

DEFENCE



DÉFENSE

Strategic Defence Technologies

Science and Technology Symposium, 21-22 April 2004

John Leggat, ADM (S&T) & CEO DRDC



Defence R&D
Canada

R et D pour la défense
Canada

Canada



Outline

- **Defence R&D Canada**
- **Technology Investment Framework**
- **Transformation Concepts**
- **Technology Outlook**
- **Theme of the Symposium**
- **Outcome Expectations**

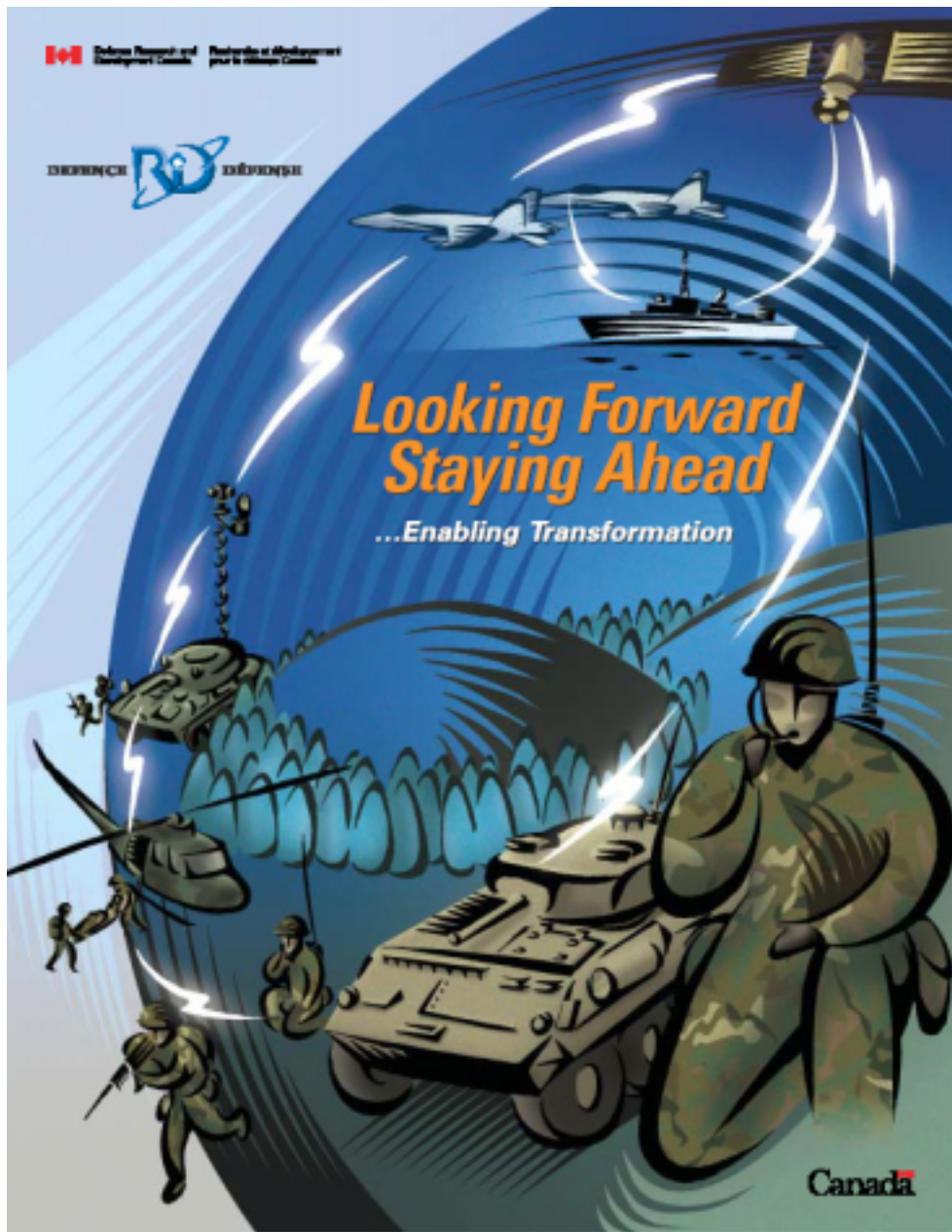


Defence R&D Canada

“To ensure that the Canadian Forces are technologically prepared and relevant.”



- ◆ *Advise on Science & Technology*
- ◆ *Conduct Defence R&D*
- ◆ *Assess technology trends, threats, and opportunities*
- ◆ *Support the Canadian Defence industrial base*
- ◆ *Conduct S&T projects with National Security partners*




 Defense Support and Development
Partnership of Excellence
pour le meilleur Canada



Looking Forward Staying Ahead

...Enabling Transformation

Canada 

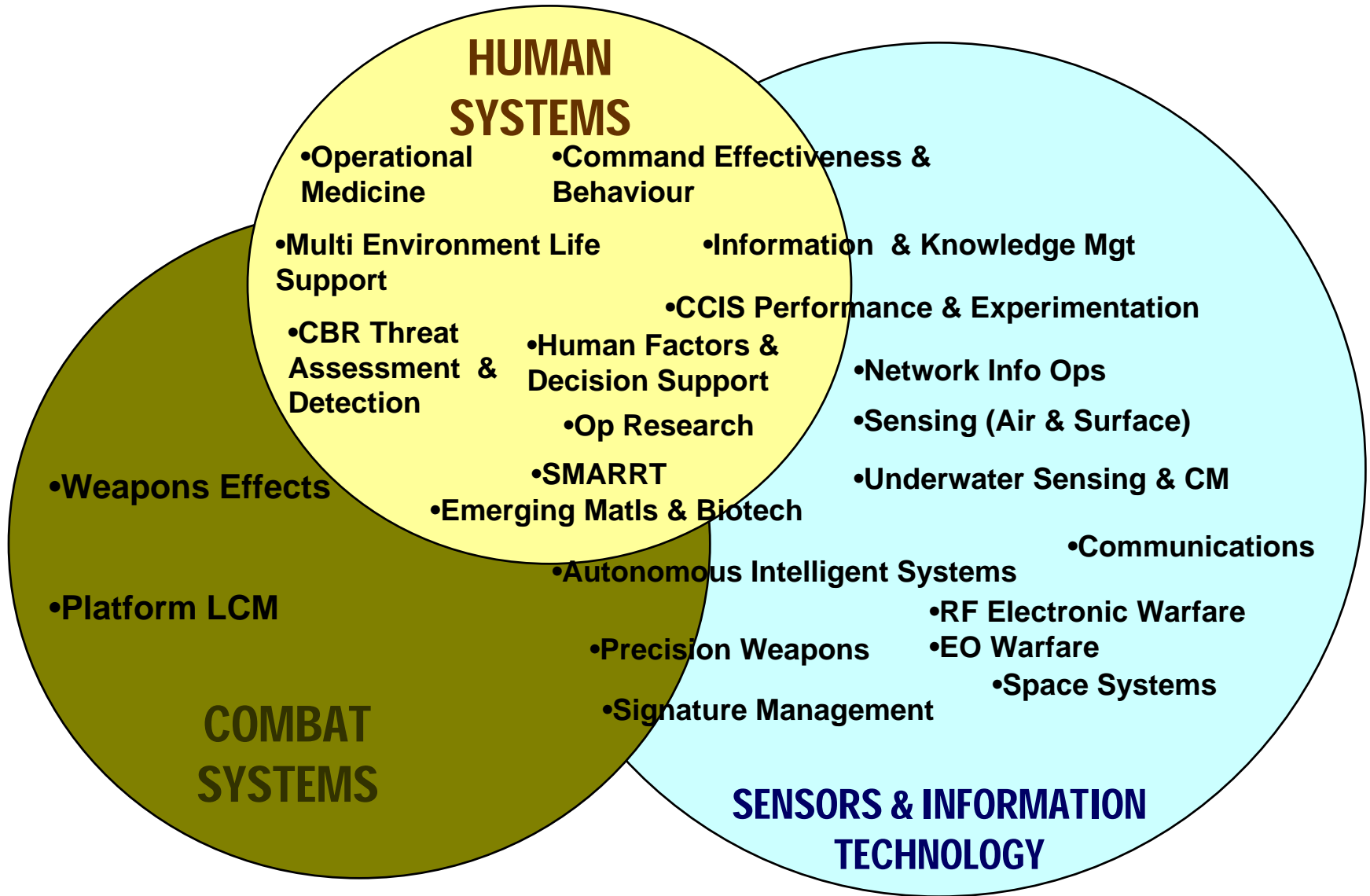


Technology Investment Framework

1. Investment in Strategic Defence Technologies
 - *Technology Investment Strategy*
2. Identification and assessment of emerging disruptive technologies
 - *Technology Investment Fund*
 - *Technology Outlook*
3. Exploiting Dual Use Technologies
 - *Defence Industrial Program*
 - *Partnering and contracting*
4. Adapting and using civilian-driven technologies
 - *Technology Demonstration and Experimentation*

Technology Investment Strategy

22 R&D Activities





Transformation Concepts

Knowledge Based Command & Sense

- Network Centric Warfare
- The Human in Command
- Effects Based Operations

Generate & Sustain Forces

- Capability-based acquisition
- SMARRT-enabled force generation
- Distributed, deployable training & mission rehearsal

Conduct Operations

- Task tailorable
- Multi-effects capable
- Precisely lethal
- Plug-and-fight coalition ready
- Autonomous operations

Force Protection

- Full spectrum protection
- Information operations
- Fratricide inoculation



Net Centric Warfare Domains

Physical Domain

where strike, protect, and maneuver take place across different environments

Information Domain

where information is created, manipulated and shared

Cognitive Domain

where perceptions, awareness, beliefs, and values reside and where, as a result of sensemaking, decisions are made

Social Domain

set of interactions between and among force entities

Cross-Cutting Domain





TTCP Net Centric Warfare Priority R&D Issues

- Understanding decision-making at all levels;
- Concept Development and Experimentation;
- Operational situational awareness (intelligence, sensors, fusion, etc);
- Countermeasures and counter-countermeasures, from components to systems;
- Information/data management;.
- Network connectivity, including bandwidth management;
- Autonomous, self-organising sensors; and
- Network-enabled lethal and non-lethal weapons, and information operations.



Human in Command: Adaptive Intelligent Interfaces



- The next big challenge
- Management of
 - Time
 - Knowledge
 - Attention
- What's good...what is to be avoided?
- Where is the book on designing Adaptive Intelligent Interfaces?

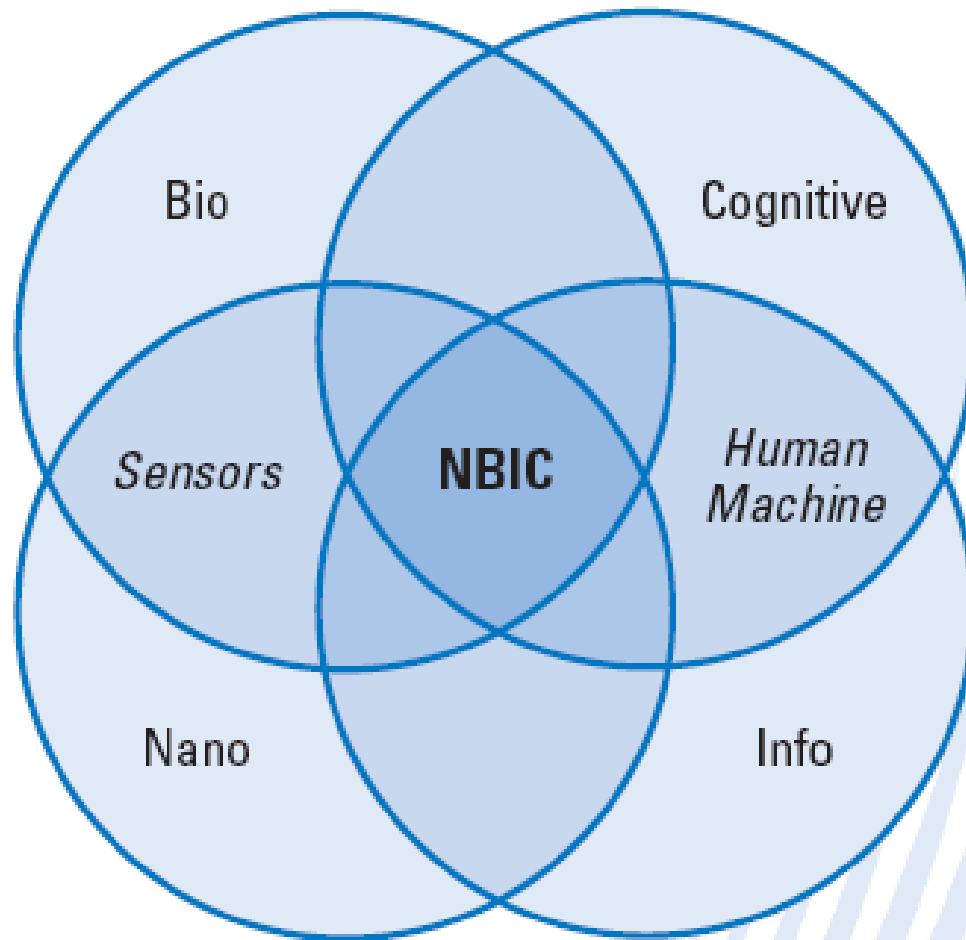


Technology Outlook: Concepts and Technologies currently being assessed

- **Convergence of nano/bio/info/cognitive (NBIC) technologies;**
- Non-Conventional/Non-Lethal Weapons;
- Technology for Advanced Logistics;
- Autonomous Intelligent Systems;
- Quantum Computing and Encryption;
- Exploitation of Massive Computing;
- Full Spectrum Camouflage;
- Sensors/activators to monitor and improve health and cognitive abilities;
- Next Generation Internet;
- Advanced Power Sources.



Nano-Bio-Info-Cognitive (NBIC) Technologies





Some Possible Technology Convergence Outcomes

- Expanded Human Cognition and Communications, e.g.
 - Rapid learning
 - Translation Implants
 - Brain-to-Machine Interface
- Improved Human Health and Physical Capabilities, e.g.
 - Nano Biosensors to monitor and repair bodily functions
 - Increasing human sensor capabilities
- Swarming Nano Autonomous Intelligent Systems



Theme of the Symposium:

*Computers Everywhere and In Everything:
exploring the intersection of cyberspace and life and the
implications for Defence and Security*

Presentation topics will include the following areas:

Global Information Grid out to Year 2010

Complexity and Chaos

Convergence of Nano, Bio, Info and Cognitive Technologies

Next Generation Computing and the Internet

Direct Brain-Machine Interface

Legal, Social and Ethical Interface: Issues in Biosystems

Imagined Worlds



Outcome Expectations

- Engagement of the Defence Community in discussion of Science and Technology Issues;
- Identification of Collaborative Opportunities;
- Indicators for future Research & Technology Investments.