MODAF-M09-002

MINISTRY OF DEFENCE

MOD Architectural Framework

Overview

Version 1.0

31 August 2005

Prepared by:- MODAF partners

Approved by:- MODAF Project Review Board

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
Version 1.0	31 August 2005	First MODAF Baseline release

Disclaimer

Following review it has been decided that, to better reflect its intended audience and to avoid confusion with the Acquisition Process, the Acquisition Community of Interest (COI) Deskbook is to be renamed the Integrated Project Team (IPT) COI Deskbook. This change is immediate; all references in the MODAF documentation to the Acquisition COI Deskbook should be interpreted as the Integrated Project Team COI Deskbook. This change will be reflected in the MODAF documentation at the next update.

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FOREWORD

1. An ‘effects based approach’ to military operations demands that we combine military capabilities in time and space, to an ever increasing tempo, in order to achieve the desired outcome. To achieve this, we must master the complex interaction of weapons, platforms, sensors and people, in order to maximise their combined strengths and to minimise any potential weaknesses. We seek to do this through our adoption of Network Enabled Capability, integrating existing capabilities into an increasingly coherent system of systems.

2. At the same time, perpetual pressure on Defence spending means that we must seek maximum return on our investments and drive inefficiency out of our operations.

3. Our greatest enemy in this regard is complexity and we must find effective ways to overcome it. One key to achieving the simplicity we seek is to focus on the decision-making process and the information flows that must support effective decision making and subsequent action.

4. The MOD Architectural Framework (MODAF) offers invaluable assistance in our struggle for simplicity, as it provides a common language and common formats for the capture and shared use of trusted data. It is therefore my intent that we adopt an architectural approach, grounded in MODAF, to our day-to-day business. This Deskbook explains how you can begin to use MODAF to articulate your business in a manner that will aid collective understanding, increase efficiency and enhance effectiveness; I commend it to you.

1. INTRODUCTION

5. MOD's adoption of Network Enabled Capability (NEC) [1] as its means of integrating existing capabilities into a coherent system of systems is an ambitious exercise in managing both complexity and change throughout the enterprise. Modern warfare is fast changing and the systems that technology is now making available are in themselves faster, more complex and more adaptable than ever before. The combination and orchestration of these systems in concert with operational planning introduces a level of complexity never before experienced in the Ministry of Defence.

6. To assist decision-makers, MOD has decided to adopt the MOD Architecture Framework (MODAF) as a means of abstracting essential information from the underlying complexity and presenting it in a way that maintains coherence and consistency. One of the principle objectives is to present this information in a way that is understandable to the many stakeholder communities involved in developing, delivering and sustaining capability through life.

7. MODAF is an *Architectural Framework* which has been designed to meet the specific business and operational needs of the MOD. It defines a way of representing an *Enterprise Architecture* which enables stakeholders to focus in on specific areas of interests in the enterprise, whilst retaining sight of the "big picture". In essence it enables decision-makers to manage complexity by splitting the problem space into manageable pieces – defined in the framework as "Views". The views are categorised under *Viewpoints* by their perspective (e.g. operational, technical, etc.). Each View has a particular purpose, and usually presents:

- Broad summary information about the whole enterprise (e.g. high level operational concepts);
- Narrowly focussed information for a specialist purpose (e.g. system interface definitions);
- Or, information about how aspects of the enterprise are connected (e.g. how business processes or operational activities are supported by a system, or how programme management brings together the different aspects of network enabled capability).

8. The fundamental tenet of an *Enterprise Architecture* approach is that there is 'one source of truth'. This reflects the fact that while there can only be one enterprise, there can be many valid stakeholder views providing they are based on a common data set. The diagram in *Figure 1-1* attempts to illustrate this concept of a single enterprise that can be presented in different ways that has meaning for particular stakeholders or communities of interest.

[1] Network Enabled Capability JSP 777 Edition 1 dated April 2005.

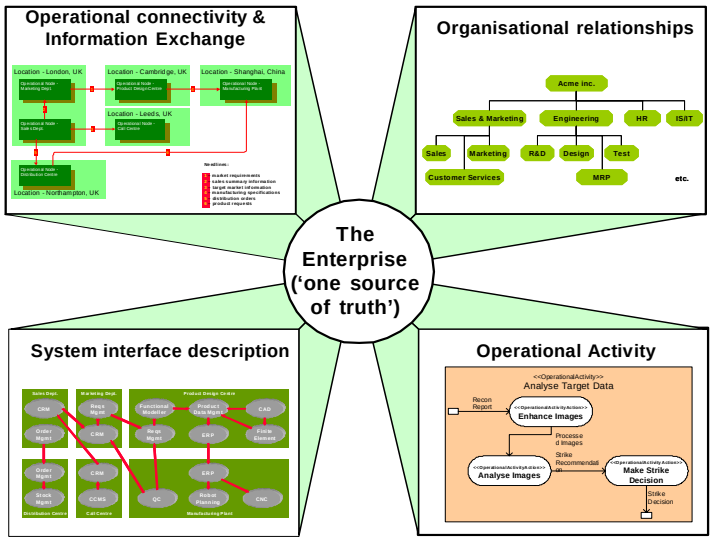


Figure 1-1: Enterprise Architecture View

9. The MODAF approach has been developed to provide an Enterprise Architecture approach in support of a wide number of communities across MOD and assist them in conducting their day-to-day business. Although focussed largely at operational processes and acquisition of capability to support these, MODAF is equally applicable to business space, all other aspects of the MOD enterprise and other organisations that interface with it, such as coalition partners and its supply chain.

10. MODAF is being adopted within the MOD in order realise a more coherent and integrated approach to the acquisition, management and operation of military capability. The nature of MODAF benefits will include:

a. Structured analysis and articulation of business issues

b. Enhanced requirements specifications

c. Improved efficiency, effectiveness and standardisation of MOD-wide processes and ways of working

d. Improved validation and assurance of solutions

e. More coherent portfolio of military capability and more integrated systems

f. Avoidance of unnecessary costs in the overall investment programme

1.1 Purpose

11. The purpose of this document is to explain to the reader what MODAF is, why it is relevant to them, how to go about the development of architectures in accordance with the MODAF approach and how to use them to best effect. This overview is applicable to any reader within the MOD and its supply chain and will steer them to those aspects of the MODAF baseline documentation suite that is relevant to their specific needs.

12. It is important to distinguish the purpose of MODAF as an architectural framework from the architectures that are intended to be produced within the framework.

Architecture has been defined as[2] "the fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution". MODAF merely provides the standard by which such architectures are to be constructed within the MOD. As such MODAF is an enabler of other activities; it provides the means by which users within the MOD can achieve their various ends.

13. Whilst MODAF has been developed specifically to support the MOD's processes for managing military capability, the framework can equally well be applied by any organisation that has to manage complex projects and / or a large infrastructure. Although the extrapolation of MODAF to these alternative applications is not dealt with explicitly within the MODAF documentation suite it should be relatively straightforward to map the approach to any organisation's key processes.

1.2 Structure of this Document

14. The remainder of this document is structured as follows:

a. Section 2 – provides an overview of what MODAF is, including an overview of the key elements that support it

b. Section 3 – explains how the reader should use the MODAF baseline documentation suite to answer their questions.

c. Section 4 – explains why MODAF is being adopted within the MOD and the nature of benefits that can be expected in different parts of the organisation.

d. Section 5 – describes a generic model for developing MODAF architectures within the MOD, including the governance processes and the resources available to support MOD users. This is also summarised in a separate "quick reference guide".

e. Section 6 – describes the process that is being followed for the maintenance of this and all other documents within the MODAF document suite.

[2] IEEE 1471, Architectural Descriptions of Software-Intensive Systems

2. OVERVIEW OF MODAF

2.1 The MODAF Framework

15. MODAF is the framework that MOD has selected to develop its enterprise architecture models. These models will help the MOD to understand, analyse and specify Capabilities, Processes, and Systems with a view to thereby assisting in the improvement of military capability and cost effectiveness across the MOD.

16. MODAF has been developed from the US Department of Defense Architectural Framework (DoDAF)[3]. MODAF keeps compatibility with the core DoDAF viewpoints in order to facilitate the exchange of architectural information with the US, for example in conducting international interoperability analyses. However, MODAF has supplemented DoDAF with two new viewpoints that support analysis and optimisation of the portfolio of military capabilities and the acquisition programmes that deliver them. Therefore, MODAF consists of six viewpoints as shown in *Figure 2-1*. These cover all of the main perspectives and dimensions that are required in order to conduct the core MOD processes around acquisition and operations.

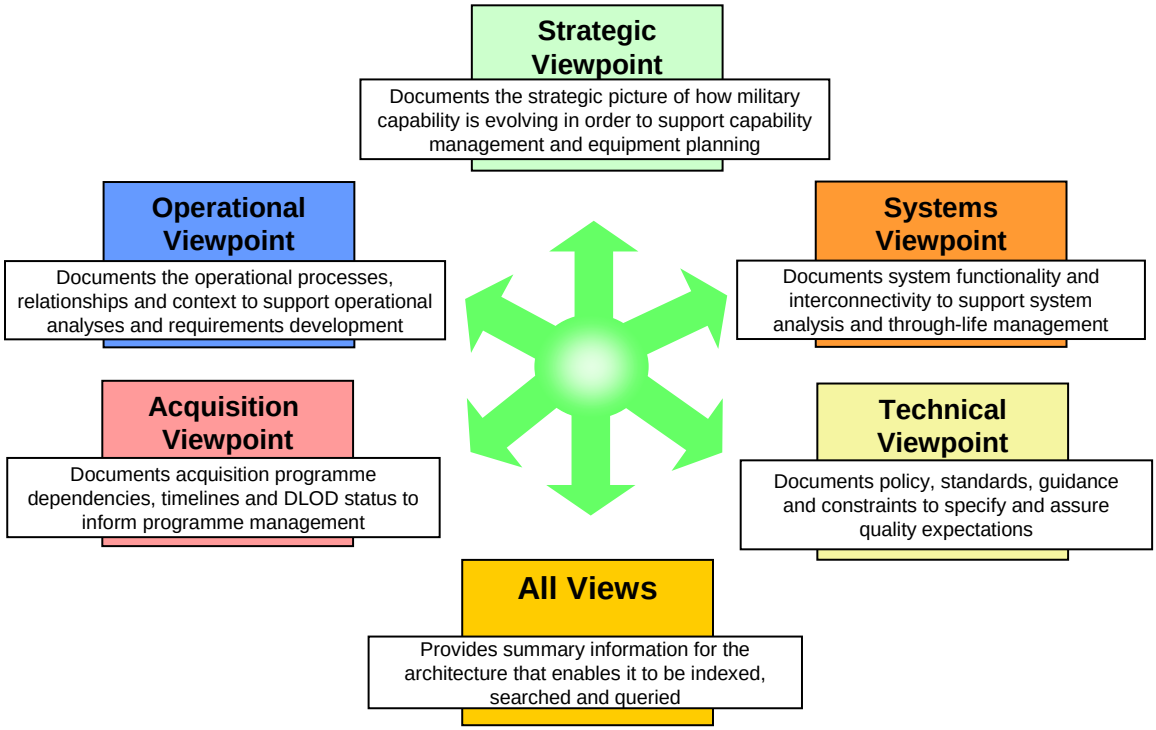


Figure 2-1: MODAF Viewpoints

17. The new elements of MODAF that are not included in DoDAF are the Strategic and Acquisition Viewpoints. The sections that follow provide an overview of each of the MODAF viewpoints and describe the relationships between them.

2.2 MODAF Viewpoints

18. Each viewpoint takes a different perspective upon the architectural model; for instance, the Operational Viewpoint considers the operational nodes (eg roles and

[3] DoD Architectural Framework, version 1.0, February 2004

platforms) that interact in certain ways in order to achieve a desired outcome. Furthermore, each of these viewpoints consists of several views, which offer slightly different details within the viewpoint. For instance within the Operational Viewpoint, OV-1 provides a high level conceptual graphic, whilst OV-2 considers the interactions between operational nodes and OV-3 details the information flows.

19. Whilst the data within each view adds more richness to the overall description of an architecture, it is not necessary for all of the MODAF views to be completed at any particular point in time / through the MOD's acquisition lifecycle. Indeed, each group of users within the MOD will have different needs and will only populate and exploit those MODAF views that are of relevance to them. This means that most of the MOD's communities of interest (COIs) will only be dealing with the population and exploitation of a subset of MODAF Views and few will need to understand and deal with all of the available MODAF Views.

20. The main use of each of the MODAF viewpoints within the MOD is summarised below. More detail on each view is available in the MODAF documentation suite (see section 3) and a summary list of all MODAF views is included at Appendix B.

2.2.1 Strategic Viewpoint

21. Strategic Views **(StVs)** support the process of analysing and optimising the delivery military capability in line with the MOD's strategic intent. The StVs achieve this by capturing the capability policy / concepts, decomposing this into a capability taxonomy supported by appropriate measures of effectiveness that can be used for capability audit and gap / overlap analysis. The StVs further detail the dependencies between military capabilities, enabling capability options to be built in a more coherent manner and effective trade-offs to be conducted across the entire Equipment Programme (EP). See examples in *Figure 2-2*.

22. The StVs will mainly be developed and exploited by those within the policy / analytical concepts areas and the Customer 1 function.

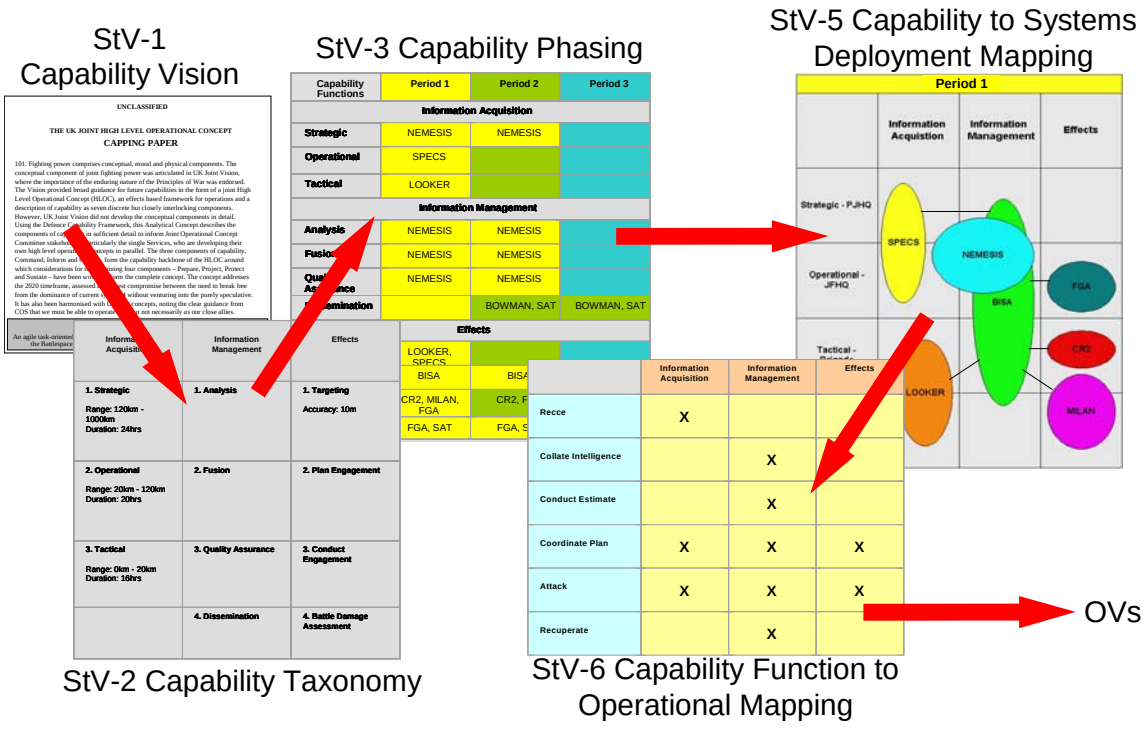


Figure 2-2: Examples of some Strategic Views

2.2.2 Operational Viewpoint

23. The Operational Views **(OVs)** are a description of the tasks and activities, operational nodes and elements, and information exchanges required to accomplish MOD tasks, including business and war fighting activities. The OVs can be used at a number of points through the MOD lifecycle including the development of user requirements, capturing future concepts and supporting the operational planning processes. See examples in *Figure 2-3*.

24. A number of stakeholders will develop and exploit OVs during the MOD acquisition lifecycle. For instance, Customer 2 will use OVs to support URD development and in conducting operational planning processes.

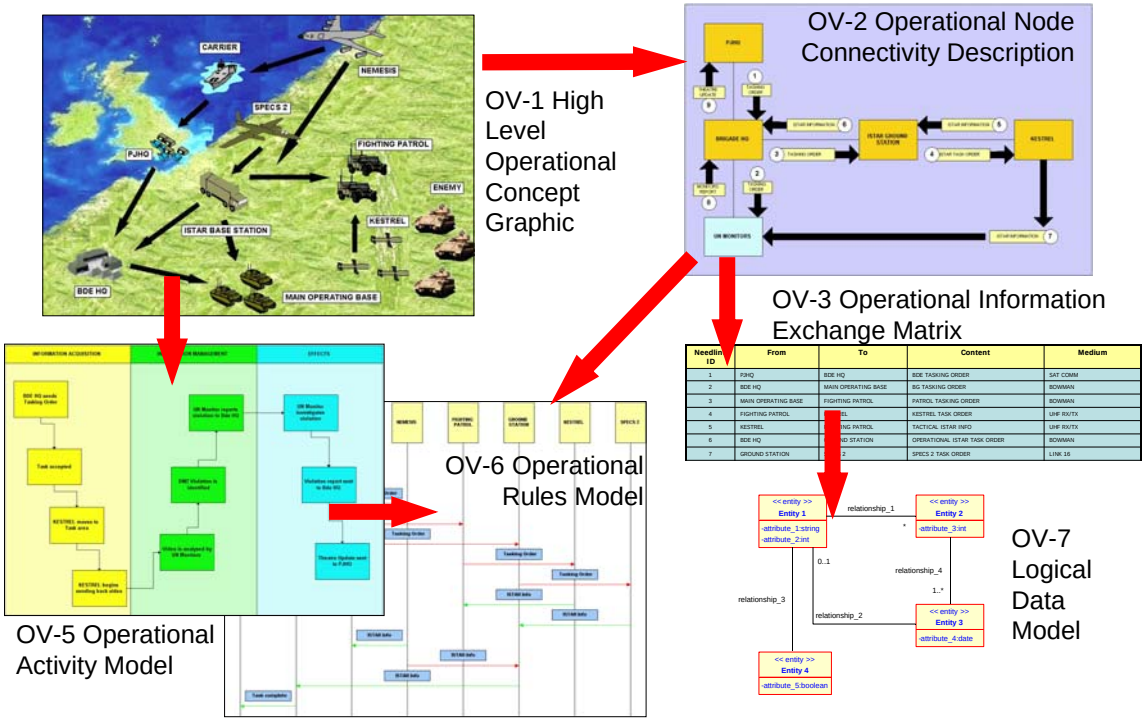


Figure 2-3: Examples of some Operational Views

2.2.3 Systems Viewpoint

25. The System Views **(SVs)** are a set of views that describe systems (primarily but not exclusively the communications and information systems) and interconnections between them that support MOD functions, both warfighting and business space. The SVs can be used to associate system resources to the OVs. One of the primary uses of the SVs is in the development of system solutions that satisfy the user requirements and hence the development of appropriate system requirements. See examples in *Figure 2-4*.

26. The SVs will primarily be developed and exploited within the MOD's acquisition community and its associated supply chain.

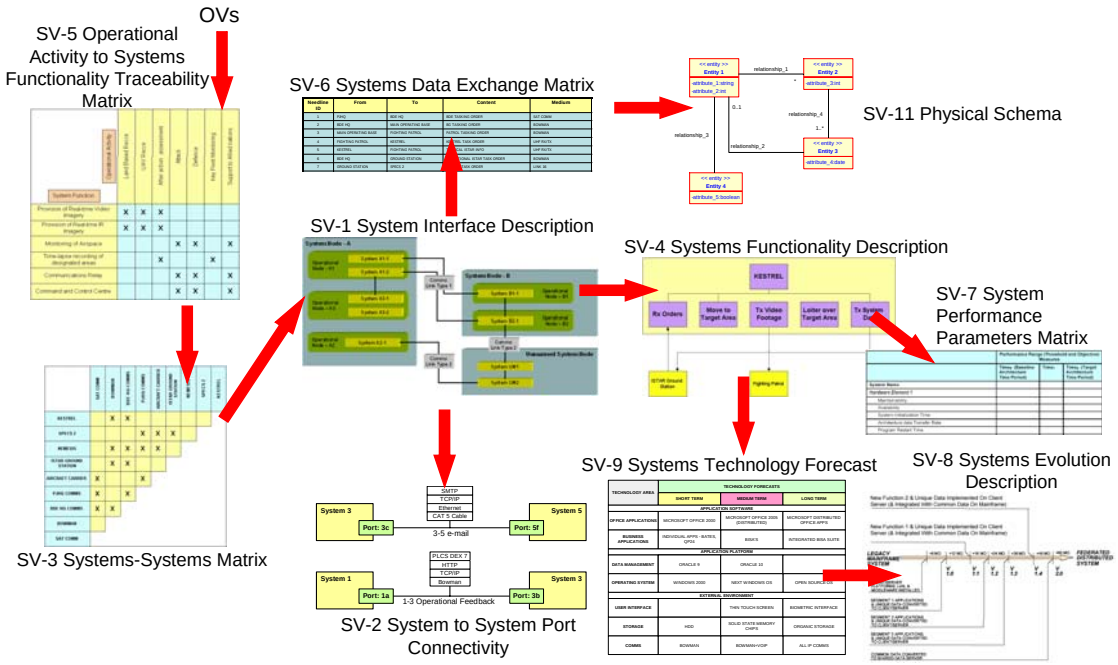


Figure 2-4: Examples of some System Views

2.2.4 Technical Viewpoint

27. The Technical Views **(TVs)** are tabular views containing standards, rules, policy and guidance that are applicable to aspects of the architecture. Despite the name, the contents of the TVs do not necessarily need to be of a technical nature and can apply just as much to operational activities (eg doctrine, Standard Operating Procedures (SOPs) and Tactics, Techniques and Procedures (TTPs)) as they do to systems (eg standards, and protocols). See examples in *Figure 2-5*.

28. The elements contained in the TVs will come from a number of sources including the policy setting organisations in MOD and core interoperability standards from Customer 1. The TVs will then be further detailed and managed throughout the acquisition lifecycle by the standardisation officers within the IPTs.

TV-1 Technical Standards Profile

Service Area	Service	System Elements	Standard / Policy
Transport Services	TCP/IP	BOWMAN	IP v6
Data transfer	Data compression algorithms	CRYPTO	
Operating System	Microsoft Windows	JOP	
Deployment	Physical Activity	HQ Equipmen	

TV-2 Standards Forecast

TRM CATEGORY	STANDARDS FORECASTS		
	SHORT TERM (1 year)	MID TERM (3 years)	LONG TERM (5 years)
Application Platform			
Data Interchange Document Interchange	Security Marking DTD – in CAPCO coordination (proposed IC standard)		
Mapping	Geography DTD 2.0 – accepted by GIS Consortium	Commercial products that use the standard become available	
	Geospatial XSD – in coordination Open GIS		Geospatial XSD – accepted by Open GIS
Communications Electronic Mail		IETF RFC2060 Internet Mail Access Protocol (IMAP) – accepted, replaces *de facto* standard	
World Wide Web Services	IETF - Common Gateway Interface (CGI) 1.2 – becomes proposed standard		IETF –Common Gateway Interface (CGI) 1.2 – accepted, replaces CGI 1.1, the *de facto* standard
			IETF – RFC 2818 HTTP Over TLS – accepted, replaces RFC 2616
Communications Transport Services		IETF –Wireless Extensions to TLS – becomes proposed standard	
		IETF – RFC 2002 IP Mobility Support - accepted	IETF –IPv4 Mobile IP Protocol – becomes proposed standard
Security			IETF - RFC 2246 The Transport Layer Security (TLS) Protocol Version1.0 – accepted; replaces SSL

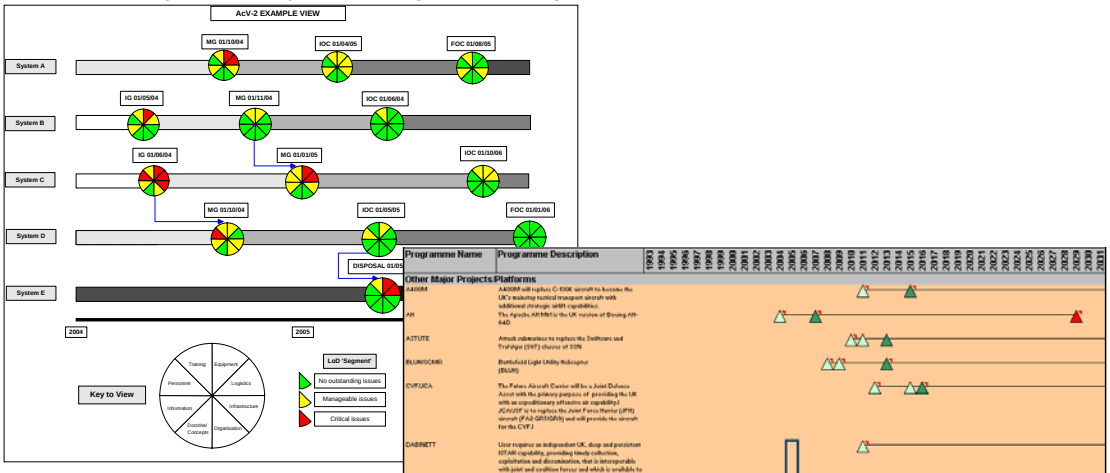
Figure 2-5: Examples of Technical Views

2.2.5 Acquisition Viewpoint

29. Like the Strategic Views, the Acquisition Views **(AcVs)** are unique to MODAF, i.e. they are not in DODAF. They describe programmatic details, including dependencies between projects and capability integration across the Defence Lines of Development (DLODs). The Views identify interaction between programmes and projects, and integrate acquisition activities across all of the DLODs. See examples in *Figure 2-6*[4].

30. The AcVs provide important programmatic information for those involved in capability management and acquisition. Since they also address the maturity across all of the DLODs to deliver an integrated military capability, the AcVs also form an important interface between the acquisition IPT and its Customer 2 community.

Generic AcV-2 System of Systems Acquisition Programmes



Example NEC Roadmap

Figure 2-6: Examples of Acquisition Views

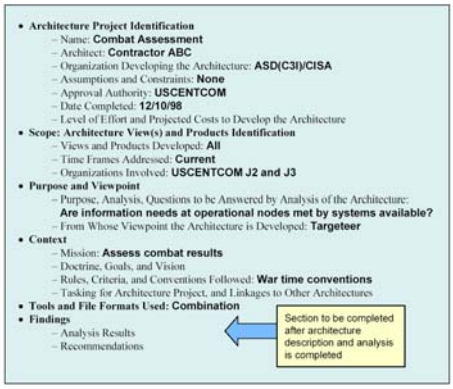
2.2.6 All-Views Viewpoint

31. The All-Views (**AVs**) provide an overarching description of the architecture, its scope, ownership, timeframe and all of the other meta data that is required in order to effectively search and query architectural models. The AVs include a dictionary of the terms used in the construction of the architecture – which helps others fully understand it's meaning at a later date. Since the AVs provide critical information for the future access and exploitation of an architectural model their population is essential whenever a MODAF architecture is created or modified. See examples in *Figure 2-7*.

32. The AVs shall be produced by every community within MOD that populates or alters MODAF architectures and they provide a critical input into the processes that provide architectural governance.

[4] Note that the example NEC Routemap is illustrative and does not show current capability data. This view is not to the MODAF AcV-2 standard as it does not include DLOD status indicators. However, it does illustrate work in progress within the MOD at starting to develop MODAF convergent views.

AV-1 Overview & Summary Information



AV-2 Integrated Dictionary

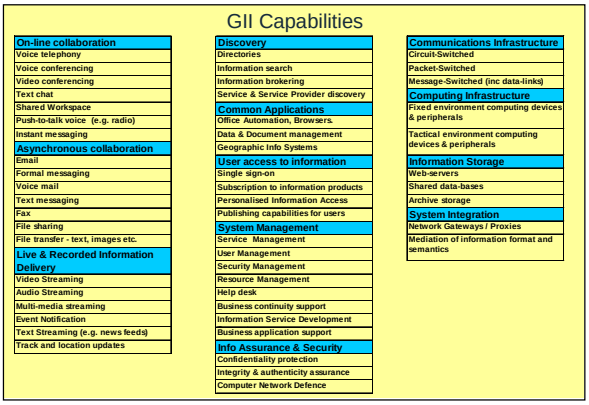


Figure 2-7: Examples of All Views

2.3 Relationship Between MODAF Viewpoints

33. The six MODAF viewpoints are not separate models of different things but are a means of viewing the same architectural problem from different perspectives - for instance, that of the operational user, the policy setter, or the system architect. This is illustrated in *Figure 2-8* below[5]. The architectural model is contained within the cube and the different faces of the cube provide different perspectives represented by the MODAF viewpoints – in this case operational, system and technical. Furthermore, there are a number of separate openings on each face of the cube that represent the number of different views available within each MODAF viewpoint.

Figure 2-8: Relationship between MODAF Views

[5] Adapted from an architectural modelling approach developed in DCBM(A)

34. This cube analogy can be extended further by considering how the different sides (ie Viewpoints) of the cube relate to each other as shown in *Figure 2-9* below and in more detail in Appendix C. Some of the key points that can be developed from this analogy are:

a. That the All-Views provide the common reference for all other elements of the architecture – hence the importance of establishing them right at the outset and maintaining them throughout the architectural development cycle

b. That each Viewpoint has an associated set of Technical Views that document the standards for everything within that Viewpoint. For instance, the doctrinal inputs of CONOPS and SOPs define the rules for the Operational Viewpoint

c. That each Viewpoint has overlaps and interfaces with its neighbouring Viewpoints and that these create the natural linkage between the two Viewpoints. Examples are the SV-5 view that relates operational activities within the Operational Viewpoint to system functions in the System Viewpoint.

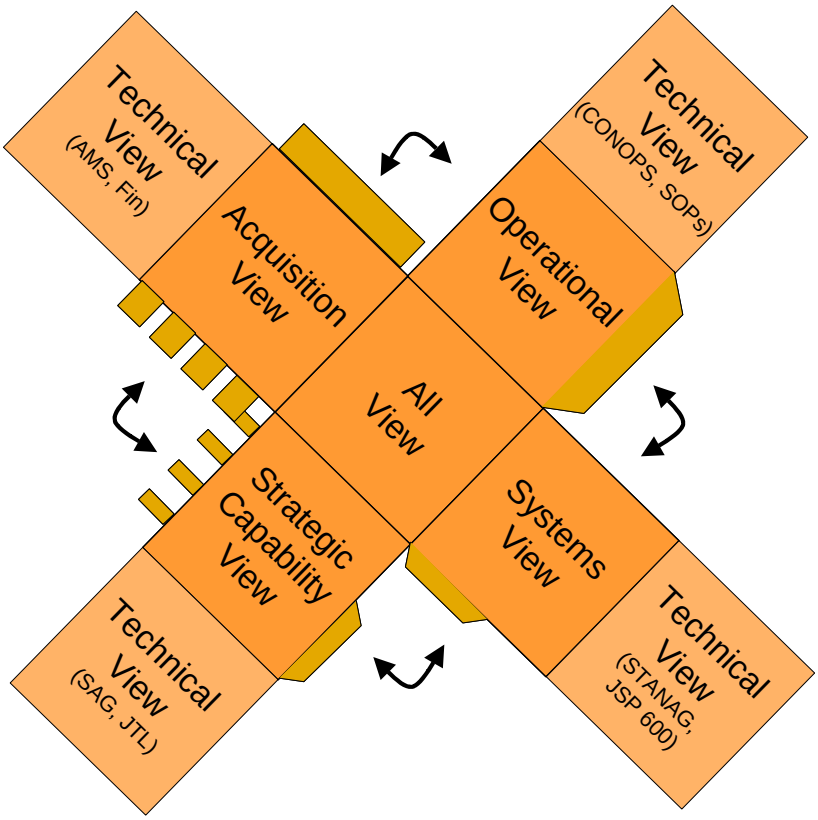


Figure 2-9: Expanded Relationship between MODAF Views

35. Although all of the MODAF Viewpoints can be linked together, it should be reiterated that it is not necessary to create or have access to all of the populated Viewpoints at the same time or point in the lifecycle. Any particular user will typically only be interested in the data from perhaps two Viewpoints.

2.4 Key Supporting Elements to MODAF

36. The definition of the MODAF views contained within the MODAF documentation[6] is necessary for users to be able to develop architectures that have a consistent look and feel – so that, for example, all operational process information is presented in a similar manner. However, the view definitions for MODAF alone are not sufficient to enable architectures to be interchanged repeatably between teams and for the architectures to be unambiguous and consistent with each other. Furthermore, the definitions of the MODAF views alone will not ensure compatibility with the MOD Architectural Repository (MODAR).

37. In order to achieve these additional objectives for consistency, model interchange, and compatibility, a number of other elements are required in support of MODAF as shown in *Figure 2-10*.

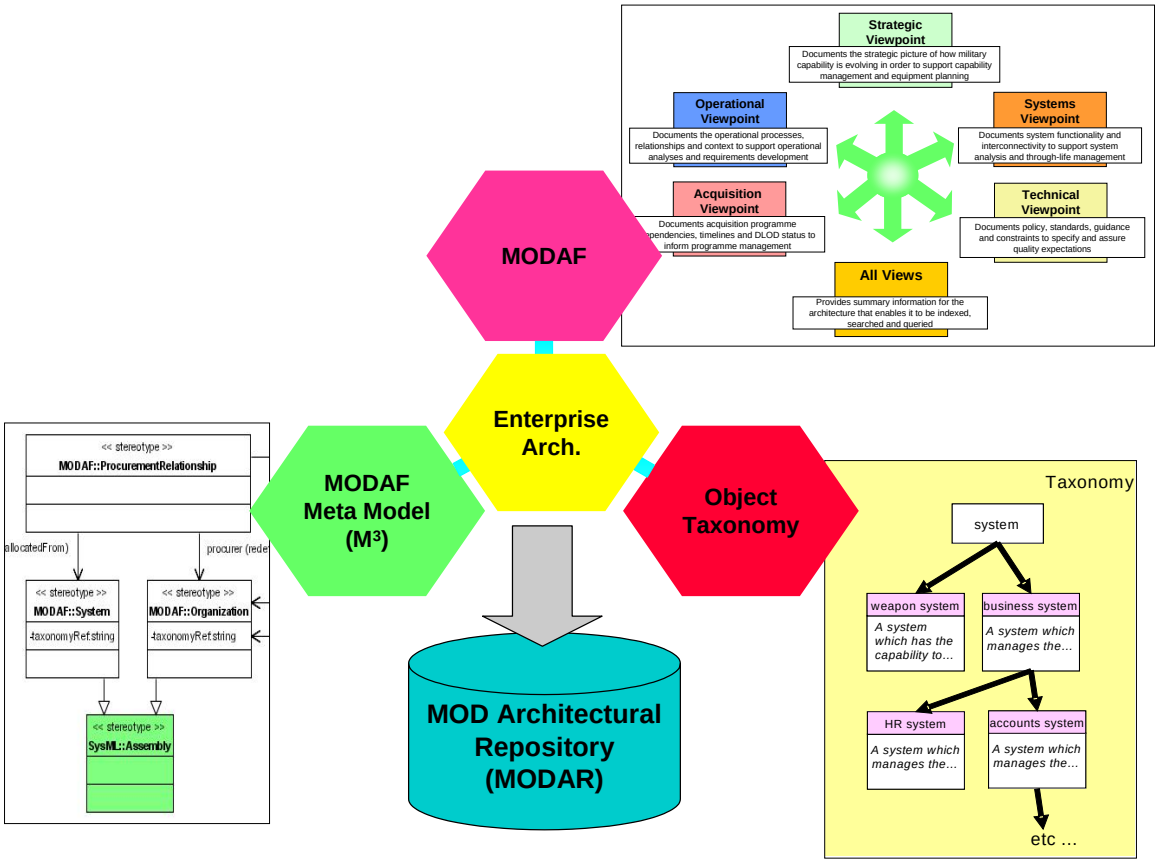


Figure 2-10: Key Supporting Elements of MODAF

38. The key elements that are required in order for MOD to develop a consistent and joined-up enterprise architecture using MODAF are:

a. Definition of MODAF views and how to utilise them within different communities / processes across the MOD – described in the MODAF Handbook and Deskbooks

b. MODAF Meta Model (M3) which describes the allowable architectural objects and relationships between them in the form of a UML 2.0 profile. This is used to

[6] MODAF Handbook (MODAF-M07-022, August 2005) and MODAF Viewpoint Overview (MODAF-M07-016, August 2005)

ensure that the views are constructed in a consistent manner and forms the basis of an interface schema between MODAF tools. The MODAF Meta Model is documented within the MODAF 1.0 baseline

c. MODAF taxonomy that provides a common, structured set of object names and definitions – ensuring consistency of naming across the various MOD architectural modelling communities. The MODAF taxonomy is still under development at the time of MODAF baseline 1.0 although a white paper is available[7] that describes the approach being taken

d. MOD Architectural Repository (MODAR) that provides a repository of architectural models that may be queried searched and analysed in a variety of ways and which enables models or elements of them to be re-used. The requirements for MODAR and its interface with other MODAF tools is still under development at the time of MODAF baseline 1.0 and the IA should be consulted for the latest information on MODAR.

39. In practice, using MODAF certified tools should ensure that the user is complying with most of these requirements, as they are required to demonstrate compliance with the MODAF views, meta model and interoperability with MODAR as part of the certification process. Further guidance on the selection of appropriate tools for conducting MODAF modelling is included in Section 5.1.4.

2.5 Ensuring Architectures are MODAF Compliant

40. In order to maximise the ability to exploit architectures produced in MODAF format it is important that they fully comply with the MODAF standards, which includes not only the use of MODAF views but also the MODAF Meta-Model and Taxonomy. The use of MODAF-certified tools by architecture development teams will ensure that most of these requirements are satisfied and hence provide assurance of interoperability between tools and with the MODAR repository.

41. It is possible for users to create Views that look similar to those specified in MODAF, but which do not conform to the full standard. In such cases it is likely that the resulting architecture will not be capable of full information exchange between tools / with the MODAR repository and therefore might not be accessible to others running architectural queries. The resulting architecture would become, to a greater or lesser degree, isolated from the main MODAR body of architectural knowledge.

42. However, there may be good reasons for wishing to modify MODAF views – such as adding further overlays to enhance understanding. Where this is the case, the user wishing to develop modified Views should first contact the MODAF team and/or IA (see Section 6 for points of contact) for advice on how to implement the required enhancements in a manner that maximises tool interoperability and hence the future exploitation of the resulting architecture.

[7] Implementation Strategy for MODAF Taxonomy, IA/02/16-ERMcm03, February 2005

3. THE MODAF DOCUMENTATION SUITE

43. This MODAF Overview forms part of the overall suite of MODAF 1.0 baseline documentation as shown in *Figure 3-1*.

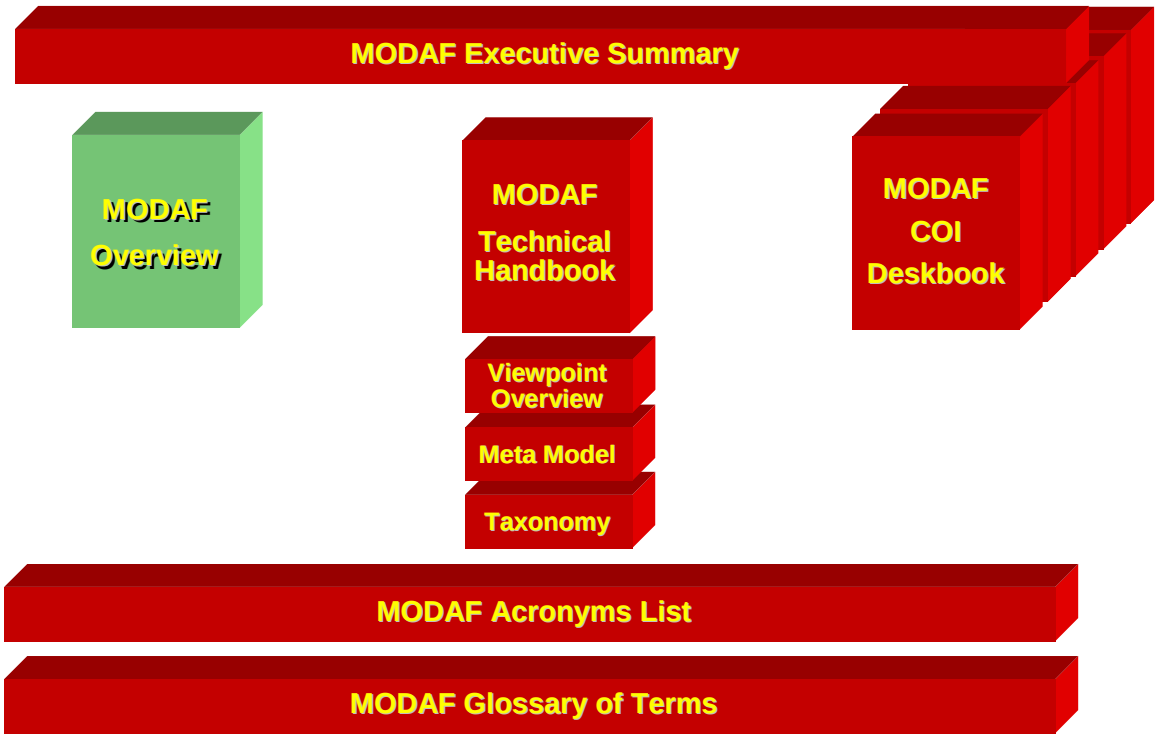


Figure 3-1: MODAF 1.0 Baseline Products

44. The main elements of the MODAF baseline are:

a. **Executive Summary** – provides a brief summary of the entire MODAF baseline

b. **MODAF Overview** – describes what MODAF is, why it should be used and details the process for developing architectures

c. **MODAF Technical Handbook** – provides details of the construction of MODAF Views and their relationship to the MODAF Meta Model (M^3). This is supported by:

i. **Viewpoint Overview** – a short summary of each view intended for quick reference by MOD users

ii. **MODAF Meta Model (M3)**[8] – used to define the architectural objects that are permitted in MODAF views and their relationships with each other. The M3 is derived from a conceptual model of the elements within the MOD architecture - the Enterprise Reference Model (ERM)[9]

[8] MODAF Meta Model, IA/02/16-ERMcm04, V1.0 please refer to IA for more information
[9] Enterprise Reference Model (ERM), IA/02/16-ERMcm06, model version 2.1, 15 August 2005; document version 1.1, 15 August 2005

iii. **Taxonomy**[10] – provides the approved names and definitions for architectural objects to be used within the MOD's architectures

d. **MODAF Deskbooks** – describe how users within particular communities in the MOD are expected to utilise MODAF architectures to support their processes

e. **MODAF Acronym List and Glossary of Terms** – these documents define the commonly used terminology in the MODAF Document Suite.

45. For the purpose of describing the relationship of MODAF to MOD's processes, five Communities of Interest (COIs) have been considered as shown in *Figure 3-2* below. Whilst these do not describe the whole of the MOD's processes as described in the Business Management System (BMS) (see COI mapping to BMS in Appendix A), they do cover the core processes around acquisition and military operations.

46. It should be noted that the COI names referred to in *Figure 3-2* are merely convenient labels to apply to communities / groups that are engaged in similar activities. For instance, the scope of the Acquisition COI aligns broadly with that of the DPA IPTs (ie largely equipment focussed from Concept stage through to delivery into service). Obviously this scope is somewhat more limited than the full Smart Acquisition definition of Acquisition – which encompasses all DLODs and the entire lifecycle. However, collectively the MODAF COIs do encompass all of the DLODs and cover the entire MOD acquisition lifecycle.

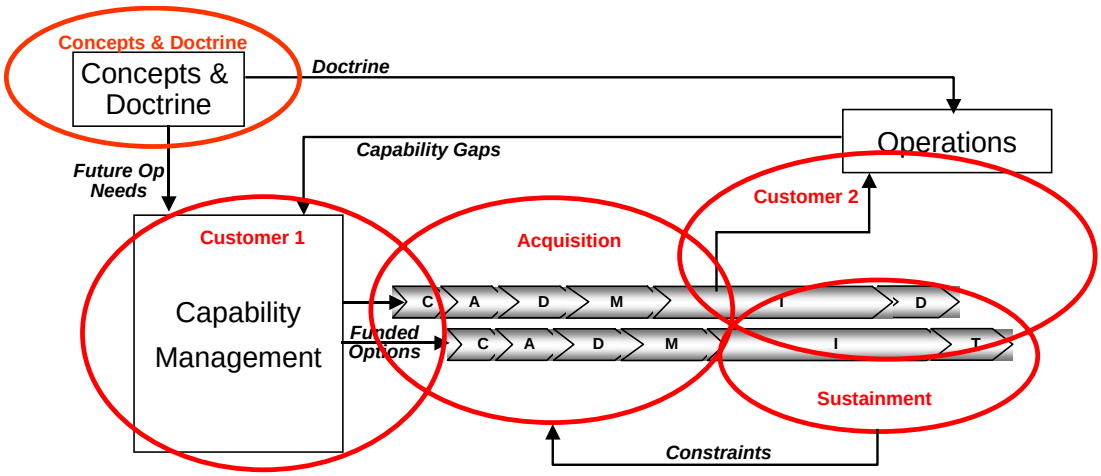


Figure 3-2: Community of Interest Deskbook Scope

47. The high level scope of these COIs is:

a. **Concepts and Doctrine** - the development of analytical concepts (e.g. Joint High Level Operational Concept), applied concepts (e.g. Joint Fires) and in-service doctrine (eg SOPs andTTPs)

b. **Customer 1** – the monitoring of capability gaps against future needs, building the Equipment Programme (EP) and ownership of User Requirements Documents (URDs) for new capabilities

c. **Acquisition** – the development and fielding of new military capabilities, the primary focus is up to the acceptance into service of a fully operational capability

[10] MODAF Taxonomy Requirments, IA/02/16-ERMcm05, V1.0 please refer to IA for more information

d. **Sustainment** – the processes to maintain military capability in line with the relevant Through Life Management Plan while recognising the in-theatre sustainment roles of the relevant Second Customer's Pivotal Managers[11]

e. **Customer 2** – the Core Leadership and Pivotal Management roles as defined in Smart Acquisition[12] and described further in the Joint and Single Service 2nd Customer Handbooks[13].

48. A number of the COI Deskbooks are supported by one or more "Quick Reference Guides" that provide an easily digestible summary of elements of the COI's MODAF development process. A summary of the available Quick Reference Guides that provide high-level summaries of key COI processes is shown in *Table 3-1* below.

Table 3-1: Community of Interest Quick Reference Guides

Title	Relevant COIs	Reference
Capability Management	• Customer 1	MODAF-M10-002
User Requirements Document	• Customer 1 • Acquisition • Customer 2	MODAF-M10-003
Project Management	• Acquisition	MODAF-M10-006
Requirements	• Acquisition	MODAF-M10-007
System Requirements Document	• Acquisition	MODAF-M10-008
Systems / Technology	• Acquisition	MODAF-M10-009
Industry / Supplier Liaison	• Acquisition • Sustainment	MODAF-M10-010
Through-Life Management	• Acquisition • Sustainment • Customer 2	MODAF-M10-011

[11] Covered in the Customer 2 Deskbook as the Maintain Military Capability process

[12] For further detail, see Smart Acquisition Handbook, available at http://www.ams.mod.uk.

[13] Customer 2 (Core Leadership) is undertaken by single-Service Chiefs to provide overall strategic management of individual Services and their professional direction. Core Leadership provides advice to Customer 1 on the full range of factors contributing to military capability across the DLODs. Customer 2 (Pivotal Management) is undertaken by those who use the equipment in-service (primarily the front line and training commands) in order to provide the user perspective and manage allocated resources to achieve the required output.

4. BENEFITS OF DEVELOPING MODAF ARCHITECTURES

4.1 Quantifying MODAF Benefits

49. One of the key benefits of implementing MODAF is that it provides good visibility of strategic portfolio management and programme integration issues – between multiple projects and across the Defence Lines of Development (DLODs). In this sense MODAF is an enabler of a more coherent Enterprise Architecture that is capable of better aligning all activities and capabilities across the MOD.

50. It has been estimated within the AfNEC programme that the total risk and rework associated with integration across the Equipment Programme (EP) could be between £2.3 B and £3.4 B if no mitigating actions are taken[14]. The degree to which this risk can be addressed depends strongly upon the maturity of the system(s) being considered. There is far more leverage to be obtained by addressing integration issues at the early stages of the lifecycle than by addressing the same issues when the system has already been developed or is in-service. Therefore, the adoption of a rigorous architectural approach in the early stages of the system lifecycle when there is still an opportunity to correct issues regarding system context, scope, interfaces, etc is likely to have a high impact on this EP risk and should realise good savings.

51. Although it is not feasible to unpack the individual contribution of MODAF towards these overall savings, the impact that the collective approach of MODAF, AfNEC, IX and other IA services would make across the acquisition portfolio is shown schematically in *Figure 4-1*. In complex enterprises with large capital-intensive infrastructures similar to the MOD it is not uncommon for there to be 30 to 40% of the total portfolio value in risk and rework across the acquisition portfolio associated with integration and interoperability issues. Not all of this risk and rework will have been budgeted for within contingencies (ie within the EP) – therefore, if this risk does mature it will adversely affect the affordability of downstream projects ie delaying the availability of future military capability. However, if the enterprise was to adopt a more coherent approach to managing across the entire portfolio and using good practice systems engineering / architectural approaches this risk and rework element could be significantly reduced [15] – with less downstream affordability impact on the rest of the future portfolio.

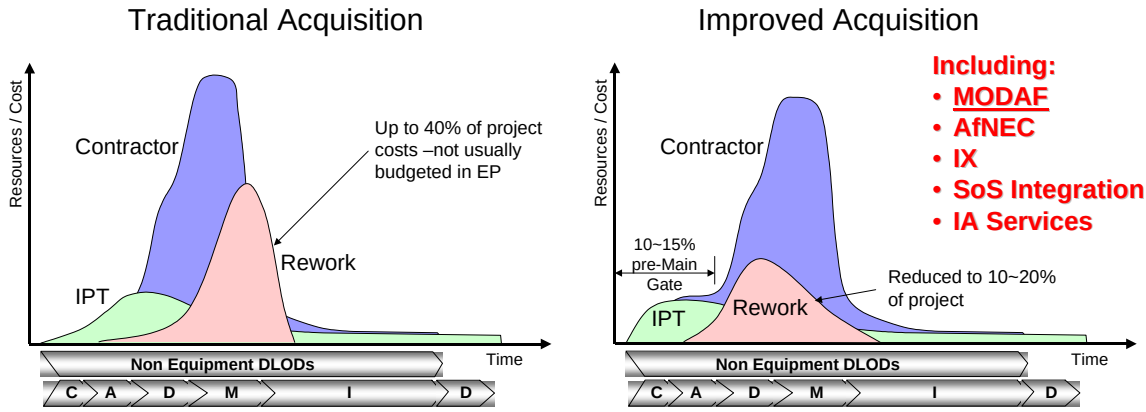


Figure 4-1: Potential Benefits in Acquisition Risk / Rework

[14] AfNEC Business Case, September 2004 and Integration Cost Report, D/PFG26/11/3

[15] See Figure 6 in NASA SP6105, June 1995 and Systems Engineering Centre of Excellence report 01-03, 2003 (on www.incose.org)

52. When considered from an overall perspective such as this there is not any burden associated with conducting MODAF architectures. Quite the contrary, there is a large overall reduction in overall cost / resources, although with a small shift in the resource profile early in the lifecycle toward early investment in de-risking the remainder of the lifecycle.

53. More specifically, the nature of benefits that can be obtained from the adoption of an Enterprise Architectural approach such as MODAF will include[16]:

a. Structured analysis and articulation of business issues

b. Enhanced requirements specifications

   i. New projects scoped more accurately meaning fewer adverse 'surprises' and cost increases during implementation

   ii. Reduced development risks / costs for projects and faster introduction, so that business benefits can be realised earlier

c. Improved efficiency, effectiveness and standardisation of MOD-wide processes and ways of working

   i. Cost reduction through the introduction of standards and improved management of Whole Life Costs

d. Improved validation and assurance of solutions

e. More coherent portfolio of military capability and more integrated systems

   i. Improved portfolio and programme management

   ii. Scarce resources are now focused on investments that are best aligned with the enterprise needs and strategy – not those with the loudest or most powerful sponsors

   iii. Enhanced systems interoperability

f. Avoidance of unnecessary costs in the overall investment programme

   i. There is less need for expensive 'temporary' workarounds caused by incomplete project implementations

54. The means by which the benefits of an architectural approach are likely to be realised by MODAF COI are described in Section 4.2.

4.2 Benefits to MOD Communities of Interest

55. There are significant benefits to be achieved through the use of a MODAF architectural approach in support of the key MOD processes / COIs. The nature of these benefits by COI is detailed below.

4.2.1 Benefits to Concepts and Doctrine COI

56. The benefits from MODAF that are likely to apply to the Concepts and Doctrine COI include:

a. Improved articulation of the process from concepts development to identified defence capabilities

[16] Based upon commercial case studies and research (eg Gartner) – for more detail refer to MODAF PID, August 2004

b. Improved identification and management of cross-capability dependencies

c. Better support for concept generation and capability development and assessment

d. Ensure better capability selection, endorsement and integration across all DLODs.

4.2.2 Benefits to Customer 1 COI

57. The benefits from MODAF that are likely to apply to the Customer 1 COI include:

a. Improved definition of both capability and user requirements; by providing a integrated set of views to support requirements development

b. More effective cross-DEC working; by bringing commonality to the articulation of data across options, plans and analyses

c. Reduced risk to the Equipment Programme through improved delivery assurance; by providing traceability of requirements into the activities of Acquisition, Sustainment and Customer 2.

4.2.3 Benefits to Acquisition COI

58. The benefits from MODAF that are likely to apply to the Acquisition COI include:

a. Improved clarity of the context within which a new capability will operate

b. Clearer and more comprehensive requirements documents

c. Improved ability to resolve interoperability issues between systems

d. Better understanding of the mapping of system functions to operational needs and hence the ability to conduct improved trade-offs.

4.2.4 Benefits to Sustainment COI

59. The benefits from MODAF that are likely to apply to the Sustainment COI include:

i. Improved military, logistics and acquisition decision-making, primarily through better traceability between the business processes and the solutions which support those processes

ii. Improved clarity of the CONOPS, CONEMP and CONUSE of an existing, improved and new capability, including how support will operate

iii. Improved efficiency through easier identification of opportunities for rationalisation of activities, roles and equipment, and faster, more effective feedback

iv. Improved interoperability between systems

v. Enable the integration across the DLODs

vi. Reduction in risk for introduction of equipment and their support

vii. Improved value-for-money and an enabler towards faster delivery.

4.2.5 Benefits to Customer 2 COI

60. The benefits from MODAF that are likely to apply to the Customer 2 COI include:

a. Improved military decision-making through a better, joined-up, coherent and holistic understanding of relationships between all the elements of the military landscape (eg capabilities, activities, systems and roles). This will result in improved military effect and reduced risk

b. Improved clarity of the context within which a new capability will operate

c. Improved efficiency through easier identification of opportunities for rationalisation of activities, roles and equipment, and faster, more effective feedback.

d. Improved interoperability between systems

e. Reduction in risk for introduction of equipment.

5. APPROACH TO DEVELOPING MODAF ARCHITECTURES

5.1 General Approach to Developing MODAF Architectures

61. The overall approach to developing a MODAF compliant architecture is broadly the same regardless of which MOD community is doing the work or the MODAF views that are being generated. This general approach is shown in *Figure 5-1* and summarised below. A quick start guide to this general process for developing MODAF architectures is also available – ref MODAF-M09-003. More details of the nature of the specific issues addressed and products generated by MODAF architectures in each of the different COIs is then discussed Section 5.3.

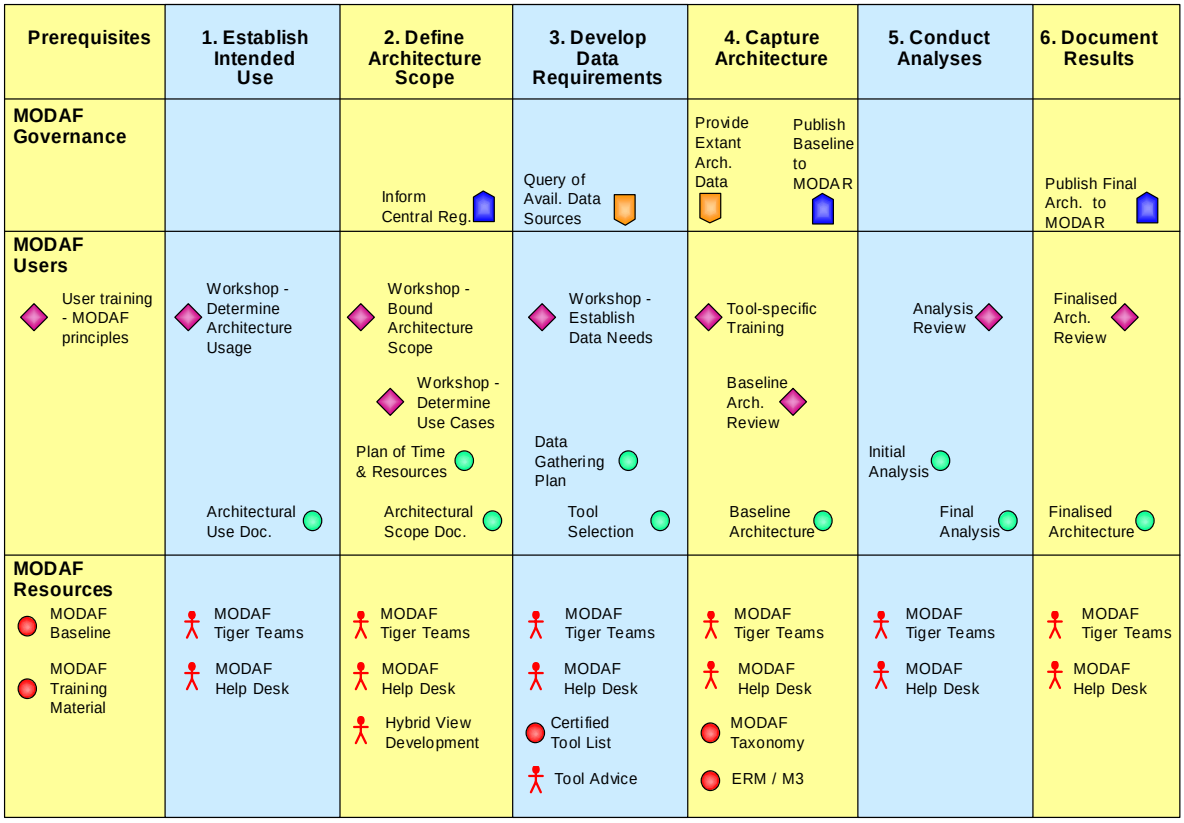


Figure 5-1: Overview of six-step MODAF architecture development process

62. In addition to showing the steps that a MODAF user should follow, *Figure 5-1* also highlights the MODAF resources that are available to help them and the key interactions that are required with the MODAF governance processes. Amongst the MODAF governance mechanisms is the MOD architectural repository (MODAR) that is run by the Integration Authority (IA). This can be used to run queries and extract existing architectural data – such as information on the systems that a new capability has to interface with. It is also important that all new architectures are lodged with MODAR to inform others and allow the re-use of the most current architectural data. Furthermore, for the Acquisition community the IA provides additional integration services that assist in modelling end-to-end performance and interoperability assurance.

5.1.1 Prerequisites

63. Before commencing a MODAF architecture it is important that the team concerned familiarise themselves with the MODAF architecture development approach, the available views and the expected nature of architectural activities

associated with their COI. Although all of this information is available through the MODAF baseline documentation suite, it is recommended that the affected team attends an introductory course regarding the use of MODAF within their COI. At this point it is probably not appropriate to undertake training regarding the use of any particular MODAF architecture tools – as subsequent architectural scoping work may influence the team's final tool selection.

5.1.2 Step 1 – Establish Intended Use

64. It is essential that any architectural activities are conducted with a clear purpose in mind – the main reason for developing architectures is the production of a suitable abstraction of complex real world situations that are amenable to detailed analysis. Therefore, step 1 of the architecture development process is aimed at determining and documenting the intended usage of the architecture – which can subsequently be used to test whether the developed architecture is fit for purpose. It is often useful to elicit statements of intended use for the architecture through a workshop that includes all of the potential stakeholders who are expected to provide data to and / or utilise the resulting architecture.

65. Some examples of the "exam questions" that MODAF architectures might address for different COIs include:

a. Identification of capability gaps / overlaps – Customer 1

b. Develop and trade-off capability options in order to optimise the overall Equipment Programme – Customer 1

c. Develop a clear understanding of the operational context and use cases in support of URD production – Customer 1, Acquisition, Customer 2

d. Establish system boundaries and interfaces, including interoperability analysis – Acquisition

e. Documentation of applied concepts (CONUSE, CONEMP, CONOP) – Concepts and Doctrine

66. More details of the COI specific usage of MODAF architectures is contained in the MODAF COI Deskbooks and summarised in Section 5.3 below.

5.1.3 Step 2 – Define Architecture Scope

67. The key outcome of this stage is a clear definition of the content and boundaries of the architecture that is to be developed. This will include a definition of the architectural scope in relation to many dimensions, examples of which may include:

a. Process scope

b. Organisational scope

c. Systems / platforms scope – including those that have to be interfaced with

d. Geographic scope

e. Coverage of the Defence Lines of Development

f. Timescales that are to be considered (eg 'as-is', 'to-be', circa 2015, etc)

g. Degree of granularity that is to be modelled (eg system, subsystem or component)

68. During this stage the team should also start to consider how the architectural information is likely to be presented so as to address the exam questions developed

during step 1. This would normally include a list of the key MODAF Views that are expected to be produced – guidance for which can be found in the relevant MODAF COI deskbook(s).

69. In some cases modified MODAF Views may be desirable in order to enhance the required analysis or presentation of results. For example, modified MODAF Views may include the addition of overlays to enhance understanding. However, as discussed in Section 2.5, there is a risk that modified views my not be compatible with other tools / the MODAR repository. Therefore, advice should be sought through the IA to ensure maximum compatibility.

70. At this stage it is also important to inform the MODAF governance processes[17] of the intended architectural activities. This will help ensure that architecture developers can be made aware of all extant architectural data sources before they commence work and can also be put in touch with other teams that may be developing architectures with similar or overlapping scopes. As MODAR becomes more densely populated this will considerably ease the burden of developing architectures – whole elements could be cut-and-pasted from extant models.

5.1.4 Step 3 – Develop Data Requirements

71. Before commencing data gathering in order to populate the architecture, it is good practice to establish a data-gathering plan. This should include the definition of what data is required, the level of granularity of data that is required, identification of multiple / redundant data sources to provide data validation and / or back-up sources. The data-gathering plan should also consider data formats, pre-processing and data migration issues.

72. Over time the MODAR architectural repository should become a valuable source of existing architectural data – much of which could be re-utilised with little, if any, translation effort required. This is why it is important to inform the MODAF governance processes[17] of the architecture's intended scope – so that a central register of all the MOD's architectural activities can be built. Based upon this scope information, the MODAR team can provide a summary of the available architectural data that may be of value to the new architecture.

73. An important consideration associated with the data gathering plan is conducting an assessment of the security aspects of the populated architecture. This needs to consider not only the classification of the individual data sources, but also the potential for a higher classification if certain combinations / aggregation of lower classification data is presented through the architecture. Consideration should also be made of the security implications for accessing the published architectural data and conducting the required analyses.

74. This is probably also the most appropriate stage of the overall process in which to consider tool selection. Since the MODAF tool certification scheme is still being developed at the time of this MODAF baseline issue, definitive guidance as to tool availability and fit with different COIs is not currently available. Therefore, interim guidance exists on the availability of MODAF convergent tools[18]. A further consideration in the tool selection process should be an analysis of the tool(s) used to develop the bulk of the available architectural data that is relevant to the new modelling effort. Although model interchange will be available between all MODAF

[17] At the time of MODAF Baseline 1.0 the MODAF governance processes were still under development and in the interim MOD users should liase with the IA as custodians of MODAR regarding the scope of their intended architectures.

[18] Interim NEC, CBM and BMS MODAF Modelling Policy, DEC (CCII) File ses 046-05, 1/3/05.

certified tools, there will often be an advantage to edit models within the native format that they were developed in – which maintains the intended graphical layout and potentially additional architectural data that goes above and beyond the MODAF specification.

75. Having made the tool selection it may be necessary to provide tool-specific training to those who are going to be deeply involved in capturing and editing the architectural models. It is expected that there will be a variety of tool-specific MODAF course available through tool vendors and their intermediaries.

5.1.5 Step 4 – Capture Architecture

76. It is during this stage of the process that the bulk of the architecture development actually takes place – importing and editing extant architectural models, capturing additional data and entering it into the architecture. This is likely to include extracting data from existing architectures via MODAR or associated tool-specific repositories.

77. When building the architecture it is important that it is only constructed in accordance with the MODAF Meta Model and MODAF Taxonomy. These constraints underpin the MODAF tool interoperability mechanisms and the MODAR repository and compliance with them ensures that the architecture will be compatible with the MODAR repository and that others will be able to re-use the content in the future. Help on how to achieve this will be available through the MODAF project or IA.

78. It is important that before the resulting architecture is baselined for publication and analysis its accuracy and validity is confirmed. This should include a review of the entire architecture by the subject matter experts who have provided key inputs. It may also be advisable to consult the MODAF governance processes / IA during the review process to ensure that any dependent architectures (eg with details of interfacing processes or systems) have not changed or are not in the process of changing.

79. At this point in the architecture development process the baseline (ie pre-analysis) architecture should be published to the MODAR repository in order to provide visibility to others across the MOD.

80. In order to facilitate the searching and query of architectures it is essential that the All Views (AV-1 with meta data regarding the architecture and AV-2 with the architecture's object dictionary) are completed thoroughly for all architectures before they are published. It may even be appropriate to start the documentation of the AVs during an earlier stage and to refine them as the scope of the architecture evolves.

5.1.6 Step 5 – Conduct Analyses

81. Given the validated baseline architecture delivered through step 4 of the process, all of the required data should now be available to conduct the analyses that were identified during step 1. These analyses are likely to be COI-specific as identified in section 5.1.2 and may include a variety of analytical techniques, including but not limited to:

a. Static analyses – such as a gap / overlap analysis against the Strategic Views in order to identify capability issues

b. Dynamic analyses – such as network traffic / bandwidth analysis based upon network configurations from SV-1 and traffic data from OV-2/OV-3

c. Experimentation – using information developed from the architectural analysis to establish the use cases / context for experimentation campaigns such as those run through NITEworks

d. Trials – using architectures to provide use case / context information for exercises and trials at a variety of scales from battlelabs to full brigade or division level exercises

82. As with the review of the baseline architecture, it would be good practice to conduct a review on the initial analyses and if necessary to revise the analyses before issuing the final product(s).

5.1.7 Step 6 – Document Results

83. Having conducted the required analyses, changes to the baseline architecture will often be identified. Examples might include:

a. Capability analysis may have highlighted a serious capability gap which has been developed into an EP option – the capability, timing and other details of which should then be entered into the finalised architecture

b. System interoperability analyses may identify interface problems that have to be rectified by means of changes to the applicable standards or introduction of a gateway equipment, which need to be included in the finalised architecture

84. When the architecture has been updated with the relevant changes it should again be subjected to a further review and the resulting finalised architecture published to the MODAR repository.

5.2 Practical Applications of General Approach to MODAF Architectures

85. In reality few, if any, teams within the MOD will simply follow the general six-step process outlined above from start to finish once only and then not utilise architectures again. In practice there will be a wide variety of approaches to conducting architectural work that will involve various iterations and variations around this general process.

5.2.1 Approaches to Iterative Development

86. There is no right way of conducting iterations around this general architecting process, but some practical examples are highlighted in *Figure 5-2* below.

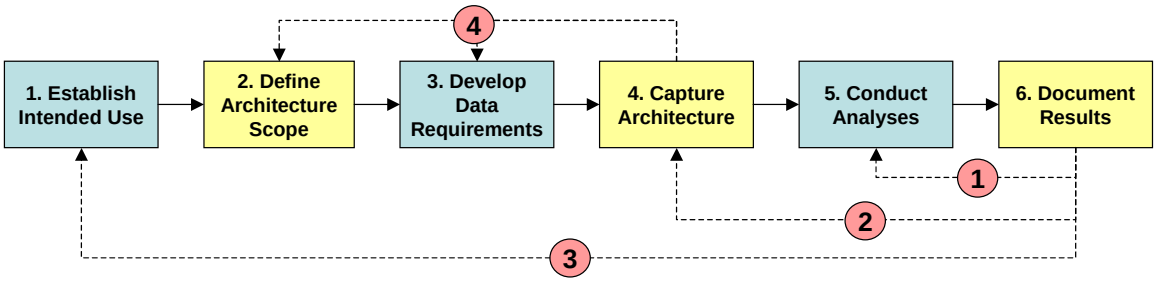


Figure 5-2: Iteration around the six-step MODAF architecture process

87. The first common type of iteration (1) is where having generated the architecture there are periodic analysis / update cycles without any major refresh of the architecture itself. This approach may apply for example to the development and detailing of a number of capability options within Customer 1's processes of finalising the Equipment Programme.

88. Another type of iteration (2) would be where the architecture is refreshed with more up to date data before the analysis is repeated. This approach may apply for example to the update of the Strategic Views each time the capability audit is conducted within Customer 1's processes.

89. In some cases (3) it may be appropriate to periodically return right back to the start of the architecture processes to review the purpose, scope and data sources. A good example of where this may apply is within an acquisition IPT as it moves between CADMID/CADMIT stages – where there are different stage objectives, the solution boundaries may have changed and new data sources may be available. Of course these review activities of the early architectural activities can usually be conducted quite rapidly – possibly covering the review of steps 1 to 3 in a single workshop.

90. Sometimes, as the data is being gathered and entered into the architecture it may become apparent that it is not going to be possible to achieve the desired results using the elements being considered. In this case (4) it may be necessary to re-visit the architecture scope and / or data gathering plan in order to develop an architecture that will satisfy the original objectives.

5.2.2 Approaches to Rapid Architectural Update

91. In some cases the team will be working with an architecture that is largely pre-existing (eg from elsewhere within the MODAR repository) and against a well defined task and scope definition. In these cases it may be possible to abbreviate the process and conduct steps 1 to 3 in a single quick pass through the definition of desired outcomes, architectural scope and data sources as shown in *Figure 5-3*. It is still good practice to document the key deliverables of each of these architectural stages even if they are in a single document that has been captured during a single workshop.

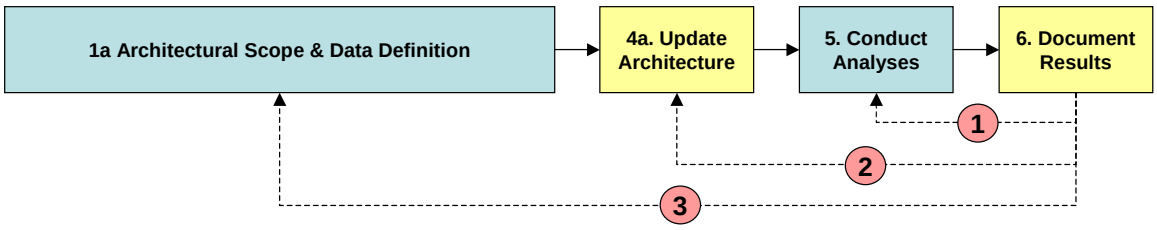


Figure 5-3: Rapid architectural update

92. It should be noted that similar iterative options could still exist with this rapid update approach.

5.2.3 Read-Only Architectural Usage

93. In some cases particular groups of MOD architecture users will not need to create architectures of their own but will be conducting analysis on the architectures produced by others. For instance, this may apply to the assurance and scrutiny communities who want to examine the adequacy and maturity of architectural activities conducted by IPTs at various stages of the acquisition lifecycle. In this case, a rather abbreviated version of the six-step process applies and there will be no update or publication of the architecture, as shown in *Figure 5-4*.

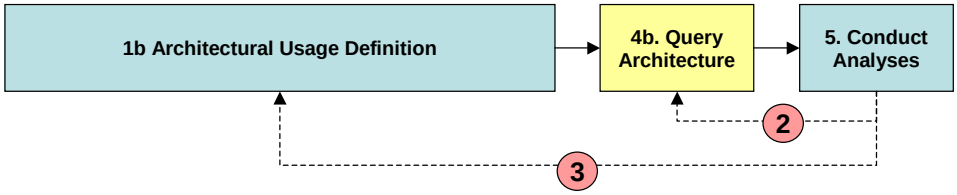


Figure 5-4: Read-only architectural usage

94. It should be noted that similar iterative options could still exist with this rapid update approach.

5.2.4 Parallel Architectural Activities

95. Another common situation in the MOD will be where there are a number of parallel streams of architectural activities being conducted in relation to the same overall project. For example, within the Concept stage of the acquisition cycle there will be refinement activities on the URD being conducted largely using the OV suite of MODAF views while simultaneously a high level suite of SVs will be in the process of being developed for the purpose of optimising different system solutions. In some cases these parallel streams of architectural activity may be being conducted by quite separate teams. However, in most cases these various architectural streams will need to converge at certain points in the project when joint / cross-cutting analyses are required (see *Figure 5-5*), such as an IPT conducting an overall risk assessment using elements from both the OVs and SVs to assess issues such as the clarity of use cases and the degree of interface definition.

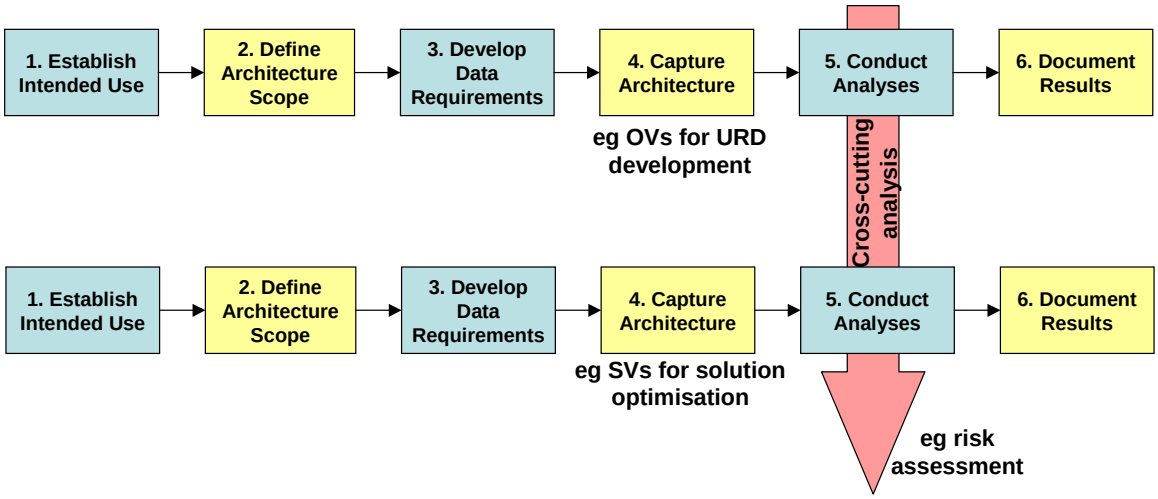


Figure 5-5: Parallel Architectural Activities

5.3 COI-Specific Architecture Processes

96. The general approach to developing MODAF architectures has been described above. This has described how to go about setting up architectural activities, the types of resources available and interactions required with the MODAF governance processes / MODAR. However, this does not show how specific MODAF views should be used to support specific MOD processes and deliverables.

97. The detailed relationship of MODAF architectures to specific MOD processes has been developed for five key communities of interest (COIs) that cover a large part of

the MOD's operational and acquisition processes. The details of these MODAF relationships to MOD COIs is documented in separate MODAF Deskbooks and associated quick reference guides for each COI – see section 3 and an overview of each COI in the section below.

98. Although MODAF has only been mapped in detail to these five MOD COIs as part of MODAF baseline 1.0 this does not mean that MODAF is not applicable to other MOD processes / COIs - see Appendix A. It is expected that further MODAF COI Deskbooks will be developed in the future to provide more complete coverage of the remaining MOD processes. Support on tailoring the MODAF guidance to other MOD COIs can be obtained from the MODAF project team or the IA.

5.3.1 Concepts and Doctrine COI

99. The main scope and interfaces of the MOD's Concepts and Doctrine COI are shown in *Figure 5-6* and detailed in the Concepts and Doctrine Deskbook[19].

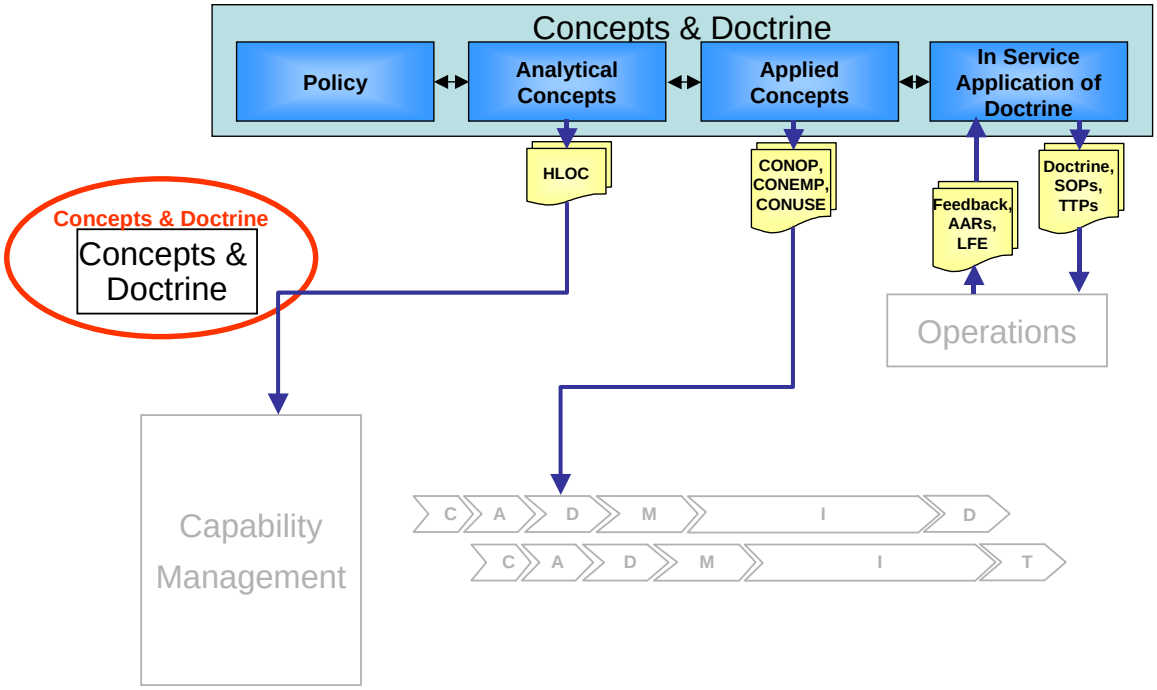


Figure 5-6: Key Processes and Products of Concepts and Doctrine COI

100. The main products of this process and their relationships to MODAF views are:

a. Analytical concepts such as the Joint High Level Operational Concepts that help define the future capability needs (and hence the StV-2) for Customer 1

b. The applied concepts that provide information on the operational context of new capabilities to the early stages of the acquisition lifecycle – these will usually be illustrated with progressively more detailed OVs as the lifecycle progresses. This process is also likely to highlight the need for future doctrine development as new capability is fielded (using the TV-2 standards forecast)

[19] MODAF Concepts and Doctrine Deskbook, MODAF-M10-013, August 2005.

c. The In-service application of doctrine takes feedback from operational activities (eg AARs) and refines the doctrinal products for use by the Services. The references to these doctrinal products (eg SOPs and TTPs) may be presented as a TV-1

5.3.2 Customer 1 COI

101. The main scope and interfaces of the MOD's Customer 1 COI are shown in *Figure 5-7* and detailed in the Customer 1 Deskbook[20].

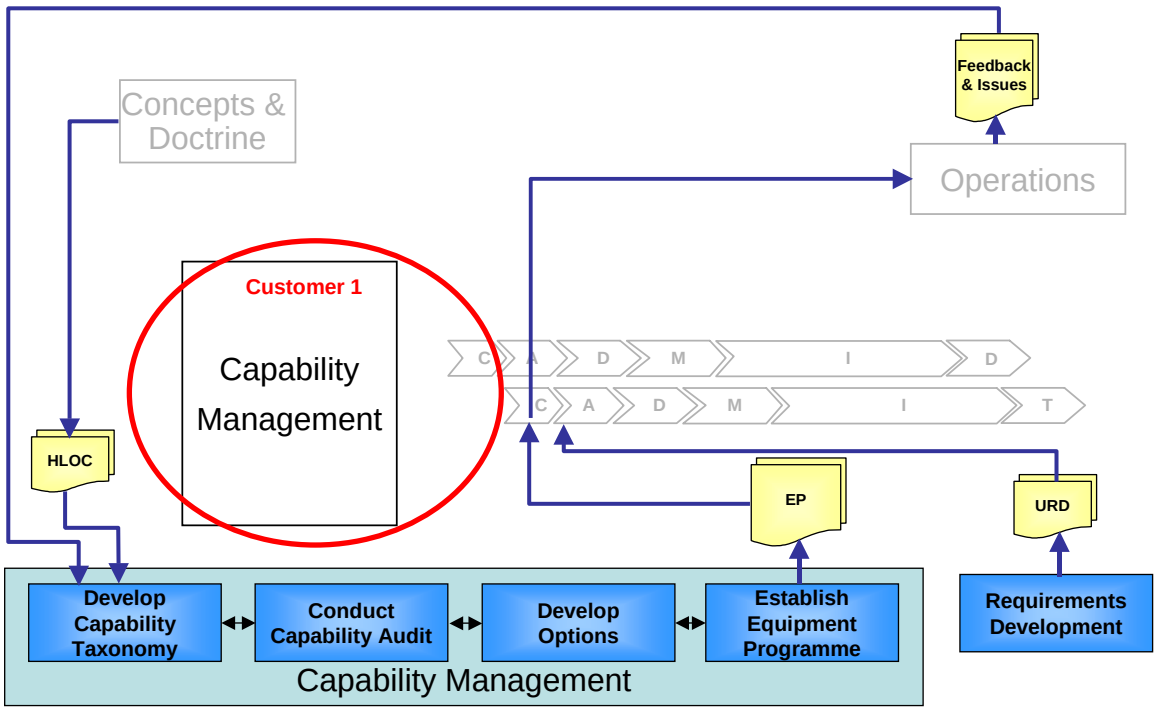


Figure 5-7: Key Processes and Products of Customer 1 COI

102. The main products of this process and their relationships to MODAF views are:

a. Conducting a capability audit using a taxonomy of capabilities (StV-2) developed from appropriate analytical concepts and capability portfolio analyses using information from StV-3

b. The development of a coherent and affordable Equipment Programme (EP) that should be informed by the MODAF StVs and AcV-2 which give visibility of issues and dependencies across the entire capability portfolio

c. Development of URDs for each new capability that is being acquired – illustrated by suites of OVs for each of the key use cases. Some key user requirements (KURs) such as interoperability may also be captured using MODAF views (eg OV-2 and TV-1)

[20] MODAF Customer 1 Deskbook, MODAF-M10-001, August 2005.

5.3.3 Acquisition COI

103. The main scope and interfaces of the MOD's Acquisition COI are shown in *Figure 5-8* and detailed in the Acquisition Deskbook[21].

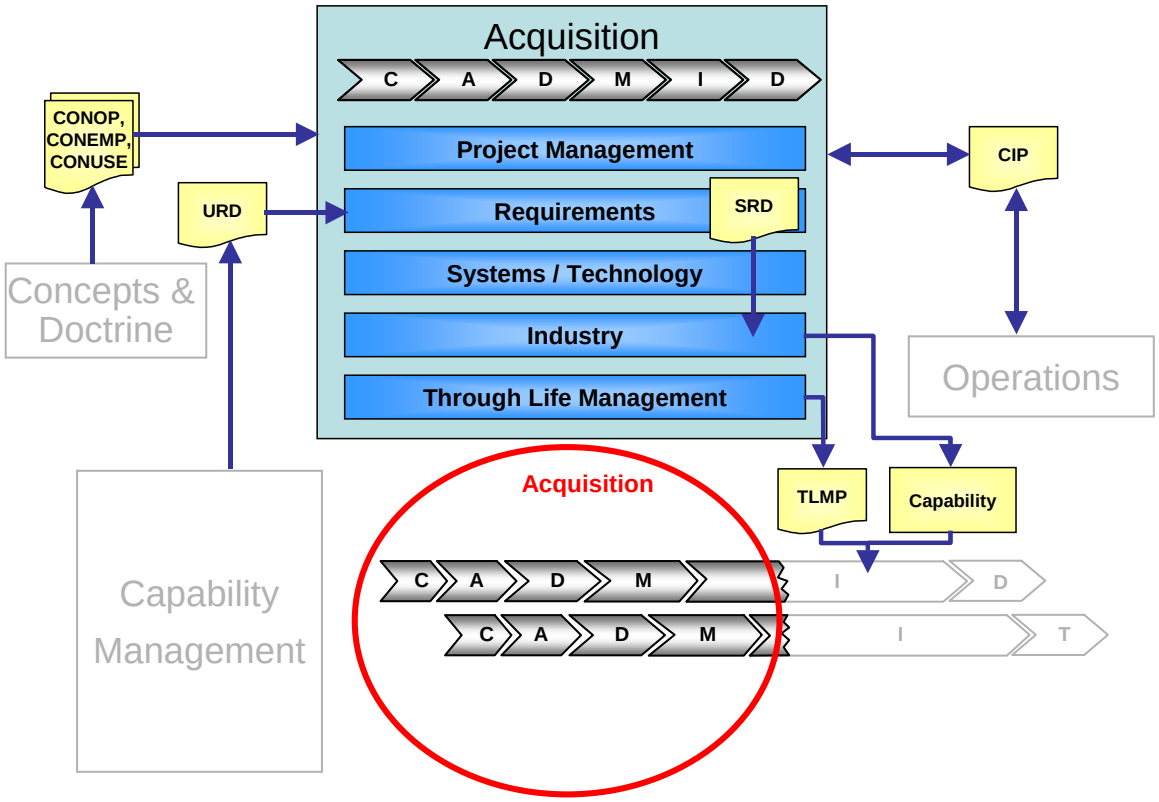


Figure 5-8: Key Processes and Products of Acquisition COI

104. The main products of this process and their relationships to MODAF views are:

a. A solution will be developed that satisfies the URD and this will be documented in an SRD, supported by a suite of SVs for the selected system solution

b. A TLMP will be developed that specifies the expected capability lifecycle including technology insertion points (SV-9), standards evolution (TV-2) and system updates (SV-8)

c. A Capability Integration Plan (CIP) shall be agreed between the IPT and Customers 1 & 2 which defines the products and dependencies between each of the DLODs – supported by AcV-2 across the affected projects / DLODs

[21] MODAF Acquisition COI Deskbook, MODAF-M10-004, August 2005.

5.3.4 Sustainment COI

105. The main scope and interfaces of the MOD's Sustainment COI are shown in *Figure 5-9* and detailed in the Sustainment Deskbook[22].

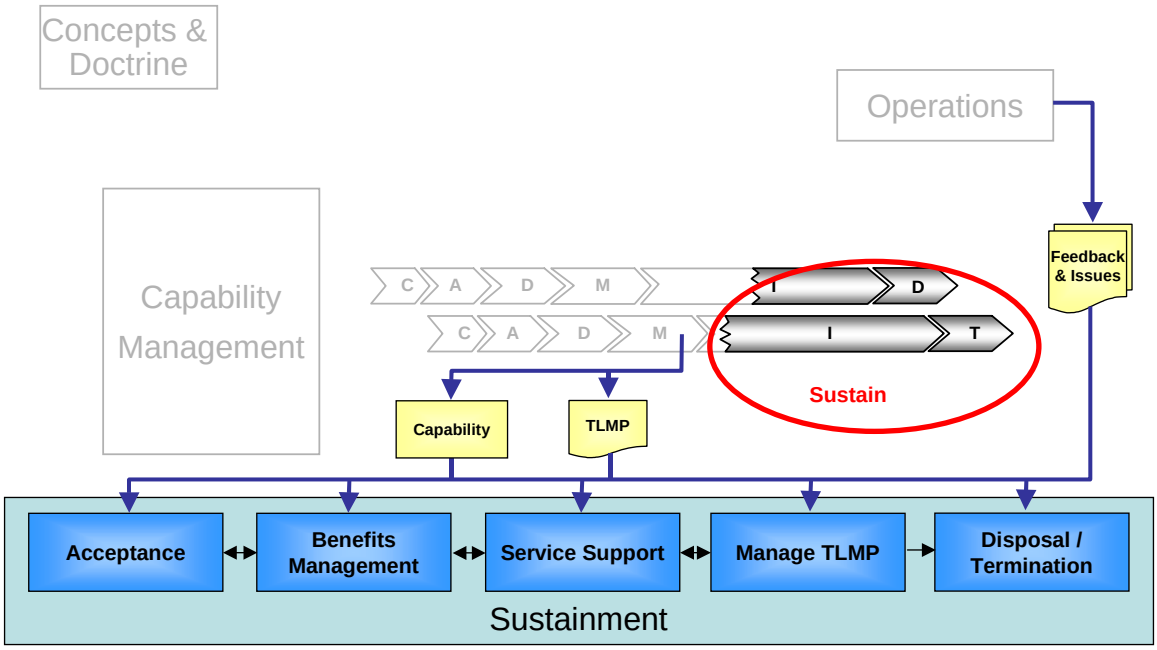


Figure 5-9: Key Processes and Products of Sustainment COI

106. At least to start with, the Sustainment COI is seen as largely being a consumer of the MODAF information provided in the products and architectures prepared by other COIs. Some of the key products that this COI is likely to utilise will include:

a. The TLMP and associated technology plans (SV-9), standards forecast (TV-2) and system updates (SV-8)

b. The provision of feedback and operational experience from Customer 2's usage of the capability

c. The development and documentation of support solutions that facilitate the Sustainment processes

[22] MODAF Sustainment COI Deskbook, MODAF-M10-014, August 2005.

5.3.5 Customer 2 COI

107. The main scope and interfaces of the MOD's Customer 2 COI are shown in *Figure 5-10* and detailed in the Customer 2 Deskbook[23].

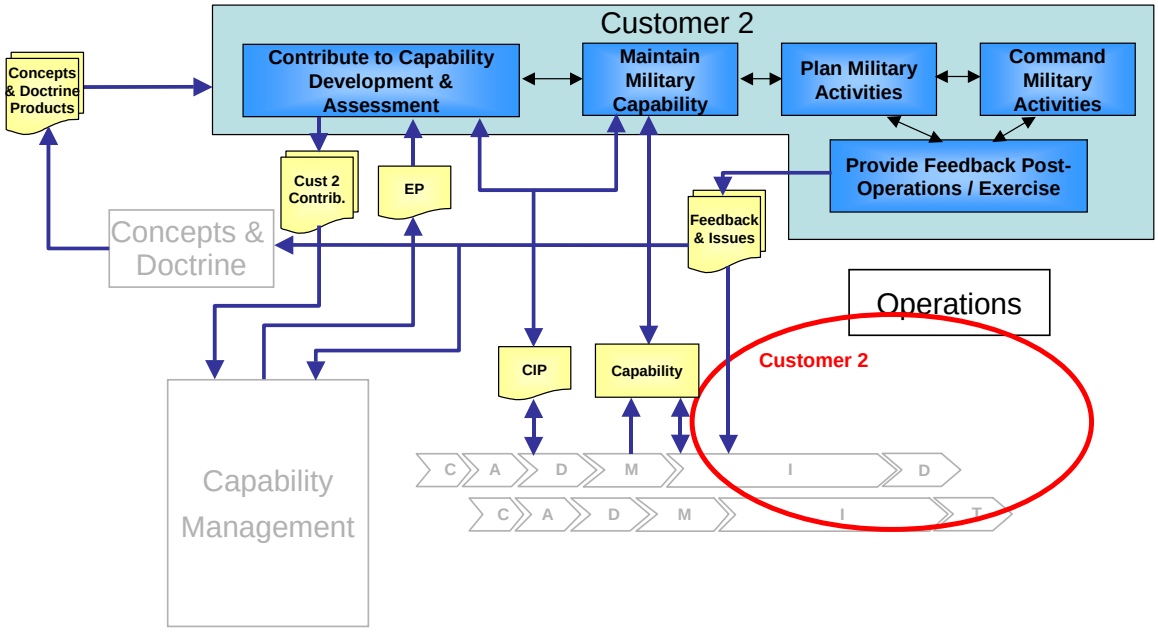


Figure 5-10: Key Processes and Products of Customer 2 COI

108. The main products of this process and their relationships to MODAF views are:

a. Provision of Customer 2 contributions to Customer 1's capability management and URD development processes. This is likely to include inputs to the capability audit (against StV-2 and StV-3) and support from Customer 2 SMEs to the development of the OVs suite that illustrate the operational context in the URD

b. Working with the IPTs in developing and agreeing the CIP which addresses the integration of all the capability elements including inter-project dependencies and activities across all DLODs. This activity will be supported by information contained within the AcV-2

c. Provision of operational feedback and requests for changes / improvements based upon this analysis. This feedback will potentially affect all of the other COIs

[23] MODAF Customer 2 COI Deskbook, MODAF-M10-005, August 2005.

6. DOCUMENT MAINTENANCE

109. It is intended that the MODAF product suite will evolve through time in order to reflect learning from experience, changes to the MOD's processes and the evolution of architectural best practice. A change control process will be established for all MODAF products and suggestions upon the refinement / improvement of this and related products are welcome. The formal MODAF change control process shall be published in due course (see www.modaf.com). In the interim, suggestions should be forwarded to the MODAF team – through http://defenceintranet.diiweb.r.mil.uk/DefenceIntranet/Teams/BrowseTeamCategories/ProgrammesProjectsAndWorkingGroups/MinistryOfDefenceArchitectureFrameworkmodaf.htm.

Acknowledgements

This document has been developed by MODAF partners as part of the MODAF 1.0 Baseline that is being prepared by DEC CCII supported by the IA. Other MOD organisations that have contributed to the content and / or review of this document are:

ECC	CSD Apps, SOinC (A)	DSTL
DPA	Fleet CIS	JDCC
DLO	Strike HQ	PJHQ
DCSA	D Def Acq	NITEworks
DG Info (incl. CBM J6)	DGMO	

The MODAF development team also wish to acknowledge the support that these organisations offered to the Project Board, User Group and Technical Working Group.

The role of Industry is also acknowledged in providing support to the MODAF development and in reviewing the MODAF products prior to its release.

MODAF partners

The MODAF 1.0 Baseline has been developed for the MOD by MODAF partners. The MODAF partners team leaders for this work have been:

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APPENDIX A: MAPPING MODAF COIs TO BMS

110. The relationship of the MODAF COI scope to the MOD's Business Management System (BMS) processes is shown in *Figure A-1*. The emphasis for the first batch of MODAF COI deskbooks has been on the operational and acquisition processes where it was felt that the largest benefits could be obtained most quickly.

111. MODAF is potentially applicable to all MOD processes and future COI deskbooks are likely to be developed for other areas of the BMS in the future.

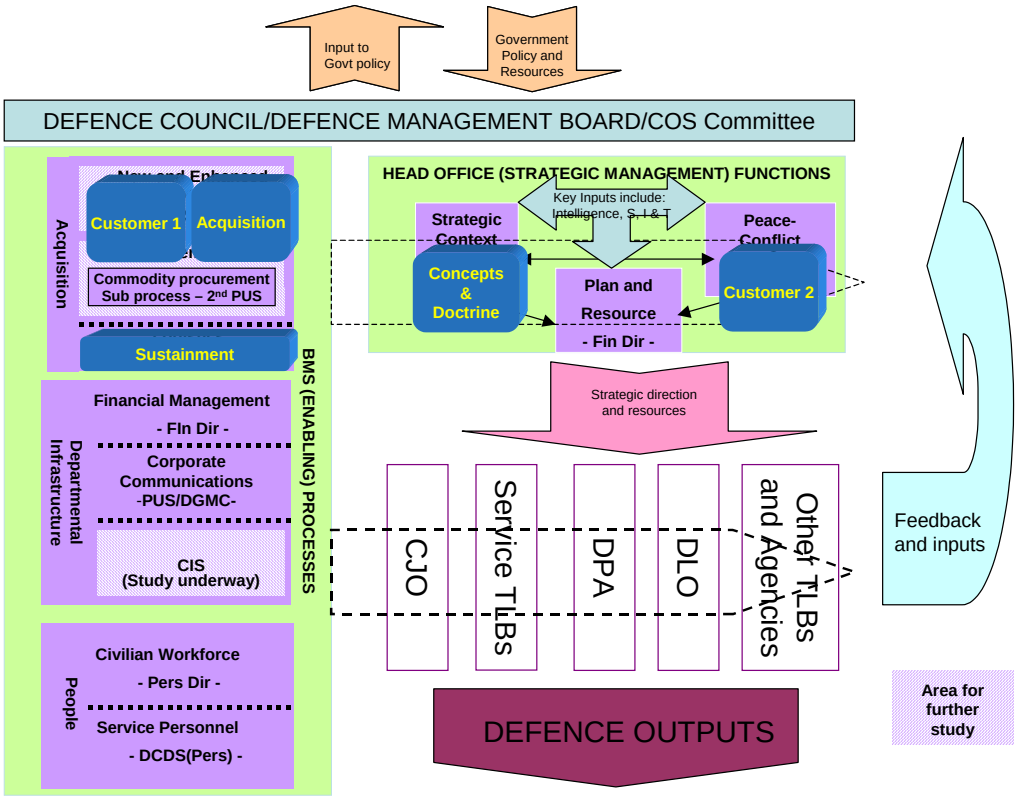

Figure A-1: Relationship of MODAF COIs to BMS key processes

APPENDIX B: LIST OF MODAF VIEWS

112. The full suite of available MODAF Views that are documented in the MODAF Handbook are listed below along with a short description for each.

View Category	View Number	View Name	View Description
All Views	AV-1	Overview and Summary Information	Scope, purpose, intended users, depiction of environment, analytical findings. Also provides version information about the architecture
All Views	AV-2	Integrated Dictionary	Defines the taxonomy elements used by the architecture
Strategic	StV-1	Capability Vision	Outlines the vision for a Capability area over a particular time frame
Strategic	StV-2	Capability Taxonomy	The Capability Taxonomy (StV-2) View provides a structured list of capabilities and sub-capabilities (known as capability functions) that are required within a capability area during a certain Period of Time.
Strategic	StV-3	Capability Phasing	Captures the planned availability of Capability at different points in time, i.e. different Periods of time
Strategic	StV-4	Capability Clusters	Provides a means of analysing the main dependencies between Capabilities
Strategic	StV-5	Capability to Systems Deployment Mapping	Shows the planned Capability deployment as systems, equipment, training, etc and their interconnection by organisation / period of time
Strategic	StV-6	Capability Function to Operational Mapping	Describes the mapping between capability elements and operational activities that can be performed by using them and thereby provides a link between capability analysis and activity analysis
Operational	OV-1a	High Level Operational Concept Graphic	High-level graphical/textual description of operational concept
Operational	OV-1b	Operational Concept Description	Provides a supplementary description of the High Level Operational Concept Graphic
Operational	OV-1c	Operational Performance Attributes	Provides detail of the operational performance attributes associated with the scenario / use case represented in the High Level Operational Concept Graphic
Operational	OV-2	Operational Node Connectivity Description	Operational nodes, connectivity, and information exchange needlines between nodes
Operational	OV-3	Operational Information Exchange Matrix	Information exchanged between nodes and the relevant attributes of that exchange
Operational	OV-4	Organisational Relationships Chart	Organisational, role, or other relationships among organisations
Operational	OV-5	Operational Activity Model	Capabilities, operational activities, relationships among activities, inputs, and outputs; overlays can show cost, performing nodes, or other pertinent information

View Category	View Number	View Name	View Description
Operational	OV-6a	Operational Rules Model	Identifies business rules that constrain operation
Operational	OV-6b	Operational State Transition Description	Identifies business process responses to events
Operational	OV-6c	Operational Event Trace Description	Traces actions in a scenario or sequence of events
Operational	OV-7	Logical Data Model	Documentation of the system data requirements and structural business process rules of the Operational Viewpoint
System	SV-1	Systems Interface Description	Identification of systems nodes, systems, and system items and their interconnections, within and between nodes
System	SV-2a	System Port Specification	System ports and protocols used by those ports when communicating with other systems.
System	SV-2b	System To System Port Connectivity	Protocol stack used by a connection between two ports. The ports may be on different systems.
System	SV-2c	System Connectivity Clusters	Individual connections between system ports, and grouping into logical connections between nodes.
System	SV-3	Systems-Systems Matrix	Relationships among systems in a given architecture; can be designed to show relationships of interest, e.g., system-type interfaces, planned vs. existing interfaces, etc.
System	SV-4	Systems Functionality Description	Functions performed by systems and the system data flows among system functions
System	SV-5	Operational Activity to Systems Functionality Traceability Matrix	Mapping of systems back to capabilities or of system functions back to operational activities
System	SV-6	Systems Data Exchange Matrix	Provides details of system data elements being exchanged between systems and the attributes of that exchange
System	SV-7	Systems Performance Parameters Matrix	Performance characteristics of Systems Viewpoint elements for the appropriate time frame(s)
System	SV-8	Systems Evolution Description	Planned incremental steps toward migrating a suite of systems to a more efficient suite, or toward evolving a current system to a future implementation
System	SV-9	Systems Technology Forecast	Emerging technologies and software/hardware products that are expected to be available in a given set of time frames and that will affect future development of the architecture
System	SV-10a	System Rules Model	Identifies constraints that are imposed on systems functionality due to some aspect of systems design or implementation
System	SV-10b	Systems State Transition Description	Identifies responses of a system to events
System	SV-10c	Systems Event-Trace Description	Identifies system-specific refinements of critical sequences of events described in the Operational Viewpoint

View Category	View Number	View Name	View Description
System	SV-11	Physical Schema	Physical implementation of the Logical Data Model entities, e.g., message formats, file structures, physical schema
Technical	TV-1	Technical Standards Profile	Listing of standards that apply to all the Views in a given architecture
Technical	TV-2	Technical Standards Forecast	Description of emerging standards and potential impact to all the Views in a given architecture, within a set of time frames
Acquisition	AcV-1	System of Systems Acquisition Clusters	Provides detail of how Acquisition tasks are grouped to improve management of interoperability and programmatic dependencies
Acquisition	AcV-2	System of System Acquisition Programme	Provides an overview of either the complete acquisition programme or a subset of projects

113. The relationships between the elements in the various MODAF views are shown in *Figure C-2*.

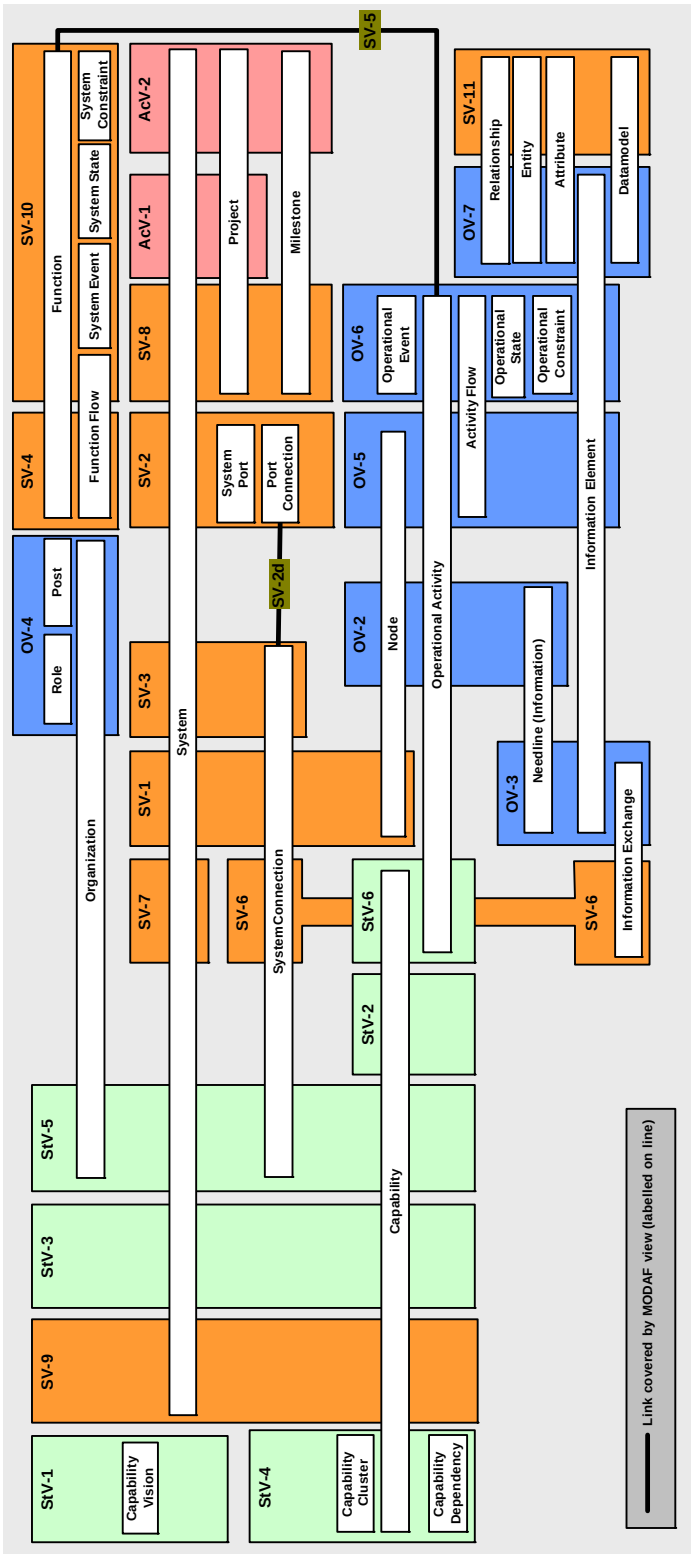

Figure C-2: Relationship of MODAF COIs to BMS key processes