

INCOSE International Symposium 2011

NiTEWORKS

A horizontal red line with a jagged, stepped pattern, starting from the left edge of the slide and extending towards the right, ending with a small vertical tick.

Systems thinking and methods within a collaboration paradigm

Dr M K Wilkinson, Technical Director
Mr D E Evans, Chief Architect

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

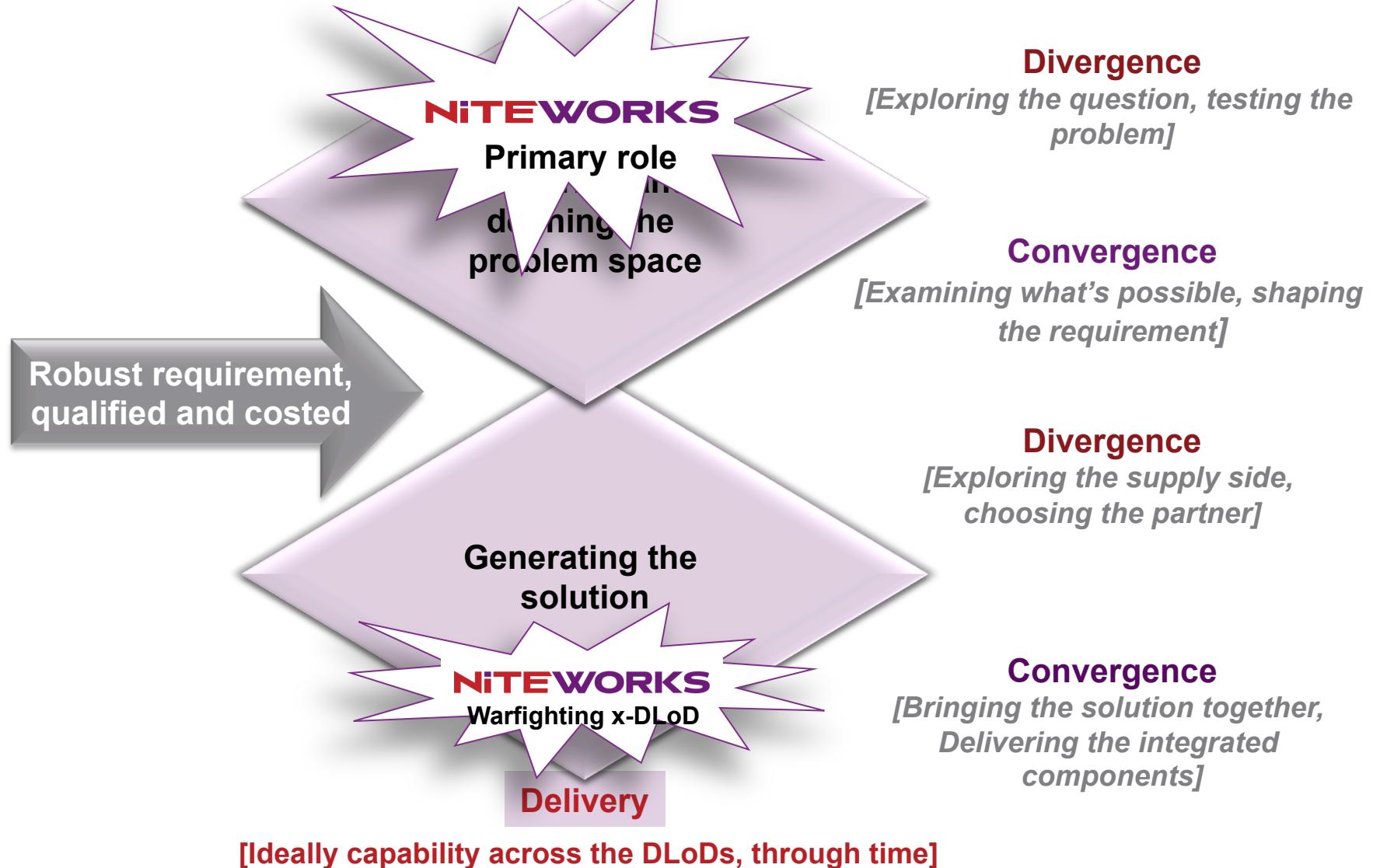
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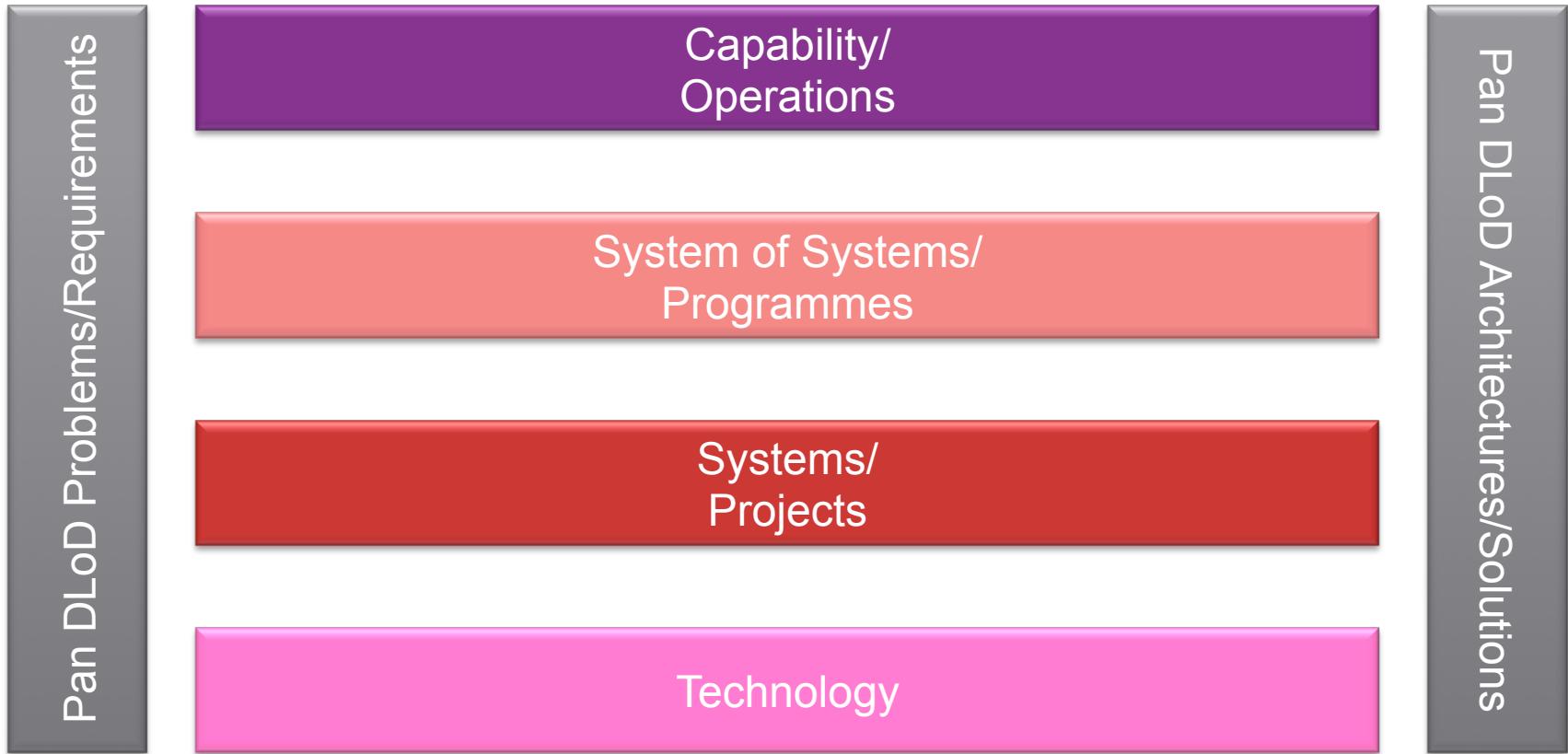
Current priorities

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

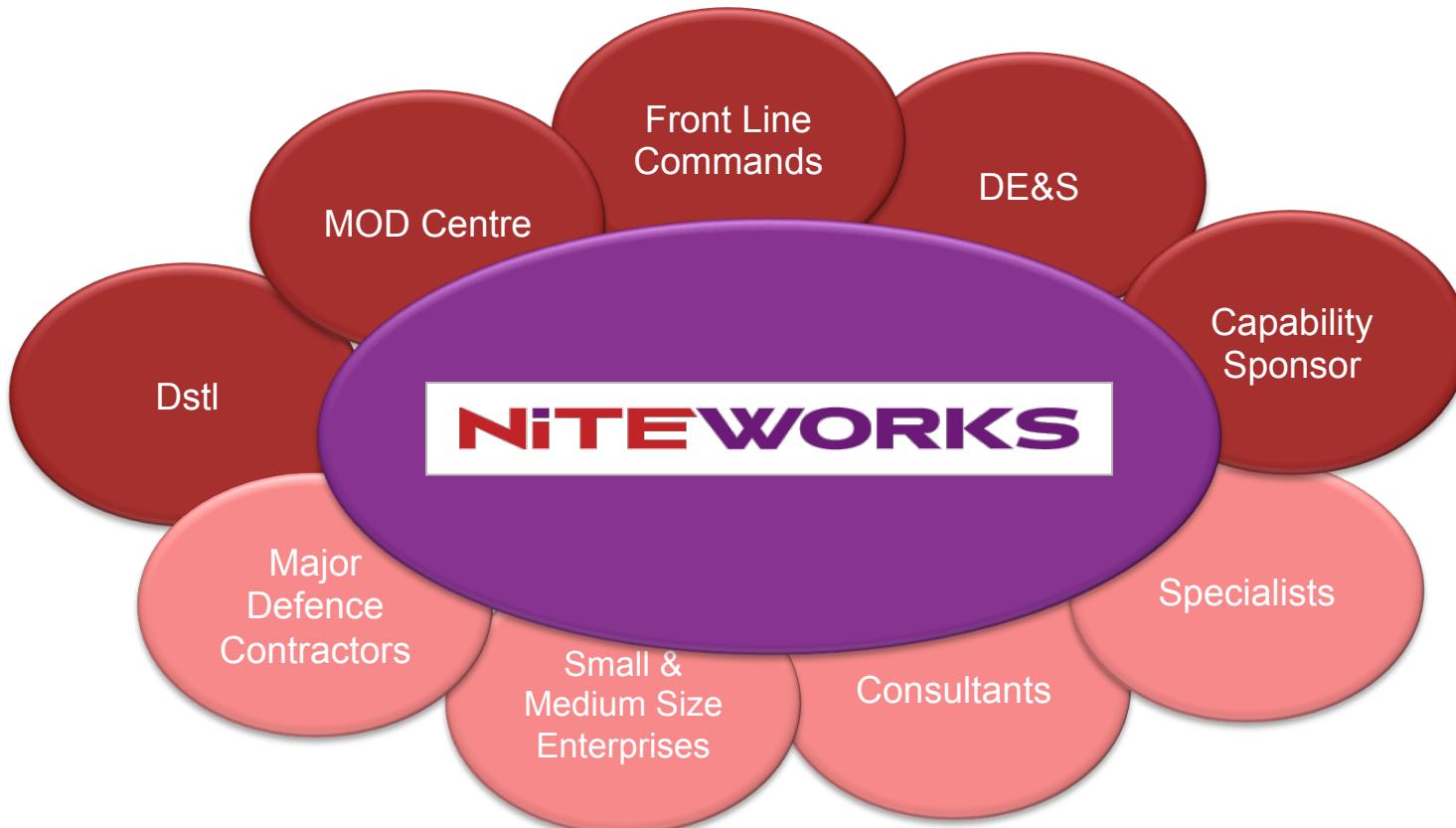
Where does Niteworks fit?



The Niteworks footprint



Partnership and commercial construct



Membership



BAE SYSTEMS

CASSIDIAN
AN EADS COMPANY

FINMECCANICA
GENERAL DYNAMICS
United Kingdom Limited



LOCKHEED MARTIN

logica

MBDA
MISSILE SYSTEMS



QinetiQ

Raytheon
Systems Limited

TALES



ABEDAS

ACTICA
consulting

agile ideas

ATKINS

Atos

Origin

Aviation Requirements

concinnit s

Cranfield

UNIVERSITY

daco

DS

ENVITIA

Et
Consulting

Burchelli
Consulting
Limited

Capgemini
CONSULTING TECHNOLOGY OUTSOURCING

CBIA

catalyze

CISCO

conncinnit s

HELIO-S

inspire

infonic

integrate

JA Consulting
www.jaconsulting.co.uk

ETCHELLS CONSULTING

FUJITSU

Reply
glue

harmonic

helios

Jane's

JCSys

KAPLAN

IT LEARNING

<KNK/

L3
communications

ASIA

LSC GROUP

magnaparva

mm

Mott
McDonald

NEXOR
persides

PRICEWATERHOUSECOOPERS

PRTM

purple

secure systems

Quintec

r2b2

Limited

RAND

EUROPE

Real-Time Data
Company Ltd

RED
SCIENTIFIC LIMITED

RJD
Technology Ltd

roke

Rolls-Royce

SAIC

Salamander

solutions for the right enterprise

scisys

SCS

SEA

S2
SIMULTEC
SYSTEMS

Soteria
Consulting

Stellar
RESEARCH SERVICES

steria

Sula

SVGC

SyntheSys

SYSTEMATIC

Talascend

TENET

Tessella

Ultra
ELECTRONICS

VEDETTE
CONSULTING

WarnerMcCall
TECHNOLOGIES

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

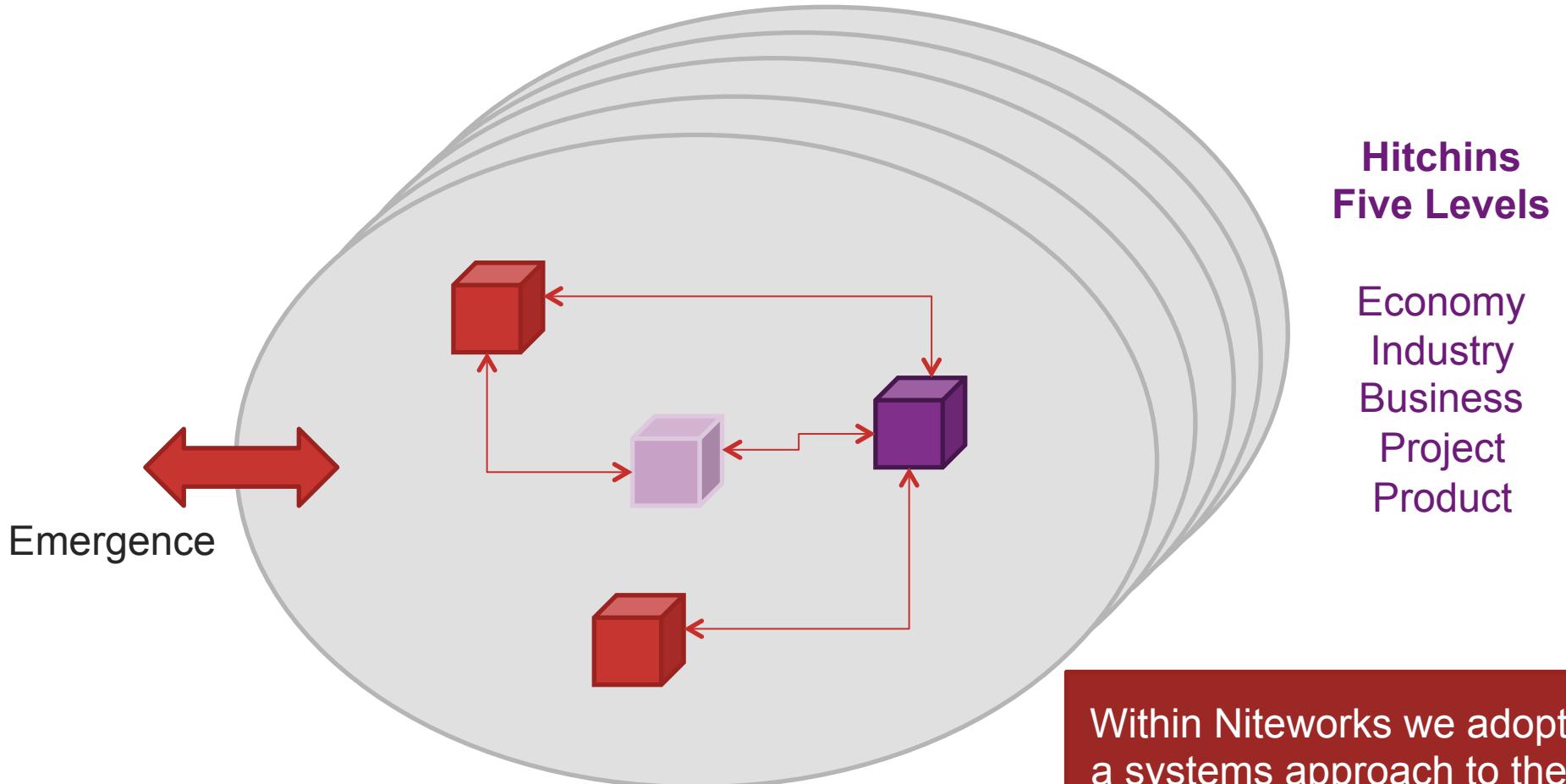
Collaboration model

- 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

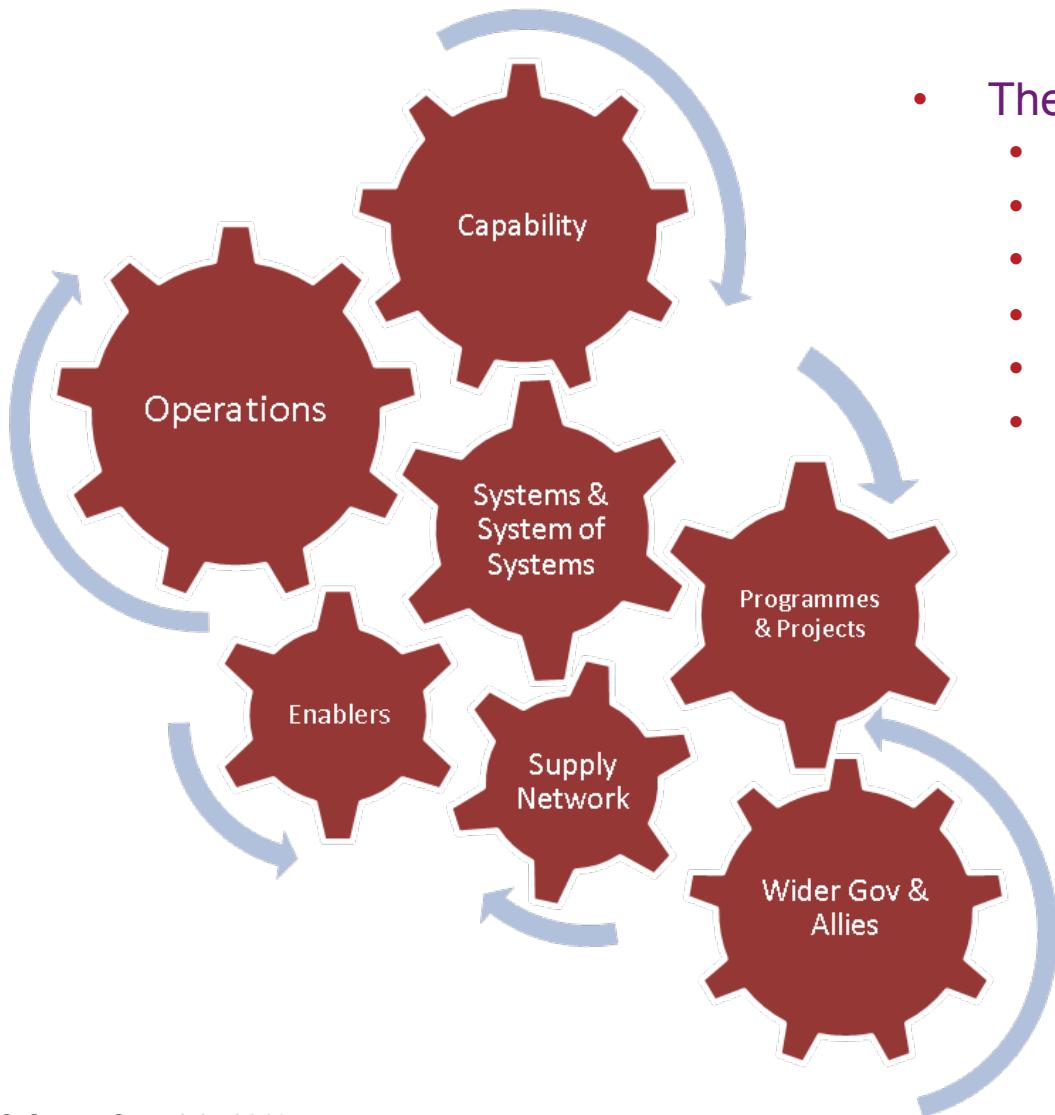


Within Niteworks we adopt a systems approach to the projects we undertake and to understanding our context

The Niteworks Way

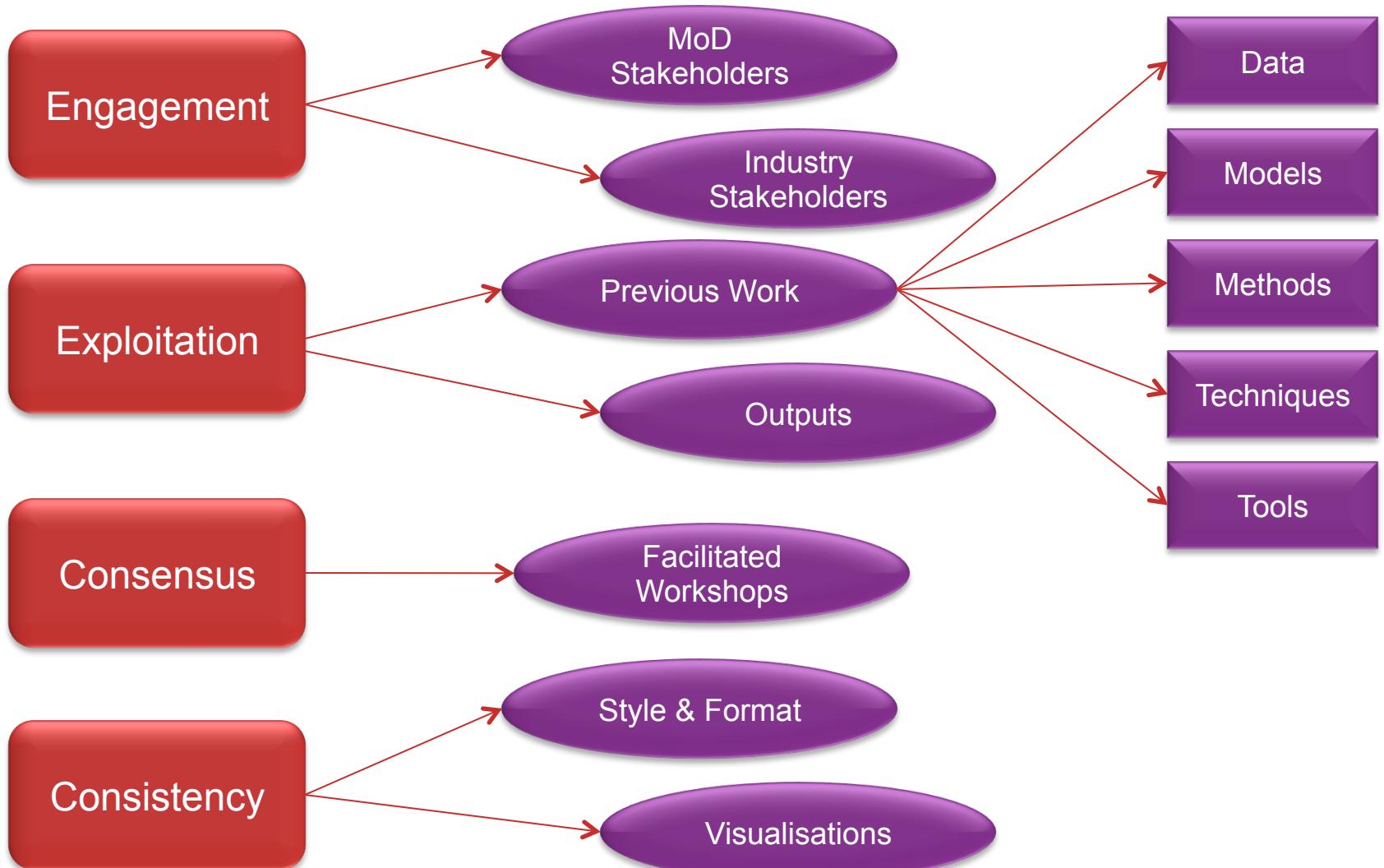
- The way Niteworks goes about its business
 - A complete, coherent and repeatable customer experience
 - More than delivery of ‘output’
 - Makes the most of the unique aspects of the partnership
 - Is in a state of continuous development
- Key elements
 - Defence Enterprise Model
 - Principles
 - Generic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

Evidence - Aim

Awareness
BOI
Capability
Trading

DLOD
Trading
Validation
Audit
Capability
Investigation
Methodology

Evidence Characteristics

Key drivers

Quantitative
Absolute
Performance,
Cost, Time

Relative P, C,T
Risk
Qualitative
Ratings

Qualitative
Comment

Relationship
between factors

Methods & Techniques

Experimentation

Modelling & Analysis

Decision Support
- MCDA
- Judgement

Problem Solving
- SSM
- SWOT

Data Gathering
- Interview
- Survey

Form of visualisation

Bullseyes
Heatmaps
Matrices
RAG
OV1

Quotes

Simple charts
SV1
OV2
Sv4

Complex Charts

Aim of output

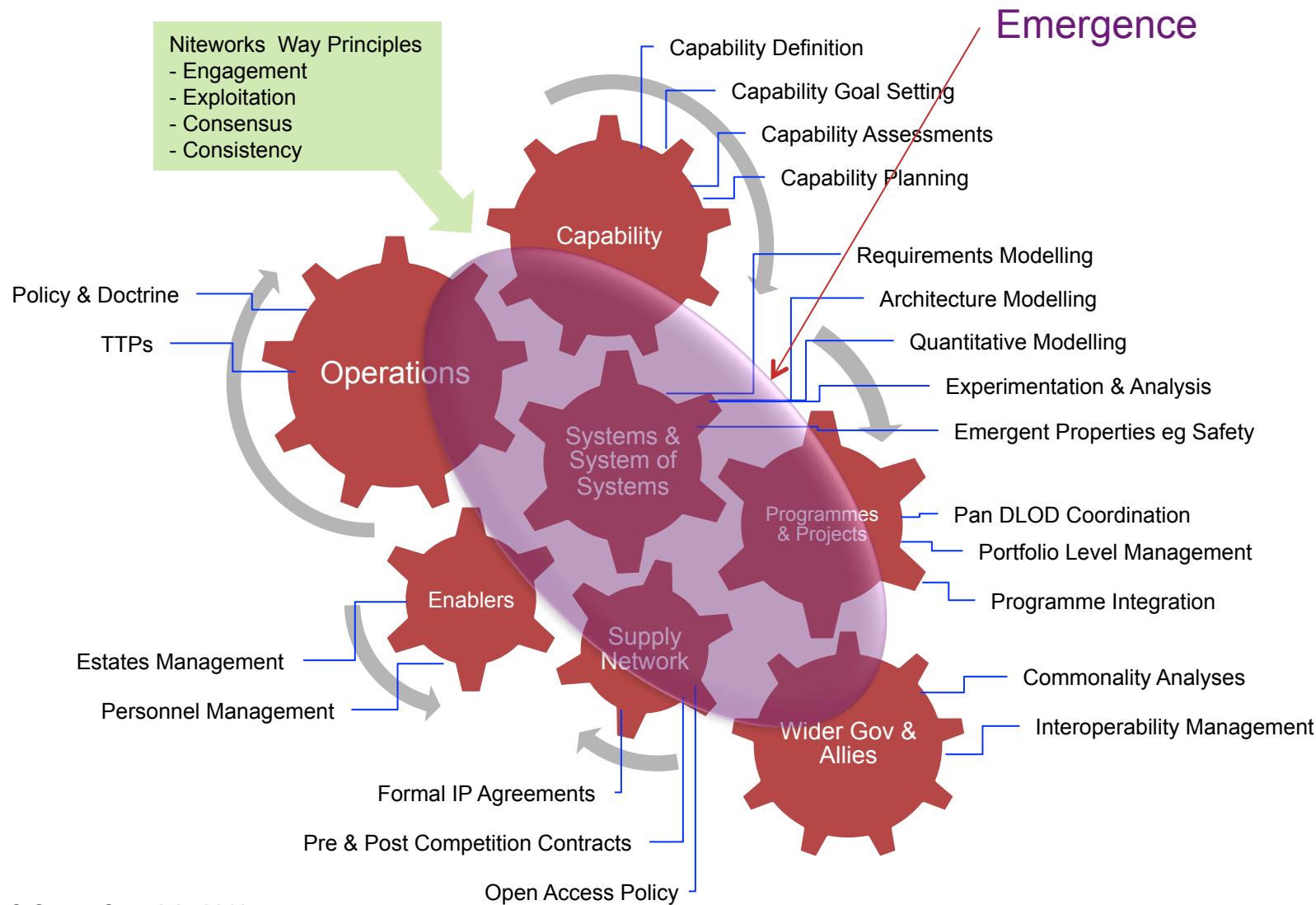
2 * brief
Exec Summ
Act of
Customer
Report
Partnership

SO1
Technical
Report
Understand/
Verify
Analysis/Dstl

Decision Support

Visualisation

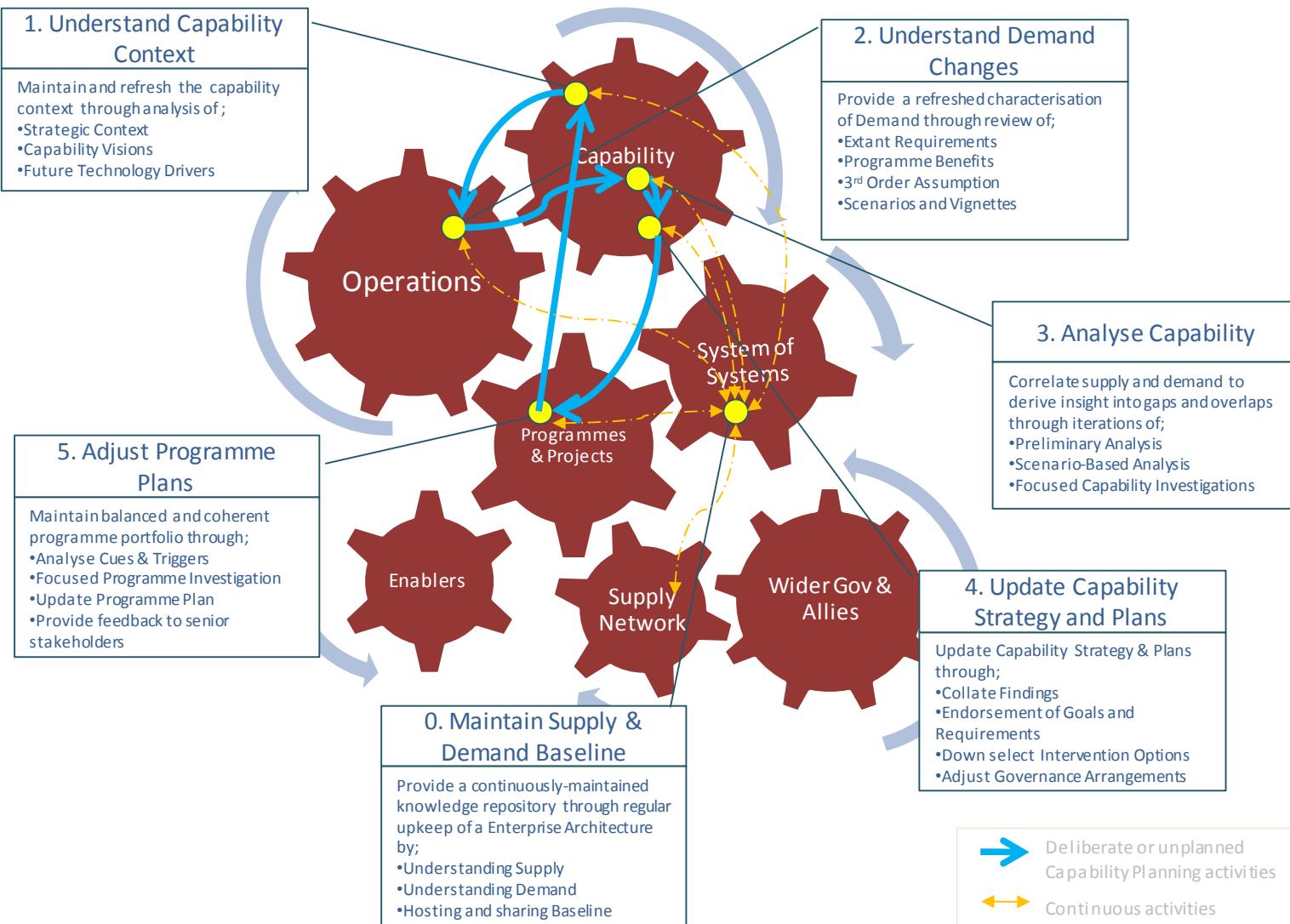
Niteworks Way – MOD Decision Activities



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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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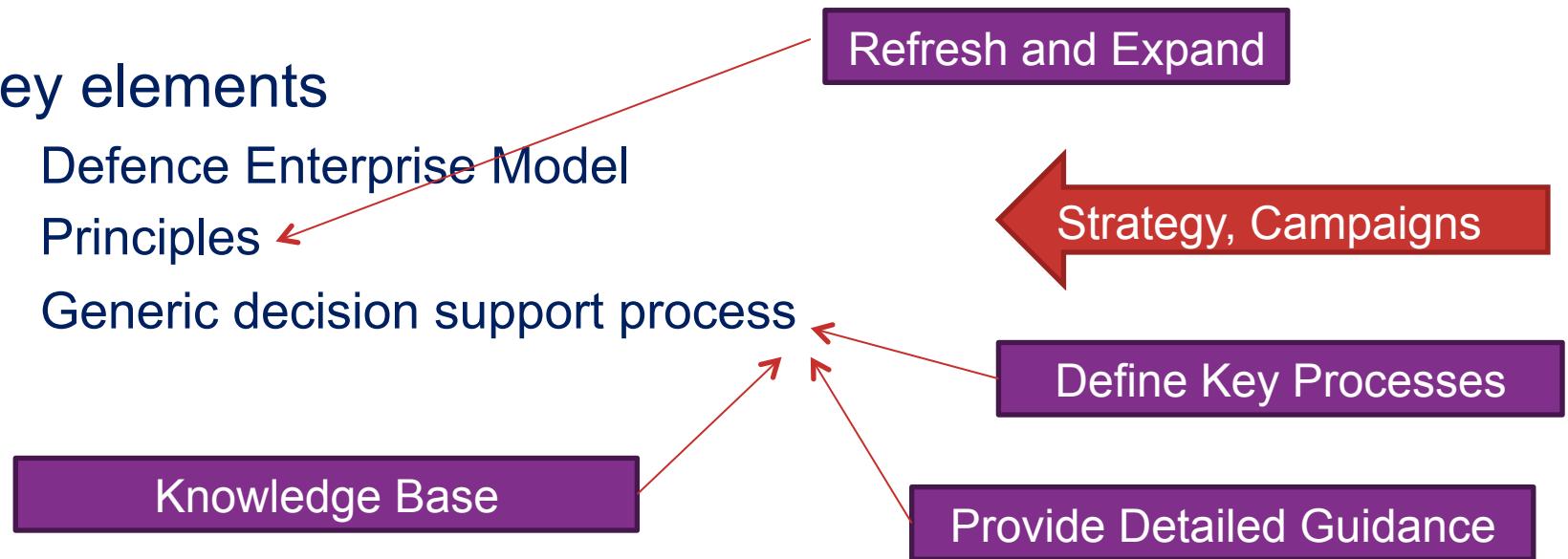
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Development of the Niteworks Way

- 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
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- Key elements

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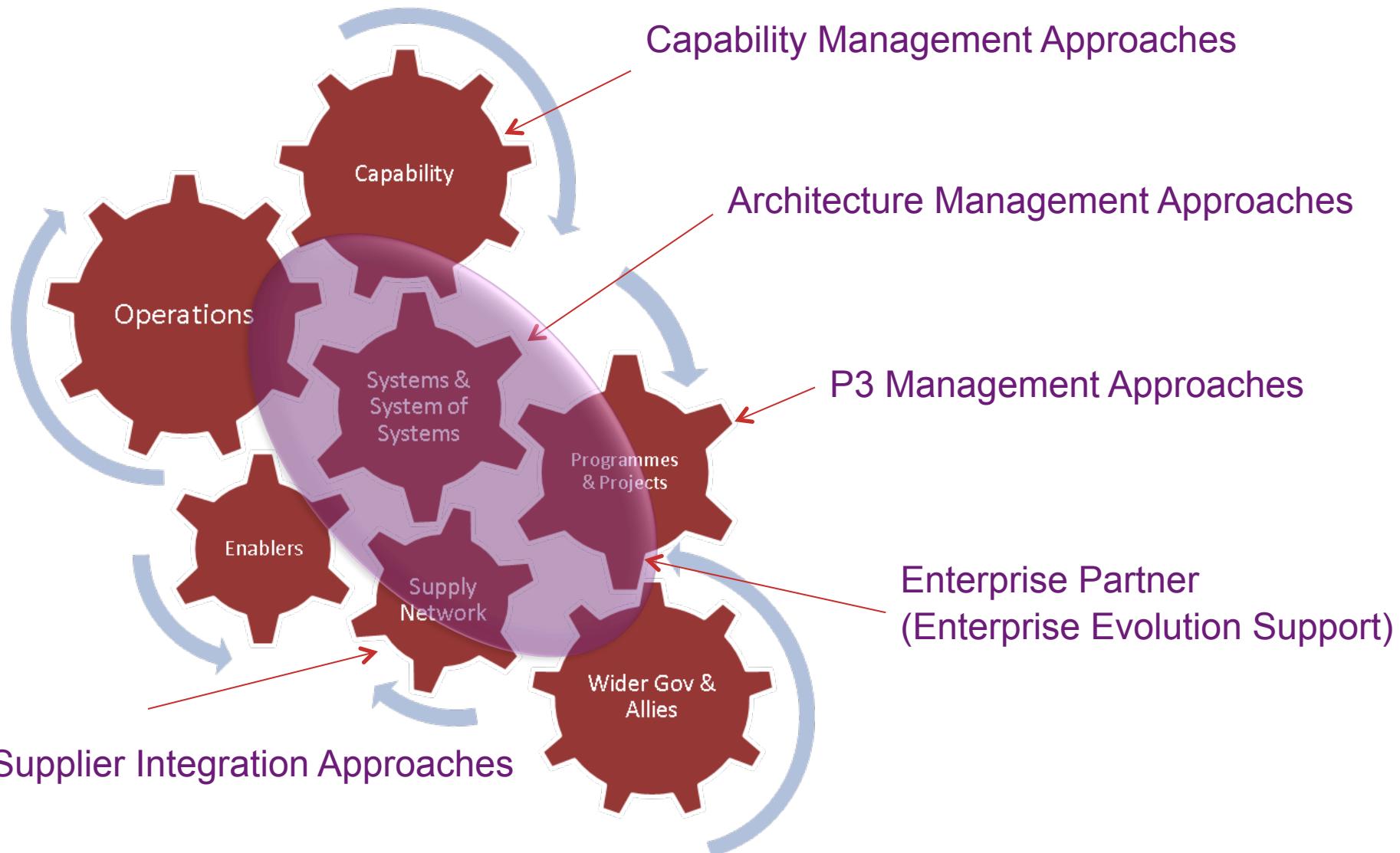
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Key points

- 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