



AUSTRALIAN  
DEFENCE FORCE

# C4ISR Design and Operational Design Patterns

Systems Modelling Conference  
4th October 2018

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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

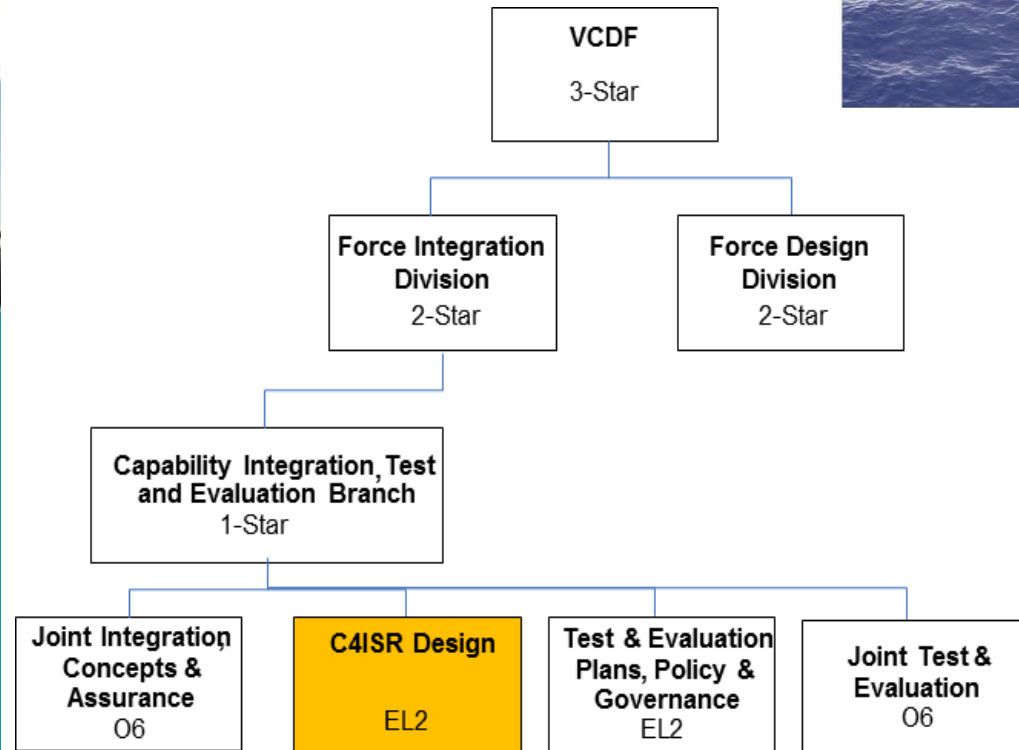


**C4ISR Design Vision**

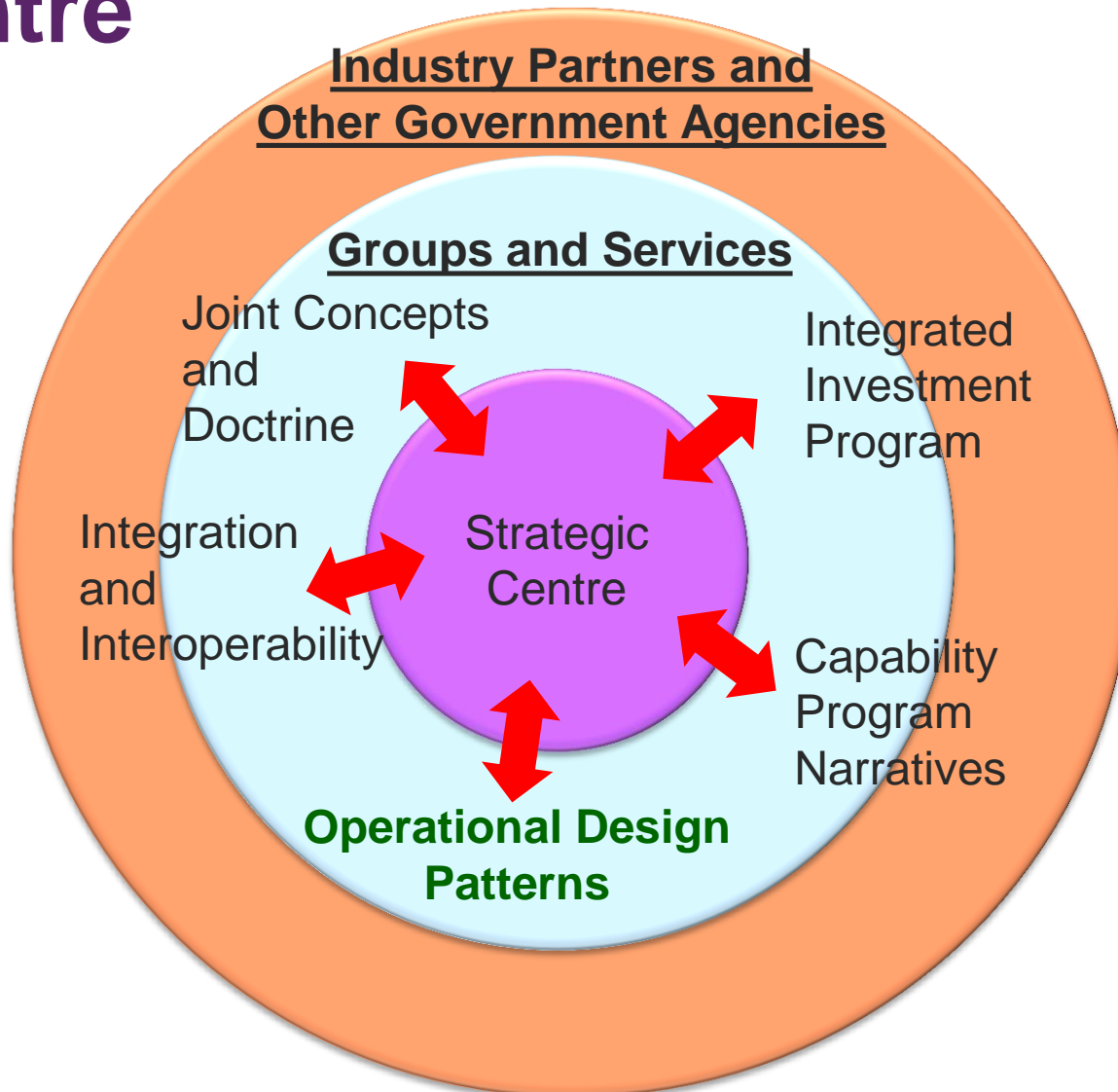
*Enhancing  
Future Joint Force Integration  
by developing a **C4ISR design for Defence**  
to **fight in a complex, congested  
and contested operating  
environment***

The graphic features a central text block with a background of binary code. To the left is the Royal Air Force crest, and to the right is an F-35 fighter jet. Below the text are three images: a soldier in a desert environment, a large naval ship at sea, and a cloudy sky. A small blue, red, and white bar is at the bottom left.

# C4ISR Design Authority



# Providing Guidance from the Centre



# C4ISR Design

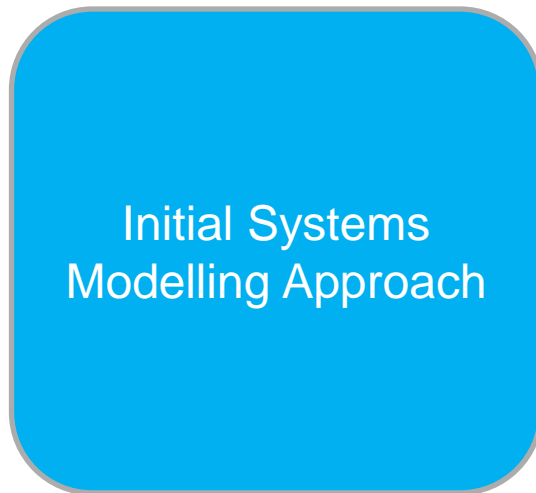
Base-line comprehensive  
Future Design

Initial Systems  
Modelling Approach

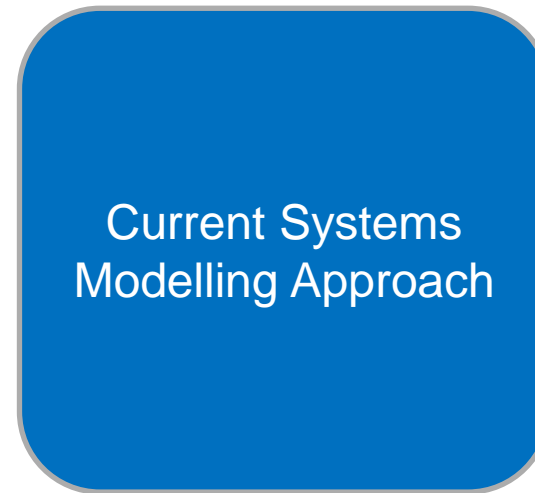


# C4ISR Design

Base-line comprehensive  
Future Design



Repeatable patterns,  
rules and guidance





# 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

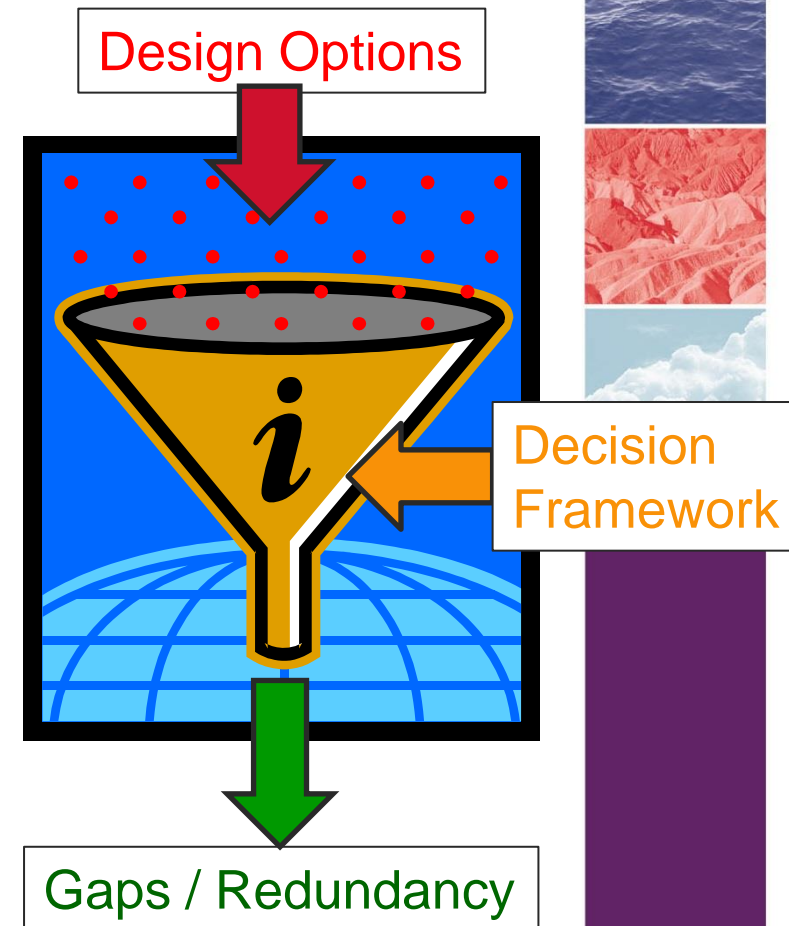
- Decision Frameworks come in many forms
  - Flow Diagrams, Decision Matrices, Tables, Karnaugh Graphs



Decision Framework

# 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

