Coalition Campaign Planning; Lessons From Analysis Of UK And Australian Approaches

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Abstract

Planning is arguably the prime function of HQs at the Operational and Strategic levels of Command, although the military doctrine for campaign planning is still developing. While training at the tactical level has been honed and trained over many years, the Operational and Strategic levels have not had a well defined methodological approach. Military and research establishments in both UK and AS are putting significant resource into enhancing the ability of the respective nations to plan and conduct campaigns.

The aim of this paper is to compare and contrast UK and AS approaches to campaign planning, and draw out implications for how the two nations should conduct planning in a coalition context.

1 Introduction

1.1 The nature of the problem

Planning is a knowledge-intensive and collaborative activity, which has to deal with many human, social and cultural issues as well as military issues, particularly when planning for OOTW. Problems experienced at a national and coalition level include the following:

- **Acquiring the right knowledge** - a plan is a multi-faceted statement of intent for which a diverse range of expertise is required across multiple organisations. Gaining access to the required expertise is even more difficult in a coalition setting.

- **Understanding and managing the complex interaction between factors** – the inter-dependence of factors such as own/enemy forces, sustainment, medical, legal, cultural, political etc provides a very complex planning environment. This inter-dependence is exacerbated by the fact that each factor may be the responsibility of a different branch/agency/dept. The number of factors tends to increase in coalition operations.

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• **Dynamically re-planning** - while a lot of effort has gone into tools to assist in the up-front planning process, there has been less emphasis on the requirement to dynamically re-plan once the scenario starts to unfold. Given the complexity of plan development in the first place, this activity is only made harder for coalition operations which tend to have more on-going changes to Multi National Force composition and goals.

1.2 **The opportunity**

The author, Dr Richard Davis, had spent 2 years from ’98-99 setting up a research group (Command & Control Australian Theatre) at HQ Australian Theatre, where one of the key areas had been the development of Australia's campaign planning capability. He was then attached to DERA, which also had active programs in Campaign planning at DERA Malvern and Fort Halstead.

1.3 **Approach**

The approach taken is to compare and contrast UK/AS approaches to the following:

- Military doctrine and processes for campaign planning
- Technology available to support campaign planning
- Research being conducted in support of campaign planning

The insights gained from this comparison is then used to draw out implications for coalition campaign planning.

2 **Military planning**

The paper explores the implications of the similarities and differences in military doctrine between UK/AS for combined planning between the two nations, and draws out some implications for coalition planning with nations that have less compatible doctrine and processes.

2.1 **The Nature of Planning**

The generic planning process has the following iterative stages, following an initial detection that some problem exists or some event requires some planning to resolve:

- Problem framing (understanding the nature of the problem)
- Solution finding (working out possible solution paths)
- Plan implementation (proceeding from planning to action)
- Plan Maintenance (monitoring the unfolding plan and re-planning as necessary)
This generic framework is broadly represented in Figure 1, which shows the Joint Military Appreciation Process (JMAP) used in AS. The figure emphasises the fact that Planning is not a discrete activity within the overall C2 process. It feeds off the Situation Awareness systems, must interact with the execution system and needs to be modified by command evaluation as the campaign progresses. This is why Planning cannot be seen simply as a “J5” activity, because it clearly involves the whole of the HQ up and down the command chain.

![Figure 1 Joint Military Appreciation Process (AS)](image)

The diagram shows a Mission Analysis activity which is broadly analogous to a generic Problem Framing process, supported by an Intelligence Preparation of the Battlespace (IPB). Once sufficient analysis has been done, the solution space is progressively defined by developing and analysing Courses of Action. These are then turned into operational instructions and orders for execution, and then the situation is monitored for re-planning as necessary. Note that the IPB is represented as being closely involved at all stages of the planning process.

2.2 Generic planning issues

The planning process as represented looks deceptively simple. Some significant issues are the following:

- A range of skills are needed at different stages of the planning process. The initial problem framing and identification of solution paths is a conceptual activity that requires a lot of knowledge and understanding of the situation and one’s capabilities. As the planning proceeds to the more concrete implementation issues, there is a need for increasing formalisation and pragmatic evaluation of options.
Some ‘plans’ may be required at very short notice, while others may be planning for contingency events far into the future. Different mechanisms, skills and tools are required for these different scenarios. For example, crisis planning may more closely resemble Recognition Primed Decision Making (Klein, 1997) while deliberate planning may be more normative/comprehensive/evaluative. A contingency plan may never be implemented, and thus never require the kind of detail or re-evaluation of an implemented crisis plan.

Some plans may be highly constrained and directed, while others may be exploratory and innovative. Again, different skills and mechanisms are required to suit the different circumstances.

Plans can be considered at many levels. A military campaign plan in its totality might comprise many separate plans, developed by different staffs and some more tightly linked than others. For example, there might be a separate air campaign, or a detailed plan for special forces to secure a building. Deciding where the boundary exists between plans, and which should be properly considered as part of the campaign plan is part of the overall military planning process. Command Intent is a key concept for helping to manage plans at different levels of command.

Overall, it should be evident that no one solution will exist for a ‘planning tool’!

2.3 Campaigning in UK and AS

There are broad similarities in the doctrine to plan and conduct campaigns for the UK and AS. That is, campaign planning is performed at the Joint Operational level in both nations, and involves steps such as Mission Analysis and Course of Action analysis depicted in Figure 1.

2.4 Organisational Issues

There are subtle organisational differences between UK and AS in their approach to planning. For example, the UK has a relatively greater emphasis on the strategic level of command. Organisationally, this is translated into the UK strategic level being split into two different HQs (Grand Strategic and Military Strategic), where these are combined in AS. The Operational level is correspondingly more differentiated in AS with relatively more powerful Component Commanders (at 2 star level, compared to 1 star level in UK). The Operational level Commander Australian Theatre is responsible to the Chief of the Defence Force for the C2 of Australian operations/campaigns, whereas this is the responsibility of the Military Strategic level, under Commander Joint Operations at PJHQ in the UK.
2.5 **Process issues**

The organisational process as the planning proceeds from strategic to Operational level is summarised in Figure 2, highlighting the fact that the split is organised differently in UK and AS. The large nodes represent the HQ with primacy at each stage, while the small nodes represent involvement from the other HQs.

In the UK, the Military Strategic Estimate is a substantial document which guides the development of the Campaign Plan, including broad courses of action. In AS, the strategic guidance does not include broad courses of action, which are thus developed at the Operational level.

The actual Campaign Plan is quite similar in structure across the UK and AS.

2.6 **Combined/Coalition Issues**

Having described the broadly similar national approaches to planning in UK and AS, what are the implications for combined and coalition planning?

2.6.1 *Enablers between UK/AS*

Combined planning between UK and AS is considerably helped by the following factors:

- common language (albeit with culturally different nuance)
- deep mutual understanding of the others procedures and practices
• formalised treaties on classified information exchange. For example, military LOs permitted access to the other nation’s C2 systems.

• similar philosophical approach for campaign planning.

2.6.2 Barriers to combined planning between UK/AS

The barriers to combined planning are:

• Time/space dislocation (making synchronous working between the static HQs more difficult)

• Technological differences and lack of connectivity between national C2 systems

• More difficult to agree basic Intent, Method and Endstate with two nations involved

• More difficult to match tasks to resources, because the resources come from different nations, with different degrees of certainty and different degrees of capability/sustainability.

2.6.3 The Combined Planning Process

The current approach is that the framework nation (AS in the case of Timor) will already have, or will rapidly develop an outline plan to which other nations can then contribute resources. That is, the diagram in Figure 2 does not represent a parallel sequence of activity between the two nations. In the case of Timor, for example, AS had already produced an outline plan before any formal plans for the UK to participate. The subtle differences between planning processes between the nations will matter less if the processes are not being conducted in parallel. The crucial role of the Liaison Officer is to ensure compatibility between the Combined/Coalition goals with national goals and resources, irrespective of differences in planning doctrine.

2.6.4 Wider coalitions

For coalition planning, not only are the problems of combined planning exacerbated, but there are additional problems such as:

• less likelihood that nations will have practiced together previously

• less compatible military organisation and doctrine

• shared information will be at a lower security level (probably at the official use only level)

• multiple security compartments within the coalition
• more leadership and less partnership (ie will need more explicit demarcation etc)
• less implicit understanding, requiring more time and effort for making explicit agreements.

2.6.5 Conclusions

Although the ability to conduct combined planning between UK and AS would be classed as quite good, this is achieved primarily though human-human communication rather than mediated by technology. That is, despite a rich and close history of interaction, the most effective means of combined planning is still to send LOs.

It is also evident that the planning process needs to undergo significant change when transitioning from a national plan, through a simple combined plan to a full and complex coalition plan. Currently, this transformation is almost entirely the responsibility of the LOs, with very little assistance given by any C3I technology.

3 Campaign Technology

A comparison is made here of the technology available to the two nations to support military planning. The emphasis is on current or near term technology, with the longer term plans being described under the next section (planning research areas).

3.1 Current technology

3.1.1 Overview

The primary UK C2 system is the Joint Operational Command System (JOCS), while the corresponding AS system is the Joint Command Support System (JCSS). JCSS is relatively more mature than JOCS with greater penetration from Joint Strategic through to Single Service Tactical levels, and a more sophisticated Information Management environment. See also Section 3.2. The primary applications on JCSS are a bespoke Situation Awareness system (Llama/Cheetah), MS Office for office automation, Lotus Notes for information management and Intranet technologies for dissemination/publication. The corresponding JOCS technologies are a Situation Awareness system collating information from a number of sources (the Joint Operational Picture, or JOP) accessible by a variety of different displays, MS office automation packages and secure intranet access. Tools for geospatial and temporal analysis and applications supporting image manipulation, logistics support, intelligence request management and other specialist planning activities are also included.

JCSS access is available to UK LOs, and the same is true for AS LO access to JOCS, but the two systems cannot exchange operational information.

It can be seen that there are broad similarities of approach between the two nations, but very basic levels of interoperability have yet to be achieved. Greater use of web technology and better
ability to compartment national versus combined information provide a potential migration path for enhanced interoperability in the future.

3.1.2 Use of Lotus Notes in JCSS

Lotus Notes is not used in JOCS, but is the primary vehicle for Information Management in JCSS. The following key applications are all based on Notes applications:

- **Message databases**: messages coming into the HQ from the Defence Messaging system, DISCON, are passed into various Notes databases.
  - Main HQ database, based on selecting those message from the defence stream for which the HQ is an action or information addressee
  - Specific operation/exercise database, when there is a major operation, a database may be created which selects messages of relevance only to that operations - through the use of Subject Indicator Codes
  - Email, staff can elect to have messages fed directly to their email system, based on a personal profile over which they have edit authority

- **Email**, all HQ email is conducted through Lotus Notes. The advantages are that links can be made with other Notes databases.

- **OPS LOGs**, the J3 staff maintain an event log using Notes, recording key messages, orders, phone calls etc, which can be viewed by Date, operation, regional area etc. Other branch areas have now also started using their own logs, with the concept of a Theatre, HQ and Branch log.

- **ADMIN logs**, there are various Notes databases used to track various aspects of administration, from car parking spaces to problems with the phones etc.

- **PLANNING**, the GEMS database is used to help conduct planning for operations and exercises, a different database for each OP/EX.

- **DISCUSSION**, a 'forum for discussion' database was widely used as the forum for exchange of routine (non-operational) information around the HQ.

- **SPECIFIC**, a range of databases are routinely created to cater for a specific topic. An example was a "Theatre Improvement Program" database to facilitate input and management for the TIP.
3.2 Capability Development

The Smart Procurement Initiative is mandated for all procurements in the UK. Although an Incremental Acquisition model is included in SPI to address issues for CIS, it is not always used by the CIS projects. An Evolutionary Acquisition model was selected at an early stage in the procurement of the Australian JCSS.

A brief history and status of JCSS:

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>Project initiated</td>
</tr>
<tr>
<td>1992</td>
<td>Definition of User Requirement</td>
</tr>
<tr>
<td>1993</td>
<td>Phase 1 JCSS formally approved, and first prototypes delivered on FEPCIS (the office automation system, equivalent to the UK's CHOTS)</td>
</tr>
<tr>
<td>1995</td>
<td>JCSS trialed by EXCON as a complete C2 system during Ex Kangaroo 95</td>
</tr>
<tr>
<td>1996</td>
<td>Phase 1 implementation</td>
</tr>
<tr>
<td>2000</td>
<td>Phases 1-5 completed, currently in Phase 6 &amp; 7. JCSS has over 600 users at Strategic, Operational and Tactical (deployed) HQs, and has progressively replaced single service Command Support Systems.</td>
</tr>
</tbody>
</table>

3.3 Stakeholder integration

In both nations, there is a need for tighter linkage between the key User, Procurement and S&T stakeholders. The pace of IT development, and the need to dynamically co-evolve technology, doctrine and organisation mean that traditional waterfall models of acquisition are doomed to failure. Separating the stakeholders also makes it difficult to dynamically co-evolve.

The Integrated Product Team (IPT) approach is being increasingly adopted in the UK, encouraging these stakeholders to have greater contact. Although AS does not have a formal IPT mandated approach, use of PRINCE methodology, and the tighter integration of DSTO with the rest of the Defence Department means that this issue is also being addressed.

DSTO has made strong efforts over the last 2-3 years to enhance the effectiveness with which it can transfer its prototype ideas into the operational environment. Important initiatives are the following:

- **EXC3ITE.** The Experimental C3I Technology Environment is an ambitious attempt to provide an experimental C3I facility on which to trial new concepts and ideas, which can operate in parallel with the operational system. To that end, it has been designed as a distributed system with nodes at the major DSTO laboratory sites, at key military sites, and even unclassified nodes at selected academic sites. Initial prototypes are now beginning to become available on EXC3ITE.
• **Embedded research groups.** The Command & Control Australian Theatre (C2AST) group was the first research group to be embedded within an operational HQ, with the explicit aim of facilitating the introduction of new ideas/technology. A second group was also established to focus on the Operational Requirements aspects (ORAST). ORAST is broadly equivalent to the DERA/CDA staff in PJHQ as J5OA, but the UK has not an equivalent to C2AST. The advantages of being embedded were a much richer understanding of requirements, and the ability to conduct iterative development with the users.

DERA has broad equivalents to these initiatives, but there are not as closely integrated with the user community. That is, the BIM ARTD (Battlefield Information Management Applied Research Technology Demonstrator) and other demonstrators tend to be located in the laboratory environment rather than the user environment, and the embedded research staff tend to be conducting military OA tasks rather than R&D tasks.

**3.4 Combined/Coalition issues**

It has already been noted that the nation’s respective C2 systems cannot be greatly utilised for electronic information exchange in combined planning. The key barriers are currently:

- **Security.** The most pressing single issue is that of compartmenting national and combined information. The nation’s systems have simply not been designed with this degree of compartmentalisation in mind. A procedural workaround is that the nations can access each other’s national C2 systems by physically sending LOs.

- **Interoperability.** While both JOCS and JCSS have migrated towards being NT client WANs with Microsoft Office, there are significant differences between many of the other applications, including the Situation Awareness display, the Information Management systems and specific databases.

For a coalition operation, any form of access to the framework nation’s C2 system might be denied, further reducing the effectiveness of C2 system support to the overall planning process. In practice, a separate office system may be hastily procured in order to give some basic level of IT support to the coalition.

It is evident that the requirement for combined or coalition working is not a high priority requirement within each nation’s procurement process. There are often too many pressing national issues to be resolved before effort is put into addressing complex international issues.

International demonstrations such as JWID provide the opportunity to test greater levels of interoperability between nations, such as exchanging track information between respective situation awareness systems.
4 Planning Research areas

The paper reviews the areas of active and potential collaboration in campaign planning, and draws out the implications for combined planning between the two nations and for coalition operations.

4.1 Overview

DERA and DSTO both have active research programs addressing campaign planning. Both research organisations are assisting in the development of better process descriptions and requirements analysis for campaign planning. There is also a close correspondence between the philosophical approaches which emphasise the distributed knowledge-intensive nature of campaign planning.

4.2 UK research projects

DERA has a strong background in the decision aid aspects of planning, and is developing tools to support areas including information collection, fusion and management, co-ordination of planning and decision-making, collaborative planning, decision management, and also discrete planning activities.

- Joint Training & Warfighting Initiative. JTWI seeks to improve the operational effectiveness of PJHQ, JFHQ and Component Command Headquarters through the provision of tools and techniques to support improved campaign planning, mission rehearsal, command and staff training and education. An Interim Operational Capability (IOC) is planned for 2002. JTWI builds on previous DERA programs, including Command Decision Making Aids (CDMA) and OA support package Thistle.

- Crisis Planning. To provide advice on Information Systems support for crisis planning, focused primarily at PJHQ level.

- Logistics Support. To provide support to the logistics plan and management processes from Strategic to tactical levels.

- Extended Command Hierarchy Operational Support. The ECHOS prototype is a generic planning framework aimed at the task scheduling aspect of plans in the Operational/Tactical environment. The thrust is that there is a need for a more dynamic/real-time re-planning capability which is integrated across component or sub-plans. The ECHOS project was been underway for 18 months, and has a Phase 1 demonstrator available, with a second version planned for Sept 00. It is funded under Sea Systems ARP 19a (Planning and Decision Aids).

- Command Intent. There is interest in studying the process by which Command Intent is derived and used for C2 of operations.
• Project Support. The most relevant MOD projects to which DERA provide support in this area are the following:
  - JOCS, the current C2 system
  - JCS, the future replacement for JOCS
  - JCS LOG, a specific sub-set of JCS focussing on the Logistics requirements.
  - JBD, the digitisation program developing requirements for JCS

4.3 AS research projects

In terms of prototype development, DSTO has historically focussed more on the collaborative and information management aspects of planning, developing Lotus Notes-based prototypes which have been used across the Australian Theatre. More recently, work has moved to the decision aid end of the spectrum, with interest in modelling/ simulation aids to campaign assessment and systems to support specific aspects of the campaign (such as targeting and critical asset tracking).

• **Research on Collaborative Knowledge Systems**. The ROCKS task focused on the planning process at Strategic and Operational levels of command. The most successful product of this task was the Group Enabled Meeting Support system (GEMS), which became widely used across the Theatre despite being a research prototype.

• **Distributed Interactive C3I Effectiveness**. The DICE task aims to provide a Synthetic Environment for C2 processes at the Operational level. One component of this task is developing models of the planning process.

• **C3I OA studies**. As part of a set of activities concerning C3I requirements at Theatre level, there is a task examining requirements for the campaign planning process.

• **Campaign Analysis Tool**. The CAT is being developed by the Operations Research Australian Theatre group, equivalent to the CDA group at PJHQ. The three main areas for support are Force Effectiveness, Asset Management and Targeting assessment & monitoring.

• **Project Support**. The key DoD project relevant to this area is the JCSS.

4.4 Planning requirement areas

Independently, the DSTO and DERA (19K package) structure for planning requirements are quite similar, and split out Planning Infrastructure, Management and Tools as three separate thrusts to be addressed, as summarised in Figure 3.
An alternative characterisation was provided by a Military Assessment Panel on the JTWI project (March 2000), which used Structured Database, GIS, Visualisation/presentation, Synchronisation, what if toolset, staff check toolset. These items can readily be mapped to the structure in Figure 3.

4.5 Summary

Having outlined the major planning requirement areas, and the major research programs in each nation, Table 1 summarises the relationship between the requirements and the programs.

<table>
<thead>
<tr>
<th>Activity</th>
<th>UK programs</th>
<th>AS programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning requirements &amp; process development</td>
<td>• JTWI</td>
<td>• ROCKS</td>
</tr>
<tr>
<td></td>
<td>• Crisis Planning</td>
<td>• C3IOA</td>
</tr>
<tr>
<td></td>
<td>• Logistics planning</td>
<td>• CAT</td>
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<td></td>
<td>• JBD</td>
<td>• DICE</td>
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<td></td>
<td>• JCS Log</td>
<td>• JCSS</td>
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<tr>
<td>Decision Aids/Tools</td>
<td>• JTWI</td>
<td>• CAT</td>
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<td></td>
<td>• Crisis Planning</td>
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<td></td>
<td>• Logistics planning</td>
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<td></td>
<td>• ECHOS</td>
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<tr>
<td>Plan Management</td>
<td>• Logistics planning</td>
<td>• No specific programs</td>
</tr>
<tr>
<td>Collaborative Services</td>
<td>• Various (non-core)</td>
<td>• GEMS</td>
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<tr>
<td>Visualisation services (Situation Awareness)</td>
<td>• Various (non-core)</td>
<td>• Various (non-core)</td>
</tr>
<tr>
<td>Information Services</td>
<td>• Various (non-core)</td>
<td>• Various (non-core)</td>
</tr>
</tbody>
</table>

Table 1 Summary of UK and AS programs relevant to planning
4.6 Coalition Issues

While some of the programs allude to the likely combined or coalition nature of future operations, there is typically little explicit work addressing specific coalition requirements. Nevertheless, the increasing emphasis on web browser front-ends to products, middleware architectures and so on will tend to be helpful in promoting technical interoperability. The main drive towards enhancing combined interoperability is usually an international program under TTCP, CCEB, or AUSCANZUKUS auspices, such as JWID, CFBL and so on.

5 The Way Ahead

5.1 A Proposed Framework

One way of characterising the planning domain is to match the planning support structure against the planning process. The resulting matrix yields some interesting insights.

<table>
<thead>
<tr>
<th>Frame Problem</th>
<th>Find Solution</th>
<th>Implement</th>
<th>Maintain</th>
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<tbody>
<tr>
<td>Tools</td>
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<tr>
<td>• What if analysis</td>
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<td></td>
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<tr>
<td>• Synch matrix</td>
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<td></td>
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<tr>
<td>• Dynamic re-plan</td>
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<td>• IPB spt</td>
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<tr>
<td>• Staff Check tools</td>
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<tr>
<td>Management</td>
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<td>• Plan product &amp; dissem</td>
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<td>• Process Man.</td>
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<tr>
<td>• Plan re-use</td>
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<tr>
<td>• Decision traceability</td>
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<tr>
<td>Infrastructure</td>
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<tr>
<td>Info services</td>
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<tr>
<td>• Heterogenous databases</td>
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<td></td>
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<tr>
<td>• Distributed computing</td>
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<tr>
<td>• Interoperability</td>
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<tr>
<td>• Multi-level security</td>
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<tr>
<td>Visualisation services</td>
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<tr>
<td>Collaborations services</td>
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<tr>
<td>• Virtual collocation</td>
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<td>• Brainstorming</td>
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<tr>
<td>• Group authoring</td>
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</table>

Table 2 Planning Support Framework
There could undoubtedly be discussion about whether a place in the matrix deserves a highlight or not, but the following broad points arise from the table as it stands:

- There is relatively more emphasis on the Find Solution and Implement aspects than on Frame Problem and Maintain. This may reflect the fact that planning has been seen as a discrete, directed activity to produce a document. There has been less emphasis on framing the original problem or actively helping in changing/maintaining the plan.

- Tools which support Framing also tend not to support Implement or Maintain, implying that framing is a fundamentally different kind of activity. Framing is a knowledge intensive and conceptual activity where formalisms tend not to assist. Formalisms are very beneficial when implementing or automatically changing a plan based on new circumstance.

- The Find Solution phase is the single most supported aspect of planning, which seems appropriate, although some re-focussing of effort may be useful.

5.2 Additional research areas

Table 2 includes items from the Planning Support architecture in Figure 3, which is a summary of some key areas to be considered. Additional areas which could be highlighted or considered in their own right are the following:

- **Multiple COA.** Given the aim to maintain operational flexibility and surprise, there is interest in the ability to maintain multiple COA and switch between them to suit the circumstance. That is, rather than deciding on a single COA (albeit with some branches and sequels), the aim would be to agree a family of COA which could be rapidly called up. Developing and maintaining multiple COA would be more complex than the case for a single COA and would need specific support.

- **Multiple Operations.** It is becoming the norm to be running multiple concurrent operations. The US CINC21 program now has this as a fundamental part of its goal. There is currently little support to explicitly managing this concurrency, which is particularly important at the Joint Strategic and Operational levels.

- **Command Intent.** A plan could be represented as a mechanism for communicating Command Intent, and is very important to the Centralised Command/Decentralised Control philosophy used by UK and AS military forces. It requires sufficient information about the goal, constraints, operational concept and so on to allow a subordinate command to achieve the objective. More explicit support to the development and communication of Command Intent could assist the overall planning process from Strategic to Tactical levels.
• **Planning ontologies.** On a more technical level, there is a need for better formal understanding of the components of a plan and their inter-relationships. Such ontologies offer potential for dynamic re-planning, language translation, ROE representation, use of AI technologies and so on. These benefits, though, come at a potential cost of usability and flexibility of the tools. A flexible and usable way to incorporate ontologies in planning would be a significant step forward.

• **Planning-centric information push.** While there is generic progress on information push/pull in various programs, there would be advantages to a specific focus on mechanisms to enhance visibility of the plan as it evolves, and as maintenance is required. That is, mechanisms to detect and assess changes/updates to the plan, or changes to the underlying assumptions on which the plan is based. This would almost certainly require more sophisticated planning ontologies than currently exist.

5.3 **Collaboration opportunities**

There are a number of areas where greater collaboration between DERA and DSTO can be envisaged, either under bilateral arrangements, or as part of a wider collaboration under TTCP or other international fora. The Planning Support framework is used to structure the possibilities, noting whether the collaboration could be based on information exchange, collaboration, joint experiments and so on.

An assessment of collaboration opportunities under each of the planning support framework areas is summarised below and in Table 3.

• **Requirements and process** – there is excellent opportunity for greater information exchange between the various UK and AS projects which are examining planning requirements and processes.

• **Lotus Notes** – DSTO can (and is, through the attachment) assisting DERA develop its Lotus Notes applications, at the level of software exchange and joint development. A new prototype, called Plan Management (PlanMan), has been developed by combining DSTO's and DERA's Lotus Notes prototypes (called GEMS and CJPA respectively), and is to be demonstrated at JWID 2000.

• **Planning ontology development** – one of the potential benefits from a better definition of a planning ontology is that it could significantly enhance coalition operations by helping language translation, nation-specific representations of the plan (including Rules of Engagement) and so on. There would be a strong case for a collaborative approach to ontology development, in order to develop ontologies which are robust to national differences.
Dynamic re-planning – There is plenty of scope to work collaboratively on the general area of dynamic re-planning. This can build on the front-end Problem Framing approach by DSTO, translating it into the more structured approach by DERA which is more amenable to re-planning.

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Table 3 Potential areas for collaboration

Key: ●●● = Already active area, ●● = collaboration has started, ● = potential area

5.4 Implications for coalition planning

Overall, it is clear that a number of basic improvements to combined and coalition planning would be achieved if the planning infrastructure was better. This includes basic connectivity, security and interoperability.

Areas which would be specifically beneficial to combined or coalition planning are then those which enhance the ability of different nations to view the underlying plan in a way that supports their own processes. For example, being able to view the plan in one’s own language is a significant benefit. The development of a more powerful planning ontology would help in this aspect.

Other factors which become particularly important in coalition operations include the usability and flexibility of systems. Usability is extremely important because coalition partners will not have much opportunity to take part in training activities. Flexibility is important because coalition operations are even less ‘standard’ than national operations.
5.5 Conclusions

There is much worked being conducted by UK and AS in the area of military planning, and it is evident that planning is a complex area in need of support.

There is definitely scope for enhanced collaboration between UK and AS across a range of projects. The criteria for selecting specific projects will be based on areas of common interest, and whether they bring specific benefit to combined planning.

6. References