DEFENCE MATERIEL ORGANISATION

CAPABILITY DEFINITION DOCUMENTS GUIDE

Incorporating:

Guidance for the Preparation of the;

i. Operational Concept Document (OCD),
ii. Function and Performance Specification (FPS), and
iii. Test Concept Document (TCD).

Version 1.1
November 2002

Sponsored by Director General Materiel Management Policy and Services

AMENDMENT CERTIFICATE

Proposals for amendment of the DMO's Capability Definition Documents Guide are to be forwarded to:

DGMPS
R2-6-C063
Russell Offices
Canberra ACT 2600

Amendment		**Effected**	
No	Date	Signature	Date
1.1	Nov 2002		

DEFENCE MATERIEL ORGANISATION

Guidance for the Preparation of an OCD, FPS and TCD

'Guidance for the Preparation of an OCD, FPS and TCD' is issued for use as guidance in developing the Operational Concept Document, Function and Performance Specification and Test Concepts Document as specified by the Capability Systems Life Cycle Management Guide 2001, December 2001.

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November 2002

For **assistance** with OCD, FPS and TCD development can be obtained from the MPS Helpdesk on: (02) 6265 2000

GUIDANCE FOR THE PREPARATION OF AN OCD, FPS AND TCD

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1 SCOPE

The purpose of this document is to provide guidance for the preparation of the set of documents that forms the basis of agreement of requirements between Capability Staff, Knowledge Staff and the Defence Materiel Organisation. These documents consist of:

a. an Operational Concept Document (OCD);

b. a Function and Performance Specification (FPS); and

c. a Test Concepts Document (TCD).

2 REFERENCED DOCUMENTS

ANSI/EIA-632-1998	Processes for Engineering a System
ASDEFCON	Australian Defence Contracting - Strategic Materiel, pro-forma Request For Tender (RFT)
CSLCMG	Capability Systems Life Cycle Management Guide 2001, December 2001
	D. Gause and G. Weinberg, Exploring Requirements: Quality before Design, Dorset House, 1989
DAF	Defence Architecture Framework, http://www.defence.gov.au/dhq/cko/archmain.htm
DID-ENG-DEF-OCD-VG	ASDEFCON Data Item Description, Operational Concept Document
DID-ENG-DEF-TCD-VB	ASDEFCON Data Item Description, Test Concept Document
DI-IPSC-81431A	Data Item Description, System / Sub-system Specification (SSS), from MIL-STD-498
	G. Kotonya and I. Somerville, Requirements Engineering: Processes and Techniques, Wiley, 1998
PRP UI2063	Support Test Concept Document (TCD) Development

3 DEFINITIONS AND ABBREVIATIONS

3.1 Definitions

3.1.1 The following definitions are used in this document:

Acceptance Into Service	Is the acceptance of a system into operational use.
Architecture	Is the structure of components, their interrelationships, and the principle guidelines governing their design and evolution over time.
Contractual Delivery	Is the acceptance, by the acquisition organisation, that a system has met the requirements of the contract.
In Service Date	Is the year in which a project will deliver its Initial Operational Capability (IOC).
Mission System	Is that element of the capability that directly performs the operational function.
Support System	Is the sum of the existing support infrastructure (including that of the Commonwealth, contractors and subcontractors) and the additional support elements being generated under acquisition contract(s) to enable

	the Mission System to be effectively supported so that it can meet its operational requirements.
warfighter	In order to differentiate between external users of the system and internal users of the system (eg. operators as part of the system), this document uses the term warfighter to describe the external users. This group may not be warfighters per se but they are involved in tasking the capability, receiving its outputs or requiring its outcomes to achieve their purpose.
Year of Decision	Is the budget year in which it is planned the government will approve capital expenditure for a Major Capital Investment (MCI) project.

3.2 Abbreviations

3.2.1 The following abbreviations are used in this document:

ADF	Australian Defence Force
AEW&C	Airborne Early Warning and Control
AII	Australian Industry Involvement
AIPS	Australian Illustrative Planning Scenarios
AIS	Acceptance Into Service
AT&E	Acceptance Test and Evaluation
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CBT	Computer-Based Training
CD	Contractual Delivery
COD	Capability Options Document
COI	Critical Operational Issues
CONOPS	Concept of Operations
CS	Capability Staff
CS/KS	Capability Systems / Knowledge Systems
CSCI	Computer Software Configuration Item
CTP	Critical Technical Parameters
CV	Common View (of DAF)
DAF	Defence Architecture Framework
DCIC	Defence Capability Investment Committee
DMO	Defence Materiel Organisation
DT&E	Developmental Test and Evaluation
EA	Evolutionary Acquisition
EFFBD	Enhanced Functional Flow Block Diagram
FPS	Function and Performance Specification
GFE	Government Furnished Equipment
HWCI	Hardware Configuration Item
IOC	Initial Operational Capability
IPT	Integrated Product Team

ISD	In Service Date
LCC	Life Cycle Cost
LOT	Life Of Type
MCI	Major Capital Investment
MLOC	Minimum Level of Capability
MOE	Measures of Effectiveness
MOP	Measures of Performance
MOS	Measures of Supportability
MPS	Materiel Policy and Services
MRO	Military Response Option
MTTR	Mean Time To Repair
N/A	Not Applicable
OCD	Operational Concept Document
OH&S	Occupational Health and Safety
OLOC	Operational Level of Capability
OPEVAL	Operational Evaluation
OT&E	Operational Test and Evaluation
OV	Operational View (of DAF)
PCOD	Preliminary Capability Options Document
PDS	Project Definition Study
PT&E	Production Test and Evaluation
RFT	Request for Tender
ST&E	Supportability Test and Evaluation
SV	System View (of DAF)
T&E	Test and Evaluation
TAT	Turn Around Time
TCD	Test Concept Document
TV	Technical Views (of DAF)
USDM	Under Secretary Defence Materiel
VCDF	Vice Chief of the Defence Force
YOD	Year of Decision

4 OVERVIEW OF THIS GUIDE

4.1 Key Documents

4.1.1 Operational Concept Document

4.1.1.1 The OCD is used to:

d. describe the characteristics of the required capability from an operational perspective;

e. facilitate an understanding of the overall system goals for both the mission system and support system;

f. detail missions and scenarios associated with operations and support; and

g. provide a reference for determining 'fitness for purpose'.

4.1.1.2 All stakeholders, including warfighters (end-users) and system developers, rely on the OCD as the basis for common understandings. It can be viewed as a translation vehicle between the various specialty domains of the stakeholders.

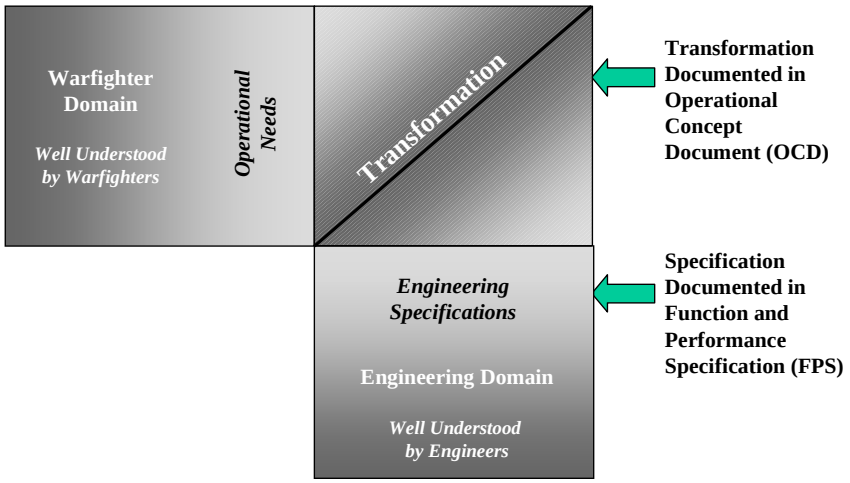

Figure 1 Systems Engineering Documents

4.1.1.3 The OCD template, defined in DID-ENG-DEF-OCD, draws upon Defence systems engineering experience and best practice. It has been developed in line with existing OCD guidance, as detailed in the Capability Systems Life Cycle Management Guide 2001 (CSLCMG).

4.1.1.4 The initial sections of the OCD are intended to provide a clear and easily understood description of a warfighter's need and the intended use of a system from an operational perspective. This operational concept is prepared by treating the system as a 'black box' and describing how it will be used by the warfighter to achieve an operational mission. To ensure that all operational requirements are identified and addressed, the process of producing the OCD involves communicating with all relevant stakeholders and potential systems suppliers.

4.1.1.5 The OCD should not be written as a technical specification but rather it should provide a narrative overview. It is a complementary document to the FPS and provides an operational context for the system. It is a source of information for technical specification development, logistic support requirements definition, project planning and enhanced decision-making especially during the design process.

4.1.1.6 The OCD is a pivotal systems engineering product; capturing operational requirements and providing and/or facilitating a means of translating operational requirements to 'engineer speak' to communicate the operational concepts to systems engineers and logisticians responsible for further defining a system solution.

4.1.2 Overview of Document Structure

4.1.2.1 The following diagrams (Figure 2, Figure 3 and Figure 4) capture the OCD structure at a high level and illustrate the relationship between the OCD, FPS and TCD. To ensure that the OCD remains a readable document, the OCD body contains only essential information. This includes a summary of the detailed information contained in the annexes.

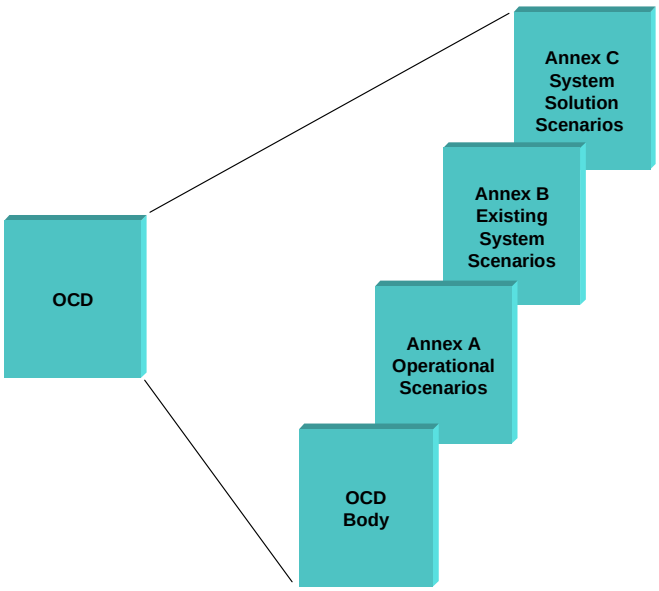

Figure 2 Overall OCD Structure

4.1.2.2 Annex A contains the detail of all operational scenarios used to determine the operational requirements for the system in a solution independent manner.

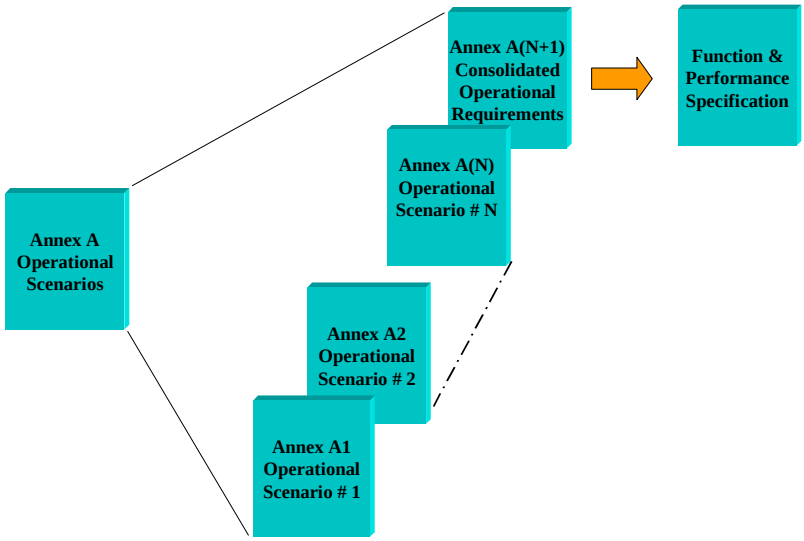

Figure 3 Structure of Operational Scenario Annex

4.1.2.3 Within each of the operational scenarios is a description of the situation requiring ADF action, the commander's Concept of Operations (CONOPS), detailed business processes associated with the CONOPS and the operational requirements for the system under consideration which is supporting those business processes.

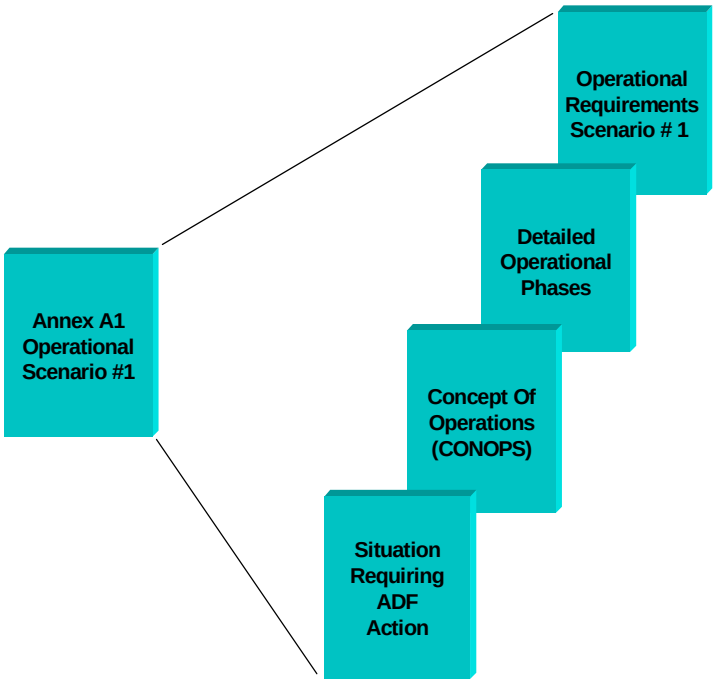

Figure 4 Structure of an Operational Scenario

4.1.3 Function and Performance Specification

4.1.3.1 The FPS specifies the requirements for the system and provides the basis for design and qualification testing of the system. Initial versions of the FPS will address the total system capability which will later be developed into a Mission System specification and a Support System specification, usually by the prime Contractor.

4.1.3.2 The FPS should be developed to DI-IPSC-81431A (from MIL-STD-498) by progressively filling out the appropriate sections as the information becomes available.

4.1.3.3 Individual requirements within the FPS should be carefully constructed to ensure that they are at least (from EIA-632):

a. Clear. The requirement is readily understandable without analysis of meaning of words or terms used.

b. Correct. The requirement does not contain error of fact and is not in conflict with itself.

c. Feasible. The requirement can be satisfied within the laws of nature, the state of the art as it applies to the project and other constraints (eg. cost) as it applies to the project.

d. Focussed. The requirement is expressed in terms of the 'what's rather than the 'how's, viz. not in terms of how to implement a solution.

e. Unambiguous. The requirement allows only one interpretation of meaning, and in particular does not use subjective words such as 'sufficient' or 'excessive' that cannot be measured.

f. Singular. The requirement cannot sensibly be expressed as two or more requirements having different agents, actions or objects.

g. Verifiable. The requirement can be assigned a suitable objective and finite method of verification at the level of system structure at which it is stated.

4.1.3.4 When requirements within the FPS are taken as sets of one or more requirements, the sets should:

a. Cover the complete scope. That the set of requirements captures the entire scope of the user need.

b. Not contain redundancy. That each requirement is specified only once.

c. Have appropriate connectivity. That all terms used within the requirements are adequately linked to other requirements and definitions.

d. Not be in conflict. That requirements are not in conflict with one another.

4.1.3.5 Further references for developing good requirements can be found in Kotonya and Sommerville, 1998, and Gause and Weinberg, 1989.

4.1.4 Test Concepts Document

4.1.4.1 In addition to preparing an FPS for each candidate solution, a TCD is required to capture the warfighter's intended test approach and hence the strategy for acceptance between the Defence Materiel Organisation (DMO) and its customer. The TCD needs to describe the approach and duration for testing and identify any significant cost drivers, such as the use of major assets (eg, aircraft or warships), the need to perform live firings and the number of test flight hours. Requirements for the Prime Contractor to support testing should also be included in the TCD, as these requirements need to be incorporated into the acquisition Contract. The identification of these needs is essential in estimating the cost of operational evaluation and associated testing and to allow sufficient time for planning the availability of assets so they are available when required.

4.1.4.2 The TCD is used by DMO to prepare a Test and Evaluation Master Plan (TEMP) which will contain the project's high-level test approach. It provides a common understanding of the test and evaluation processes in sufficient detail to bound the scope of the effort to be undertaken by all parties. This document should addresses all of the significant T&E requirements in order to identify the funding and resources required for the *total* T&E program, culminating with Contractual Delivery (CD) and Acceptance-Into-Service (AIS) of future systems/capabilities. The TCD is also used to facilitate the timely planning, including both personnel and assets, to support the Developmental Test and Evaluation (DT&E), Production/Acceptance T&E (PT&E/AT&E) and Operational T&E (OT&E) - all of which should include elements of Supportability T&E (ST&E).

4.1.4.3 The TCD should be developed in accordance with PRP UI2063, 'Support TCD Development' and DID-ENG-DEF-TCD.

4.1.5 Use of an OCD, FPS and TCD in the Evolutionary Acquisition Process

4.1.5.1 In an Evolutionary Acquisition (EA) project, an OCD should be developed to capture the high level capabilities and use of the proposed system. As each phase of the EA process is considered, these high level requirements should be developed in detail for the solution independent section of the OCD. As the solutions are being considered the solution dependent sections of the OCD can be developed.

4.1.5.2 The OCD, FPS and TCD should be updated and new baselines formed before each phase of the development. This should not be a major undertaking because the solution independent view will change to identify the new functions to be implemented, upgraded or deleted and the existing system section will be a description of the already documented, current system. Note that the TCD should usually identify regression testing needed for EA projects to ensure that any new functionality does not impact on functionality already proven in previous phases.

4.1.5.3 *Note: This section will be enhanced as more experience is gained in the use of OCDs in EA projects. For the latest guidance and examples of such OCDs, consult the Systems Engineering Directorate of Materiel Policy and Services (MPS) Branch of DMO.*

4.1.6 Relationship with the Defence Architectural Framework for C4ISR

4.1.6.1 The Defence Architectural Framework (DAF) defines a number of essential and supporting architecture views or products needed to enable comparisons between Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems. These products, which are outputs of the systems engineering process, are grouped into Common Views (CVs), Operational Views (OVs), System Views (SVs) and Technical Views (TVs).

4.1.6.2 OCDs developed for Knowledge Staff must comply with the DAF framework (refer to the web page at http://intranet.defence.gov.au/cio). The recommended locations of potential DAF products are identified throughout the OCD template and this document. *As a minimum, where the DAF is applicable, the OCD must include the essential architectural products in at least one section of the OCD*, noting that these views may be more appropriate in one or more applicable sections. These essential views are summarised in Table 1.

DAF View	***Name***
CV-1	Overview and Summary Information
CV-2	Integrated Dictionary
CV-3	Architecture Compliance Statement
OV-1	High Level Operational Capability Graphic
OV-2	Operational Node Connectivity Description
OV-3	Operational Information Exchange Matrix
OV-5	Activity Model
SV-1	System Interface Description
TV-1	Technical Systems Profile

Table 1 DAF Essential Views (that must be included in the OCD)

4.1.6.3 Details of the DAF products and their applicability to the OCD are contained in Annex C.

4.1.6.4 In relating the systems engineering process to C4ISR architecture definition it should be borne in mind that architectures provide the broader context for a specific set of systems. System engineering methodologies are used in developing this broader perspective but with less depth than would apply to the system engineering activities associated with any specific system.

4.1.6.5 *It is important to note that the DAF products on their own fall significantly short of the total information needed to be presented in the OCD.*

4.2 System and Capability

4.2.1 What is a system? There are many definitions, but for our purposes, a system can be defined as:

> "…an integrated composite of people, products, and processes that provide a capability to satisfy a stated need or objective."
>
> MIL-STD-499A

4.2.2 In this context, the system will consist of a mission system and a support system, with the delivered capability being dependent on both. In many cases, a new mission system will use existing ADF elements and, in almost all cases, the new support system will use

existing support infrastructure as shown in Figure 5. It should be noted that when a system is delivered the total capability will be tested and that testing will include existing elements of both the mission system and existing elements of the support system as indicated by the testing boundary below.

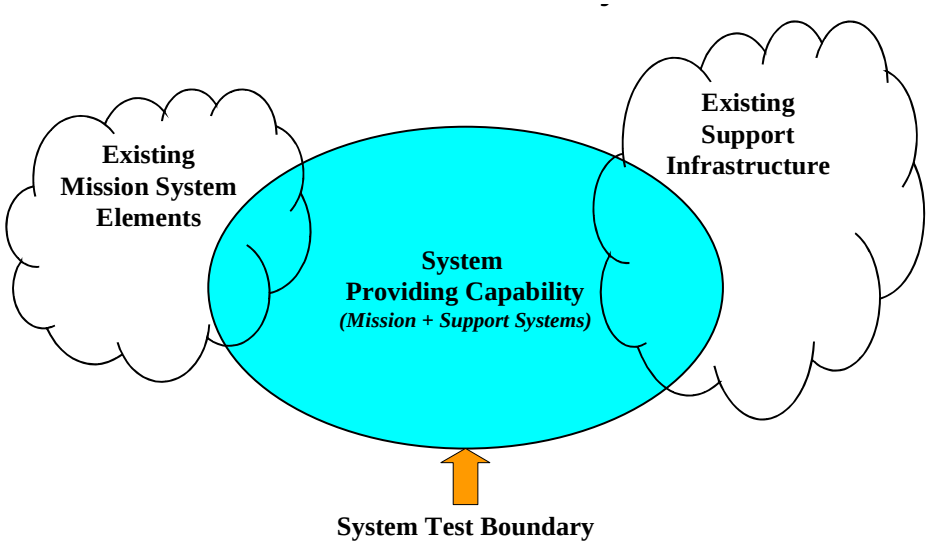

Figure 5 Actual View of the System

4.2.3 In developing the system, it will be decomposed into a mission system with its own specifications and a support system with its own specifications. This process will usually be performed by the Prime Contractor. The exact boundaries between the mission system and the support system will not be determined until relatively late in the development process (Figure 6).

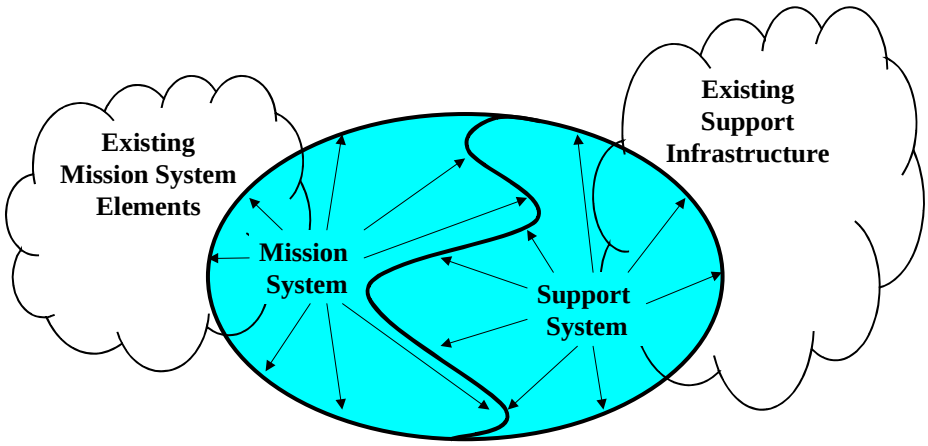

Figure 6 Actual View of the System = Mission System + Support System

4.2.4 Although the system will be tested at the boundary of the overall system, the actual elements being acquired are less than the total system as shown by the inner area in Figure 7 below.

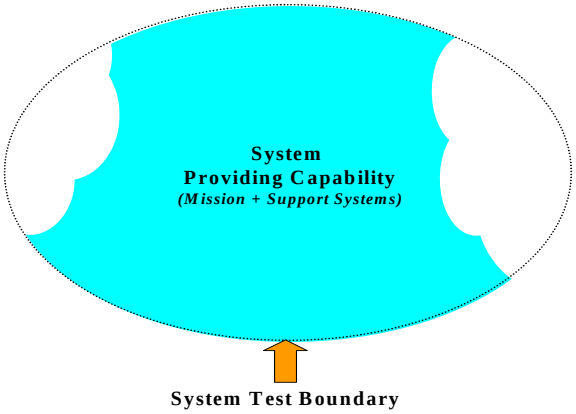

Figure 7 Boundary of Acquisition

4.3 Overview of Document Development Process

4.3.1 Introduction

4.3.1.1 The process of developing the OCD, FPS and TCD has been decomposed into a series of steps. This decomposition has been captured as a hierarchy of Functional Flow Block Diagrams (FFBDs) developed in the CORE™ systems engineering tool (guidance on the terminology used on CORE™ is provided in Annex B).

4.3.1.2 Each sub-section in section 5 of this guide corresponds to a function captured in this CORE model. A complete set of the FFBDs is captured in Annex D.

4.3.1.3 The lower levels of this model are used at the beginning of each section to provide a “road map” of the steps.

4.3.1.4 At the highest level as shown in Figure 8, the development process consists of preparation and approval for the first and second pass as per the CSLCMG, followed by refinement prior to solicitation (eg. Request for Tender (RFT) process) and management and updating through the acquisition and In-Service phases of the system life-cycle.

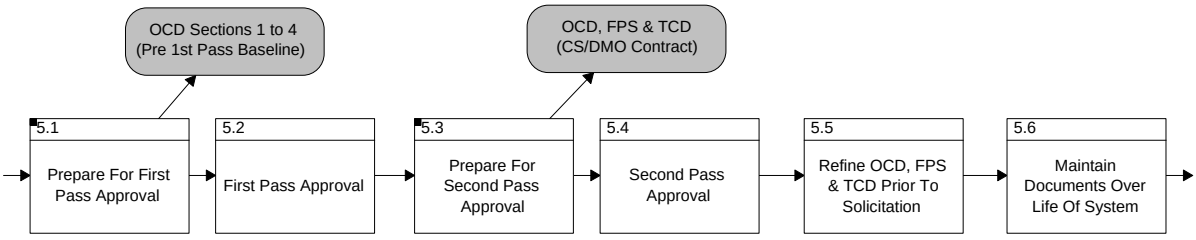

Figure 8 Develop OCD, FPS & TCD [5]

4.3.2 First Pass

4.3.2.1 In preparing for First Pass Approval, Figure 9, the process initially identifies the capability and broadly defines its operational scope. This provides a framework for further discussion. The level of detail contained in the OCD for First Pass endorsement must be commensurate with the tolerance on capability, cost and schedule required by the Defence Capability Investment Committee (DCIC). For example if the tolerance on capability, cost and schedule is +/- 20% then significantly more information is required than for the situation in which a +/- 50% tolerance is acceptable. It is not necessarily feasible to identify in this guide what "level of detail" must be provided to achieve a specified tolerance, this must be assessed for each case and ideally with some feedback from industry to ensure that the appropriate cost-drivers have been identified and sufficiently defined.

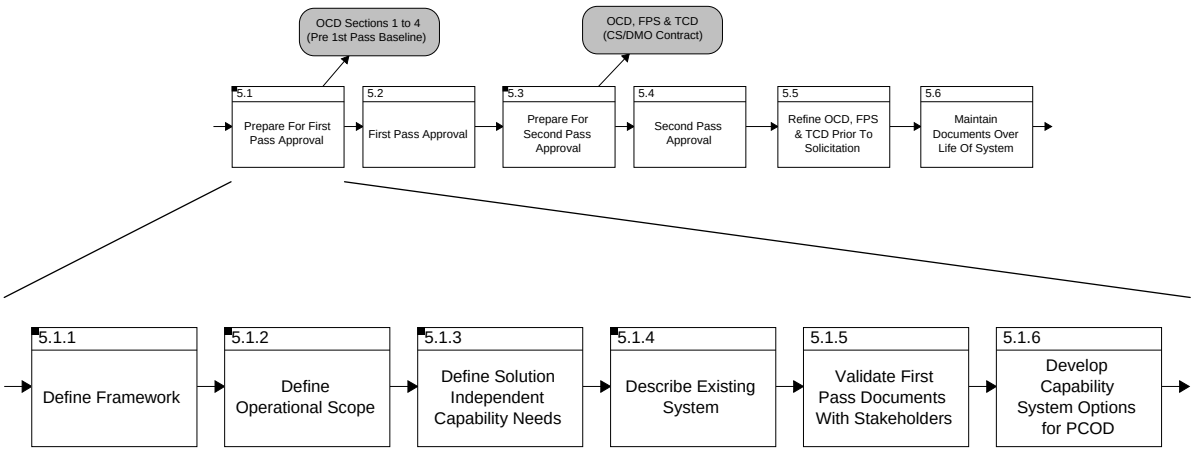

Figure 9 Prepare for First Pass Approval [5.1]

4.3.2.2 Following the establishment of the context, the operational requirements of the system need to be defined and detailed in a solution independent manner, i.e. by taking the external view as shown in Figure 10. The OCD needs to describe what the need is (the problem to be solved) and how the system as a "black box" will help satisfy the need (solve the problem). The focus at this stage is answering questions such as:

a. How will the system contribute to the overall mission?

b. What will the system have to do?

c. Who will use the system and benefit from its outputs?

d. Where the system will operate?

e. When will the system be employed?

f. What major support functions will be required?

4.3.2.3 Even if First Pass Approval has been deemed to have been granted for a project (e.g. via inclusion in the early years of the Defence Capability Plan), those sections of the OCD associated with First Pass Approval discussed in this guide are still essential. In this case, the guidance is still relevant and the applicable sections of the OCD should be completed as part of the Second Pass activities.

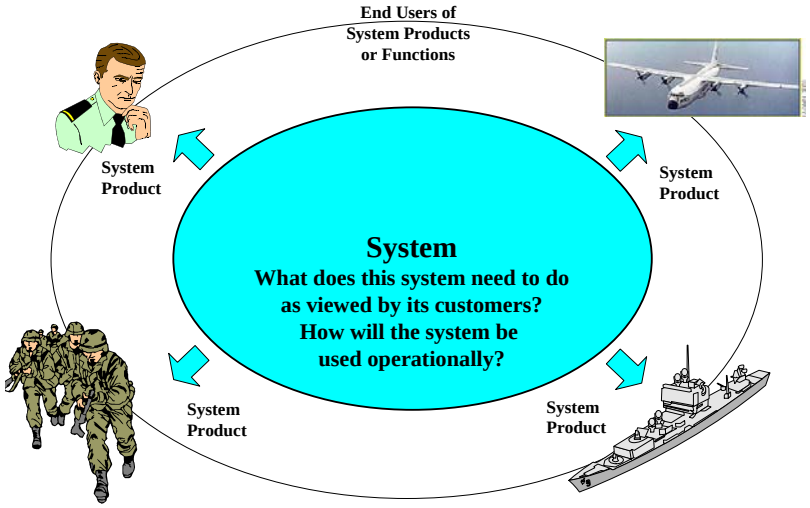

Figure 10 External View of the System

4.3.2.4 Operational requirements need to be developed in a solution independent way. Solving a problem with the same old solution assumes that the problem has not changed and there is not a better way to solve it. This is rarely the case with the changes in environment, politics, economics and technology that are now commonplace. For example, technologies that once may have been cost prohibitive may now be highly cost effective – more so than the current solution. This is also true of the support system where, for example, particular repair policies quickly become irrelevant as technology and economics change. Changes in the environment, doctrine, political circumstances and technology justify and require that the operational need be continually defined and refined independent of potential solutions.

4.3.2.5 The capture of the support requirements and concepts should be based on operational requirements and hence should begin at the solution independent stage. This may involve little more than determining availability, sustainability and deployability requirements for the system, based on operational use and the identification of those aspects of system support that are strategic to national self-reliance.

4.3.2.6 An existing system, if present, should also be investigated and used as a basis for identifying shortcomings and potential problems that need to be addressed. This can be used to show both limitations in meeting operational needs as well as limitation of operational effectiveness due to internal design, eg. human-machine interface design. If this is a new system, then it may be useful to consider similar systems as basis for comparison.

4.3.2.7 The feasibility of potential solutions is a key input to the decision-making process. There is little point in proceeding if a solution does not exist within realistic financial constraints. Sufficient detail needs to be provided to assist the DCIC to select the potential solutions that are worth further consideration. This may require consultation with industry and current users of similar systems to establish estimates for Life Cycle Cost (LCC), In-Service date, Life Of Type (LOT) and associated risks for each potential solution.

4.3.2.8 The desired outcome of the First Pass Approval cycle is approval to proceed with the definition of particular candidate solutions in preparation for second pass approval.

4.3.3 Second Pass

4.3.3.1 Preparation for Second Pass Approval, Figure 11, consists of elaborating the definition of each candidate solution approved from first pass. For each of these solutions, the process needs to:

a. describe the specific aspects of the solution that make it unique;

b. develop the system requirements by exploring the internal views of the system and constructing additional scenarios;

c. consolidate the system and personnel requirements from these scenarios;

d. addressing solution specific support issues; and

e. addressing the potential growth and evolution of the system.

4.3.3.2 As with the First Pass Approval process, the level of detail contained in the OCD for Second Pass Approval must be commensurate with the required tolerance on capability, cost and schedule required by the DCIC. The tolerances set for Second Pass Approval are usually much tighter than that permitted for First Pass Approval consequently there must be a much greater level of detail.

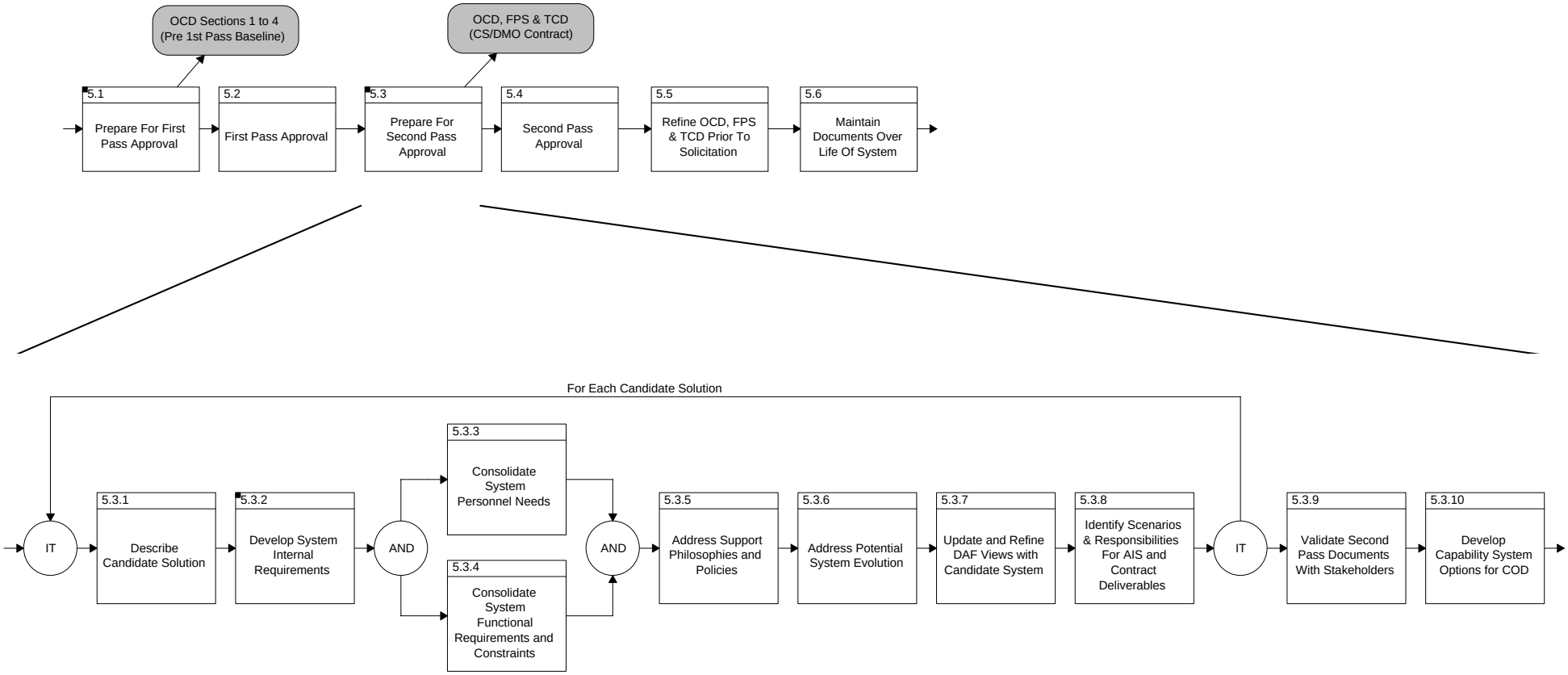

Figure 11 Prepare for Second Pass Approval [5.3]

4.3.3.3 Whereas first pass addresses the needs of the warfighter, the second pass must address the needs of the people inside the system (eg. operators, maintainers and trainers). In addition, the needs and constraints of other stakeholders external to the system also need to be captured (eg. requirements from support organisations or test and evaluation acceptance agencies, regulatory requirements and Australian industry support requirements).

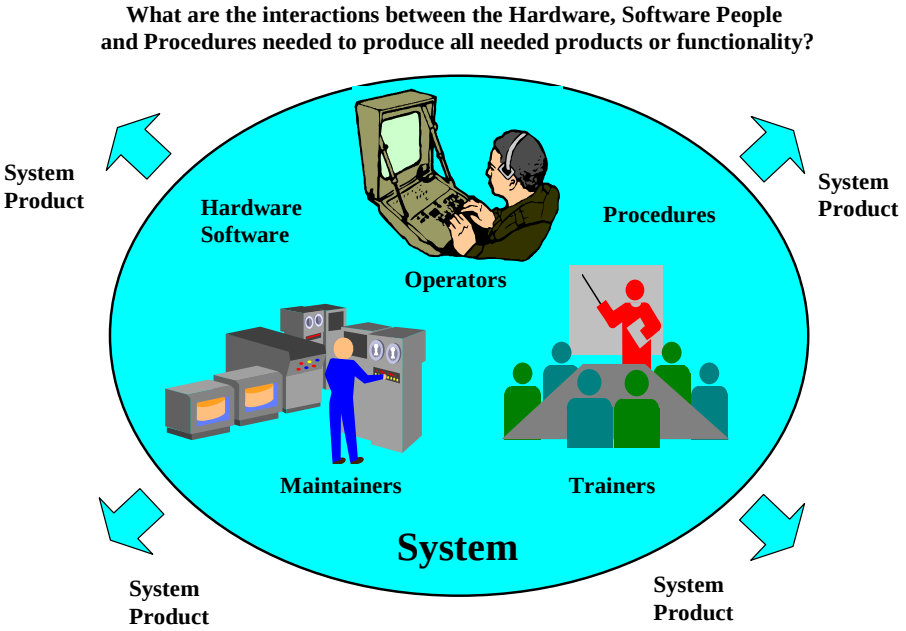

Figure 12 Internal View of the System

4.3.3.4 When addressing the system needs from the internal perspective, the internal functionality of each potential system solution needs to be described in the context of the operational scenarios defined for First Pass Approval. This internal view should be functional and largely independent of any specific implementation. At this stage, the focus is on the identification of system functions and their associated performance requirements, as opposed to engineering development or process requirements.

4.3.3.5 A solution dependent consideration needs to remain implementation independent (eg. as per Figure 13 the solution may be an airborne radar; however, the specific implementations of this solution are those offered by the different suppliers). Describing the solution in terms of implementation requirements is to be avoided (specify the 'what' rather than the 'how'), as this will limit freedom in design of the system. The focus should be at a function and performance level (i.e. what the system must do and how well it must do it to achieve the operational mission).

Capability	Solutions	Implementations
Surveillance of air-sea gap north of Australian mainland.	HF over-the-horizon radar	•Widgets Inc Implementation •Acme Implementation •U-Beaut Implementation
	HF surface-wave radars	•Low-n-Cheap Implementation •Tergais Implementation
	Airborne radars	•Widgets Implementation •Radars-R-Us Implementation •Sky-Eye Implementation

Figure 13 Solution vs Implementation

4.3.3.6 The functions identified from the scenarios (both internal and external) are then collated and a functional hierarchy determined. This collation activity seeks to identify common functions from each scenario so that a single system functional representation, which will satisfy all scenarios, can be derived. This functional representation can be assembled into a hierarchy of functions through functional decomposition.

4.3.3.7 Performance requirements are also derived from the analysis of system functionality in the context of operational scenarios. For example, how quickly a certain function needs to be performed will give rise to a performance requirement. Performance requirements are generally described as Measures of Effectiveness (MOE) related to the capability. Note that Measures of Supportability (MOS) are considered a subset of the MOE.

4.3.3.8 The requirements and constraints of other external stakeholders (such as logistic support policy makers and regulatory agencies) also need to be identified at this time, particularly where these requirements impact upon the feasibility or cost-effectiveness of any of the identified candidate solutions.

4.3.3.9 The functional hierarchy forms the outline of the FPS for the candidate solution, and should include both operational and support requirements. The level of detail used to describe each candidate solution's functions and associated performance requirements in the OCD and FPS needs to be limited to that required for a valid comparison with other candidate solutions. Therefore, the implications on LCC, staffing risk, etc need to be drawn out of this analysis.

4.3.3.10 The TCD is prepared and assists in capturing the warfighter's intended test approach as a basis for developing the strategy for acceptance between the DMO and its customers. This will involve the identification of facilities, agencies and assets that will be required to determine that the developed solution will indeed satisfy the operational need when operated and supported in accordance with the OCD. Early identification of the need for high value assets as part of a test program, such as aircraft and warships, will assist those agencies controlling the assets in planning their availability for system validation and acceptance.

4.3.3.11 The TCD should also define the level of validation activities, i.e. test and evaluation in a realistic operational environment such as the Acceptance Into Service (AIS) scenario or an extended program of Operational Evaluation (OPEVAL). The scope of these activities is key in that they may either drive cost onto a potential contractor (and hence higher cost to the Commonwealth) or risk to the Commonwealth.

4.3.3.12 The TCD should also consider the desired approach to data reduction and confidence levels for test results. Data-reduction activities can have significant implications for cost, schedule and risk, particularly if a third party (including another Commonwealth agency) has to undertake the data reduction. Confidence levels (eg. for reliability testing) can also significantly impact cost and schedule because high confidence levels can generally only be achieved over extended periods of time.

4.3.3.13 The desired outcome of the Second Pass Approval cycle is the approval to proceed with the acquisition of a particular solution within a commitment to budget, schedule and risk.

4.4 OCD Template Tailoring

4.4.1 Given the wide range and scope of likely systems to be described by an OCD, the template and the processes described by this guide need to be intelligently tailored. The level of detail in each section of the OCD could be considered as the tailoring of the guidance and template to the project under development. This tailoring should consist of variations in the emphasis placed on various sections of the OCD rather than the removal of any particular elements.

4.4.2 The rationale for the acquisition of the new system or the upgrade of an existing system can have a major influence on the emphasis placed on different sections of the OCD. The OCD for a totally new capability such as an Airborne Early Warning and Control (AEW&C) system will have significantly different emphasis to the OCD for an existing messaging system that is being upgraded to eliminate manual message handling. In the first case, all of the external interfaces to the system will be new and hence much of the OCD emphasis should be on clearly defining the interactions between the new system

and the interfacing systems. In the case of the messaging system, most of the external interfaces to the system will be the same, but what happens internally to the system will be vastly different as manual operations are replaced with automated functions.

4.4.3 Here we can see a variation between the requirement for the emphasis to be placed upon the solution independent view in the case of AEW&C, and the solution description in the case of the messaging system upgrade.

5 GUIDANCE FOR THE PREPARATION OF AN OCD, FPS AND TCD

5.1 Prepare For First Pass Approval

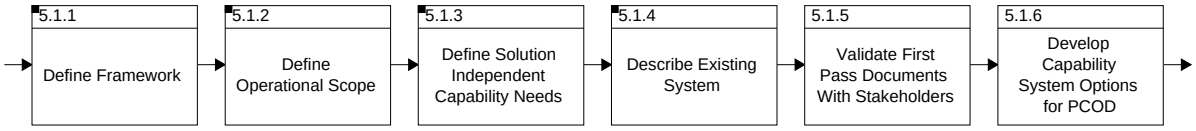

Figure 14 Prepare for First Pass Approval [5.1]

5.1.1 Define Framework

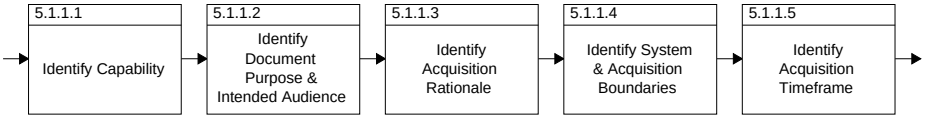

Figure 15 Define Framework [5.1.1]

5.1.1.1 Identify Capability

5.1.1.1.1 Uniquely identify the capability to be defined including any identification numbers, titles and abbreviations. Note that, at this level, the system that provides the capability is considered a combination of both the Mission System and the Support System.

5.1.1.1.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") CV-1 and CV-3. In particular the compliance with the DAF should be stated in section 1.1 of the OCD.

Document the results of this activity in…		
OCD section	*1.1*	*Identify capability*
FPS section	*1.1*	*Identify system*
TCD section	*1.1*	*Identify capability*

5.1.1.2 Identify Each Document Purpose & Intended Audience

5.1.1.2.1 Each of the output documents needs to have its scope, the intended audience and the interests of each audience clearly defined. One way of achieving this is to set out the section in each document as:

stakeholder 1: uses the document to …
stakeholder 2: uses the document to …
.
.
.
etc.

5.1.1.2.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") CV-1, CV-4.

Document the results of this activity in…	
OCD section	*1.2*
FPS section	*1.3*
TCD section	*1.2*

5.1.1.3 Identify Acquisition Rationale

5.1.1.3.1 Note that there may be occasions in which the perceived capability deficiency can be overcome by non-acquisition approaches, such as changes in doctrine or re-allocation of resources. The OCD should be developed in the same manner for non-acquisition approaches. The solution independent capability needs to be identified in the same manner, the existing system needs to be identified and the solution using the non-acquisition approach needs to show how the capability needs have been satisfied.

5.1.1.3.2 The rationale for the new system (which includes both Mission System and Support System) or upgrade for an existing system is to be clearly stated. There are many different reasons for acquiring a new system or upgrading an existing system, including:

a. a need to automate manual processes to reduce labour costs;

b. a change in threat;

c. a need to change business processes;

d. a need for greater reliability or increased performance; and/or

e. a need to replace an existing system which is no longer supportable

5.1.1.3.3 Once the rationale for the new or upgraded system is clearly understood, the elicitation of requirements from relevant stakeholders can be planned in a logical manner, reducing the chance of being biased by a single influential stakeholder. There are numerous examples of projects in which funding has been approved to achieve one objective, but the actual outcome has been distorted by a single powerful influential stakeholder.

5.1.1.3.4 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") CV-1.

Document the results of this activity in…	
OCD section	*1.3*
FPS section	*N/A*
TCD section	*N/A*

5.1.1.4 Identify System & Acquisition Boundaries

5.1.1.4.1 The system that delivers the needed capability will usually consist of a combination of existing assets/elements (which might or might not require modification) integrated with new assets/elements that would be acquired and integrated under the project being considered. Thus the system itself may be more than the resulting subject of

modification or acquisition. Of note, this will always be the case for support, where existing assets/elements may form the bulk of the Support System.

Example (from a Mission System Perspective only):

Project boundary: (as viewed by Capability Staff)

- *The provision of an air surveillance system.*

Contract boundary: (As viewed by the Prime Contractor)

- *The provision of a Command and Control system that integrates existing radars to provide an air surveillance capability.*
- *The integration of the Command and Control system with the existing radars via GFE communications infrastructure.*

Existing assets:

- *Radar 1*
- *Radar 2*
- *Radar 3, etc.*

GFE:

- *Communications infrastructure to an agreed specification*

New assets to be acquired:

- *Command and Control system including control and data interfaces to communications infrastructure.*
- *Control interface between radars and communications infrastructure*
- *Data interface between radars and communications infrastructure*

Scope of integration:

- *Radar track data fusion*
- *Radar control*

Test boundary:

- *Surveillance system*

5.1.1.4.2 The definition of the boundary for acquisition or modification may change over the period up to Second Pass Approval as more information becomes available. For example, it may be decided that it is more economical to replace some of the existing assets that were originally planned for incorporation into the system.

5.1.1.4.3 The identification and separation of existing elements from those to be modified or acquired is an important step in the solution dependent phase because it identifies interfaces between the “to be acquired” elements and other elements within the capability. The satisfaction of these interface requirements is often a critical component of an acquisition contract and yet, in many cases, these interfaces are internal to the “black box” and invisible to the warfighter. Similarly, the warfighter will not necessarily care about the source of the required products. Whether they are provided by existing elements of the capability or by new or changed elements is irrelevant from the warfighter’s perspective, i.e. from the external perspective.

5.1.1.4.4 DAF Operational Views should be used as and where appropriate to assist the capture and communication of “as is” and “to be” views of the capability.

5.1.1.4.5 Defining the boundary or context of the required capability (i.e., where it starts and stops) is an important step. For example, will the “black box” be self-transporting or will it be transported by external elements. A context diagram is often a useful representation of the capability boundary and the associated interfaces.

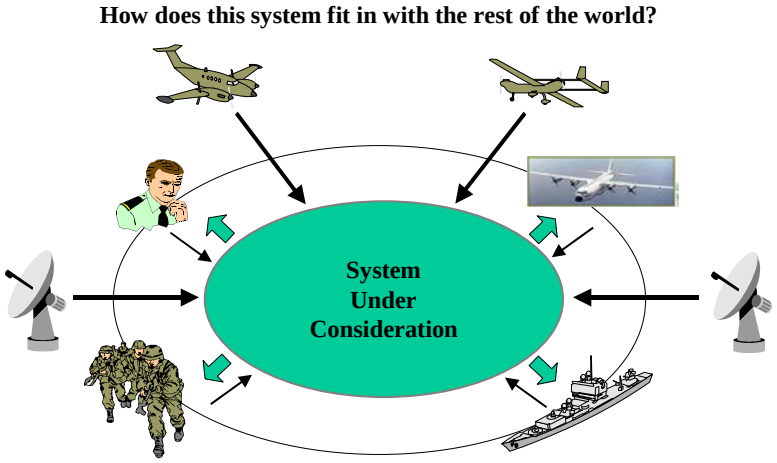

Figure 16 Information Context Diagram

5.1.1.4.6 Note that a number of different context diagrams may be needed to identify the operational context, the information context, the physical context, etc.

5.1.1.4.7 In defining the boundary of the capability, it should be possible, during examination of scenarios, to identify and define the interfaces that the “black box” system will have with other systems. The information products passed across these interfaces should also be identified.

5.1.1.4.8 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") CV-1, OV-1 for OCD section 1.4 and CV-1 for OCD section 1.5.

Document the results of this activity in…		
OCD section	*1.4, 1.5*	
FPS section	*3.3.1*	*Initially high level interface definition, refine later*
TCD section	*1.3*	

5.1.1.5 Identify Acquisition Timeframe

5.1.1.5.1 Identify the expected timeframes for acquisition and AIS of the capability, initially as a basis to project the future ADF and threat environment. This would need to be estimated in terms of the Year of Decision (YOD), initial delivery date (if applicable), and In Service Date (ISD). Additionally, the Life of Type (LOT) of the capability needs to be estimated, as this timeframe is a significant determinant of LCC.

5.1.1.5.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") CV-1.

Document the results of this activity in…	
OCD section	*1.4*
FPS section	*N/A*
TCD section	*1.4*

5.1.2 Define Operational Scope

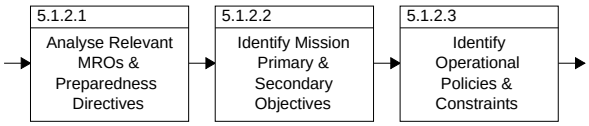

Figure 17 Define Operational Scope [5.1.2]

5.1.2.1 Analyse Relevant MROs & Preparedness Directives

5.1.2.1.1 In order to provide the traceability to high-level Government requirements, all functions and performance requirements, as well as the scenarios to be considered should be ultimately traceable (directly or indirectly) to endorsed Military Response Options (MRO) and Preparedness Directives. Initially, these should be examined for relevance to the capability.

5.1.2.1.2 Information derived from Preparedness Directives is a key input to the identification of requirements for, performance characteristics of, and the development of, the support components of the system. Preparedness relates to the ability to undertake operations in a timely manner and to sustain the activity required by the operation for the period required. The description of preparedness should include consideration of the following, as applicable:

a. the operational level of capability (OLOC) required to conduct specific roles and tasks;

b. the minimum level of capability (MLOC) acceptable;

c. the readiness notice needed to achieve OLOC from MLOC;

d. the required sustainability period - the period for which OLOC needs to be maintained;

e. minimum, work-up and sustainability resources required to achieve preparedness requirements;

f. activity levels for the different tasks and roles; and

g. usage rates (consumption of resources) for different activity levels, including attrition.

5.1.2.1.3 Preparedness will not be applicable to all capabilities, particularly those that have an ongoing requirement for a consistent level of performance (such as payroll systems). However, where the system is likely to be at different levels of preparedness during its operational life, the identification of preparedness requirements can be critical to system design and support.

Document the results of this activity in…	
OCD section	*N/A*
FPS section	*N/A*
TCD section	*N/A*

5.1.2.2 Identify Mission Primary & Secondary Objectives

5.1.2.2.1 The mission primary and secondary objectives should be identified. These should consist of short statements, i.e. single sentences or paragraphs.

5.1.2.2.2 The overall purpose and intent of operations may, where relevant, be expanded to include such things as strategies that will be used to accomplish the mission, and the specific tactics, methods or techniques that may be employed to accomplish the mission.

5.1.2.2.3 The needed capability should be considered separately from the existing capability. This will ensure that the solution is optimised for the desired capability and not simply preconceived as the need for an improved version of the current system. The needed capability also needs to be projected forwards in time to ensure that the delivered solution addresses the needed capability at that time.

5.1.2.2.4 For example, if the current system for intercepting foreign fishing vessels, eg. a patrol boat, lacks the performance to outrun the latest illegal fishing vessels, then simply examining the capability gap may lead to the conclusion that the patrol boat needs a more powerful engine. By considering the operational need both now and in the future, a better solution can be defined that will meet the forecast need. At times, the correct solution will involve upgrades to existing systems, but this conclusion should be reached after considering other viable alternatives so that innovative approaches are considered in solving old problems.

5.1.2.2.5 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-5, OV-6a, OV-6b, OV-6c, OV-7.

Document the results of this activity in…		
OCD section	*3.1*	
FPS section	*N/A*	*These primary and secondary objectives will ultimately lead to the system capability requirements in section 3.2 of the FPS.*
TCD section	*N/A*	

5.1.2.3 Identify Operational Policies & Constraints

5.1.2.3.1 The 'environment' of Defence and government policies and any operational constraints need to be explored. This is not intended to include implementation constraints on the design of the system but rather address issues such as:

a. relevant International treaties;

b. agreements regarding operation in international waters or airspace;

c. compliance with environmental, heritage, and land rights legislation; and

d. compliance with spectrum management regulations

5.1.2.3.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-6a, TV-1.

Document the results of this activity in…	
OCD section	*3.2*
FPS section	*N/A*

TCD section	*N/A*

5.1.3 Define Solution Independent Capability Needs

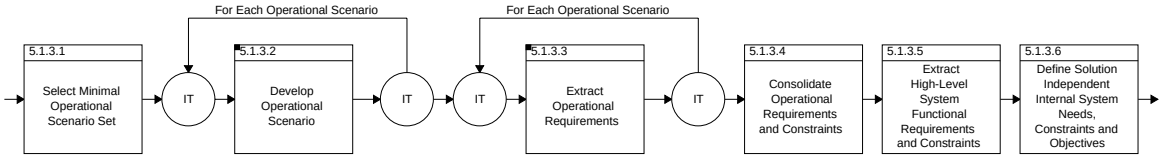

Figure 18 Define Solution Independent Capability Needs [5.1.3]

5.1.3.1 Select Minimal Operational Scenario Set

5.1.3.1.1 One of the challenges in the requirements elicitation process is to identify a minimal set of operational scenarios that will uncover the full functionality of the system from the warfighter or end-user perspective. The scenarios used will depend heavily on the capability being examined. For example, if a new Army bridging capability is being considered then the focus would be on the terrain to be crossed and the widths of the rivers and streams in areas of operation, thus the scenarios would focus on different geographical regions rather than MROs as such. In the case of a Psychological Operations project the scenarios would probably focus on the different cultural, religious and economic groups within our areas of military interest rather than directly on MROs. At the other end of the spectrum, if a joint communications capability were being considered, then high-level, joint operational scenarios identifying the information interchanges would be most appropriate. Note that there are a number of Australian Illustrative Planning Scenarios (AIPS) that have been developed by capability staff to reflect the Warfighter's concept of operations associated with the MROs. These AIPS should be used where there is a direct correlation between the scenarios needed and the MROs.

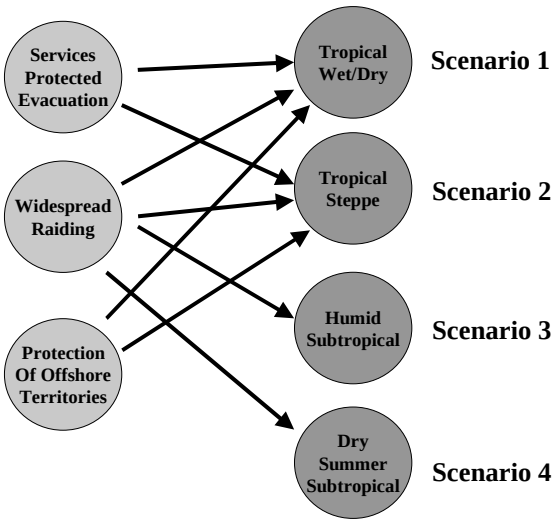

Figure 19 Geography Dominated Scenarios (ISAR, IR Systems, etc)

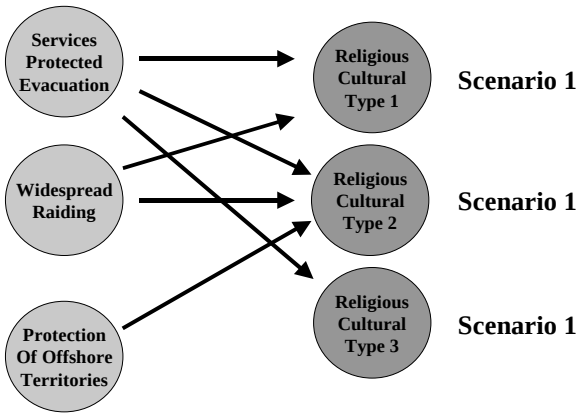

Figure 20 Religion / Cultural Dominated Scenarios (Psychology Operations)

5.1.3.1.2 As the high-level system needs are explored, this minimal set may need to be revisited and new scenarios may need to be developed that adequately scope the system requirements.

5.1.3.1.3 The DAF Operational View Products should be used, as appropriate, to assist in communicating and capturing the static and dynamic aspects of the operational scenarios. Where the number of scenarios or their descriptions is large, it may be preferable to include the scenarios in Annexes and to refer to them from this section of the OCD.

5.1.3.1.4 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c and OV-7, noting that some of these may be most applicable within specific scenarios.

Document the results of this activity in…	
OCD section	*3.4*
FPS section	*N/A*
TCD section	*N/A*

5.1.3.2 Develop Operational Scenario

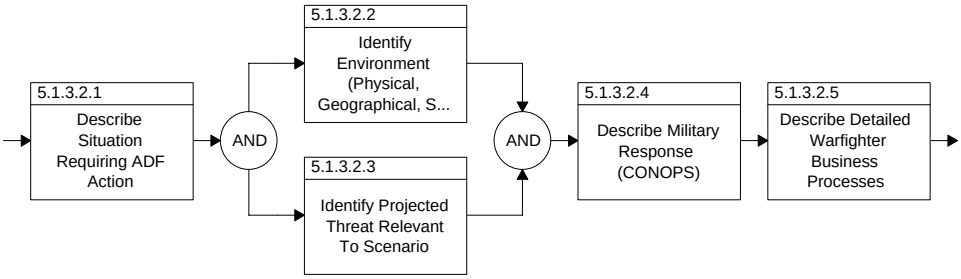

Figure 21 Develop Operational Scenarios [5.1.3.2]

5.1.3.2.1 Describe Situation Requiring ADF Action

5.1.3.2.1.1 Initially, each scenario should describe a summary of the situation requiring ADF action, i.e. one or two paragraphs that 'set the scene' for further analysis.

5.1.3.2.1.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-4.

Document the results of this activity in…	
OCD section	*3.4.x.1, Annex A*
FPS section	*N/A*
TCD section	*N/A*

5.1.3.2.2 Identify Environment (Physical, Geographical, Social etc)

5.1.3.2.2.1 The environmental aspects of scenarios need to be defined. These include physical, social, political and economic environments as well as geographical locations and regions, climate, altitude, depth, terrain, foliage, humidity, temperature, sea state, etc. If physical facilities and equipment are involved in performing the operation, then these should also be identified. For example, capturing that a “black box” is to be deployable by aircraft, ship or truck, will lead to appropriate system requirements for tolerance to air pressure variation, the ability to cope with altitude, and regimes of vibration, shock and corrosion.

5.1.3.2.2.2 The environmental aspects of scenarios need only be captured at this time to the extent that these aspects are solution independent. However, where differing solutions for a capability have different environmental aspects, these should be noted at this time, and captured for use during the development of the capability system options (i.e. 5.1.6).

5.1.3.2.2.3 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-6a.

Document the results of this activity in…		
OCD section	*3.4.1* *3.4.x.1*	*Common attributes* *Scenario-specific attributes*
FPS section	*N/A*	*These will be extracted and consolidated later.*
TCD section	*3.2*	

5.1.3.2.3 Identify Projected Threat Relevant To Scenario

5.1.3.2.3.1 Operational scenarios should be projected forward in time to correspond to the expected delivery date of the capability and, if possible, to the period of the first capability upgrade. This will help avoid the problem of delivering a capability at some time in the future that reflects today’s need and not the needs when the capability is delivered.

5.1.3.2.3.2 Intelligence organisations, such as the Defence Intelligence Organisation (DIO), should be consulted as to future technology and future threats for the scenarios under consideration.

5.1.3.2.3.3 It is important that the true performance requirements are captured in developing operational scenarios. It is very easy to become too narrowly focused and to miss the real performance requirements. Take for example the requirements for a radio direction finding capability. At first glance, the focus would be on technical issues such as whether the radio was a single channel press-to-talk radio or a frequency hopping radio; however, the performance requirements for the capability can be affected by many other factors.

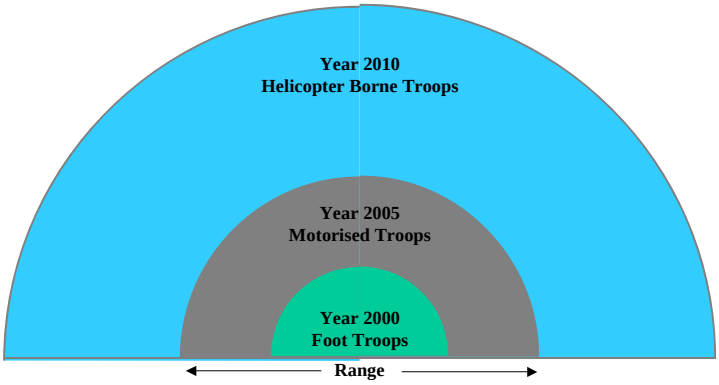

Figure 22 Surveillance Region Threat vs Time

5.1.3.2.3.4 The current threat may be a single channel press-to-talk radio carried by soldiers on foot. As they cannot move quickly, the requirement may be to be able to locate any emitter within a 20km radius of friendly lines. If that same adversary were to be motorised, then they could move much faster and so the requirement would be to locate any emitter within 50km radius. If the same adversary were to be helicopter borne then the requirement may be to locate any emitter within 150km. Thus the requirement for the direction finding capability is affected by the mode of transport and the type of weaponry that the adversary has, not just the technical parameters of the radio.

5.1.3.2.3.5 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7. The DAF views, SV-8, System Evolution and SV-9, Technology Forecast, may also be useful in describing the expected evolution of threats and technologies.

Document the results of this activity in…

OCD section	*Annex A, x.1.1.1*
FPS section	*N/A*
TCD section	*N/A*

5.1.3.2.4 Describe Military Response (CONOPS)

5.1.3.2.4.1 Define the military response as a sequence of steps from the warfighter's perspective.

5.1.3.2.4.2 The scenarios will capture the Concept of Operations (CONOPS) or the commander's concept. This is the broad outline of the commander's assumptions or intent in regard to an operation or series of operations. The CONOPS helps to define the warfighter's

processes for the external scenarios and is a vital input to an OCD. Note that a number of Australian Illustrative Planning Scenarios (AIPS) have been generated by Capability Staff to reflect the CONOPS associated with specific MROs.

5.1.3.2.4.3 Figure 23 shows an example of a high level Enhanced Functional Flow Block Diagram (EFFBD) representation of a CONOPS for defending Australia.

5.1.3.2.4.4 It is important that these scenarios are developed by the warfighters and not the engineers or operators internal to the system.

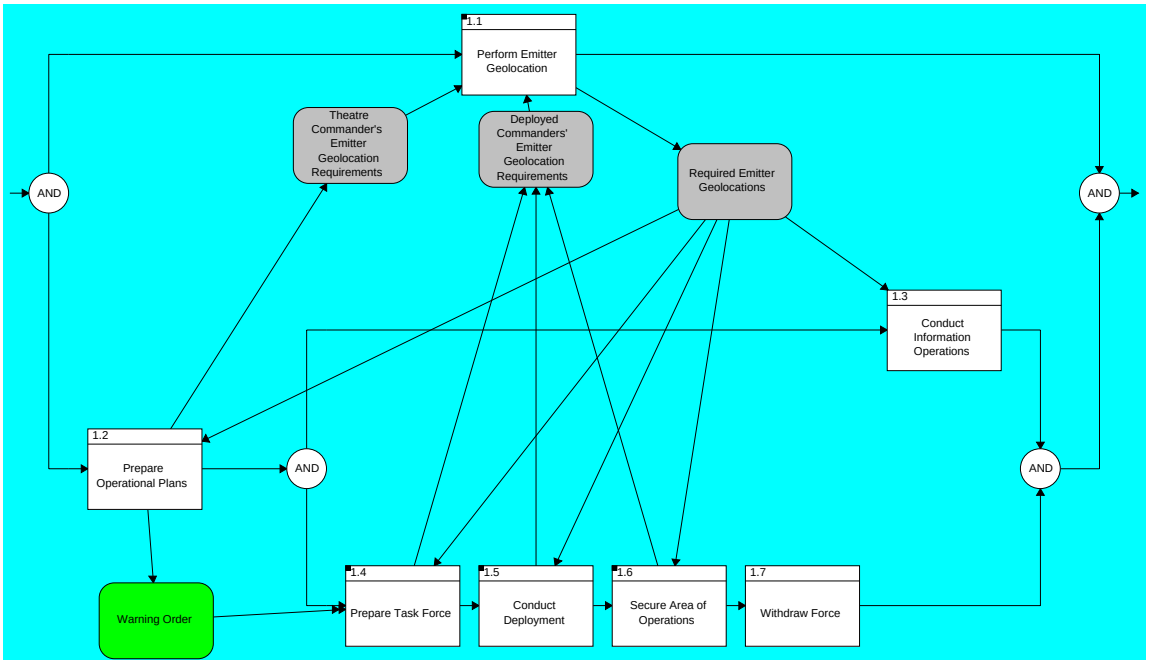

Figure 23 Top Level EFFBD of CONOPS 'Defend Australia' (not official)

5.1.3.2.4.5 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7.

Document the results of this activity in…	
OCD section	*3.4.2.2, Annex A, x.1.1*
FPS section	*N/A*
TCD section	*N/A*

5.1.3.2.5 Describe Detailed Warfighter Business Processes

5.1.3.2.5.1 Generally, the requirements elicitation process should begin with people who have defined the rationale for the acquisition of the capability. It is important to involve all stakeholders in the requirements definition process, provided the order of their involvement occurs in a planned and logical manner. For example, the elicitation of requirements for a replacement fighter aircraft should not start by asking fighter pilots whether the new generation aircraft should be a pilot-less aircraft. The result in this case would be predictably biased.

5.1.3.2.5.2 The warfighters cannot be expected to document their own requirements. Skilled facilitators should be used to step through operational scenarios in logical sequence to maximise the chance that all operational requirements are uncovered and also to document the requirements. The use of facilitated workshops to capture process flows and warfighter requirements is a powerful technique and is highly recommended.

5.1.3.2.5.3 The information gathering activities may not be straightforward as there may be many opinions regarding seemingly obvious things. In some instances this exercise will expose differences of opinion in how the ‘black box’ system will be used or what it must provide. This is a necessary step and demonstrates the need to involve a range of stakeholders even at this early stage. It is critical that these differences are resolved in order to define an unambiguous and complete set of operational (and support) requirements.

5.1.3.2.5.4 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7.

Document the results of this activity in…	
OCD section	*Annex A, x.1.1*
FPS section	*N/A*
TCD section	*5.2, 6.2*

5.1.3.3 Extract Operational Requirements

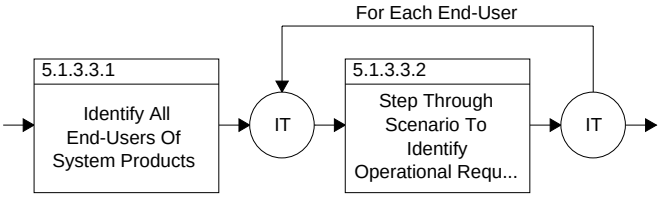

Figure 24 Extract Operational Requirements [5.1.3.3]

5.1.3.3.1 Identify All End-Users Of System Products

5.1.3.3.1.1 The scenarios should identify the people who are external to the 'black box' system and who are the end-users of the system products or capabilities. The organisational relationships of these people and their relationships and interactions with the system should be clearly defined.

5.1.3.3.1.2 The roles and needs of people inside the system, such as operators, maintainers and trainers, will receive an increased emphasis during preparation of the internal, solution dependent description.

5.1.3.3.1.3 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-3 and OV-4.

Document the results of this activity in…	
OCD section	*3.3*
FPS section	*1.2*
TCD section	*4.4*

5.1.3.3.2 Step Through Scenario To Identify Operational Requirements and Constraints

5.1.3.3.2.1 Once the warfighter's detailed approach to a particular scenario has been established, and the threats have been projected into the appropriate time frame, then it is possible to elicit the warfighter's needs against that scenario.

5.1.3.3.2.2 The requirements elicitation process should step through each phase of the scenario and establish the needs of the end-users of the capability for that phase.

5.1.3.3.2.3 If the 'black box' system being considered is providing product or services to many different echelons in the command hierarchy, then the scenarios should be presented in a top-down manner to each echelon to establish the needs of that commander. This process involves finding out the needs of the warfighter at each level and often how that warfighter will task the next lower level echelon. This process is depicted in Figure 25 below.

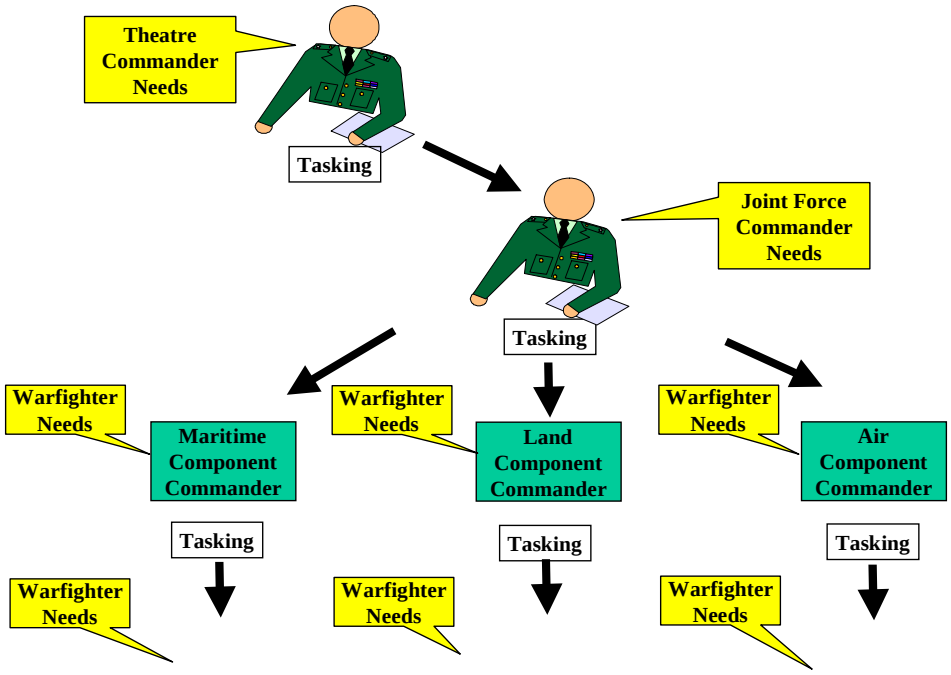

Figure 25 Warfighter Needs and Tasking

5.1.3.3.2.4 Identifying attributes for each requirement type is important, as this is necessary to establish the full set of performance parameters.

5.1.3.3.2.5 Requirements for characteristics such as accuracy, effect, availability, capacity, reliability, responsiveness, useability, interoperability, safety, security, survivability, etc contribute to determining performance requirements or how well the capability must perform. A number of categories can be used to group performance requirements, including:

a. Critical Operational Issues (COIs);

b. Measures of Effectiveness (MOEs) including Measures of Supportability (MOSs);

c. Measures of Performance (MOPs); and

d. Critical Technical Parameters (CTPs).

5.1.3.3.2.6 A COI is an issue that does not usually have a number associated with it, but is a vitally important requirement. For example, if the system being considered is an air defence

system, then a COI could be: “The system shall be capable of neutralising any hostile air threat before it can damage any high value asset”. There are many possible solutions to this COI, including moving the high value assets, moving sensors out further, moving airfields etc.

5.1.3.3.2.7 A MOE is a measure that makes the system effective to the user. A MOE usually has a number of MOPs associated with it. For example, if the MOE was the number of soldiers carried per flight, then this would have a MOP relating to volume and an MOP relating to weight. Speed, payload, range, frequency are all MOPs. When a function and performance specification is developed, the MOP is the performance component of each function or aspect.

5.1.3.3.2.8 A CTP is a parameter so important that failure to meet it may cause the project to be cancelled. If, for example, a system under consideration could be destroyed before it could respond, then it is obviously not the correct approach.

5.1.3.3.2.9 Supportability requirements should be directly traceable to operational requirements. For example the system may have to operate for 6 months on board a ship using only those operators and spares that are on board. Supportability goals, objectives and expectations for elements of support, including the elements of standardisation and obsolescence, need to be identified. For example, standardisation during this solution-independent phase could address such aspects as “deploy using standard air-cargo pallets”, or “to be mounted on the existing (at ISD) fleet of 5-tonne trucks”, or “use diesel fuel for compatibility with existing field refuellers”. Supportability requirements should address (to the extent practicable in this solution-independent phase):

a. the sustainability requirements of the system;

b. the expected useful life of the system and the likely rates of effort or expected usage;

c. system availability to meet preparedness needs;

d. mobility and deployment considerations;

e. expected operating and operational support environments;

f. any modes of system operation that could have implications for support;

g. use of existing capabilities and infrastructure for the provision of support;

h. maintenance and other support concepts for operations and deployment; and

i. the roles of Defence and industry in the provision of support, particularly identifying those elements of support that are strategic to national self-reliance.

5.1.3.3.2.10 The aim here is not to design the support system but to identify high-level support requirements for the capability. For example, if the capability were likely to contain explosive ordnance, the support concept might identify that there will be special needs for transportation, storage, handling, maintenance disposal and safety, but not necessarily describe each requirement.

5.1.3.3.2.11 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7.

Document the results of this activity in…

OCD section	*3.4.2.3, Annex A x.1.1.2*	
FPS section	*N/A*	*These will appear in the FPS through later analysis.*
TCD section	*5.2, 6.2*	

5.1.3.4 Consolidate Operational Requirements and Constraints

5.1.3.4.1 By examining the “black box” system in each of the operational scenarios, it is highly likely that there will be many common operational requirements. These common functions or products need to be consolidated to eliminate duplicate requirements of the system.

5.1.3.4.2 For example, the imagery requirements of a land commander in one scenario may be the same as the imagery requirements for a ship’s captain in another scenario. These requirements need to be consolidated to identify the capability requirements for the overall system. Requirements also need to be aggregated in areas such as performance or environmental requirements.

5.1.3.4.3 In the example shown in Figure 26, the capability needs to be transported by land, sea or air. When transported by sea, the system will need to operate normally during transit. Figure 26 demonstrates the functions identified for each of these transportation scenarios.

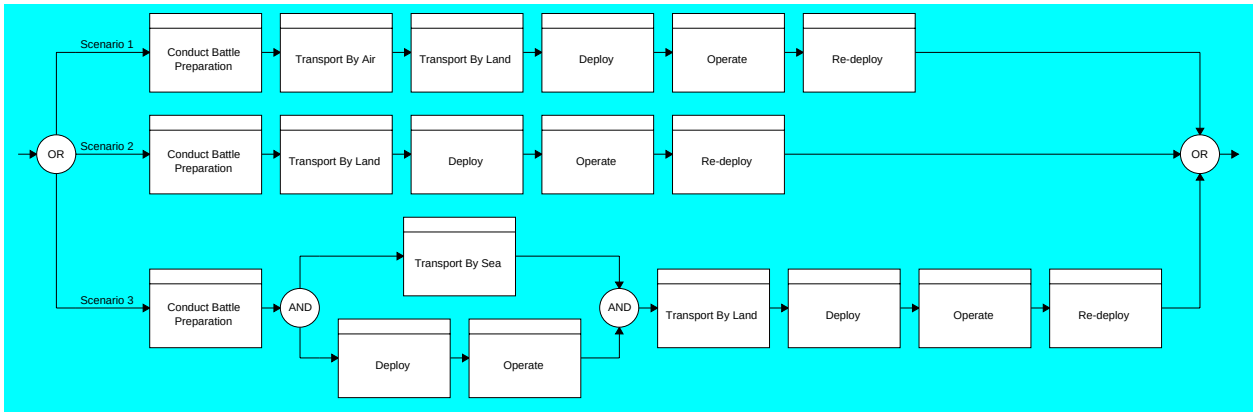

Figure 26 Example Capability Scenario (as separate threads)

5.1.3.4.4 Although the transportation of a system may seem a minor matter, a number of important requirements will be uncovered during later analysis regarding the different transportation modes. The most severe shock and vibration requirements will come from transportation by truck or rail. The most severe corrosion requirements will come from the transportation by sea and the most demanding requirements for size and weight will come from transportation by air.

5.1.3.4.5 The consolidation process will consolidate common functions and aggregate the environmental requirements that will differ widely for each of the three transportation environments. This is illustrated in Figure 27.

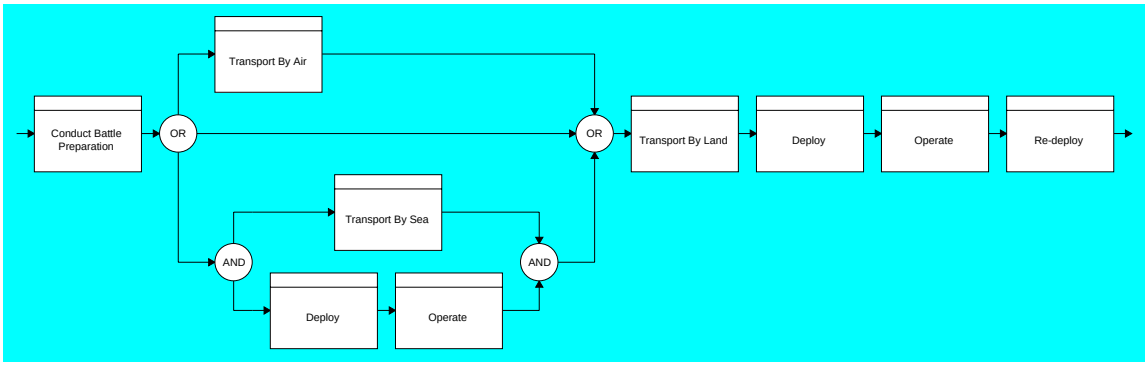

Figure 27 Example Capability Scenario (consolidated)

5.1.3.4.6 The consolidated requirements represent the set of products (both input and output) and functions that will satisfy the operational needs of the capability in all of the operational scenarios in which it will be used, as shown in Figure 26.

5.1.3.4.7 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7.

Document the results of this activity in…	
OCD section	*3.5*
FPS section	*N/A*
TCD section	*N/A*

5.1.3.5 Extract High-Level System Functional Requirements and Constraints

5.1.3.5.1 Any given operational requirement usually contains a number of functional requirements. For example, an operational requirement may be "*The location and nationality of any ship within 80nm of my ship*". Geo-location is one function, identification is a different function, and thus the one operational requirement becomes two functional requirements.

5.1.3.5.2 For a complex system or 'system of systems' there may be a number of different systems, which provide different functionality, are supplied by different suppliers and are ultimately integrated into a high level system. It is important, therefore, that requirements are organised in a functional manner and into a hierarchy within each of the functions.

5.1.3.5.3 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") SV-4, SV-5.

Document the results of this activity in…		
OCD section	*3.6*	*Include functional hierarchy and summary of system functional needs, detail should be captured in the FPS.*
FPS section	*3.2.x*	*Functional requirements presented as hierarchy of system capabilities and sub-capabilities.*
	3.x	*Identified constraints in appropriate section, eg. 3.7 Safety, 3.8 Security,*
TCD section	*6,7*	

5.1.3.6 Define Solution Independent Internal System Needs, Constraints and Objectives

5.1.3.6.1 Include a summary of requirements, constraints and objectives for the proposed capability. The detailed constraints will be contained in the FPS for this system. Constraints could include such items as:

a. regulatory requirements;

b. interface standards (Defence Architectural Framework);

c. interoperability with Allies;

d. the ability to be transported in existing assets;

e. the use of existing assets or infrastructure for operation;

f. support policies and constraints;

g. the use of existing assets or infrastructure for support;

h. national self-reliance support elements; and

i. constraints on the level of operator training.

5.1.3.6.2 Objectives could include:

a. a common operator interface across the system;

b. maximum Australian Industry Involvement (AII).

5.1.3.6.3 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") TV-1.

Document the results of this activity in…		
OCD section	*3.7*	*(summary)*
FPS section	*3.x*	*Identified constraints in appropriate section, eg. 3.7 Safety, 3.8 Security,*
TCD section	*7*	

5.1.4 Describe Existing System

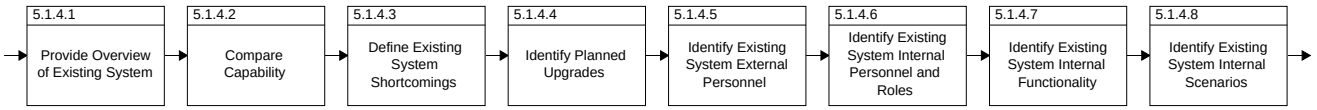

Figure 28 Describe Existing System [5.1.4]

5.1.4.1 Provide Overview of Existing System

5.1.4.1.1 The purpose in describing the existing system is to:

a. highlight the capability shortfalls in the existing system to support the rationale for upgrading the system or acquiring a new system;

b. identify any re-useable elements in the existing system that could be utilised in a new or upgraded system; and

c. provide a basis for comparison (eg. with respect to LCC) with any new or upgraded system.

5.1.4.1.2 In cases where there is no existing system within the Australian DOD, there may be benefits in describing an existing Allied system.

5.1.4.1.3 If the OCD is addressing a new capability and an existing system does not exist, then this should be stated, and the remainder of this section should be left blank.

5.1.4.1.4 The level of detail included about the existing system needs to be tailored depending on how relevant it is to the new or upgraded system. If the existing system and its use form the basis for the new system then all of the details should be included.

5.1.4.1.5 A description of the existing system including all external interfaces to the system should be provided. This subsection should also overview the system architecture, identifying the various system elements, i.e. Hardware Configuration Items (HWCIs) and Computer Software Configuration Items (CSCIs), and their interrelationships. This should also include a description of facilities, equipment, computing hardware and software.

5.1.4.1.6 A description should be provided of the existing physical support environment, if an ADF system, in terms of the implemented support concept and associated facilities, equipment, computing hardware, software, personnel, procedures, support and contracted services.

5.1.4.1.7 Where the DAF is applicable to the OCD, this should consider the DAF views ("as is") CV-1, OV-1, OV-2, 0V-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7, SV-1, SV-2, SV-3, SV-4, SV-5, SV-6, SV-7, SV-10a, SV-10b, SV-10c, TV-1.

Document the results of this activity in…

OCD section	*4.1*
FPS section	*N/A*
TCD section	*3.3*

5.1.4.2 Compare Capability

5.1.4.2.1 The existing system should be viewed in the same ‘black box’ manner as the new or upgraded system. This will permit the shortcomings of the existing system, as viewed by the warfighter, to be identified in a structured manner. The approach should be to compare the solution independent operational requirements established above with the capability of the existing system and identify those operational requirements that cannot be satisfied. Use the scenarios or phases of scenarios to demonstrate particular shortcomings where this adds clarity.

5.1.4.2.2 The existing system should also be compared against the solution independent system requirements, constraints and objectives of 5.1.3.

5.1.4.2.3 For OCD section 4.2, where the DAF is applicable to the OCD, this should consider the DAF views ("as is") OV-1, OV-2, 0V-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7, SV-5, SV-6, SV-7, SV-10a, SV-10b andSV-10c. For OCD section 4.3, where the DAF is applicable to the OCD, this should consider the DAF views ("as is") OV-1, OV-2, 0V-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7, SV-5.

Document the results of this activity in…

OCD section	*4.2*	*operational (external) capability comparison*
	4.3	*internal capability comparison*
FPS section	*N/A*	
TCD section	*3.3*	

5.1.4.3 Define Existing System Shortcomings

5.1.4.3.1 A summary of the shortcomings should be extracted from the comparison.

5.1.4.3.2 It may be worthwhile identifying the precedence of the unsatisfied requirements and separating them into essential, important etc.

5.1.4.3.3 For OCD section 4.2, where the DAF is applicable to the OCD, this should consider the DAF views ("as is") OV-1, OV-2, 0V-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7, SV-5, SV-6, SV-7, SV-10a, SV-10b andSV-10c. For OCD section 4.3, where the DAF is applicable to the OCD, this should consider the DAF views ("as is") OV-1, OV-2, 0V-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7, SV-5.

Document the results of this activity in…		
OCD section	*4.2* *4.3*	*operational (external) shortcomings* *internal shortcomings*
FPS section	*N/A*	
TCD section	*N/A*	

5.1.4.4 Identify Planned Upgrades

5.1.4.4.1 Identify any planned upgrades for the existing system before the ISD.

5.1.4.4.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("as is") OV-1, OV-2, 0V-3, SV-8, TV-2.

Document the results of this activity in…		
OCD section	*4.4*	
FPS section	*N/A*	
TCD section	*N/A*	

5.1.4.5 Identify Existing System External Personnel

5.1.4.5.1 Identify all existing system external personnel. Ensure that all external personnel for the proposed capability include this set or, if not, that their exclusion has been justified.

5.1.4.5.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("as is") OV-1, OV-2, 0V-3, OV-4, OV-6a, SV-3, SV-6.

Document the results of this activity in…		
OCD section	*4.1*	*Ensure that all relevant external personnel for the new capability are captured.*
FPS section	*N/A*	
TCD section	*3.3*	

5.1.4.6 Identify Existing System Internal Personnel and Roles

5.1.4.6.1 Identify the people internal to the system, their organisations and their relationships with the system, eg. supervisor, operator, maintainer, trainer.

5.1.4.6.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("as is") OV-4.

Document the results of this activity in…	
OCD section	*4.5*
FPS section	*N/A*
TCD section	3.3

5.1.4.7 Identify Existing System Internal Functionality

5.1.4.7.1 This section should identify the high-level functionality provided by the existing system to those personnel who are 'inside' the system, eg. operators, maintainers and trainers, as well as the processes used by those personnel. Examples are:

a. task acceptance and planning functionality,

b. asset management functionality,

c. calibration functionality,

d. manual antenna patching functionality,

e. manual tuning functionality,

f. manual recording functionality,

g. manual geolocation functionality using lines of bearing,

h. fault isolation functionality, and

i. Computer Based Training (CBT) functionality.

5.1.4.7.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("as is") SV-1, SV-2, SV-4, SV-5, SV-6, SV-7, SV-11.

Document the results of this activity in…	
OCD section	*4.6*
FPS section	*N/A*
TCD section	*3.3*

5.1.4.8 Identify Existing System Internal Scenarios

5.1.4.8.1 Identify a minimal set of internal scenarios that will identify the functionality and shortcomings of the existing system, as viewed by those personnel who are internal to the system.

5.1.4.8.2 This section should contain a summary of internal system scenarios. Detailed scenario information should be included in Annex B of the OCD.

5.1.4.8.3 Where the DAF is applicable to the OCD, this should consider the DAF views ("as is") OV-1, OV-2, 0V-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7, SV-4, SV-5, SV-6, SV-7, SV-10a, SV-10b, SV-10c.

Document the results of this activity in…		
OCD section	*4.7,* *Annex B*	*- summary* *- details*
FPS section	*N/A*	
TCD section	*3.3*	

5.1.5 Validate First Pass Documents With Stakeholders

5.1.5.1.1 Before finalising the documents, ensure that all stakeholders have had appropriate opportunity to review and comment on them. Where possible, discuss and resolve any inconsistencies or significant comments.

5.1.6 Develop Capability System Options for PCOD

5.1.6.1.1 With the operational scenarios completed and a consolidated set of capability requirements identified, it is now time to identify potential solutions. Before proceeding with the identification of potential materiel solutions, non-acquisition alternatives should be considered. Potential alternatives may include changes in doctrine, re-organisation of existing assets, use of allied systems, etc.

5.1.6.1.2 Identifying potential materiel solutions should include consideration of off-the-shelf solutions particularly where these cost-effectively satisfy the majority of requirements. Defence industry should be regarded as a useful source of potential solutions as should foreign military organisations.

5.1.6.1.3 Develop the PCOD for First Pass Approval as per the CSLCMG. The shaded PCOD sections shown below will be derived directly from the OCD sections 1 to 4.

1	Cover Sheet
2	References
3	**Description**
4	Background and Previous Committee Consultation
5	**Purpose**
6	**Justification**
7	**Relationship to Other Capabilities**
8	**Function and Performance**
9	**Timings**
10	Capability System Options
11	Financial Considerations
12	Preparedness
13	Workforce Planning
14	Training
15	Through Life Support
16	Environmental Protection
17	Information Environment
18	Industry Engagement
19	**Interoperability**
20	Collaboration
21	Acquisition Strategy
	Etc

Table 2 PCOD Sections and the OCD

5.2 First Pass Approval

5.2.1.1 The purpose of First Pass Approval is to obtain approval from Government for the requirement for the capability. In preparation for First Pass Approval, it will be necessary to produce rough order estimates of LCC and schedule for AIS for each potential solution. The level of detail provided needs to be “just enough” and “just in time” to provide Government with sufficient information to approve the capability and to indicate preferred solutions to be considered in further detail. Note that the level of detail in the OCD sections 1 to 4 required for First Pass Approval may be less than that needed by the DMO to support subsequent solicitation activities.

5.3 Prepare For Second Pass Approval

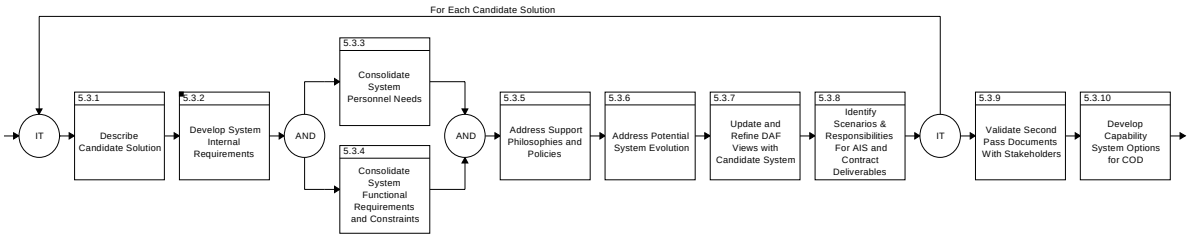

Figure 29 Prepare for Second Pass Approval [5.3]

5.3.1 Describe Candidate Solution

5.3.1.1 Describe the candidate solution in broad terms, highlighting the major components of the Mission System and identifying any existing assets/elements that will be used or re-used to provide the requisite functionality. Define how the proposed solution meets the needs of the mission with reference to the mission scenarios. State the basic support concept and ensure that any unusual or significant elements of the Support System are addressed.

5.3.1.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") SV-4, SV-5, SV-10b.

Document the results of this activity in…	
OCD section	*5.1*
FPS section	*1.2*
TCD section	*4*

5.3.2 Develop System Internal Requirements

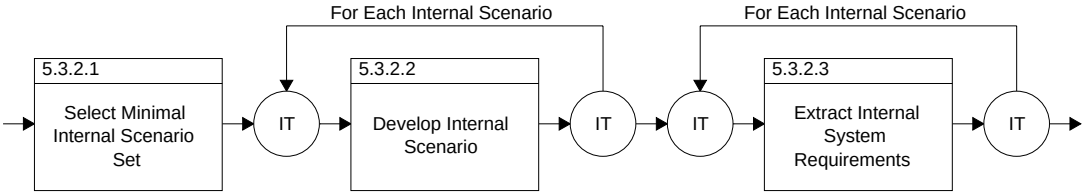

Figure 30 Develop System Internal Requirements [5.3.2]

5.3.2.1 Select Minimal Internal Scenario Set

5.3.2.1.1 The operational scenarios provide a starting point for the discovery and description of the behaviour of the Mission System from an internal perspective. They articulate how the Mission System is perceived to function through various modes and mode transitions. The behaviour of the system, including expected interactions with the external environment, needs to be addressed, outlining all important anticipated user, tester, operator, and maintainer interactions, which provide the basis and framework for the system analysis and evaluation.

5.3.2.1.2 As for the solution independent phase, the challenge at this time is to define a minimal set of internal scenarios that will satisfactorily describe the functionality of a particular solution. A useful methodology is to define scenarios that describe how a Mission System is to be operated and supported during a specific time, mission phase, operational mode, or critical sequence of activities. For example, a scenario in which the Mission System operates under extreme conditions, such as being required to process the highest input data rates while staffed with the lowest expected personnel levels, provides insight into important system aspects. Attributes such as human-machine interface bottlenecks, which could result in an overall system failure if the conditions persist for more than just a few minutes, can be uncovered by walking through such a scenario.

5.3.2.1.3 Typically, a number of scenarios are required. Each should focus upon a specific area of interest or concern and not attempt to cover all aspects at once. The scenarios should be selected so as to provide a complete set dealing with all phases of operations, including installation, start-up, typical examples of normal and contingency operations, shut down and maintenance. Operations under typical and stressful conditions, usually at the boundary conditions (eg, maximum I/O rates and loads,

minimum personnel staffing, and element failure modes) should get special emphasis. Begin with a typical, normal system operational scenario, “a day in the life of the system” and later develop additional scenarios which bring into play the stressful conditions and operations in the presence of system element faults. Consider the information and control flows internal to the system with respect to the external interfaces of the system.

5.3.2.1.4 Scenarios should also be developed to describe support processes for the Support System, showing how the proposed Mission System is likely to be supported under a given set of circumstances and how preparedness requirements will be met. The support scenarios should encompass the operational scenarios, such that each unique support situation is addressed. The support scenarios should encompass both Commonwealth and industry activities in the provision of support.

5.3.2.1.5 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") SV-4 (internal scenarios), SV-10b (states and modes).

Document the results of this activity in…

OCD section	*5.5* *5.9*	*- states and modes* *- chosen scenarios*
FPS section	*3.1*	*The states and modes of the system may need to be addressed in this section and should align with relevant scenarios.*
TCD section	*5.2, 6.2*	

5.3.2.2 Develop Internal Scenario

5.3.2.2.1 The approach is to assemble an interdisciplinary team with the right set of technical, logistics and operational expertise, to define a complementary set of scenarios, and to walk through each scenario step-by-step and record the results. This has the benefit of providing a thorough understanding for the team in the context of the other elements, as well as the rationale behind many of the decisions made as the process evolves. This insight enables the team members to suggest better ways to apply their own expertise.

5.3.2.2.2 If the OCD is to convey valid information to and from the operators and support personnel, system engineers and architects, system developers and testers, end customers and managers, then representatives from each of these communities should actively contribute to its production.

5.3.2.2.3 In developing the internal scenario, again a story needs to be told, but this time from the internal perspective. The operators and support personnel should be providing the “What” in terms of mission and support requirements, and the “Where” in terms of environments, the “When” in terms of mission and support sequences and scenarios, and the “Who” in terms of specific organisations or individuals performing actions. The system engineers and architects, developers, logisticians and testers should provide alternative “Hows” and “Whys” in terms of relevant system elements and technologies, and the partitioning of functions between the Mission System and the Support System, and between hardware, software, people, and procedural sequences.

5.3.2.2.4 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7, SV-1, SV-10a, SV-10b, SV-10c.

Document the results of this activity in…		
OCD section	*5.9* *Annex C*	*- summary* *- detail*
FPS section	*N/A*	
TCD section	*5.2, 6.2*	

5.3.2.3 Extract Internal System Requirements

5.3.2.3.1 The development of system requirements involves analysing each candidate solution from an internal perspective to identify the functions and associated performance required of the system (including both Mission System and Support System) in each of the operational scenarios. The focus of the analysis is functional identification (what needs to occur inside the system) and definition of performance (how well) it must be done. While solution dependent by its nature, the analysis remains implementation independent. Be careful to take a logical or functional view and don't start designing the components.

5.3.2.3.2 DAF System and Technical Views should be used, as and where appropriate, to assist the capture and communication of the system solution.

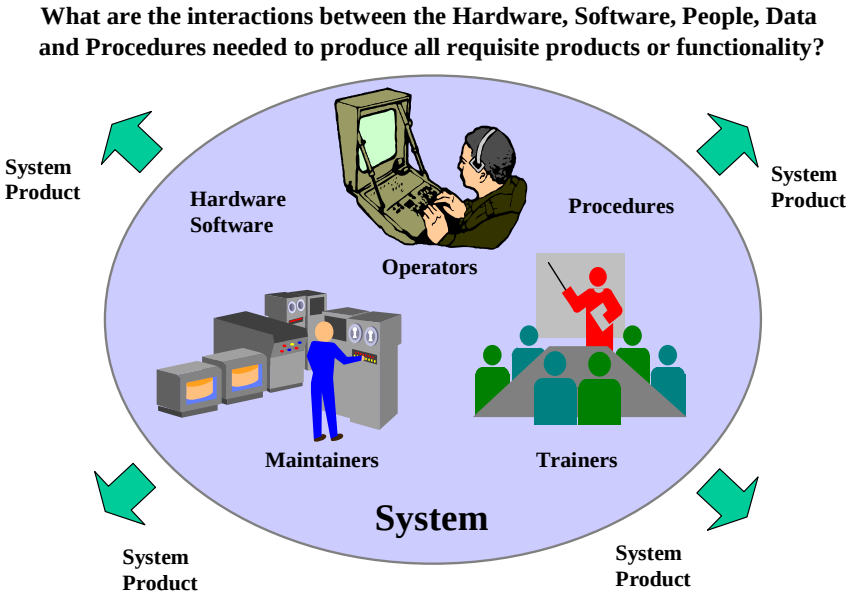

Figure 31 Internal Requirements of the System

5.3.2.3.3 Once a relatively complete set of data is available, the interdisciplinary team can begin to determine the functional flow of activities necessary for the Mission System to execute a set of normal operations. It should be possible to define a sequence of events over a period of time that represent some generally complete set of Mission System functions. In a similar fashion, a set of Support System functions should be defined and described. At this time, it is not necessary to identify a complete set of Support System functions, but those functions or sequence of events that are either atypical or drivers of cost and/or risk need to be defined.

5.3.2.3.4 Allocate functions by identifying those functions of the Mission System and Support System that will be performed by personnel within the system and the corresponding functions required of the materiel components of the system to support the personnel in their roles. Identify those functions that are currently performed by infrastructure or

existing lower tier systems that already satisfactorily contribute to the solution without modification. The earlier this can be done, the less functional decomposition is required in these areas as there is little benefit in decomposing functions that are satisfactorily provided by existing elements, providing they are not affected by new or changed elements. When identifying components, remain implementation independent; describe the functions performed by the propulsion system, sensor, weapon or supply chain, for example, not the physical components themselves.

5.3.2.3.5 Having selected a scenario, the team should then iteratively walk through all of the steps the Mission System (and, where applicable, the Support System) must execute to perform the scenario. This may take some time because states, and mode transition steps, will not be clearly defined or understood by all team members. There may be significant disagreements regarding these definitions. A major purpose here is to come to agreement and record clearly these definitions and descriptions.

5.3.2.3.6 Validation of the scenarios is accomplished by performing scenario walk-throughs in accordance with any governing policies and procedures. The scenario walk-through examines the sequence of events, extremes of data and the resultant exercising of system functions and responses. The user and development communities must provide the evaluations to validate the scenarios.

5.3.2.3.7 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-1, OV-2, OV-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7, SV-1, SV-10a, SV-10b, SV-10c.

5.3.3 Consolidate System Personnel Needs

5.3.3.1 Identify the personnel in the system (both Mission System and Support System), their roles, and how they contribute to the system functionality and performance. Include operators, maintainers, trainers and other support personnel. Identify any special skill sets that may need to be developed.

5.3.3.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-4, SV-10a.

Document the results of this activity in…	
OCD section	*5.3*
FPS section	*3.13*
TCD section	*5.2, 6.2*

5.3.4 Consolidate System Functional Requirements and Constraints

5.3.4.1 Once the internal functions have been identified to support each operational scenario and internal variants for special cases addressed, the internal functions for a solution need to be consolidated to form a functional model of the solution that satisfies all of the scenarios.

5.3.4.2 The allocation of functions to components may need to be readdressed at this stage. For example, an operator may not be capable of performing all of the functions allocated because of workload considerations, performance requirements or inappropriate skill levels for the tasks to be performed. Some functions may have been allocated to existing components that do not support them and it may not be cost effective to modify them when the function can be allocated elsewhere. This is typical for functionality that is provided by infrastructure components or where off-the-shelf-solutions are considered applicable. This regrouping of functions may require aggregation of functions or further decomposition of functions depending on the nature of the components. Once again, remember that, in undertaking any allocation or

reallocation of functions to components, the solution definition should remain implementation independent.

5.3.4.3 The resulting functional model can be formulated into a functional hierarchy that reflects the functional decomposition of the system. This functional hierarchy, if well constructed, provides a graphical representation of the outline of the FPS. It should include those functions assigned to the people components of the system as well as those allocated to materiel components.

5.3.4.4 The FPS elaborates the predominantly graphical description of the candidate solution in the OCD into a textual specification suitable for further definition. Converting the functional hierarchy from the OCD into a textual form provides the starting point for the preparation of an FPS for the system solution, i.e. both Mission System and Support System.

5.3.4.5 The FPS combines the functional requirements with the associated performance requirements identified in the OCD into requirements statements. For example, a function “Select Frequency” in the OCD may appear as, “The system shall be able to select any jamming frequency (the function) in the range 30-400MHz in increments of 10kHz (the performance)”.

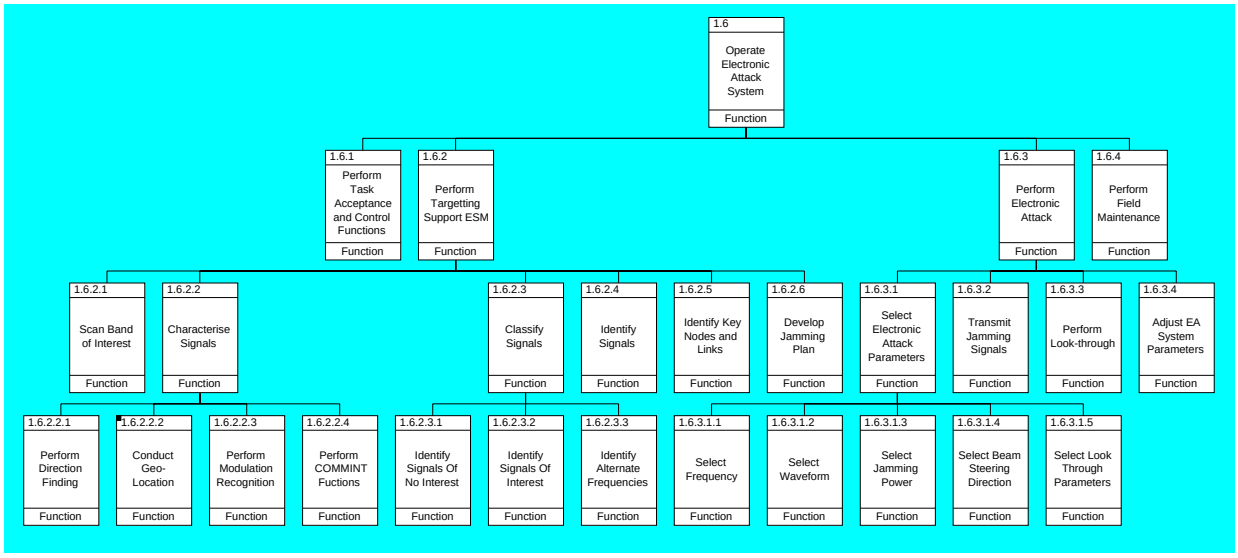

Figure 32 Example Functional Hierarchy

5.3.4.6 The functional hierarchy depicted above has been derived directly from FFBDs describing the operational process of the warfighters, operators and support staff. This hierarchy will determine the functional hierarchy for the Function and Performance Specification.

1.6 Operate Electronic Attack System
1.6.1 Perform Task Acceptance and Control Functions
1.6.2 Perform Targeting Support ESM
1.6.2.1 Scan Band of Interest
1.6.2.2 Characterise Signals
1.6.2.2.1 Perform Direction Finding
1.6.2.2.2 Conduct Geo-Location
1.6.2.2.3 Perform Modulation Recognition
1.6.2.2.4 Perform COMMINT Functions
1.6.2.3 Classify Signals
1.6.2.3.1 Identify Signals Of No Interest
1.6.2.3.2 Identify Signals Of Interest
1.6.2.3.3 Identify Alternate Frequencies
1.6.2.4 Identify Signals
1.6.2.5 Identify Key Nodes and Links
1.6.2.6 Develop Jamming Plan
1.6.3 Perform Electronic Attack
1.6.3.1 Select Electronic Attack Parameters
1.6.3.1.1 Select Frequency
1.6.3.1.2 Select Waveform
1.6.3.1.3 Select Jamming Power
1.6.3.1.4 Select Beam Steering Direction
1.6.3.1.5 Select Look Through Parameters
1.6.3.2 Transmit Jamming Signals
1.6.3.3 Perform Look-through
1.6.3.4 Adjust EA System Parameters
1.6.4 Perform Field Maintenance

Figure 33 Example Functional Hierarchy (as text)

5.3.4.7 The requirements elicitation processes described above will uncover the majority of requirements for the system under consideration, but will not uncover them all. It is recommended that the following checklist be used to uncover the remaining requirements and constraints.

a. Define Customer Expectations
b. Define Project & Enterprise Constraints
c. Define External Constraints
d. Define Operational Scenarios
e. Define Measures of Effectiveness
f. Define System Boundaries
g. Define Interfaces
h. Define Utilisation Environments
i. Define Life Cycle Concepts
j. Define Functional Requirements
k. Define Performance Requirements
l. Define Modes of Operation

m. Define Technical Performance Measures

n. Define Physical Characteristics

o. Define Human Factors

5.3.4.8 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-5, SV-4, SV-5, SV-6 and SV-7 for the Mission System and OV-4, OV-5, SV-1, SV-2, SV-3, SV-4, SV-5, SV-6, SV-7, SV-10a, SV-10b, SV-10c, SV-11 and TV-1 for the Support System.

Document the results of this activity in…		
OCD section	*5.5* *5.6*	*Mission System* *Support System*
FPS section	*3.2.x* *3.x*	*- functions and performance indices* *- constraints*
TCD section	*4.4*	

5.3.5 Address Support Philosophies and Policies

5.3.5.1 The support concept and associated support scenarios should reflect key policies and standards governing the support of the solution, including requirements for Australian Industry Involvement (AII). They should identify existing support infrastructure (where applicable) that is either mandated or available to be used, including infrastructure relating to the domains of operational support, engineering support, maintenance support, supply support, and training support. Any constraints imposed by the existing support infrastructure, such as facilities limitations, power availability, mandatory use of existing support-related information systems, and standardisation considerations should be identified.

5.3.5.2 The support concept for the solution should also address the following:

a. any solution-specific elements of the supportability requirements identified during the solution-independent development phase of the OCD;

b. concepts for engineering support, maintenance support, supply support, and training support;

c. significant components of the Support System (i.e., those elements of the Support System that represent a significant risk to the success of the capability or to LCC);

d. required facilities;

e. availability of personnel;

f. performance characteristics of the Support System, eg. spares availability, Mean Time To Repair (MTTR) for Support System components, and Turn Around Times (TATs);

g. flexibility and expandability to support anticipated areas of growth or changes in technology, threat or mission;

h. transportation and deployment concepts for elements of support;

i. the use of particular data or data-exchange standards;

j. identification of any special needs, such as the likely involvement of hazardous substances (including explosive ordnance) or security considerations, which would impact upon the support required;

k. identification of any special constraints imposed by the regulatory bodies;

l. identification of organisations involved in system development, support and use;

m. expected interfaces between the various organisational elements involved in support, including Commonwealth, overseas government agencies (eg. Foreign Military Sales (FMS)) and industry; and

n. Intellectual Property (IP) requirements to enable the support concept to be achieved over the Life Of Type (LOT) of the Mission System.

5.3.5.3 These support philosophies and policies should be developed in concert with the development and consolidation of scenarios, described previously in sections 5.3.2 to 5.3.4. This activity seeks to integrate and review the previous work and, as such, may give rise to the need for the rework or the addition of scenarios relating to support.

5.3.5.4 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") OV-4, OV-5, SV-1, SV-2, SV-3, SV-4, SV-5, SV-6, SV-7, SV-10a, SV-10b, SV-10c, SV-11, TV-1.

Document the results of this activity in…

OCD section	*5.6*
FPS section	*3.11, 3.13, 3.14, 3.15, 3.17.*
TCD section	*5.2, 6.2*

5.3.6 Address Potential System Evolution

5.3.6.1 Identify any emerging technologies and standards that may affect the system solution and identify opportunities and timeframes for technology insertion throughout the Life of Type (LOT).

5.3.6.2 This also needs to address evolving support issues, such as planned movement of support organisations or changes to support technologies, eg. migration to electronic transfer of CM data.

5.3.6.3 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") CV-3, SV-8, SV-9, TV-2.

Document the results of this activity in…

OCD section	*5.8*
FPS section	*3.10, 3.11, 3.12, 3.15.*
TCD section	*5.2, 6.2*

5.3.7 Update and Refine DAF Views with Candidate System

5.3.7.1 As a result of the real-world limitations of potential solutions, there may need to be adjustments to the system scope or interfaces. New opportunities may also arise out of the proposed solution that were not previously foreseen; however, due to their

pervasiveness, need to be reflected back to the higher levels. When these situations occur, and the DAF is applicable, there may be a need to update and refine the DAF views to reflect the candidate system.

Document the results of this activity in…	
OCD section	*as required*
FPS section	*as required*
TCD section	*as required*

5.3.8 Identify Scenarios and Responsibilities for AIS and Contractual Delivery

5.3.8.1 The total scope of T&E required to deliver the capability through the milestones of CD and AIS needs to be defined, including phases of DT&E, PT&E, AT&E and OT&E, all of which should include elements of ST&E. The following need to be identified:

a. the CD Acceptance scenarios,

b. AIS Acceptance scenarios to be covered by the DMO acquisition phase, and

c. AIS delta.

5.3.8.2 Where the DAF is applicable to the OCD, this should consider the DAF views ("to be") CV-1, CV-4.

Document the results of this activity in…		
OCD section	*1.2*	*Ensure relevant stakeholders are included in section 1.2* *These should be a subset, perhaps consolidated, of the external scenarios*
FPS section	*4*	*Testing scenarios for AIS may be referenced or identified in section 4.*
TCD section	*5.2, 6.2, 6*	

5.3.9 Validate Second Pass Documents With Stakeholders

5.3.9.1 The above process (for second pass) is repeated for each candidate solution, as each solution will have different functional descriptions dependent on its architecture. The needs of the people inside the system will also be different for each candidate solution. Additionally, the support elements of each solution are likely to be different. Each candidate solution, therefore, needs its own OCD section or separate annex. Each candidate solution should be described in the context of the solution independent, operational use description to ensure that it will satisfy the operational need. The level of detail to be provided needs only to be enough to permit a valid comparison between the various system solutions.

5.3.10 Develop Capability System Options for COD

5.3.10.1 Develop the Acquisition Business Case and Capability Options Document (COD) for Second Pass Approval as per the CSLCMG. The COD will include the OCD, FPS and TCD as Annexes - the relevance of these documents to an outline of the COD is shown in Table 3.

1	Cover Sheet	-
2	References	-
3	Description	-
4	Background and Previous Committee Consultation	-
5	Purpose	Refer to OCD
6	Justification	Refer to OCD
7	Relationship to Other Capabilities	Refer to OCD
8	Function and Performance	Refer to OCD and FPS
9	Timings	-
10	Capability System Options	Refer to OCD for each option
11	Financial Considerations	-
12	Preparedness	-
13	Workforce Planning	-
14	Training	-
15	Through Life Support	Refer to OCD for each option
16	Environmental Protection	-
17	Information Environment	Refer to OCD for each option
18	Industry Engagement	-
19	Interoperability	Refer to OCD for each option
20	Collaboration	-
21	Acquisition Strategy	-
22	Numbers of Platforms and Systems	Refer to OCD for each option
23	Science and Technology	Refer to TCD
24	Major Risks and Hurdles	-
25	Risk Management	-
26	Occupational Health and Safety	-
27	Annexes	Including OCD, FPS, TCD

Table 3 COD Sections

5.4 Second Pass Approval

5.4.1.1 The purpose of Second Pass Approval is to obtain Government approval to a particular solution and, therefore, to enable the capability development process to transition to the acquisition phase. In preparation for Second Pass Approval, it will be necessary to refine estimates of LCC and schedule for AIS for each candidate solution to allow a project budget and schedule to be agreed. The level of detail needs to be sufficient to allow a valid comparison of candidate solutions so that a commitment can be made to a particular solution with appropriate budget and schedule.

5.4.1.2 The timing for transfer of accountability from Vice Chief of the Defence Force (VCDF) to Under Secretary Defence Materiel (USDM), i.e. from Capability Systems to DMO, is not necessarily at the DCIC Second Pass Approval; it can be at any time up to the issue of the RFT and could be after a first phase Project Definition Study (PDS). An incomplete but sufficient OCD can be considered by DCIC with further detail (for RFT purposes) completed after the committee has made its decision about options, cost caps and level of capability to be delivered, etc. Capability Systems / Knowledge Systems (CS/KS) staff are responsible for the OCD through DCIC consideration and up until transfer of accountability. During this period the CS/KS staff will lead the integrated team responsible for the project and development of the OCD. DMO are responsible for determining whether or not the OCD is sufficiently detailed to enable formal transfer of responsibility. Once transfer of responsibility has occurred then DMO staff will lead the project management team responsible for the project.

5.5 Refine OCD, FPS & TCD Prior To Solicitation

5.5.1 During the initial stages of the acquisition phase, the OCD, FPS and TCD for the selected solution are refined for inclusion in the solicitation package for acquisition. For example, the logistic support elements in each of these documents may need to be further enhanced to fully address logistic support policy requirements for the agreed

system solution (both Mission System and Support System). Additionally, the full suite of regulatory requirements may need to be incorporated into the FPS.

5.5.2 Additional feedback may also be expected from the potential suppliers in areas such as limitations in “parameter space” due to implementation cost or fundamental physical limits. As an example, a system may have three parameters specifying attributes of its performance with expected minimum and maximum limits defined in the FPS. Feedback from the suppliers may indicate that if all three of these parameters are simultaneously required to be at their maximum values, then the cost may increase by a factor of ten over what they believe may be a reasonable operational envelope. Discussions with the suppliers and and-user are required to bound such limits to practicable values, defining a selected sub-space within the parameter volume. These revised bounds should be reflected in the OCD and FPS. Note that such limits are also likely to be uncovered during detailed analysis conducted in-contract by the supplier (and would lead to formal contract change proposals), one of the aims of the OCD and FPS is to capture as many of these as possible that may be significant cost drivers as early as possible.

5.5.3 The ASDEFCON Statement of Work template refers to the OCD and FPS in the areas of Requirements Validation and Acceptance Verification and Validation. The OCD and FPS are to be used by the Contractor in developing and validating Mission System and Support System specifications. Traceability is to be established and maintained between the Mission and Support System specifications and the FPS and OCD. Scenarios to be used for system validation and acceptance are to be based on those described in the OCD. These scenarios will bound the scope of Acceptance Validation and be used to assess the system’s “fitness for purpose” (i.e., its ability to perform as specified in its operational environment to satisfy the warfighter’s intended purpose). This commercial reliance on the OCD requires that it be well prepared and accurately reflect the warfighter’s understanding and intended use of the system.

5.6 Maintain Documents Over Life Of System

5.6.1 Since OCDs are used to aid communications throughout the system development phases, they should be considered living documents and updated as the system design evolves. This maintenance should only affect the internal description of the system from an implementation perspective. It is expected that the external or solution independent description will remain unchanged unless changes in the environment, threat or operational concept arise and these may then be treated as valid changes in requirement within the context of the acquisition contract. Updates to the OCD should be managed and, given the importance of the document, an appropriate level of approval authority applied, coordinated through the project sponsor. For systems expected to be in service for many years and particularly those that are planned to be evolved during their life times, the OCD should be used to support the development of enhancements or new system capabilities. This practice will enable developers to better understand the operational impacts of proposed modifications. Maintaining the OCD consistent with the current system implementation also provides a very useful source of information to help familiarise new personnel.

5.6.2 The OCD, FPS and TCD will be baselined at the point of accountability transfer to the DMO. The DMO will further develop these documents by adding lower level detail, such as Occupational Health and Safety (OH&S) and other regulatory requirement needed for acquisition purposes. If these lower level details do not change the high level functionality in the baselined documents, then CS/KS staff does not need to approve the changes. If, however, there were a need to change the high level requirements in the baselined documents (i.e. affect the end-user capability) then CS/KS staff would need to approve the changes.

5.6.3 Note that the OCD, FPS and TCD documents are not intended to be modified by DMO in isolation, rather it should be developed in an Integrated Product Team (IPT) environment whose focus moves from CS/KS to DMO with and any changes that may affect end-user requirements need to be approved

5.6.4 Under the ASDEFCON Statement of Work template, there is no requirement to maintain the currency of the FPS. This approach was adopted because of the complexities and

timing problems with attempting to maintain alignment between the FPS and the system specifications (for both the Mission System and Support System) during the acquisition phase. Instead, Application for Deviation or Waiver forms will be used to manage any differences between the FPS and the respective system specifications. These forms will be approved by the project sponsor to ensure that the differences are acceptable and that a solution that satisfies the capability will still be provided.

ANNEX A – Mapping of Development Process to OCD, FPS & TCD Documents

This table shows the extracted cross references of the activities in the guide to the sections in each of the document.

Process Element	***OCD Section***	***FPS Section***	***TCD Section***
5 GUIDANCE FOR THE PREPARATION OF AN OCD, FPS AND TCD	-	-	-
5.1 Prepare For First Pass Approval	-	-	-
5.1.1 Define Framework	-	-	-
5.1.1.1 Identify Capability	1.1	1.1	1.1
5.1.1.2 Identify Document Purpose & Intended Audience	1.2	1.3	1.2
5.1.1.3 Identify Acquisition Rationale	1.3	N/A	N/A
5.1.1.4 Identify System & Acquisition Boundaries	1.4, 1.5	3.3.1	1.3
5.1.1.5 Identify Acquisition Timeframe	1.4	N/A	1.4
5.1.2 Define Operational Scope	-	-	-
5.1.2.1 Analyse Relevant MROs & Preparedness Directives	N/A	N/A	N/A
5.1.2.2 Identify Mission Primary & Secondary Objectives	3.1	N/A	N/A
5.1.2.3 Identify Operational Policies & Constraints	3.2	N/A	N/A
5.1.3 Define Solution Independent Capability Needs	-	-	-
5.1.3.1 Select Minimal Operational Scenario Set	3.4	N/A	N/A
5.1.3.2 Develop Operational Scenario	-	-	-
5.1.3.2.1 Describe Situation Requiring ADF Action	3.4.x.1, Annex A	N/A	N/A

Process Element	***OCD Section***	***FPS Section***	***TCD Section***
5.1.3.2.2 Identify Environment (Physical, Geographical, Social etc)	3.4.1, 3.4.x.1	N/A	3.2
5.1.3.2.3 Identify Projected Threat Relevant To Scenario	Annex A x.1.1.1	N/A	N/A
5.1.3.2.4 Describe Military Response (CONOPS)	3.4.2.2, Annex A x.1.1.1	N/A	N/A
5.1.3.2.5 Describe Detailed Warfighter Business Processes	Annex A x.1.1.1	N/A	*5.2, 6.2*
5.1.3.3 Extract Operational Requirements	-	-	-
5.1.3.3.1 Identify All End-Users Of System Products	3.3	1.2	4.4
5.1.3.3.2 Step Through Scenario To Identify Operational Requirements and Constraints	3.4.2.3, Annex A x.1.1.2	N/A	5.2, 6.2
5.1.3.4 Consolidate Operational Requirements and Constraints	3.5	N/A	N/A
5.1.3.5 Extract High-Level System Functional Requirements and Constraints	3.6	3.2.x, 3.x	*6,7*
5.1.3.6 Define Solution Independent Internal System Needs, Constraints and Objectives	3.7	3.x	7
5.1.4 Describe Existing System	4.1	N/A	N/A
5.1.4.1 Provide Overview of Existing System	4.2, 4.3	N/A	3.3
5.1.4.2 Compare Capability	4.2, 4.3	N/A	3.3
5.1.4.3 Define Existing System Shortcomings	4.2, 4.3	N/A	N/A
5.1.4.4 Identify Planned Upgrades	4.4	N/A	N/A
5.1.4.5 Identify Existing System External Personnel	4.1	N/A	3.3

Process Element	***OCD Section***	***FPS Section***	***TCD Section***
5.1.4.6 Identify Existing System Internal Personnel and Roles	4.5	N/A	3.3
5.1.4.7 Identify Existing System Internal Functionality	4.6	N/A	3.3
5.1.4.8 Identify Existing System Internal Scenarios	4.7, Annex B	N/A	3.3
5.1.5 Validate First Pass Documents With Stakeholders	-	-	-
5.1.6 Develop Capability System Options for PCOD	-	-	-
5.2 First Pass Approval	-	-	-
5.3 Prepare For Second Pass Approval	-	-	-
5.3.1 Describe Candidate Solution	5.1	1.2	4
5.3.2 Develop System Internal Requirements	-	-	-
5.3.2.1 Select Minimal Internal Scenario Set	5.5, 5.9	3.1	*5.2, 6.2*
5.3.2.2 Develop Internal Scenario	5.9, Annex C	N/A	*5.2, 6.2*
5.3.2.3 Extract Internal System Requirements	N/A	N/A	N/A
5.3.3 Consolidate System Personnel Needs	5.3	3.13	*5.2, 6.2*
5.3.4 Consolidate System Functional Requirements and Constraints	5.5, 5.6	3.2.x, 3.x	4.4
5.3.5 Address Support Philosophies and Policies	5.6	3.11, 3.13, 3.14, 3.15, 3.17	*5.2, 6.2*
5.3.6 Address Potential System Evolution	5.8	3.10, 3.11, 3.12, 3.15	*5.2, 6.2*
5.3.7 Update and Refine DAF Views with Candidate System	as required	as required	as required

Process Element	***OCD Section***	***FPS Section***	***TCD Section***
5.3.8 Identify Scenarios and Responsibilities for AIS and Contractual Delivery	1.2	4	5.2, 6.2, 6
5.3.9 Validate Second Pass Documents With Stakeholders	-	-	-
5.3.10 Develop Capability System Options for COD	-	-	-
5.4 Second Pass Approval	-	-	-
5.5 Refine OCD, FPS & TCD Prior To Solicitation	as required	as required	as required
5.6 Maintain Documents Over Life Of System	as required	as required	as required

ANNEX B – Enhanced Functional Flow Block Diagram (FFBD) Overview

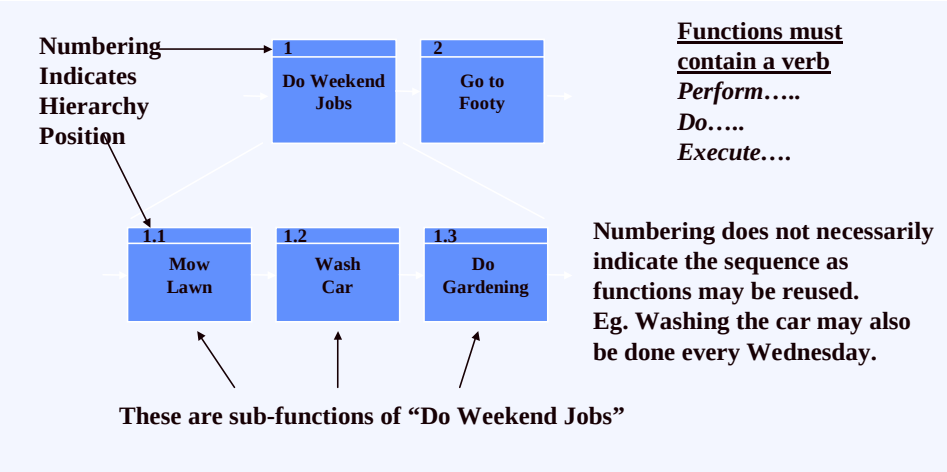

Figure 34 Functional Flow Block Diagrams - functional hierarchy

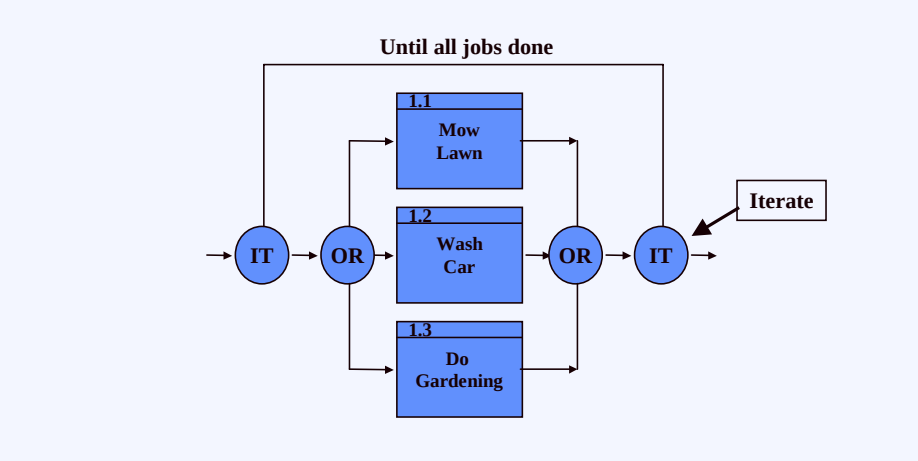

Figure 35 Where Sequence is not Defined

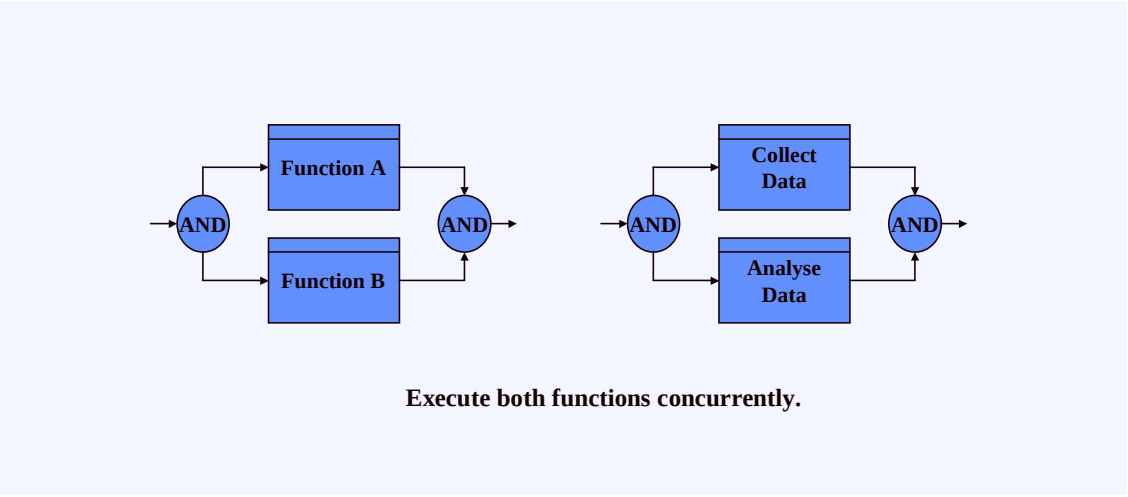

Figure 36 FFBD Concurrent Function

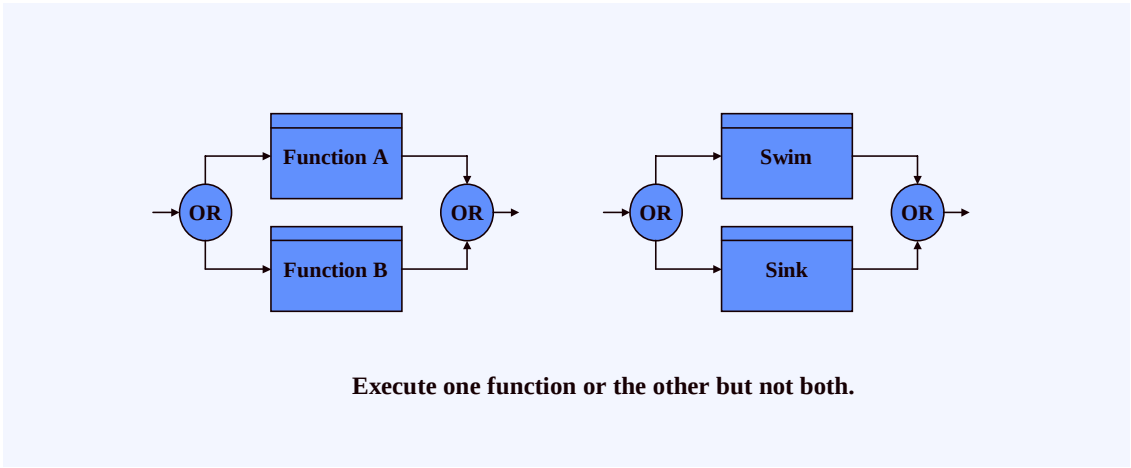

Figure 37 FFBD Select Function

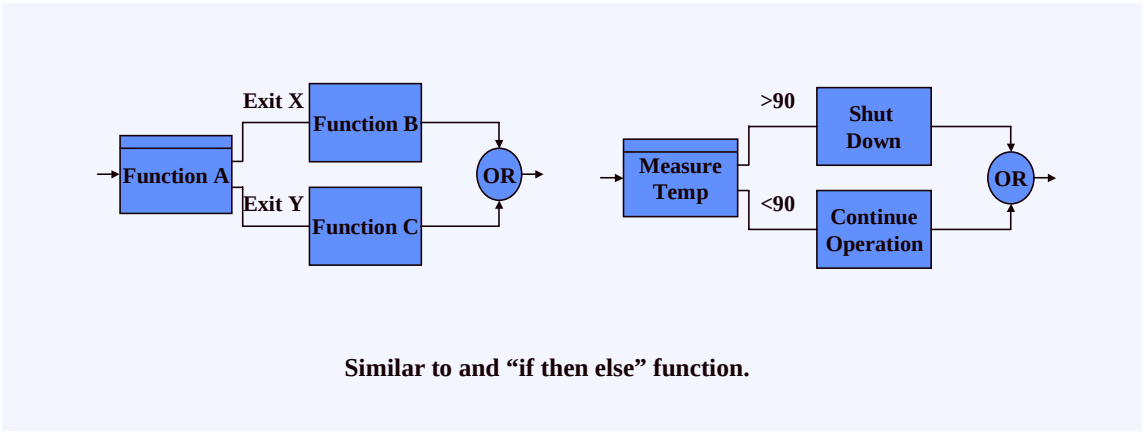

Figure 38 FFBD Exit Conditions

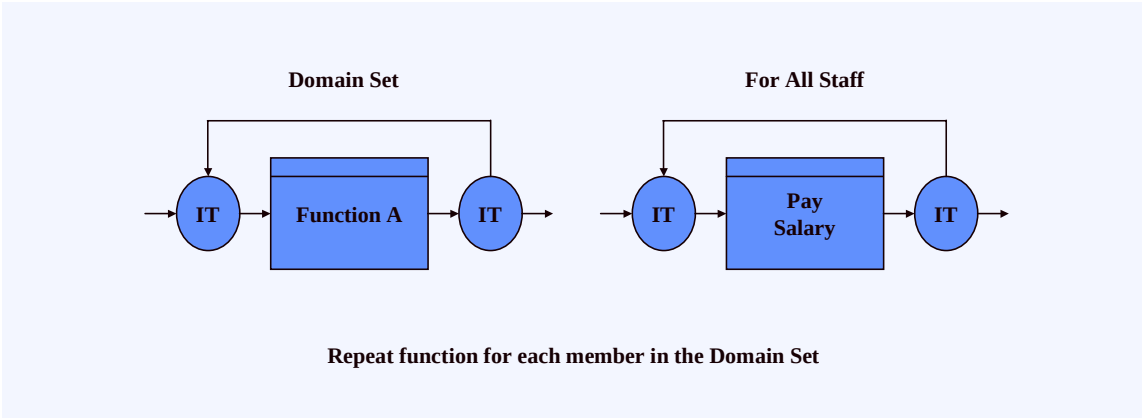

Figure 39 FFBD Iterate Function

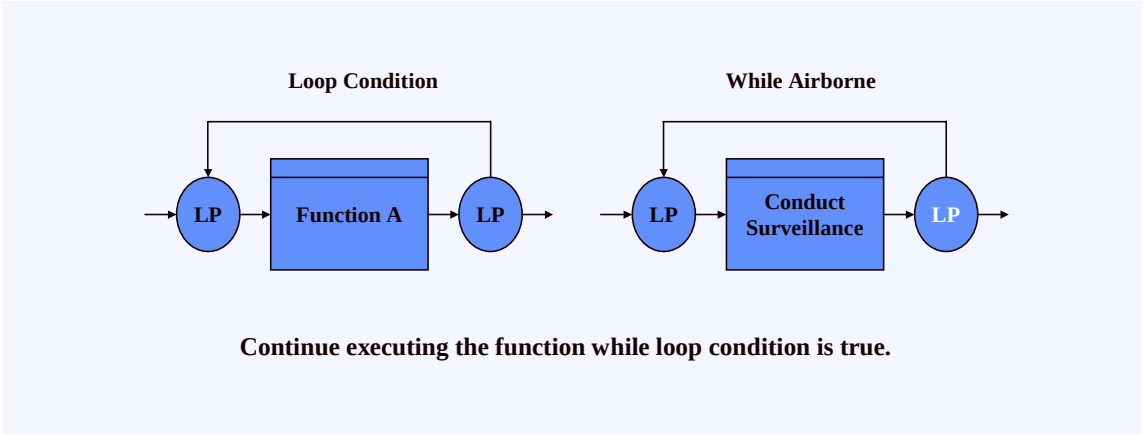

Figure 40 FFBD Loop Function

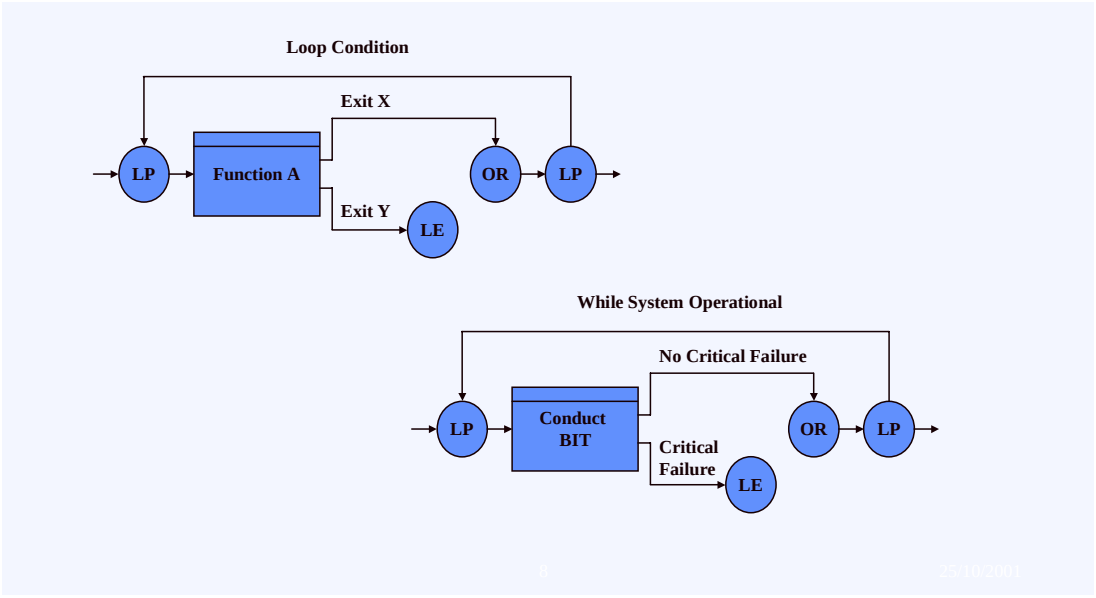

Figure 41 FFBD with Loop Exit

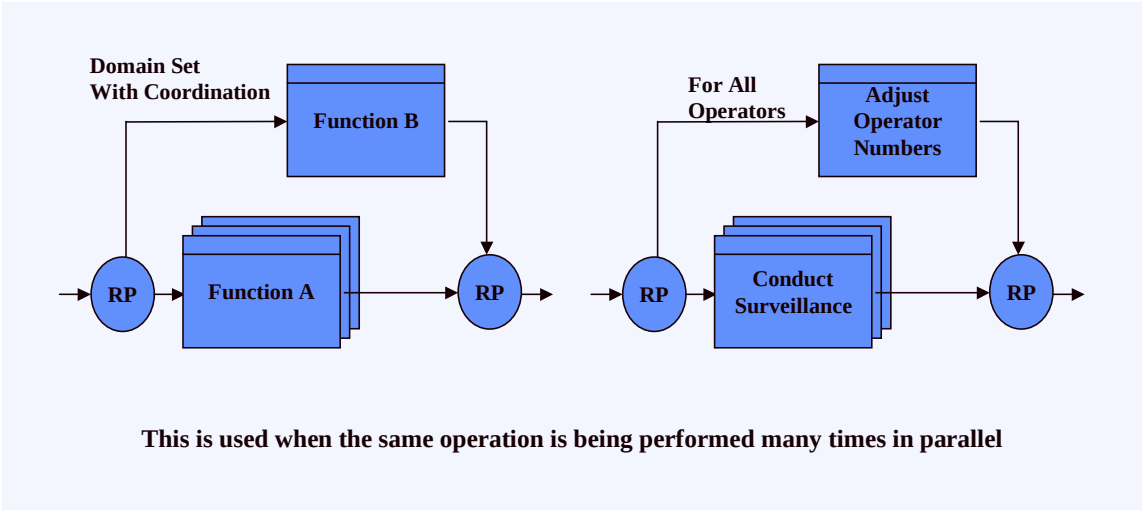

Figure 42 FFBD Replicate with Coordination

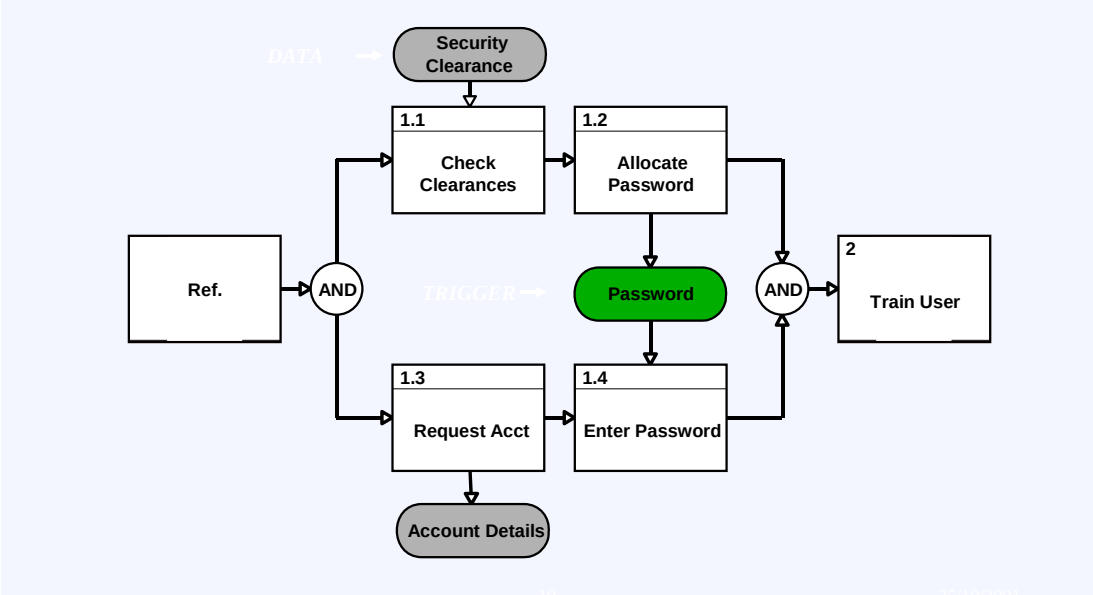

Figure 43 Enhanced FFBD - CORE™ Symbology

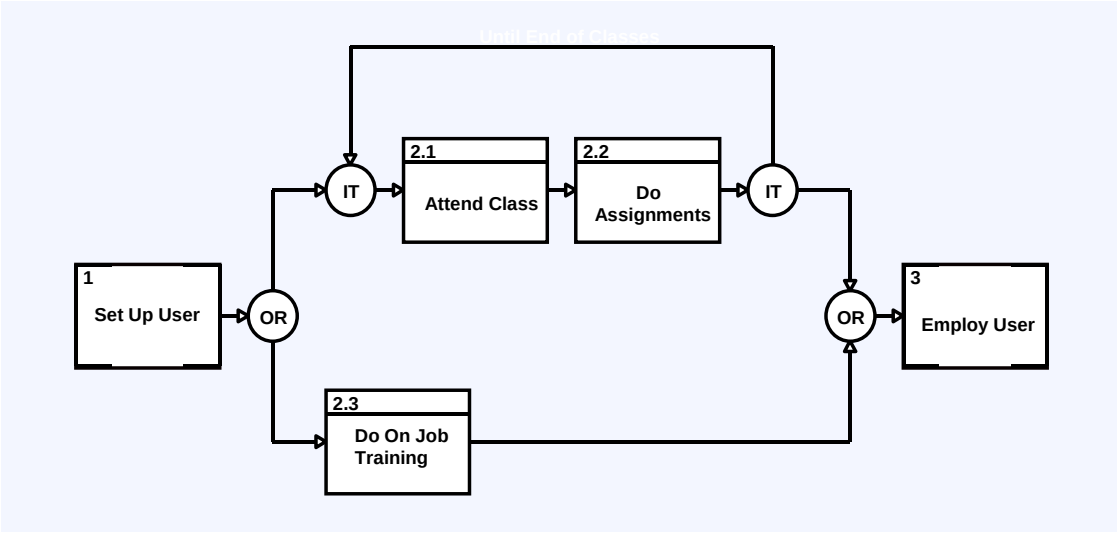

Figure 44 FFBD - CORE™ Symbology

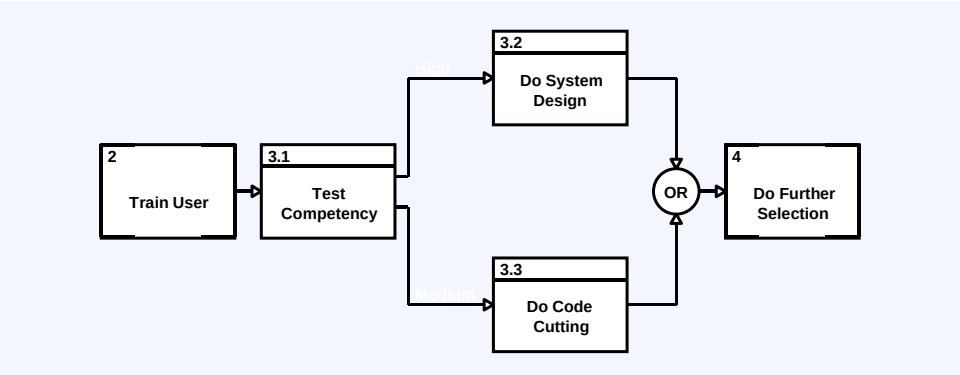

Figure 45 CORE™ FFBD Symbology

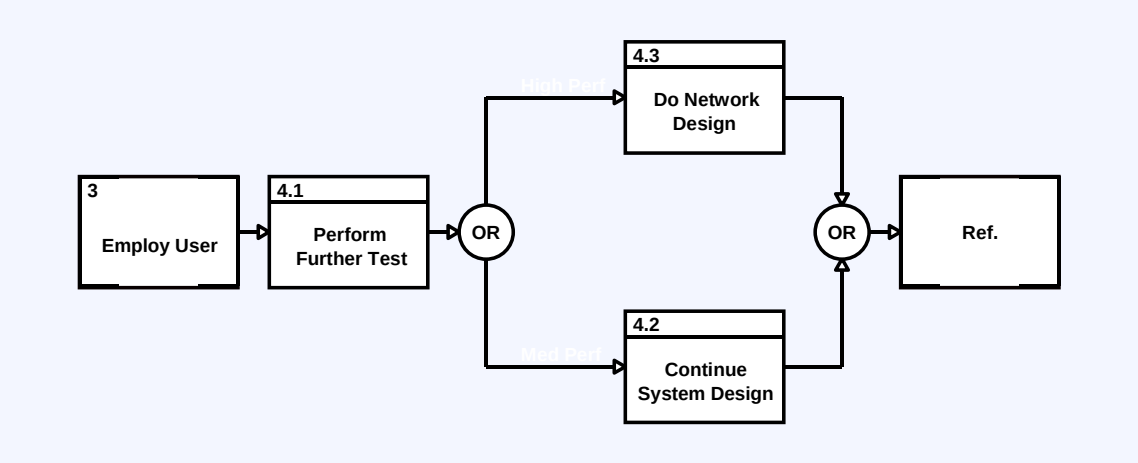

Figure 46 CORE™ FFBD Symbology

ANNEX C – Defence Architecture Framework (DAF) Summary

This Annex provides a brief summary of the Defence Architecture Framework and, where applicable, its use in the development of an OCD. For more details refer to http://www.defence.gov.au/dhq/cko/archmain.htm.

Table 4 Summary of DAF Views

DAF Product	*Product Name*	*DAF Product Description*	*Notes*
CV-1 **(essential)**	**Overview and Summary Information**	A textual description addressing: Identification. Uniquely identifies the system, when it was produced and by whom. Purpose. Explain why the system is needed, identify the decisions to be made on the basis of the description and identify the actions expected to result from the description. Scope. Identify the system views and products and the temporal nature of the system such as the time frame covered (either by specific years or by designations such as “as-is”, “to-be”, transitional”, objective” et cetera. Context. Describe the interrelated conditions that compose the setting in which the system exists. Include such things as doctrine, relevant goals and vision statements, concepts of operation, scenarios and environmental conditions. Specify the authoritative sources for rules, criteria and conventions used in developing the system. Findings. State the findings, and recommendations that have been developed based on the system. Example findings may include the identification of shortfalls, recommended system implementations and opportunities for technology insertion.	This product provides summary information describing the “who, what, when, why, where and how” of the issue. It uniquely identifies the capability described by this document, when it was produced and by whom. The intended audience is identified and their expected interest in the document. It explains why the capability is needed, identifies the decisions to be made on the basis of the description and the actions expected to result from these decisions. It identifies the temporal nature of the capability such as the time frame covered either by specific years or by designations such as “as-is”, “to-be”, transitional”, objective” et cetera. Year Of Decision, In Service Date and LOT should be identified. Where a progressive introduction into service is expected then the timing of each upgrade should be identified. This information is particularly helpful in identifying long range requirements for assets either for modification or validation. It should summarise the interrelated conditions that compose the setting in which the capability exists. Include such things as doctrine, relevant goals and vision statements, concepts of operation, scenarios and environmental conditions. Specify the authoritative sources for rules, criteria and conventions used in defining the capability. It should summarise the findings, and recommendations that have been developed based on the capability. Example findings may include the identification of shortfalls, recommended system implementations and opportunities for technology insertion.

DAF Product	*Product Name*	*DAF Product Description*	*Notes*
CV-2 (essential)	**Integrated Dictionary**	Textual information in the form of definitions and metadata associated with the graphical representations, ie. a glossary of terms and references applicable to the document. References the Defence Business Language (DBL) component of the Defence Information System.	This section should list, by document number and title, all documents referenced in this document together with its source (ie a referenced document list) Define the terms applicable to this document. Terms should be consistent with and make reference to the DBL component of the Defence Information System as applicable. (ie a Glossary of Terms)
CV-3 (essential)	**Architecture Compliance Statement**	The purpose of the Architecture Compliance Statement is to ensure that the Specific Operation/Business Architecture products are compliant with the information and technology embodied in the Defence Architecture Framework (DAF). Where the architecture products do not comply with DAF the extent of the non-compliance and the justification are to be specified.	
CV-4 (supporting)	**Capability Maturity Profile**	Description of focus areas in terms of incremental capability levels, consistent with a standard capability maturity scale.	
OV-1 (essential)	**High-Level Operational Concept Graphic**	One or more graphical representations of the operational concept. Product can be used to show the “as is” or the “to be” view.	Provides high level picture of operations
OV-2 (essential)	**Operational Node Connectivity Description**	A graphical representation of the operational nodes, the activities performed at each node, connectivity and information flow between the nodes. Main features include the operational nodes and elements, the neediness between them, and the characteristics of the information exchanged. Arrows indicate information flow and are annotated to characterise the information content (eg. voice, imagery, text and message format etc.), volume requirements, classification and security, timeliness and Interoperability requirements. Information can be shown selectively in a diagram or more comprehensively in a matrix format.	Provides high level view of operational processes that can be described in more detail using an activity model (see OV-5) to fully describe operational processes.
OV-3 (essential)	**Operational Information Exchange Matrix**	Relates the activities, operational elements and the Information flow between them, ie. *who* exchanges *what* information with *whom; why* is it necessary and *what* is the manner of communication.	Supports the description of the mission and the operational processes involved identifying the products and their producers and consumers together with the mechanisms employed.
OV-4 (supporting)	**Command Relationship Chart**	Illustrates the relationships among organisations or personnel. Relationships can include command & control, co-ordination and many others depending on the nature of the capability.	Cover reporting relationships, personnel types, structure, and interactions through the use of hierarchical organisational charts and coloured boxes.

DAF Product	*Product Name*	*DAF Product Description*	*Notes*
OV-5 (essential)	**Activity Model**	Describes the activities, data/information exchanged between the activities and the data/information exchanged outside the capability. The model is hierarchical successively decomposing activities to the required level. The Activity Model captures the activities performed in an operational process or mission. As well as the inputs, controls, outputs and mechanisms. The Activity Model additionally identifies the mission domain and the applicable viewpoint reflected in the model. Textual definitions and descriptions should accompany graphical representations as needed. Annotations may identify the nodes where the activities take place. The Activity Model contributes greatly to the definition and appropriate understanding of an operational system. It generally includes a hierarchy of activities, explanatory text and dictionary entries in the Integrated Dictionary (CV-2).	This is a key area of describing the operational use of the system particularly using graphical techniques such as EFFBDs.
OV-6a (supporting)	**Operational Rules Model**	Dynamic view describing the rules that define or constrain some aspect of the capability. Rules can be described in a number of ways including a formal language representation or a logical data model. Textual definitions of the rules should be stored in the Integrated Dictionary (CV-2).	
OV-6b (supporting)	**Operational State Transition Description**	Dynamic view used to describe critical timing and sequencing behaviour in the operational context. Used to further describe operational processes. Also used to describe operational process responses to sequences of events. Events may be referred to as inputs, transactions or triggers. When an event occurs, the action to be taken may be subject to a rule or set of rules as described in the Operational Rules Model (OV-6a).	Supports the Activity Model in terms of sequencing and responses to stimuli. Also used to describe state transitions.
OV-6c (supporting)	**Operational Event / Trace Description**	Dynamic view used to describe critical timing and sequencing behaviour in the operational context. Used to further describe operational processes. Also used to describe operational process responses to sequences of events. Events may be referred to as inputs, transactions or triggers. When an event occurs, the action to be taken may be subject to a rule or set of rules as described in the Operational Rules Model (OV-6a).	Supports the Activity Model in terms of sequencing and responses to stimuli. Also used to describe state transitions.
OV-7 (supporting)	**Logical Data Model**	Describes the data and information associated with the information exchanges identified within the scope of the capability to the level of detail required. The level of detail needs to be commensurate with the intent of the description. An example format is an Entity Relationship Diagrams perhaps without the entity attributes.	Supports the description as required. The level of detail will depend upon the type of system and the level of understanding required of the data.
SV-1 (essential)	**System Interface Description**	Links together the operational and systems views by depicting the assignments of systems and their interfaces to the nodes and need lines described in the Operational Node Connectivity Description (OV-2). It identified the interfaces between system nodes, between systems, and between components of a system, depending on the needs of the capability. Detailed descriptions of interfaces if required are provided in the Systems Communications Description (SV-2).	

DAF Product	*Product Name*	*DAF Product Description*	*Notes*
SV-2 (supporting)	**Systems Communication Description**	Systems Communications Descriptions detail the interfaces described in the System Interface Description (SV-1). It depicts pertinent information about the communications elements and services. A graphical representation with supporting text is used to describe all pertinent communications attributes (eg waveform, bandwidth, radio frequency, encryption methods)	
SV-3 (supporting)	**Systems to Systems Matrix**	The Systems to Systems Matrix is usually of the form of an N2 chart and can represent many types of information. For example, it can depict the systems to systems interfaces using different symbols and colour coding to depict status (eg existing, planned, potential, de-activated), category (logistics, intelligence, C2), and classification. It can be a useful tool for illustrating the evolution of systems and system infrastructures, the insertion of new technologies/capabilities, and the redistribution of systems and processes in context with evolving operational requirements.	
SV-4 (supporting)	**Systems Functionality Description**	The Systems Functionality Description describes the relationship between the system functions, activities and data products.	Functional flow block diagrams provide a functionality centred view. Data Flow Diagrams may also be a useful representation for depicting the flow of data and associated processing for information-intensive systems.
SV-5 (supporting)	**Operational Activity to System Function Traceability Matrix**	The Operational Activity to System Function Traceability Matrix provides a link between the operational and systems views. It depicts the mapping of operational activities to system functions and hence identifies the transformation of operational need into purposeful action performed by a system component. System functions mapped to a materiel item identify those activities that are to be automated. Similarly, activities mapped to system functions associated with human components of the system constitute the manual operations within the system.	Really depends on what the understanding of what the Operational Needs section contains.
SV-6 (supporting)	**System Information Exchange Matrix**	Detailing of data exchanges among system elements. The focus is on how data exchanges actually are (or will be) implemented in system specific details covering such characteristics as specific protocols, and data and media formats. Lends itself to being a spreadsheet as it may be useful to sort the data multiple ways. Hardcopy representations should be limited to high-level summaries or subsets of particular interest.	
SV-7 (supporting)	**System Performance Parameters Matrix**	Builds on the System Interface Description (SV-1) to depict the current performance characteristics of each system element and the expected or required performance characteristics at specified times in the future. The future performance expectations are geared to the Standards Technology Forecast (TV-2).	Captures Measures of Effectiveness and other measures of performance.
SV-8 (supporting)	**System Evolution Description**	Describes the plans for “modernising” a system or suite of systems over time. This product builds on the previous products in that information requirements, performance parameters and technology forecasts must be accommodated.	Identifies opportunities for technology insertion.

DAF Product	*Product Name*	*DAF Product Description*	*Notes*
SV-9 (supporting)	**System Technology Forecast**	System Technology Forecast is a detailed description of emerging technologies and specific products. It contains predictions about availability of emerging capabilities and industry trends in specific timeframes and confidence factors for the predictions.	Identifies potential technologies for insertion.
SV-10a (supporting)	**Systems Rules Model**	The Systems Rules Model focuses on constraints imposed by operational processes or systems functionality due to systems design or implementation.	
SV-10b (supporting)	**Systems State Transition Description**	Describes system activity sequence and timing highlighting system responses to an event or condition.	
SV-10c (supporting)	**Systems Event / Trace Description**	Describe dynamic behaviour tracing actions in a scenario or critical sequence of events. Can be used alone or in conjunction with System State Transition Diagrams (SV-10b).	
SV-11 (supporting)	**Physical Data Model**	Physical Data Model is used to describe how information presented in the Logical Data Model is actually implemented in the systems view.	Relevant to information systems.
TV-1 (essential)	**Technical Architecture Profile**	The set of rules that govern system implementation and operation. This product references the technical standards that apply to the system and how they need to be implemented. It can include a time-phased description to depict the adoption of emerging technologies and the likelihood of current technologies and standards becoming obsolete.	
TV-2 (supporting)	**Standards Technology Forecast**	The Standards Technology Forecast is a detailed description of emerging technology standards relevant to the system and operational processes. It includes predictions about the availability of emerging standards and the likely obsolescence of existing standards in specific timeframes and confidence factors for the predictions. It also contains matching predictions of market acceptance of each standard and an overall risk assessment with using the standard. The forecast includes potential standards impacts on current systems and thus influences the development of transition and objective systems.	Identifies impact of changing standards. Particularly relevant for information interfaces.

Table 5 Mapping of DAF Views to OCD Sections

Serial Description	OCD Serial	Overview and Summary Information	Integrated Dictionary	Capability Maturity Profile	Architecture Compliance Statement	High level Operational concept graphic	Operational Node Connectivity Description	Operational Information Exchange Matrix	Command Relationship Chart	Activity Model	Operational Rules Model	Operational State Transition Description	Operational Event/Trace Description	Logical Data Model	System Interface Description	Systems Communication Description	Systems to Systems Matrix	System Functionality Description	Operational Activity to System Function traceability Matrix	System Information Exchange Matrix	System Performance Parameters Matrix	System Evolution Description	System Technology Forecast	System Rules Model	Systems State Transition Description	Systems Event/ Trace Description	Physical Data Model	Technical Architecture Profile Standards and Conventions	Standards Technology Forecast
		CV-1	CV-2	CV-4	CV-3	OV-1	OV-2	OV-3	OV-4	OV-5	OV-6a	OV-6b	OV-6c	OV-7	SV-1	SV-2	SV-3	SV-4	SV-5	SV-6	SV-7	SV-8	SV-9	SV-10a	SV-10b	SV-10c	SV-11	TV-1	TV-2
Scope	1.0																												
Capability Identification	1.1	■		■																									
Document Purpose and Intended Audience	1.2	■			■																								
Justification for Acquisition	1.3	■																											
System Acquisition Boundaries	1.4	■				■																							
Context	1.5	■																											
Definitions and Referenced Documents	2.0		■																										
Solution Independent Capability Needs - "to be"	3.0																												
Mission Overview	3.1					■	■	■		■	■	■	■	■															
Operational Polices and Constraints	3.2										■																	■	
Personnel Interfaces to System	3.3								■																				
Operational Scenario Summary	3.4					■	■	■	■	■	■	■	■	■															
Common Scenario Attributes	3.4.1					■	■	■	■	■	■	■	■	■															
Scenario One	3.4.2					■	■	■	■	■	■	■	■	■															
Scenario Two	3.4.3					■	■	■	■	■	■	■	■	■															
Scenario ...n	3.4.n					■	■	■	■	■	■	■	■	■															
Consolidated Operational Needs	3.5					■	■	■	■	■	■	■	■	■															
Consolidated Functional Needs	3.6																	■	■										
Solution Independent Internal Systems Needs, Constraints and Objectives	3.7																											■	

Serial Description	OCD Serial	Overview and Summary Information	Integrated Dictionary	Capability Maturity Profile	Architecture Compliance Statement	High level Operational concept graphic	Operational Node Connectivity Description	Operational Information Exchange Matrix	Command Relationship Chart	Activity Model	Operational Rules Model	Operational State Transition Description	Operational Event/Trace Description	Logical Data Model	System Interface Description	Systems Communication Description	Systems to Systems Matrix	System Functionality Description	Operational Activity to System Function traceability Matrix	System Information Exchange Matrix	System Performance Parameters Matrix	System Evolution Description	System Technology Forecast	System Rules Model	Systems State Transition Description	Systems Event/ Trace Description	Physical Data Model	Technical Architecture Profile Standards and Conventions	Standards Technology Forecast
		CV-1	CV-2	CV-4	CV-3	OV-1	OV-2	OV-3	OV-4	OV-5	OV-6a	OV-6b	OV-6c	OV-7	SV-1	SV-2	SV-3	SV-4	SV-5	SV-6	SV-7	SV-8	SV-9	SV-10a	SV-10b	SV-10c	SV-11	TV-1	TV-2
Existing System - "as is"	4.0																												
Overview	4.1																												
Operational Capability Comparison	4.2																												
Internal Capability Comparison	4.3																												
Planned or Active Upgrades	4.4																												
Internal Personnel Interfaces	4.5																												
Internal Functionality	4.6																												
Internal Scenarios	4.7																												
Internal Scenario One	4.7.1																												
Internal Scenario Two	4.7.2																												
Internal Scenario …n	4.7.n																												
Systems Solution Description - "to be"	5.0																												
System Description	5.1																												
System Interfaces	5.2																												
System Personnel	5.3																												
Mission System Architecture	5.4																												
System Functionality and Performance	5.5																												
Support System Needs	5.6																												
System Constraints	5.7																												
System Evolution and Technology Forecast	5.8																												
System Solution Internal Scenarios	5.9																												
Solution Scenario One	5.9.1																												

Serial Description	OCD Serial	Overview and Summary Information	Integrated Dictionary	Capability Maturity Profile	Architecture Compliance Statement	High level Operational concept graphic	Operational Node Connectivity Description	Operational Information Exchange Matrix	Command Relationship Chart	Activity Model	Operational Rules Model	Operational State Transition Description	Operational Event/Trace Description	Logical Data Model	System Interface Description	Systems Communication Description	Systems to Systems Matrix	System Functionality Description	Operational Activity to System Function traceability Matrix	System Information Exchange Matrix	System Performance Parameters Matrix	System Evolution Description	System Technology Forecast	System Rules Model	Systems State Transition Description	Systems Event/ Trace Description	Physical Data Model	Technical Architecture Profile Standards and Conventions	Standards Technology Forecast
		CV-1	CV-2	CV-4	CV-3	OV-1	OV-2	OV-3	OV-4	OV-5	OV-6a	OV-6b	OV-6c	OV-7	SV-1	SV-2	SV-3	SV-4	SV-5	SV-6	SV-7	SV-8	SV-9	SV-10a	SV-10b	SV-10c	SV-11	TV-1	TV-2
Solution Scenario Two	5.9.2																												
Solution Scenario …n	5.9.n																												

LEGEND

DAF essential “to be” view

DAF supporting “as is” view

DAF supporting “to be” view

ANNEX D – Consolidated FFBD Model of Development Process

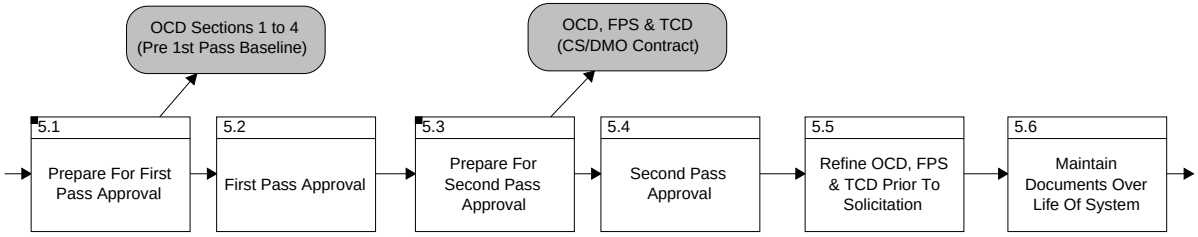

Figure 47 Develop OCD, FPS & TCD [5]

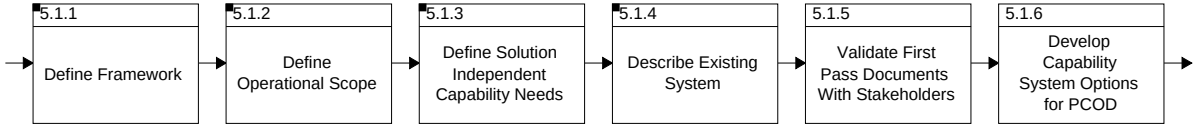

Figure 48 Prepare for First Pass Approval [5.1]

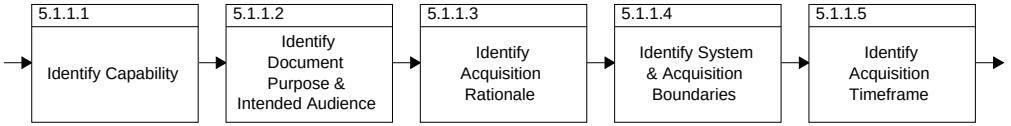

Figure 49 Define Framework [5.1.1]

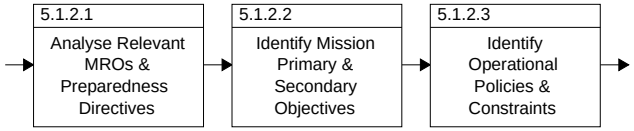

Figure 50 Define Operational Scope [5.1.2]

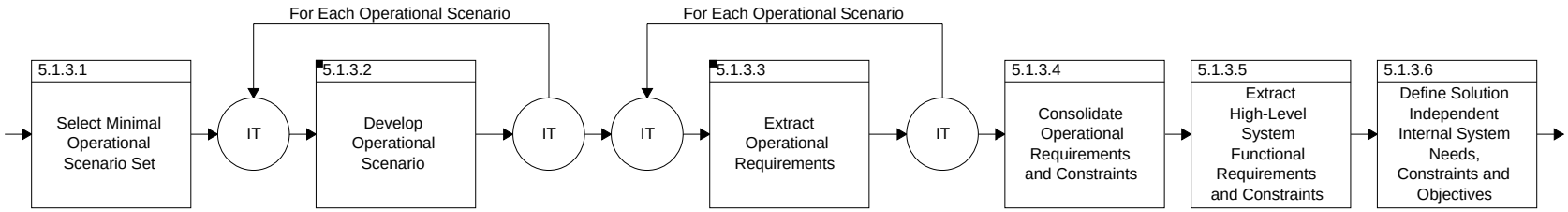

Figure 51 Define Solution Independent Capability Needs [5.1.3]

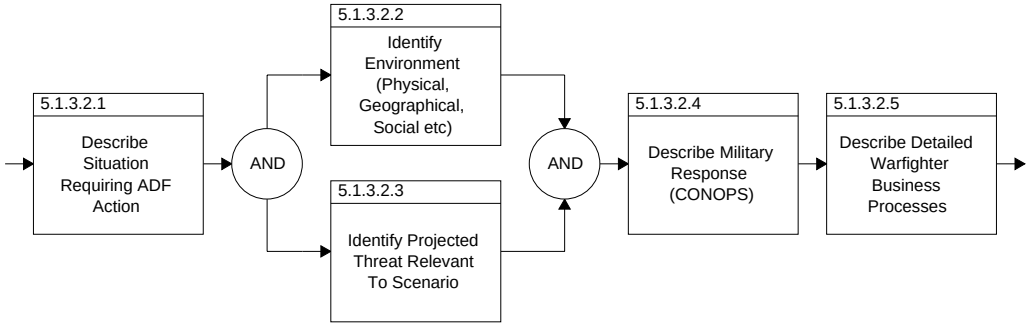

Figure 52 Develop Operational Scenarios [5.1.3.2]

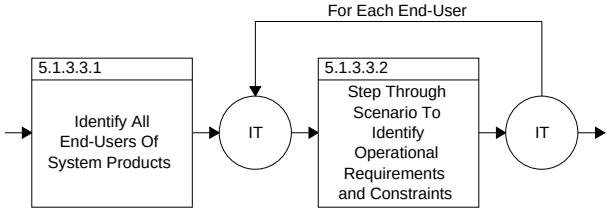

Figure 53 Extract Operational Requirements [5.1.3.3]

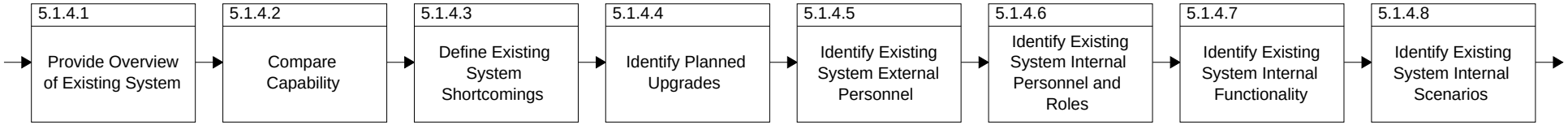

Figure 54 Describe Existing System [5.1.4]

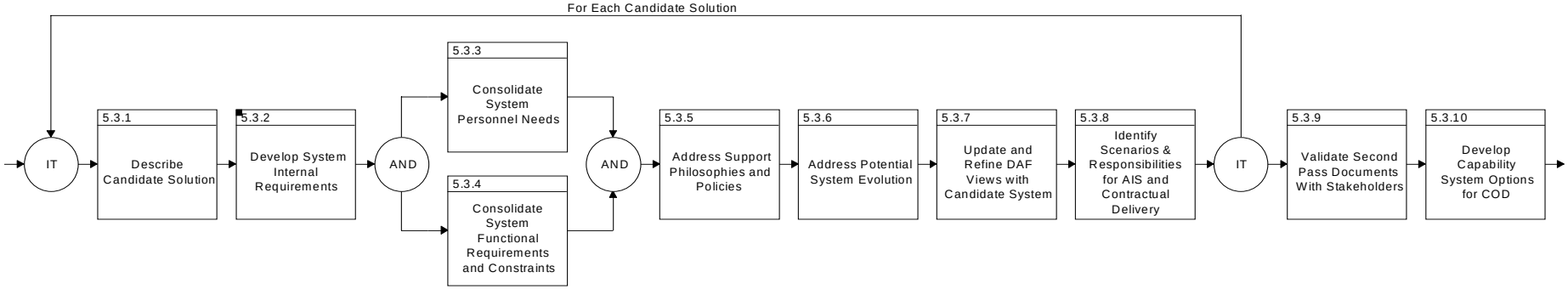

Figure 55 Prepare for Second Pass Approval [5.3]

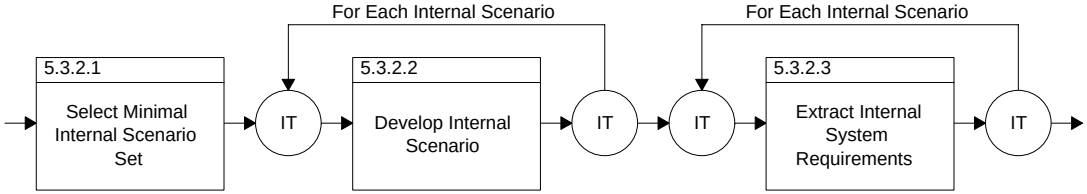

Figure 56 Develop System Internal Requirements [5.3.2]