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ICCRTS - Network Centric Applications

Aerospace Surveillance and Battlespace Management in 2023: The Impact of Social and Technological Change

Thea Clark

Daniel Hall

Neill Smith

Defence Systems Analysis Division

Defence Science & Technology Organisation (DSTO) Australia

Presented by John O'Neill at 8th ICCRTS Washington, June 2003

Introduction

- This presentation provides:
  - A brief description of Aerospace Surveillance & Battlespace Management
  - An overview of the research task that the work described in this paper contributes to, and
  - A summary of some of the findings from the first phase of the research task

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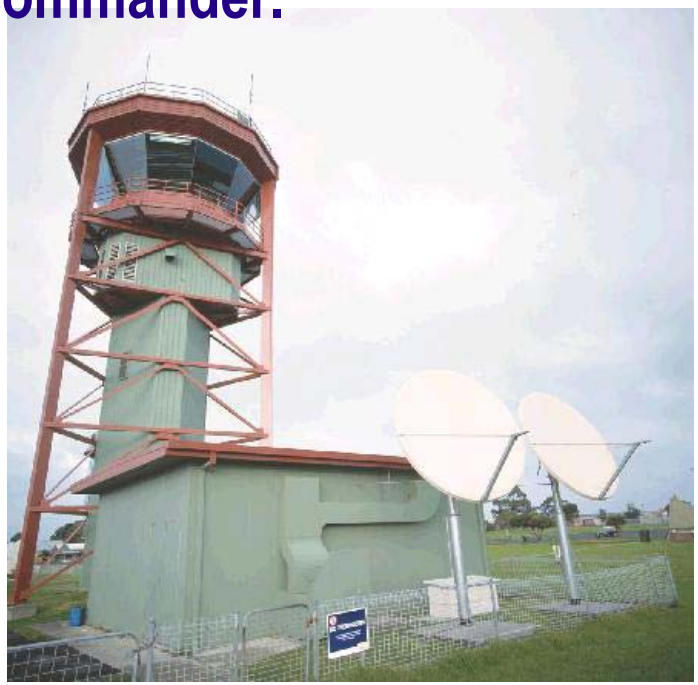
Where Does Aerospace Surveillance and Battlespace Management Fit?

- Recognised as one of four aerospace capability areas for the Royal Australian Air Force:
  - Offensive Combat
  - Flexible Combat Support
  - Rapid Mobility
  - Aerospace Surveillance & Battlespace Management (ASBM)

What is ASBM?

- Aerospace surveillance
- Compilation and dissemination of Recognised Air Picture (RAP) and other information products.
- Management of Air and Space Assets to achieve effects required by the operational commander.
  - Air Traffic Control (ATC)
  - Tactical control of assets.
  - Higher level planning and management.



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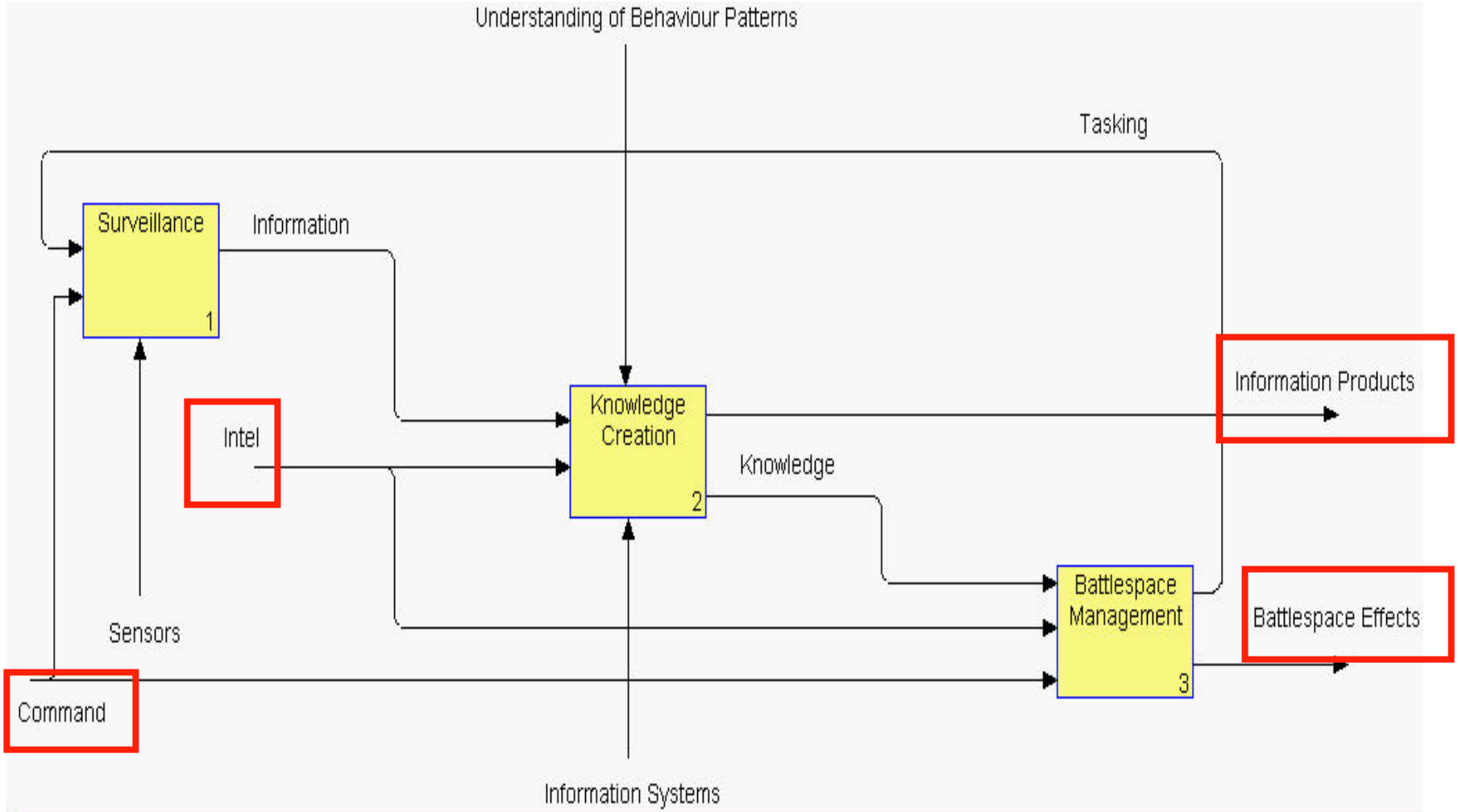
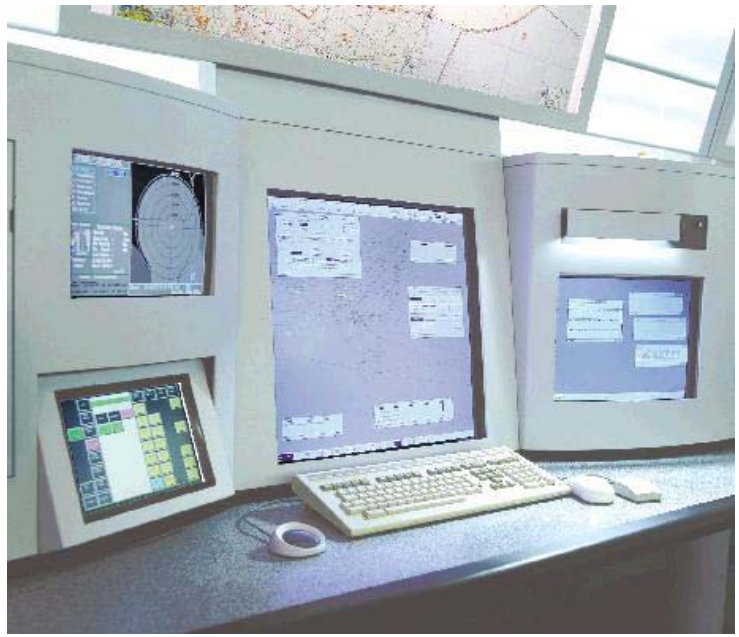
What is ASBM?



NCW and ASBM

- The ADF has outlined its vision for the future in the *Force 2020* document.
- The key aspirational concepts for NCW (as per *Force 2020*) are:
  - A geographically dispersed force
  - *A knowledgeable force*
  - An effectively linked force
  - A force designed for networking

These concepts are fundamental to ASBM.



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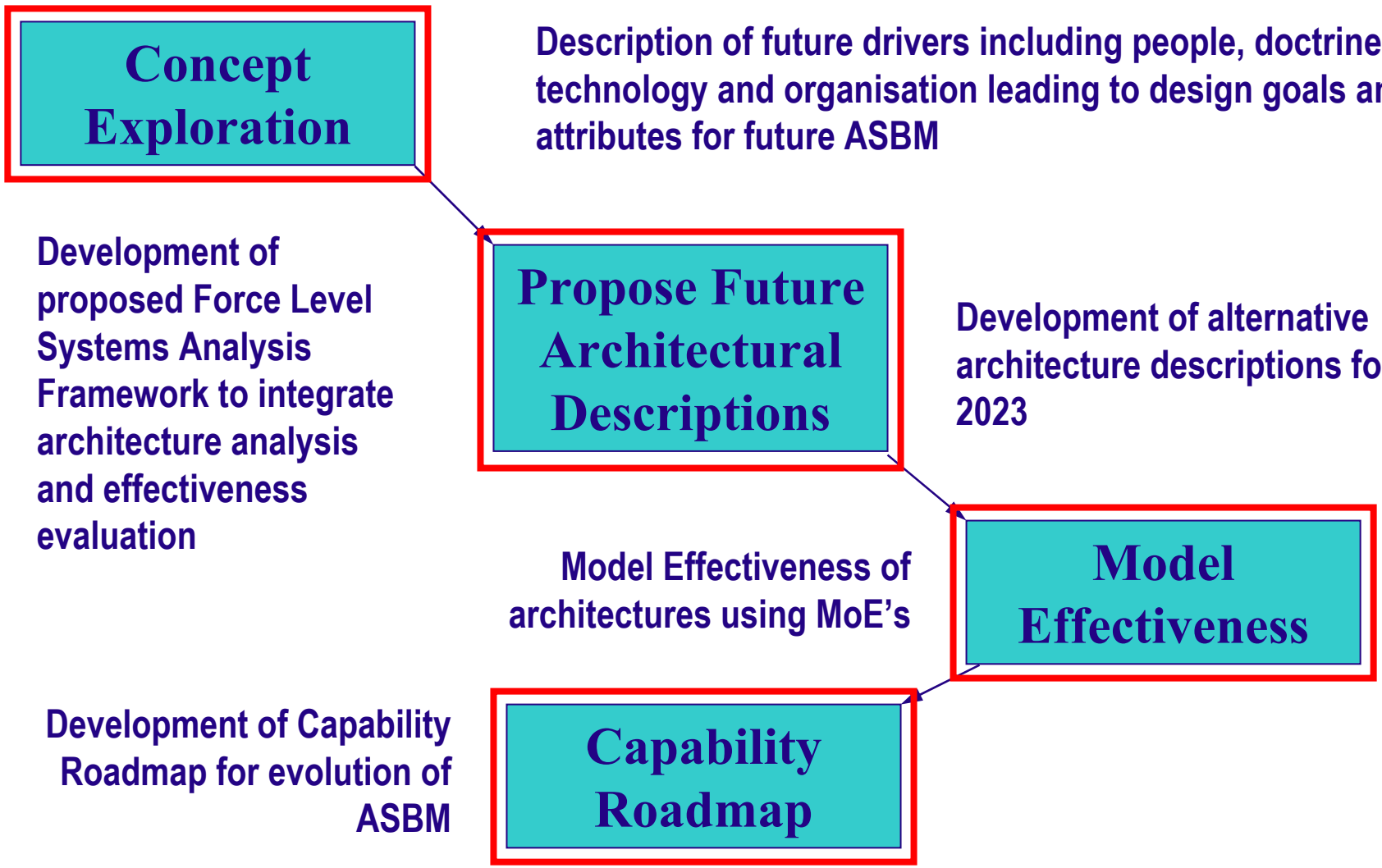
Research Task – Systems Studies for ASBM



Concept Exploration

- This is where we're at now…
  - This Paper contributes to Concept Exploration by:
    - Identifying an "Ideal" ASBM capability
    - Identifying "Future Drivers" that will "push" the capability area
    - Discussing the "Risks and Challenges" facing the development of ASBM
    - Comparing the Ideal case, a more likely ASBM configuration in 2023 and the current capability

The "Ideal" ASBM

- Characteristics were divided into three categories:
  1. Operational
  2. System / Technology
  3. Organisational / Management
- Does not yet incorporate Measures Of Effectiveness (MoEs)…

Operational Ideal

- Seamless Joint Operations
- Seamless Coalition Operations
- Training and mock scenarios are integrated into normal working patterns.

- The force is designed for NCW techniques and organisation and doctrine is in place to support them.
- Sensor and control systems are deployable at short notice to provide services at forward operating bases.

System / Technology Ideal

- Robust, resilient and agile ASBM architecture
- Sensors – size, resolution, active/passive, range of targets
- Widespread automation that doesn't reduce the Situational Awareness of key personnel
- Prevalent unmanned platforms with high levels of autonomy
- Communications links with adequate bandwidth, reach and protection for any foreseeable deployments

Organisational / Management Ideal

- Management structure chosen to minimise information overload and to maximise decisiveness.
- Whole-of-Government responses and long-term collaborative partnerships in place with other government departments, agencies and non-military organisations.
- Pay and reward structures match those of comparable commercial enterprises - focus on skill acquisition and staff retention.

Future Drivers & Issues

- Divided into the following categories:
  - Strategic & Operational
  - Technological
  - Organisational
  - Societal Change

Strategic & Operational

- Government's push for a more expeditionary force
  - Leads to requirements for a more interoperable force (coalitions).
  - A more deployable and sustainable force.
  - Potential for coalitions with regional defence forces.
    - May see Australia taking a lead role in providing, in-theatre, ASBM support.
- Greater breadth of operations (non-state actors), greater operational tempo.
- Whole-of-Government approach to defence (surveillance in particular).

Technology

- Computing and Communications
  - Growth laws: Moore & Gilder.
  - Semantic web, pattern recognition, decisions aids, pervasive computing, TADILS, proliferation of high-bandwidth satellite links.
- Sensors
  - Over-The-Horizon Radar, Surface Wave Radar.
  - Greater contribution from passive sensors in the future (acoustic aircraft tracking, ESM, SBIRS).
  - Counter-stealth technology
- Platforms
  - Autonomous UAVs
  - JSF ~ RAAF's first stealthy platform…

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Organisation

- Knowledge work
  - Less hierarchy
  - Staff retention
  - Flexible working conditions

Societal Change

- Australia's ageing population
  - Smaller recruitment pool for Defence
  - Higher ratio of non-working (retired) to working people in the future.
    - Pressure on revenue through income tax.
    - Increased spending on health / welfare.
    - More pressure on the Defence budget.
- Increasing proportion of Australians will be born overseas.

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Risks, Challenges and Possible Solutions

- Rapid Technological Change
- Cognitive Overload
  - Solutions: Decision aid technology, clever automation, organisational structure.
- Interoperability
- Financial constraints
  - Solutions: smart procurement.

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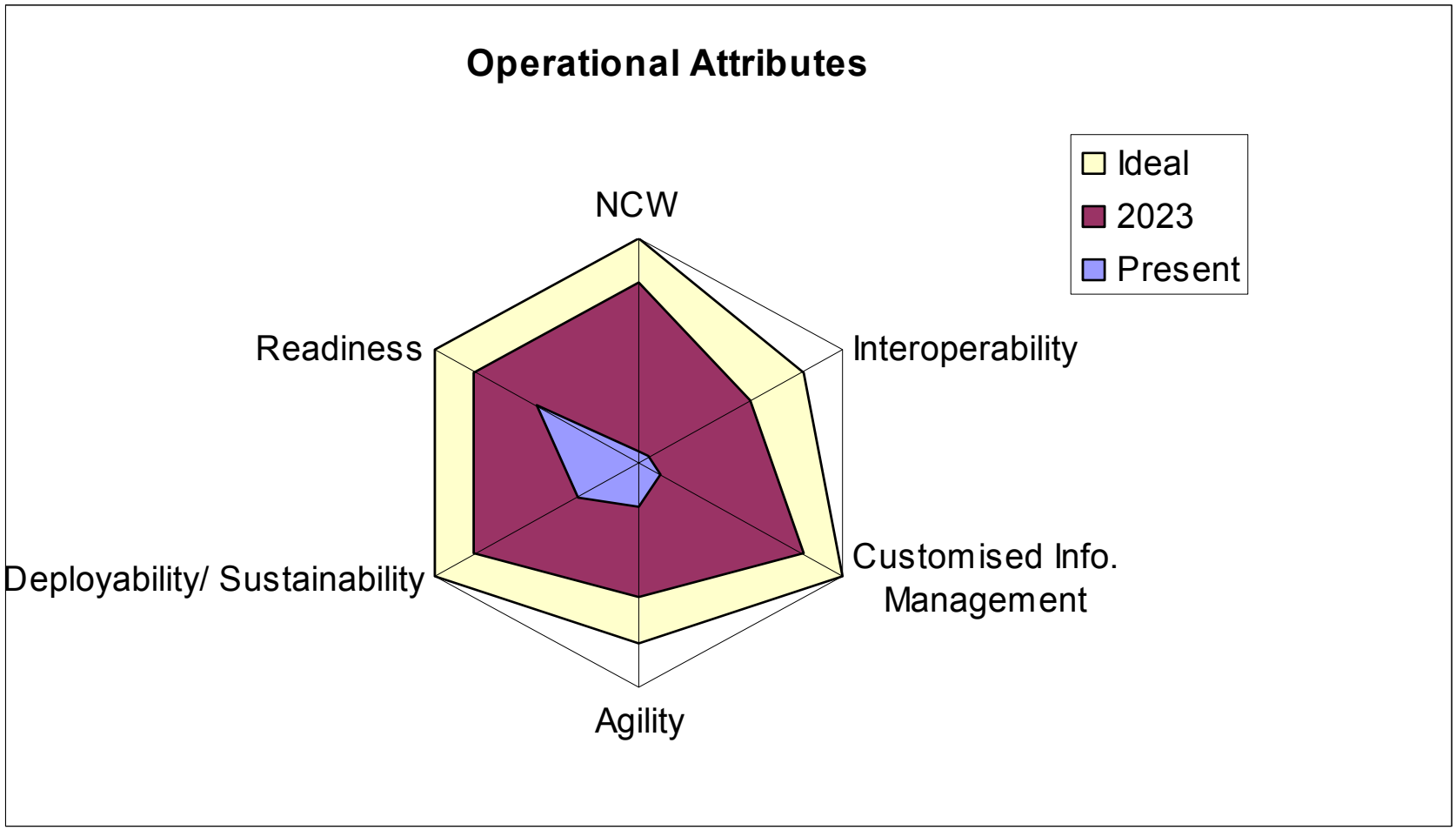
Evolution of ASBM Attributes



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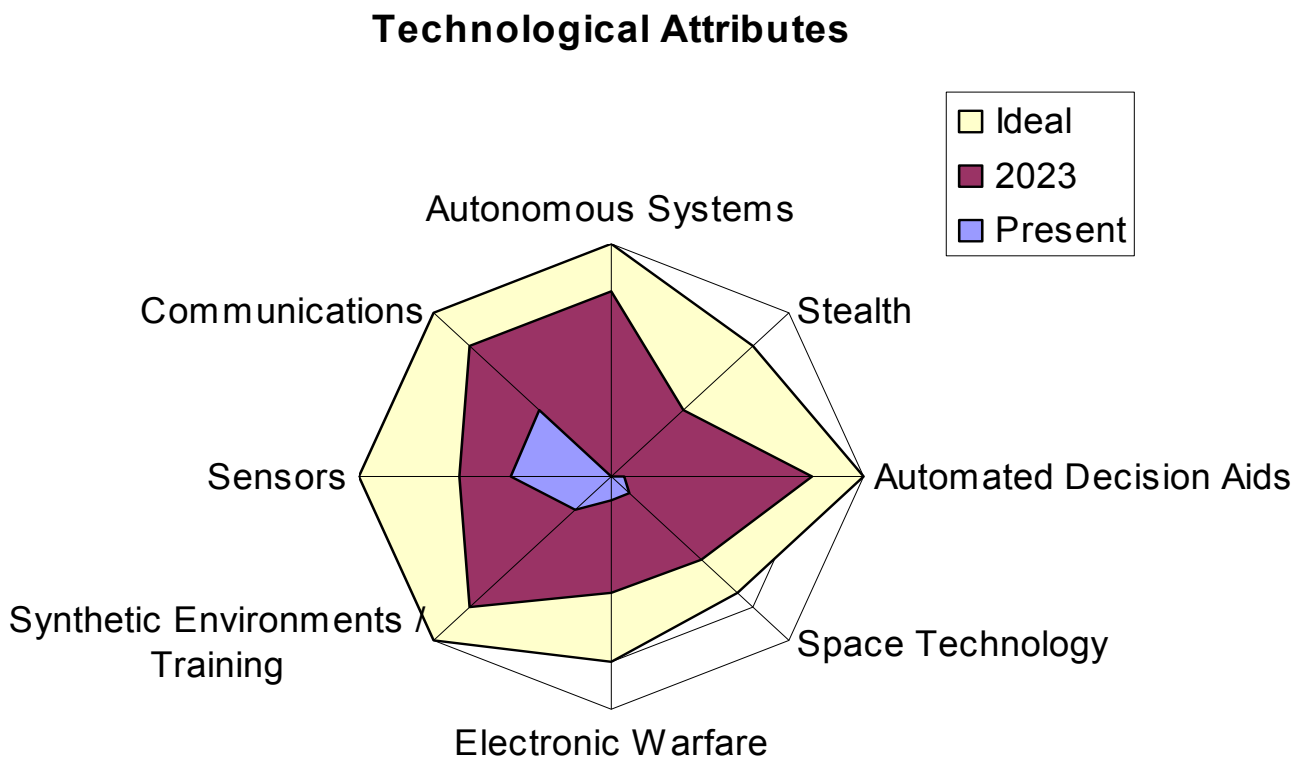

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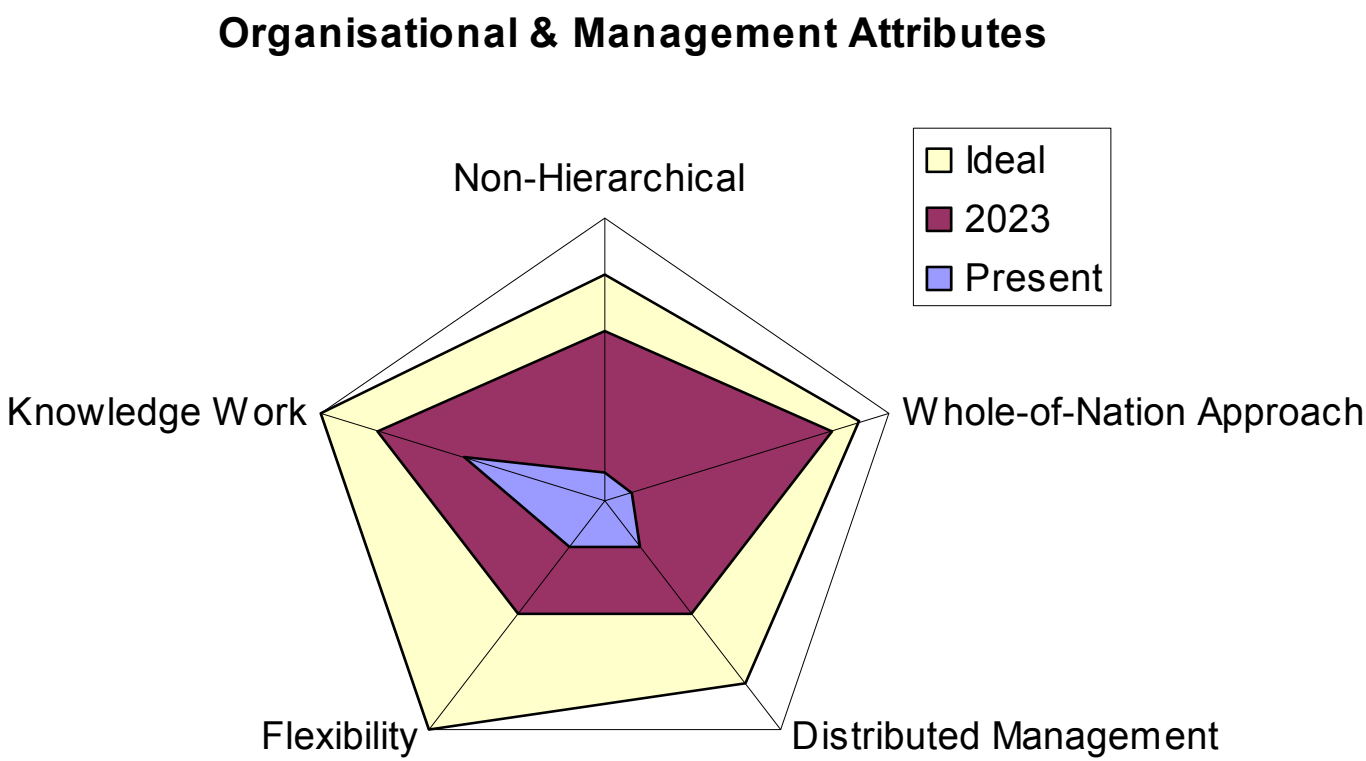

Conclusions / Further Work

- Developing the ASBM capability area is essential if the Australian Network Centric force described in *Force 2020* is to be realised.
- This paper has identified a number of potential capability gaps and areas that will require further research and development.
- Continuation of work:
  - Develop a set of MoEs for ASBM
  - Develop and evaluate a small number of future ASBM architectures
  - Construct a roadmap for development

Questions?