C4ISR Design and Operational Design Patterns

Systems Modelling Conference
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C4ISR Design
CIT&E, FID, ADF HQ
Department of Defence
Overview

- C4ISR Design Authority
- C4ISR Design Approach
- Operational Design Patterns (ODPs)
- System Modelling Challenges
- Feedback from Users

C4ISR Design Vision

Enhancing Future Joint Force Integration by developing a C4ISR design for Defence to fight in a complex, congested and contested operating environment
C4ISR Design Authority
Providing Guidance from the Centre

Industry Partners and Other Government Agencies

Groups and Services
  - Joint Concepts and Doctrine
  - Integrated Investment Program
  - Capability Program Narratives
  - Operational Design Patterns

Strategic Centre

Integration and Interoperability

Operational Design Patterns
C4ISR Design

Base-line comprehensive Future Design

Initial Systems Modelling Approach
C4ISR Design

Base-line comprehensive Future Design

Initial Systems Modelling Approach

Repeatable patterns, rules and guidance

Current Systems Modelling Approach
C4ISR Design Approach

• Focus on how we should do C4ISR
  – for small focused areas
  – to answer specific questions
  – or address known gaps or lessons learned
C4ISR Design Approach

• Focus on how we should do C4ISR
  – for small focused areas
  – to answer specific questions
  – or address known gaps or lessons learned

• Operational Design Patterns
  – What we need to do
  – Not rigid architectures
  – Sets of rules that can be applied as new capability or operational requirements are identified
  – Criteria to be considered when acquiring new capabilities
  – Enduring
Operational Design Patterns

Aim – to guide designers, developers and deliverers to consider how their capability integrates into the Joint Force.

ODPs consist of one or more of the following:

• A logical design
• Taxonomy of factors and logical nodes
• Roles and responsibilities of logical nodes
• Criteria or rules of relationships
• Information exchange needs
• A decision framework
System Modelling Challenges

1. A Suitable Systems Modelling Tool
2. Decision Frameworks
3. Modelling Decision Frameworks
4. Automating Objective Force Analysis
A Systems Modelling Tool

- Basic Architecture Diagrams
  - DoDAF Views OV-1, OV-2, OV-3

- Maintain consistent use of terminology and relationships

- What tools can help us model Decision Frameworks?
Decision Frameworks

• Guidance Without Restricting Innovation
• Efficient ways to describe how to use ODPs
• A tool to explain and guide the user on how to apply the pattern.
• Offer sufficient level of systems modelling without requiring the users to have a Systems Engineering Degree
Modelling Decision Frameworks

• Decision Frameworks come in many forms
  – Flow Diagrams, Decision Matrices, Tables, Karnaugh Graphs
Modelling Decision Frameworks

- Decision Frameworks come in many forms
  - Flow Diagrams, Decision Matrices, Tables, Karnaugh Graphs
- How do we automatically pass Design Options through Decision Frameworks?
Objective Force Analysis

Analysis of the Objective Force Against the ODP

- How platforms and capabilities relate to the logical nodes in the ODP
- Technologies in the force that can meet the ODP guidance
- Gaps and opportunities

- Automate the passing of Design Options:
  - Customised Scripting Vs Generic Tool Support
Feedback from Users

• “I see this ODP being a very important document for aiding the discussion on the capability needed to support ADF needs.”

• “We can use the ODP to determine what capability is needed to support various operational configurations.”

• “The ODPs set out to be as comprehensive as possible with regard to the purpose of the docs and the strategic alignment and consideration for the many influencing factors at play.”
Questions?

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The role of ODPs

Force Design

Joint Concepts and Doctrine

IIP

C4ISR Design Strategy

C4ISR Design Priorities

Analysis

C4ISR Gaps & Opportunities

V&A (Projects and Programs)

JFA Directives

CMs

Services & Other Defence Groups

SMEs

Force Integration

Integration Target States

O2A

JICA

C4ISR Design