

## Technology Application Guidelines

The optimisation of resources to support the widest application of practical science to defence capability.



Prepared for  
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## DOCUMENT INFORMATION

### **VERSION CONTROL**

Version	Date	Reason for upgrade
1	02 Nov 2009	Initial Release

### **DOCUMENT USAGE**

1. This document has been designed for use as a reference when using the portal software. It is highly repetitive in places and only the introduction section has been written in an informative style.
2. The Table of Contents (TOC) should be used to find a task that needs to be performed. Clicking the indexed item will take the reader to the page. Many pages have graphics and associated point of relevance.
3. The reader is able to start from almost anywhere in the TOC and the starting point page contents will link to other information (via hyperlinks) to help set the context of the chosen task.
4. Having followed a hyper link the reader can use the 'Previous View' tool from the Adobe 9.1 reader to return to the starting point. To make the 'Previous View' tool visible please see Annex D.

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## INTRODUCTION

5. This Technology Application Guidelines manual provides an overview of the Defence Portal process. The Defence Portal can be used without a full understanding of the details contained in this document. This document contains sufficient information to enable continuous improvement initiatives.

## SUPPORTING DOCUMENTATION

6. The Technology Application Guidelines manual has been written based on the assumption that the reader has used the [Defence Suppliers Research Information Portal](#) to access and understand the Defence Technology Innovation Centre's role in providing support to the Defence supply network. Relevant information can be found by following the links below. In particular, item d. ("How do I submit an idea?") is directly relevant to this document.
- [Should I work with MOD?](#) Enterprise and investment.
  - [How do I work with MOD?](#) Developing a proposal.
  - [What are the terms of business?](#) Commercial basis.
  - [How do I submit an idea?](#) On-line account with MOD.

## DEFENCE PORTAL – HOME PAGE

7. Readers who have not yet set up an account on the Defence Enterprise Portal should go to the [Opening an Account](#) section in the Account Manual referenced below. The Defence Portal Home Page view is included below for completeness:

science | innovation | technology

MINISTRY OF DEFENCE

User: md@LargeEnterprise.com - Enterprise Authority

### Defence Portal

**User Tasks**  
[Edit User Details](#)  
[Change password](#)  
[User's Manual \(pdf\)](#)  
[Log out](#)

**My Applications**  
[Opportunities](#)  
[Proposals](#)  
[Contracts](#)  
[Archive](#)  
[Application Manual \(pdf\)](#)

**My Account**  
[Edit Account](#)  
[Enterprise Users](#)  
[Account Manual \(pdf\)](#)

**My Invitations To Tender**  
[Manage ITT](#)  
[Adopt ITT](#)  
[Review ITT Activities](#)  
[ITT Manual \(pdf\)](#)

Powered By: **Quantiv** Technology Enterprise Modelling

[Technology Application Guidelines \(pdf\)](#)

This manual explains how information from each Defence Portal task area is used for technology application

8. The Technology Application Guidelines Manual makes reference to other manuals that are located on [innovative.ideas.mod.uk](http://innovative.ideas.mod.uk) and these are:



- a. **Account Manual.** This explains how Single User and Multi-user accounts can be operated and maintained and how business links are maintained between the Account Authority and MOD.
  - b. **User's manual.** This explains how individual users maintain secure access to the account and how support is offered to individuals when using the portal.
  - c. **Application Manual.** This explains how opportunities are: generated from scratch or from an Invitation to Tender; converted into a proposal; tracked through the assessment process and, when necessary, archived.
  - d. **Invitation To Tender Document.** To generate, approve and make accessible Invitations to Tender to stimulate targeted innovation and investment in strategic areas of defence need.
9. The instructions in this Technology Application Guidelines manual are applicable to Single-user enterprise accounts and Multiple-user enterprise accounts.

### **WHAT IS TECHNOLOGY APPLICATION?**

10. Technology Application<sup>1</sup> is a means by which the defence community can optimise resources by identifying areas where knowledge is lacking, or methods and skills are becoming outdated.
11. Our approach to Technology Application is based on the continuous optimisation of methods, theories, and practices needed to *supply* defence materiel resources, **as well as** the optimisation of *materiel* resources themselves. Four supporting definitions are provided:
  - a. **Materiel Resources** refer to the trained People, Information, Process and Equipment that function together to deliver Military effects
  - b. **Supply Resources** refer to the trained People, Information, Process and Equipment that function together to produce Materiel Resources
  - c. **Inventory Resources** refer to the combination of Supply and Materiel resources required to deliver a given Defence Capability on demand
  - d. **Defence Resources** refer to the inventory resources for which the defence community has access rights.
12. Continuous optimisation of resources requires the use of 'Enterprise' level information structured to quantify the resources and processes to sequence the application of suitable resources.
13. The Defence Industrial Strategy provides leadership for the defence community and articulates well that defence capability is dependent on the coordination of military capability and supply capability. This Technology Application Guidelines document presents Defence Resources as the focus of investment to achieve defence capability; and the Technology Application guidelines as the means of optimising Defence Resources.

### **WHY IS TECHNOLOGY APPLICATION IMPORTANT TO DEFENCE?**

14. The application of practical sciences has become more complex in recent times for a variety of reasons. The most significant reason has been the amount of knowledge associated with highly developed technology that must be coordinated to enable Defence Resources to serve society.
15. The nature of today's defence challenges are such that threats can appear quickly when adversaries adopt novel methods of attack or neutralise the efficacy of an existing defence solution by revising strategy and tactics; this can occur more quickly than our own nation can forecast and reorganise.
16. In Defence today the costs associated with the delivery of a solution which needs highly developed technology, cannot be fully justified in a business case for a single-purpose application because of the dynamic nature of the threats. Once a materiel solution is provided new threats can and do emerge making the 'lifetime', and therefore the value, of the solution impossible to predict.

<sup>1</sup> Technology Application are two words in common usage. This document introduces specific meaning for the phrase which allows for a richer, and necessary, description of the methodology.



17. The approach to Technology Application will enable “top down AND bottom up” business cases for investments into flexible Defence Resources that can be configured or reconfigured quickly ahead of emerging threats.
18. Investment risks for most businesses operating in technology dependent markets are ameliorated by continuously improving working practices. The defence market is no different to other markets in this respect and the three maxims expressed below apply in pursuit of continuous improvement:
  - a. Quality: This means the delivery of the intended defence capabilities that do not vary beyond agreed limits and are provided at a price that represents value
  - b. Cost: The right enterprise resources, deployed to the right place and at the right time to deliver the intended quality
  - c. Timing: Prioritising the development, rights of access to, and sequencing of knowledge to support quality and cost activities.
19. The Technology Application approach provides a means of organising knowledge to deal with investment cases and to provide controlled access to the knowledge in support of flexible, cost-effective, and manageable Defence Resource provision.

### ***HOW WILL TECHNOLOGY APPLICATION WORK?***

20. The application of practical science to defence has many challenges, many of them stemming from the plethora of methods and practices available, which require specific knowledge and skills to be developed locally and yet made accessible across the defence community.
21. The structured approach to Technology Application presented in this document can be used to:
  - a. Identify and prioritise investments in technology
  - b. Develop resources that can be deployed and re-used many times
  - c. Apply resources at the right time to conduct the right tasks
22. The Defence Portal has been designed to take advantage of the Technology Application approach and relies upon:
  - a. A Resource Capability Growth<sup>2</sup> process and associated tasks to sequence technology application elements to achieve desired Quality, Cost and Timing targets at each capability growth stage
  - b. The use of the Technology Application elements<sup>3</sup> to characterise independently the maturity of Materiel Resources and Supply Resources to identify mismatches in the availability and or mutual understanding of knowledge and skills
  - c. The identification of technology information classes<sup>4</sup> and information management techniques to characterise Defence Resources required for ANY threat/countermeasure
  - d. Identification of Defence Resource owners and Investment Budget owners required to fund the Defence Resource gap closures.

<sup>2</sup> Please see Annex A – Technology Application Lifecycle contained in this document.

<sup>3</sup> Please see Annex B – Technology Application Elements contained in this document

<sup>4</sup> Please see Annex C - Technical Information Structure contained in this document.



## DEFENCE PORTAL OVERVIEW

### ***DEFENCE PORTAL USER COMMUNITIES***

23. The Defence Portal was originally provided to enable the defence supply community to submit proposals for funding to the MOD. The Defence Portal functionality to which this manual refers is capable of aligning investment funds to areas of need with greater efficiency than earlier versions. An overview of the technology acquisition process is provided in the Application Manual that is accessible from the My Applications task area in the [Defence Portal](#) home page.
24. The Defence Portal can accept unsolicited proposals and can guide innovators to areas of need using Invitations To Tender (ITTs). In both cases budget holders and other MOD stakeholders must be engaged in the processes that support the Defence Portal.
25. There are two main user community groups engaged in the operation of the Defence Portal, namely the MOD and the Supplier groups. The communities may work independently or in combination as the needs arise:
  - a. The MOD must identify investment funds, develop Invitations to Tender, and manage the release of ITTs to all enterprise accounts. The ITT Manual describes this process and is available from the [Defence Portal](#) home page
  - b. Suppliers decide whether to invest in the development of bids against an ITT. The Account Manual describes how information access can be managed and the Application Manual describes how information is entered and shared. Both manuals are accessible from the [Defence Portal](#) home page
26. The defence community (MOD and Suppliers) have developed the means to target areas of need with a view to managing the efficiency of investments. Suitable sources of guidance from recent initiatives can be found from:
  - a. [The Defence Industrial Strategy](#)
  - b. [The Defence Technology Strategy](#)
  - c. [The Defence Technology Plan](#)
  - d. [The Innovation Procurement Plan](#)

### **Technology Application Groups**

27. The Defence Portal is able to support the grouping of MOD and Supplier resources to deliver efficiently capability growth from strategic investments laid out in the [Innovation Procurement Plan](#) (IPP). The IPP alludes to several different resource groupings that have been and continue to be formed to develop and apply technology at various stages of maturity.
28. The Defence Portal has a single concept called a Technology Application Group that can be used to link all of the resource groups conceived of in the IPP by what is common (the information structure and acquisition process) and at the same time optimise that which makes each group unique.
29. Technology Application Groups have their own set of resource needs and their own sets of commercial terms (where necessary) and these are managed and tracked through the ITT process. The linking of budgets, needs, resources and ownership to the ITT allows for the focussed assessment of proposals; and also the deliberate development of contracted resource capability towards the delivery of a return on investment.



# Technology Application Guidelines

## DEFENCE PORTAL PROCESS

30. The [Defence Portal Tasks](#) have been designed to manage technology application information within a Defence Portal process that is summarised below:

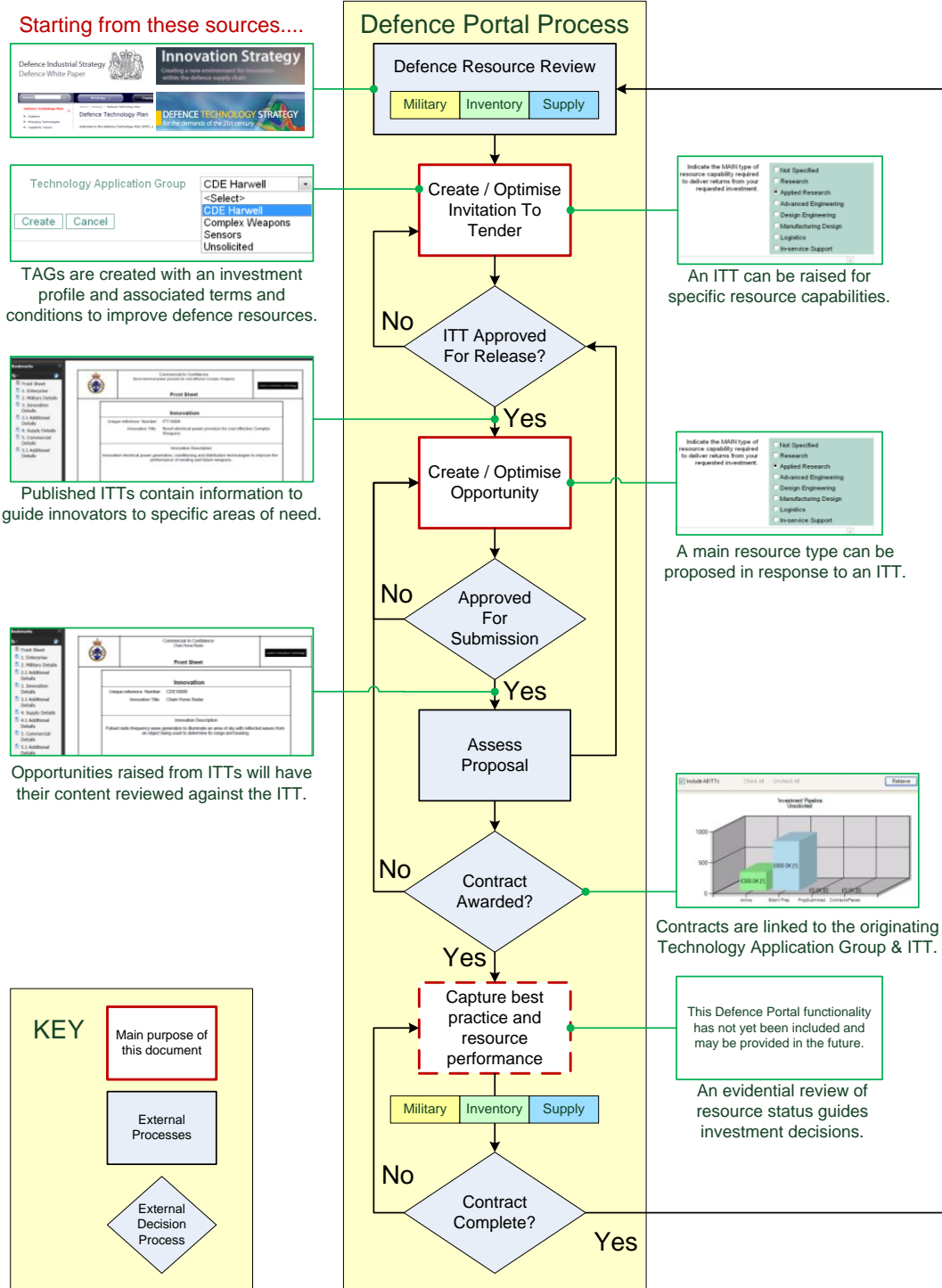


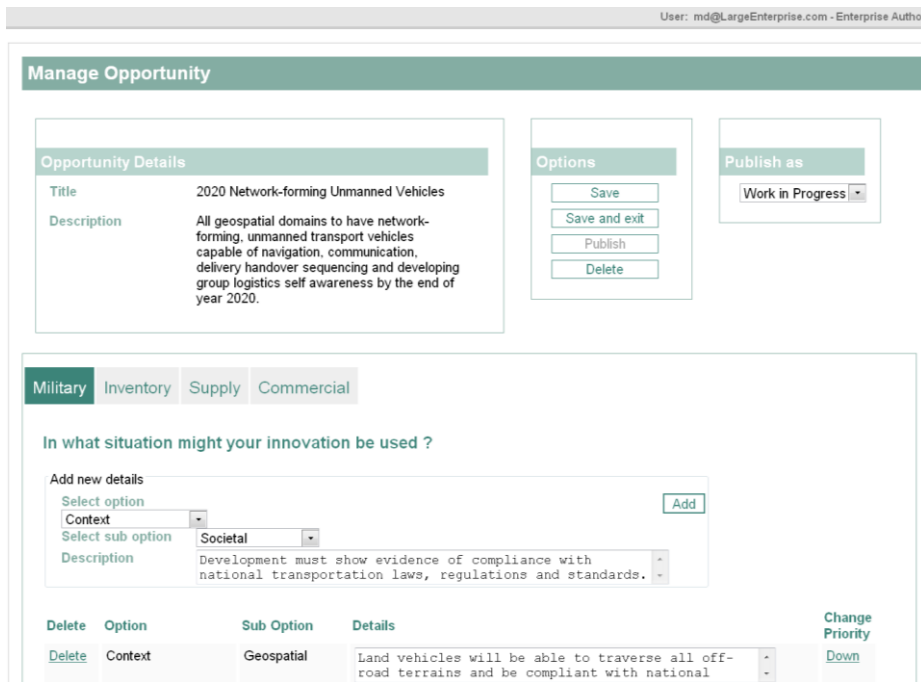
Figure 1. Technology application information in the context of the Defence Portal process.

### INFORMATION INPUT AND OUTPUT

31. The Defence Portal information input and output mechanisms are the same for creating an ITT and for creating an opportunity, each can be referred to as an application because the application structure is common to both. Each application type has the same approach to information input and output and are outlined below:

#### Input via Forms.

32. Information entry is facilitated by the use of web-based forms that follow the technology information structure described in the Application Manual – see the [Defence Portal](#) home page. An example of a view of the form is shown below:



Delete	Option	Sub Option	Details	Change Priority
<a href="#">Delete</a>	Context	Geospatial	Land vehicles will be able to traverse all off-road terrains and be compliant with national	<a href="#">Down</a>

Figure 2. An example of an information entry form.

#### Output via Reports.

33. Information output is achieved via the publishing of pdf reports from the controls shown in Figure 2. An example of a published pdf application report is shown below:



	Commercial In Confidence Chain Home Radar	
	<b>Front Sheet</b>	
<b>Innovation</b>		
Unique reference Number: CDE10008 Innovation Title: Chain Home Radar		
Innovation Description		
Pulsed radio frequency wave generation to illuminate an area of sky with reflected waves from an object being used to determine its range and bearing.		

Figure 3. An example of an application report



## **INFORMATION ACCESS**

34. Information access is described in detail in the Account Manual that is accessible from the [Defence Portal](#) home page and is summarised briefly in this section.

### **Access to Forms**

35. Application information entry forms are invoked first to create a technology application, as described in the [Application Manual](#).
36. Only the enterprise user who has been appointed as the 'Opportunity Manager' for a given application can access and amend the information entered via the forms shown in Figure 2.

### **Access to Reports**

37. Reports are not accessible until they are published as described in the [Application Manual](#).
38. The enterprise user appointed as the 'Opportunity Manager' is the only person who can enable the publishing of application reports. The person who created the application (opportunity creator) and the enterprise authority, who assigns enterprise privileges to users, determines rights of access to published application reports:
- Within the originating enterprise, opportunity teams can be established and access to information can be shared horizontally and vertically as may be required by an enterprise's organisational structures
  - Between the originating enterprise and MOD, the enterprise user who is appointed as opportunity creator can accept the legal terms and conditions for the Technology Application and submit the information to MOD.

## **TECHNOLOGY APPLICATION EVIDENCE GROWTH**

### **Create / Optimise an ITT**

39. Invitations to Tender are created by MOD personnel in response to a defence resource need as shown in Figure 1. A suitably empowered MOD user would follow the Generate ITT link from the My Invitation To Tender task box on the Defence Portal home page. The relevant part of the home page is shown below:



Figure 4. MOD's ITT options on the Defence Portal home page

40. A resource capability gap, budget and stakeholder benefit assessment is undertaken as part of an ITT approval processes prior to releasing the ITT to all enterprise account holders. The ITT is released to, or withdrawn from, all enterprise accounts using the [Manage ITT](#) link shown in Figure 4.
41. Every ITT has a unique reference and can be associated with a [Technology Application Group](#).

### **Create / Optimise an Opportunity**

42. The generation of opportunities is an investment of resources, and resources can be most efficiently deployed if opportunities are raised against well-structured ITTs.
43. On the assumption that the MOD has released ITTs for use by the enterprise accounts, enterprise account authorities must approve the expenditure of their resources by releasing an appropriate ITT for use within



their own enterprise. Having granted approval for use, approval can be subsequently withdrawn, Figure 5 refers.

44. Granting and withdrawing approval is done via the Manage ITT link as shown in Figure 5

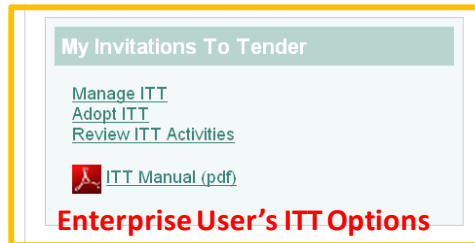


Figure 5. Non-MOD Enterprise User's options on the Defence Portal home page

45. Opportunities, whether derived from an ITT or not, have the same acquisition lifecycle management options and these are described in the [Application Manual](#) and summarised by Figure 6 below:

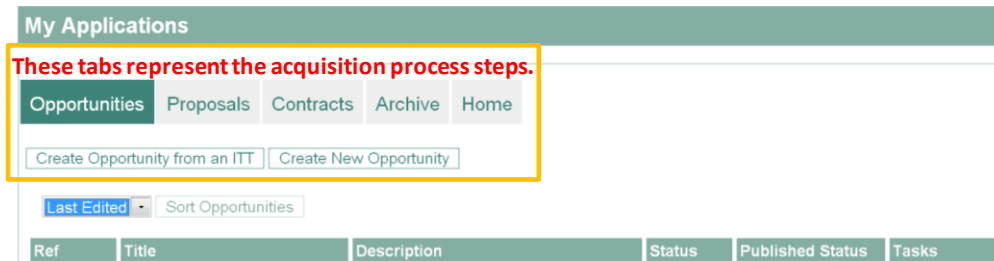


Figure 6. Acquisition lifecycle process steps.

46. Unsolicited proposals are important drivers for innovation but should not be the norm as they are potentially more wasteful of supplier and assessment resources when known challenges remain unresolved.

### Capture Best Practice

47. Certain successful Technology Applications may be selected by MOD to participate in the development of the Defence Portal to capture evidence of delivery from contracts using the functionality provided via the Contracts tab shown in Figure 6.
48. The aim of the best practice approach is to quantify improvements and to agree commercial terms for the dissemination thereof for the overall benefit of the defence community.
49. Capturing best practice is made possible by the current Defence Portal functionality but has not yet been implemented to widest or best effect.

## COMPILING TECHNOLOGY APPLICATION EVIDENCE

### *TECHNOLOGY APPLICATION REPORT*

#### Contents List

50. Technology Application Reports contain six main sections and these are shown in Table 1 below

Report Section Reference	Application Information Description
<a href="#">Front Sheet</a>	Unique identifiers and a reminder that terms and conditions apply.
1. <a href="#">Enterprise</a>	Enterprise details of interest to MOD and contact details for the enterprise and the application.
2. <a href="#">Military Details</a>	Military resource implications and benefits of relevance to the Military user and assessor communities.
3. <a href="#">Innovation Details</a>	Delivery task resource implications and benefits of relevance to the defence application team and the assessor community.
4. <a href="#">Supply Details</a>	Technology resource implications and benefits for the supplier and assessor communities at start and end of the delivery tasks. Financial year cost totals are included to enable assessors to judge value for money.
5. <a href="#">Commercial Details</a>	Selection of appropriate terms and conditions, entry of resource types, scheduling and cost information as they relate to the planned investment and return on investment expectations. Resource cost and sequencing details that confer commercial advantage are withheld from the assessment community.

Table 1 Main Sections contained in an application report

51. The main sections contain information presented as bullet point lists derived from the text entered into the fields of the [information entry forms](#) described earlier in this document.
52. Sections 2 through 5 of a Technology Application report referred to in Table 1 can contain free formatted text and images to provide suitable amplification of purpose to the main bullet points, as may be required by the originator.

#### Report View

53. Application reports are viewed in a pdf viewer of the readers supply. An application report with a full contents list for an ITT prepared by MOD is shown in Adobe Reader® 9.2 in Figure 7.

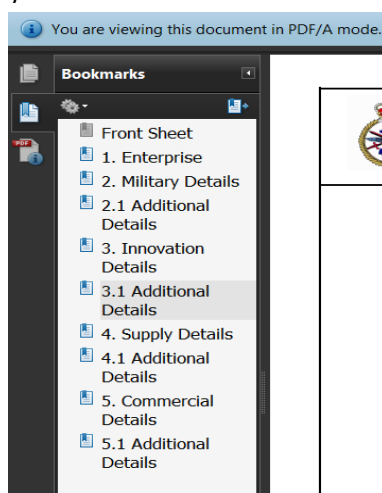



Figure 7. Full application report contents list

### FRONT SHEET



54. The front sheet provides sufficient information to enable a reader to uniquely identify the report when stored or presented alongside reports of an identical format.

	Commercial In Confidence Novel electrical power provision for cost effective Complex Weapons	science   innovation   technology
	<div style="text-align: center;"> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 8px;">1</span> <b>Front Sheet</b> </div>	
<b>Innovation</b>		
<span style="border: 1px solid black; border-radius: 50%; padding: 2px 8px;">2</span>	Unique reference Number: ITT10006 Innovation Title: Novel electrical power provision for cost effective Complex Weapons	
<span style="border: 1px solid black; border-radius: 50%; padding: 2px 8px;">3</span>	Innovation Description Innovative electrical power generation, conditioning and distribution technologies to improve the performance of existing and future weapons.	
<span style="border: 1px solid black; border-radius: 50%; padding: 2px 8px;">4</span>	<input checked="" type="checkbox"/> I acknowledge the terms of business for the Defence Portal initiative and hereby unequivocally accept the terms and conditions of the contract type selected. If stage payments have been requested I <ul style="list-style-type: none"> <li>• Hereby unequivocally accept the additional MOD terms and conditions associated with stage payments as set out in the CDE website.</li> <li>• Include within my Defence Portal proposal a month by month expenditure profile to support stage payment schedule.</li> </ul> Additionally I acknowledge that: <ul style="list-style-type: none"> <li>• <b>The MOD will not pre-fund any expenditure.</b> Consequently all milestone payment claims must not include costs that have not been incurred by that point in time.</li> <li>• No more than 6 Milestone payments are to be proposed per annum</li> <li>• The last payment, entitled "Satisfactory completion of all work under the Contract", shall be 20% of the total quoted firm price.</li> </ul>	
Proposed by: MOD <span style="border: 1px solid black; border-radius: 50%; padding: 2px 8px;">5</span>		
Date: 14/October/2009 08:55 <span style="border: 1px solid black; border-radius: 50%; padding: 2px 8px;">6</span>		

Commercial In Confidence

Point #	Description of Point of Relevance
1	The header is automatically generated. The section heading name and information classification are the same for all application reports but the title is unique to the application. All information entered into the Defence Portal is marked Commercial In Confidence in both the header and the footer of each <a href="#">main section page</a> in the application report.
2	The unique reference number is generated when the ITT or the Opportunity is created. The prefix 'ITT' identifies the application as an Invitation To Tender, whereas the prefix 'CDE' identifies the application as an opportunity (or a proposal dependent on the position in the process)
3	The Innovation Title and Innovation Description come from the information entered when the application was created, or from subsequent alterations made using the 'Details' link from the task column on the Generate ITT or Opportunities tab view accessible from the <a href="#">Defence Portal</a> Home Page.
4	This statement and associated check box indicate the legal acceptance of the terms and conditions that relate to the application. The statement relates to acceptance of terms published by MOD and selected by the proposer from the commercial tab on the <a href="#">information entry form</a> .
5	The name of the enterprise that created the application is printed here. The text that appears here comes from the name of the organisation entered by the Enterprise Authority/Proxy into the 'Edit Enterprise Details' form accessible from the 'My Account' task areas on the <a href="#">Defence Portal</a> Home Page.
6	The time and date are system generated and provide an 'evidence stamp' that refers to the timing of the report's publication.


### ENTERPRISE

	Commercial In Confidence Novel electrical power provision for cost effective Complex Weapons	
	<b>Enterprise</b>	
<b>Enterprise Coordinates</b>		
<u>Enterprise Name</u> <u>Enterprise Address</u> <u>Point of Contact</u> <u>Contact Address</u> <u>Organisation Structure</u>	1 2 3	MOD Defence Technology & Innovation Centre Defence Academy Shrivenham Wiltshire SN6 8JU Major Winner Address: Defence Technology & Innovation Centre Defence Academy Shrivenham Wiltshire SN6 8JU Tel: 01234567890 Mob: 09876543210 email: sit-opsnextgen@mod.uk Size of Organisation on-shore in UK : 50-150 Type of Organisation : Public Sector Research Establishment Number of staff engaged in science and engineering in UK : 100
<b>Markets</b>		
<u>Current Markets</u> <ul style="list-style-type: none"> <li>Defence</li> </ul> <u>Defence Sectors of Interest</u> <ul style="list-style-type: none"> <li>MOD Directly, Defence Primes</li> </ul>		
<b>Products</b>		
<u>Product Portfolio</u> <u>Capabilities In Support of Product</u>		
<b>Business</b>		
<u>Existing or Anticipated Supply Role</u> <ul style="list-style-type: none"> <li>Cross Cutting Tech, Emerging Tech, Other</li> <li>Other: Support for Urgent Operational Requirements</li> </ul> <u>Nature of development work Undertaken</u> <ul style="list-style-type: none"> <li>Applied Research, Advanced Engineering</li> </ul>		

Point #	Description of Point of Relevance
1	The text that appears here comes from the name of the organisation entered by the Enterprise Authority/Proxy into the 'Edit Enterprise Details' form accessible from the My Account task areas on the <a href="#">Defence Portal</a> Home Page. The same controls also make available for editing the organisational structure, market, product, and business information.
2	The point of contact is taken from the name of the enterprise user that is designated as the opportunity creator. The individual user can change the configuration of their name using the 'Edit User Details' link from the User Tasks task area on the <a href="#">Defence Portal</a> home page.
3	The individual user can change their preferred correspondence address using the 'Edit User Details' link from the User Tasks task area on the <a href="#">Defence Portal</a> home page.

### MILITARY DETAILS

55. The military details printed in this section of the application report are compiled automatically from the information entered into the Military tab on the [information entry form](#) referred to earlier.
56. A structured [Military Information Set](#) is presented at Annex C as a means of stimulating thought and enabling the cross-correlation/indexing of military resource needs with inventory and supply resources.
57. A word document containing additional information in the form of free format text and images may be attached to the military information tab. The maximum attachment size is 1 Mbyte.

<p>Science   Innovation   Technology</p> <p><a href="http://Innovative.ideas.mod.uk">Innovative.ideas.mod.uk</a></p>	<p>The optimisation of resources to support the widest application of practical science to defence capability.</p> <p><b>Technology Application Guidelines</b></p>	
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58. If an opportunity is created from an ITT, the opportunity will contain the ITT text preloaded in the information entry form fields. The preloaded information can be edited or deleted at the discretion of the opportunity manager. Any [additional information](#) present in the ITT pdf is not preloaded when an opportunity is created from an ITT.

### ***INVENTORY (INNOVATION) DETAILS***

59. The inventory details printed in this section of the application report are compiled automatically from the information entered into the Inventory tab on the [information entry form](#) referred to earlier.
60. A structured [Inventory Information Set](#) is presented at Annex C as a means of stimulating thought and enabling the cross-correlation/indexing of inventory resource needs with military and supply resources.
61. A word document containing additional information in the form of free format text and images may be attached to the inventory information tab. The maximum attachment size is 1 Mbyte.
62. If an opportunity is created from an ITT, the opportunity will contain the ITT text preloaded in the information entry form fields. The preloaded information can be edited or deleted at the discretion of the opportunity manager. Any [additional information](#) present in the ITT pdf is not preloaded when an opportunity is created from an ITT.


### ***SUPPLY DETAILS***

63. The supply details printed in this section of the application report are compiled automatically from the information entered into the Inventory tab on the [information entry form](#) referred to earlier.
64. A structured [Supply Information Set](#) is presented at Annex C as a means of stimulating thought and enabling the cross-correlation/indexing of supply resource needs with inventory and military resources.
65. A word document containing additional information in the form of free format text and images may be attached to the supply information tab. The maximum attachment size is 1 Mbyte.
66. If an opportunity is created from an ITT, the opportunity will contain the ITT text preloaded in the information entry form fields. The preloaded information can be edited or deleted at the discretion of the opportunity manager. Any [additional information](#) present in the ITT pdf is not preloaded when an opportunity is created from an ITT.

### ***COMMERCIAL DETAILS***

67. The commercial details printed in this section of the application report are compiled automatically from the information entered into the Commercial tab on the [information entry form](#) referred to earlier.
68. The nature of the commercial information is the subject of documents provided elsewhere:
- a. For guidance on entering information that will lead to a compliant commercial bid the reader is referred to the [research contract terms & conditions](#) provided on the [Defence Suppliers Research Information Portal](#).
69. The Application Manual, located on the [Defence Portal](#) home page, describes how the controls on the Commercial tab of the [information entry form](#) can be operated. The controls allow information to be entered and structured under the following headings:
- a. Resource scheduling
  - b. Contract terms
  - c. Deliverables
  - d. Payment schedules
70. The skilled practitioner will note that resource<sup>5</sup> scheduling and deliverables referred to in paragraph 69 could readily be defined and entered using the subset headings of information sets shown in Annex C. The Inventory subsets are provided here by way of an example:
- a. Requirements

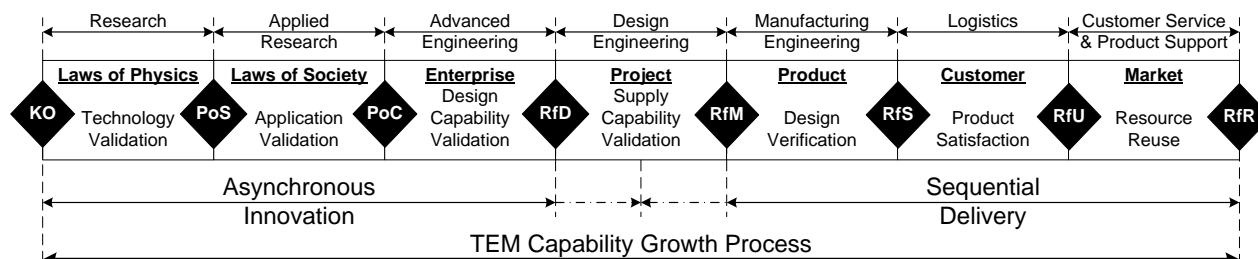
<sup>5</sup> Resource here refers to **inventory resources** as defined in paragraph 11.c

Science   Innovation   Technology <a href="http://innovative.ideas.mod.uk">Innovative.ideas.mod.uk</a>	The optimisation of resources to support the widest application of practical science to defence capability.  <b>Technology Application Guidelines</b>	
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- b. Solutions
- c. Critical Parameters
- d. Performance Assessment
- e. Intellectual Capital Management
- f. Stakeholder Management.

## ANNEX A – TECHNOLOGY APPLICATION LIFECYCLE

71. The technology application lifecycle is defined by a stage and gateway process to ensure that tasks and evidence interact in an optimal fashion.
72. A Technology Enterprise Model (TEM) can be used to visualise the ordering and sequencing of knowledge to grow beneficial capability in defence. Tasks are grouped into stages and evidence is reviewed at the gateways between stages as shown in Figure A1: Defence Resource Capability Growth Process below.



73. Figure A1: Defence Resource Capability Growth Process
74. The identification of the capabilities of an enterprise is important to ensure that any given technology application can be conducted by the enterprise, or combination of enterprises, in the right sequence and at the right time. To this end Table A1 below is provided to enable an enterprise to characterise the nature of development activities it is capable of undertaking.

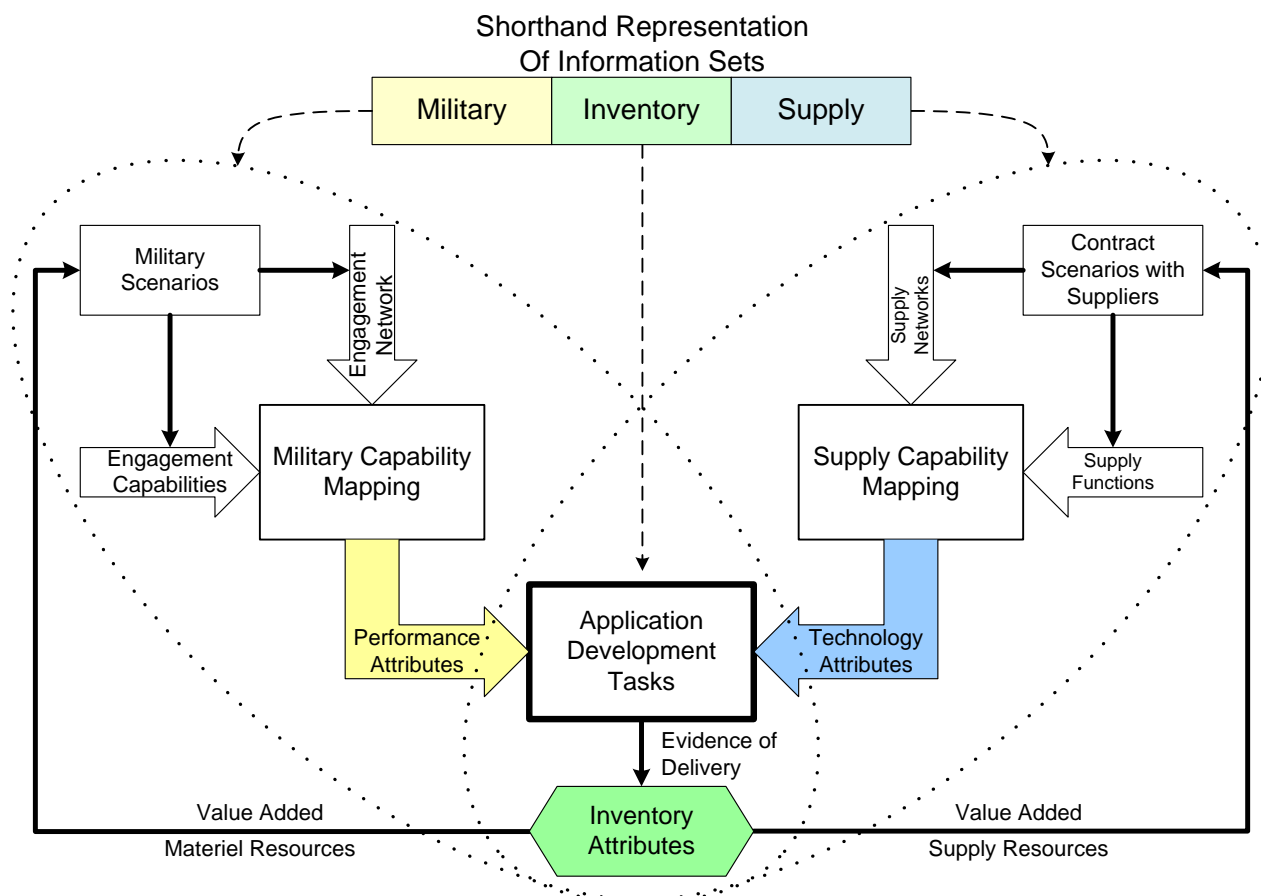
Table A1: TEM Stage & Gateway Summary

Upstream Stage Details			Downstream Gateway	
Name	Capability Focus	Resource Type	ID	Name
Laws of Physics	To determine that the underlying scientific principles are known, accessible and parameterised.	Research	PoS	Proof of Science
Laws of Society	To establish the range of architectural parameters required, and allowed, by standards, codes of practice and legislation in relation to the markets and scenarios of choice.	Applied Research	PoC	Proof of Concept
Enterprise Development	To quantify and develop stakeholder capabilities in an appropriate number and diversity sufficient to conduct robustly the downstream stages.	Advanced Engineering	RfD	Ready for Design
Project Compliance	To undertake minimum product configuration development, specific to agreed targets of Quality, Cost and Timing (QCT) for a given product.	Design Engineering	RfM	Ready for Manufacture
Product Compliance	To manage manufacturing and delivery resources to get the goods and services to the point of sale	Manufacturing Engineering	RfS	Ready for Sale
Customer Support	To provide customers with products and product support (education and warranty issues) in the right quantities and at optimal QCT	Logistics and Support	RfU	Ready for Use
Market Position	To evaluate continually the product performance and to identify emerging market scenarios. Also, recycling of product materiel at the point of refresh / retirement.	Customer Service & Product Support	RfR	Ready for Refresh

75. Table A1

## ANNEX B – TECHNOLOGY APPLICATION ELEMENTS

76. The polygons in the diagram below represent the Technology Application Elements. Each polygon has information structures associated with it and the diagram enables the orientation of each information set to be visualised.



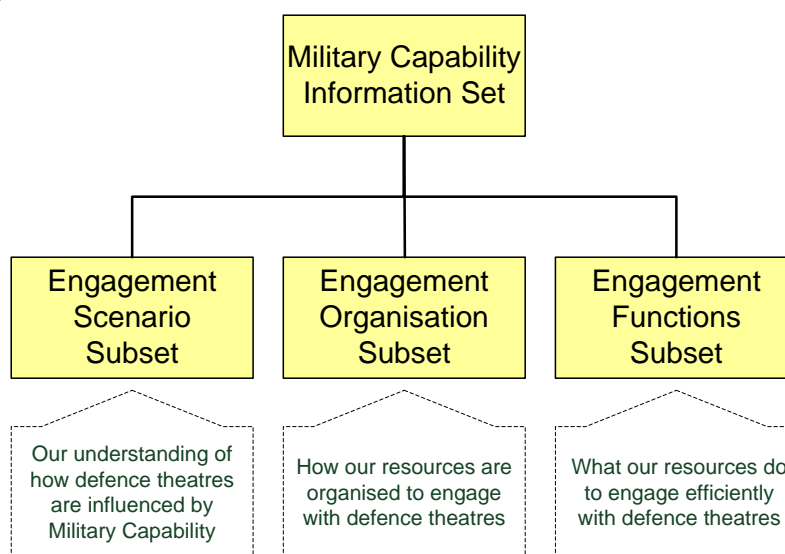
- 77. Figure B1: Technology Application Elements
- 78. The rectilinear polygons (rectangles) represent methods and processes used to capture and or translate information between sets. Cross-functional mapping techniques such as Quality Functional Deployment can be used to manipulate information sets.
- 79. Figure A1: Defence Resource Capability Growth Process and Figure B1: Technology Application Elements provide the framework for developing a common understanding of defence resource maturity.
- 80. Annex C - Technical Information Structure, which contains top-level information definitions, to support the provision of a common language for clearer communication.

## ANNEX C - TECHNICAL INFORMATION STRUCTURE

81. This section contains a description of the technical information sets used within the Technology Application Structure

### **MILITARY INFORMATION SET**

82. The Military information set is provided to characterise a Military Engagement capability required for a given defence theatre. The Military information can be compiled to define a current or future capability or a capability gap, or a combination of each.



### Military Information Options

83. Information options are provided within each of the Military information subsets. The options can be selected, or proposed where none exists, to highlight skills or knowledge of specific relevance from which competitive advantage can be derived.
84. Each Military option is further broken down into sub-options that represent the finest resolution of information provided or requested to stimulate innovation in specific areas.
85. Military information options and sub options are provided for the following Military information sets
- Scenario
  - Military Engagement Organisation
  - Military Engagement Functional Capabilities

### Scenario Options

#### *Purpose*

86. The purpose of the scenario options are to:
- Characterise our understanding of how the world operates
  - Highlight those parameters that are important to the technology application.
87. The table below, Scenario Information Options, provides a list of attributes suitable for stimulating innovation, and for checking innovations, in key knowledge and skill areas.

#### *Scenario Information Options*

Scenario Options	Sub-option	Details of examples to be entered by relevant experts
Context: Defines the operational theatre	geospatial	
	societal	

Scenario Options	Sub-option	Details of examples to be entered by relevant experts
	political	
	environmental	
	temporal	
	commercial	
Players: Defines the nature of personnel roles	opposing forces	
	unknown status	
	supporting forces	
	bystanders	
Effectors: Defines those things that facilitate movement	vehicles	
	facilities	
	infrastructure (roads, utilities etc)	
	weapons	
Tactics: Defines behaviours of players and effectors in context	acquisition	
	storage	
	transit	
	concealment	
	evacuation	
	recovery	
	retirement	

## Military Engagement Organisation

### *Purpose*

88. The purpose of the military engagement organisation (Military Organisation) options are to:
- Characterise our understanding of how the Military Commands are currently organised, or need to be re-organised for some future, planned capability improvement.
  - Highlight those parameters that are important to the technology application.
89. The table below, Military Organisation Information Options, provides a list of attributes suitable for stimulating innovation, and for checking innovations, in key knowledge and skill areas.

### *Military Organisation Information Options*

Organisation Options	Sub-option	Details of examples to be entered by relevant experts
	Combat	
	Engineering	
	Logistics & Support	
	Intelligence, IT & Comms	
	Medical	
	HR & Finance	
	Music & Ceremonial	
Army	Combat	
	Engineering	
	Logistics & Support	
	Intelligence, IT & Comms	

	Medical	
	HR & Finance	
	Music & Ceremonial	
Air Force	Combat	
	Engineering	
	Logistics & Support	
	Intelligence, IT & Comms	
	Medical	
	HR & Finance	
	Music & Ceremonial	
Joint	Combat	
	Engineering	
	Logistics & support	
	Intelligence, IT & comms	
	Medical	
	HR & finance	
	Music & ceremonial	
Defence Command	Resource management	
	Scenario modelling and forecasting	
	Decision making	
	Information prioritisation	
Defence Intelligence	Engineering Experts	
	Scientific Experts	
	Linguists	
	Image analysts	
	Information analysts	

## Military Engagement Functional Capabilities

### Purpose

90. The purpose of the Military Engagement Functional Capability (Military Capability) options are to:
- Characterise our understanding of the military functional capabilities that are required from any (Actual, Current and/or Future) military organisation and how such understanding leads to operational excellence.
  - Highlight those parameters that are important to the technology application.
91. The table below, Military Capability information options, provides a list of attributes suitable for stimulating innovation, and for checking innovations, in key knowledge and skill areas.

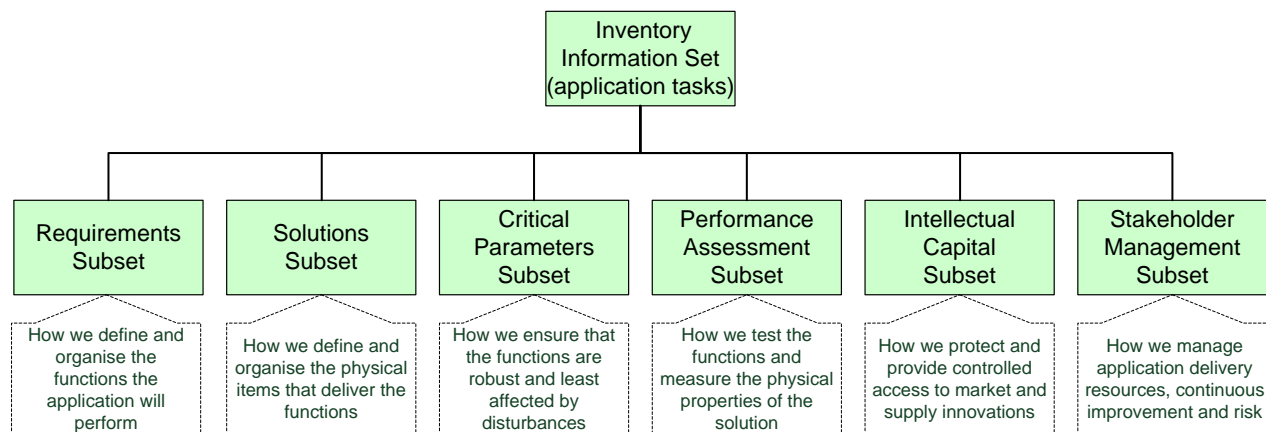
### Military Capability Information Options

Engagement Capability Options	Sub-option	Details of examples to be entered by relevant experts
Inform	Education	
	Training	
	Networking	

	Reporting & Feedback	
Command	Initiating	Setting mission objectives
	Planning	Aligning resources to objectives
	Enacting	Deploying resources
	Controlling	Reconfiguring resources
	Concluding	Reconciling objectives vs outcome
Prepare	Intelligence gathering	
	Operational planning	Sequencing of available resources
	Logistic Management	
	Deceptions & Counter Intelligence	
	Assembly	At the point of operations
Operate	Capability Parameters - Mission Specific	
	Interoperability parameters	
	Operational support parameters	
	Human interaction parameters	
Protect	Known threats	
	Threat avoidance	
	Secrecy	
	Reduce recognition	
	Resilience to weapons effects	
Project	Support to forward line	
	Pursuit	
	Securing objectives	
	Position consolidation	
	Defensive options	
	Unplanned lull	
	Re-organising & regrouping	
Sustain	Research & Development	
	Design Configuration	
	Acquisition	
	Storage	
	Movement & Distribution	
	Maintenance	
	Evacuation	
	Disposition	

### INVENTORY INFORMATION SET

93. The inventory information set is provided to characterise the tasks and deliverables required when performing a technology application. Inventory information is provided for the six main tasks that are needed to undertake a successful technology application.



### Inventory Information Options

94. The options can be selected, or others proposed where none exists, to highlight skills or knowledge of specific relevance from which competitive advantage can be derived. Inventory information options are provided for each of the inventory information subsets in the Inventory Information Set.
95. Each Inventory option is further broken down into a sub-option that represent the finest resolution of information provided or requested to stimulate innovation in specific areas.
96. Inventory information options and sub options that specifically relate to the nature of tasks are provided for the following inventory information subsets:
- Requirements
  - Solutions
  - Critical Parameters
  - Performance Assessment
  - Intellectual Capital Management
  - Stakeholder Management

### Requirements

#### Purpose

97. To organise and structure our knowledge that characterises the functional performance of the Application and should be free from the physical parameters that characterise the construction of any intended solution opportunities. The main aims are
- To identify the boundaries (New, Modified and Carryover)
  - To identify the interfaces
  - Highlight particular opportunities and constraints

#### Information Options

Requirement Options	Sub-option	Details of examples to be entered by relevant experts
Operational	Internal	
	External	
	Interface	

Usability	Internal	
	External	
	Interface	
Affordability	Internal	
	External	
	Interface	
Availability	Internal	
	External	
	Interface	
Safety	Internal	
	External	
	Interface	
Security	Internal	
	External	
	Interface	

## Solutions

### *Purpose*

98. To organise and structure our knowledge that characterises the physical performance of the items that will form the items of inventory that will provide the solution. The main aims are
- a. To identify the boundaries (New, Modified and Carryover)
  - b. To identify the interfaces
  - c. To characterise the nature of the Materiel deliverables

99.

### *Information Options*

Solution Options	Sub-option	Details of examples to be entered by relevant experts
Architectures	People	
	Information	
	Process	
	Equipment	
System/Subsystem	People	
	Information	
	Process	
	Equipment	
Module	People	
	Information	
	Process	
	Equipment	
Interface	People	
	Information	
	Process	
	Equipment	
Adaptor	People	
	Information	
	Process	
	Equipment	

## Critical Parameters

### *Purpose*

100. To optimise the organisation of our knowledge to deliver transfer functions that perform the primary function well in the presence of unknown variations in noise parameters from the real world usage scenarios.
101. The main aims are
  - a. To identify and classify the types and ranges of parameters involved in the application
  - b. Seek evidence of potential coupling between the architecture of the solution and noise factors
  - c. Identify the range of benefits possible for a given architectural configuration
- 102.

### *Information Options*

Critical Parameter Options	Sub-option	Details of examples to be entered by relevant experts
Transfer function	Functional	
	Physical	
Primary Input	Functional	
	Physical	
Primary Output	Functional	
	Physical	
Control Factors	Functional	
	Physical	
Noise Sources	Functional	
	Physical	
Unintended Outputs	Functional	
	Physical	

## Performance Assessment

### *Purpose*

103. To organise and structure our knowledge in relation to how we characterise and measure compliance between target values and achieved values for functional and physical requirements. The main aims are
  - a. To identify the resources needed to validate a design and verify the inventory performance
  - b. To provide evidence for continuous improvement to support application task development
- 104.

### *Information Options*

Performance Assessment Options	Sub-option	Details of examples to be entered by relevant experts
Modelling	People	
	Information	
	Process	
	Equipment	
Measurement	People	
	Information	
	Process	
	Equipment	

Demonstration	People	
	Information	
	Process	
	Equipment	
Design Validation	People	
	Information	
	Process	
	Equipment	
Design Verification	People	
	Information	
	Process	
	Equipment	
Evidence Assessment	People	
	Information	
	Process	
	Equipment	

## Intellectual Capital Management

### *Purpose*

105. To organise and structure our knowledge that characterises the rights of access to intellectual capital needed to perform the schedule tasks and to exploit the deliverables in downstream stages. The main aims are
- Ensure the assembled or requested resources are likely to be able to close known capability gaps
  - Ensure that designs and know how protection are appropriate (protected or accessible)

### *Information Options*

IC Management Options	Sub-option	Details of examples to be entered by relevant experts
Background IP	Original idea	
	Current owner	
	Previous usage	
	Access rights	
Foreground IP	Usage in defence	
	Usage non-defence	
	Ownership	
	Access rights	
Skills & know how	In-house	
	Subcontractor	
	Availability to defence	
Differentiators	Quality	
	Cost	
	Timing	

## Stakeholder Management

### *Purpose*

106. To organise and structure our knowledge that characterises benefits anticipated by the contracted parties and the wider defence community the application serves. The main aims are

- a. Continuous Improvement
- b. Exploitation routes for any anticipated next stage
- c. Collective risk avoidance (Collaborate and Compete)

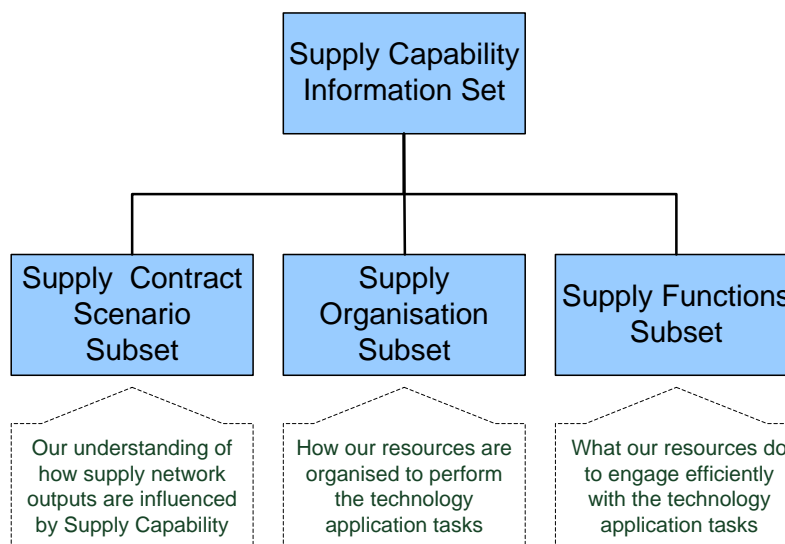
### Information Options

Stakeholder Management Options	Sub-option	Details of examples to be entered by relevant experts
Upstream Application Stage(s)	Your enterprise	
	Investors	
	Military engagement community	
	Supply capability community	
Current application stage	Your enterprise	
	Investors	
	Military engagement community	
	Supply capability community	
Downstream application stage(s)	Your enterprise	
	Investors	
	Military engagement community	
	Supply capability community	

107.

### SUPPLY INFORMATION SETS

108. The Supply information set is provided to characterise how outputs from supply networks are planned and achieved. The Supply information can be compiled to define a current or future capability or a capability gap, or a combination of each.



### Supply Information Options

109. Information options are provided within each of the Supply information subsets. The options can be selected, or proposed where none exists, highlight skills or knowledge of specific relevance to from which competitive advantage can be derived.
110. Each Supply option is further broken down into sub-options that represent the finest resolution of information provided or requested to stimulate innovation in specific areas.
111. Supply information options and sub options are provided for the following Supply information sets
- Contract scenario planning
  - Supplier engagement organisation
  - Supply capability functions

### Supply Scenario Options

#### Purpose

112. The purpose of the scenario options are to:
- Characterise our understanding of how the business world operates
  - Highlight those parameters that are important to the technology application.
113. The table below, Scenario Information Options, provides a list of attributes suitable for stimulating innovation, and for checking innovations, in key knowledge and skill areas.

#### Supply Scenario Information Options

Scenario Options	Sub-option	Details of examples to be entered by relevant experts
Context: Defines the operational environment	geospatial	
	societal	
	political	
	environmental	
	temporal	

	commercial	
Players: Defines the nature of personnel roles	opposing businesses	
	unknown status	
	supporting businesses	
	bystanders	
Effectors: Defines those things that facilitate movement	vehicles	
	facilities	
	infrastructure (www., roads, utilities etc)	
	Competitive products	
Tactics: Defines behaviours of players and effectors in context	acquisition	
	storage	
	transit	
	concealment	
	evacuation	
	recovery	
	retirement	

## Supplier Engagement Organisation

### Purpose

114. The purpose of the engagement options are to:
- Characterise our understanding of the Supply networks are currently organised, or need to organise for some future, planned supply capability improvement.
  - Highlight those parameters that are important to the technology application.
115. The table below, Engagement Information Options, provides a list of attributes suitable for stimulating innovation, and for checking innovations, in key knowledge and skill areas.

### Engagement Information Options

Organisation Options	Sub-option	Details of examples to be entered by relevant experts
MOD	Engineering	
	Finance	
	Legal	
	Manufacturing	
	Purchase	
	Logistics	
	Sales & Marketing	
Primes	Engineering	
	Finance	
	Legal	
	Manufacturing	
	Purchase	
	Logistics	
	Sales & Marketing	
Tiers	Engineering	
	Finance	

	Legal	
	Manufacturing	
	Purchase	
	Logistics	
	Sales & Marketing	
Academia	Engineering	
	Finance	
	Legal	
	Manufacturing	
	Purchase	
	Logistics	
Defence Centres	Resource management	
	Scenario modelling and forecasting	
	Decision making	
	Information prioritisation	
NDIC	Engineering Experts	
	Scientific Experts	
	Business Experts	

## Engagement Functional Capabilities

### *Purpose*

116. The purpose of the Capability options are to:
- Characterise our understanding of how a Supply organisation (Actual, Current and Future) operates to deliver its capability
  - Highlight those parameters that are important to the technology application.
117. The table below, Engagement Functional, provides a list of attributes suitable for stimulating innovation, and for checking innovations, in key knowledge and skill areas.

### *Supply Capability Information Options*

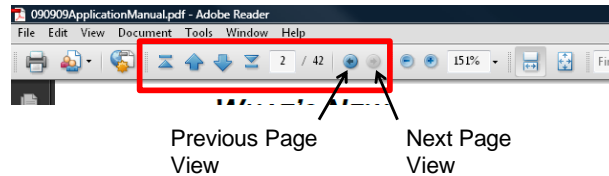
Engagement Capability Options	Sub-option	Details of examples to be entered by relevant experts
Inform	Education	
	Training	
	Networking	
	Reporting & Feedback	
Command	Initiating	Setting mission objectives
	Planning	Aligning resources to objectives
	Enacting	Deploying resources
	Controlling	Reconfiguring resources
	Concluding	Reconciling objectives vs outcome
Prepare	Intelligence gathering	
	Operational planning	Sequencing of available resources
	Logistic Management	
	Intellectual Capital	

	Assembly	At the point of operations
Operate	Operational capability parameters	
	Interoperability parameters	
	Operational support parameters	
	Human interaction parameters	
Protect	Known threats	
	Threat avoidance	
	Secrecy	
	Reduce recognition	
	Resilience to competitor products	
Project	Support to forward Product leadership	
	Pursuit of market share	
	Securing objectives	
	Position consolidation	
	Defensive options	
	Unplanned lull	
	Re-organising & regrouping	
Sustain	Research & Development	
	Design Configuration	
	Acquisition	
	Storage	
	Movement & Distribution	
	Maintenance	
	Product's Market Exit	
	Disposition	

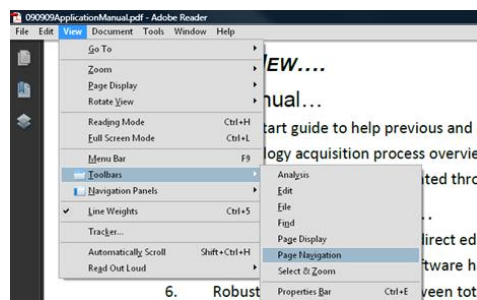


## ANNEX D – CONFIGURING ADOBE® READER® 9

118. These instructions have been prepared using Adobe® Reader® 9. With this document open in Adobe® Reader® ..... The Page Navigation tool bar looks like this...



119. If the Page Navigation Toolbar is not visible then...  
a. Select View, then Toolbars, then Page Navigation



120. The Page Navigation tool bar has appeared and the Previous Page view tool still hasn't appeared the Page Navigation toolbar needs to be customized ...

a. Select Tools, then Customize Toolbars, scroll down to Page Navigation Toolbar then select the Page controls required, select OK

