17 April 2013

© Crown copyright 2013 Dstl

UNLIMITED

Ministry of Defence

Cornwallis XVIII: The Strategic Balance of Investment Study (Strat BoI)

Arjun Madahar

April 15, 2013

© Crown copyright 2013
Published with the permission of the Defence Science and Technology Laboratory on behalf of the Controller of HMSO

Contents

- Strategic BoI Question Space
- What is Strat BoI?
- Support to the Strategic Defence and Security Review (SDSR 2010)
- Lessons Learnt and Way Forward
- Summary

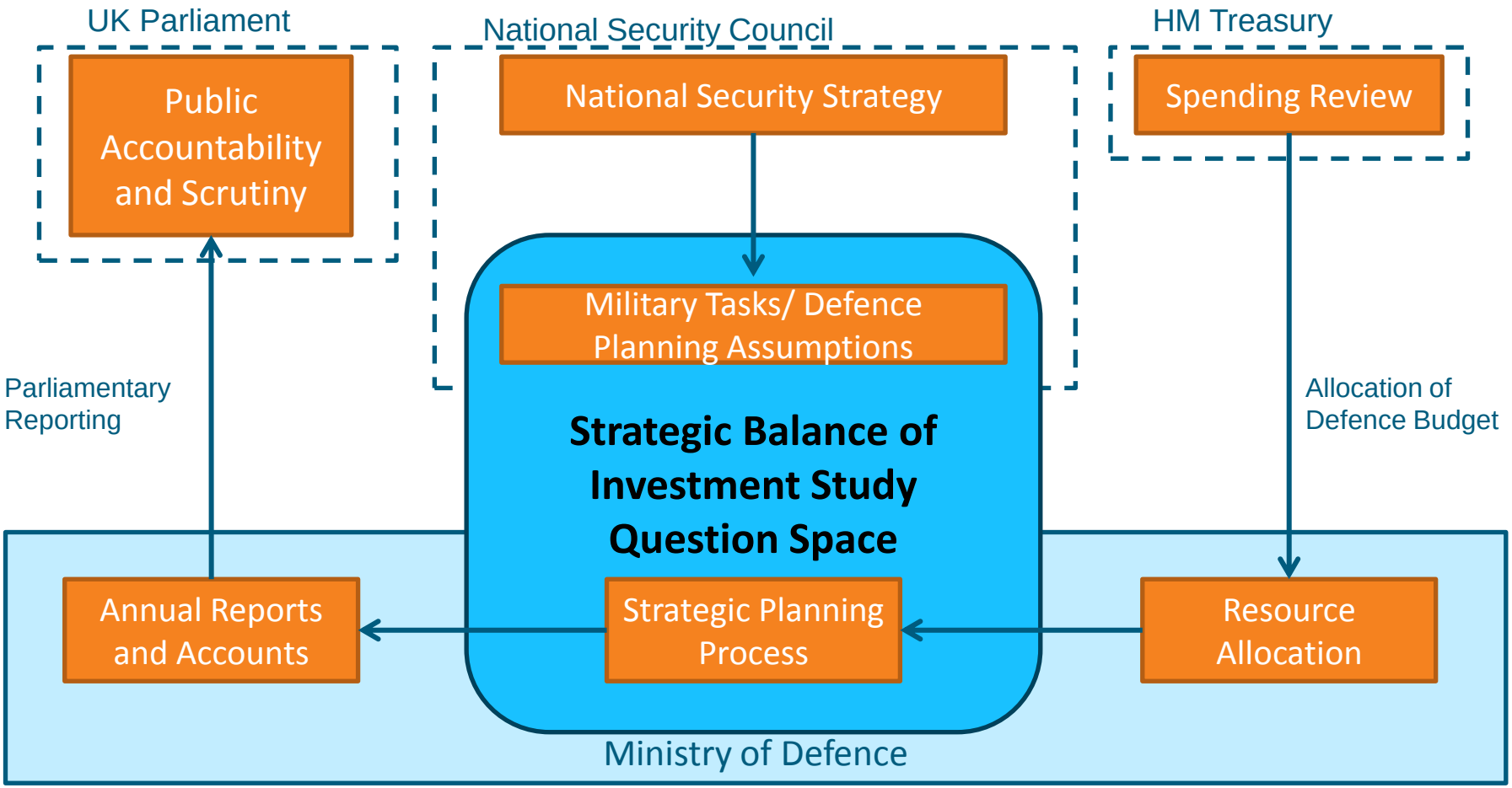
© Crown copyright 2013 Dstl

Contents

- Strategic BoI Question Space
- What is Strat BoI?
- Support to the Strategic Defence and Security Review (SDSR 2010)
- Lessons Learnt and Way Forward
- Summary

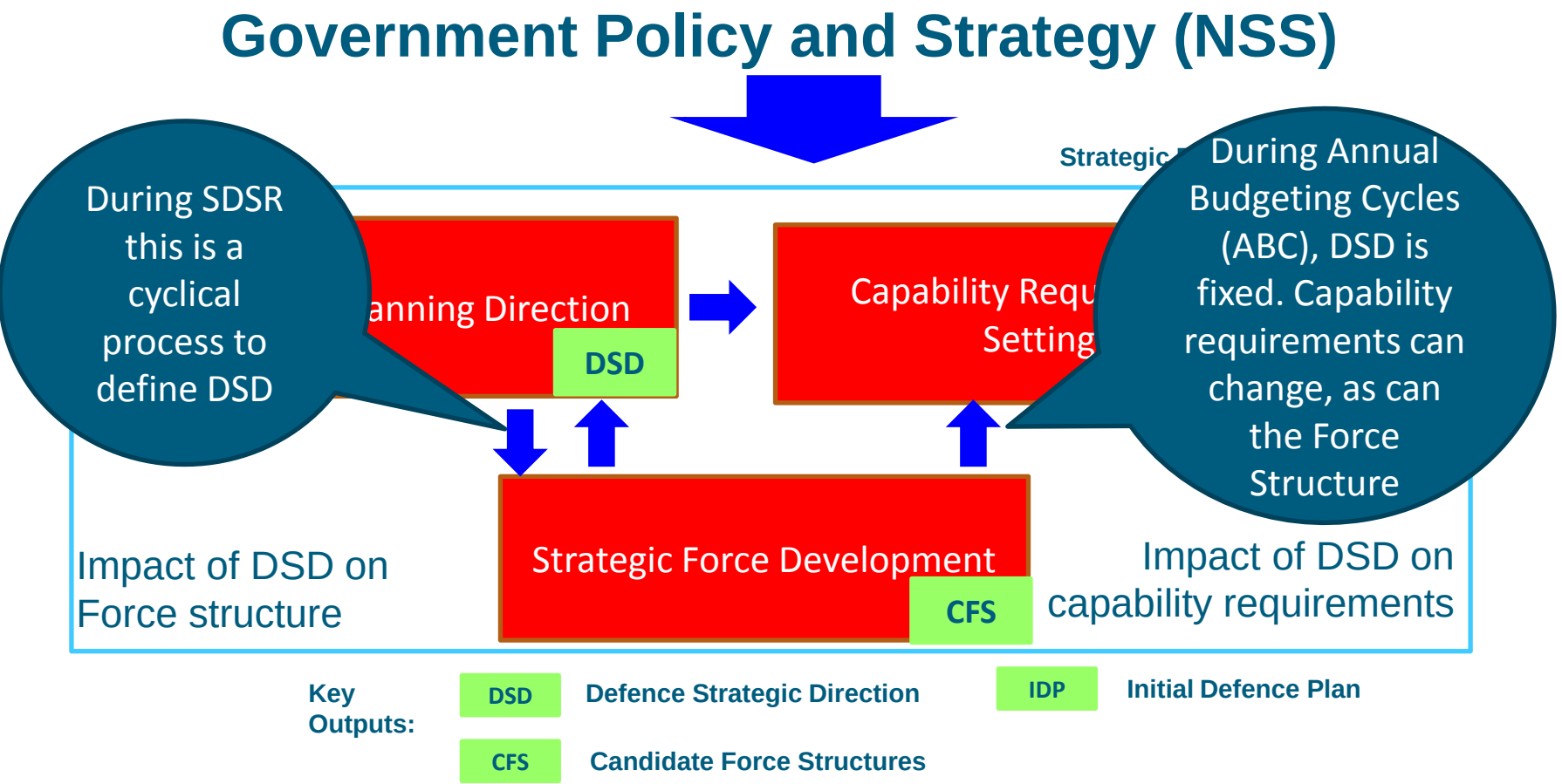
© Crown copyright 2013 Dstl

Defence in a Government Context



[dstl]
© Crown copyright 2013 Dstl
UNLIMITED
Ministry of Defence

Stat BoI Question Space



© Crown copyright 2013 Dstl

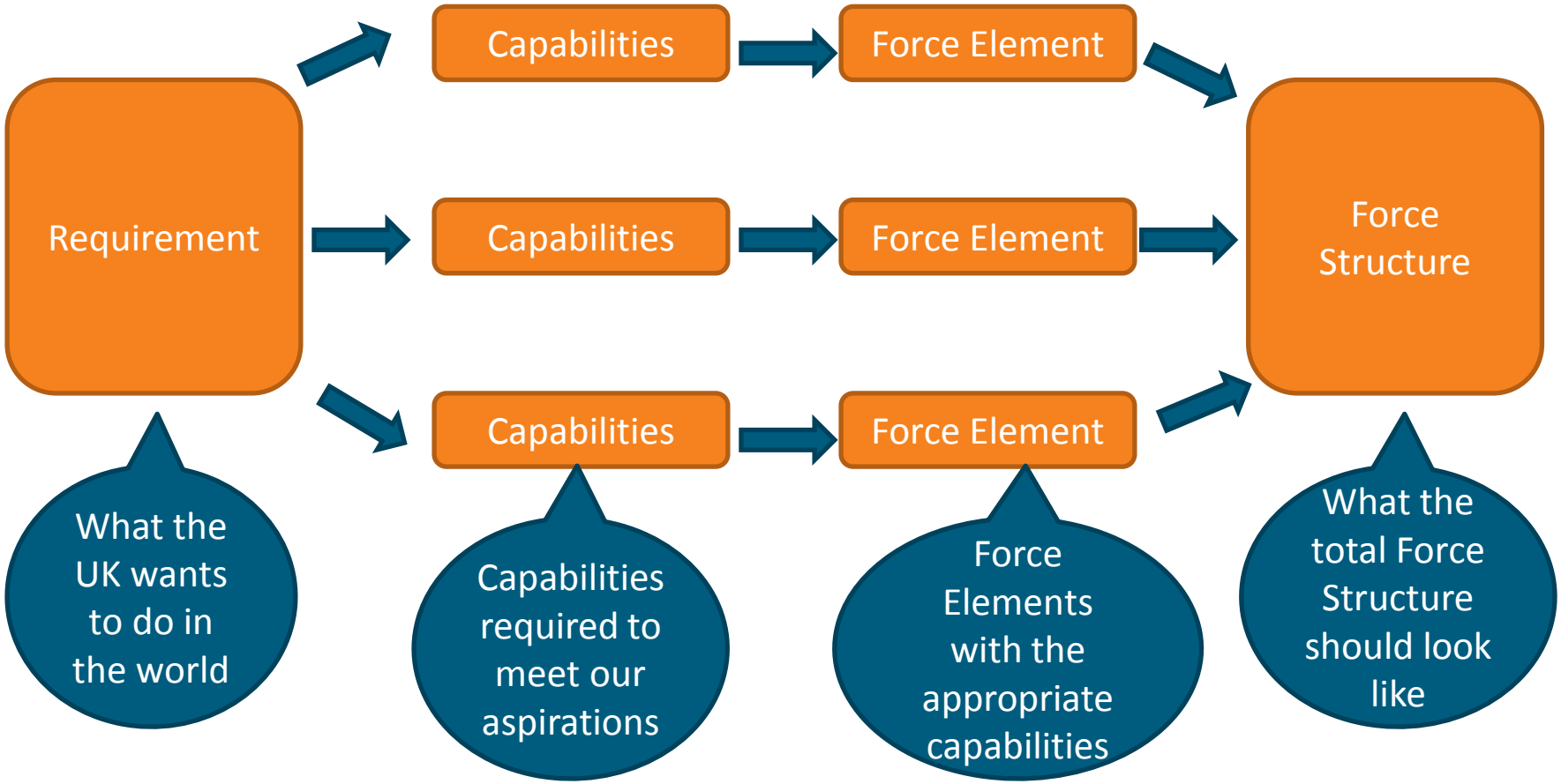
The Key Question

- Senior Defence Staff have to make decisions on what the future Force should look like and how it should be equipped

- These decisions are affected by many areas including:
  - Requirements
    - What do we want to do in the world?
    - Political aspirations, Frequency, Areas etc.
  - Capabilities
    - What do we have? What can we have in the future? What do our enemies have?
  - Costs
    - Equipment, Manpower, Training, Infrastructure….

© Crown copyright 2013 Dstl

Problem Structure



© Crown copyright 2013 Dstl

Contents

- Strategic BoI Question Space
- What is Strat BoI?
- Support to the Strategic Defence and Security Review (SDSR 2010)
- Lessons Learnt and Way Forward
- Summary

© Crown copyright 2013 Dstl

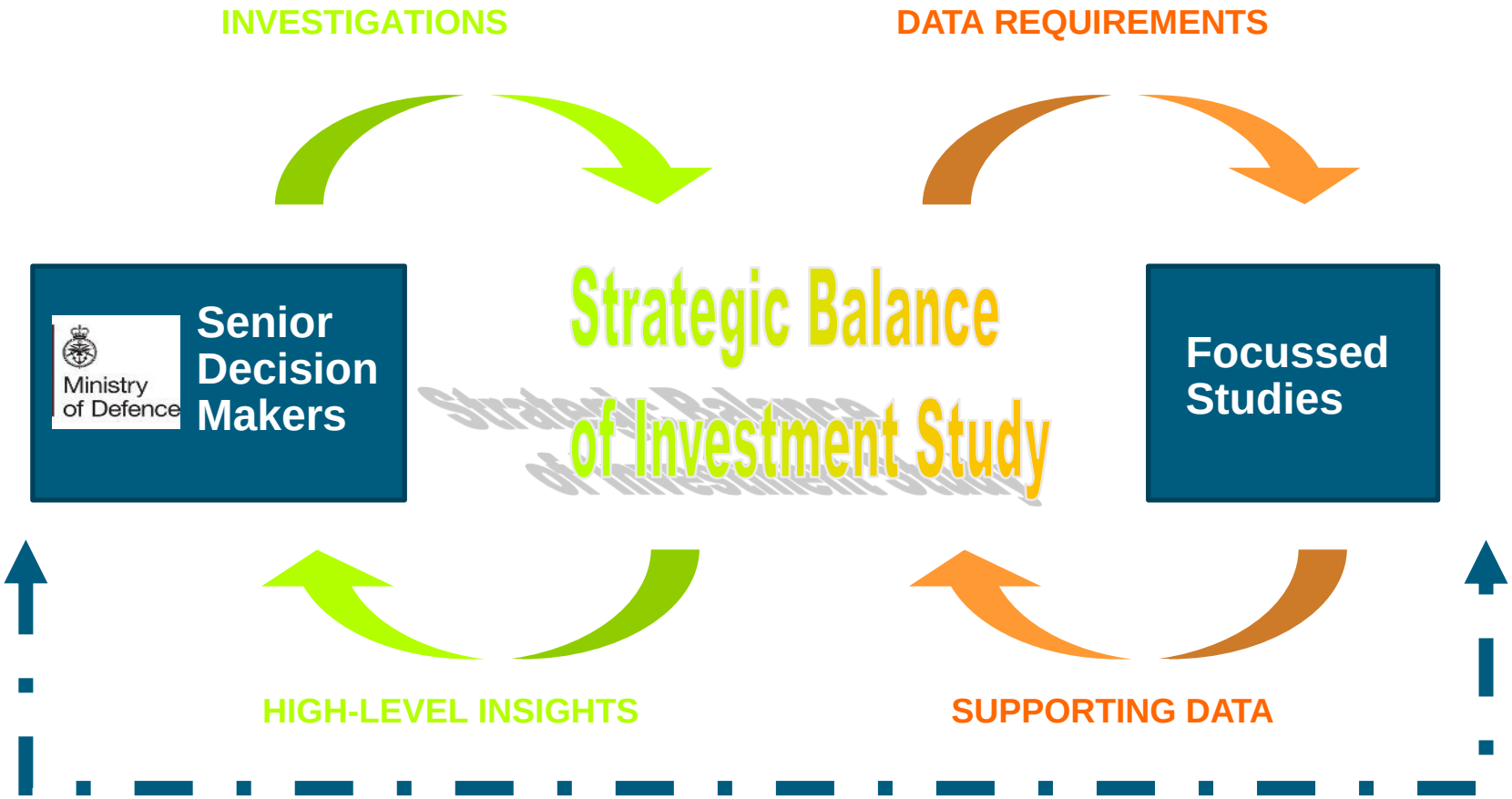
Strategic Balance of Investment

- The Strategic Balance of Investment Study informs Senior Decision Makers in adjusting the balance of funding between capability areas to reflect the requirements of strategic guidance on the future

  - Assesses the most cost effective mix of Force Elements to meet requirements
  - Considers the consequences of different Defence priorities
  - Provides independent, auditable and coherent evidence to support decisions

© Crown copyright 2013 Dstl

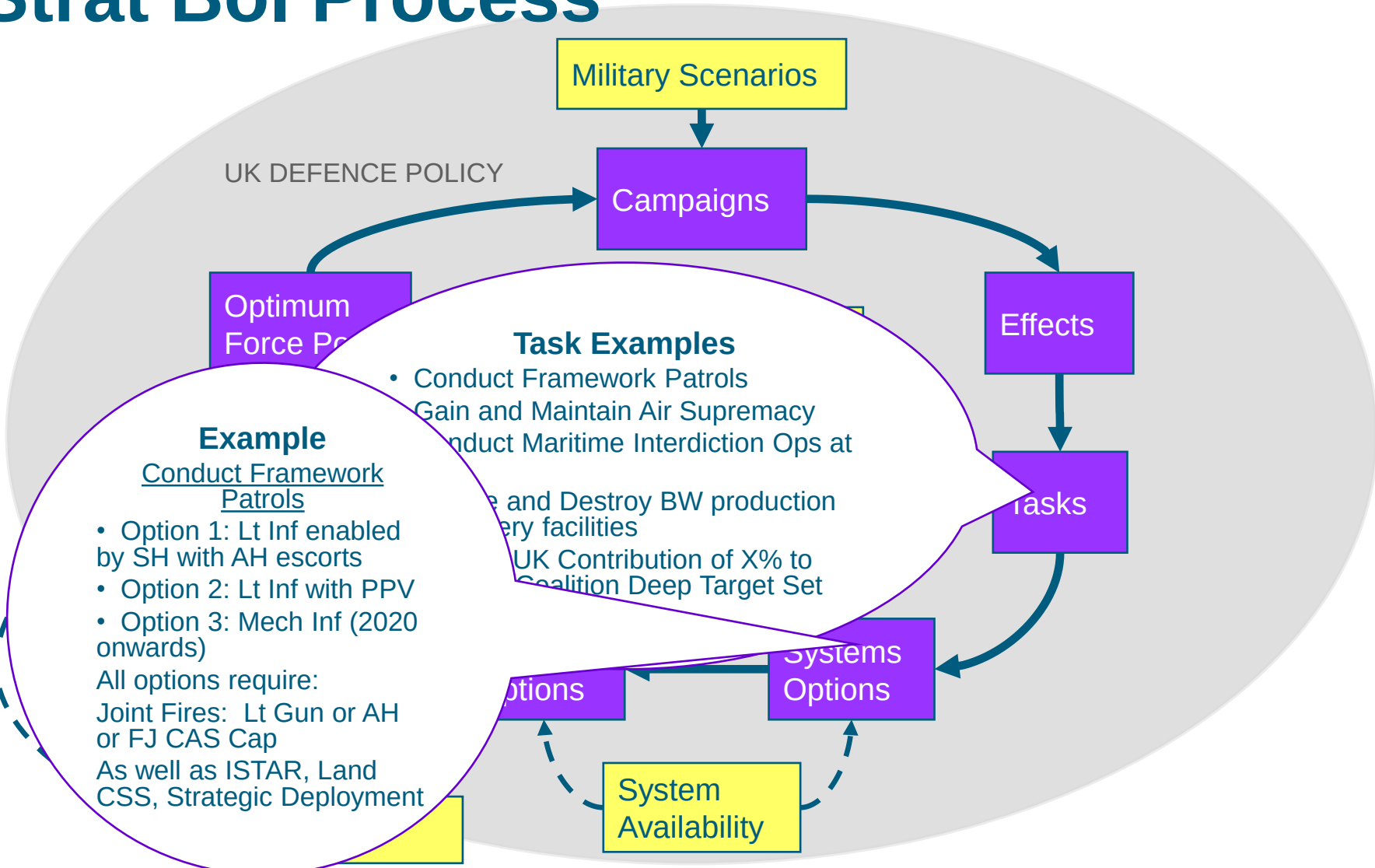
Position in the Support to Senior Decision Makers



Utilise specific studies to conduct detailed investigations into specific capabilities and requirements

© Crown copyright 2013 Dstl

Strat Bol Process



© Crown copyright 2013 Dstl

At the heart of Strat BoI is a Mixed Integer Linear Programme

- The Linear Programme generates cost-effective force mixes

- Benefits of an LP approach
  - Provides a clear and auditable relationship between Policy, Capabilities and the Force Structure
  - All areas considered simultaneously
  - Optimisation method well understood
  - Quick running hence can be used iteratively

- **Key Note:** Strat BoI is Minimum Cost, Constant Effectiveness LP

© Crown copyright 2013 Dstl

Contents

- Strategic BoI Question Space
- What is Strat BoI?
- Support to the Strategic Defence and Security Review (SDSR 2010)
- Lessons Learnt and Way Forward
- Summary

© Crown copyright 2013 Dstl

Challenges for the analysis

DATA & ASSUMPTIONS

- Policy evolving
- Scenario develo
- Utilise data set
  previous 2 years

RESPONSIVENESS

l hours
i 9 to 5
o

EMOTIVE

- Choices around Britain's role in the world and National Security
- Issues concerning the lives of our Armed Forces personnel and investments in Industry

CLOSI

- Work in Whiteha
- Bubble of suppo
- Utilise the trusted relationship developed over a number of years

CATION

ise

- Understandable and visual outputs
- 1-1 conversations

© Crown copyright 2013 Dstl

[dstl]

UNLIMITED

Ministry of Defence

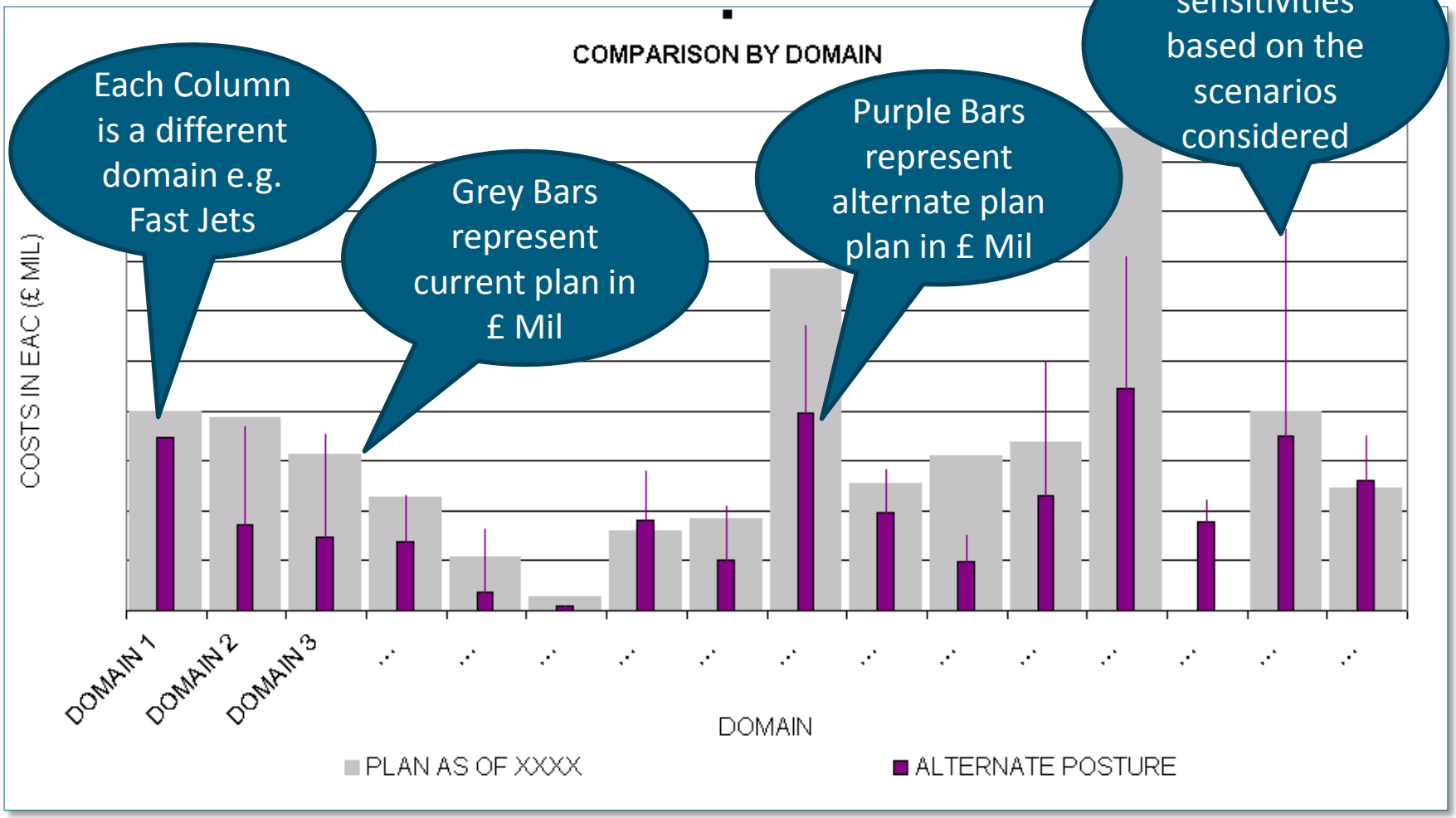
Example: Support/Output

- Starting Point (August 2010)
- Requirement to understand how emerging policy options would effect the capability areas in terms of significant changes to investment, capability breakdown, and concurrency requirements

- Initial issue
  - Compare impact of different defence postures on capability requirements and cost

© Crown copyright 2013 Dstl

Comparison by defence postures



© Crown copyright 2013 Dstl

Example: Support/Output

- Requirement to understand how emerging policy options would effect the capability areas in terms of significant changes to investment, capability breakdown, and concurrency requirements

- Initial Point
  - Compare impact of different defence postures on capability

The Adaptable Britain Posture

Was chosen to provide defence with a flexible, balanced and well supported Force Structure that is able to conduct both Expeditionary Intervention and Stabilisation Operations

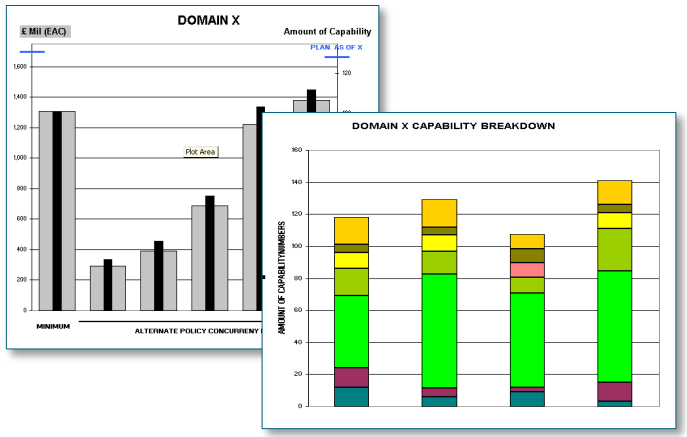
© Crown copyright 2013 Dstl

Example: Support/Output

- Starting Point (August 2010)
- Requirement to understand how the emerging policy would effect the capability areas in terms of significant changes to investment, capability breakdown, and concurrency requirements

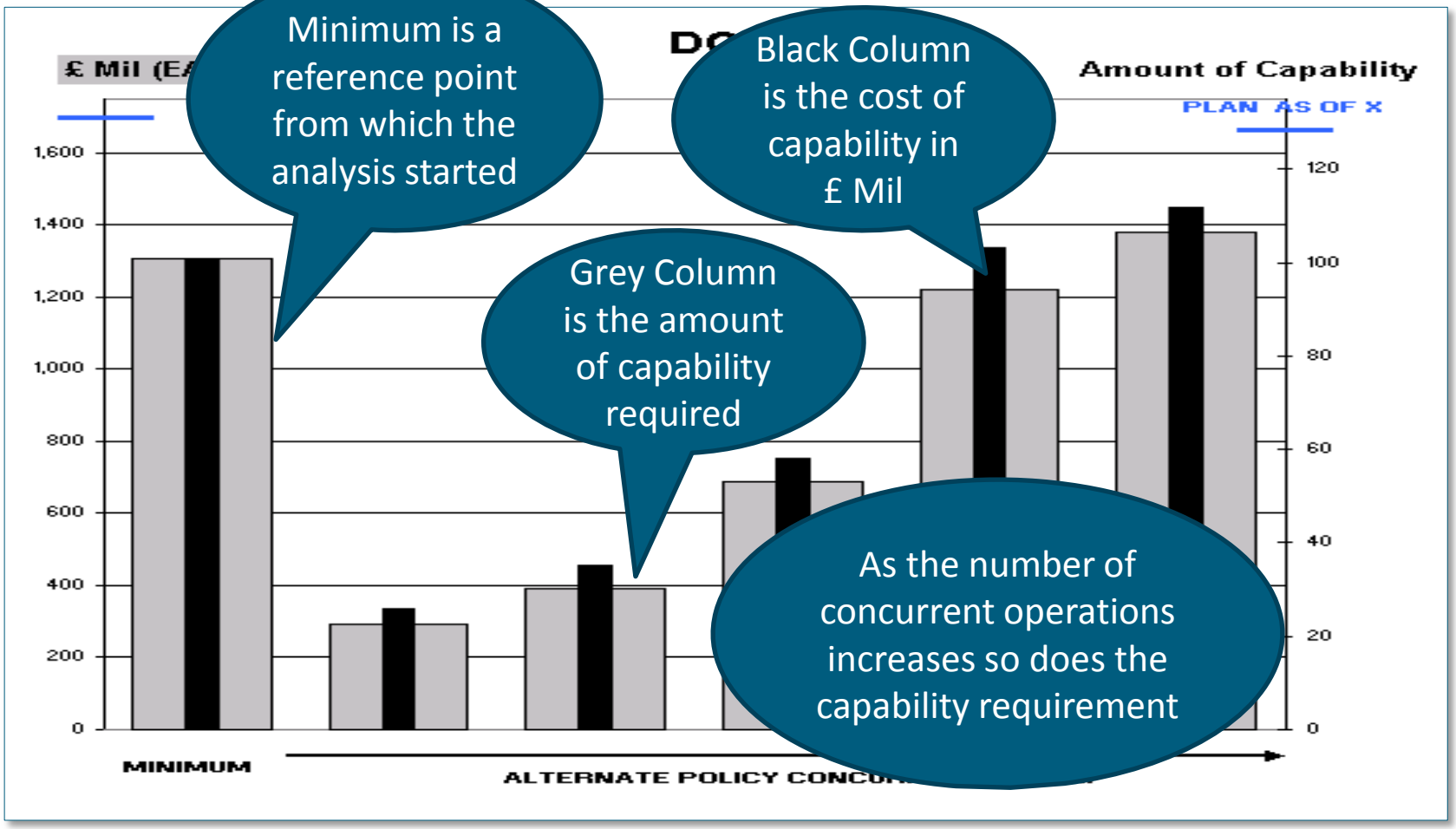
- Initial Issue
  - Compare impact of different defence postures on capability requirements and cost
- Next Step
  - Focus on a particular area
    - Concurrency
    - Capability

Output was in the form of an interactive excel spreadsheet



© Crown copyright 2013 Dstl

Concurrency - Build by Domain

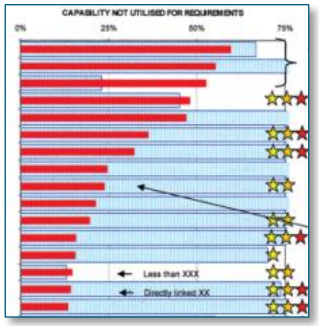


© Crown copyright 2013 Dstl

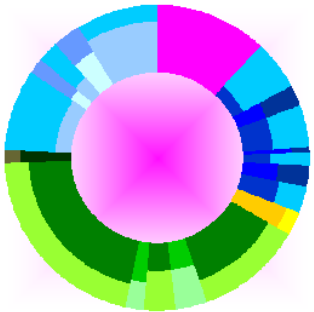
Range of Analysis & Presentations

Shape of the Armed Forces

Balance of Military Capability



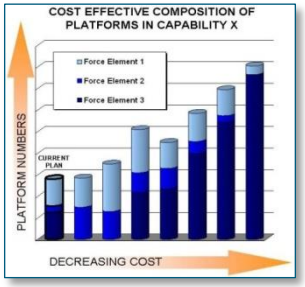
Cost breakdown of Defence



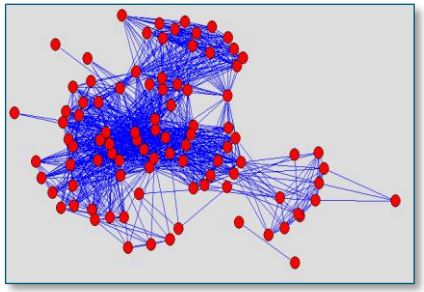
Risks

RISK	TIMEFRAME			
	2015	2020	2020	2025
OPERATIONAL				
Risk 1				N/R
Risk 2				
Risk 3				
Risk 4	N/R			
READINESS & HARMONY				
Risk 5				N/R

Performance & Cost parameters



Dependencies



© Crown copyright 2013 Dstl

Contents

- Strategic BoI Question Space
- What is Strat BoI?
- Support to the Strategic Defence and Security Review (SDSR 2010)
- Lessons Learnt and Way Forward
- Summary

© Crown copyright 2013 Dstl

Impact of the Analysis Support

- Strat BoI was considered to be a success during SDSR 10. Here are some selected quotes:

"…pretty powerful analysis"

"…80% of me loves it, 20% of me hates it "

"…very much like this approach"

"…Strat BoI is very useful for where it is focussed"

© Crown copyright 2013 Dstl

Lessons Learnt

- Thorough knowledge of tools and underlying data a must for all analysis team
- Presentation was essential
  - Complex analysis **MUST** be presented in an easy to understand way
- Responsiveness is critical
  - Time was short
  - Preparing analysis, “on the shelf” just in case

© Crown copyright 2013 Dstl

The World has changed

- The UK is still in recession
- The questions are subtly different…

*"What can I do with my **current** budget?"*
*"What **risks** am I taking against my aspirations?"*
*"What are the **limitations** of my current force?"*

- It is more important than ever that decisions are supported by evidence
- The next SDSR is planned for 2015

© Crown copyright 2013 Dstl

What are we doing now?

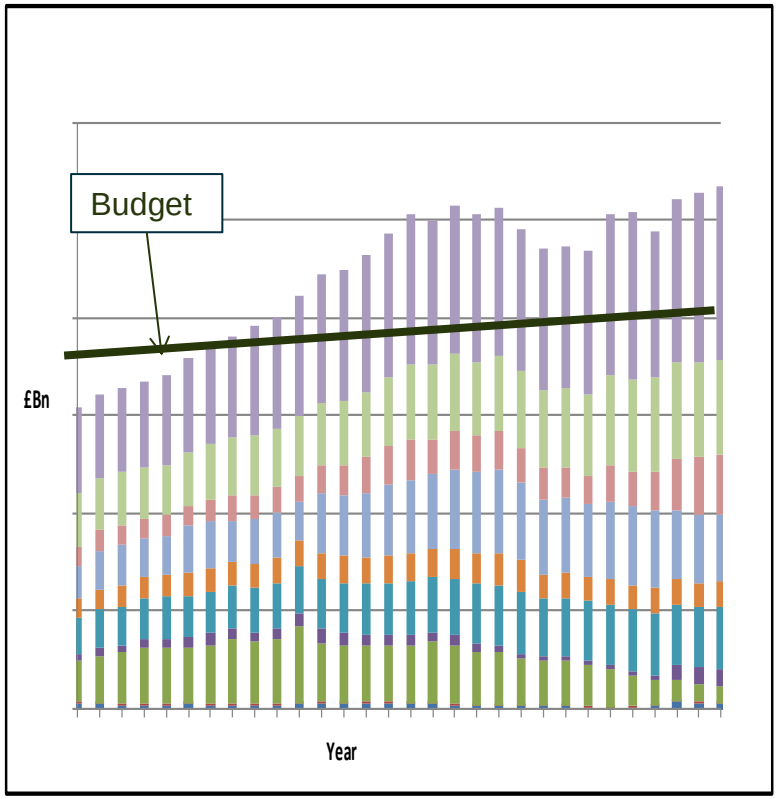
- Creating an archive of analysis
  - Second guessing what the questions will be?
  - Collating supporting analysis
  - Understanding the Key Issues

- Building relationships of trust with key decision makers

© Crown copyright 2013 Dstl

Improving the method

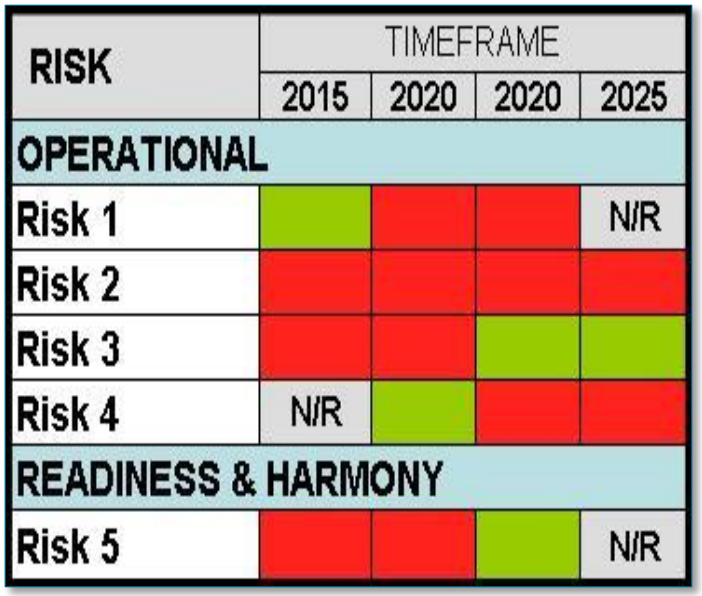
- Researching options to improve the method
  - Developing cost profiles for potential Force structures
  - Understanding how cost can change through time
  - Impact that a decision now will have in the future



© Crown copyright 2013 Dstl

Improving the Method

- Budget constrained optimisation
  - Minimise operational risk?
  - Maximise effectiveness?
- Multi objective function optimisation?
  - Maximise effectiveness, minimise risk?
  - Minimise cost and risk?
  - Maximise effectiveness and minimise cost?



RISK	TIMEFRAME			
	2015	2020	2020	2025
OPERATIONAL				
Risk 1				N/R
Risk 2				
Risk 3				
Risk 4	N/R			
READINESS & HARMONY				
Risk 5				N/R

© Crown copyright 2013 Dstl
UNLIMITED

Contents

- Strategic BoI Question Space
- What is Strat BoI?
- Support to the Strategic Defence and Security Review (SDSR 2010)
- Lessons Learnt and Way Forward
- Summary

© Crown copyright 2013 Dstl

Summary

- Strat BoI uses a capability led balance of investment methodology
- It informs Senior Decision Makers in adjusting the balance of funding between capability areas to reflect the requirements of strategic guidance on the future
- It has been used extensively by UK senior decision makers, including during SDSR 10
- Moving towards SDSR 15 looking into developing capability to consider fixed cost, variable risk and capability

© Crown copyright 2013 Dstl

Arjun Madahar

Grenville Building
Dstl Portsdown West
Portsdown Hill Road
Hampshire
PO17 6AD
email: ajmadahar@dstl.gov.uk

© Crown copyright 2013 Dstl

UNLIMITED

17 April 2013

© Crown copyright 2013 Dstl

UNLIMITED

Ministry of Defence