

INCOSE International Symposium 2011

NiTEWORKS



Systems thinking and methods within a collaboration paradigm

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Contents

- The UK Defence context
- A brief history of Niteworks
- Niteworks today
- The Niteworks way
- Example projects
- Areas of current development
- Summary and conclusions

UK Defence context

- Organisational, system and technology challenges
 - Scale and complexity, continuous capability evolution, optimisation at SoS level, operational tempo
 - Inadequate methods, reduced tolerance of risk, reduced funding
- Trailers
 - Green Paper (pre-SDSR)
 - Bernard Gray Review
 - Haddon Cave Review
 - UoRs/current operations
- The new coalition government
 - Established National Security Council: NSS, SDSR
 - Focus resource based on risk assessments

Consequences...

- Key decisions
 - Aircraft carriers, Harriers, Nimrod, headcount reduction, ...
- Greater adaptability, flexibility, accelerated change
 - Must 'engineer-in' (including commercial)
- Greater engagement across government and allies
 - Alignment across enterprise (project, programme, SoS, etc)
- Pragmatic approach to managing capability shortfalls
 - Improved risk management
- Regular capability updates, shorter acquisition
 - More evolutionary approach to acquisition
- Decision support at appropriate level and tempo
 - SoS technical and commercial trades
- Reduced appetite for technologically ambitious projects
 - Improved risk management

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Introduction and key facts

- Niteworks is a partnership between the UK MOD (including DE&S, Dstl, serving officers) and industry
 - Around 90 industrial companies
- 2002: Scoping Study
- 2002-2007: Assessment Phase
 - Ten key industrial partners
 - Focus on 'man-in-the-loop' warfighter experimentation for NEC
 - Funded centrally
- 2007-date: In-Service Phase
 - More flexible decision support offering required
 - Mixed funding model introduced
 - Major restructuring to systems approach required

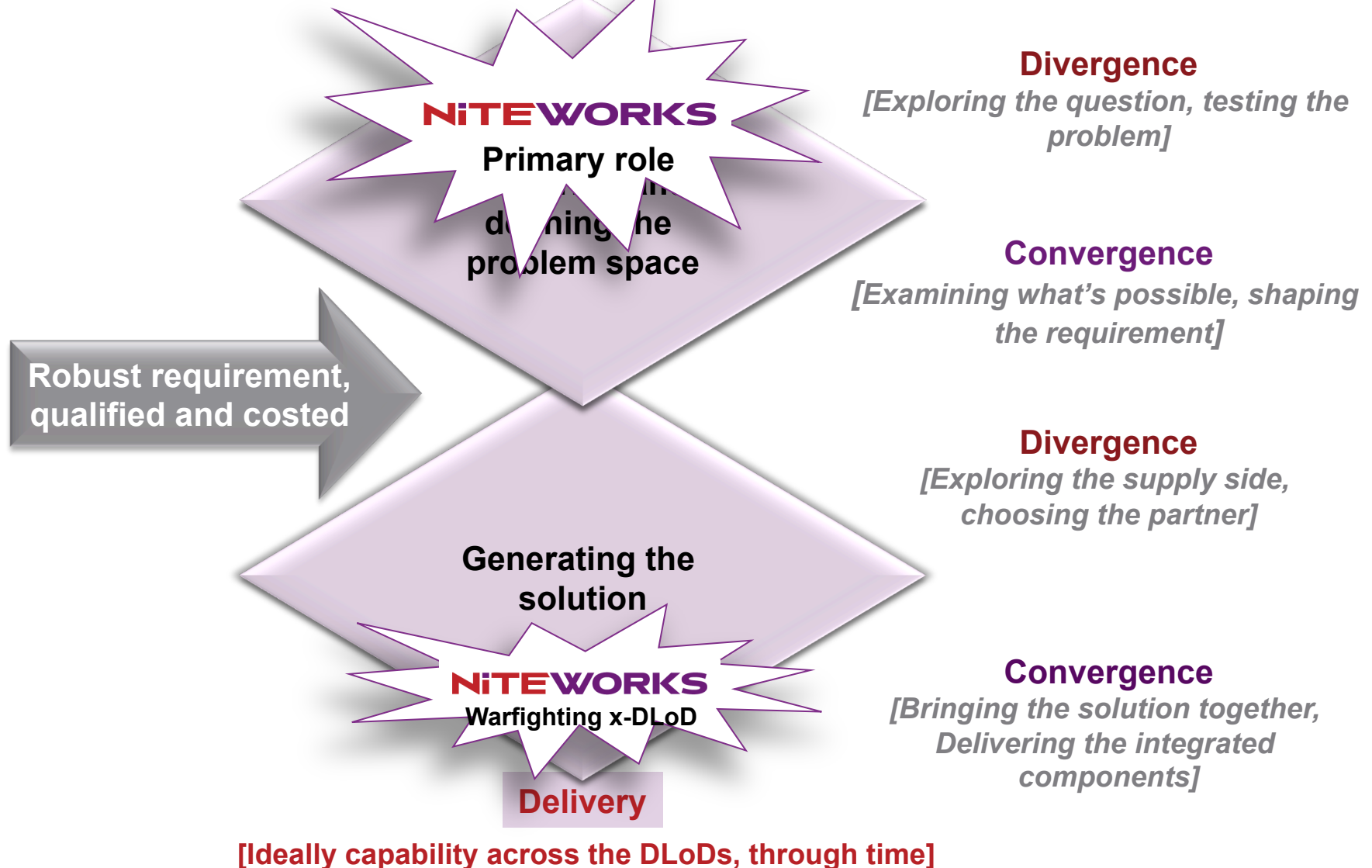
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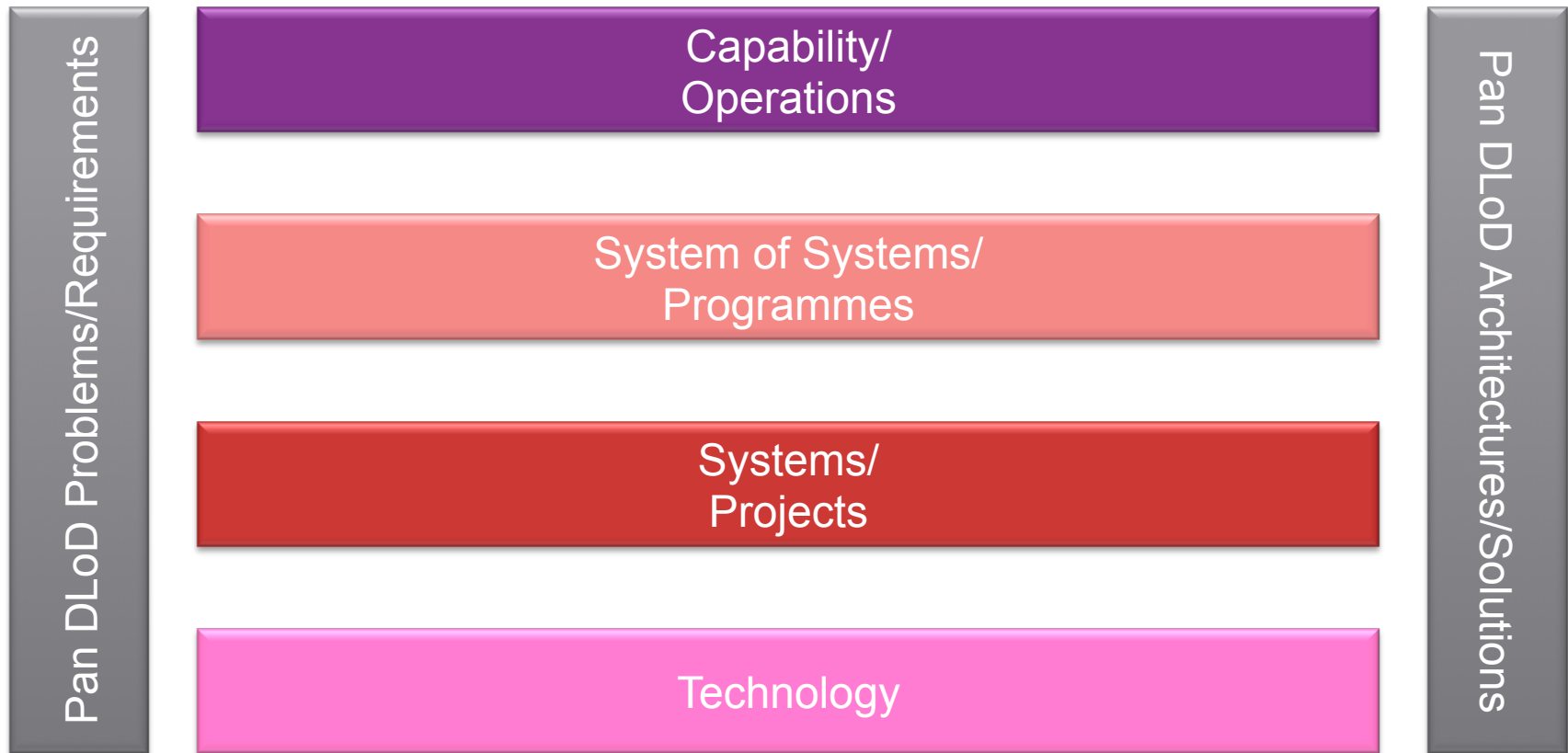
Current priorities

- Support to front-line operations
- Support to JCB decision-making
- Support to capability-based acquisition programmes
- Enabling NEC through the Key Systems Advisor service

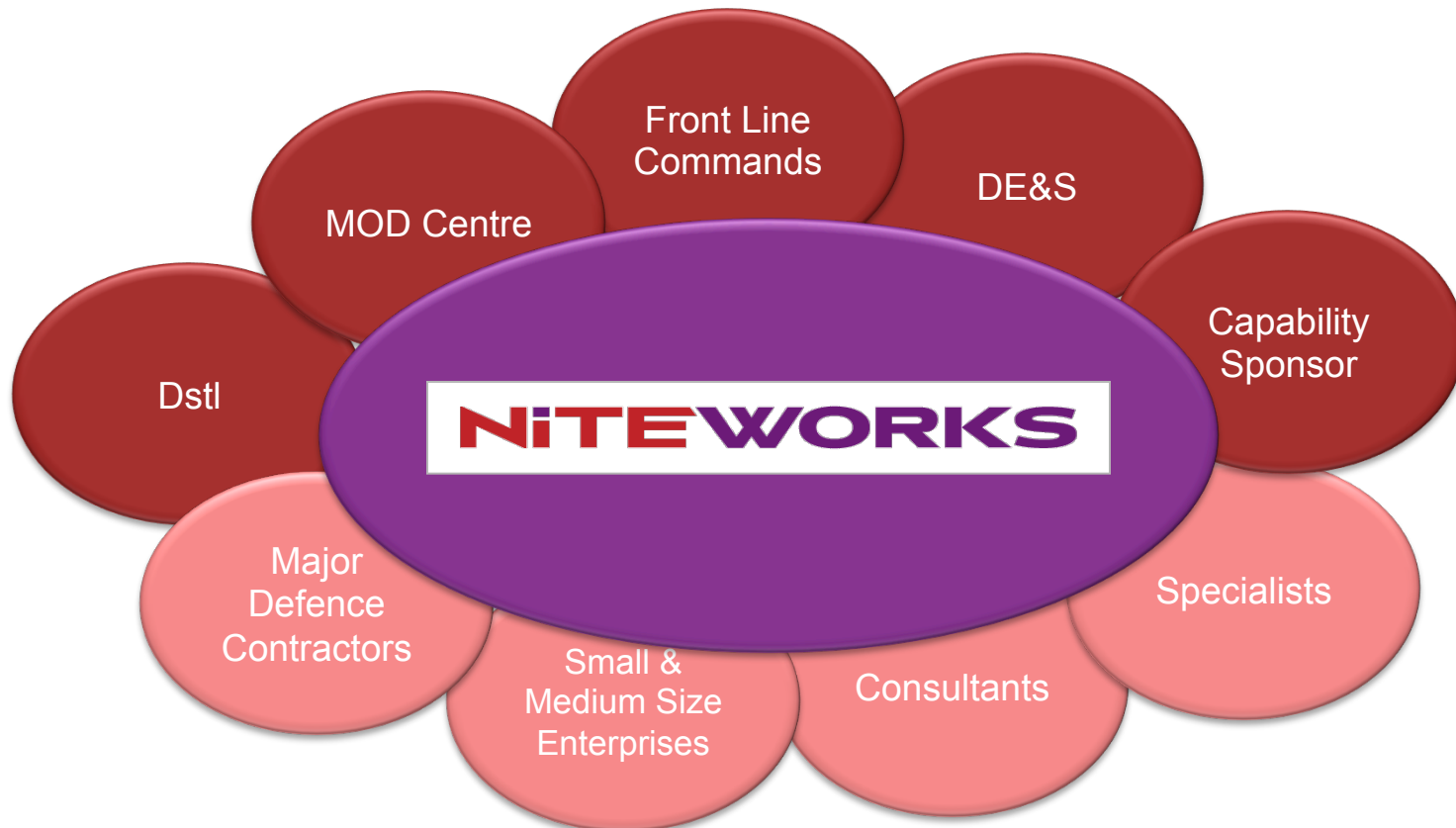
Where does Niteworks fit?



The Niteworks footprint



Partnership and commercial construct



Membership



12 industry partners drawn from the major defence providers



≈80 associate members made up of small and medium sized enterprises (SMEs), specialists, academia and consulting companies

Collaboration model

- Truly 'badgeless' environment
- Openness ensures impartiality
- Collaborative culture and behaviours underpinned by charter
- Two-way benefits flow
 - Background IP protected, foreground IP exploitable
- Rainbow teams constructed via 'Best Athlete' process
- Supplemented by other methods
 - Core pool, call-off, review panel, red team, community forum
- To-date, Niteworks projects have engaged several hundred different individuals from scores of different companies

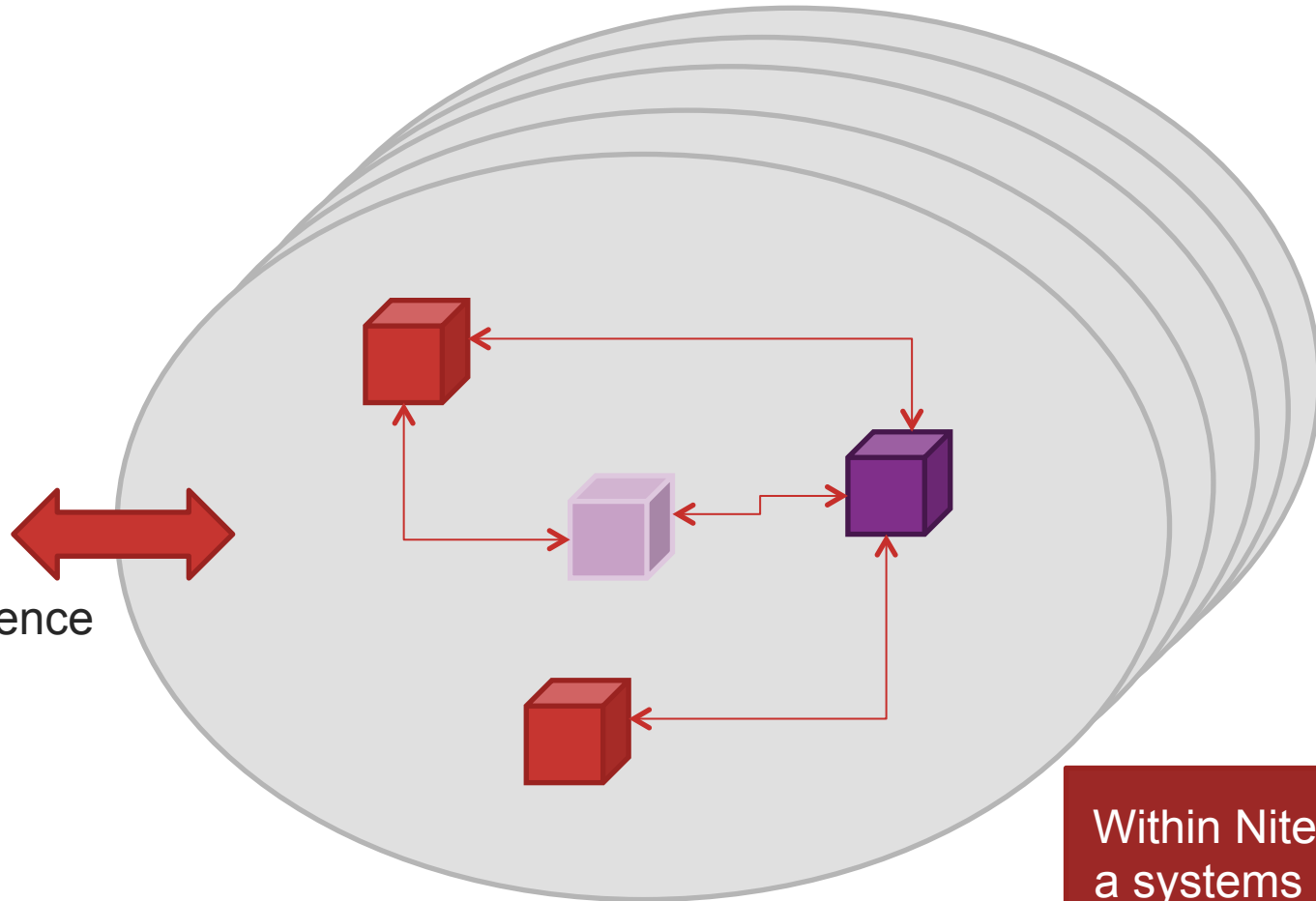
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The Systems Approach – systems all around

Hitchins Five Levels

Economy
Industry
Business
Project
Product

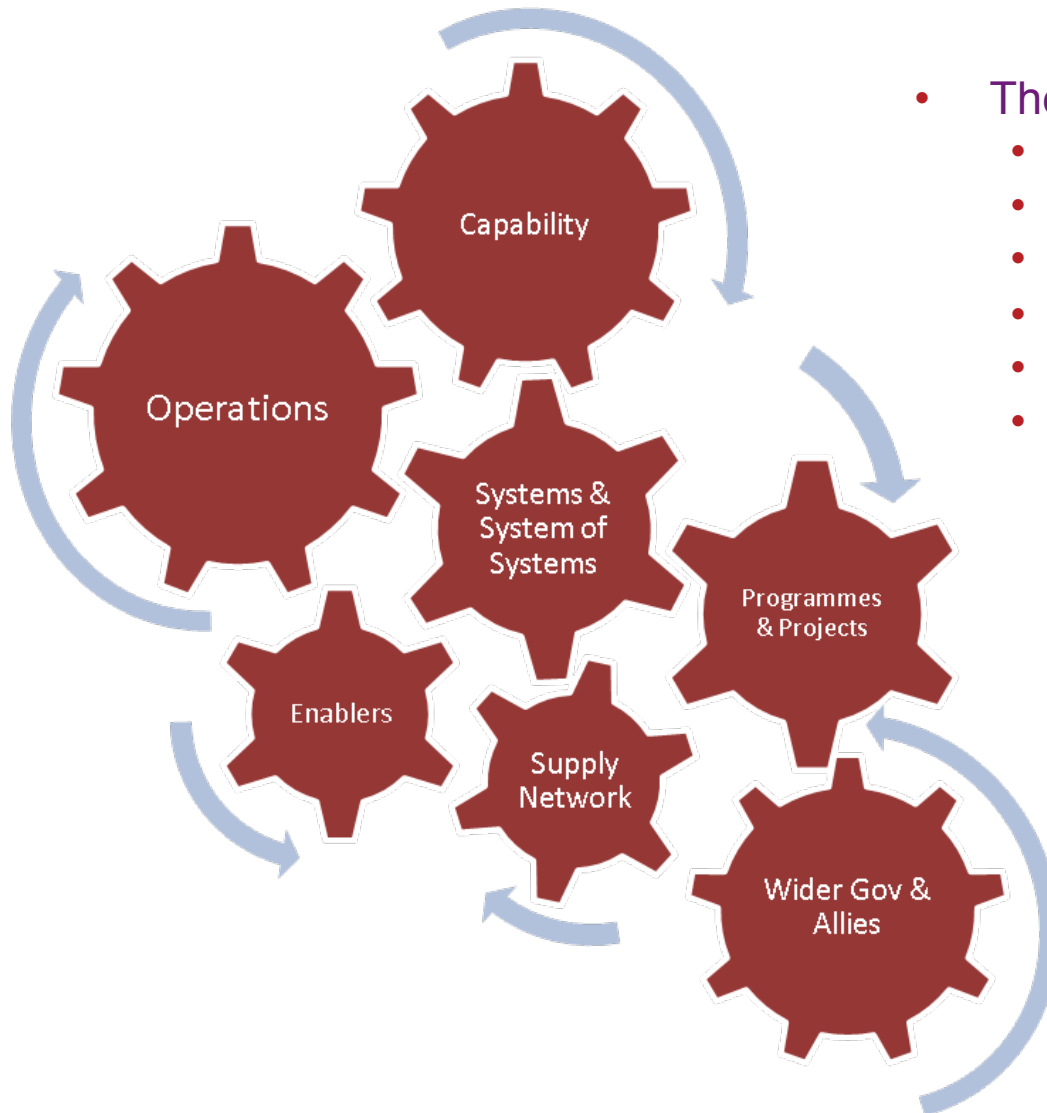


Within Niteworks we adopt a systems approach to the projects we undertake and to understanding our context

The Niteworks Way

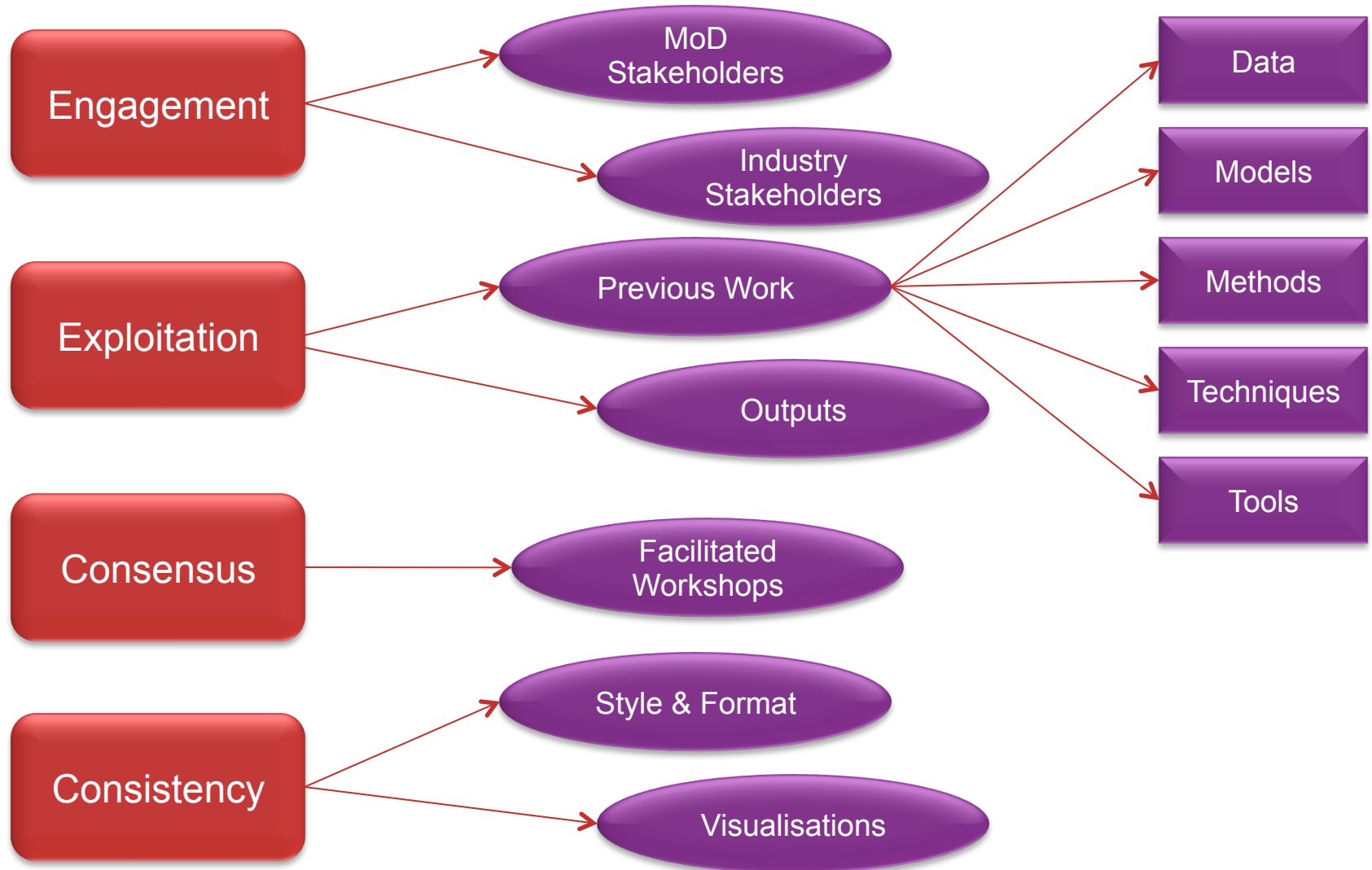
- The way Niteworks goes about its business
 - A complete, coherent and repeatable customer experience
 - More than delivery of 'output'
 - Makes the most of the unique aspects of the partnership
 - Is in a state of continuous development
- Key elements
 - Defence Enterprise Model
 - Principles
 - Generic decision support process

The Niteworks Way – Defence Enterprise Model

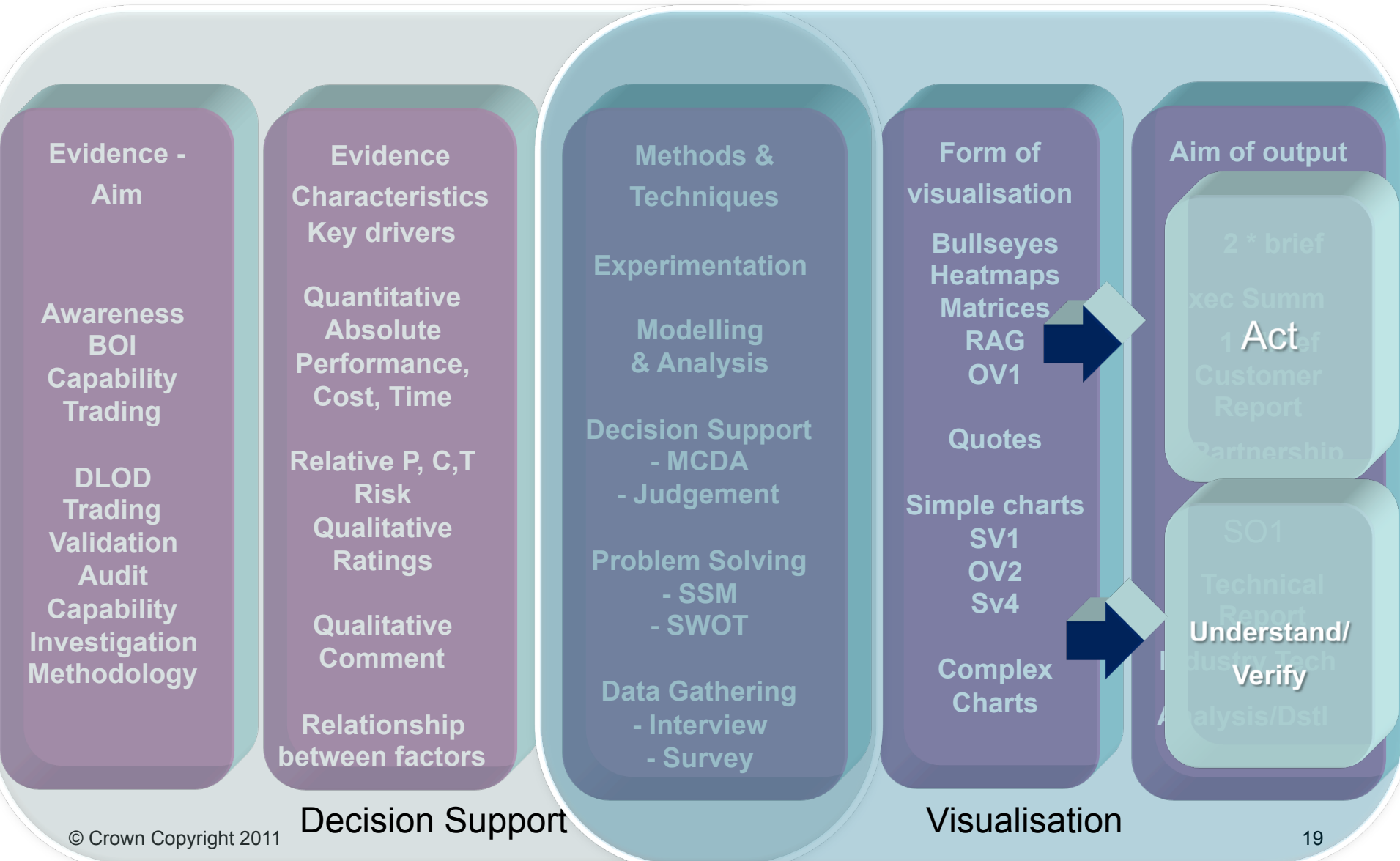


- The Defence Enterprise as a system
 - Loosely bound 'areas of concern'
 - Asynchronous couplings
 - Multiple time constants
 - Incoherence across boundaries
 - Loose coupling, high coherence
 - "Enterprise Evolution"

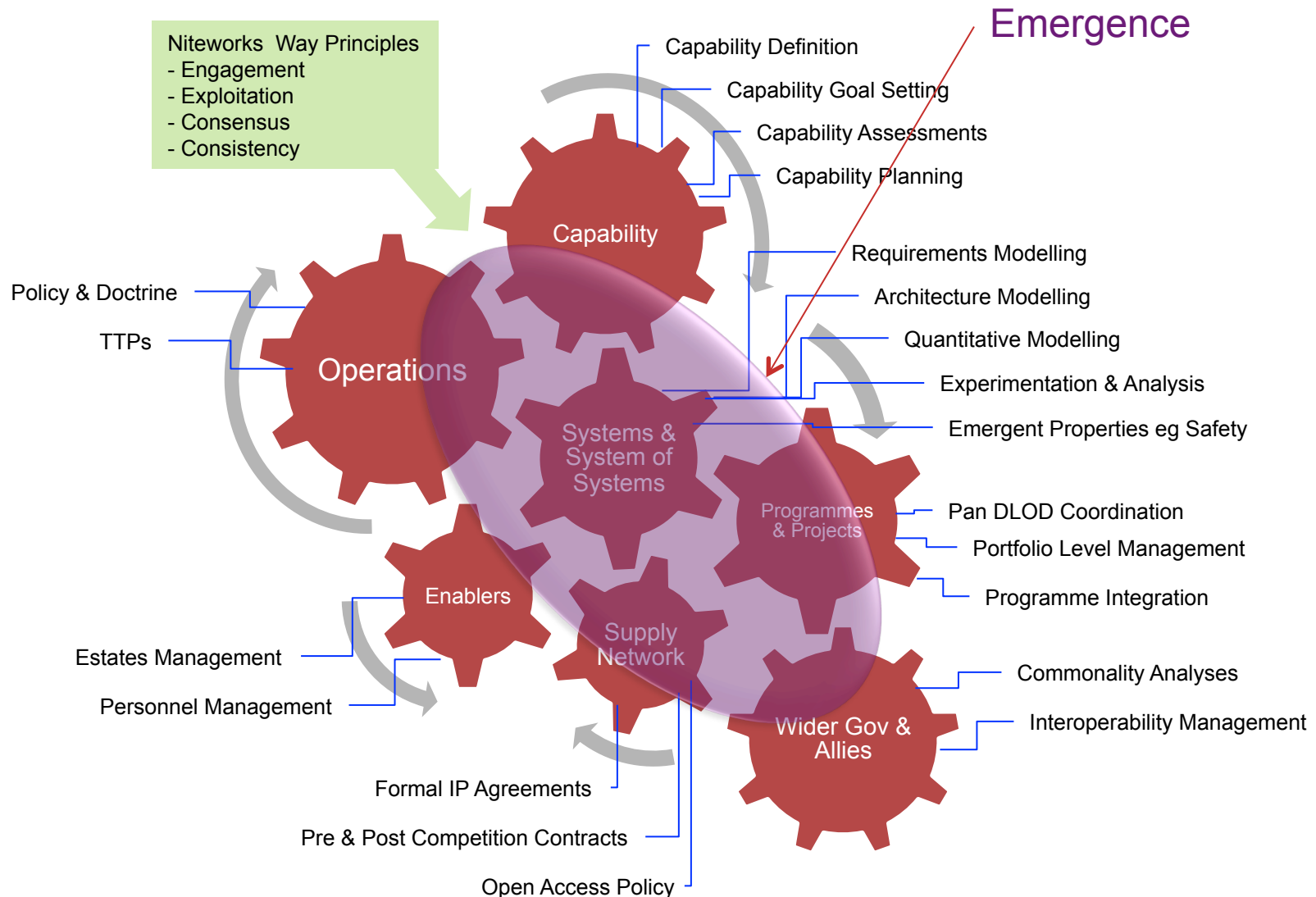
Niteworks Way - Principles



Niteworks Way – Decision Support Lifecycle



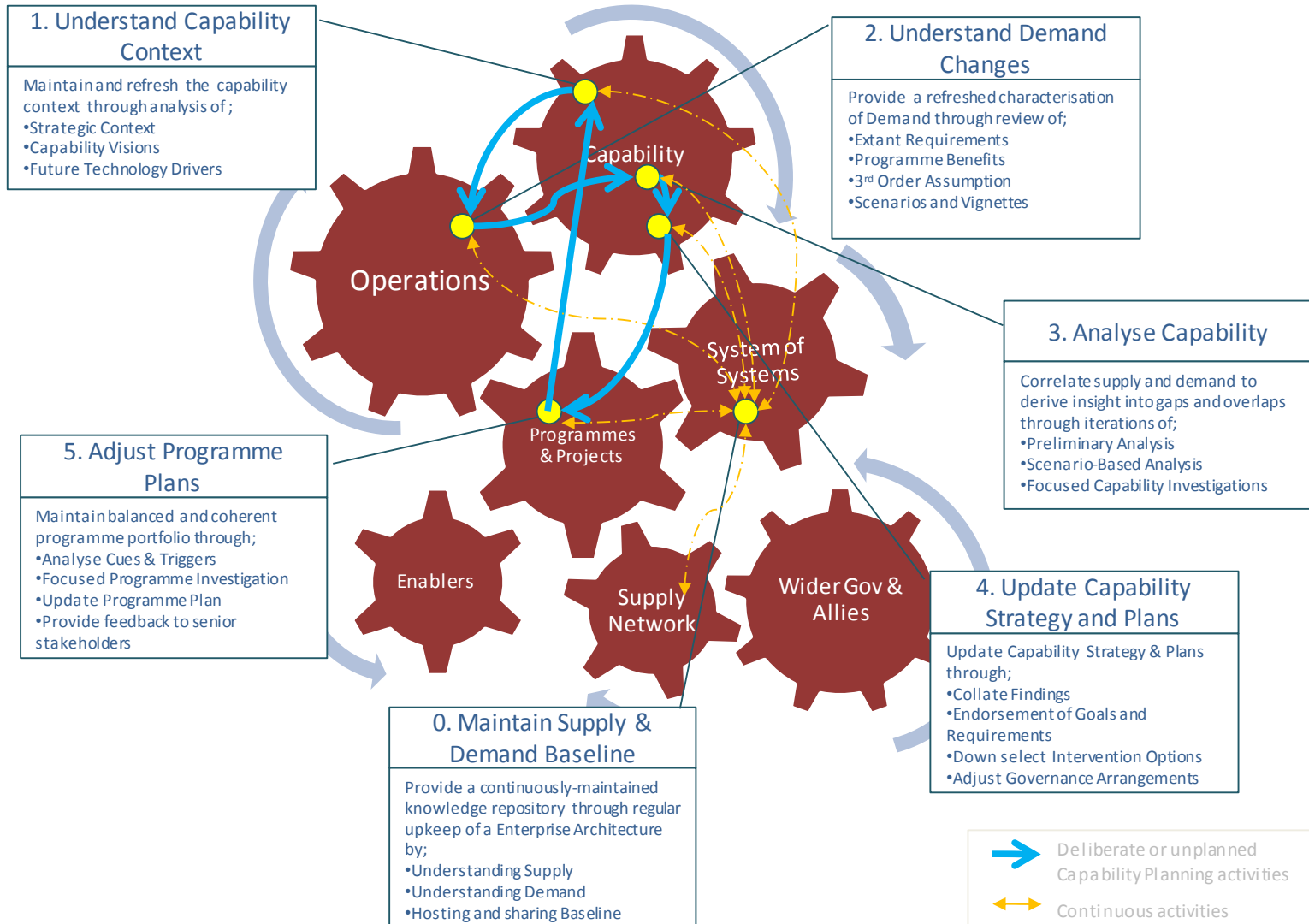
Niteworks Way – MOD Decision Activities



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Example – Capability Planning (Process)



Example – Capability Planning (Techniques)

- **Project on a Page**
 - Vital statistic and links to further information
- **Enterprise Architecture Models**
 - Tailored knowledge base to support a variety of analyses
- **Service Taxonomy**
 - Linking capability to technology through a hierarchy of services
- **Capability Performance Charts**
 - Visual and quantitative structure for SME judgements
- **Science and Technology Horizon Tables**
 - Visualising the impact of technology on capability demand/supply
- **DLOD Management Information Tables**
 - How DLOD factors bear on capability integration

Example – Capability Assessment

- Capability driven assessment of Mine Counter Measures
- Medium weight amphibious operation
- Process/techniques
 - Initial visualisation...
 - ...followed by targeted fidelity experiment
 - Architectural models used to determine fidelity needs
 - Extensions made to modelling approach to capture human factors
- Outputs impacted on
 - Strategy, capability requirement, doctrine, CONEMP, CONUSE

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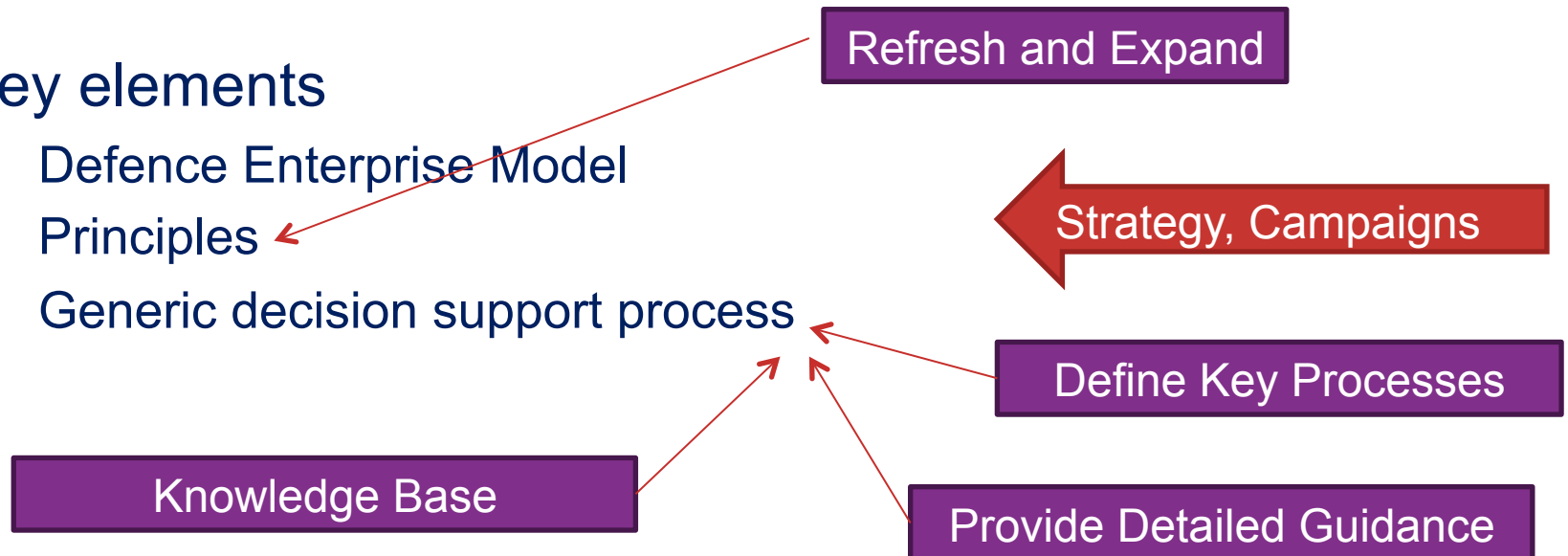
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Development of the Niteworks Way

- The way Niteworks goes about its business
 - A complete, coherent and repeatable customer experience
 - More than delivery of 'output'
 - Makes the most of the unique aspects of the partnership
 - Is in a state of continuous development

- Key elements

- Defence Enterprise Model
- Principles
- Generic decision support process



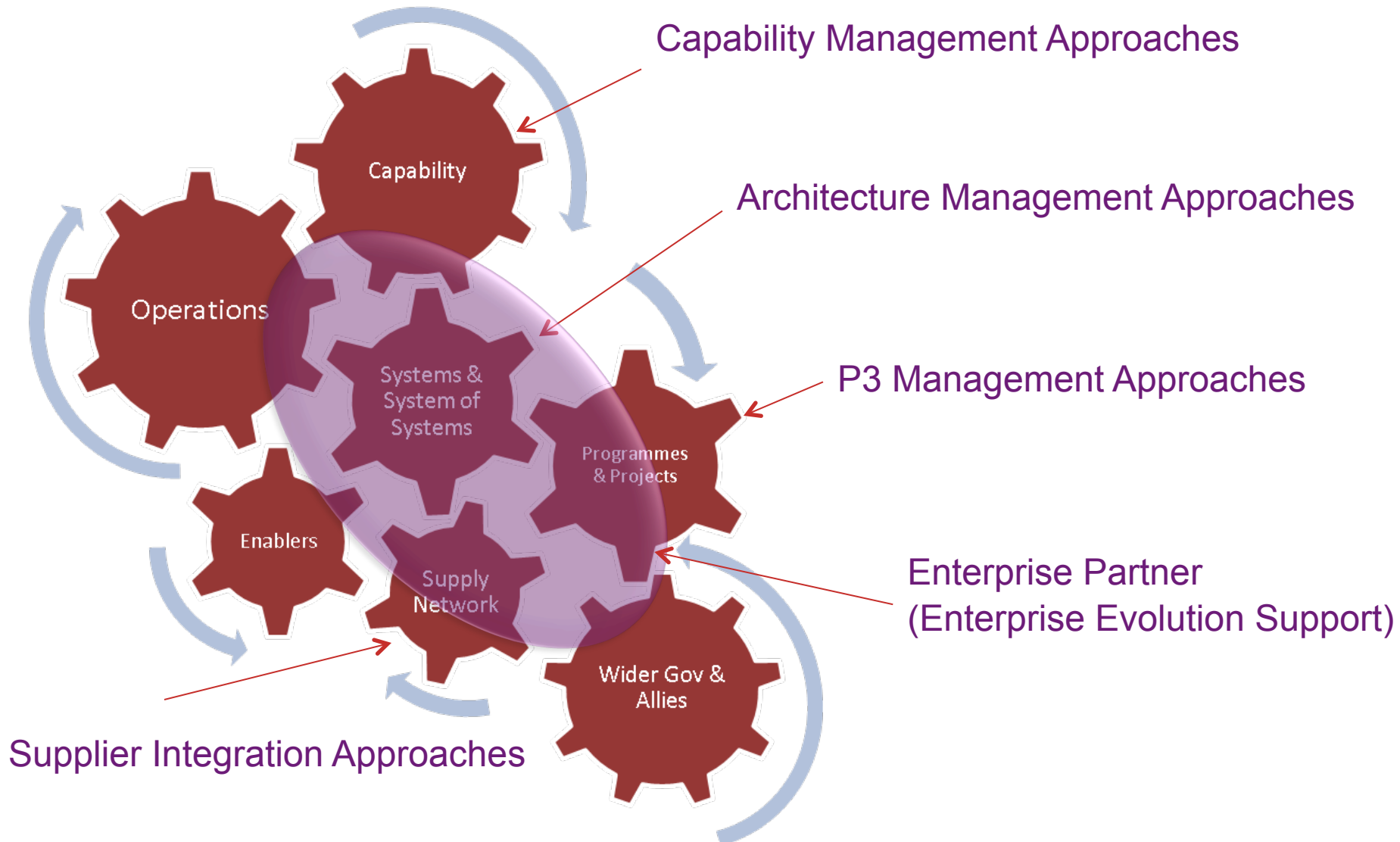
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Key points

- UK Defence is facing complex challenges
 - Must engineer at the Enterprise level
 - Systems Engineering/Thinking key to this process
 - Role of Systems Engineer needs to expand
- Niteworks is an exemplar for part of what is needed
 - Collaborative construct across customer/supplier
 - Commercially neutral, safe and impartial
 - Both sides better informed and able to make better decisions
- Systems Thinking and Engineering methods used
 - Looking at Enterprise as a system
 - Adopting a set of holistic principles (people, process, equipment)
 - Tailoring of a generic decision support process

The Niteworks contribution



Acknowledgements

- Niteworks colleagues past and present
 - Contributions to the development of the Niteworks Way
 - Review and input to this paper
- MOD's Systems Engineering and Integration Group
 - Permission to publish this paper