CF

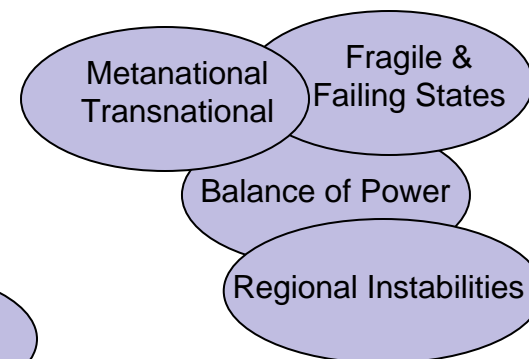
Economic & Social Trends



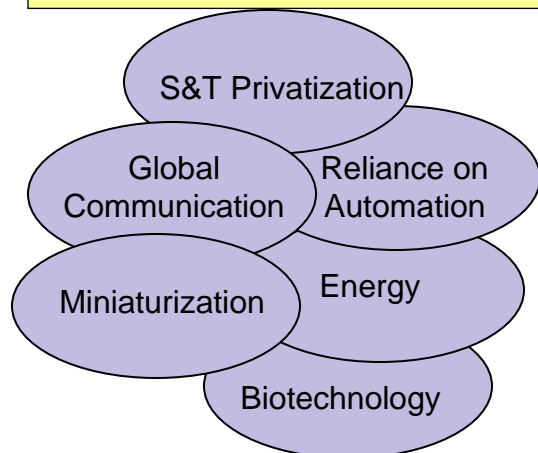
Environmental & Resource



GeoPolitical Trends

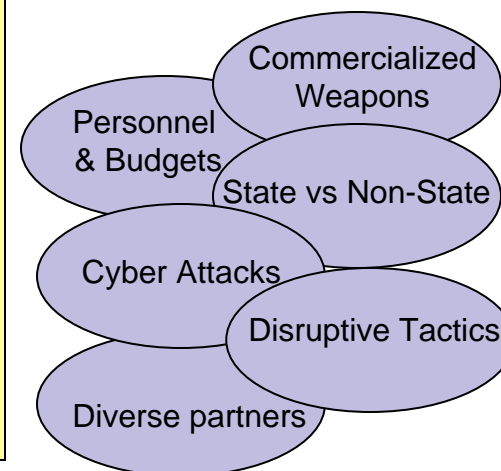


Science & Technology



**COMPLEXITY of future world
demands a
COMPREHENSIVE,
INTEGRATED, ADAPTIVE
and
NETWORKED
focus in the application of
national intent.**

Military & Security



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Scenarios



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Capability Based Planning & Scenarios

- CBP is part of a holistic FD process that begins with the development of the FSE, SOC and **FPS** set, continues with the analysis of each **scenario** and a determination of which capabilities and capacities will be required in the future. These recommendations are then prioritized and promulgated for inclusion in the Strategic Capability Roadmap.



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Scenario Background

- Scenario set approval authority - CDS
- Why scenarios?
- Why classified?
- Why “real world”?
- Scenario set development:
 - Collaborative – DND/CF input
 - Scope – Domestic, Continental, International
 - Span – Full spectrum of potential missions
 - Iterative – Scenario set will be updated



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Scenarios – The What

- The FPS set provides a representative lay down of the situations in which the CF anticipates conducting operations and allows, through the study of these scenarios, different approaches to delivering capability to be explored. The scenarios are classified and depict a range of indicative domestic, continental and international events and possibilities across the full spectrum of conflict.



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Scenario “End Users”

Examples of who & why re FPS use:

- Force development community
- Environments (strategy writing, project planning)
- DG Cap Dev (mission analysis -- opportunity for involvement in task identification)
- Project officers (cross check with FPS)
- etc



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