



Towards a Model of Capability Trading for UK Defence (Paper 011)

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Author Biography

- Team Leader for the Open Systems team in the Naval Systems Department of the Defence Science Technology Laboratory (Dstl), an agency of the Ministry of Defence, UK.
- Worked for Dstl for three years, and previously for various UK defence and commercial companies.
- Currently studying for an Engineering Doctorate (EngD) in Systems with Bristol and Bath Universities, UK.

Why does DSTL exist?

“Dstl carries out the Science and Technology work that needs to remain in Government”

- Dstl provides science and engineering based products, services and expertise to government on defence and security issues.
- Dstl sits within Government to provide essential, impartial, high quality, timely advice on science and technology issues.
- Our expertise enables our colleagues across government and the UK Armed Forces to determine potential issues and threats.
- Our work also helps them to plan and supply effective counter measures and equipment to meet the demands of modern day war fighting and security issues.



Terrain following in the vicinity of Snowdonia.

The Pentagon, in Washington
© Getty Images



Working conditions in the High Mojave Desert, at Fort Irwin, California

Problem : Capability Trading in the UK

- Capability Trading is the defence term for altering the Balance of Investment (BOI) between military capability components to maximise effectiveness
- Trading is essential to achieve efficiency within the UK Defence Budget
- In the current defence procurement process, decisions are made on short term, high confidence metrics with less consideration of long term (projected) costs and implications
- Trading is effected with partial visibility of capability, and so often trading decisions are made that have unforeseen consequences
- Trading is achieved, but the process is not fully defined

Definition of terms - Capability

UK definition of “Capability”

“The ability to bring maritime, ground and air components into coherent joint forces under unified command in order to deliver appropriately motivated, manned, trained and equipped force packages at the required level of readiness and with the necessary support, sustainability and deployability to achieve the full range of agreed military tasks.”

(Defence Acquisition Change Programme, 2007)

US definition of “Capability”

“The ability to achieve a desired effect under specified conditions through combinations of means and ways to perform a set of tasks”

(US Joint Staff Doctrine, 2007)

The UK and US definitions help people like us understand how we can help bring together (engineer) the “way and means” to create and sustain Force Elements and Enablers at Readiness, with the “ways and means” captured in Defence Lines of Development (DLOD)

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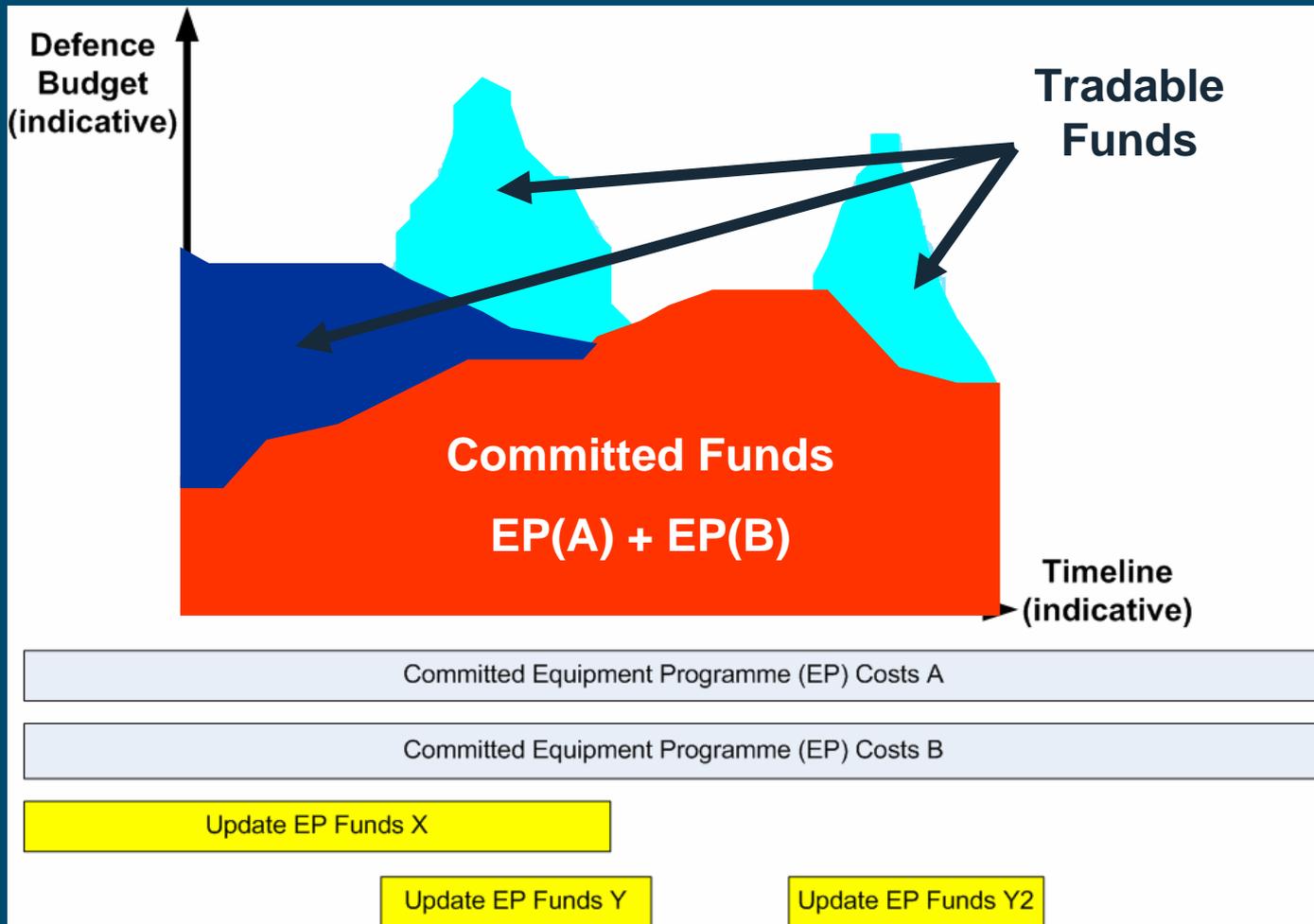
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UK Capability “ways and means” Defence Lines of Development (DLODs)

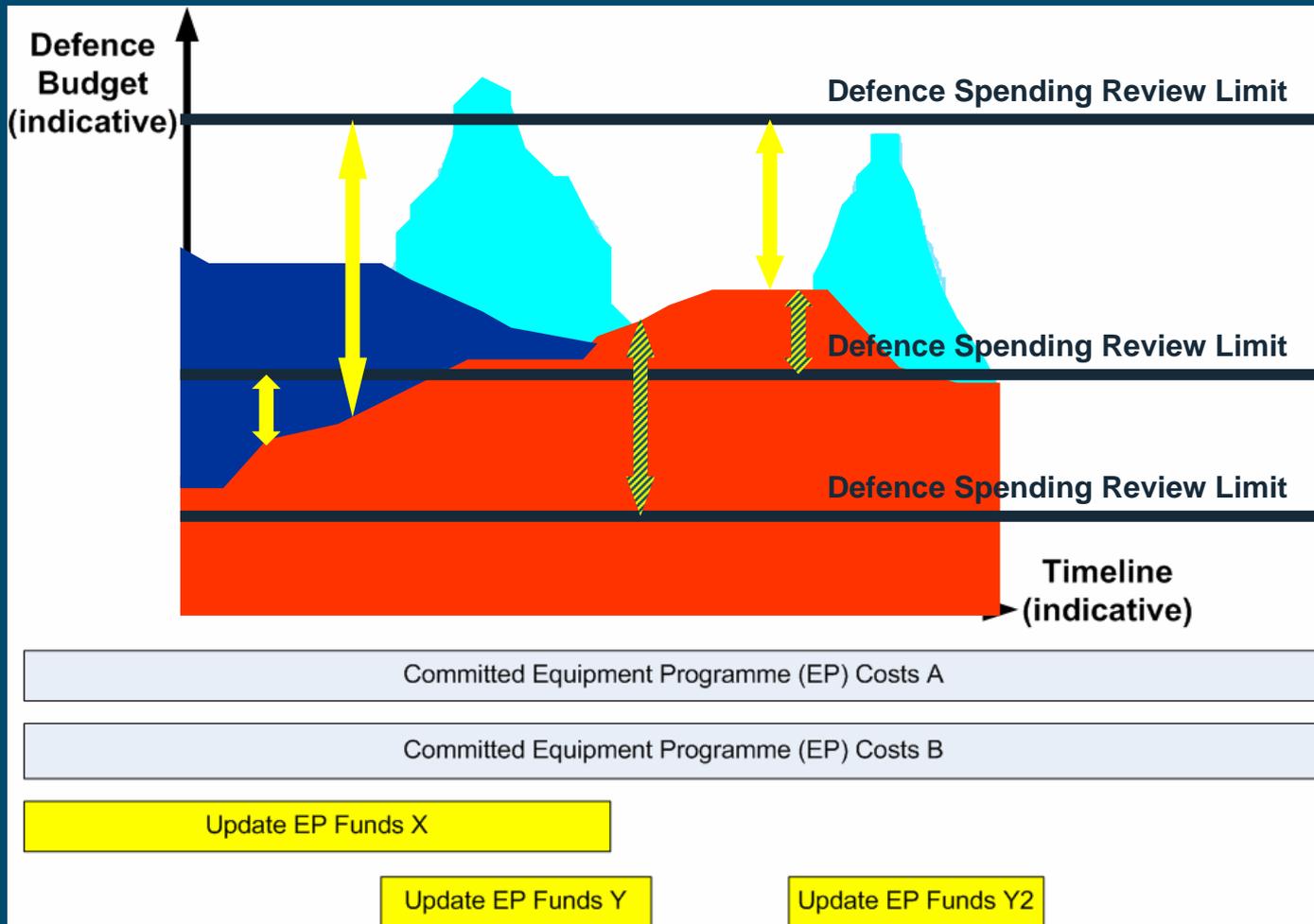
- **Equipment:** platforms, electronics, hardware and software
- **Infrastructure:** buildings, land, utilities and facilities
- **Doctrine and Concepts:** translation of decision into action, expression of capabilities that could be used to accomplish activity in the future, how equipment is used and operated, tactics
- **Organisation:** organisational relationships of people
 - in MOD and between MOD and Industry
- **Training:** to work together as units and groups
 - collective (and emergent) behaviours
- **Personnel:** appropriately trained and motivated people
- **Information:** data, information, knowledge and processes
- **Logistics:** science of planning and carrying out operational movement and maintenance



Capability Trading



Capability Trading



Methodology

During the period, September 2007 to March 2008, a series of structured interviews were held with various representatives of the defence acquisition community.



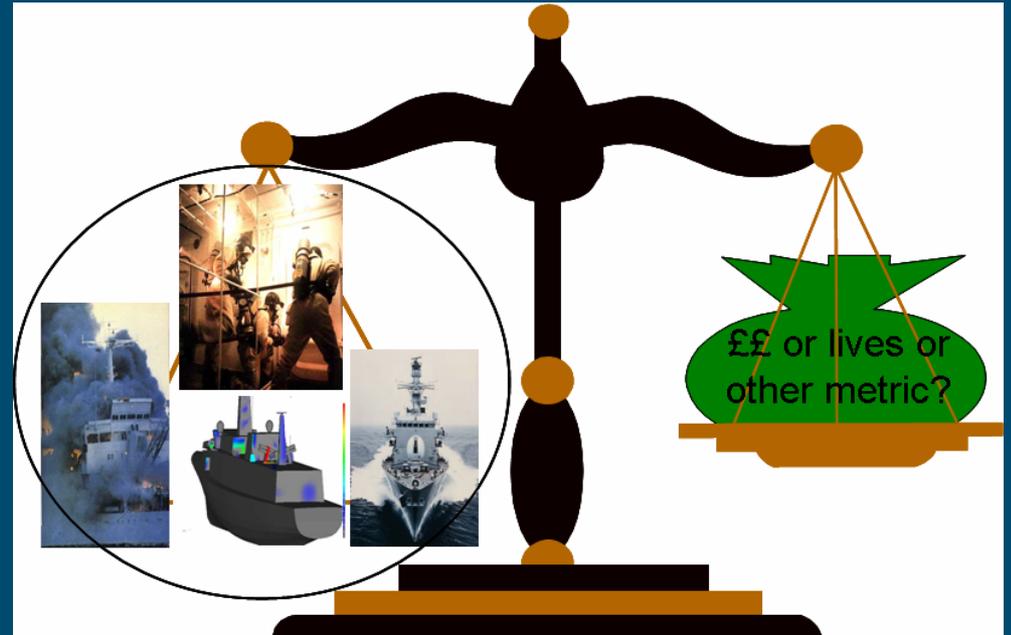
The aim was :-

- 1) To gain factual trading data from practitioners
- 2) To gain an understanding of the confidence in trading decisions
- 3) To gain a DLOD decomposition of trading



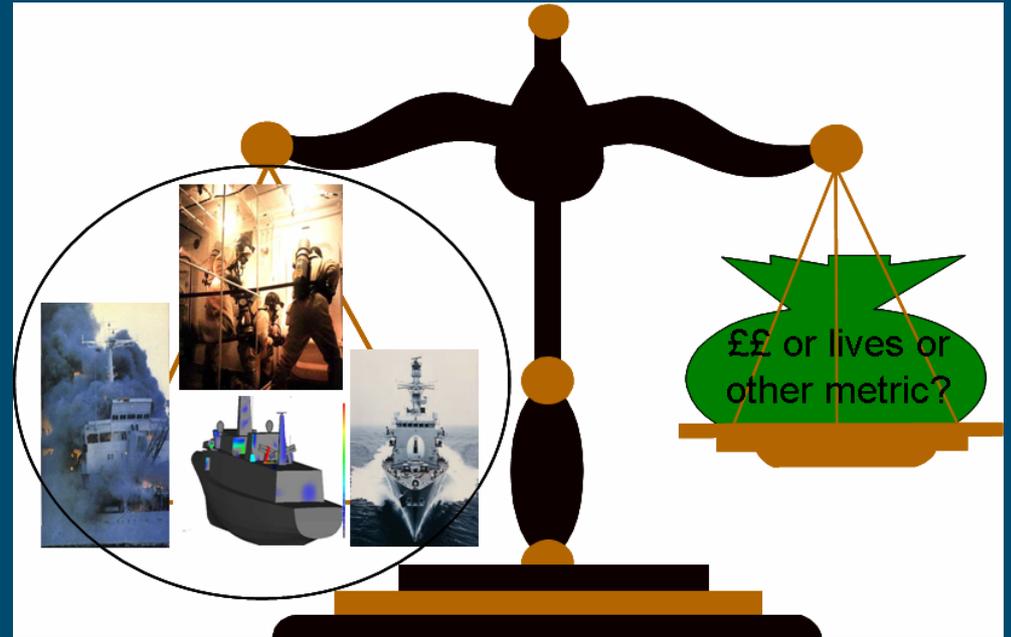
Capability Trading Options

- How do you trade?
- What to you trade?
- When do you trade?
- What confidence do you have in your trading decisions?
- What are the consequences of trading?
- What are the consequences of not trading?

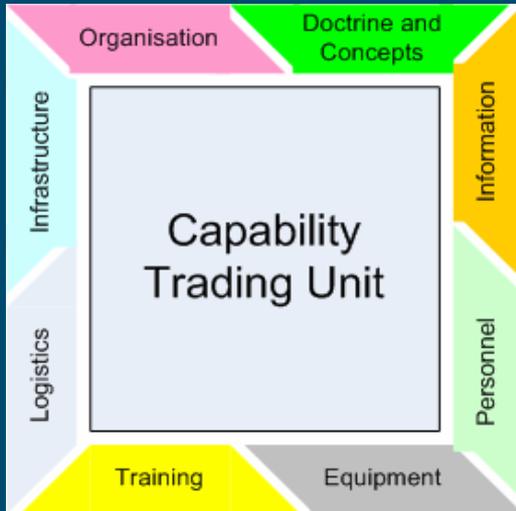


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“Naïve Construct” – H(0)



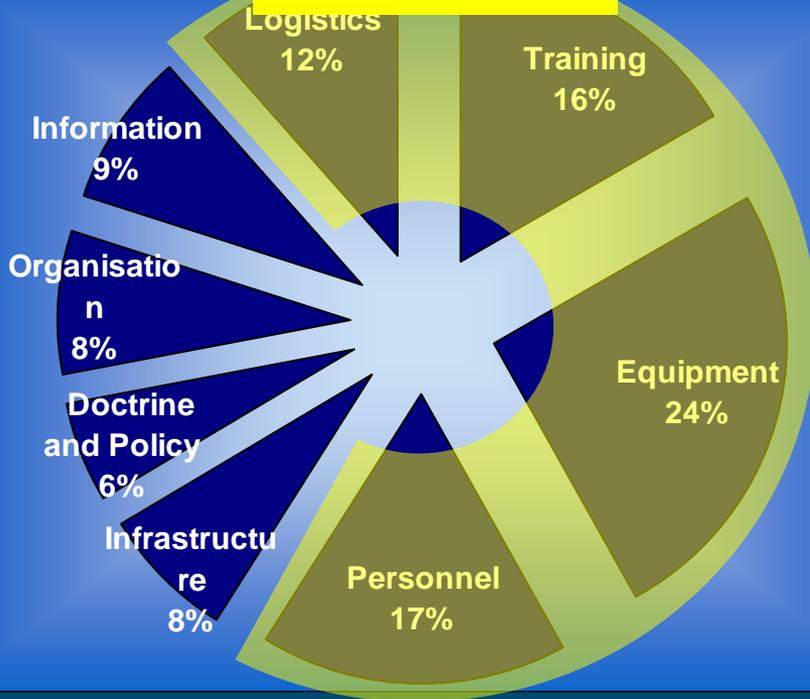
The Capability Trading Unit (CTU) is a construct of the research, developed to examine the trading process using bounded units

DL0D	Template Ratio
Training	12.5
Equipment	12.5
Personnel	12.5
Information	12.5
Concepts and Doctrine	12.5
Organisation	12.5
Infrastructure	12.5
Logistics	12.5

H(0) = It is assumed that all the DL0Ds are mutually independent and should be considered in equal weighting

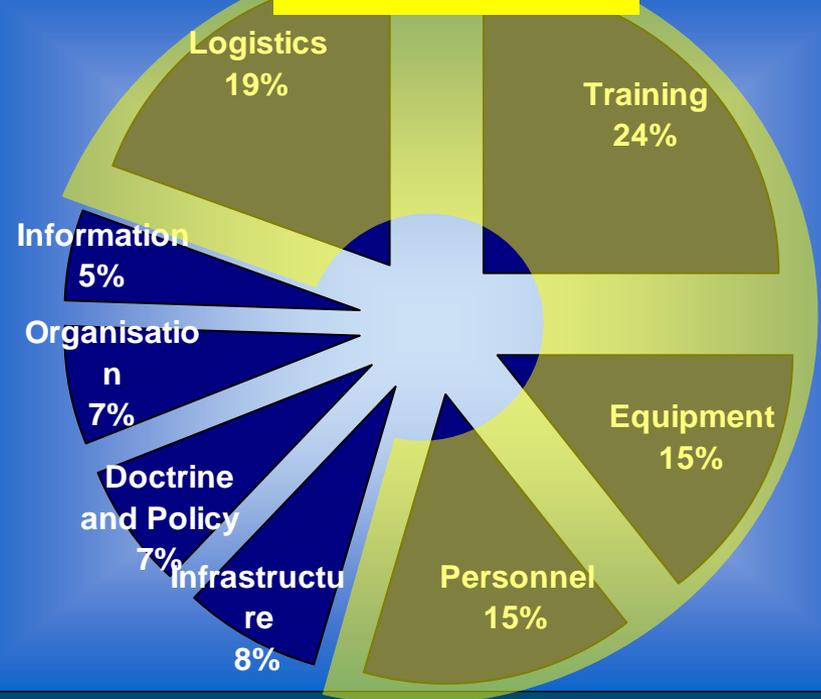
Trading decomposition into DLODs

MAJOR DLOD CONTRIBUTORS
~75%



Stage 1 (Concept) Confidence Decomposition

MAJOR DLOD CONTRIBUTORS
~75%



Stage 5 (In Service) Confidence Decomposition

Adapted Construct – H(1)



DLOD	Template Ratio
Logistics	18.75
Training	18.75
Equipment	18.75
Personnel	18.75
Information	6.25
Concepts and Doctrine	6.25
Organisation	6.25
Infrastructure	6.25

H(1) = It is assumed that all the DLODs are mutually independent there are four major DLOD contributors and four minor ones

Future work

- Validation of ratio construct within Capability Trading Units (CTUs)
- Extrapolation of CTU usage
 - across stages, across domains, across time
 - cost extrapolation from single DLOD data
- Define process mapping from evidential experience
 - “time now experience”
 - “future experience”

Any other suggestions?

[dstl] Questions?

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