MINISTRY OF DEFENCE

MOD Architectural Framework

White Paper on Strategic View 5 (StV-5): *Capability to Systems Deployment Mapping*

Version 1.0
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Prepared by:-

Approved by:-

RECORD OF CHANGES

This page will be updated and re-issued with each amendment. It provides an authorisation for the amendment and a checklist to the current amendment number.

Issue No.	Date	Revision Details
Draft 0.1	19 November 2004	First draft for review
Draft 0.2	25 November 2004	Formatting and edits after initial review
Draft 0.3	16 December 2004	Further edits following review
Draft 0.4	14 January 2005	Changes made following review meeting of 5 Jan 05
Draft 0.5	17 January 2005	Revision to Data Model section
Draft 0.6	27 January 2005	Final revision prior to release
Version 1.0	2 March 2005	Updated to include linkage to MODAF meta model and finalised for publication

Introduction

The purpose of this paper is to describe the initial content and layout of the Capability to Systems Deployment Mapping (StV-5) view in a way, which will allow peer review from stakeholders. With the exception of this section, the rest of the paper broadly follows the layout of the DODAF volume II document. The intention is that this format will be retained and used in the final MODAF documentation, currently scheduled for publication in July 2005.

The MOD Architecture Framework (MODAF) is being developed with the intention of providing a rigorous way to specify systems of systems, and is a key enabler to NEC[1]. The framework will predominantly be used for acquisition purposes, and a key driver for its adoption is the need to improve interoperability between systems. However, the MODAF could equally well be used to analyse existing, operational systems and better enable their integration with other systems (both new and existing).

An architectural framework defines a set of key business and technical information for describing a system of systems architecture. The purpose of an architectural framework is to define the operational context (organizations, locations, processes, information flows, etc.), the system architecture (interfaces, data specifications, protocols, etc.), and the supporting standards and documents that are necessary to describe the system of systems. The information presented in an architectural framework is split into logical groupings – usually known as views. The same system and business elements may be present in more than one view, but the purpose of each view is different and so each provides a different viewpoint on the information.

The most mature and widely adopted architectural framework in the defence industry is the US DoD Architectural Framework (DoDAF). This framework has its origins in the C4ISR community and is seen as a fundamental part of the DoD's drive towards Network Centric Warfare. The MODAF is to based on the DoDAF specification, and will use many of the aspects of DoDAF without alteration. MODAF will also add a number of new views needed to support MOD-specific processes and structures. In addition, other views will be modified, based on lessons learned by users of DoDAF.

The *Capability to Systems Deployment Mapping* (StV-5) view is one of the new Strategic views that MODAF adds to the base DODAF standard. The purpose of the StV-5 view is to represent the planned deployment of Capability, and the System interconnection between Capability, Organisations, and Epochs.

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[1] CM(IS) NEC Next Steps paper of April 2003

Capability to Systems Deployment Mapping (StV-5)

Capability to Systems Deployment Mapping (StV-5) – Product Description

Product Definition - The *Capability to Systems Deployment Mapping* (StV-5) provides a representation of the planned deployment of Capability, and the System interconnection between Capability, Organisations, and Epochs.

Product Purpose - The StV-5 view is used to support the Capability Management process. Specific types of analysis that can be supported include:

- Capability redundancy/overlap/gap analysis
- Identification of deployment level shortfalls
- Identification of System connectivity issues
- Requirements for System interoperability by Organisation
- Identification of System legacy issues
- Assessment of Capability and System options

Product Detailed Description - To provide a full picture in order to conduct analysis, several StV-5 views would be created to represent the number of epochs that being analysed. Although the StV-5 views would be represented separately, Systems may exist in more than one view e.g. Systems that span epochs, and Systems may be interconnected across multiple views. Information to create the StV-5 is drawn from other MODAF views (StV-2, StV-4, OV-2, SV-3, AcV-2, etc), and would include: Capability functions, System connectivity, Organisational structures, Epoch definitions and Programmatic information.

The StV-5 view is based on a tabular representation with the appropriate Organisational structure represented on one axis and the Capability functions on the other. Graphical objects representing Systems are placed in the relevant position relative to Capability and Organisation. Interconnection links are shown between Systems that are dependant and/or have interaction. Systems can be represented on multiple views to represent the epochs for which they are in-service; the colour coding of the System should not change across epochs, in order that in can represent the epoch when the System entered service. Systems can be interconnected between the separate epoch views to illustrate the transition between a legacy System being removed from service, and a new System being introduced.

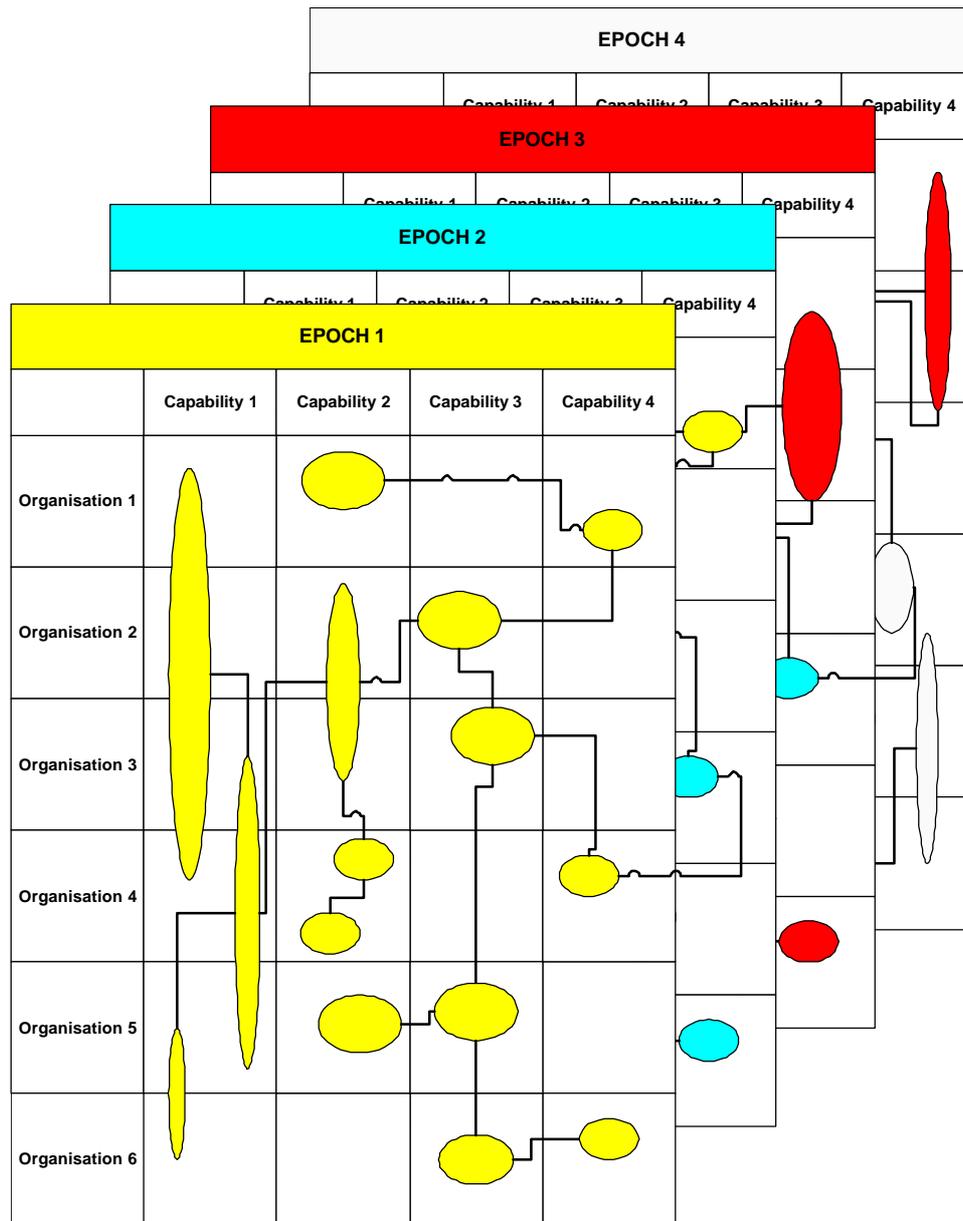A template for an StV-5 view is included below.

Figure 1: An example of the StV-5 view

Taxonomies

The MODAF Taxonomy is to be developed in a related project in conjunction with the communities of interest. The Integration Authority is coordinating current work and subsequent ownership will rest with DG Info.

UML Representation

StV-5 is, at first sight, not well suited to UML representation, and many tools may wish not to use UML for the diagram. However, one solution for UML usage does present itself. By elongating classes horizontally (stereotyped to organization), and vertically (stereotyped to capability) to represent capabilities, classes representing systems can be overlayed at the appropriate overlaps of organization and capability – as shown in Figure 2.

	<<capability>> ISTAR	<<capability>> Targeting	<<capability>> ELINT
<<organization>> PJHQ			
<<organization>> JTF	<<system>> Sys-1		
<<organization>> LCC		<<system>> Sys-2	<<system>> Sys-3
<<organization>> Division			<<system>> Sys-4

Figure 2 – UML Representation of StV-5

MODAF Meta-Model Support for StV-5

The MODAF Meta-Model defines a UML profile for exchanging information between MODAF tools using the XMI file format. For StV-5 the appropriate section of meta-model needed to exchange that view's information is shown in Figure 3. It should be noted that the classes shown for one view may be used in several other views.

The classes defined in the MODAF Meta-Model specify the allowable UML stereotypes that may be exchanged in an XMI file. As it is a meta-model, all relationships that feature in the view are also modelled as classes. Rather than define a class for every conceivable item that could appear in a view, the meta-model defines generic classes and allows references to the MODAF Taxonomy. For example, the MOD would be represented in XMI as an Organization stereotype, with a tagged value referring to the element in the taxonomy which says "Ministry of Defence".

For more information on the use of XMI in MODAF, refer to the document "XMI UML & MODAF", available from www.modaf.com
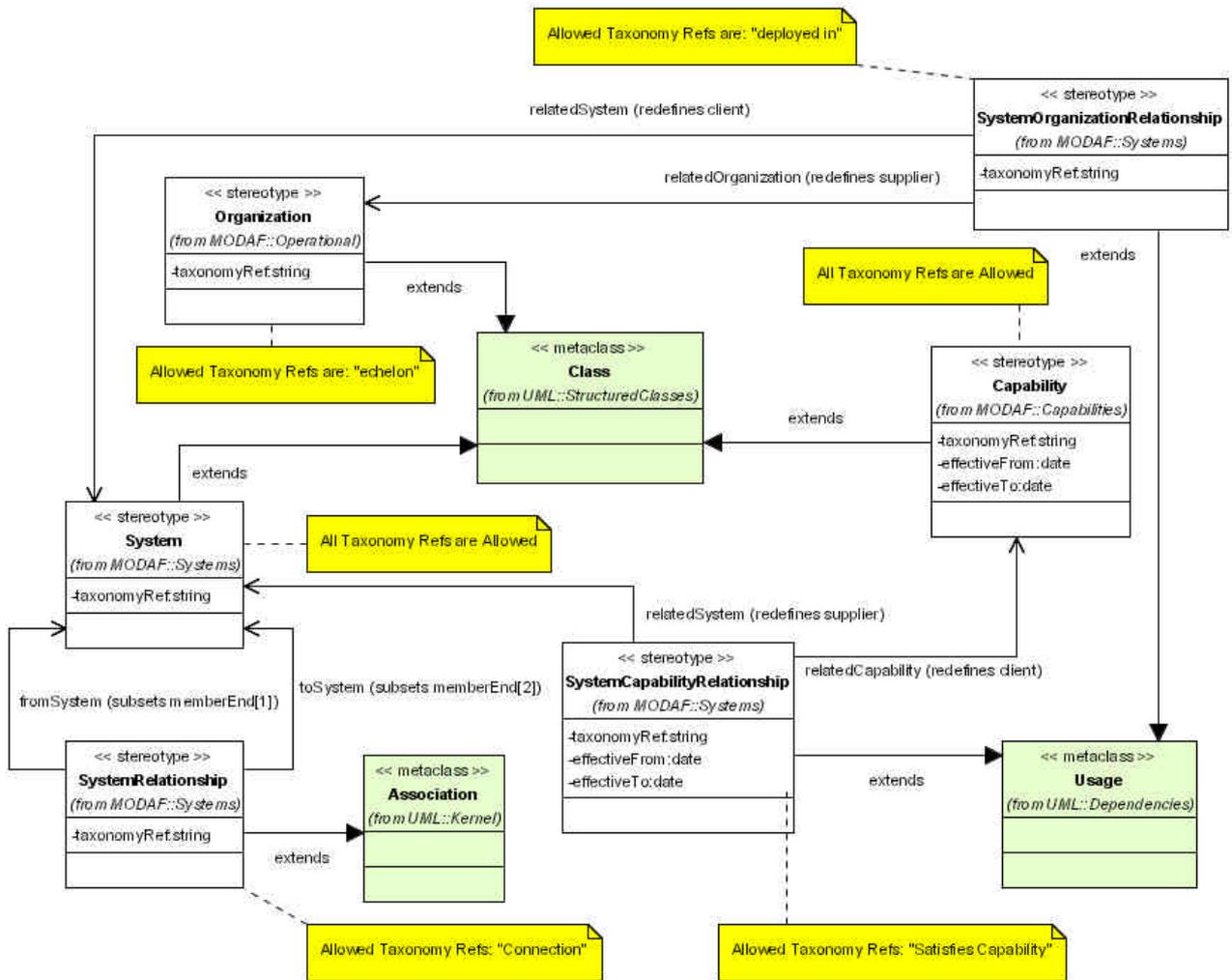
Figure 3 – MODAF Meta-Model Excerpt for StV-5

Model Element Definitions

Capability – A high level user requirement, usually functional.

Organization – A group of persons, associated for a particular purpose

System – A coherent combination of physical artefacts, energy and information, assembled for a purpose.

SystemCapabilityRelationship – An assertion of a relationship between a capability and a system. In StV-5, the relationship is only used to assert that a system satisfies a capability.

SystemOrganizationRelationship – An assertion of a relationship between a system and an organization. In StV-5, the relationship is only used to assert that a system may be deployed in an organization

SystemRelationship – An assertion of a relationship between two systems. In StV-5, the relationship is only used to assert that a connection can exist between the two systems.