



SOSA Overview

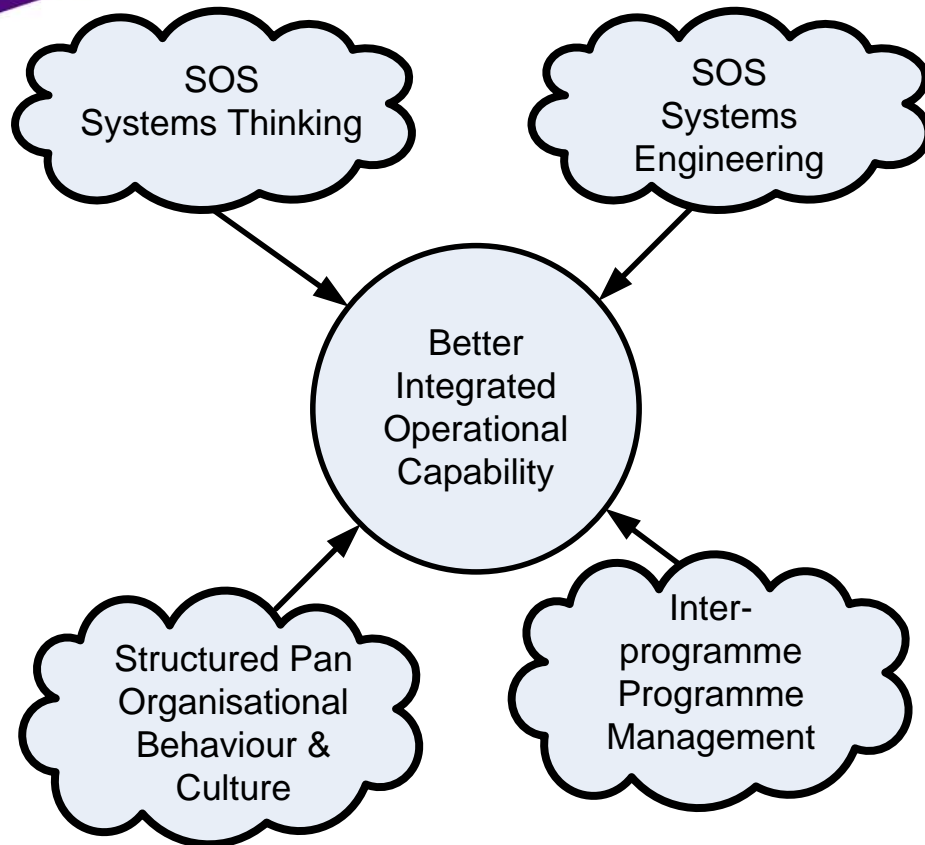
Derek Lomax
SEIG Support



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The System of Systems Approach

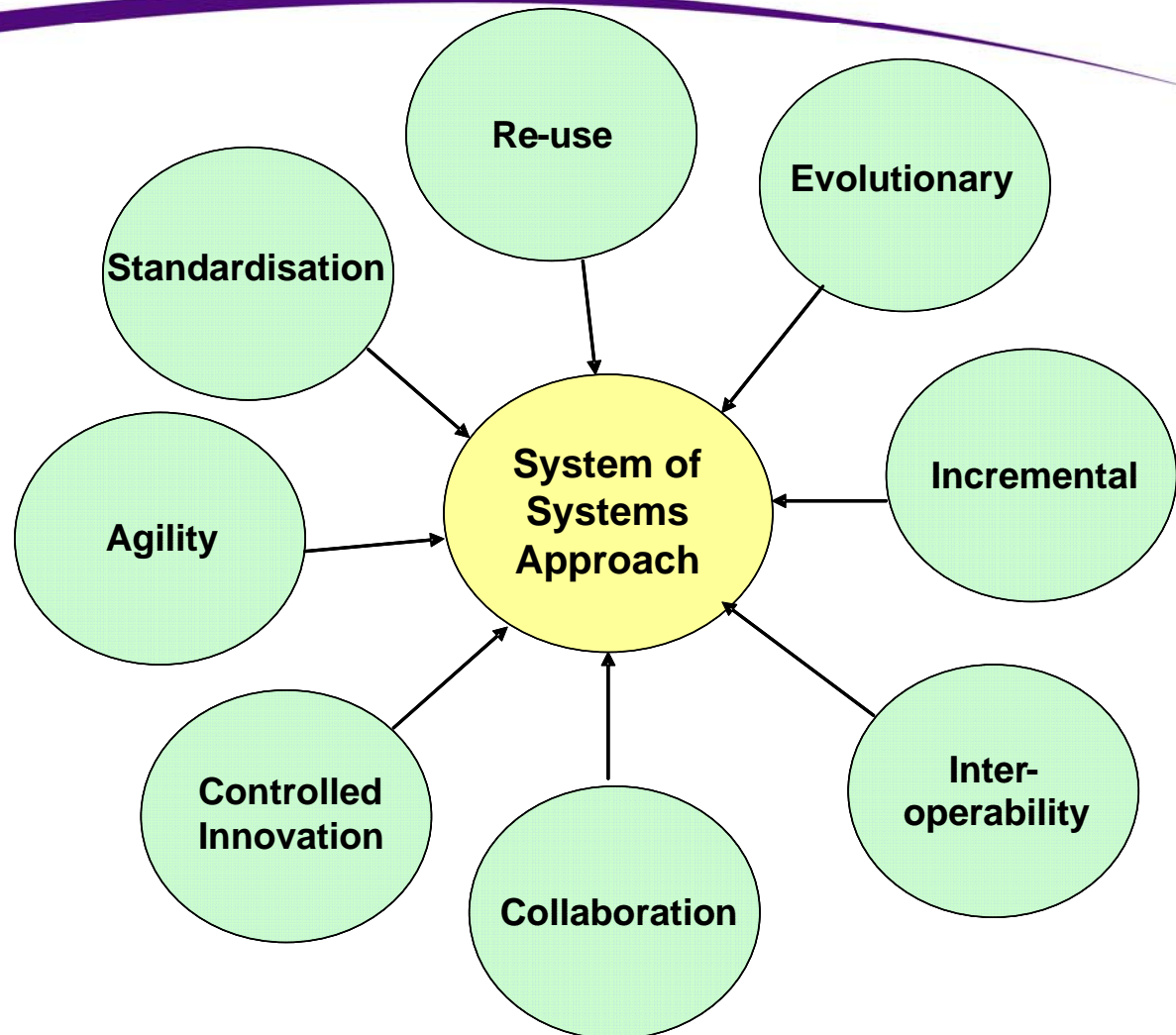


- SOSA is a combination of hard and soft activities and skills, intended to deliver enhanced military capability enabled by interoperability.
- This is achieved by considering System of Systems (SOS) issues rather than purely System issues:
 - SOS Thinking
 - e.g. Business Architecture
 - The extension of Systems Engineering to encompass SOS
 - e.g. Services based
 - Behaviours
 - Collaborative - Cross system Boundary & Cross Organisation
 - Inter-programme Programme Mgt
 - e.g. TLCM Programme Boards Interdependencies not recognised



Key System of System themes:

A Systems of Systems Approach will provide the processes, organisational constructs, strategies, governance and behaviours that drive appropriate levels of commonality, re-use and interoperability in all aspects of defence procurement.



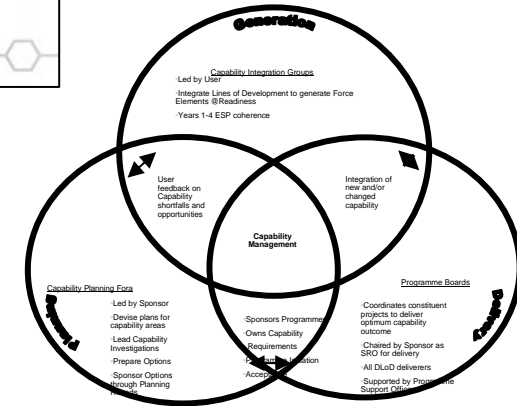
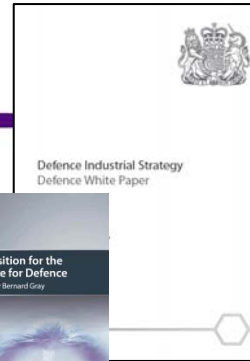
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Key approaches that need to become second nature

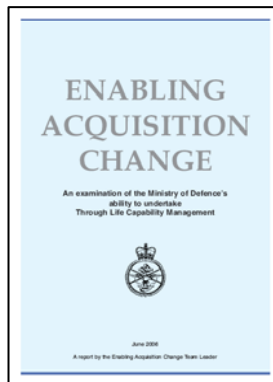


Key Initiatives & Reports

- MoD to be Design Authority for C4ISTAR Architecture
 - “ownership and design authority which can only rest with MOD”
- Systems Engineering – Key skill and enabler
 - System Engineering Skills as part of AOF
 - Delivery Team Chief Engineers
- SRO for NEC



- Programme Boards
 - Integration between Planning, Delivery, Generation (& Operation)
 - Project Foundation Reviews
- Better budgetary control needed – better planning and estimation
- Network Capability Authority / Technical Authority / Operating Authority
- Ensurance vs Assurance

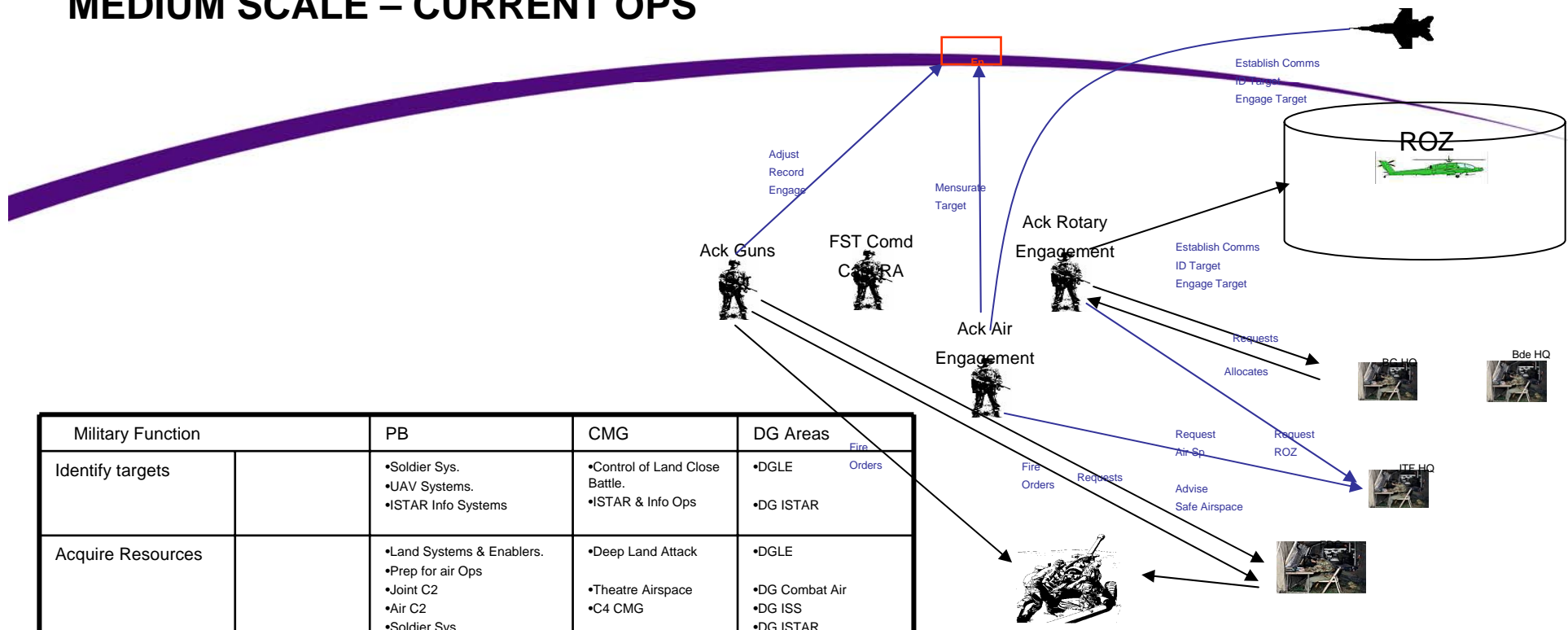


MoD needs to operate as expert customer at System of Systems Level



OV1 – JOINT FIRES INTEGRATION MEDIUM SCALE – CURRENT OPS

Programme Boards Example



| Military Function | | PB | CMG | DG Areas |
|--------------------------------|----------------------|--|--|---|
| Identify targets | | <ul style="list-style-type: none"> •Soldier Sys. •UAV Systems. •ISTAR Info Systems | <ul style="list-style-type: none"> •Control of Land Close Battle. •ISTAR & Info Ops | <ul style="list-style-type: none"> •DGLE •DG ISTAR |
| Acquire Resources | | <ul style="list-style-type: none"> •Land Systems & Enablers. •Prep for air Ops •Joint C2 •Air C2 •Soldier Sys | <ul style="list-style-type: none"> •Deep Land Attack •Theatre Airspace •C4 CMG •Control of Land CB | <ul style="list-style-type: none"> •DGLE •DG Combat Air •DG ISS •DG ISTAR |
| Develop Fire Plan | De-conflict Airspace | <ul style="list-style-type: none"> •Find/Attack •Tactical Network | <ul style="list-style-type: none"> •Intra Theatre Mob •C4 | <ul style="list-style-type: none"> •DG Hels •DG ISS / DG ISTAR |
| | Confirm Resources | <ul style="list-style-type: none"> •Core Network | <ul style="list-style-type: none"> •C4 | <ul style="list-style-type: none"> •DG ISS |
| | Distr Plan | | | |
| Co-ordinate with Manoeuvre Arm | | | | |
| Execute Fire Plan | | <ul style="list-style-type: none"> •Combat Air •Complex Weapons | <ul style="list-style-type: none"> •Deep Land Attack •CM(PA)? | <ul style="list-style-type: none"> •DG Combat Air •DG Weapons |

- Mission Thread Split over:
 - 14 Programme Boards
 - 6 Cap Areas
 - 6 DG Areas
 - > 20 Projects



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So who is responsible for end to end mission thread performance?



Key Enablers

- Conceptual consistency
- An architectural approach
 - Baseline, Planned & Target
 - Single Context (Enterprise) Vision - Clear joint understanding of Capability
 - What 'good' looks like
 - Through Time
 - Requirements articulated
 - Hard (Measurable)
 - V&V Criteria
- Agile rapid acquisition – Framework to assess impact of UORs
- Simulation and synthetic environments
- Better use of Test and Experimentation Facilities to 'Qualify' capability
- Effective pull-through of technology from research to delivery
- Accurate and rigorous measurement to provide realistic estimates (and risks) of what can be achieved

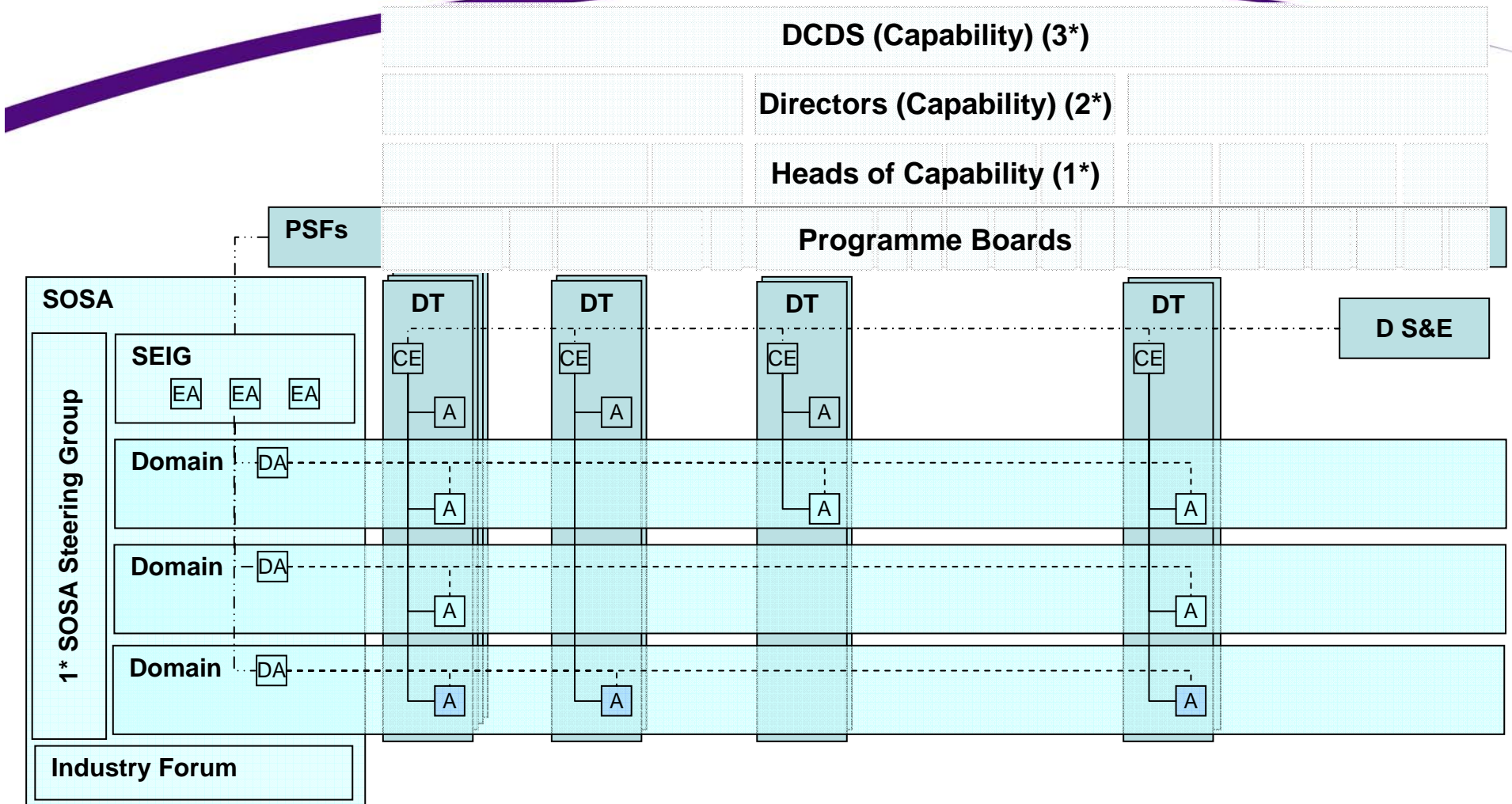


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The challenge is to integrate the complex technologies that make up modern Defence systems



SOSA – PSFs, Domains, Delivery Teams & SEIG Working Together – Operating Model



PSF: Programme Support Function
 DT: Delivery Team

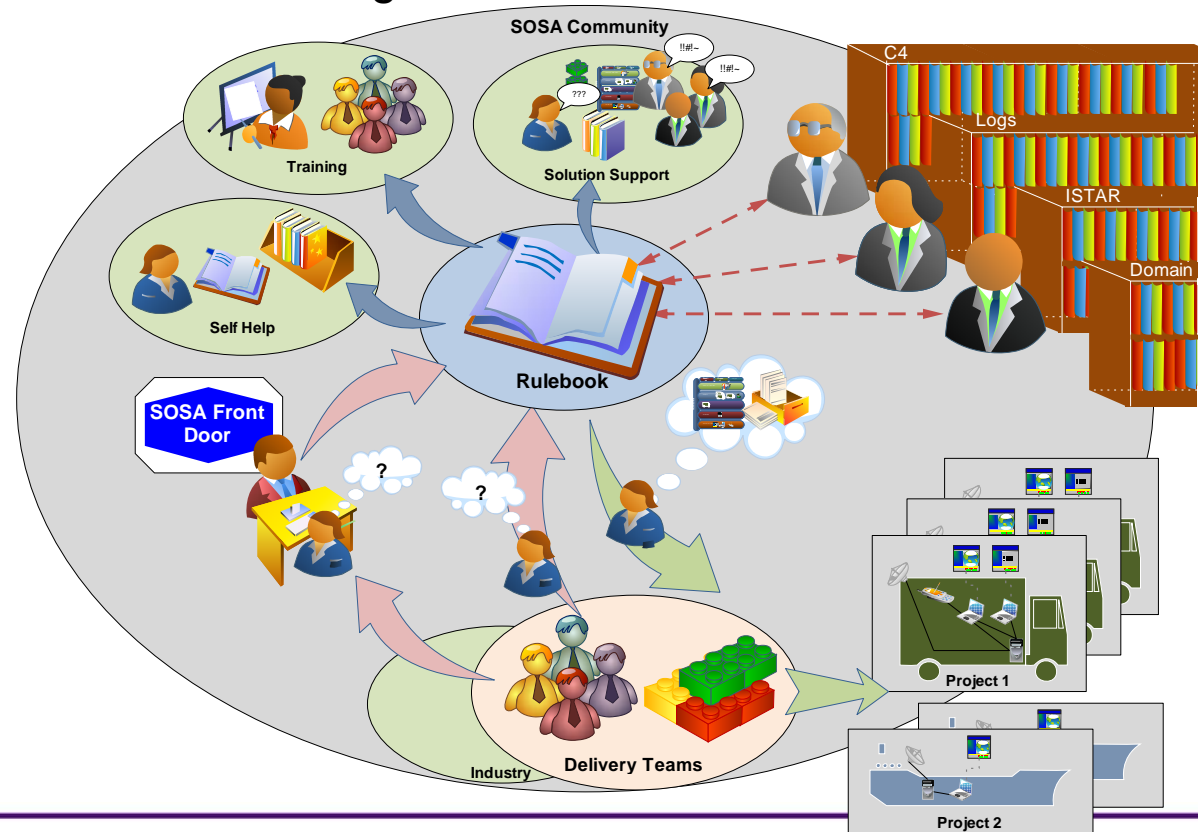
CE: Chief Engineer
 EA: Environment Analyst
 DA: Design Authority
 A: Architect

————— Capability Delivery
 - - - - - Technical Coherence
 Engineering Authority
 - · - · - · SOSA Support



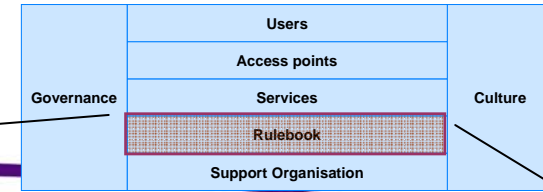
Uniting the acquisition organisation around the Rulebook

- The Rulebook provides the single common truth, which lays out a set of rules to drive everyone to a common and agreed conclusion.
- Rulebook consists:
 - Guiding Principles
 - Strategies
 - Rules
 - Directories
 - Processes
- Dedicated Support Organisation



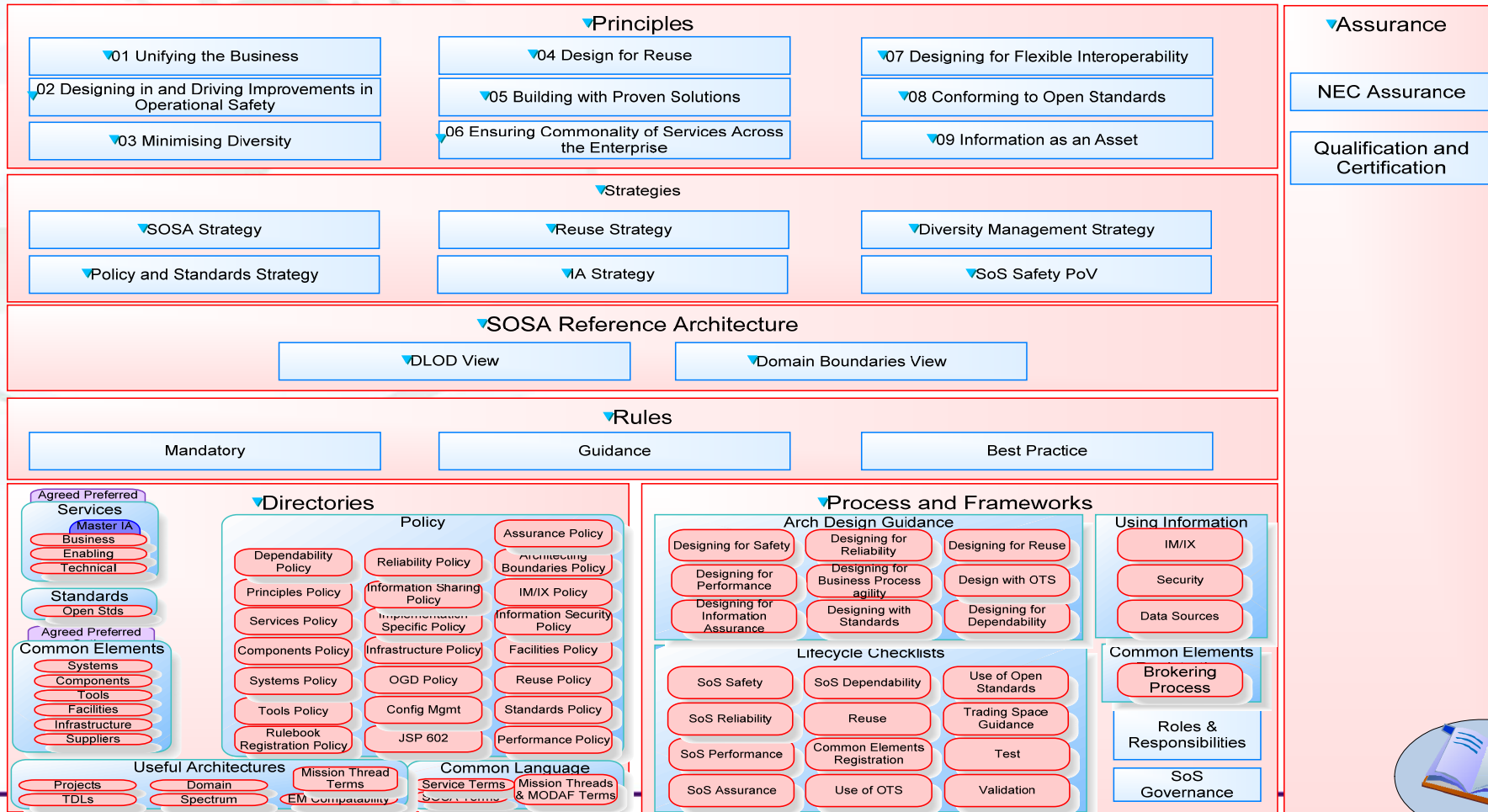
SOSA Rulebook Contents

- expansion of High Level SOSA diagram



G: Element Life-Cycle Draft ■ G: View Life-Cycle Draft ■

Rulebook

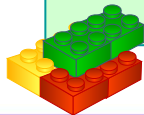


SOSA Principles

The objective?

What will Principles provide?

The approach to embedding the Principles within the MoD



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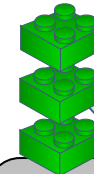
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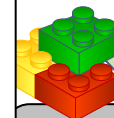
Business Drivers

- Unifying the Business
- Driving Business & Operational Effectiveness
- Minimising Diversity



Reuse

- Design for Reuse
- Building with Proven Solutions
- Ensuring Commonality of Services across the Enterprise

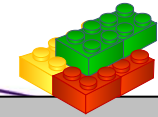


Interoperability

- Designing for Flexible Interoperability
- Conforming to Open Standards
- Information as an asset

de&s

The high level view of the SOSA Principles



Business Drivers

P1. Unifying the Business: The organisation will achieve unified business and Operational goals that will be delivered through a governance framework to assign authority and guide dedicated delivery units, who will be responsible for ensuring collaboration, in the delivery of coherent solutions and their successful in-service acceptance.

P2. Driving Improvements in Business & Operational Effectiveness: Solutions will be developed to deliver business and operational effectiveness that is informed by use. Solution requirements will include the through-life dimensions of development, use and support, across all DLoDs. Dimensions include financial, exportability, performance, assurance, dependability, safety and supportability.

P3. Minimising Diversity: Solutions will be delivered to ensure that the total cost of managing and supporting a portfolio of systems, components, tools, facilities, Infrastructure and suppliers is minimised across all Defence Lines of Development.



Reuse

P4. Design for Reuse: All Defence Lines of Development will deliver solutions by exploiting legacy and ensuring that new solutions and their constituent parts are designed so as not to preclude their reuse across the Enterprise.

P5. Building with Proven Solutions: Solutions will be Off the Shelf component based. Only when this is proven to be ineffective, in terms of cost and time, will tailored Off the Shelf or bespoke components be procured.

P6. Ensuring Commonality of Services Across the Enterprise: Common services will be provided by the same solution irrespective of organisational and operational situ, security domain and infrastructure.




Interoperability

P7. Designing for Flexible Interoperability: Interoperability will be achieved by full electronic integration whilst supporting the need for flexibility in the end to end business process and solution, during acquisition and deployment, by ensuring that solutions are of modular design that is aligned to business process.

P8. Conforming to Open Standards: Solutions will be designed with Open Standards in a manner that is not detrimental to innovation and Operational superiority.

P9. Information as an Asset: Solutions will be developed by ensuring that Information is managed across the Enterprise, maximising accessibility without comprising security.

SOSA – Now Live on Acquisition Operating Framework (Version 1 – Increment 1)



Welcome to SOSA - The System of Systems Approach

The Problem
Too many projects are delivering products that do not work together due to the lack of shared understanding of relationships, requirements and constraints in generating capability. Without this shared understanding decisions are being made that do not consider their wider impact.

The Symptoms
Cost overruns, late delivery, reduced operational capability etc.

The Solution = SOSA
In order to develop systems that will work together from day one, teams specifying and procuring the systems need to work together. SOSA helps these teams work together collaboratively across Defence and encourages re-use of existing assets in order to reduce delivery costs and timescales.

Central to SOSA is the SOSA Rulebook: a resource that helps teams identify the strategies, policies, rules and approaches they need to follow to develop interoperable systems.

SOSA also provides education services and a dedicated support function that helps teams directly by addressing system of systems issues on their behalf.

New to SOSA?

- How does SOSA help Defence?
- How will SOSA help my team?
- How do I use SOSA?
- Frequently Asked Questions
- What's New in SOSA?

Existing SOSA User?

SOSA Education | SOSA Support

SOSA Rulebook

- Principles
- Strategies
- MoD Common Approach
- Information Registration
- Lifecycle & Processes
- Roles and Responsibilities
- Governance

Who do I contact to find out more?

SOSA Support is a single point of contact relating to all matters concerning the System of Systems Approach.

SOSA Support Contact
Tel: +44 (0) 30679 33813
Mil: 9679 33813
E-Mail DES SE SEIG-Prog@mod.uk

Team Owner | Test Team | View Last Modified 23/04/2010 14:46:41

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www.syseng.dii.r.mil.uk/sosa



Summary of Objectives of SOSA



- Provide Context to Projects/Programmes
- Manage the Interoperability Risk
- Single point of reference



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Application of Modelling

- All MOD architectures should be linked to the TLCM and NEC Planning, Delivery and Generation Processes.
- Views may be presented in any format as long as they are consistent with the MODAF Metamodel.
- Every model element type in a view will be reflected in the MODAF Metamodel.
- Views do not necessarily show the use of every model element type or model element in a view.
- Architecture viewpoints and views are standard ways to present aspects of an architecture, but users can define their own views to suit their own purposes.



MODAF Style Guide



- View size
- Fonts
- Element Shapes
- Use of Colour
- Naming
- Labelling
- Notes
- Protective marking



Use of Shapes



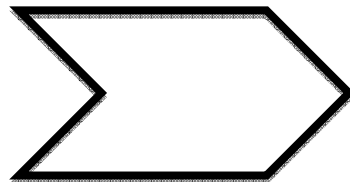
Structural Element

e.g. Node, Resource, Capability



Behavioural Element

e.g. Operational Activity, State, Function



Temporal Element

e.g. Enterprise Phase, Project



Info/Data Element

e.g. Information, Data



ARCHITECTURE TAXONOMY AND ONTOLOGY

- Taxonomy and Ontology are needed in MODAF to support the development of federated architectures and it is of the greatest importance that MOD can ensure consistency in definitions, relations and meaning.
- **TAXONOMY**. In current usage within "Knowledge Management", taxonomies are seen as slightly less broad than ontologies. The term is now applied in a more general sense and refers to a classification of things, and to the principles underlying such a classification.
- **ONTOLOGY** are used in artificial intelligence, the semantic web, software engineering, data mediation and information architecture as a form of knowledge representation about the world or some part of it. Help to enforce the semantic rigour between definitions and terms and add value to traditional definitions.



The problem



- **Capability**

A high level specification of the enterprise's ability

- **System**

The usage of an artefact as a System in a Capability Configuration

- **View**

A specification of a way to present an aspect of the architecture.
Views are defined with one or more purposes in mind - e.g. showing the logical topology of the enterprise, describing a process model, defining a data model, etc.



View Styles



- Clarity
- Explanation
- Reference Information
- Protective Markings



Exemplar Views

AcV-2 Example Programme View

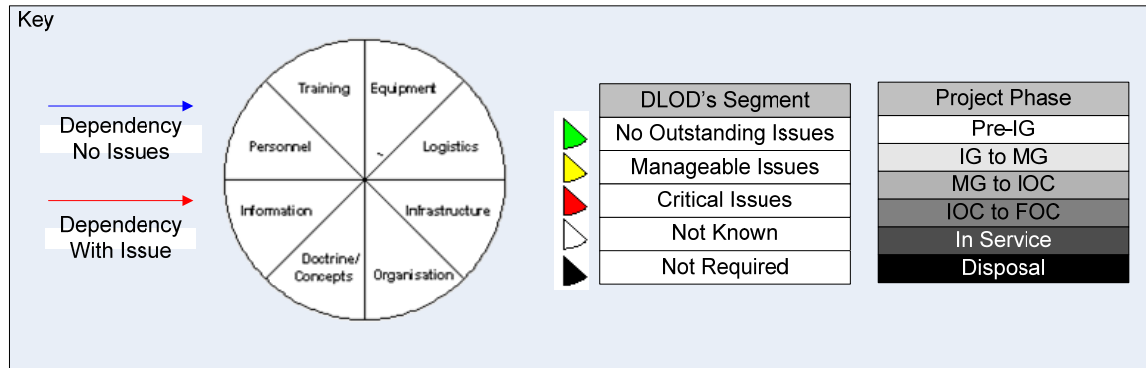
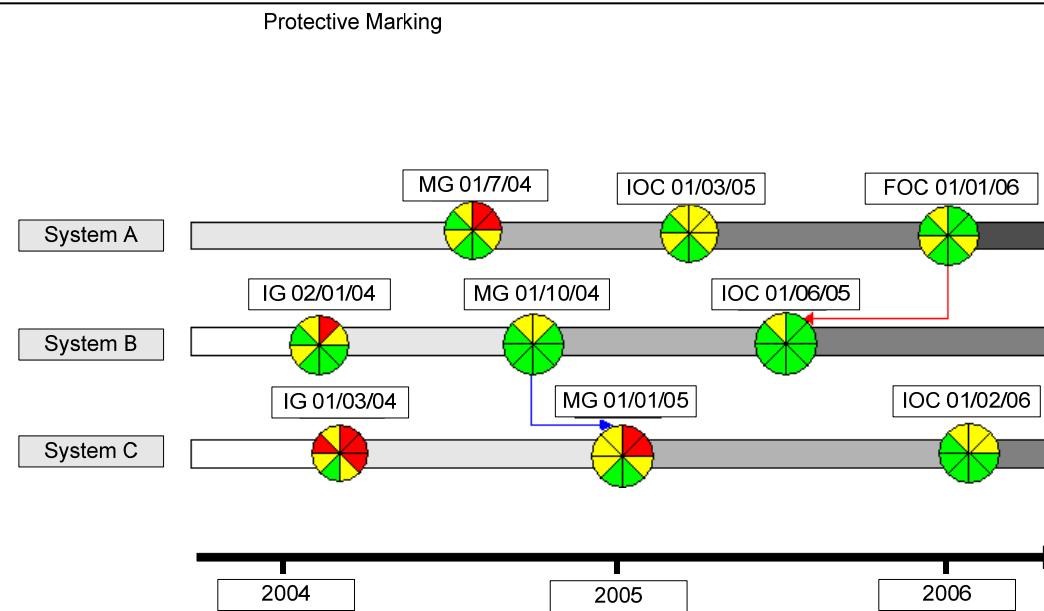
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Date Approved:
1 September 2009

Last Modified:
1 September 2009



Protective Marking



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OV-2 Example Operational Activity Model View

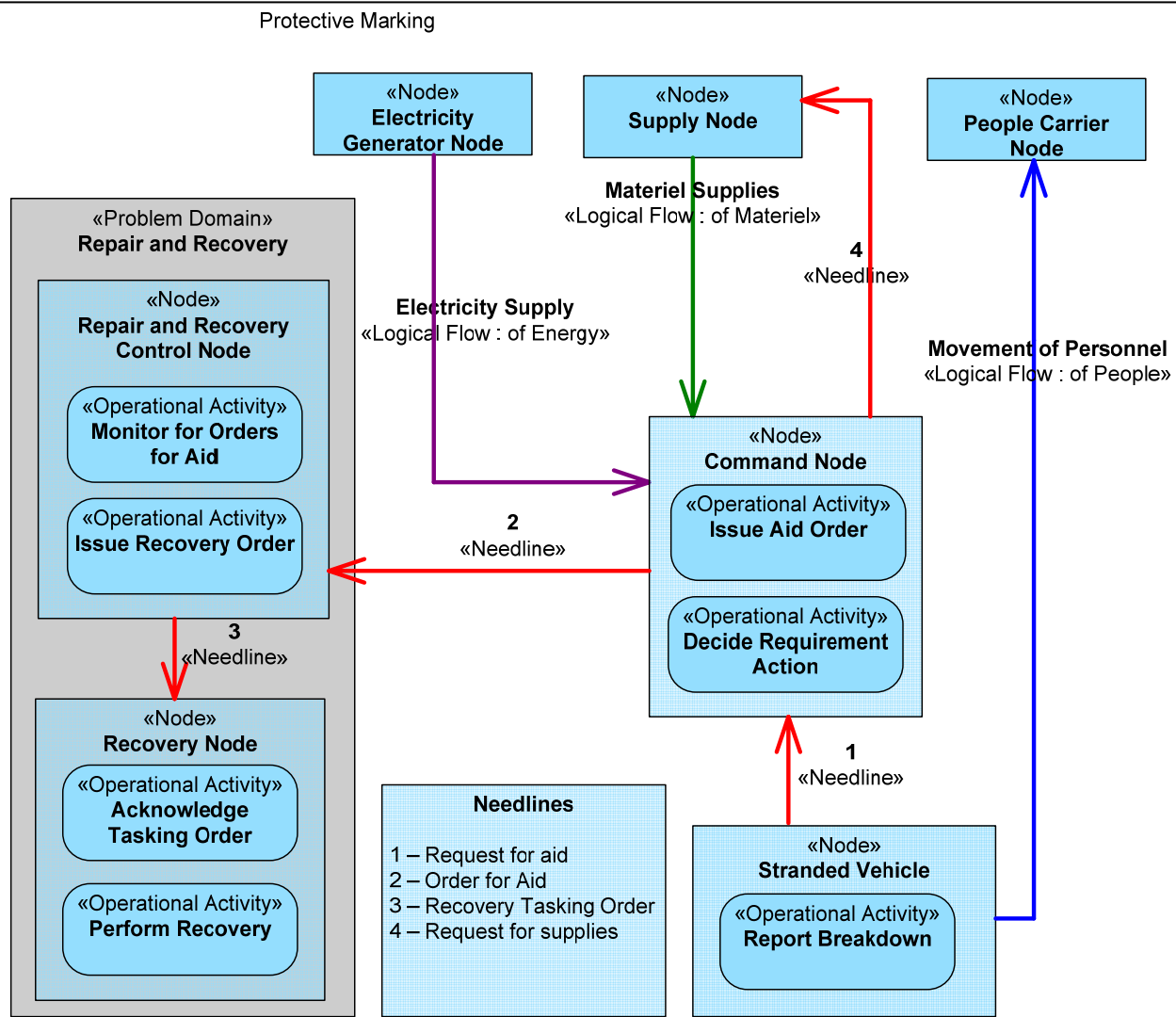
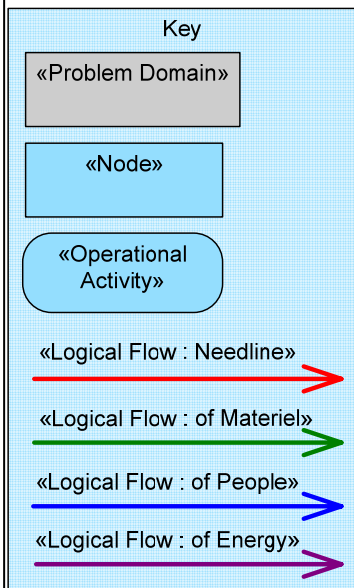
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- Needlines**
- 1 – Request for aid
 - 2 – Order for Aid
 - 3 – Recovery Tasking Order
 - 4 – Request for supplies



OV-5 Example Operational Node Relationship Description View

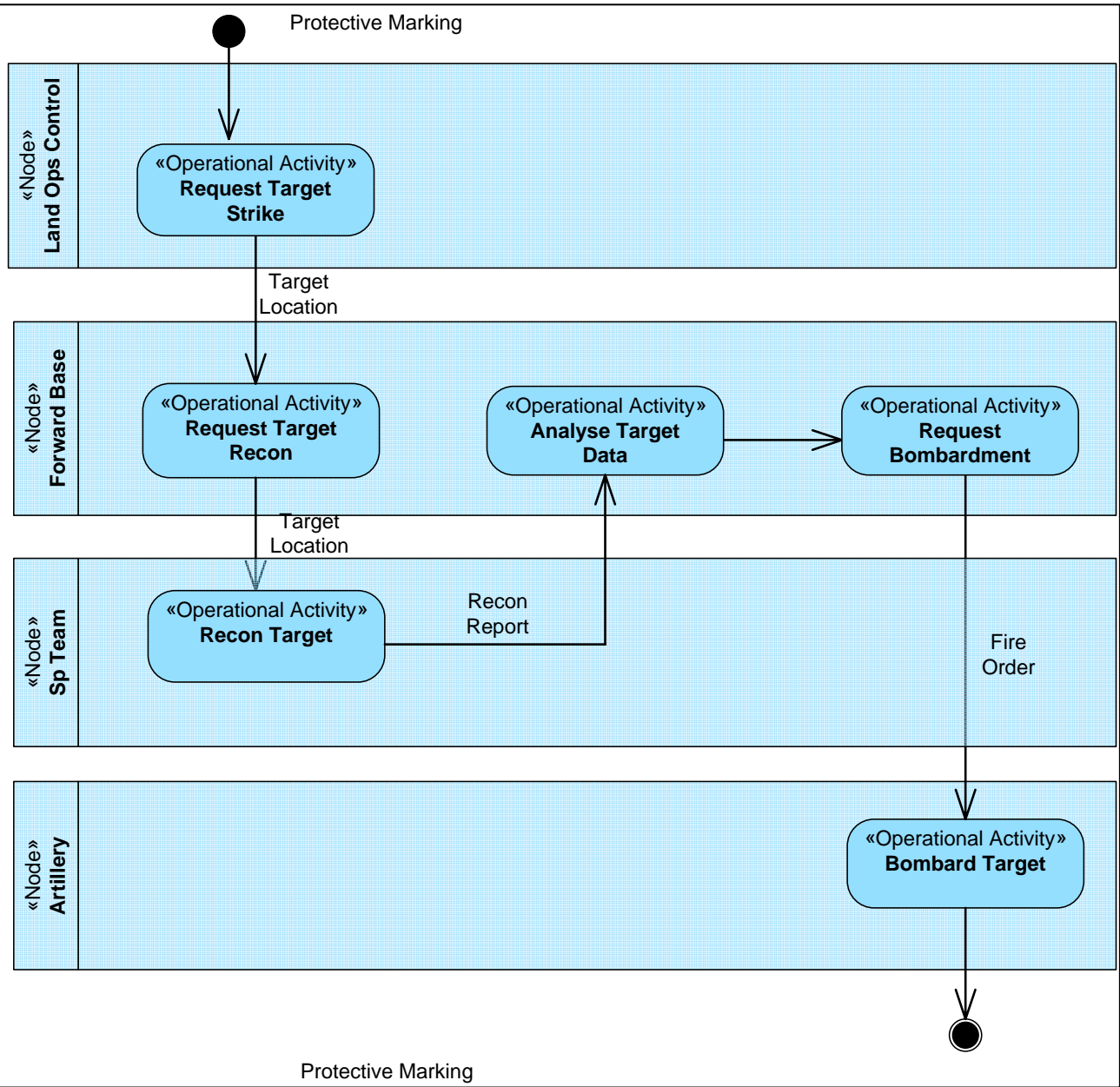
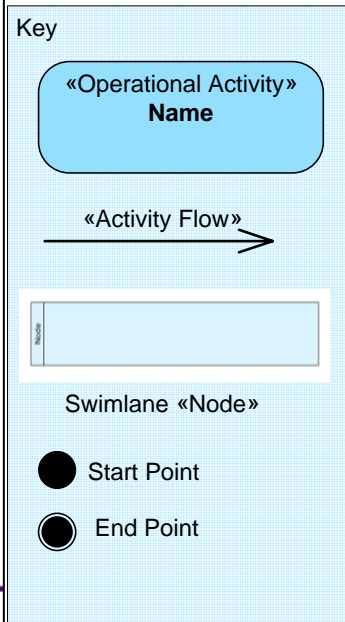
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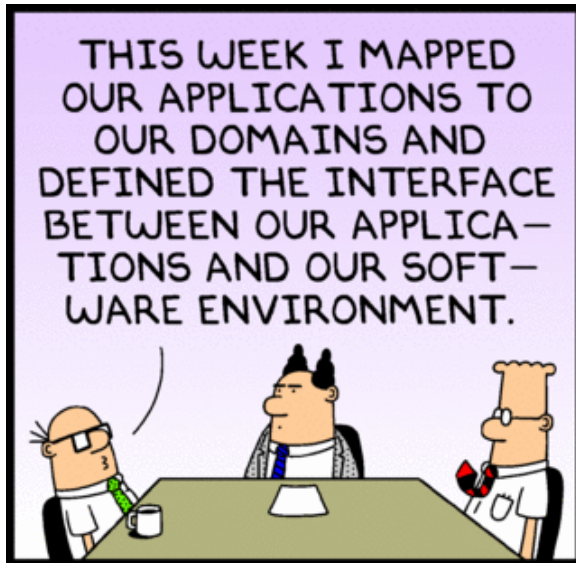
The Future



- A Style Guide for each view
- Modelling Guidance
- Contributions from others



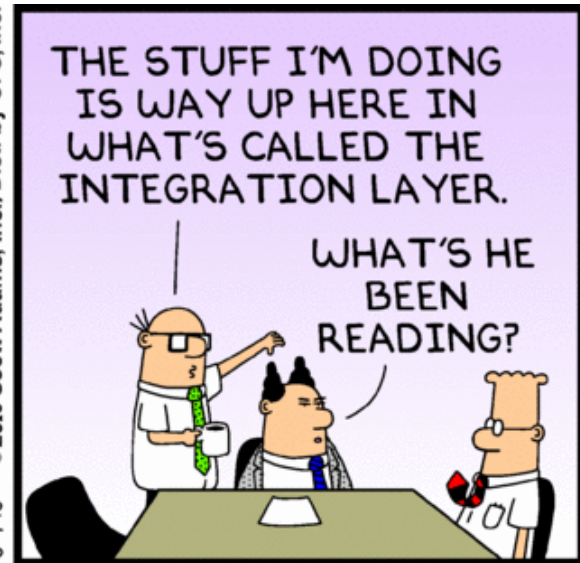
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