

Towards Quantifying the Benefits of NEC

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Outline

- What is Network Enabled Capability? **Georgia**
 - Definition
 - The role of analysis and experimentation
- Knowledge mining activity **Georgia**
 - Examples of the evidence collected
 - Methods used
- Benefits Analysis activity **Alison**
 - Method used
 - outcome
- Next Steps **Alison**

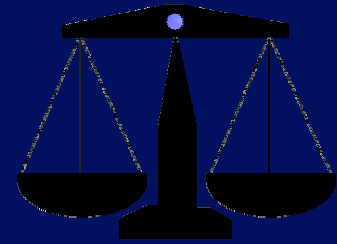
NEC is....

- The coherent integration of sensors, decision-makers and weapon systems along with support capabilities
 - to bring to bear the right military capabilities at the right time to achieve the desired military effect
 - this ability to respond more quickly and precisely will act as a force multiplier enabling our forces to achieve the desired effect through a smaller number of more capable assets
- More than equipment; also transformed doctrine and training and optimised command and control structures

* Source: Defence White Paper, *Delivering Security in a Changing World*, July 2004

NEC Core Themes

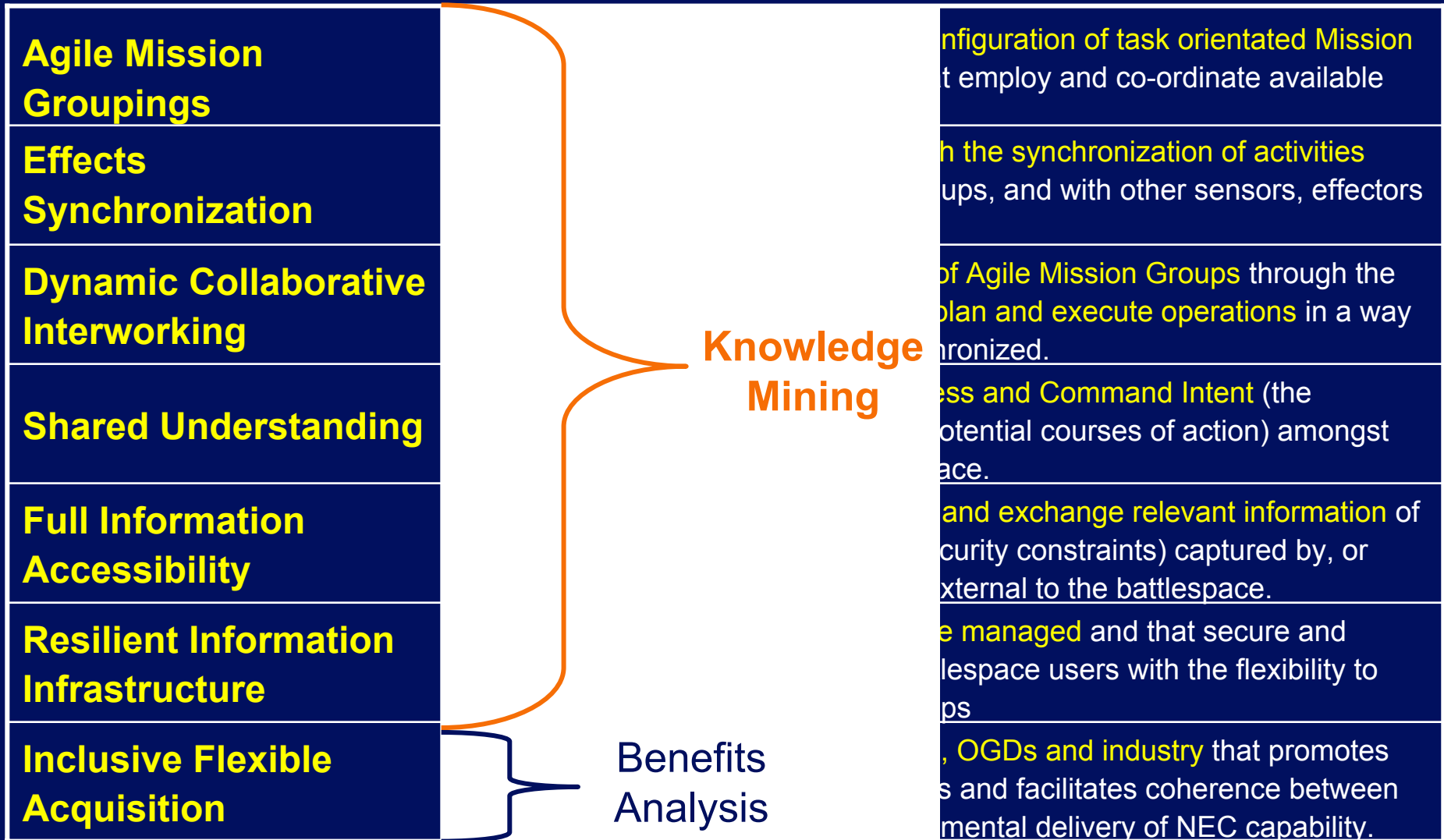
| | |
|---|---|
| Agile Mission Groupings | Enabling the dynamic creation and configuration of task orientated Mission Groups that share awareness and that employ and co-ordinate available assets to deliver the desired effect. |
| Effects Synchronization | Achieving overwhelming effect through the synchronization of activities within and between Agile Mission Groups, and with other sensors, effectors and decision makers. |
| Dynamic Collaborative Interworking | Enabling agile command and control of Agile Mission Groups through the ability of all elements to concurrently plan and execute operations in a way that is dynamic, continuous and synchronized. |
| Shared Understanding | Providing Shared Situational Awareness and Command Intent (the intentions of friendly forces, and the potential courses of action) amongst collaborating elements in the battlespace. |
| Full Information Accessibility | Enabling users to search, manipulate and exchange relevant information of different classifications (respecting security constraints) captured by, or available in, all sources internal and external to the battlespace. |
| Resilient Information Infrastructure | Ensuring information resources can be managed and that secure and assured access is provided to all battlespace users with the flexibility to meet the needs of Agile Mission Groups |
| Inclusive Flexible Acquisition | Co-ordinating processes across MOD, OGDs and industry that promotes the rapid insertion of new technologies and facilitates coherence between acquisition programmes and the incremental delivery of NEC capability. |



Analysis Support to NEC

- Analysis and experimentation has a role in helping UK MoD to identify:
 - Where NEC will deliver most value to defence
 - What can be traded off to pay for it
 - What changes are required to deliver the required transformation
- Analysis support is being provided in 3 ways;
 - Knowledge mining existing evidence of the benefits of NEC
 - Influencing ongoing studies and experiments to include NEC
 - Decision Support to acquisition committees

Approach Taken

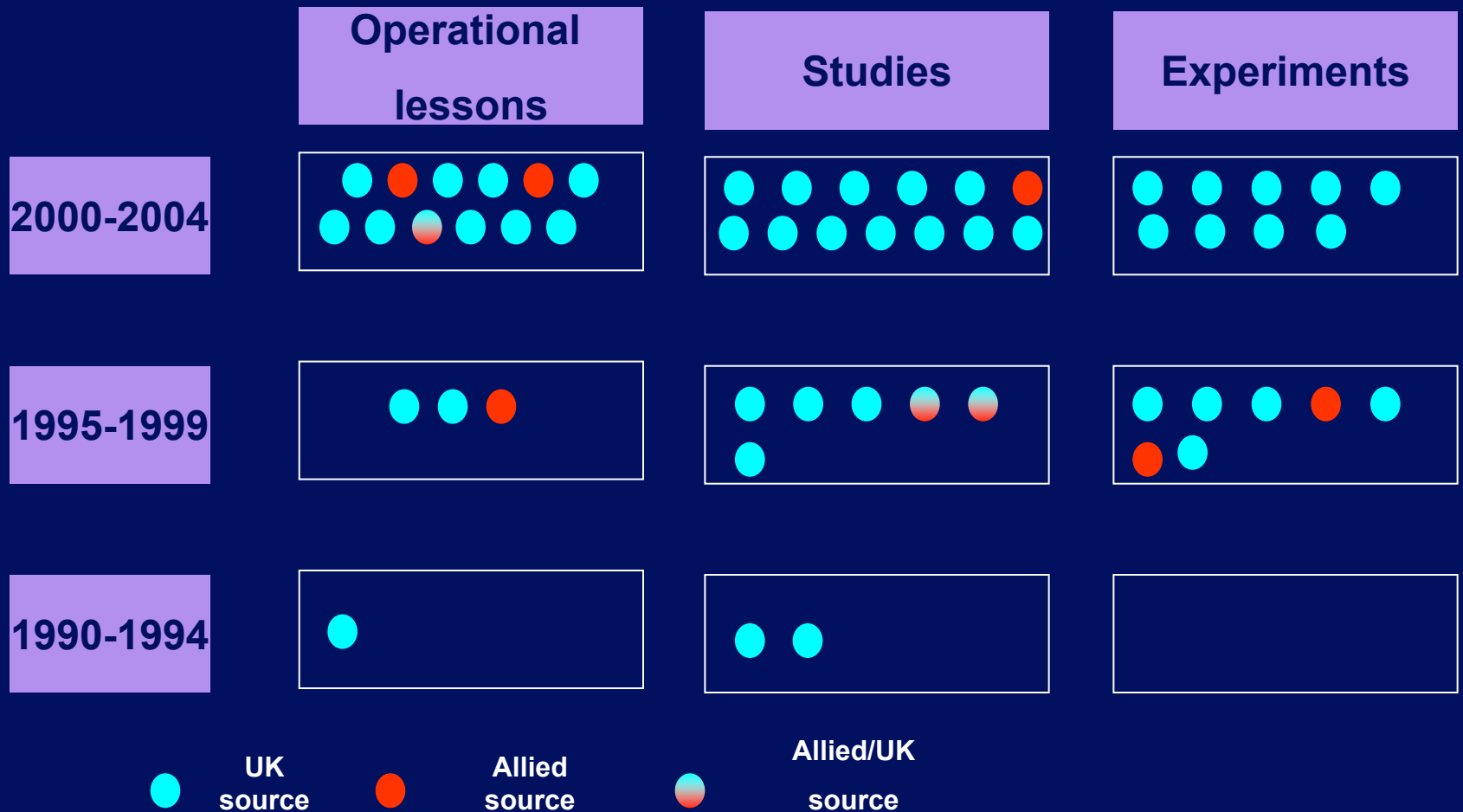


Knowledge Mining



- The ideas within NEC are not new - work over past decade or so has considered many of them
- “Knowledge mining” previous work to bring together existing evidence which quantifies potential benefits and risks:
 - Studies
 - UK and Allied Experimentation
 - Evidence from operations

Knowledge Mining: Sources



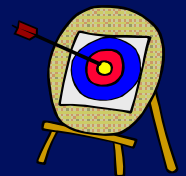
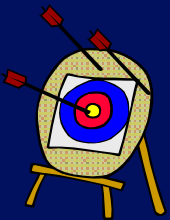
Examples by NEC Theme

- Resilient information infrastructure and Full information accessibility
 - Investment in a networked long-range precision capability (the coherent integration of sensors, information infrastructure, precision attack weapons and decision-makers) reduced the need for direct fire assets.
 - Used campaign-level modelling to consider the same measures of effectiveness as have traditionally been used to decide whether to invest in a weapon or platform.



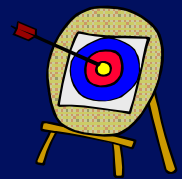
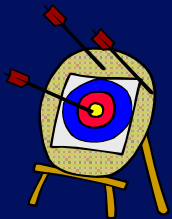
Examples by NEC Theme

- Shared understanding
 - In defending air space under tight rules of engagement, a common picture for weapon system operators and the commander, plus the appropriate doctrine to take advantage of this generated a large improvement in the likelihood of correctly identifying an authorised target.
 - A combination of methods was used to produce this evidence, systems level modelling combined with capability chain assessments. Linear programming was used to identify the optimum networked air defence mixes.



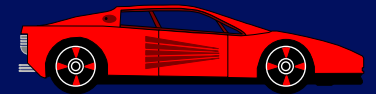
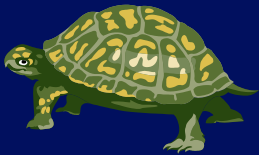
Examples by NEC Theme

- Dynamic collaborative working
 - Agile C2 delivered significant improvements to the effectiveness of digitised forces in warfighting experiments, compared with forces for which only the timeliness and reliability of information was improved.
 - The experiments used man-in-the-loop collective simulations.
 - By assessing unit effectiveness the benefits of agile C2 can be compared with other improvements such as equipment or training enhancements.



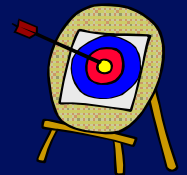
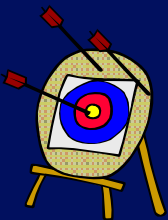
Examples by NEC Theme

- Agile mission grouping
 - The ability to prosecute a high priority target through network-enabled fire using any of land, sea and air systems reduced the kill chain completion time.
 - Stochastic simulation of kill chains was used to consider the time taken to prosecute a target.



Examples by NEC Theme

- Effects synchronisation
 - Multiple surprise is crucial to military success at the campaign level. If an attacker can keep a defender continually off balance by getting inside his decision cycle time, then the chances of success are greatly enhanced.
 - This evidence was generated from historical analysis of 160 land and air campaigns.



Lessons from Knowledge Mining

- Evidence comes from a wide range of methods.
- Choice of measures of effectiveness is important - need to balance investment in NEC with other possible investments.
- Available evidence was not spread evenly over themes.

Inclusive Flexible Acquisition: A Different Approach...

A different approach.....(1)

- Benefits Analysis applied to Acquisition for NEC (AfNEC)
- Aids understanding of “How to deliver a benefit”
- Enables formal recognition of the issue
- Provides framework for considering arguments/viewpoints
- Causal links allow dependency of the benefits to be recognised
- Strategy results from understanding system

A different approach.....(2)

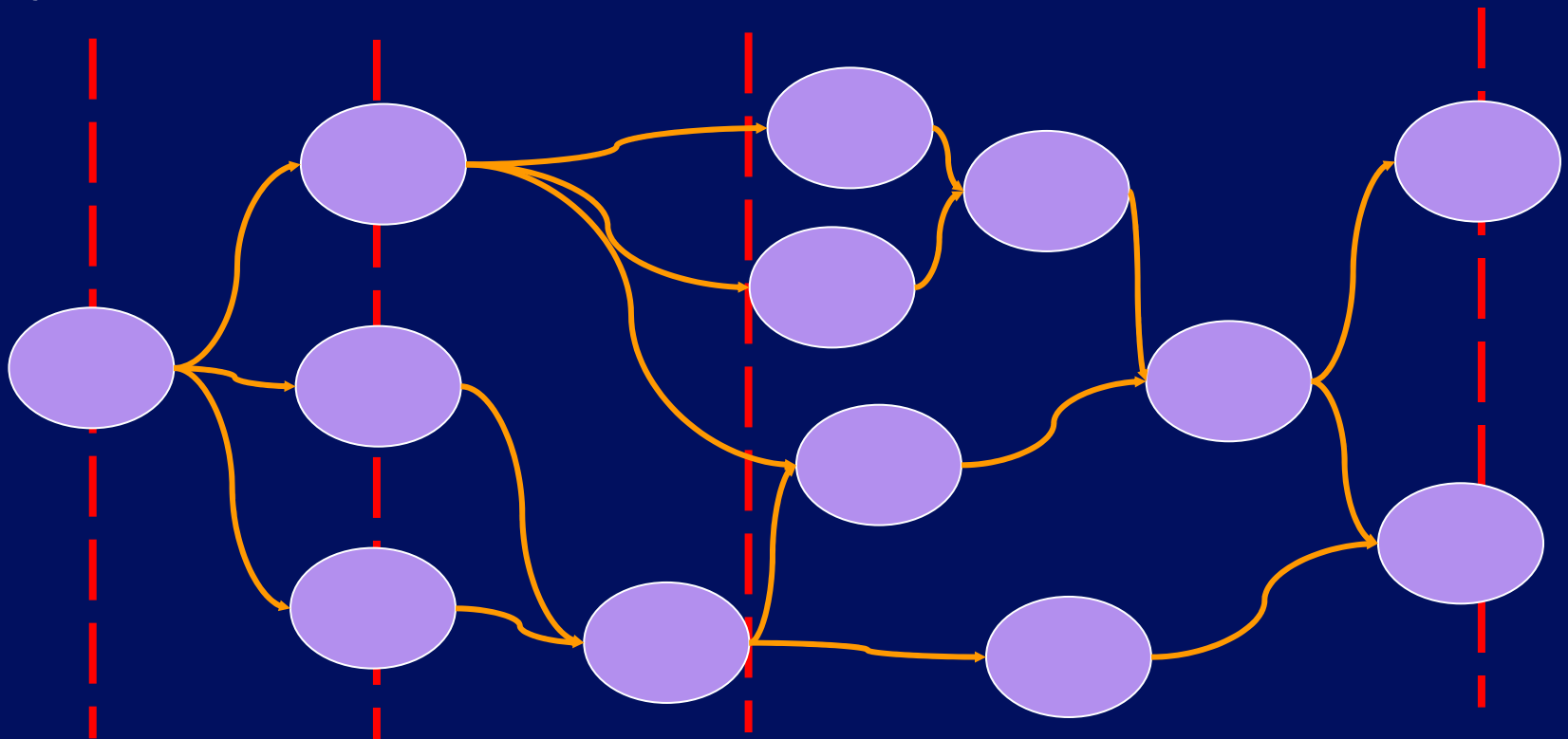
- Results in a comprehensive (single) view of the problem where
- Supported by simple visualisation tools, outputs are more transparent than traditional modelling methods
- Encourages less tangible and softer issues for investment advantage to be considered
- Structures and records qualitative understanding of benefit within a context

Benefits map

Generic Investment System Variables

Low Level Benefits

High Level Benefits



Benefits Analysis tells us.....(1)

- Allows you to understand “What to buy?”
- Understanding the Priority of a set of equipment requirements is straight forward however,
 - Investment considerations are wider than just equipment
 - Investment benefits can not be considered in isolation
 - Enabling equipment elements must be in place!
 - Existing schedules for roll out of equipment, aligned to other LoDs
 - Must maximise appropriateness to a range of futures
 - Focus on ultimate achievement
 - All investment must be justified

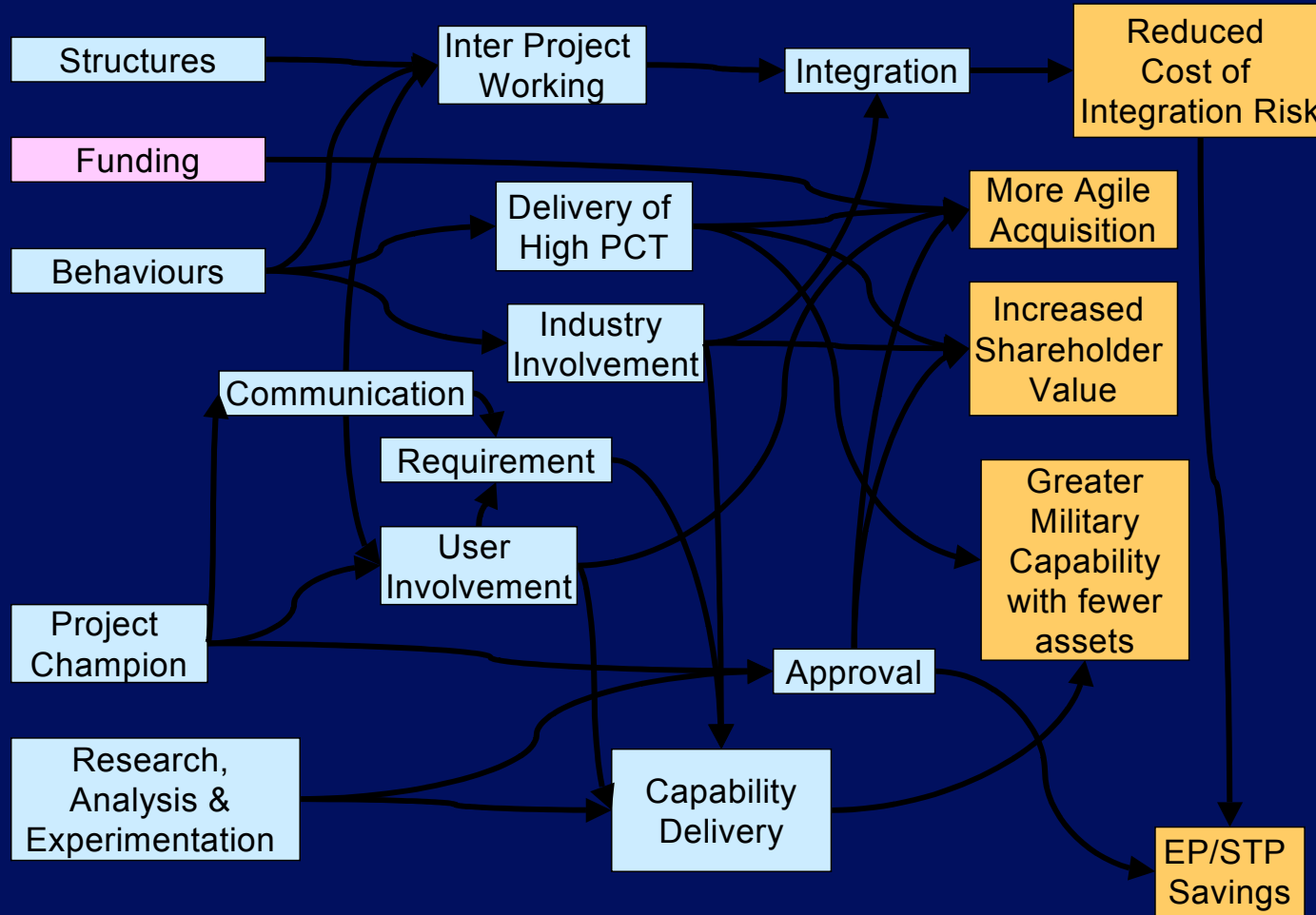
Benefits Analysis tells us..... (2)

- Allows you to understand “How to buy?”
 - Understanding different procurement options, i.e. ways in which to buy
 - What the enablers and blockers are to achieving procurement

Method

- Carried out a series of workshops
 - To validate the end benefits
 - To gather evidence from lessons learned, industry and the pilots to build the arguments
- Constructed a benefits map
- Reflected this back to consultants and stakeholders to validate the model

Summary of AfNEC Benefits Map



Next Steps

- The output from the knowledge mining to date is influencing the design of planned and ongoing studies and experiments.
- The output of benefits modelling to date is influencing the design of MoD's acquisition processes.
- Both the knowledge mining and benefits modelling activities will continue.



Questions?



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