

[dstl]

07 August 2014

© Crown copyright 2014 Dstl



Ministry
of Defence

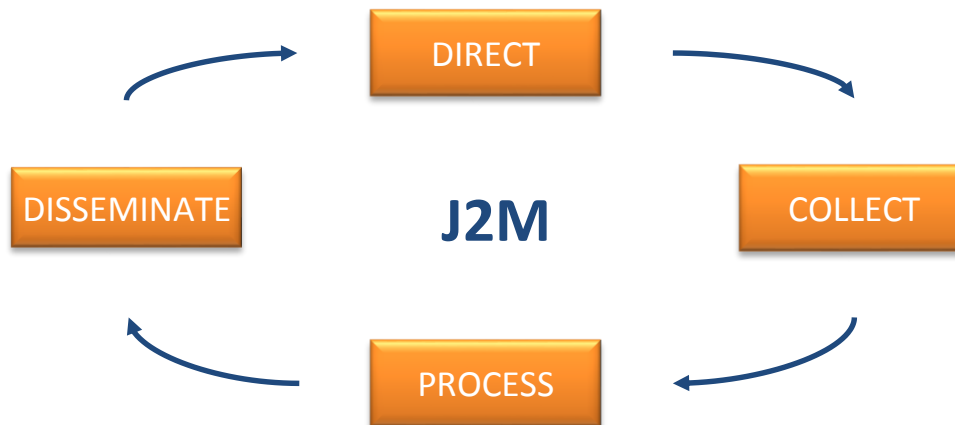
Searching for the ISR Holy Grail

Ruth Carpenter
C4ISR Analyst

ISMOR - 31st July 2014

Background (1)

- Intelligence, Surveillance and Reconnaissance (ISR) is an essential enabler
- Dstl's J2M model is a key tool for assessing scenario specific ISR tasks in the context of the DCPD cycle



Background (2)

- J2Ms outputs include:
 - The percentage of satisfied ISR tasks (Intelligence Requirements)
 - Reasons for failure (e.g. analyst, collector, comms bearer)
- “Better ISR: so what?”
- No exploitable understanding of how the fulfilment of these tasks relates to campaign outcome
 - E.g. Better battle damage assessment: so what?
 - J2M focus but problem across the ISR domain

Background (3)

- Two methods developed to answer the “Better ISR: so what?” question
 - Linking Intelligence Requirements to the Defence Tasks
 - Linking Intelligence Requirements to the Campaign End-state

Linking IRs to Defence Tasks

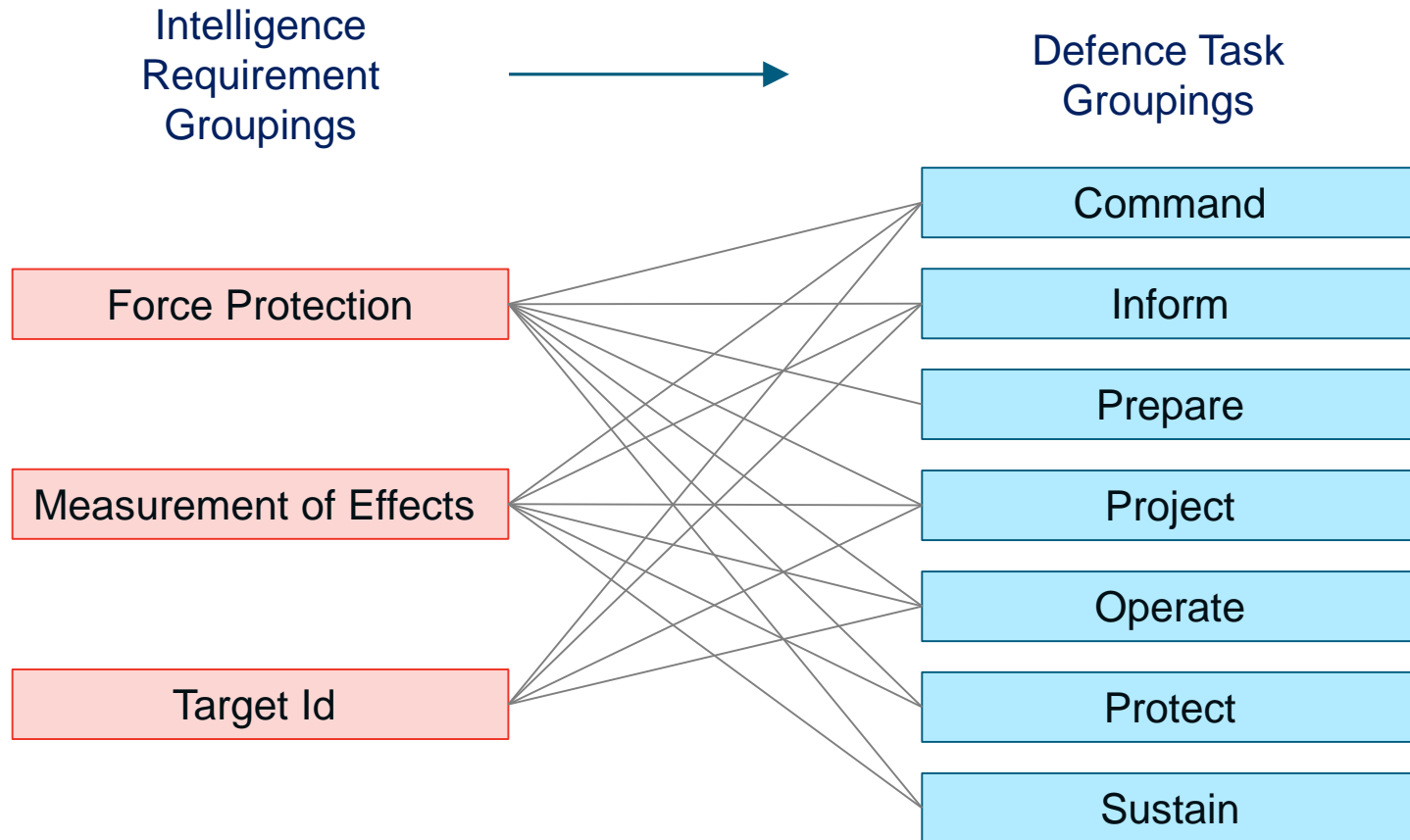
Linking IRs to Defence Tasks (1)

- What is an Intelligence Requirement?
 - A military commander’s request for intelligence
 - E.g. “Conduct battle damage assessment” and “Identify targets”
 - 50 per day in a typical J2M scenario
- What is a Defence Task?
 - 26 tasks that “differentiate defence from other government departments” (DIRM)
 - E.g. “Prosecute, or constrain the movement, of targets” and “Collect ISR”

Linking IRs to Defence Tasks (2)

- Analyst generates a spreadsheet linking the Intelligence Requirements to the Defence Tasks
- Hold a military judgment panel to review these links
 - Does meeting the Intelligence Requirement support the Defence Task?
 - E.g. Does "Conduct battle damage assessment" inform "Prosecute, or constrain the movement of, targets"
 - Is the link 'essential', 'beneficial' or 'not required'?

Linking to Defence Tasks (3)



Linking to Defence Tasks (4)

- Produce tables stating how many ‘essential’ and ‘beneficial’ links there are in each group

	Force Protection	Measurement of Effects	Target Id
COMMAND	4	10	4
•	•	•	•
•	•	•	•
•	•	•	•
OPERATE	10	21	7
•	•	•	•
SUSTAIN	4	7	0

Linking to Defence Tasks (5)

- Calculate the percentage of 'essential' and 'beneficial' Intelligence Requirements met for a given force mix

	Force Protection	Measurement of Effects	Target Id
COMMAND	95 %	29 %	32 %
•	•	•	•
•	•	•	•
•	•	•	•
OPERATE	95%	37%	46%
•	•	•	•
SUSTAIN	95 %	49 %	-

Linking to Defence Tasks (6)

- Limitations
 - Military advisors required for a day long workshop
- Strengths
 - Relatively quick
 - Answers the “Better ISR: so what?” question
 - Can be used to identify whether or not there are any obvious gaps in the Intelligence Requirements
 - Can be applied to any scenario or vignette
 - Uses MoD defined data such as Defence Tasks

Background (3)

- Two methods developed to answer the “Better ISR: so what?” question
 - Linking Intelligence Requirements to the Defence Tasks
 - **Linking Intelligence Requirements to the Campaign End-state**

Linking Intelligence Requirements to Campaign End-state

Linking to Campaign End-state (1)

- Identify the Supporting Effects
 - "Control of the sea achieved"
 - "Blue ports and airfields protected"
- Identify the Decisive Conditions
 - "Access to region secured"
 - "Red aggression defeated"



Linking to Campaign End-state (2)

- Identify the Campaign Objectives
 - "Red defeated"
 - "Freedom of action maintained"
- Identify the Campaign End-state
 - "Pre-crisis territorial boundaries restored"



Linking to Campaign End-state (3)

- Link the Supporting Effects to the Decisive Conditions
 - "Control of the sea achieved" supports "Red aggression defeated"
- Link the Decisive Conditions to the Campaign Objectives
 - "Red aggression defeated" supports "Red defeated"

Intelligence
Requirements

Supporting
Effects



Decisive
Conditions



Campaign
Objective

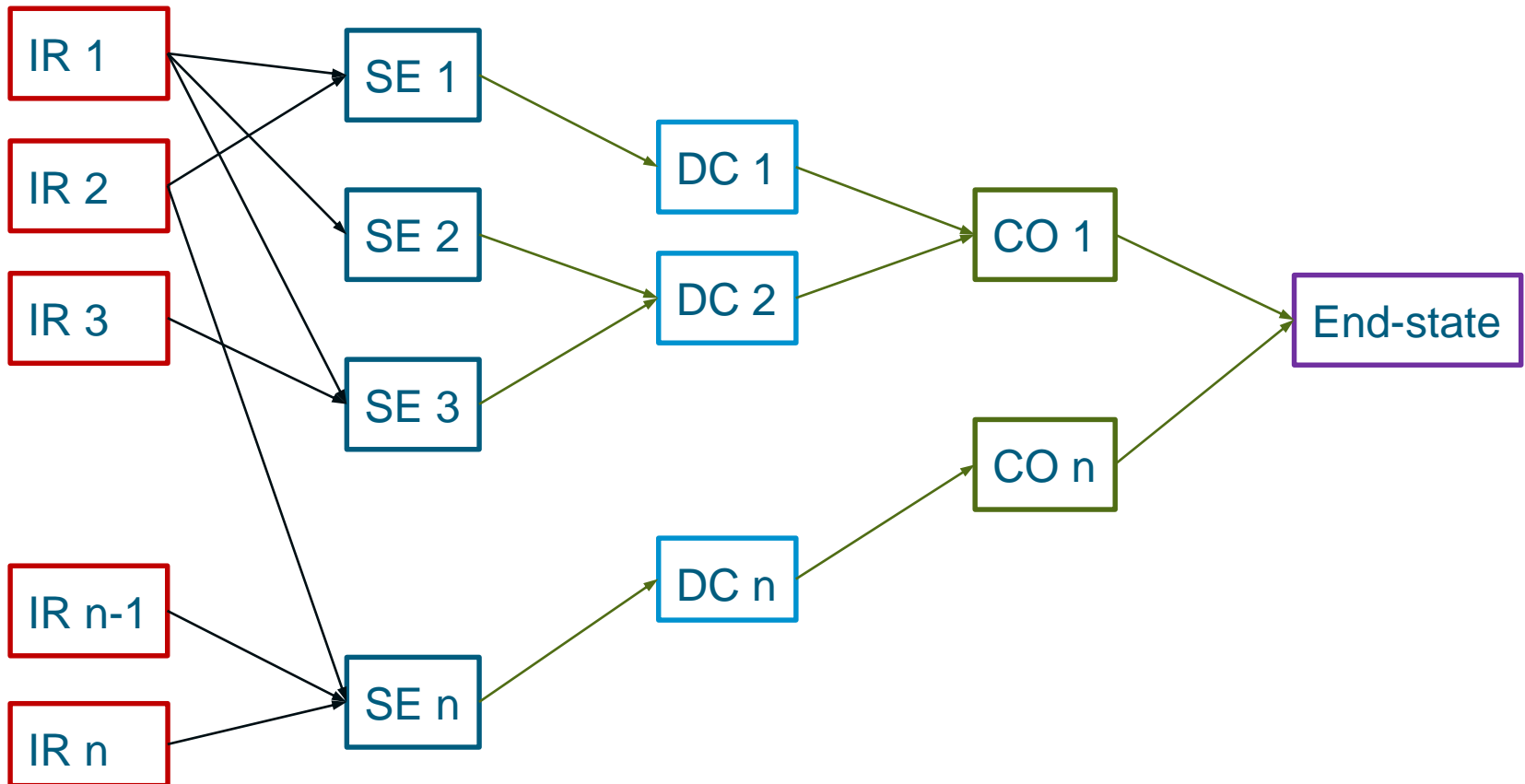
End-state

Linking to Campaign End-state (4)

- All Campaign Objectives link to the End-state
 - "Red Defeated" and "Freedom of action maintained" support "Pre-crisis territorial boundaries restored"
- Link the Intelligence Requirements to the Supporting Effects
 - "Identify targets" informs both "Control of the sea achieved" and "Blue ports and airfields protected"

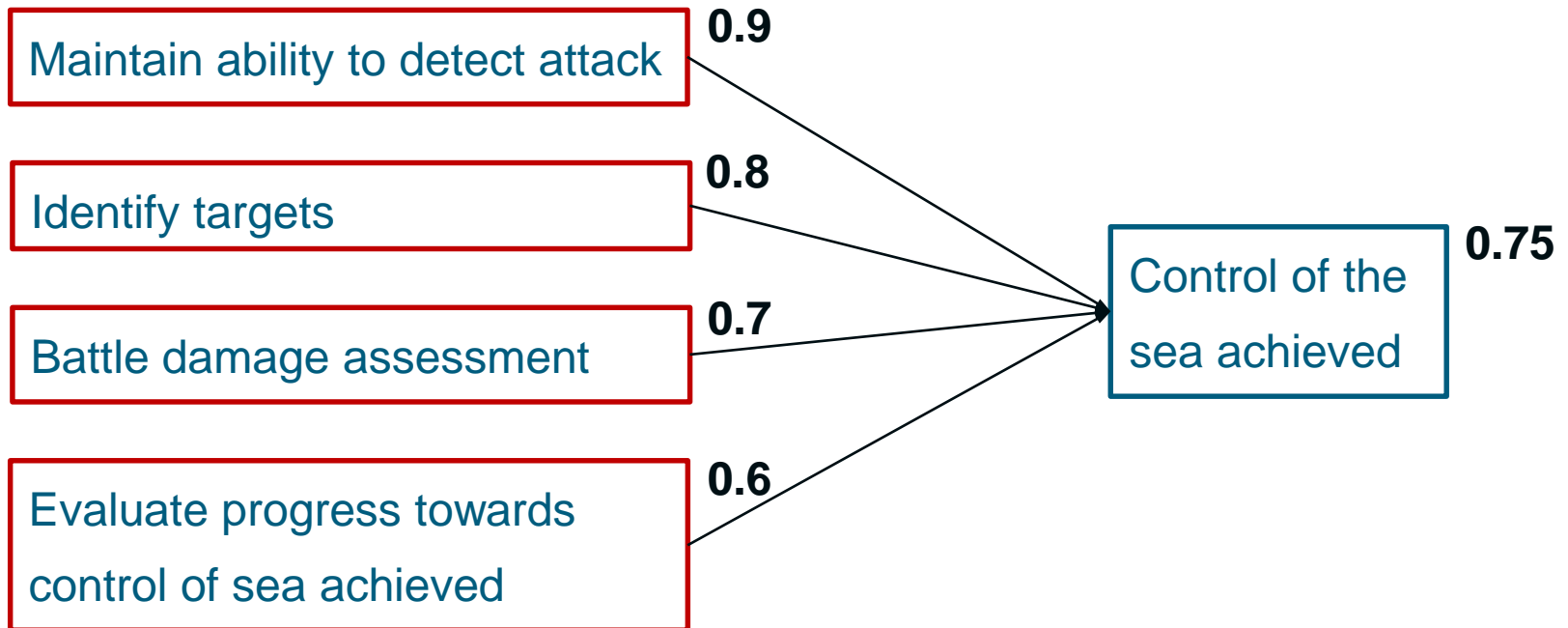


Linking to Campaign End-state (6)



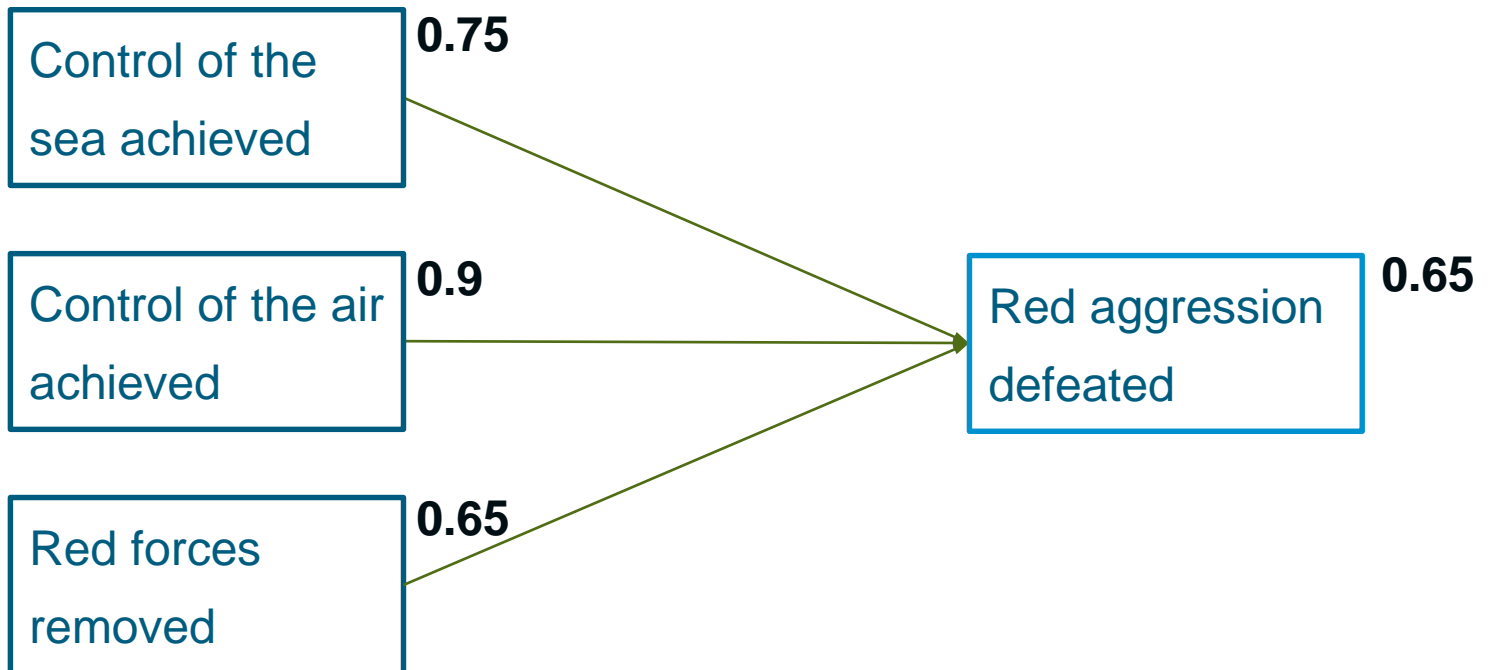
Contingent relationships

$$V_{\text{parent}} = (V_1 + V_2 + \dots + V_n)/n$$

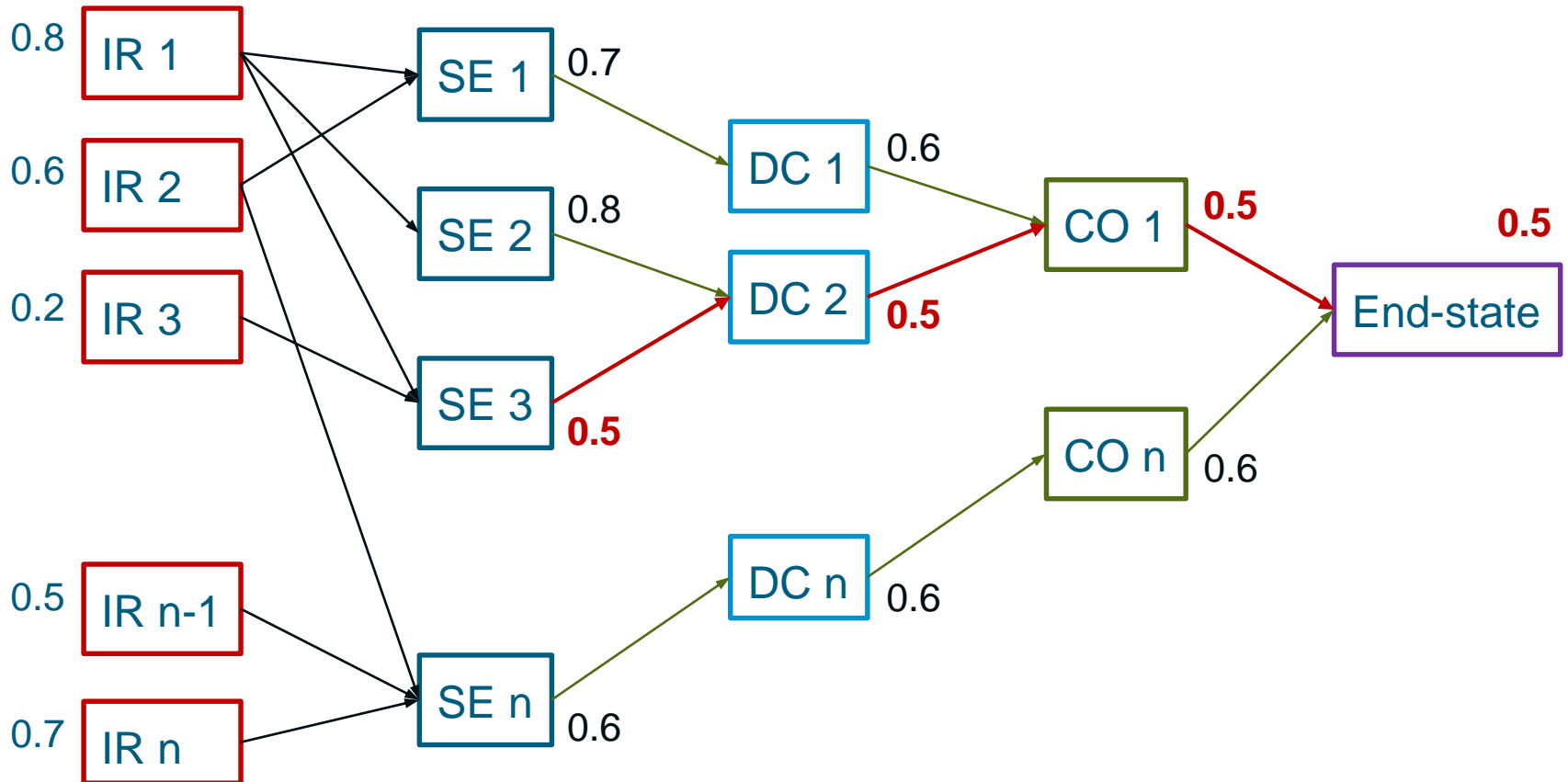


Compounding relationships

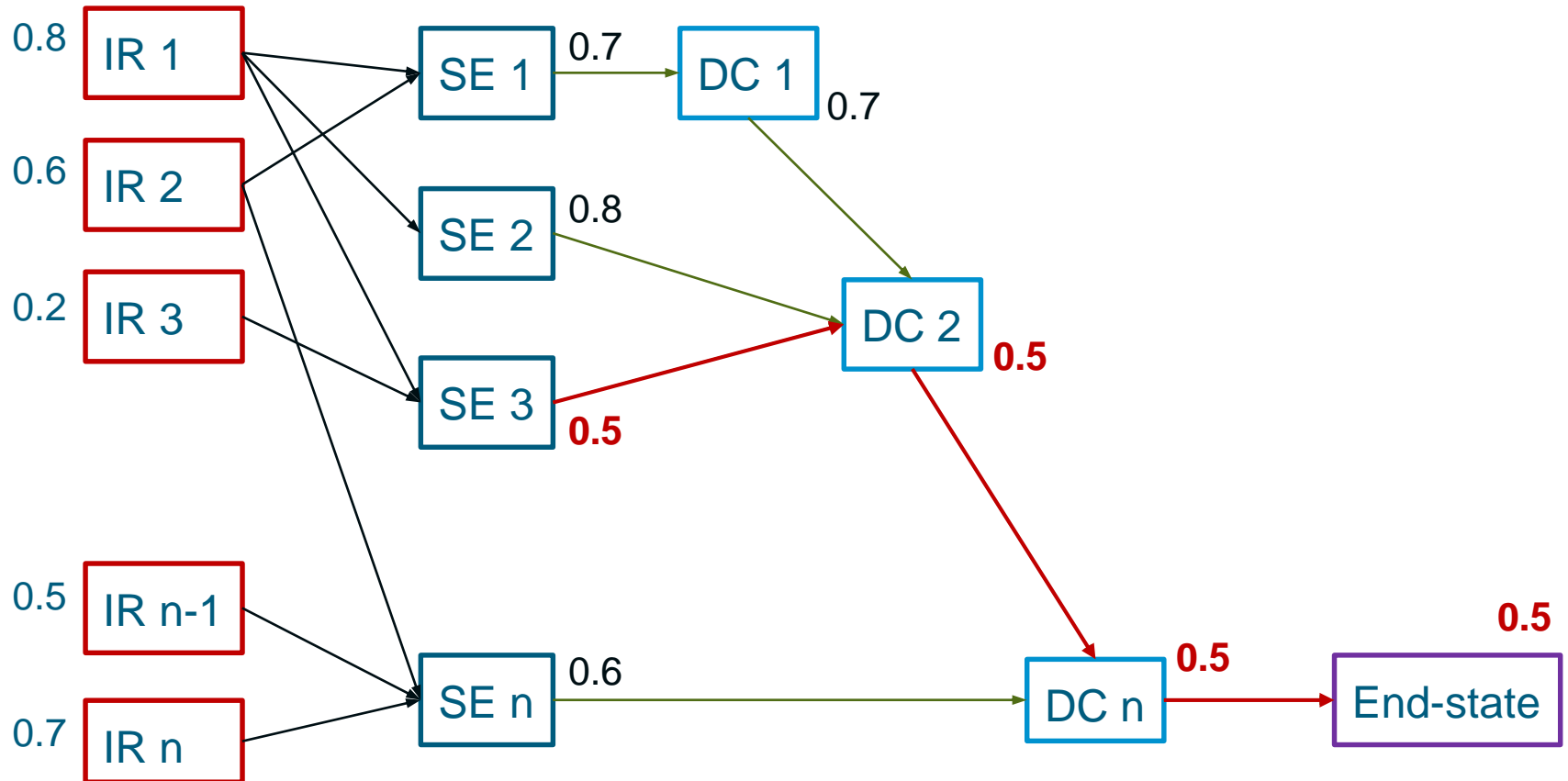
$$V_{\text{parent}} = \min (V_1 + V_2 + \dots V_n)$$



Linking to Campaign End-state (7)



Linking to Campaign End-state (8)



Linking to Campaign End-state (9)

- Limitations
 - Scenarios need to have developed Supporting Effects, Decisive Conditions, Campaign Objectives
- Strengths
 - Military advisors required for a couple of hours
 - Answers the “Better ISR: so what?” question
 - Strong relationship with campaign plans
 - Can identify any obvious gaps in the Intelligence Requirements

The ISR Holy Grail?

- Two methods that answer the “Better ISR: so what?” question
 - Linking Intelligence Requirements to the Defence Tasks
 - Linking Intelligence Requirements to the Campaign End-state

Findings

- Linking Intelligence Requirements to Campaign End-state preferred method
 - Military advisors required for a couple of hours
 - Uses existing campaign plans
 - Less need for analytical judgement
 - Provides better discrimination between options
- Campaign details not always available
 - Link Intelligence Requirements to Defence Tasks instead

What next

- Apply the linking Intelligence Requirements to Campaign End-state approach to real problems answering “Better ISR: so what?”
- Map more scenarios (campaigns)
- Consideration of reusable vignettes

[dstl]

07 August 2014

© Crown copyright 2014 Dstl



Ministry
of Defence