The Development of the United Kingdom's Single Army Activity Model and Associated Information Needs and Its Relationship to Command and Control

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Abstract

In January 1996 work began on the development of the United Kingdom's Army Operational Architecture (AOA). Three models of the Army; High Intensity Conflict (HIC), Peace Support Operations (PSO) and a Business View covering the delivery of Military Capability were developed. Whilst this work was being undertaken, separate, but related modelling and analysis, was being carried out to produce a formal Statement of User Needs (SUN) to support the development of a future Formation Battle Management System (FBMS). This work included the examination and modelling of the processes associated with Command and Control (C^2) on the battlefield including Intelligence Preparation of the Battlefield (IPB) and Intelligence, Surveillance, Target Acquisition and Recconaisance (ISTAR) and the linkages to Combat Service Support (CSS) and Targeting. In January 1999 work began to develop a model, which covered activities that had not been in the previous models and also to consolidate the separate models into a Single Army Activity Model (SAAM), set within the context of Defence/Joint activity. This paper sets out how the model was built, its associated information taxonomy, how information was captured for each activity, the lessons learnt and how the work is planned to be exploited to analyse real world issues in order to develop future C^2 systems and support Information Management.

1. Introduction

In May 1998 the UK's AOA Version 1.0 was released on CD-ROM. Its aim was threefold; to explain what was meant by an Operational Architecture from a UK perspective, to provide access to the models which had been built using the Soft Systems Methodology (SSM) and captured using the MooD case-tool and to illustrate how an Operational Architecture could be used for a variety of analysis. It was planned that Version 1.0 would be followed by subsequent models, which covered those areas that had not been developed and that all the models would be merged to form the SAAM (in SSM this is referred to as a Consensus Primary Task Model (CPTM)). It was proposed that the SAAM, when complete, would consist of:

- A pictorial depiction of those activities which the Army should undertake to be the organisation, which is defined by capstone documents. These documents include; the Army Plan, Defence Missions and Military Tasks (as defined by the Strategic Defence Review (SDR) and subsequently the Strategic Plan), and high level Defence and Army doctrinal publications. This pictorial depiction includes activities to provide the land components of capability, generate the land component of a specific force and the employment of the land component of this specific force. The SAAM is termed "conceptual" because it is derived from a logical decomposition of the definitions of the Army and is independent of current organisations and equipment. It defines ***what*** an Army must do to be the organisation defined in the capstone documents, not ***what it does now*** nor ***how*** it does it. Implicit in the pictorial depiction is the logical dependencies between activities.
- An information architecture, which defines, for each activity within the model, three categories of information: that required for the activity to take place; that produced as an output of the activity; that required as a measure of performance of the activity. From this the sources and sinks of information can be identified.
- The mapping of one or more Command and Staff Functional Areas (CSFA)[1] to each activity

1.1 *Initial Plan*

The initial plan had seen this work beginning in June 1998 but resources were required to support the SUN modelling effort. This modelling was looking in more detail at C^2, IPB, ISTAR, Targeting and CSS, and was considered more important at that stage because it was intended to inform potential contractors for the British Army's FBMS about the relationship between these key areas. This is illustrated in the diagram at Figure 1 below.

[1] Command and Staff Functional Area are also referred to as Key Business Function's in other related areas of work; they describe generic types of "real-world" functional processes undertaken within Defence.

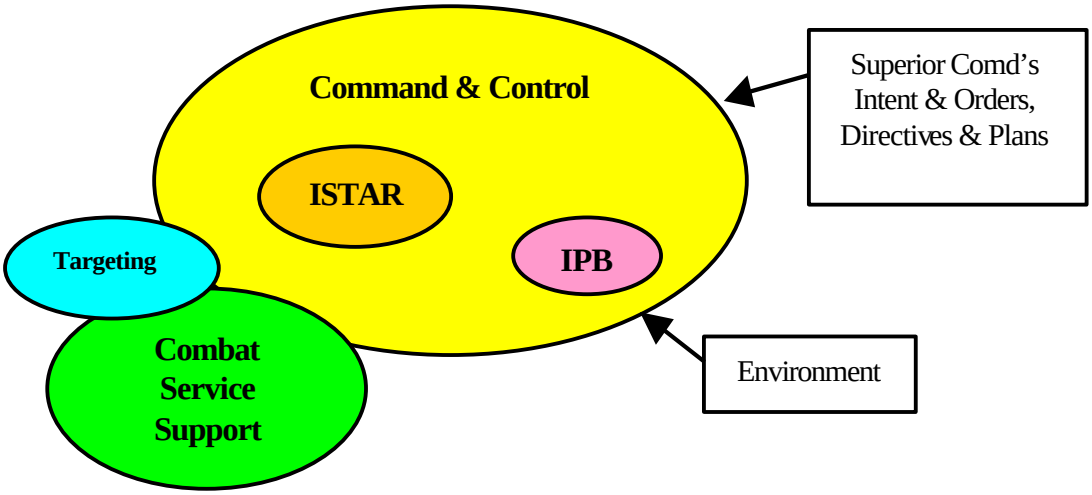


Figure 1. SUN Modelling Context Diagram

In addition, the staff within the AOA Team was tasked to look at what activities were associated with "Force Preparation"[2]. This was a new term and it was through conducting a detailed analysis of the Business View (to be retitled Force Preparation) that the team were able to develop a paper that allowed a definition of "Force Preparation" to evolve and identified key activities. Although this was important work and illustrated how an Operational Architecture could be exploited, it had delayed the development of the SAAM until January 1999.

1.2 *The Challenge*

The challenge that faced the team was how this model was to be built and how could the existing work within the AOA and SUN be used and show clearly the linkage from the AOA into the SUN. The SUN models were effectively a subset of activities within the AOA that had been described in the language of the "real world" and were then modelled to a higher resolution. The diagram in Figure 2 below illustrates the situation:

[2] The term "Force Preparation" is used within this paper to describe all military activities that take place prior to the operational deployment of a force and subsequent to its recovery or redeployment, and which must also be maintained during conflict. These activities are largely conducted in-barracks, but are all focused in support of operational effectiveness. Force Preparation as been defined as "All activities necessary to define, resource and deliver British Army capability, within graduated readiness criteria, for operational employment in the Land Component of a joint/combined force"

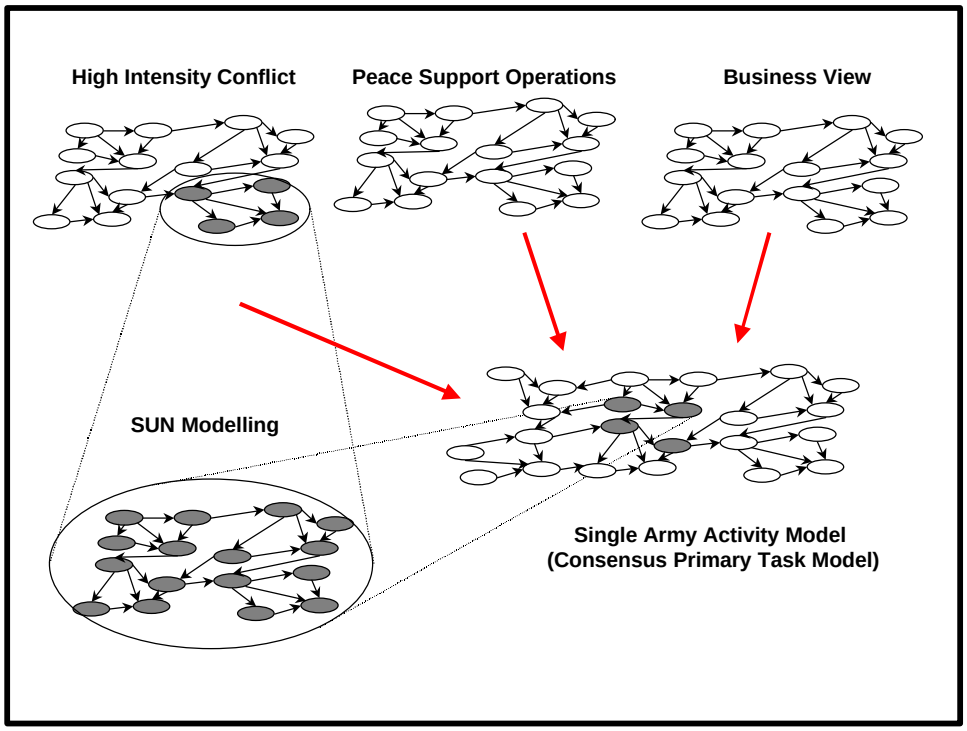


Figure 2. The Problem in Developing a Single Army Activity Model

In addition:

- An information taxonomy was required so that the information captured by the modelling could be linked to the work ongoing in the UK's Defence Command and Army Data Model (DCADM) and existing Information Products (for example AdatP3 messages). The latter because information products, although providing the wrapper for information were being used by research staff within the Defence Evaluation and Research Agency (DERA) to describe the Information Exchange Requirements (IER) between organisations in the Joint Information Flow Model (JIFM).
- A mapping of one or more generic CSFAs to each of the lowest level of activity associated with each of the sub-models developed, which could then support the mapping of organisations, where lead responsibilities for key activities are likely to lie.

1.3 ***Selection of Modelling Methodology***

The models developed as part of the AOA Version 1.0 had been developed using SSM, which had been adapted to support the AOA approach to modelling. A brief explanation of SSM is at Appendix A. This methodology had now become more widely accepted within the Ministry of Defence (MoD) and two of the Army's Commands were using both the methodology and the MooD case-tool to support the work in defining their own business processes and the Royal Navy had adopted a similar approach. It was therefore decided to continue with SSM however the team had an open mind on whether to continue to use MooD to support SSM or utilise other case-tools.

1.4 *Selection of a Case-tool*

The AOA Version 1.0 had used MooD Version 3.32 as a case-tool to support the modelling process. Using MooD the team had been able to develop Aggregate Models[3] for each of the sub-systems developed. A major problem however was to bring all the models together to form an overall aggregate model in order to conduct the analysis, and as the average number of activities for each of the 3 views modelled exceeded 600, MooD did not provide a practical solution to the problem. A member of the team came across an application called Power Designer, which contained a suite of tools, one of which was Process Analyst Version 6.1. Utilising this tool the team were able to produce models which included all the activities at Level 3 (ie the third level of decomposition of activities) on a single A0 sheet of paper. There were a number of drawbacks; activities were limited to 80 characters and a direct link to MooD could not be established due to the proprietary nature of the database in Process Analyst. As a result a number of potential case-tools were reviewed by the team prior to January 1999 to see if one tool could support both SSM and allow aggregate models to be developed. Ultimately it was decided that both MooD and Process Analyst would be used and the penalty of having to rebuild the models in Process Analyst would be accepted.

2. **Developing the SAAM**

2.1 *Initial thoughts in developing the SAAM*

Initial thoughts centered on the relationship between Military Capability and Military Operations and earlier work had indicated that there was a relationship between the generation of specific capability to meet a specific operation. Each of the three views modelled to support the AOA Version 1.0 had included a generic sub-model which, although given three separate names because the MooD Case-tool did not allow duplication of processes or activities, were all the same. These were “Generate the Force”, “Generate Military Capability” and “Generate Military Capability required”. In addition a comparison of the two operational views had provided a clear insight of those activities, which were either the same in each view or were similar. With this as a starting point a series of Root Definitions were developed and two high level models built. An early context diagram for the Military Operations model showing this relationship is at Figure 3.

[3] In order to ensure coherence and compatibility of approach when building complex models, the AOA models were developed by decomposing activities into component sets of sub-activities which themselves were further decomposed to higher levels of resolution. The Aggregate Model represents the complete set of activities at the highest level of resolution together with the logical dependencies between these activities. Aggregate models at lesser levels of decomposition were also built to support specific analyses.

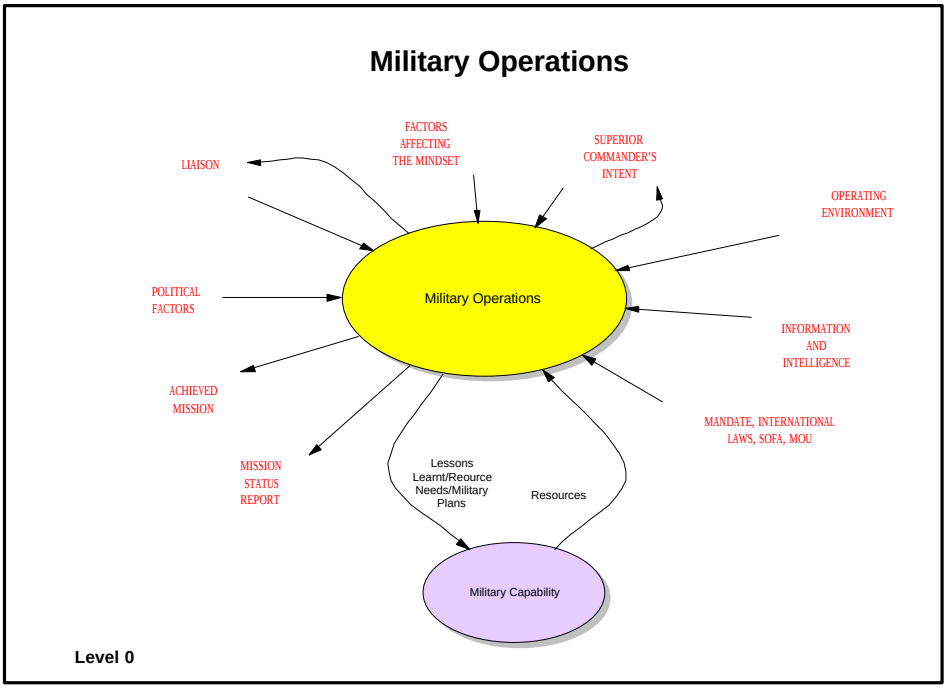


Figure 3. Initial Context Diagram showing Relationship between Military Operations and Military Capability

Work on the Force Preparation paper indicated that the relationship was however more complex, and that other areas, which had not been specifically addressed in either the modelling contained in AOA Version 1.0 or the SUN, had also to be considered. An example was Resource Accounting and Budgeting (RAB), which was a new process for managing MoD resources. This complexity is illustrated in the diagram at Figure 4.

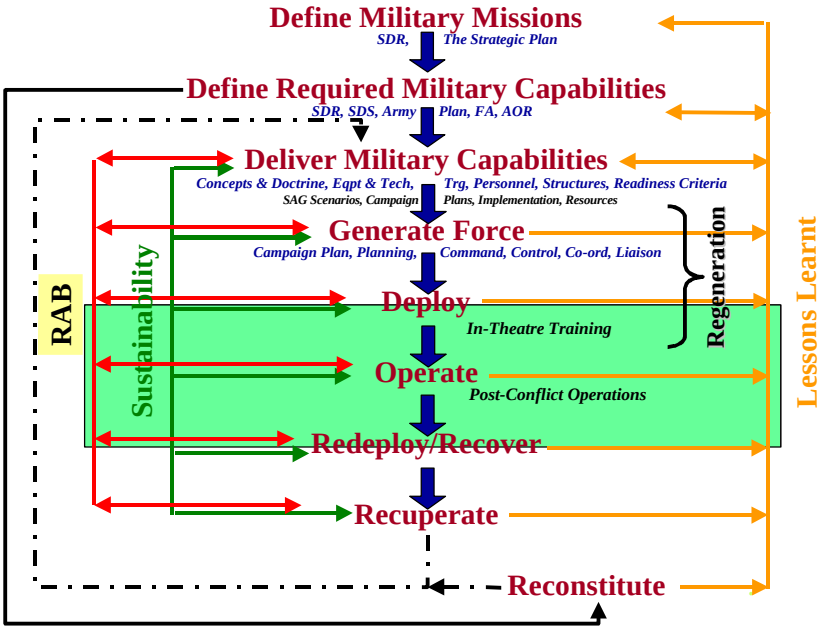


Figure 4. Force Preparation Diagram showing the more complex relationship between Military Capability and Military Operations

The shaded area, in “Green”, is about the employment of Military Capability for specific Military Operations. What was clearly indicated by the analysis was that future battlefield systems would need to be supported by what had hitherto been described as Non-Operational Systems, particularly in the Deployment and Recovery phases of an operation.

2.2 ***Building the SAAM***

In December 1998 a contract was awarded to The Smith Group and Hi-Q Systems for support to the military AOA staff, forming a multi-disciplinary team responsible for building the SAAM. One of the key objectives was to reuse, where logically sound to do so, the existing work within the AOA Version 1.0 and SUN Models Version 4.1. To facilitate this process a member of the military staff mapped SUN activities against those in the AOA HIC and PSO models. At the same time the team began a top-down process of determining a series of Root Definitions that described the purpose of the British Army against the laid down Defence Missions and Military Tasks that had been agreed in the SDR. With the support of Dr Brian Wilson, a Level 1 CPTM was developed. This was based on the concept of an Enterprise Model. This is shown diagrammatically at Figure 5.

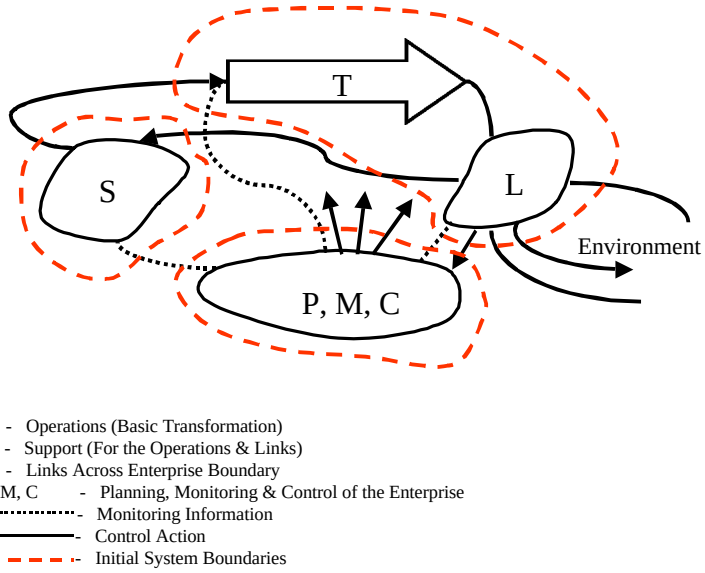


Figure 5. Model of Any Enterprise with Initial SAAM System Boundaries

Further refinement of the Root Definitions and the need to take in the relationship with the Defence and Joint environments lead to the development of the Context Diagram at Figure 6, which then allowed the development of 4 sub-models, which were colour coded and numbered as follows:

- Overall management and control of the Army (Grey - 4).
- Provide and maintain the Land Component of military capability (Yellow - 1)
- Conduct overall military strategy and operational planning (Purple - 3).
- Command and Control the execution of a specific Land Component mission (Green - 2).

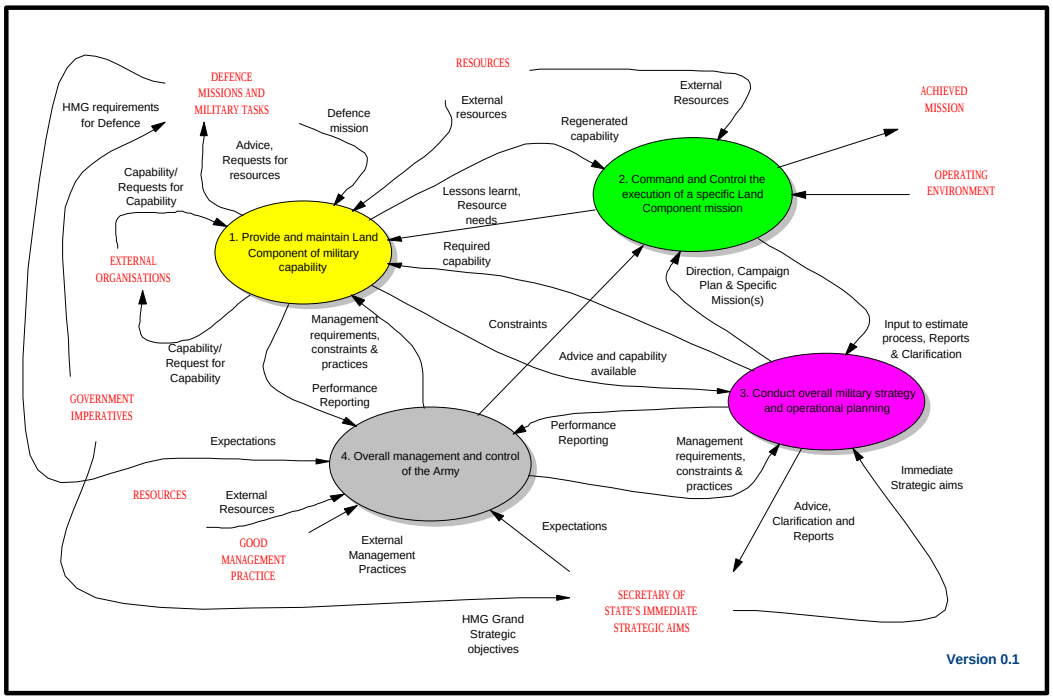


Figure 6. Context Diagram for SAAM

2.2.1 *The "Scope" of the SAAM*

The links between the Army and the Defence, Joint and Combined areas were not well developed in previous work in both the AOA and the SUN which had addressed mainly single Service activity. In developing the SAAM it was essential to move from a single Service ("Sector") view to an Environmental view in which the Army operated as the Land Component of a joint/combined force. In this view, certain Army activities support purely single Service objectives whilst others take place in the wider environment; mainly that of the Land Component, but there are complex overlaps between the single Services (RN, Army, RAF) and Environments (Sea, Land, Air) views. The potential complexity of the "extended" boundary of Army interest is shown in the diagrams in Figure 7 below which also show the boundary for the SAAM:

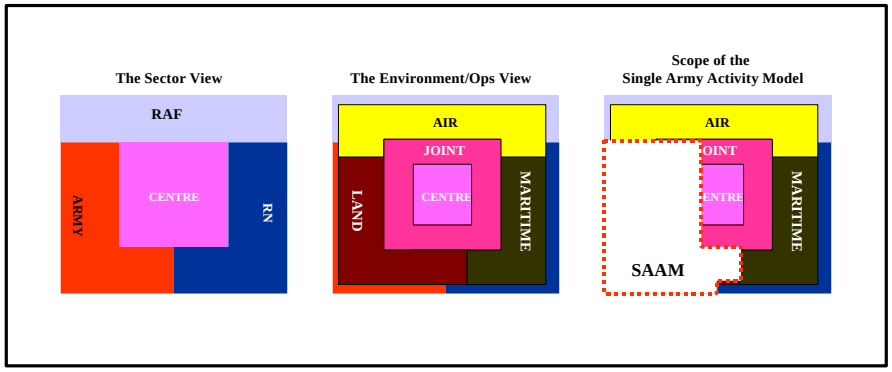


Figure 7. Sector, Environmental/Ops View and Scope of the SAAM.

The concept for broadening the scope of the SAAM is implicit in the definitions of the four major sub-models in Paragraph 2.2 above. Fixing this scope for the SAAM should then provide the "hooks" for other OAs into the SAAM's environment and vice versa. Thus, if the boundary of Army interest were drawn on the context diagram for the SAAM at Figure 6, it would pass through some of the activities. An example is the sub-model for "Conduct overall military strategy and operational planning"; this example also well illustrates the value and robustness of models developed using SSM:

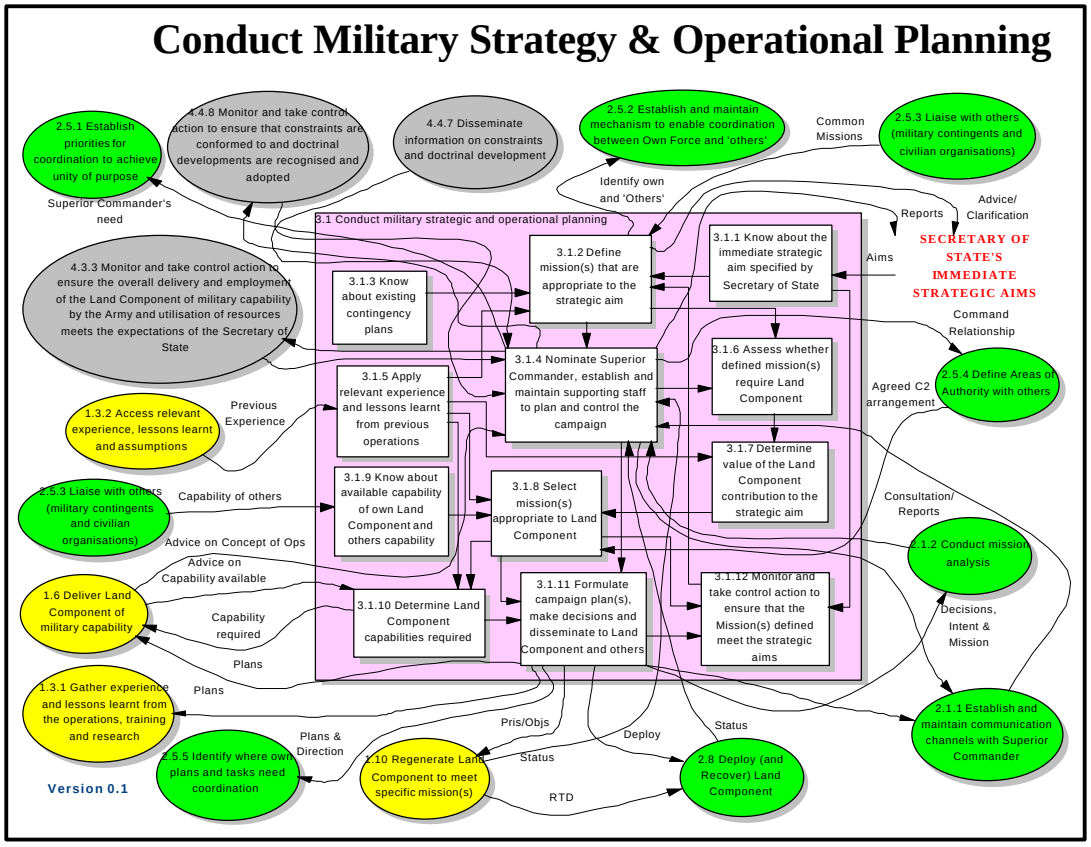


Figure 8. SAAM – Sub Model Conduct Strategic and Operational Planning.

The activities within the large central square represent those, which, logically, must take place to support the main activity of conducting overall military strategy and operational planning. This conceptual model may be "instantiated" to look at the "real world" by identifying which real-world organisation performs each activity. In this particular model with this particular set of activities, some are performed in the real world by the Joint staffs, some within MoD HQ, and some by Army organisations. Boundaries (or goose eggs) may therefore be drawn around activities to shown the boundary between the Army and outside organisations; the activities outwith the Army boundary then represent the overlaps or "hooks" into the other environments within which these organisations exist. The activities within the model are independent of current organisations because they represent a logical view of what must take place, not how it takes place. Therefore the model would be just as valid a view in, say, 1990 as 1999 as 2009. However, between 1989 and 1999 the real-world boundaries would have changed with, for

example, the increasing emphasis of Joint operations and the formation of the UK's Permanent Joint Headquarters (PJHQ) as a key player.

2.2.2 *Root Definitions and CATWOE*

The Root Definition "attempts to capture the essence of the system being described and hence it is more than a mere statement of the objectives of the system. It incorporates the point of view that makes the activities and performance of the system meaningful" [Wilson, 1992]. The Root Definition can be tested to see how well it is formulated. This test is performed against the following elements, often remembered by the mnemonic CATWOE:

Customer
Actors
Transformation
Weltanschauung
Owner
Environment

The system exists so that a certain **Transformation Process** may be performed by **Actors** within the system for the benefit (or otherwise) of **Customers**. The system is controlled and resourced by an (external to the system) **Owner** and the system must operate within constraints imposed by the wider **Environment**. The Root Definition will have been written in consideration of some particular framework of perceptions or outlook (**Weltanshauung**) which make this particular Root Definition a meaningful one.

The root definition provides the basis from which a conceptual model can be built. The model is derived by writing down the activities, which **must** take place for the system to be that defined in the root definition; arrows, which show some type of logical dependency, link these activities. Models may be taken to higher levels of resolution by deriving root definitions for activities in the top-level model and then deriving the lower level model in a similar manner to the first. Opinions differ as to the number of activities in an ideal model; either few if any level of decomposition (ie a large "flat" model") or several levels of resolution with relatively few activities against each root definition (ie a collection of linked "deep" models). In practice, and because of the need to use a supporting tool, the latter approach, which had been adopted for the AOA, was retained for the SAAM.

The supporting Root Definitions and CATWOE for the SAAM are as follows:

- Overall management and control of the Army.

Root Definition: A Secretary of State owned system to contribute to the Defence Missions and the immediate strategic aim, as laid down by the Secretary of State, by utilising appropriately organised Army personnel in conjunction with other forces and non-military personnel as appropriate to execute the total range of functions, represented by that organisation through the application of good management practice and the application of those constraints that are relevant to the achievement of Defence Missions and the immediate strategic aim.

C	Secretary of State.
A	Not specified.
T	Application of good management practice and the utilisation of appropriately organised Army personnel, other forces and non-military personnel to the achievement of the immediate strategic aim and provision of the capability required to meet the Defence Mission and Military Tasks.
W	The application of good management practice and appropriately organised Army personnel will contribute to the achievement of the immediate strategic aim and the generation of the capability required to meet the Defence Mission and Military Tasks.
O	Secretary of State.
E	Good management practice, constraints relevant, Defence Missions and immediate strategic aims.

- Provide and maintain the Land Component of military capability.

Root Definition: A system to advise on, provide and maintain the Land Component of military capability required, augmented by 'others' as appropriate, to respond to a series of Defence Missions and Military Tasks ranging from High Intensity Conflict against a sophisticated, complex and adaptive enemy in uncertain circumstances to the creation and maintenance of a benign operating environment (PSO) and others, as laid down by the Secretary of State, and within an agreed readiness criteria, whilst recognising previous experience, potential international relationships, technical and doctrinal developments and within financial and other appropriate constraints.

C	Secretary of State.
A	Not specified.
T	To advise, provide and maintain the Land Component of military capability required to respond to a series of Defence Missions and Military Tasks laid down by Secretary of State.
W	By knowing what range of missions and tasks are to be met, you can maintain the appropriate Land Component of military capability.
O	Not specified.
E	Need to take account of previous experience, potential international relationships, doctrinal and technical developments, and financial and other appropriate constraints.

- Conduct overall military strategy and operational planning.

Root Definition. A system owned by a Superior Commander and operated (by the Army) in conjunction with other forces, allied and neutral personnel, where appropriate, to provide advice both on the capability potentially available and utilisation of the Land Component during the conduct of the Strategic estimate and development of a specific Campaign plan, taking account of existing contingency plans and previous experience where appropriate, in order to contribute

to the achievement of the immediate strategic aim as specified by the Secretary of State and within economic, political, legal and cultural constraints.

C	Not specified.
A	Other forces, allied and neutral personnel, where appropriate
T	To provide advice both on the capability potentially available and utilisation of the Land Component during the conduct of the Strategic estimate and development of a specific Campaign plan.
W	Defining specific Campaign plan by taking into account previous experience and existing contingency plans where appropriate is the way to achieving an immediate strategic aim which will be specified by the Secretary of State.
O	Superior Commander.
E	Available capability, economic, political, legal and cultural constraints.

- Command and Control the execution of a specific Land Component mission.

Root Definition: A Superior Commander owned system, operated by a commander and subordinates, to continually make decisions about the deployment (and recovery), employment and sustainability of Land Component of a military force together with the execution of these decisions, in order to successfully achieve the Superior Commanders intent with respect to a specific mission whilst learning from this process to bring about improvements in operational effectiveness and recognising the changing operating (physical) environment, operating constraints and coordinating action with other forces and nonmilitary organisations as appropriate to the mission.

C	Land Component of a military force
A	A commander and subordinates
T	To make and execute decisions to successfully achieve the superior commander's intent with respect to a specific mission.
W	Mission will be achieved by continually making decisions about the deployment (and recovery), employment and sustainability of Land Component of a military force together with the execution of those decisions. Learning from the process will enable improvement. The force may operate in conjunction with other forces and non-military organisations and therefore there will be a requirement for co-ordination.
O	A Superior Commander
E	A changing operating (physical) environment and operational constraints.

2.3 ***The Relationship to Command and Control***

The End State for Future Army C^2 for the British Army, achieved through Digitization of the Battlespace (Land) (DBL), is defined as:

"A highly effective command and control capability that exploits information for force preparation, force generation and the conduct and sustainability of operations around the spectrum of conflict, that is optimised for joint combat within an alliance/coalition context, with the object of delivering tactical success, contributing towards operational impact and strategic significance."[4]

Work in support of the SUN had focussed predominantly on C^2, IPB, ISTAR, Targeting and CSS and it was important to ensure that the SAAM maintained this link, which although implicit in the AOA Version 1.0, needed to be explicit within the SAAM. Figure 1 showed the relationship between those processes that had been supported in the SUN Models Version 4.1. The Level 1 C^2 model is at Figure 9.

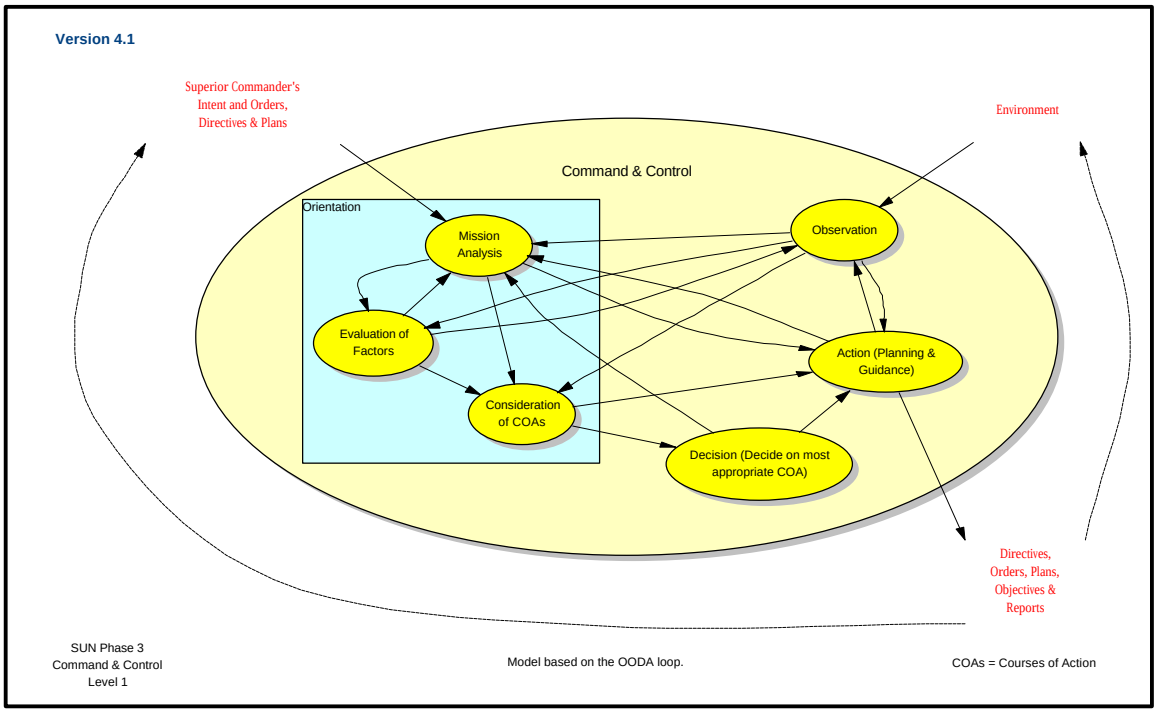


Figure 9. Command and Control Level 1 Model SUN Version 4.1 based on OODA Loop

The SUN C^2 model was built to reflect the OODA loop (Orientation, Observation, Decision and Action). This was retained in developing the SAAM. The relationship of the SUN C^2 model to the SAAM is shown at Figure 10.

[4] Draft Paper "Operational Parameters For Digitization Of The Battlespace" (Land) (ADC/P(99)1 dated 12 Mar 99).

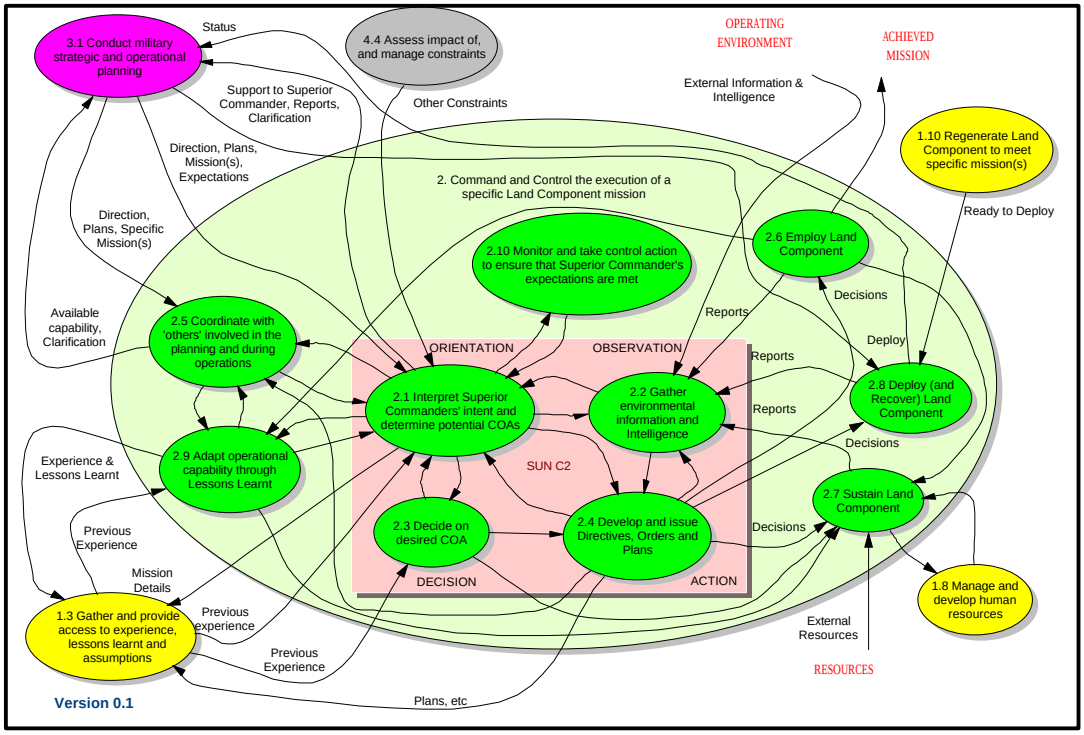


Figure 10. Level 1 Model – Command and Control the execution of a specific Land Component Mission

The key differences are that although the SAAM as incorporated the C2 model based on the OODA loop and the underlying activities, they are now linked to the wider environment. In addition by following the SSM a clear audit trail now exists from the top-level context diagrams in the SAAM to the SUN models. The three MooD processes; “Mission Analysis”, “Evaluation of Factors” and “Consideration of Courses of Action (COA)” shown in the rectangle box marked “Orientation” in Figure 9 have been incorporated into one MooD process “ Interpret Superior Commander’s intent and determine potential COAs” in the SAAM and expanded at the next level.

2.4 *Level of Decomposition*

In the AOA Version 1.0 the models were taken to three levels, with the exception of a number of monitoring and control activities, in the SUN the level of decomposition was taken to 4 levels, the 4th level only for key activities. In the SAAM it was not possible to model to a specific level across the model. Each sub-model was therefore modelled to a level of resolution that was considered useful. This is illustrated in the diagram at Figure 11.

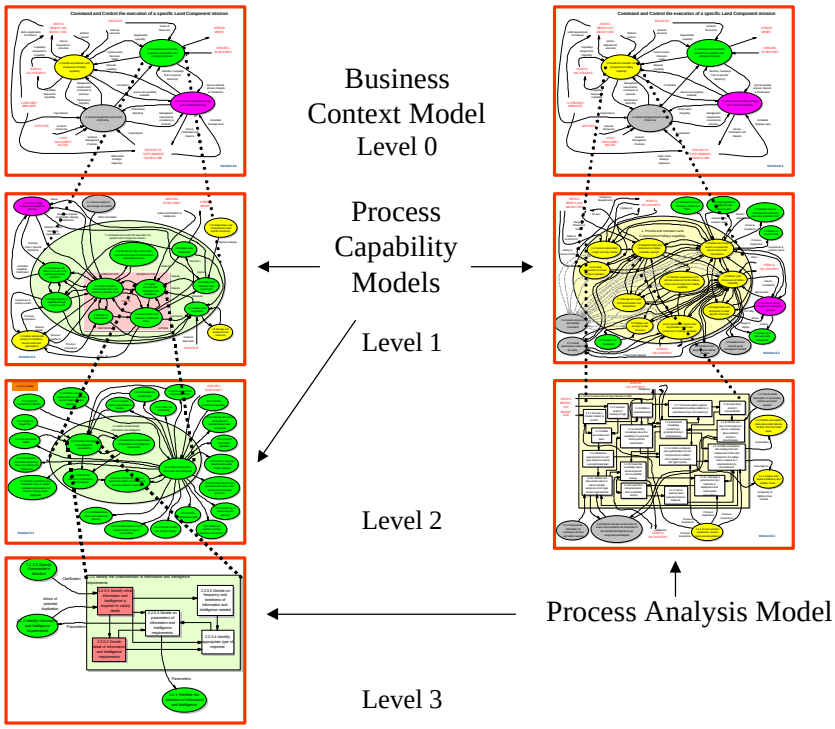


Figure 11. Decomposition Process using MooD Case-tool

It was only after the models were built that work could begin on capturing the information associated with each activity as either an input to the activity or an output from the activity, mapping CSFAs and identifying MoP for each activity. This was captured in MooD using an Object Association Model. It was at this point that work could also begin on developing an aggregate model. Aggregate models provide not only an ideal tool for conducting system or organisational mapping but also assist in the integrity checking of the complete model. The diagram in Figure 10 illustrates an aggregate model developed to support the AOA version 1.0 Business View. The mapping shown in Figure 12 is the system boundaries for each of the five sub-models developed.

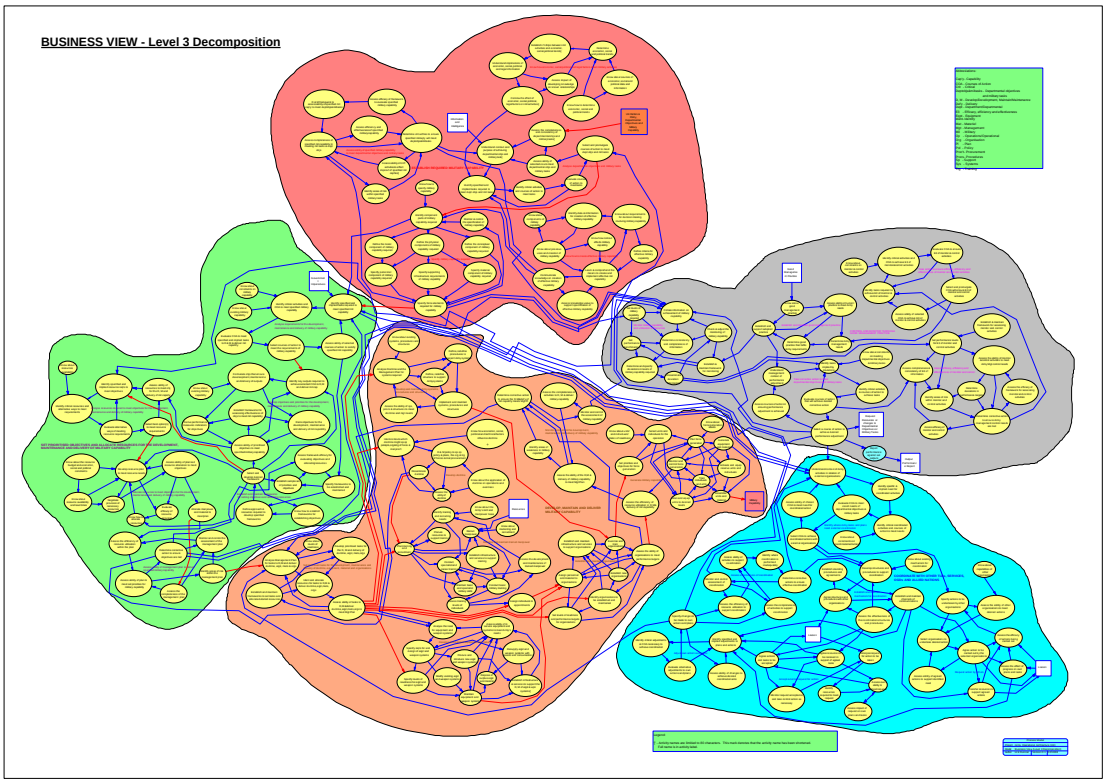


Figure 12. Aggregate Model of the Business View in AOA Version 1.0) marked with Sub-System Boundaries.

3. Information Taxonomy and Information Architecture

3.1 *Background*

The SAAM has been built with the information requirements of an activity in mind from the outset. This has required a common understanding of "information" in order to identify inputs and outputs to activities as well as the relationship of information to the measure of performance of activities. Consequently staff from both the AOA and the Army Data Services were engaged in discussions in the early stages of the development of the SAAM. This generated information relational terms (taxonomy) and a method for producing descriptions of data and information to support both the SAAM and DCADM respectively.

3.2 *Information Taxonomy and Information Architecture Development*

The method for developing the SAAM information architecture was as follows:

- Define information taxonomy, and information categories (input, output, MoP) to be captured in the SAAM.
- Create an information category catalogue from the AOA and SUN information categories, and reference to information products where applicable. The information products were derived from AOA/SUN, JIFM, DERA User Requirements Database (URDb)/Information Architecture/Battlefield Information System Tool (BIST) descriptions and STANAGS (ADatP-3).

- Map information categories from the catalogue to SAAM using MooD;
- Develop the SAAM information categories further as the activities are populated. Use the information in MooD to populate the top half of the Maltese cross.[5] An example of a Maltese cross is at Figure 13.

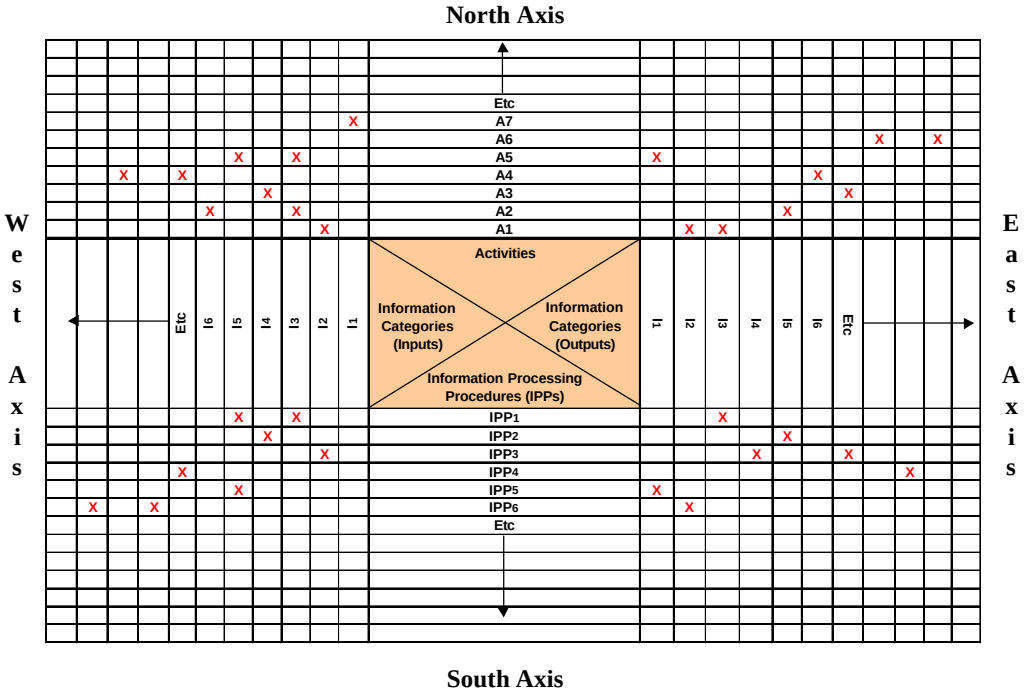


Figure 13. An example of a Maltese cross.

The successive stages in this development are described in the remainder of this section of the paper.

3.3 *Information Taxonomy*

3.3.1 *General*

The relationship between information and data, described here as the information value chain, is illustrated at Figure 14. Information is used, through the learning process, to create knowledge that is acquired through training (in such establishments as the Joint Services Staff College) and experience (such as Operations). Data is a series of observations or measurements. Data with context can be regarded as information. Data processing is the sequence of operations performed on data by a computer and only becomes information when read in context by a human.

[5] In essence the Maltese cross is a four-part matrix. The upper half or north axis contains the activities taken from the activity model, the east and west axes are identical and contain information categories deemed essential for the support of those activities (The west axis (represents inputs) is the mirror image of the east axis (represents outputs). The south axis is a listing of information processing procedures (automated and manual) that exist prior to any review. In a green field site the lower half of the cross will be blank.

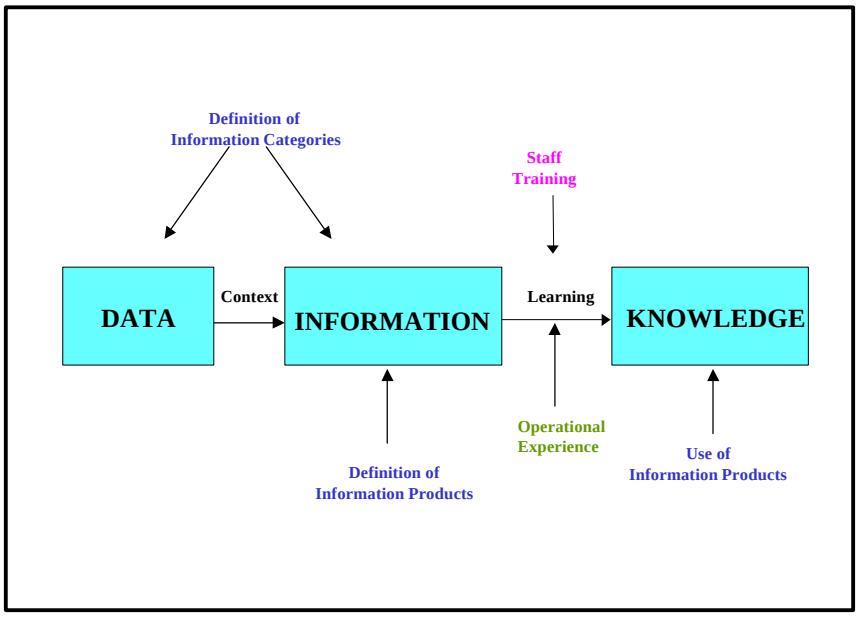


Figure 14. SAAM Information Taxonomy Value Chain

Information categories are the set of information classes necessary to describe the nature of information that is required, or produced, by SAAM activities. Information products can be thought of as the *container* for carrying one or more information categories. In order for operators to use products, they have to populate templates by applying their knowledge through a combination of experience and the current operational circumstances. Taxonomy is a classification scheme, that is, a standard means of identifying and describing things, in this case meta-information. Meta-information is 'information about information', that is, information used to describe the properties of real information. The same concept exists for data. Figure 15 represents taxonomy of information relation (meta-information), detailing the framework for producing the SAAM information architecture. The taxonomy was required to facilitate:

- The creation of a SAAM Information Architecture;
- The structural definition of the SAAM Information Repository.

The SAAM Information Architecture comprises the information inputs to and outputs[6] from activities, expressed as information categories. The structure of the SAAM information repository is based upon inputs and outputs recorded as a series of hierarchical objects within MooD.

[6] Including MoP information.

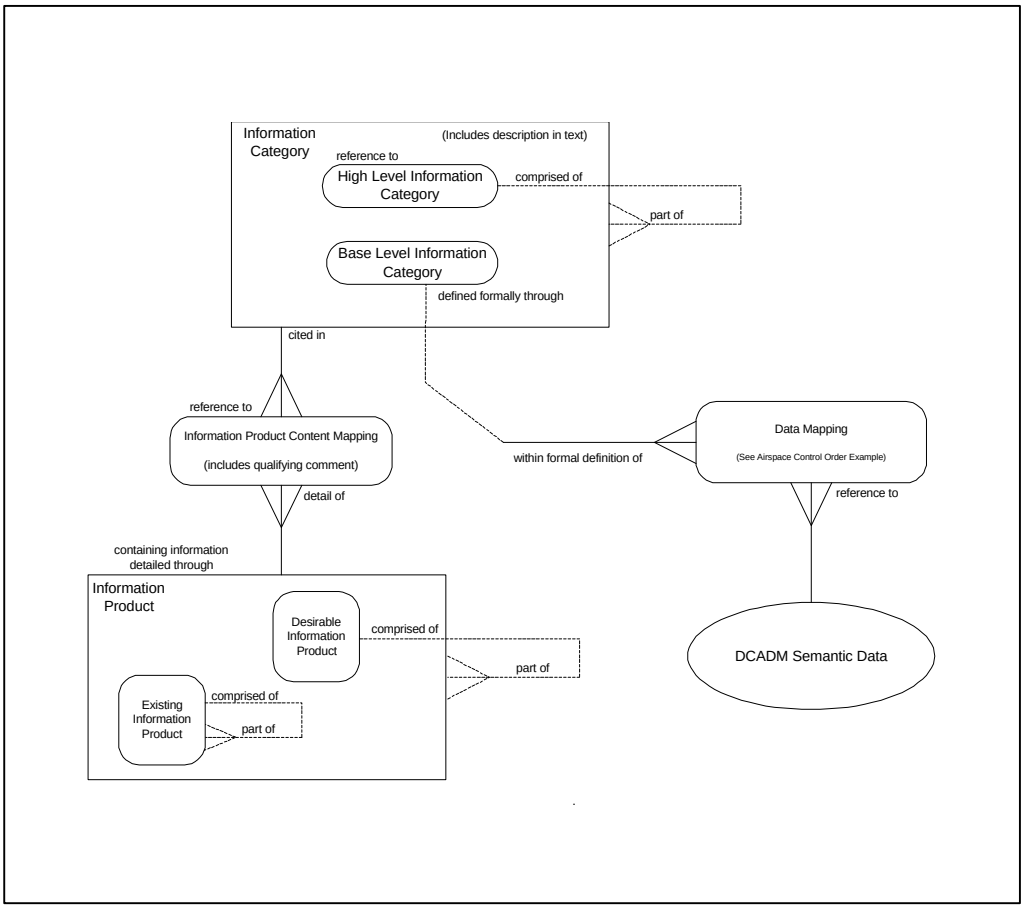


Figure 15. Taxonomy of SAAM Information Architecture

Figure 15 illustrates the relationships between the following:

- **Information Categories.** The information categories, in this instance derived from the names and description in the SUN and AOA catalogues, are contained within a hierarchy. The hierarchy is not unique, for example the information category 'enemy mission' could be under the heading 'enemy' but just as easily fall within a category 'mission' which has another child information category called 'own force mission'. The hierarchy is simply a tool to aid navigation through the information categories. The information categories captured in the SAAM as activity inputs and outputs are defined down to the level that is meaningful for the activities.
- **Information Products.** The individual elements of existing information products are used to derive and refine the lower level information categories. Once in place these categories can be utilised to define new information products. An element of any given information product may map onto a number of information categories both within the same hierarchy and/or within separate categories as indicated in Figure 16.

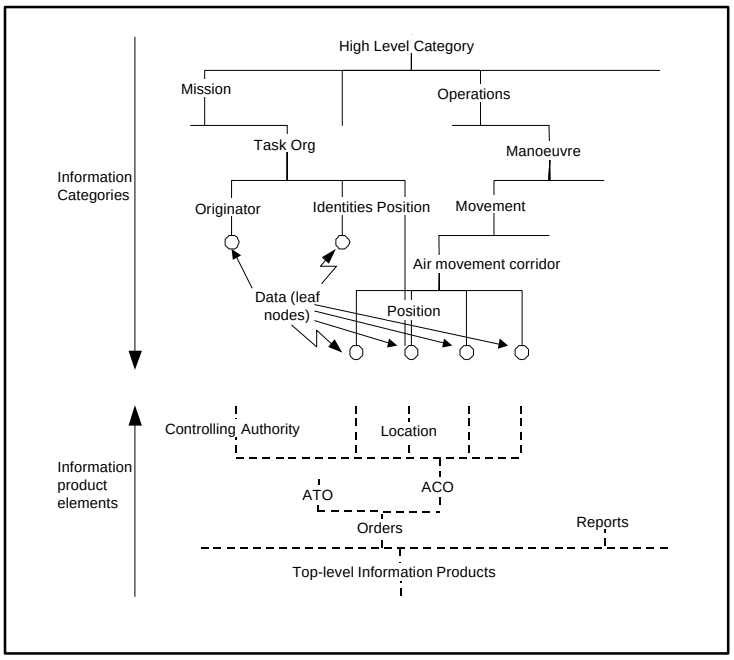


Figure 16. Convergence of Information Categories and Information Products.

DCADM Semantic Data. t is anticipated that a convergence will occur between the lowest level information categories and the highest level semantic data defined within the DCADM.

disparity that remains between low-level categories and semantic data will identify areas requiring more detailed activity modeling. Ultimately the completeness of convergence can

projects.

3.4

3.4.1 ***Stages of Information Analysis***

project. The first stage was to agree an information classification scheme, as described in paragraph 3.3 so that all analysts and subsequent users of the SAAM shared a common view of

catalogue of information category names and descriptions. This was achieved firstly by logically rationalising the AOA and SUN information catalogues and then refining this by relating the

catalogues.

An understanding of the utility of the information contained in the catalogues, when related to

SAAM catalogue, known as the SAAM information repository has been refined throughout the

project. Once in possession of the SAAM catalogue and the MooD SAAM activities the mapping of information categories as activity inputs and outputs was completed to form the SAAM information architecture.

Figure 17 below illustrates the information analysis method adopted. There are four key stages to the method:

- Definition of the Information Taxonomy.
- Associating information product elements with information categories.
- Development of the SAAM Information Repository.
- Development of the SAAM Information Architecture.

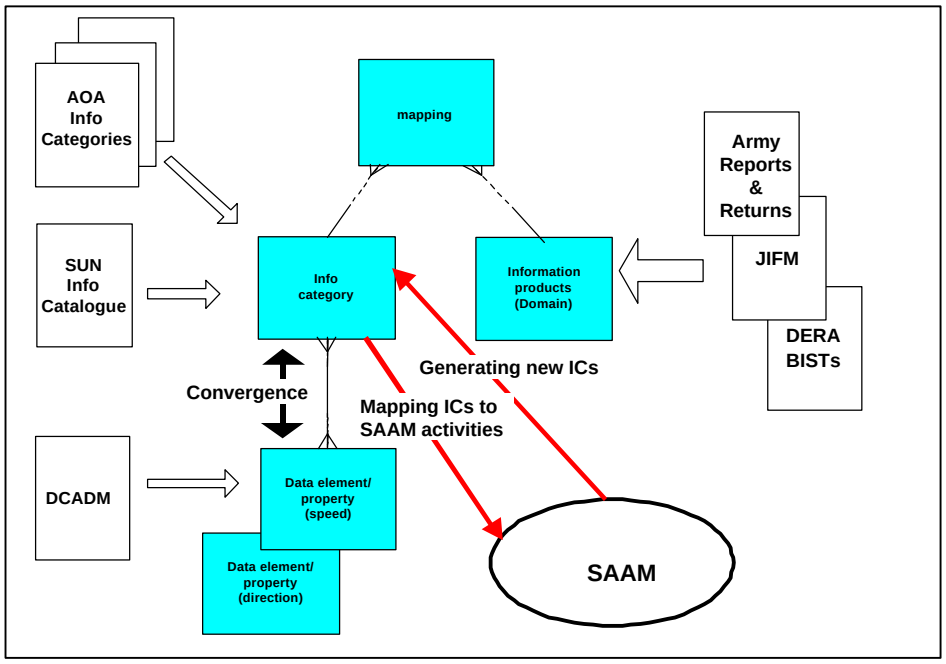


Figure 17. The Information Analysis Method

Appendix B describes how by using Airspace Control as an example, information categories were rationalised from the existing AOA and SUN work and enhanced where appropriate.

3.4.2 *Defining the Information Taxonomy*

The taxonomy details the framework for producing the SAAM information architecture. Its completion was essential to ensure that a consistent method was adopted in the development and refinement of the information catalogue. An illustration of the taxonomy produced together with an explanation of the relationships between its comprising elements has been provided in paragraph 3.2.

3.4.3 *Associating Information Product Elements with Information Categories*

The existing information product elements help identify information categories by both name and description. It was felt that an analysis of the operational products would enhance the descriptions of AOA categories and provide an in-depth understanding of how to develop and use the catalogue during the information analysis. A list of information products/information categories were obtained from the following sources:

- JIFM.
- DERA BIST descriptions.
- Army reports and returns.
- SUN Information Catalogue.
- AOA Version 1.0.

The information products were examined to establish which of the existing information categories, contained within either the AOA or SUN catalogues, most closely corresponded to each of the information product elements. Depending on the degree of correlation one of the following actions was taken:

- Where a direct correlation was found between the category description and information product element an association was created to the appropriate AOA or SUN category and no further action taken. These associations can be used in engineering new information products envisaged in follow on work.
- Where an appropriate AOA or SUN category was present, but deemed to require clarification, then the information product element names together with any qualifying comments were included with the category association. These details will allow the relevant category descriptions to be refined at a later stage.
- Where no appropriate AOA or SUN sub-category existed, information product elements were associated with the most closely related high level category. Clarifying information was included with the association so as to allow the creation of new sub-categories at the appropriate time.

An example of the results of the association of the selected JIFM product elements to AOA/SUN categories is in Appendix C.

3.4.4 *Development of the SAAM Information Repository*

Having associated various information product elements with the appropriate categories found either within the AOA or SUN activity models, the category hierarchies defined within each model were compared. Categories from the two separate models were combined with, or subsumed by, categories defined within the other to create the initial SAAM Information Repository.

3.4.5 ***Development of the SAAM Information Architecture***

The initial SAAM Information Catalogue was imported into MooD as an Object Hierarchy. Once within this tool it was utilised to categorise the Information Inputs and Information Outputs for the modelled activities thus creating the SAAM Information Architecture. This information was recorded using MooD Object Association Models (see Figure 18). The SSM equivalent terminology is shown in brackets. The Object Association Models were then automatically interrogated and the results presented as the Activity Information Category Inputs and Outputs on the North half of a Maltese cross.

The process of categorising information flows identified a number of refinements to category names that were later applied to the catalogue.

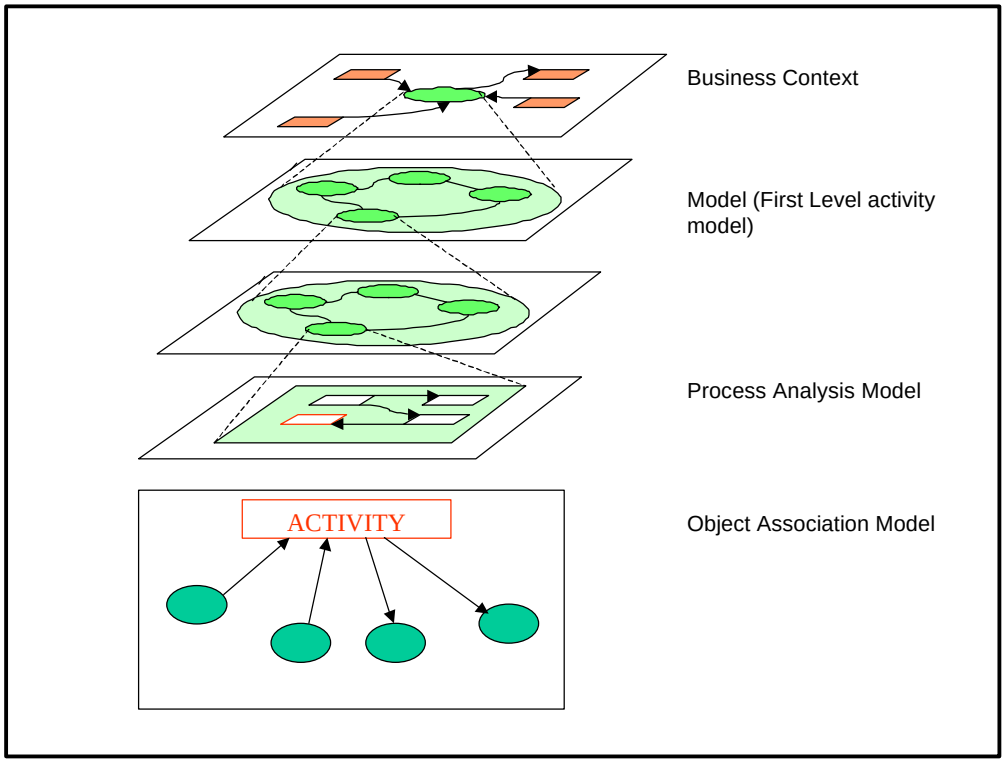
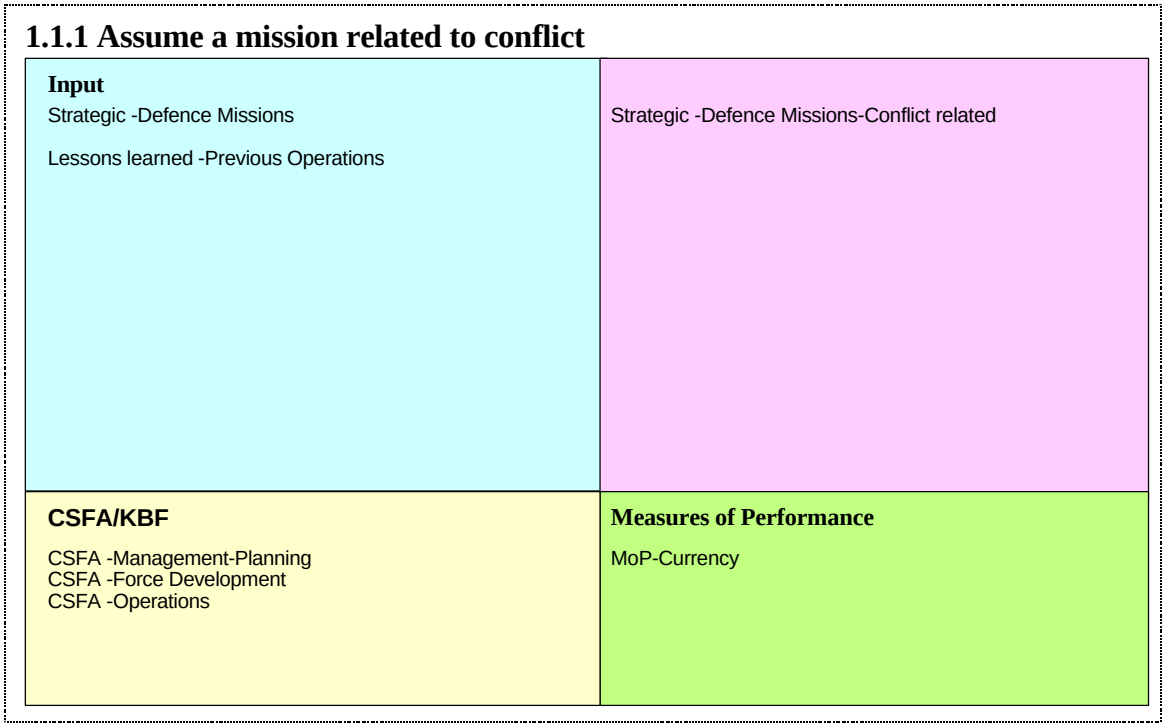


Figure 18. Activity Information Capture using MooD

Capturing inputs and outputs in MooD is achieved by assigning a service to an Object. For each *consumed* or , or in the case of MoP, *measured by* *performed by*. It was by this method that the northern half of the

Within MooD the Object Association Model is presented as shown in Figure 19. The actual links and object diagrams are hidden.



Version 0.1

4. Validation, Evaluation and Exploitation of the SAAM

Version 1.0 of the AOA was subject to rigorous validation, in order to ensure that the models

organisation which the Army was defined to be in top-level planning and doctrinal documents. The activities within the model were also subject to evaluation to identify those, which might

improved tempo of operations. Subject matter experts from all areas of the Army carried out both validation and evaluation. The SAAM was built by reusing as much of AOA V1.0 as

these areas of the model. Nevertheless, it is intended that the SAAM will be subject to similar rigorous validation and evaluation where necessary.

Component should do and what information is required or produced by these activities, can inform a whole series of analyses by owners of Lines of Development and those responsible for information management, organisational design and the provision of coherent information

against actual (ie “real world”) organisations, information requirements, systems and SOPs.

[7] Lines of Development identify the key areas and functions, which will drive the move to the Future Army. In the

The SAAM then provides a coherent and consistent over-arching Army-wide environment (or context) within which, lower level analyses can take place; a simple analogy is to that of the picture on the box of the jigsaw. The SAAM provides a coherent and consistent view of the wider environment into which the individual pieces of the jigsaw, be this related to operations, an information system, organisation or indeed doctrinal or force development issue, should fit. Examples of these analyses include:

- Support to production of Statements of User Needs (the actual SUN consisting also of textual descriptions – ie Concepts of Use).
- Doctrinal development.
- Capability gap/overlap analysis.
- Force Development.
- Information Management.
- Information system applications design.
- Information services design.
- Organisational structure design.
- Process improvement.
- Performance (efficacy, efficiency, effectiveness) monitoring of activities.

In general, analyses will be conducted by "instantiating" the conceptual model into the real world. Given that the models are designed to be robust and have longevity, it is desirable that real world, and hence rapidly changing, data is not recorded in the actual model since this would then become monolithic and difficult to maintain. Ideally, real-world information should be linked to the model through one of the properties associated with the conceptual activity in the model. For example, in the diagram below, the real-world organisations of the G2 Intelligence Cell at say Division or the G2/G3 cell at Brigade can be linked to a generic activity within the model of "Collating Sources of Information". The link is via the real-world function of G2 Int, which we can map to a generic function (the CSFA), Intelligence, which is one of the properties associated with activities in the model. If, in the real world, staff functions are reorganised, and say G2 Int became X21, then all that we need change is the association (ie the link from the real to the conceptual world) between the CSFA of Intelligence and G2 Int to X21, and not ever single instance of where G2 Int occurs in the real-world instantiation of the model.

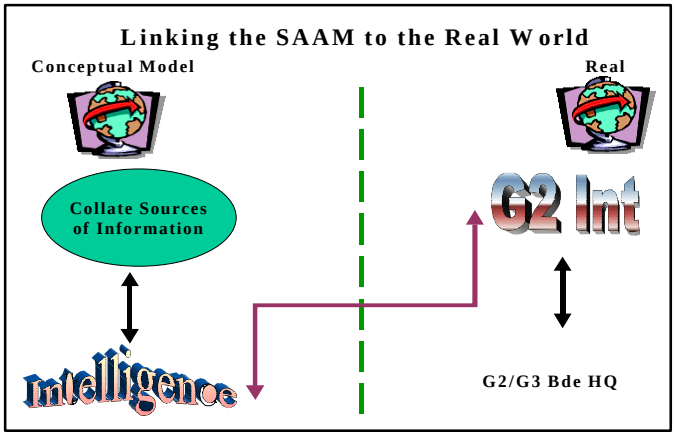


Figure 20. Linking the SAAM to the Real World

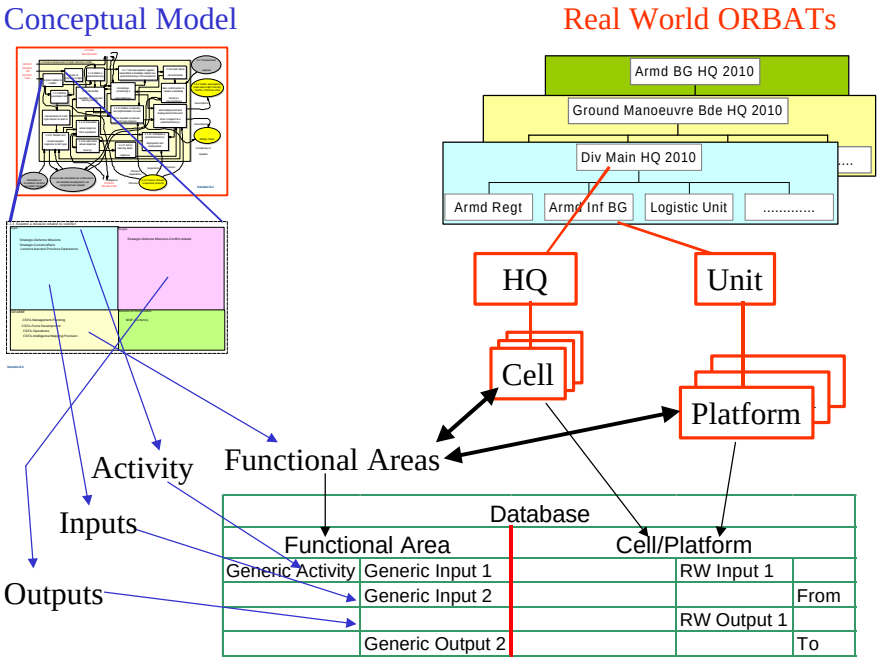


Figure 21. Potential Exploitation of the SAAM by mapping the Real World to the Conceptual Model

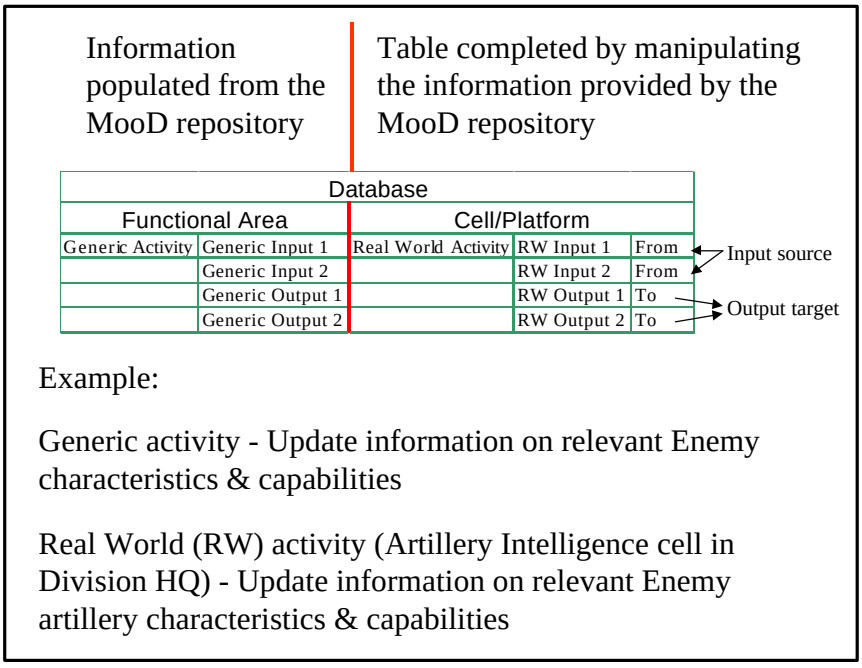


Figure 22. Example of Mapping Real World to Conceptual Model

A key enabler to the Federation of systems for Joint Battlespace Digitization is an understanding of anticipated information needs and information flows across the battlespace. It is recognised by the Central Staff responsible for determining these needs in Joint CIS projects that the

understanding had to be traceably derived from military processes in developing Operational Architectures for the Joint and single Service environments. Figure 23 illustrates how the work from the relevant Operational Architectures is related to the work in developing the JIFM. Currently the linkage to the JIFM is through a common description of business function areas and information categories, which have been linked to information products. The SAAM work has already identified the need for a number of additional Key Business Functions (KBFs) in the JIFM (CFSAs in the SAAM) to adequately describe the Army's business. Further work is needed in the JIFM to provide the linkage to Operational Architectures.

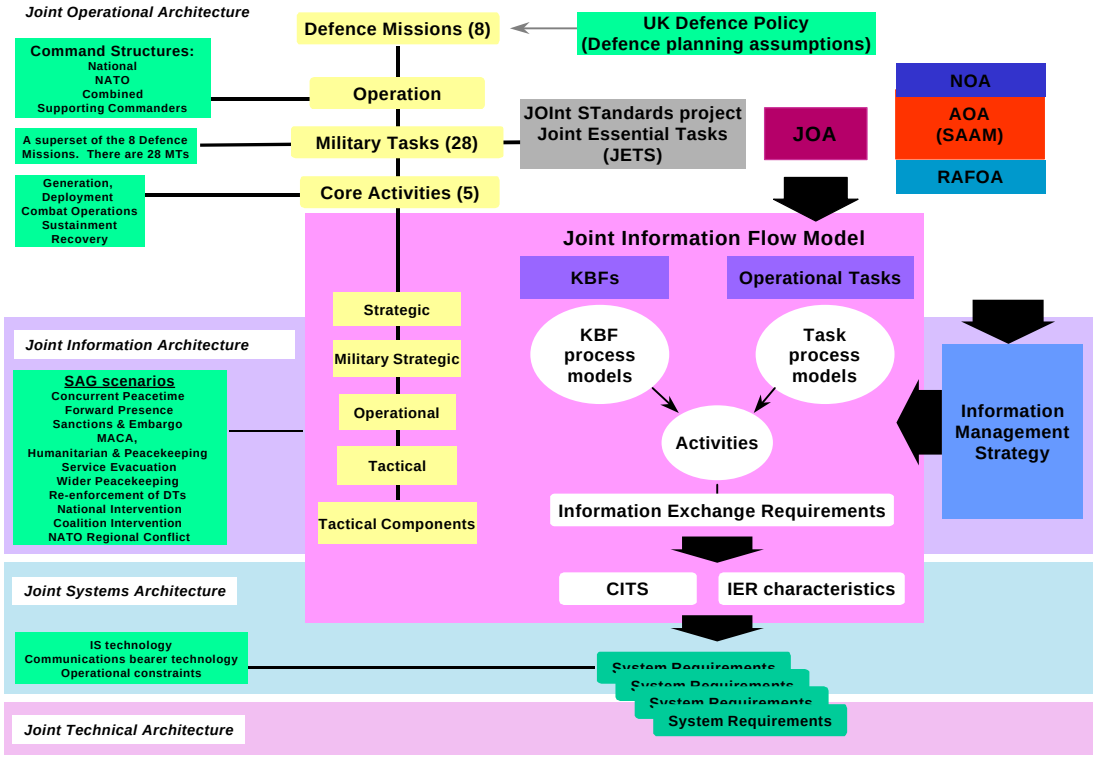


Figure 23. Relationship of Operational Architectures to JIFM

4.1 Future Work

It is proposed that as well as exploiting the SAAM in its current format that the SAAM will be migrated to MooD Version 4.0, which the AOA staff, are currently evaluating prior to release. MooD 4.0 will offer significant advantages in developing the information flows at all levels unlike MooD 3.32, which only allowed objects to be associated at the Process Activity Model level. This is illustrated in Figure 24, which highlights a selected activity at the Process, Capability Model level, the information required on the logical links and the associated information categories and the changed state of an object. In addition scenarios can be developed in MooD 4.0.

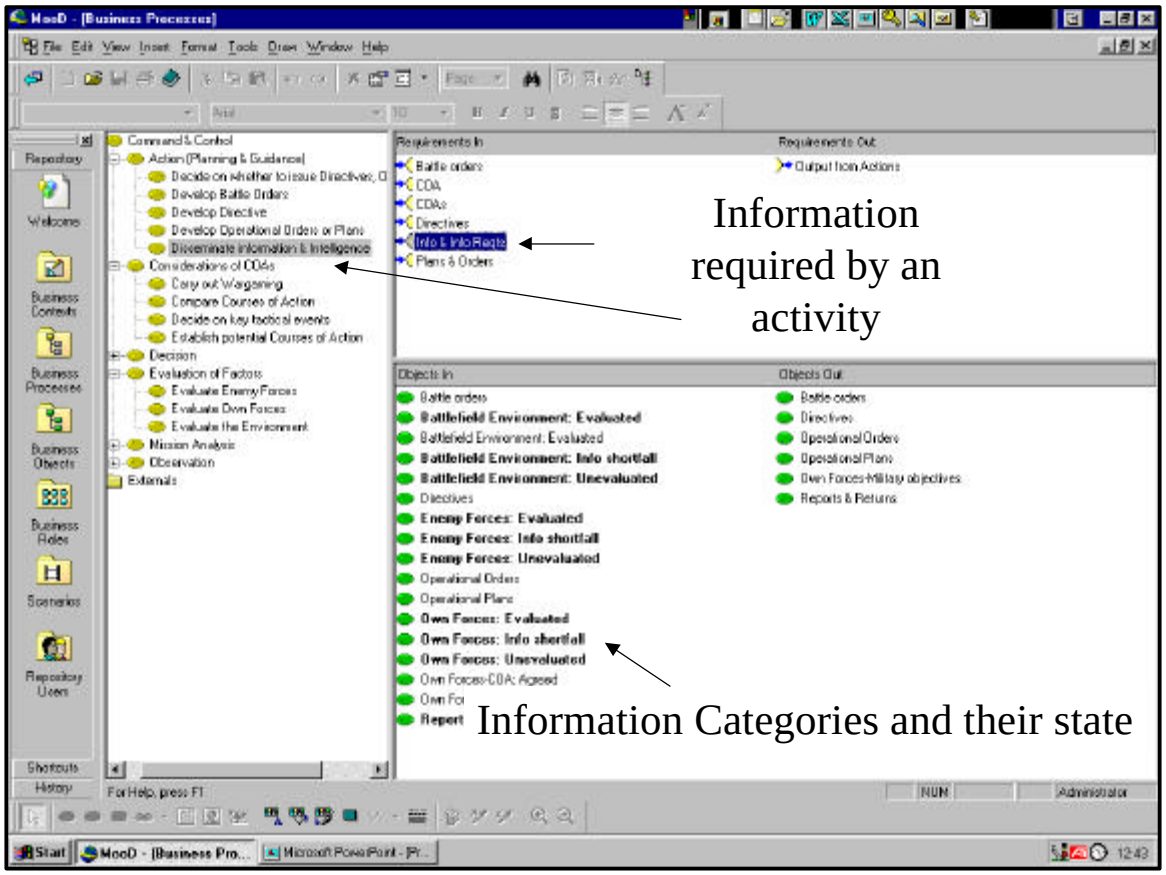


Figure 24. Screenshot from MooD 4.0 (Beta 2 Release)

5. Lessons Learnt

A number of lessons have been learnt in the process of building the SAAM and its Information Architecture.

- The need to have a multi-disciplinary team involved in the process at the outset, with the customer maintaining control of the project. This creates a greater risk on the part of the customer but ensures that the work remains focussed. This was particularly important in developing the conceptual model's, as it was too easy to begin to focus on the real world of *how* things are done not *what* should be done.
- All members of the team needed to be familiar with SSM and how to use the MooD Case-tool at the outset given that the project had only 3 months in which to complete the initial work.
- An understanding of doctrine and awareness of future concepts.
- Maintaining links with the other Sectors and staff in the Defence/Joint environment so that they are aware of the work being undertaken.

6. Acknowledgements

- Dr Brian Wilson for his initial support in developing the Root Definitions and Level 1 CPTM and kind permission to reproduce the Overview of SSM at Appendix A.

- Dr Dick Whittington and staff at the Salamander Organisation Limited for their advice and support in the use of MooD.
- Maj H Duncan for the work involved in developing the SUN Models Version 4.1 and his pioneering of the methods too fully exploit the MooD Case-tool.
- Maj Mark Old for his support in building the SAAM and Information Architecture.
- Maj Mark Thurlow and staff at the Army Data Services for their active participation in developing the Information Taxonomy.
- Mr R Dines from DERA for his support in developing the CSFAs in the SAAM, which were derived in part from his involvement in JIFM.
- Staff from the Smith Group and Hi-Q Systems who supported the team in delivering the end product in a short timeframe.

7. Appendices

A. An Overview of Soft Systems Methodology
B. Example of Applying Information Analysis Method to Airspace Control
C. Example of Product Mapping to Information Categories

8. References

[Wilson, 1992] Dr. Brian Wilson *Systems: Concepts, Methodologies and Applications*. Second Edition, John Wiley & Sons (ISBN 0-471-92716-3).

Appendix A

An Overview of Soft Systems Methodology
(A method for the analysis and definition of information requirements)

1. Introduction

Soft Systems Methodology (SSM) is, in reality, a set of methodologies. Each methodology is represented by a set of ideas (concepts) structured in such a way that their use is appropriate to the situation being analysed. The use of SSM as a powerful problem-solving tool requires this flexibility. Each situation is unique and hence the methodology must be tailored to fit the situation and also the style of the analyst using it. Application of this kind is a sophisticated use of SSM and the analysts need to develop the ability to be so flexible as a result of considerable experience in a variety of situations. However a few standard methodologies have been developed as a result of the experience of practitioners such as Peter Checkland and Brian Wilson and these have general applicability for particular types of situation, such as Information Requirements Analysis, Role Exploration, Issue Resolution and Re-organisation. An overview of the Checkland Methodology is shown in the diagram at Figure 1.

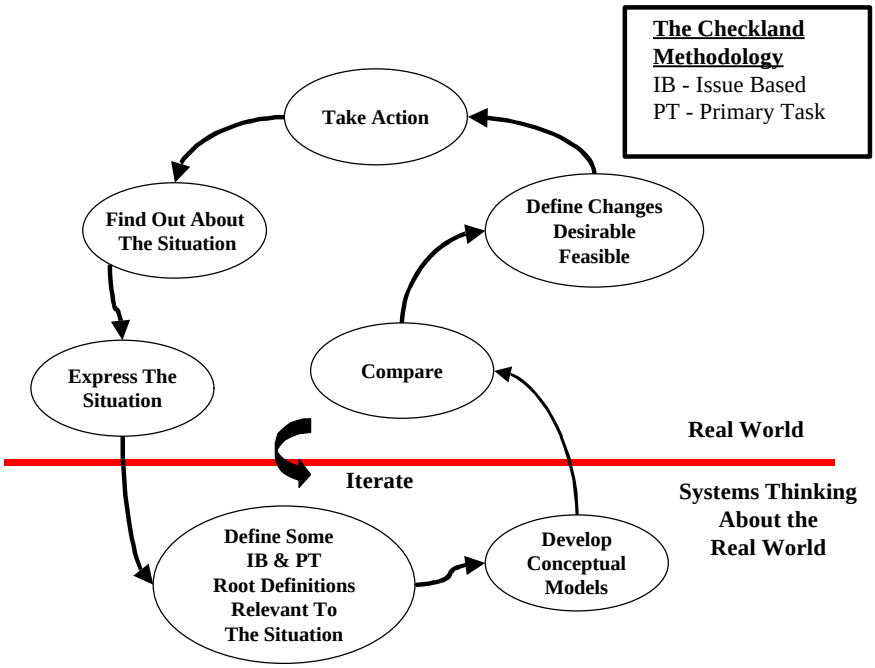


Figure 1. The Checkland Methodology

An overview of the information-oriented version is shown at Figure 2.

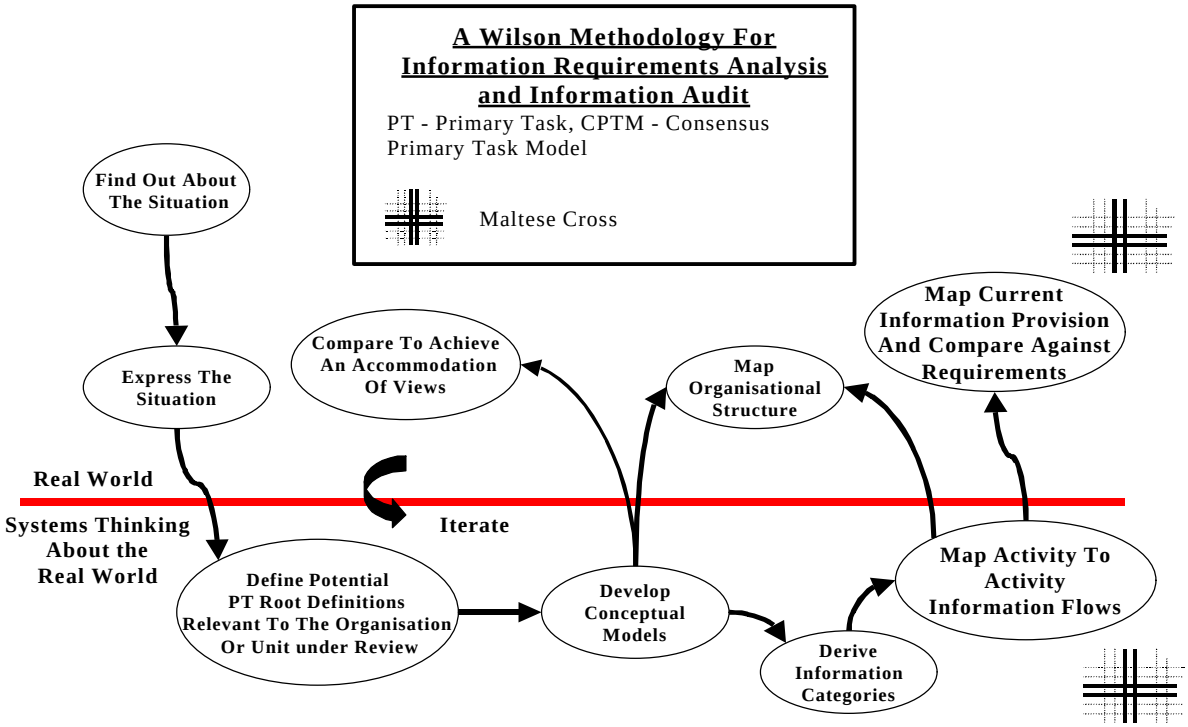


Figure 2. The Wilson Methodology

2. **Why is the Soft Systems Methodology useful?**

Approaches to systems development often fail to satisfy users' problems and requirements. Both the problems are not understood, or not identified, and therefore the information requirements which are supposed to address these problems are inappropriate, or at worst, not known. The secret to successful systems development is in understanding the users' situation, the problems associated with it and correctly identifying the information requirements. Often the problem is knowing what the problem is, and resolving conflicting views of problems and requirements between users. SSM addresses all these issues in the analysis and definition of information requirements.

Specifying information requirements relating to a business area is complicated. Information was confused with data and what are commonly referred to, as information systems are really data processing systems. If we take the definition of information to be:

"Data together with the meaning ascribed to the data"

Then we can develop a process of defining information requirements. This is based upon an analysis of how the data is used in supporting business processes. The SSM essentially supports the process of analysis of information requirements.

When we describe a set of business processes necessary for the achievement of a business objective further complications will arise; different individuals will interpret the objective in different ways. If, for example, we are developing information support for a prison, the set of business processes will vary depending on what we take the purpose of a prison to be.

We could take its purpose to be:

- To control the interactions of offenders and the community (a security perspective) or alternatively:
- To instill society's norms and values (a rehabilitation perspective)

Clearly the set of business processes required (and therefore the information support) would be vastly different in the two cases. In reality a prison is not any of these but is a mixture of these and other perspectives. However, different individuals will subscribe to different mixtures. This example, although extreme, represents the situation in all businesses though the differences may be subtler.

3. What does the Soft Systems Methodology provide?

- An explicit, organised and defensible way of reconciling different and/or conflicting perspectives
- The means to build a model of business processes appropriate to the users within the area of concern.

4. The Use of the Methodology

The methodology starts with the construction of a "rich picture' of the situation in which some concern has been expressed or in which some kind of information system is desirable. This identifies those organisational entities relevant to the investigation. It illustrates the inter-relationships of material, information and other resources, in addition to the features of the situation, which give rise to the concern or request. Features of the social situation such as inter-personal conflict, views of the situation etc. may have a significant impact on the conduct and outcome of the study and should be considered.

After this initial study the next stage in the method is to use the knowledge gained by the construction of the picture to derive a model representing the business processes which accommodate the many perspectives and issues.

It is assumed that whatever the business is about individuals within it will play a meaningful role. Their roles and purposes may well be different because of the many perspectives described above but they will not be acting randomly or without purpose. Their function is therefore significant and relevant to the development of the system.

Carefully structured definitions known as Root Definitions are built which state the purpose of the system, for each of the different user perceptions identified. Purposeful activity models (known as conceptual models) are developed next to represent this set of perspectives. These are built to form logical descriptions of what must be done to achieve the objective contained in each of the Root Definitions. These models then are not models of the situation but are modelling the perceptions of the situation.

A number of techniques are used within the methodology to assist in the analysis and definition of information requirements. The building of a rich picture, the organisational mapping (defining responsibilities for activities) and the Maltese Cross (which allows comparison between the information systems required and those already in existence) are all valuable techniques.

5. **How are the products of SSM used?**

The models may be used in several ways:

- To compare against reality in order to make recommendations for procedural change which can be argued to be beneficial.
- To form a single model, reconciling the many perspectives, representing a 'taken-to-be' description of a business area.
- To compare this model against reality in order to re-define roles and organisational structures.
- To use this model as a source of information requirements to support the business area.

This last approach is particularly useful when developing an information strategy within an organisation or carrying out an audit of current information support for a business area. It is also recommended to be used as an initial analysis for systems development projects using structured methods such as SSADM (Structured Systems Analysis and Design Methodology).

The rich picture provides the context of the situation in which such a development is taking place. The analysis identifies the organisational change, which is necessary to effectively incorporate the development. It also confirms, or otherwise, whether the proposed development is feasible, appropriate and if it should approved.

The SSM is a powerful, rigorous and prescriptive approach providing a sound foundation for proposed information systems development, with clearly defined

Appendix B

Example of Applying Information Analysis Method to Airspace Control Function

1. Introduction

The focus for the example has been taken from the Airspace Control function, due to its "Joint" flavor and the availability of a Short Range Air Defence (SHORAD) activity model. Several of the main activities in this function, of relevance to this example, are shown below underlined:

Control of AD Fire (High-Medium Altitude AD (HIMAD), SHORAD, AD Fighters):
Weapon Control State (WCS);
Arcs of fire;
Co-ordination with Joint Force (JF) AD, Operational Commander;
Use of Mobility Corridors for friendly forces Fixed Wing/Rotary Wing (FW/RW);
Control of Indirect Fire, BATES (Battlefield Artillery Target Engagement System) Messages:
SPRT GEOM (Support Geometry);
SPRT ACA (Support Airspace Control Authority);
Friendly Force Operations:
Manoeuvre;
All Arms AD (AAAD).

The following example of the SAAM information analysis is described using the four stages described in paragraph 3.4 in the main paper.

2. Definition of the Information Taxonomy

The informational relational terms expounded in paragraph 3.2 in the main paper are followed.

3. Associating Information Product Elements with Information Categories

3.1 *Identifying Information Products*

The following Information Products from the JIFM were identified as being relevant to this example:

Orders operations

- ACO (Airspace Control Order)
- ATM (Air Tasking Message)
- ATO (Air Tasking Order) Multinational
- ATO National
- Operation Order
- Call for fire message
- Movement Orders

The example relates to Control of Airspace in the context of SHORAD, WCS and Mobility Corridors for friendly RW/FW. The ACO product is identified as being most relevant and is selected for further analysis.

In addition to identifying the ACO information products within JIFM, the use of the ACO in the Air Defence Control BIST was also considered.

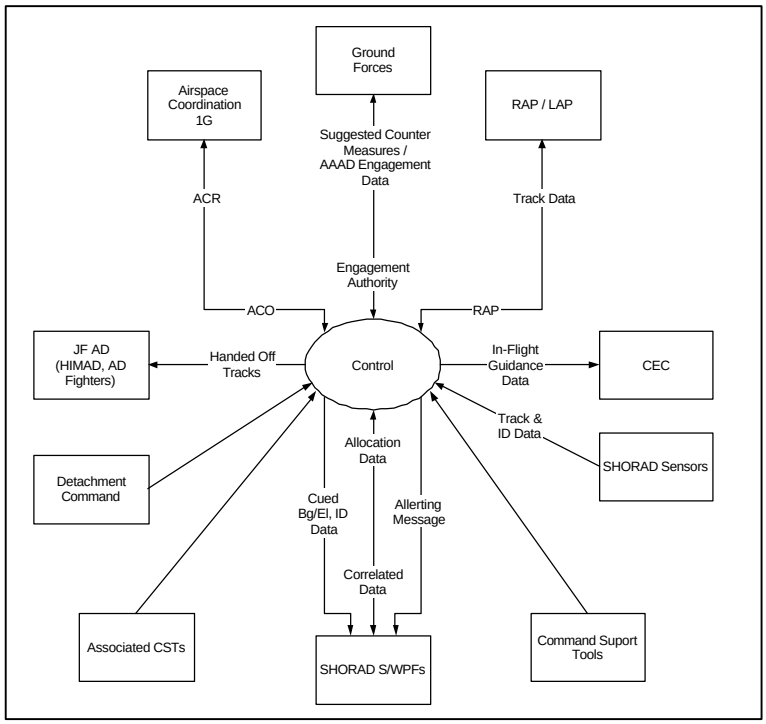


Figure 1. Air Defence Control BIST

Having identified the relevant Information Products it is necessary to examine the individual Information Product Elements. Examining the JIFM identified the following elements of the ACO Information Product:

- ACO Identifier
- Controlling Authority
- Area
- Period
- ACM
- Type
- Dimensions

The Air Defence Control BIST Definition and Data flow diagrams were also examined in limited detail. This cursory inspection did not identify any additional elements to the ACO Information Product.

4. **Identifying relevant AOA or SUN Information Categories**

The method advocates inspection of the AOA and SUN catalogues to identify categories for information product elements. In its simplest form this requires a syntactical comparison using key words such as “Air movement” or “Airspace”. This procedure identified the categories shown in Table 1.

AOA	SUN
Operations Manoeuvre Movement *Air movement corridors*: Locations Threats Hazards Cover Possible Diversions	Control measures *Airspace control measures*

Table 1. Comparison of AOA and SUN Information Categories

Applying domain knowledge, together with a familiarity with Information Category names, it was possible to identify additional categories that although without syntactical similarity, were the most appropriate to the Information Product Elements in question. This process allowed the following associations to be established between Information Product Elements and Information Categories and is highlighted in Table 2.

Information Product Element (JIFM)	Description (JIFM)	Identified Category AOA / SUN	Type of association
Controlling Authority	Controlling Authority	TASKORG-Formation-Superior HQ	Closest available Category but requires the inclusion of a sub-category.
Area	Applicable Area	Operations-Named Area of Interest	Appropriate Category that requires refinement to category description.
Period	Effective Duration	Mission-Coord instrs	Appropriate Category that requires refinement to category description.
Airspace Control Measure (ACM) Type	ACM Type	Operations-Movement-Air Corridors	Appropriate Category no action required.
ACM Dimension	ACM Dimension	Operations-Movement-Air Corridors	Appropriate Category no action required.

Table 2. Initial information product to category association

5. **Development of the SAAM Information Repository (Catalogue)**

The method rationalised the AOA and SUN categories and formed the SAAM Catalogue. This was developed, in the context of the ACO example, using the results from the "Type of Association" shown in Table 2 and produced the SAAM Information Categories shown in Table 3.

Identified Category (AOA / SUN)	**SAAM Category / Description**
TASKORG-Formation-Superior HQ	Own Forces – Mission – Task Organisation – Originator
Operations-Named Area of Interest	Own Forces – Ops – Named Area of Interest; description now includes "(e.g. applicable area for Airspace control)"
Mission-Coord Instrs	Own Forces – Mission – Coord Instrs; description now includes " (e.g. effective duration for Airspace control)"
Operations-Movement-Air Corridors	Own Forces - Operations-Movement-Air Corridors
Operations-Movement-Air Corridors	Own Forces - Operations-Movement-Air Corridors

Table 3. SAAM Catalogue Information Categories

6. **Development of the SAAM Information Architecture**

A number of activities exist within the SAAM relating to Airspace control. The particular activity selected for further analysis was the SAAM/SHORAD Activity "Derive Potential Courses of Action (COAs)". There are a number of techniques that could be used to associate information categories with activities. In this instance the "Use Case" technique from the Booch Object Oriented Design method was chosen. Potential "airspace control" information categories are italicised.

Use Case 4.3: Derive Potential Courses of Action to achieve mission and provide required protection
Actor: Commander AD, AD Regt CO, AD Battery Commander
Pre-Condition: Extracted Orders. **(2.3)**
Description: Assess the current tactical situation (Land, Sea & Air).
Perform SHORAD Intelligence Preparation of the Battlefield (IPB) Process (3.2)
For each task:
Assess the AD assets system capabilities (13.2).
Assess the deployment posture: defence, attrition or ambush.
Assess current Emission Control (EMCON) State and it's effect.
Assess current ***Airspace / (WCS)*** and it's effect.
Assess logistic support, missiles, re-supply and maintenance support for each asset.
Assess communications connectivity.

Assess the need for additional AD assets from Superior Comd.
Determine the optimum mix of allocated AD assets (13.4).
Derive potential Degree of Protection achievable for task(s) under each deployment option.
Assess contribution to ***Counter Air Campaign*** for each deployment option.
Assemble candidate deployment options.
Post-condition: Candidate deployment options.

The Use Case consists of a textual description of all the processes/tasks involved in a given information flow. The nouns identified in such a description equate to the Objects (and attributes) required in an Object Oriented Design, but for the purposes of the SAAM Catalogue can be seen to identify the required Categories. Here the categories would be information inputs to the activity “derive potential course of action”.

Appendix C

Examples of Product to Information Category Mapping

Product	Category	Comments
Generic Product: Analysis General		
Specific Product: Assessment	Enemy-Capabilities	
	Enemy-Intentions	INTSUM (103)
	Management/control-Performance Categories	
	Measurement of Fighting Power	
	Operational Planning	
	Structure/strength	
Generic Product: Analysis Operations		
Specific Product: Cabinet document	Civilians	Deployment of..
	Deployability-Concurrent ops-Duration	6 month
	Deployability-Force generation assets	Recommend force level changes
	Deployability-Reserve activation plan	Review NTM for Reinforcements
	Environment-NBC	NBC Policy
	Geo-political	Ministerial Briefings
	Geo-political-Inter-service/allied	Cooperation
	Geo-political-Local culture/religious	Cooperation with Host Nation
	Geo-political-Political-Constraints on missions	HMG's Political Objectives and Strategic end state
	Image/ethos-Public empathy-PR	P Info
	Incidents	Briefings on breaches of agreements
	Legal	International law
	Legal-Govt Imperative	Impact on mission
	Legal-Negotiations-Impact on ops	
	Management/control	Financial accounting
	Media-Current policy	
	Mission-Comd's intent	"Strategic Direction by CDS"

Product	Category	Comments
	Mission-Military objectives	
	Mission-Priority tasks	Intelligence, Mil Deception, PsyOps
	Mission-Priority tasks-EW	
	Mission-Priority tasks-Fire Support	Targeting
	Mission-Task organisation	"Assigned Forces", "Command Relationships"
	Operational Planning	Commitments, Constraints,
	Operational Planning-Planning	Contingency planning
	Operations-Coalition-ROE	
	Operations-Named Area of Interest-Theatre	Deployment outside TAOR to be cleared of ops
	Own Forces-Capabilities-PsyOps	
	Own Forces-Pers-Burials	Repatriation of the dead
	Own Forces-Pers-PoW	
	Perceptions	
	Protection-Military	Deception
	Protection-OPSEC	
	Protection-Physical	Destruction
	Sustainability-Medical Services	Casualty Policy
Specific Product: OA Lessons	Doctrine-Lessons learned	
Generic Product: Orders Operations		
Specific Product: ACO	Mission-Cord instrs	Effective Duration
	Operations-Movement-Air Corridors	ACM Type, Dimensions
	Operations-Named Area of Interest	Applicable area
	TASKORG-Formation-Superior HQ	Controlling Authority
Specific Product: ATM	Equipment-Aircraft-Fixed Wing	Type of aircraft
	Equipment-Weapons	Armament
	Mission-Priority tasks	Tactical air task details
	Own Forces-Locations	
	Target-Engagement-Method	TOT/ASAP/NLT, control, in-flight report
	TASKORG-Formation-Level	Sqn/Wing

Product	Category	Comments
	TASKORG-Formation-Type	Number of aircraft
Specific Product: ATO Multinational	Mission-Priority tasks	Offensive Air and SH sorties
	Operations	Air situation (superiority/parity)
	Operations-Coalition	
Specific Product: ATO National	Mission-Priority tasks	Offensive Air and SH sorties
	Operations	Air situation (superiority/parity)
Specific Product: FRAGOs	Enemy	
	Management of Information-Information-Sinks	"Distribution of FRAGO to subordinates"
	Mission	
	Mission-Concept of ops	
	Mission-Cord instrs	
	Mission-Priority tasks	Own force tasks
	Operations	Op overlay
	Operations-Command support	Command and Signals
	Operations-CSS	Service Support
	Own Forces	Including "neighbouring formations"
	TASKORG	
Specific Product: Op Order	Deployability-Concurrent ops-Op locs	"HQ Locs"
	Deployability-Priority and objectives	"HQ Movement details"
	Enemy	"Air activity"
	Enemy-Capabilities	"Strengths"
	Enemy-Capabilities-Fighting	
	Enemy-Capabilities-Mobility/C Mob	
	Enemy-Dispositions	
	Enemy-Intentions	
	Enemy-Locs	
	Enemy-ORBAT	"Identities" "composition"
	Management of Information-Information-Sinks	"Distribution of Op O to subordinates", "Signature
	Management of Information-Information-Sources	"Place of issue", "Copy#", "File #", "Refs"
	Mission	

Product	Category	Comments
	Mission-Concept of ops	Includes "scheme of manoeuvre" and "Main effort"
	Mission-Constraints	"Critical support plans"
	Mission-Cord instrs	"General, def ops, off ops, transitional phase, timing
	Mission-Priority tasks	"Manoeuvre force tasks, "air tasks"
	Mission-Priority tasks-DF	"Avn"
	Mission-Priority tasks-EW	
	Mission-Priority tasks-Fire Support	"Arty comd rels", "arty tac tasking" "fire plan"
	Mission-Priority tasks-IW	
	Mission-Priority tasks-Protection	"AD", "Engr"
	Operations	Op overlay includes Map Refs
	Operations-Command support	Command and Signals
	Operations-CSS	Service Support
	Operations-CSS-Critical shortages	"Critical supplies"
	Operations-Movement-Capability	"Movement table", "by-passing policy"
	Operations-ROE	"Recognition and Identification instructions"
	Operations-Security reqts	"Protective Marking", "Ack", "Authentication"
	Own Forces	Including "neighbouring formations", "air situation
	Own Forces-Capabilities-Construction	"Defence stores"
	Own Forces-Capabilities-Liaison	"Liaison channels"
	Own Forces-Capabilities-Surveillance	Counter Surveillance Measures"
	Own Forces-Leaders	"Alternative Commander"
	Own Forces-Use of EM spectrum	"CEI", "Codewords", "Nicknames"
	Own Forces-Use of EM spectrum-EMCON measures	
	TASKORG	Including "Time zone", "related OPO number"