

THE GHOST IN THE MACHINE

BETTER APPLICATION OF HUMAN FACTORS TO ENHANCE THE MILITARY APPRECIATION PROCESS

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Land Warfare Studies Centre

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Abstract

The topic of this paper is the Military Appreciation Process (MAP), which is the structured procedure employed by the Australian Army for operational planning. The paper argues that, while the MAP is generally very effective, it could be further improved by better application of human factors. Specifically, better use of the personal role of the commander, intuition, and creativity will result in both higher quality plans and more efficient conduct of the planning process. The paper draws on a variety of scientific research pertaining to these human factors, including both specifically military-focused material and more general decision-making theory. Conclusions are then drawn about ways to better employ human factors in military planning and specific activities that should be incorporated in the MAP for this purpose. The recommendations thus made would result in additional reference to human factors being included in doctrinal publications and MAP training courses; changes to the current methodology used in staff colleges for MAP training; and changes to the way the MAP is actually conducted in operational headquarters. It should be noted that the MAP is very similar to equivalent processes conducted by other modern military organisations, and that the argument of this paper is equally applicable to them.

Disclaimer

This paper was written while the author attended the Canadian Forces College in fulfilment of one of the requirements of the Course of Studies. The paper is a scholastic document, and thus contains facts and opinions which the author considered appropriate and correct for the subject. It does not necessarily reflect the policy or the opinion of any agency, including the Government of Canada and the Canadian Department of National Defence.

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Abbreviations

AAR	After Action Review
CECA	Critique, Explore, Compare, Adapt
COA	Course of Action
IPB	Intelligence Preparation of the Battlefield
JMAP	Joint Military Appreciation Process
MAP	Military Appreciation Process
MDMP	Military Decision-Making Process
OODA	Observe-Orientate-Decide-Act
OPP	Operations Planning Process
RPM	Recognitional Planning Model
SA	Situational Awareness
USMC	United States Marine Corps

Introduction

Background

The Military Appreciation Process (MAP) is the Australian Army's doctrinal planning process. It is a structured model for collaborative planning designed to assist 'the commander (and his staff) apply thoroughness, clarity, sound judgement, logic, and professional knowledge, in potentially stressful situations, to reach a decision'.¹ The process itself is very similar to the Joint Military Appreciation Process (JMAP), as used by the Australian Defence Force in joint environments, the NATO Operational Planning Process (OPP) as used by the Canadian Forces, and the Military Decision-Making Process (MDMP) used by the United States Army. All of these processes are originally based on a bounded rational decision-making model, which combines logical analysis with assumption-based measures to account for the real-world uncertainties of incomplete knowledge and unpredictable outcomes.

The MAP is an effective process that is well established in doctrine and proven in many operational theatres. However, as currently taught and doctrinally promulgated, it has a tendency to be mechanistic and does not fully exploit the human qualities of the commander and his staff.² In many cases, field practitioners of the MAP adjust the process to redress these shortfalls, and such adjustments tend to make the difference between mediocrity and excellence in planning. There are sound scientific bases for these adaptations, well established by decision-making researchers, and there is clear potential for them to be permanently incorporated in MAP doctrine and training. In this way, the benefits gained by the most astute commanders will be more readily achieved across the board.

1 Australian Army, *LWP-G 0-1-4 Australian Army Land Warfare Procedures – General: The Military Appreciation Process*, 2001, p. 1-1.

2 For simplicity the male gender has been used throughout this paper. References to the male gender should be considered equally applicable to the female gender wherever they occur.

Purpose

The MAP is a sound planning process for military operations, with particular benefits as a method for combining diverse specialist areas of expertise and aligning them with a single commander's intent in a complex situation, all while developing common situational awareness among a large staff. The MAP's limitations as a somewhat mechanistic process could be significantly improved by better incorporating human factors, specifically the personal role of the commander, intuition and creativity.

The purpose of this paper is to show that human capabilities can significantly leverage the MAP's effectiveness, and to suggest specific techniques for doing so. The implications of this paper's recommendations would be changes in the way that the existing MAP doctrine is applied, and changes in the training methodologies used by staff schools to educate staff officers and potential commanders in the use of the MAP.

Scope

Some of the recommendations of this paper are based on the author's personal observations of MAP training and application, both during exercises and on deployed operations. After seeing the MAP applied extremely well in some circumstances and less so in others, it became clear that the difference was in the management of human factors. Upon conducting further research, it was found that this observation was shared by others, and that there was a good scientific basis for it.³

Most of the decision-making research and experimentation that has been done is based on individual decision-making rather than collective processes such as the MAP. As stated by decision-making researcher Dr Gary Klein, 'by viewing planning as a type of problem solving, it should be possible to gain a richer appreciation of the planning process. Cognitive scientists have not given as much attention to planning

as to problem solving, and there seems to be a good opportunity for research here.'⁴ Nonetheless, much of the research that has been conducted into problem solving is still relevant to planning, and has been extrapolated in many cases to develop the arguments of this paper. The research cited is a blend of direct military-related material and broader management material—this is significant, as it typifies the reality of the decision-making body of knowledge. The two domains have much in common, and each can learn much of value from the other. Very broadly, military decision-making's strength is in its structural processes, whereas civilian management's forte is more the human creative aspects. Hence, given that this paper addresses the issue of blending human factors with structured planning, it is no coincidence that the reference material draws on both domains.

Given that the aim of this paper is to propose methods for improving the effectiveness of the MAP, it is necessary to define exactly what that means. For the purposes of this paper, the definition of MAP effectiveness is the achievement of the right balance between timeliness, optimal plan development, achievement of group 'ownership' of the plan, robustness of the plan itself, and preparedness of the commander, his staff and subordinate elements to execute the plan. This is a conceptual definition, because the actual balance among these requirements is dependent on the situation.

For a variety of reasons military planning is a collective process, led by a commander and conducted according to a structured, analytically-based procedure, namely the MAP or its equivalents. While other models have been developed (such as Klein's Recognitional Planning Method), it is not considered necessary to replace the MAP with a new process at this time, and the recommendations of this paper assume that any changes would be made within the framework of the existing MAP. The assumptions made in this paper are as follows:

- The MAP is applicable to any level of planning, though is best suited in its doctrinal form to planning at regiment/battalion level or higher.
- The MAP is designed for planning military operations, however is applicable and occasionally used for other planning purposes, such as procurement, restructuring or strategic planning.

3 Personal observations referred to in this paper are based on: squadron and regimental level MAP in the 3rd Combat Engineer Regiment; battalion group level MAP within the 3rd Battalion Royal Australian Regiment (Parachute) on operations in East Timor; brigade and division level JMAP with headquarters 3rd Brigade and the Deployable Joint Force Headquarters during command post exercises. Staff training course references are based on the Junior Staff Course, Combat Officers Advanced Course and Intermediate Operations Course (all conducted by the Australian Army), and the Command and Staff College course (conducted by the Canadian Forces).

4 Gary Klein, *Sources of Power: How People Make Decisions*, Massachusetts Institute of Technology Press, Massachusetts, 1999, p. 146.

- Reference will be made to the MAP throughout, however the recommendations of this paper are equally applicable to the OPP or the MDMP, as the processes and the potential for improvement through human factors are effectively the same.
- The most common use of MAP is to conduct detailed planning prior to a major activity (e.g. a military operation) followed by situational decision-making during the execution phase. The doctrine provides for the MAP to be a repetitive, cyclic process, but in reality this rarely occurs.
- The actual context for military planning is left open, so could include conventional combat operations on a linear battlefield or unconventional asymmetric campaigns, such as Operations Other Than War or the International Campaign Against Terrorism. The latter in fact provide more complexity and ambiguity, hence are more likely to benefit from the consideration of human factors as proposed by this paper.
- References to ‘the commander and his planning staff’ are not restricted to the G5 (Future Plans Cell), but to all involved in the planning process, such as specialist advisers, other agencies, current operations staff and others as pertinent to the occasion.⁵

The first chapter of this paper will provide a description of the MAP and its rationale as a planning and decision-making tool, then will summarise its strengths and weaknesses in order to clearly identify the problem. Subsequent chapters will each address a particular human factor. First, the role of the commander will be examined, showing the benefits of greater personal involvement to both the planning process itself and the commander’s subsequent ability to make time-pressured decisions during the execution phase. Second, the role of intuition will be examined, by discussing how it works, explaining how it can effectively be combined with analytical processes, and suggesting specific measures for improving planners’ intuitive judgment. Third,

the role of creativity will be examined, by explaining how creative processes work and how to establish the conditions for good creativity within the MAP. Finally, the interplay between these factors and their integration into the conduct of the MAP will be demonstrated in a tabular format.

5 Modern Western military headquarters are normally organised into nine primary staff branches (or ‘cells’) along functional lines: Personnel and Administration (G1), Intelligence (G2), Current Operations (G3), Logistics (G4), Future Plans (G5), Communications and Information Systems (G6), Doctrine and Training (G7), Resources and Finance (G8) and Civil Military Cooperation (G9). Slight variations exist, and the nomenclature varies with the nature of the headquarters, but these designations are those that will be referred to throughout this paper.

The Military Appreciation Process

*Decision making is an art and a science, with no simple rules.*⁶

*The reality is that managers make decisions based on a combination of intuition, experience and analysis.*⁷

The aim of this chapter is to place the paper's arguments into context. This will be achieved by providing a brief overview of the MAP and its theoretical basis, then identifying its shortfalls and outlining the nature of the human factors that can be applied to remedy them.

MAP Overview

As explained in the Australian Army's MAP doctrinal publication, the

Military Appreciation Process is a doctrinal approach to decision-making that allows a battlefield situation to be examined and a logical decision to be reached . . . The MAP is an assumption-based planning model where known information is analysed and that which remains unknown is deduced through assumption.⁸

It is a logical process that follows the sequence of: Mission Analysis, Course of Action (COA) Development, COA Analysis then Decision and Execution, with concurrent Intelligence Preparation of the Battlefield (IPB), as shown in Figure 1. The

MAP includes numerous briefing sessions, with the primary purpose of informing and seeking guidance from the commander and the secondary purpose of developing collective situational awareness among a large staff.

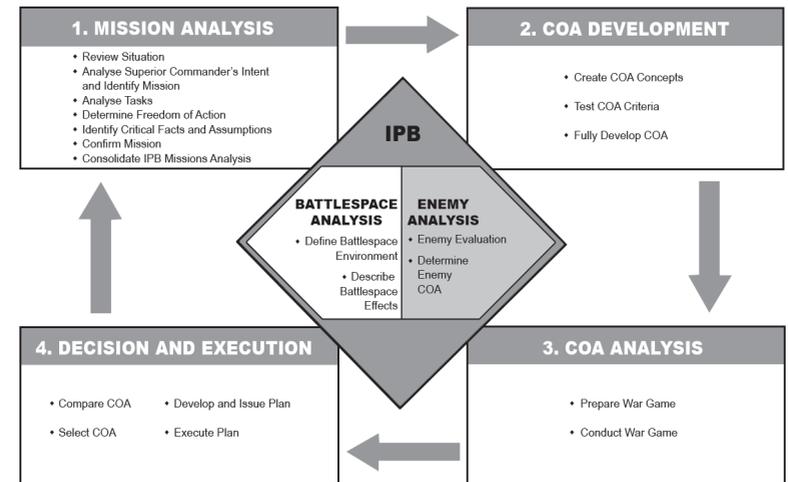


Figure 1. *The Military Appreciation Process*⁹

The MAP is an evolution of the Military Estimate or Appreciation, as previously used by most modern military forces. It is designed to be conducted by a headquarters staff, though the doctrine allows for it to be used as an individual process or conducted in an abbreviated 'hasty' format. The MAP has been used by the Australian Army for nine years, and more recently by the other Australian services in its joint format, titled the Joint Military Appreciation Process. It is a well established planning tool regularly used at all levels from battalion/regiment upwards (and in a modified format at lower levels), and it has proven its worth in the planning of numerous operational deployments. The MAP is very similar to the Operational Planning Process (OPP) that is NATO doctrine as used by the Canadian Forces, as well as the US Army Military Decision-Making Process (MDMP). See Figure 2 for a comparison of the different models. For all practical

6 Robert I. Gross and Susan E. Brodt, 'How Assumptions of Consensus Undermine Decision Making', *MIT Sloan Management Review*, Vol. 42, No. 2, Winter 2001, p. 87.

7 Des Dearlove, *The Ultimate Book of Business Thinking: Harnessing the Power of the World's Greatest Business Ideas*, Capstone Publishing Ltd, Oxford, 2003, p. 60.

8 *IWP-G 0-1-4 Australian Army Land Warfare Procedures – General: The Military Appreciation Process*, p. 1-1.

9 *Ibid.*, p. 1-3.

purposes these processes are equivalent, and the observations made in this paper apply equally to all of them.

MAP	OPP	MDMP ²
	Initiation	Receipt of Mission
Mission Analysis	Mission Analysis	Mission Analysis
COA Development	COA Development	COA Development
COA Analysis		COA Analysis
Decision and Execution	Decision	COA Approval
	Plan Development	
	Plan Review	Orders Production

Figure 2. *Comparison of Military Planning Methodologies*¹⁰

The MAP is essentially a bounded rational decision-making process, adapted and refined for military purposes, but with a solid basis in established decision-making theory. For example, Dearlove describes the ‘rational model of decision making’ or ‘synoptic model’ as: ‘identifying the problem, clarifying the problem, prioritising goals, generating options, evaluating options, comparing predicted outcomes, and choosing an option which best matches the goals’.¹¹ The classic rational choice strategy of Janis and Mann is also recognisable within the MAP, as follows:¹²

- Thoroughly canvas a wide range of options (COA Development)
- Survey a full range of objectives (Mission Analysis)
- Carefully weigh the costs, risk, and benefits of each option (COA Analysis)
- Intensively search for new information in evaluating options (IPB)

10 OPP: Department of National Defence, Canada, *B-GJ-005-500/FP-000, CF Operational Planning Process*, 2001; MDMP: Department of the Army (US), *FM 101-5: Staff Organization and Operations*, May 1997.

11 Dearlove, *The Ultimate Book of Business Thinking*, p. 60.

12 Janis and Mann’s model as quoted in Klein, *Sources of Power*, p. 28. [MAP cross-references added]

- Assimilate all new information (IPB and other information updates throughout)
- Re-examine the positive and negative consequences of each option
- Carefully plan to include contingencies if various risks occur (branch and sequel planning).

The ‘bounded rationality’ nature of a decision-making process is the recognition of real world uncertainties, generically described as follows:

In reality decision-makers have imperfect knowledge about means and ends relations; they are not fully informed about the full range of possible alternative means to achieve their objectives; they have insufficient information about the relative efficiency and effectiveness of alternative means; and the objectives of the decision are ambiguous. Busy, time pressed decision makers do not have time to collect all of the information necessary to make fully informed rational decisions... Bounded rationality takes into consideration the real decision making constraints which confront managers.¹³

In the MAP this is typified by its ‘assumption-based’ nature, as well as the consideration and assumption of risk on the part of the commander, the iterative information search provided by IPB, and the incorporation of branch and sequel planning.

Validity of the MAP

The MAP’s widespread acceptance and successful application for many operations is strong justification for its fundamental validity as a means of producing effective plans. This is also supported by experimental results, such as a 1995 US Army Research Institute experiment that tested the performance of different groups of planners considering COA for a division-level advance. The study showed that those groups

13 University of Leicester Management Centre, *Strategic Analysis and Choice*, Study Guide 2603/4/5, Edition 12, Learning Resources, Cheltenham, 2002, p. 1-10.

that followed a structured process, similar to the MAP, achieved better performance due to more rigorous consideration of the relevant factors.¹⁴

The MAP also has value as a means of developing collective situational awareness (SA). SA has been defined in a variety of ways, a useful example being that ‘Situational Awareness is a person’s *perception* of the elements of the environment within a volume of time and space, the *comprehension* of their meaning and the *projection* of their status in the near future.’¹⁵ Klein has conducted a number of studies with US military organisations to assess the linkages between SA and decision-making effectiveness, and his conclusion is that ‘team situation-awareness (SA) is crucial for effective decision-making. In fact, research has demonstrated that obtaining and maintaining SA in teams is far more complex than in individuals.’¹⁶ The MAP activities of promulgating commander’s intent and sharing information via regular structured briefings serve very well to develop collective SA.

Consequently, there is no reason to recommend fundamental changes to the doctrinal MAP: it is an effective and valuable planning tool in its current form. The improvements required relate to the application of human factors within the existing process.

Weaknesses of the MAP

While it is a sound process, there is scope to consistently improve the effectiveness of the MAP by addressing three critical factors, namely the personal role of the commander, intuition and creativity. Each of these will be discussed in detail in their separate sections of the paper. Overall, while the MAP is a useful process, it does not naturally harness the skills of either the commander or his planning staff to the fullest extent possible. For example, Schmitt and Klein have undertaken numerous studies on behalf of the United States Navy, Marine Corps and Army. They have repeatedly

drawn the same conclusions, based on observations of the naturalistic processes used in the field:

Although existing planning models tend to be very elaborate, they view planning as an orderly, sequential process. They are based on conventional models of human decision-making that view decision making as a rational process of multiple-attribute utility analysis. ... Existing planning models do not do justice to the non-linear complexity of real planning, and in many cases actually inhibit and degrade planning ... Fortunately, most command post staff members ignore these models during operational missions – even during training exercises unless the staff is being scrutinized for compliance with doctrine.¹⁷

Klein and Schmitt’s solution was to devise a naturalistic planning process, called the Recognitional Planning Method (RPM), which will be further discussed in the main body of this paper. They felt this was necessary for two reasons: first, to align theory with observed practice; and second, to better exploit the intuitive ‘recognition-primed’ thinking of the commander. Their model has much value, but is essentially already within the possible variations of the MAP, and as such is not recommended as a replacement for the MAP itself. The RPM is pertinent because it typifies the massaging of the doctrinal process carried out by astute commanders in order to better harness human factors.

The first problem is the MAP’s approach to the role of the commander. In recognition of his diverse responsibilities, the MAP is designed to allow the commander to be absent for much of the process, relying on his initial guidance and various backbriefs to stay informed and align the staff with his intent. While theoretically an efficient process, in practice the commander’s ability to personally influence the process is less than ideal and it tends to result in a high dependence on relatively junior staff. The consequences of this are that more experienced personnel’s capacity is not fully exploited and that planning time is wasted. It also fails to prepare the commander for

14 Jon J Fallesen, ‘Decision Matrices and Time in Tactical Course of Action Analysis’, *Military Psychology*, Vol. 7, No. 1, 1995, p. 49.

15 Lieutenant Colonel Stephen R Riese (US Army), ‘Quantifying Information Availability for Situational Awareness: MORS Workshop on Decision Aids/Support to Joint Operations Planning’, briefing by the US Army Training and Doctrine Analysis Center, November 2003, <http://www.mors.org/meetings/decision_aids/da_pres/Riese.pdf> accessed 27 April 2004.

16 Raanan Lipshitz, Gary Klein, Judith Orasanu and Eduardo Salas, ‘Taking Stock of Naturalistic Decision Making’, *Journal of Behavioural Decision Making*, Vol 14, 2001, p. 331.

17 John Schmitt and Gary Klein, ‘A Recognitional Planning Model’ in Proceedings of the 1999 Command and Control Research and Technology Symposium, US Naval War College, Rhode Island, June-July 1999, <http://www.dodccrp.org/events/1999_CCRTS/pdf_files/track_3/105klein.pdf> accessed 27 February 2004.

subsequent intuitive decision-making. These issues are very important, so this paper will recommend specific methods for the commander to be more influential in the process, while still leaving some time available for other responsibilities. This problem is partly caused by training methodologies, so improvements will also be suggested for training future commanders and key staff officers to be more effective in applying the MAP.

Second, the process is biased towards analysis and determinate judgments, which is unrealistic in terms of the likelihood of complete and accurate information being available, and also in terms of the intuitive decision-making processes actually used in practice. Much research has shown the value of integrating intuitive and analytical reasoning, so this paper will recommend methods to do so within the existing MAP framework.

Finally, the creative aspect of the process tends to be left to chance, with no consideration of the best way to harness the full creative abilities of the people involved. Notwithstanding the requirement for greater direction from the commander, other members of the planning staff also need to think laterally and devise innovative solutions. Typically, there is surprisingly little attention paid to the COA development phase of the MAP, perhaps because it is overshadowed by the mechanics of the planning sequence. Creativity is also required throughout the MAP for other purposes, such as anticipation of possible enemy COA, identification of implied tasks, devising deception plans, resolving logistic problems and negotiating ways to satisfy national interests. This is especially pertinent in the current era of non-traditional conflicts and asymmetric warfare, characterised by short warning times, multinational coalitions, political complexities, convergence of warfighting and humanitarian roles for military forces, and elusive enemies made up of insurgents and terrorists.

Summary

The MAP is a well structured and logical planning tool that has a sound basis in decision-making theory. It has been well proven by operational use and is fully established as doctrinal procedure. Its strengths are its ability to incorporate diverse factors and develop comprehensive plans, largely due to its structured nature. Its weaknesses relate to the incorporation of the human factors of the personal role of the commander, intuition and creativity. The application of the MAP is flexible according to the particular situation and the commander's preferences, and within its current

form there is sufficient flexibility for the weaknesses to be obviated. Consequently, the improvements that are recommended by this paper are achievable within the current doctrine and relate to the way it is applied, rather than a need to substantially revise the doctrine itself. The doctrinal publications do, however, need to be amended to provide greater emphasis on the human factors, in order to instil the necessary enhancements in MAP training and application.

The Personal Role of the Commander

If I always appear prepared, it is because before entering on an undertaking, I have meditated for long and have foreseen what may occur. It is not genius which reveals to me suddenly and secretly what I should do in circumstances unexpected by others; it is thought and meditation.

– Napoleon

Too much information can paralyse a force as quickly as too little if commanders are hesitant to act in ambiguous situations. The commander's coup d'oeil remains a key ingredient in success in battle.

– Clayton Newell¹⁸

The commander 'owns' the operation and the plan to make it happen. His name will be forever linked with its success or failure. When people remember the Battle of Trafalgar they think of Horatio Nelson; the Battle of Alamein was a showdown between Irwin Rommel and Bernard Montgomery; the Inchon landings were Douglas MacArthur's brilliant operational manoeuvre; and Operation DESERT STORM will forever be remembered as the personal triumph of Norman Schwarzkopf. These linkages are not coincidental, nor are they based on a simple protocol of focusing attention on the top of the leadership pyramid. Those commanders played a direct personal role in planning their operations, and the outcomes in every case were strongly influenced by them. Nonetheless, a military commander has many other responsibilities concurrent with the planning process, and he has a staff with their own creativity and planning skills, so there is a balance to be achieved. It is considered that in both training and practice this balance is often sub-optimal: there is a tendency for the process to be staff-driven, and for the unique capabilities of the commander to be insufficiently exploited. Recognising this, it is important to identify how the personal role of the commander can be better incorporated within the construct of the MAP.

18 Clayton R Newell, *The Framework of Operational Warfare*, Routledge, New York, 1991, p. 136.

In order to maximise the effectiveness of the MAP, the commander should play two key roles: the first is shaping and guiding the planning process itself to achieve the right plan; and the second is to develop his own understanding and intuition to facilitate good decision-making during the execution phase. These activities make the commander's personal role a critical 'human factor' in leveraging the effectiveness of the MAP.

The commander's role in the MAP can be viewed in terms of his critical inputs—namely establishing the conditions, shaping the process, setting the direction, and developing his own intuitive decision-making skills for the execution phase—and they will be considered in that order. It is important to note that the existing doctrine provides the commander with a lot of flexibility, and that no substantial changes to the process itself are required. However, it is considered that greater emphasis should be placed on certain human aspects of the commander's personal role, and that the overall thrust of these would have a substantial effect on the way that the doctrine is applied.

Establishing the Conditions

Well before a particular MAP commences, the commander should have already largely completed one of his most significant roles: establishing the conditions for him and his staff to be able to conduct the process well. This involves setting the obvious physical conditions, such as establishing procedures and organising the staff into appropriate groupings, but also significant cultural issues that are less immediately apparent. An example of this process is Montgomery's assumption of command at Alamein; as soon as he arrived, he recognised that the 8th Army Headquarters needed major changes of both physical aspects (location, working areas, administrative procedures) and culture (defeatist attitude, lack of innovation) if it was to become capable of planning and conducting a successful campaign to defeat Rommel. He drove the change process himself, with alacrity, and was completely successful in establishing the conditions for his headquarters to work effectively.¹⁹

The physical conditions are doctrinal and largely self-evident, so the only one to be discussed here is that of planning staff size. Headquarters are large organisations, for

19 Nigel Hamilton, *The Full Monty, Volume 1: Montgomery of Alamein 1887–1942*, Allen Lane, London, 2001, pp. 508–556, 608–619.

example a corps headquarters is typically 1000 people or more. The issue is therefore to have the right people involved in the planning process, striking a balance between the need for detailed specialist advice and the need to avoid getting bogged down in an unwieldy process. A study by Major J P Storr provides good simple models to illustrate the detrimental effects of large staffs on tempo, mission command of subordinates, complexity and individual effectiveness.²⁰ He makes a strong case for the superior effectiveness of small planning staffs, supported by both experimental evidence and theory. He also describes many disadvantages of large staffs, including vulnerability, insecurity and physical unwieldiness, as well as finding that they do not necessarily produce better plans. It is therefore considered that planning staffs should be kept as small as possible, and that current practice is to have larger staffs than is ideal.

The solution to this problem is for the commander to conduct the MAP with a dedicated G5 (Future Plans) cell plus a small group of key senior advisers with professional mastery of their area of expertise (logistics, offensive support, engineering etc). These specialists are well placed to advise the commander which planning factors can be assumed, and which absolutely require detailed assessment for the plan to proceed. According to their advice, additional staff can be 'sub-contracted' to provide the necessary analysis (without actually being drawn into the MAP any more than necessary for them to perform their calculations). This approach will create an integrated and synchronised plan that considers all the relevant issues, and will do so in an efficient manner. It does, however, depend on the ability of those key advisers to provide accurate advice in sufficient detail based largely on their own judgment and experience. This is considered to be a sound assumption, and the risk thereby assumed is a price worth paying for the advantages of smaller planning teams.

Other physical conditions required for good planning relate to communications systems, security, location of the headquarters and functional layout; however, these do not relate to the human factors that are the topic of this paper so will not be discussed further.

Conversely, there are some issues relating to the development of organisational culture that are significant human factors in optimising the MAP. The commander

plays a key role in establishing the organisational culture of his planning staff, and this in turn has a significant impact on the effectiveness of their work. This linkage has been well demonstrated by Bennis and Biedermann in their study of 'Great Groups', which were a variety of highly successful collaborative teams such as the Manhattan Project (responsible for the development of the atomic bomb) and Lockheed's 'Skunk Works' (responsible for development of stealth aircraft technology).²¹ They describe the conditions necessary for collaborative groups to achieve the high level of synergy and focus typified by their examples. Among their findings, the following are directly applicable to the role a commander plays in establishing organisational culture that will enhance the effectiveness of planning using the MAP:

- Encouraging and rewarding unconventional thinking.
- Creating a strong sense of team spirit and group identification.
- Allocating responsibilities and expectations that stretch individuals.
- Ability of the leader to impart his vision, and provide team members with a strong sense of meaning to their work and personal ownership of its outcome.
- Maintenance of a positive atmosphere—good interpersonal relations, sense of fun, camaraderie.
- Selection of particularly talented team members and creation of a sense of 'specialness', simply by virtue of being included in the team.
- Encouragement of autonomy for sub-groups within the team.
- Treatment of failure and mistakes as valuable learning experiences, and as evidence of the right blend of qualities required for ultimate success in an uncertain environment.
- Protection of the creative team from bureaucracy and distractions.
- Support from the leader in the form of wielding his 'clout' to overcome external obstacles or objections.
- Results-orientation and time discipline ('real artists ship', in reference to the need to actually produce tangible outcomes in a timely fashion).²²

20 J P Storr, 'Alternative Concepts for Battlefield Command and Control Organisations' in *Proceedings of the 1999 Command and Control Research and Technology Symposium*, US Naval War College, Rhode Island, June-July 1999, pp. 7–17 <www.dodccrp.org/events/1999_CCRTS/pdf_files/track_5/026storr.pdf> accessed 27 February 2004.

21 Warren Bennis and Patricia Ward Biederman, *Organizing Genius: The Secrets of Creative Collaboration*, Addison Wesley, Massachusetts, 1997, p. 196.

22 This list is an abridged summary of the 'Take Home Lessons' in Bennis and Biederman, *Organizing Genius*, pp. 196–218.

It is significant to note that Bennis and Biedermann's model did not preclude strong leadership, and that in fact the role of the leader in each of their 'Great Groups' was the dominant factor in creating the conditions for success. This is an important point for the implementation of the recommendations of this paper: clear direction from the commander and creativity among the staff are not mutually exclusive activities.

There is, however, a potential downside to the creation of close-knit, focused teams, and that is a phenomenon termed by Irving Janis as 'groupthink'. Managing this potential issue is the second major role of the commander in establishing the conditions for good planning. After researching such events as the Bay of Pigs invasion, appeasement of Hitler in the 1930s, failure to anticipate the Japanese attack on Pearl Harbor and American conduct of the Vietnam War, he identified a common problem in the collective mindset of the decision-makers involved:

"How could we have been so stupid?" demanded John F. Kennedy after his country's invasion of Cuba had been soundly defeated at the Bay of Pigs. Former Yale University psychologist Irving Janis notes that the planners of this operation included some of the smartest people in America. . . . They didn't fail because they were stupid. They failed because *they followed a poor process in arriving at their decisions*.²³

Groupthink is defined by Janis as 'a mode of thinking that people engage in when they are deeply involved in a cohesive in-group, when the members' strivings for unanimity override their motivation to realistically appraise alternative courses of action'.²⁴ Ideally, the diverse viewpoints brought to a collective planning process should reduce the risk of major errors; however, in practice there is a demonstrated potential for this not to occur. Janis' research provides eight specific symptoms, but essentially groupthink occurs because group members subordinate their individual judgment to the apparent will of the group, in a mistaken belief that cohesion is the overriding priority. Noting the examples researched by Janis, it is a phenomenon

pertinent to the military domain, for reasons related to the hierarchical and cohesion-focused nature of military organisations.

A related issue is that of social projection, whereby assumed consensus for the leader's view obviates consideration of alternatives. This was studied by Gross and Brandt, and they drew the following conclusion:

A key culprit in undermining intuitive judgement is social projection, also known as the false-consensus effect. Projection is the misperception of the commonness of one's own beliefs, values, abilities and behaviors—usually in the direction of overestimating how common they are.²⁵

Commanders, like all human beings, can be wrong, and the dynamics of collective thinking do not always work to inform the emperor about the state of his wardrobe.

The solution to groupthink and social projection lies in the effective management of dissent, and fortunately for Australian military commanders this aligns very well with the national character of the people involved.²⁶ Once the value of dissent is recognised then it is a simple matter of creating the right environment and procedures to manage it. The role of the commander in establishing the conditions for productive use of dissent is well expressed by this famous quote from Alfred P Sloan, Jr:

Gentlemen, I take it we are all in complete agreement on the decision here . . . Then I propose we postpone further discussion of this matter until our next meeting to give ourselves time to develop disagreement and perhaps gain some understanding of what the decision is all about.²⁷

Bryant expresses the same principle in the following comments about creativity:

23 J Edward Russo and Paul J H Schoemaker, *Decision Traps: The Ten Barriers to Brilliant Decision-Making and How to Overcome Them*, Simon & Schuster, New York, 1989, p. 146.

24 Em Griffin, *A First Look at Communication Theory*, 3rd edition, McGraw-Hill, 1997, <<http://www.afirstlook.com/archive/groupthink.cfm?source=archther>> accessed 14 March 2004.

25 Gross and Brodt, *Assumptions of Consensus*, p. 88.

26 At the risk of stereotyping, it is fair to say that the Australian character includes assertiveness, confidence, independence of thought and willingness to challenge authority. Nonetheless it would be wrong to conclude that groupthink is not an Australian problem.

27 Alfred P Sloan, Jr was the President and CEO of General Motors 1923-1946, quoted in Sal F Marino, 'Rely on science, not your gut', *Industry Week*, Vol. 249, No. 2, 24 January 2000, p. 18.

The bias to seek confirming evidence can hinder creativity in problem solving. Looking for evidence that ‘breaks’ one’s plan fosters creativity and the consideration of alternative ways of solving a problem.²⁸

Janis suggests the following practical ways to harness dissent and minimise the effect of groupthink, all of which could be applied to the MAP (selectively, and in modified form):

- Leaders should assign the role of critical evaluator to every group member.
- Leaders should not state their preferences at the beginning of an evaluation process.
- Periodically have outside experts review the group’s deliberations, and encourage them to challenge the views of the core members.
- Appoint an individual to play the role of Devil’s Advocate.
- After formulating a tentative proposal, hold a second-chance meeting and invite all members to express any residual doubts.²⁹

The inculcation of such procedures into a headquarters planning process is another measure that will assist the commander to establish the conditions for good planning using the MAP.

In closing, the discussion of the commander’s role in establishing the conditions for effective planning, it is important to note the requirement for balance between confidence and realism.

The ideal business person is a *realist* when making a decision but an optimist when implementing it . . . In a corporation, as in an army, a strategic dose of over-confidence can motivate the doers, but the planners should maintain a realistic attitude.³⁰

28 Dr David Bryant, *Critique, Explore, Compare, and Adapt (CECA): A New Model for Command Decision Making*, Technical Report of Defence Research and Development Canada, TR 2003–105, July 2003, p. 35.

29 Quoted in Roger Collins and Yvonne McLaughlin, *Effective Management*, 2nd Edition, CCH Australia, North Ryde, 1996, pp. 264–65.

30 Russo and Schoemaker, *Decision Traps*, p. 79.

The role of the commander is to have a foot in both camps, and to manage each differently.

Shaping the Process

Having considered the role of the commander in establishing the conditions, it is now important to consider the role he plays in shaping the actual conduct of a given planning process. Each occasion will be different, and the MAP doctrine is only a guide, so the commander is free to tailor the planning process as he sees fit. His own initial assessment (possibly by conducting an individual abbreviated MAP) ‘drives the MAP and results in a command decision allowing the commander to influence the direction that the staff will take when solving the problem’.³¹ Leaving aside simple practical issues such as timing and procedural adjustments, the role of the commander is to determine fundamentally how a plan (or decision) is to be made. Thus, the commander’s two key considerations are to identify whether the outcome to be sought must be the absolute optimum, or merely an adequate solution, and to decide whether the process to arrive at the solution needs to be heavily analytical, reliant on intuitive judgment, or a combination of the two. The commander’s assessment of these two considerations can then be used by him to shape the conduct of the MAP, in terms of number of COAs considered, scope allocated for subordinate initiative, time allocated, research conducted, specialist advice sought and decision-making processes used.

The theoretical basis for this distinction between approaches is the principle of ‘satisficing’ as developed by of Nobel Prize-winning economist Herbert Simon. He found that there is a distinction between satisficing (‘selecting the first option that works’) and optimising (‘trying to come up with the best strategy’).³² Clearly, in many (but not all) military contexts, satisficing is a good approach, allowing minimal planning time and the maintenance of operational tempo. Patton stresses this fact when he says, ‘*Don’t Delay*: The best is the enemy of the good. By this I mean that a good plan violently executed *now* is better than a perfect plan next week.’³³

The shaping process can be exemplified by considering historical examples. Montgomery at Alamein was at one extreme, whereby he saw there was very little

31 *The Military Appreciation Process*, p. 1-12.

32 Klein, *Sources of Power*, p. 20.

33 George S Patton, Jr, *War as I Knew It*, Houghton Mifflin, Boston, n.d, p. 354.

time available and a poor environment for the planning that he considered necessary, so he quickly determined a course of action himself and the planning process became really only a matter of promulgating his intent.³⁴ At the other end of the spectrum are Operations DESERT STORM and IRAQI FREEDOM, whereby Schwarzkopf and Franks respectively made extensive use of the time and expertise available to them in conducting optimising analytical planning processes.³⁵

The full MAP is a detailed analytical process, that allows for the consideration of multiple COAs and the incorporation of diverse specialist advice to produce ‘optimal’ solutions. As described in the Australian Army’s doctrinal publication on the MAP:

The staff MAP is a detailed, thorough and time-intensive process used when adequate planning time and sufficient support staff are available to thoroughly examine numerous friendly and enemy COA. Typically, this occurs in the preparation of operational plans, when planning for an entirely new mission, and during staff training designed specifically to teach the MAP. The staff MAP is usually undertaken prior to the commencement of an operation, or where significant planning time is available.³⁶

In its full form, it is a lengthy and deliberate process requiring the participation of many staff officers. In many cases this is appropriate and necessary. Large-scale complex campaigns with plenty of lead-time are an example of this. Another reason for conducting a full MAP is accountability; if outcomes are subject to review and post-analysis then it is important to be able to show a sound basis for decisions made. This is likely to be the case for operations other than war where minor actions can have far-reaching consequences, and the complexity and unfamiliarity of the situation call for detailed analysis prior to deployment.

A simpler option for the commander seeking a satisficing solution is the Recognition Planning Model (RPM) proposed by Klein and Schmitt.³⁷ The RPM is,

in effect, a reduced MAP cycle considering a single COA option intuitively derived by the commander, as shown at Figure 3. The RPM has its theoretical basis in Klein’s work on recognition-primed decision-making and intuition, but it also incorporates analytical processes to validate the single intuitively derived COA. Bryant, Webb and McCann have also identified the role of both analytical and intuitive processes in military decision-making and suggest that integration of both is desirable in many situations.³⁸ In a civilian context, Sauter also draws the same conclusion, referring to the ‘integrated style of decision-making [which] utilizes both right and left-brain styles, using both facts and feelings, depending upon which is available and appropriate at the time’.³⁹ These ‘integrated’ models have a lot of value for commanders seeking to shape their use of the MAP. Klein’s research in naturalistic (real world) planning found that in many cases commanders were adapting the MDM (US equivalent of the MAP) to a locally derived process akin to the RPM on their own initiative, as they found it to

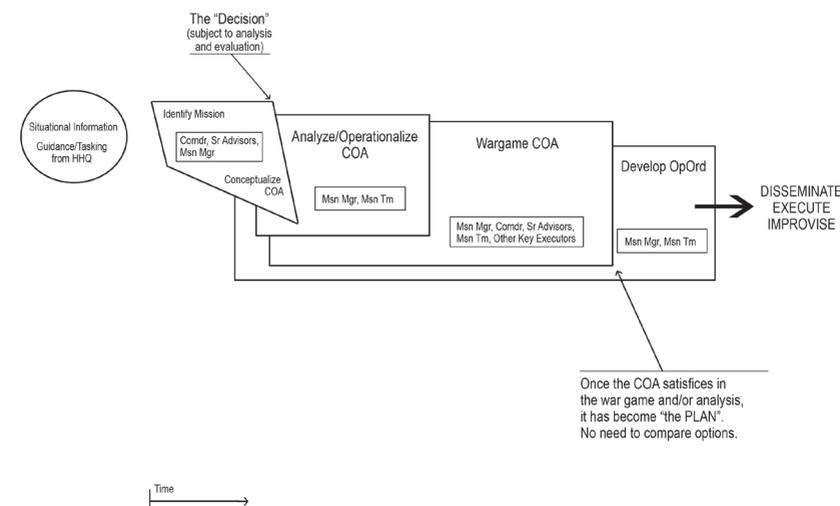


Figure 3. Schmitt and Klein’s Recognition Planning Model (RPM).

34 Hamilton, *The Full Monty*, pp. 508–56, 608–19.

35 Brigadier-General Robert H Scales, Jr, *Certain Victory: The U.S. Army in the Gulf War*, Brassey’s, Washington, 1994, pp. 103–55; Colonel Walter J Boyne, USAF (Retd), *Operation Iraqi Freedom: What went right, what went wrong, and why*, Forge, New York, 2003, pp. 38-39.

36 *The Military Appreciation Process*, p. 1-4.

37 Schmitt and Klein, *A Recognition Planning Model*, p. 520.

38 Dr David Bryant, Dr Robert D G Webb and Carol McCann, ‘Synthesizing Two Approaches to Decision Making in Command and Control’, *Canadian Military Journal*, Vol. 4, No. 1, Spring 2003.

39 Vicki I. Sauter, ‘Intuitive Decision Making’, *Association for Computing Machinery: Communications of the ACM*, Vol. 42, No. 6, June 1999, p. 110.

be the most effective and efficient way to conduct planning.⁴⁰ The RPM is considered most applicable under conditions of time pressure and relative problem familiarity.

The next level of abbreviation would be for the planning process to become a simple act of decision-making by the commander followed by the production and issuing of orders. This is applicable to smaller organisations or post H-Hour manoeuvre. Thus we have a range of possibilities for the commander to choose from as he shapes the MAP to suit his needs.

Direction Setting

Once the MAP actually commences the commander needs to determine his role in direction setting. The MAP is a 'command led and staff driven' process and there is often debate in military circles as to what this actually means.⁴¹ The general principle is that the commander uses certain key inputs to the process (Commander's Planning Guidance, and further guidance given during backbriefs) to align the staff with his broad intent, which they then further analyse and test, and ultimately develop into the myriad outputs that constitute an operational plan. The commander is thereby free to allocate time to other responsibilities concurrent with the planning process. Within this construct there is a lot of scope for differing approaches by the commander, especially with regard to the amount of specificity he provides in expressing his intent, and the level of involvement he has in the detailed development of the plan.

In theory, this is an efficient and effective approach; in practice there is a tendency for insufficient personal involvement by the commander and excessive dependency on staff-driven outcomes.⁴² The MAP doctrine does allow for the commander to provide more specific direction, however, this is only suggested as an occasional time-saving measure, as opposed to being a standard practice.⁴³ Recognition of this problem was

a key factor in Schmitt and Klein's creation of the RPM. In their words, one of the key improvements required was to:

[get] the commander, the most experienced person in the organization, more involved in all aspects of the planning process—but especially in the critical area of conceptual design. We continually hear from operators that the commander should be “driving” the process, yet existing models actually inhibit this. This results in a system whereby subordinates generate the options, and bring these to the commander so that he can select among them.⁴⁴

This is a serious waste of talent on the commander's part, whose situational awareness, intellectual ability and experience are largely untapped, and effort on the part of the staff, whose best efforts are dissipated by virtue of being unfocused.⁴⁵ In an earlier study Klein and Schmitt (and others) had 'found that the commander could generate higher quality options than his staff, and in a fraction of the time, so the current procedure is both inefficient and ineffective'.⁴⁶ A classic example of the commander's superior ability to generate COAs is MacArthur's plan for amphibious landings at Inchon during the Korean War. This was his own idea, based on substantial personal experience of amphibious manoeuvre during the Second World War, yet it went against the strong recommendations of most of his planning staff. Events, of course, proved him right.⁴⁷ This effect can be quantified by considering that there is generally a two rank difference between formation Chiefs of Staff and commanders (colonel and major-general for a division, lieutenant colonel and brigadier for a brigade), with those intervening years providing five or six years additional experience at the strategic level and usually attendance at a senior staff course.

40 Schmitt and Gary, *A Recognition Planning Model*, p. 520.

41 *The Military Appreciation Process*, p. 1-2.

42 This is based on both personal observation and the various references on the subject that are cited by this paper. There is certainly much debate among staff officers using the MAP on a regular basis about the role of the commander *vis-à-vis* his staff in terms of direction-setting. It is fair to say that the consensus view is that the doctrinal MAP and the way that it is taught tend to result in imbalance towards staff input and insufficient personal involvement by the commander.

43 *The Military Appreciation Process*, p. 1-5.

44 Schmitt and Klein, *A Recognition Planning Model*, p. 521.

45 That is not to say that the commander should be the sole source of creative input, just that he should be the most significant one. The value of diverse creative inputs is well acknowledged and discussed elsewhere in this paper.

46 Schmitt and Klein, *A Recognition Planning Model*, p. 523.

47 Colonel Robert Debs Heinl, Jr, (USMC), *Victory at High Tide: The Inchon-Seoul Campaign*, The Nautical & Aviation Publishing Company of America, Washington, 1984, pp. 24–43.

The tendency for insufficient personal involvement by the commander is exacerbated by the teaching approach adopted in many staff colleges. Comments by a serving Canadian Forces officer explain this:

Unfortunately, the reality often differs from the theory. Commanders tend to let planners come up with possible courses open and then, realizing that they do not meet their understanding of the situation, incrementally adjust them to their liking during the information and decision briefings. This may be a reflection of the teaching method in our staff colleges where Directing Staff, acting as commanders, ask their student planners to come up with the commander's planning guidance, ostensibly to give them a better opportunity to read into the problem. Delegating mission analysis and identification of possible courses of action to the staff is the wrong approach; not only does it waste the time and cognitive energy of the staff, it marginalizes the expertise of the commander who ultimately makes the decision.⁴⁸

While well intentioned, this approach to training significantly alters the dynamic of the process and instils a poor model in the minds of officers under training. This is significant given that the aim of such courses is specifically to prepare them for command, as well as for key staff appointments. Arguably, any commander who does not personally write the commander's guidance is missing the point, and displaying a lack of personal commitment, leadership and situational awareness that will be detrimental both to the quality of the planning process and to his ability to command effectively post H-Hour.⁴⁹ The staff college training methodology therefore risks exacerbating the potential problem already manifest in the doctrine.

Having identified the problem and a contributing cause, it is necessary to identify the solutions. Simply put, there should be more direct command involvement in the

48 Colonel Christian Rousseau, 'Complexity and the Limits of Modern Battlespace Visualization', *Canadian Military Journal*, Vol. 4, No. 2, Summer 2003, p. 42. This 'teaching' approach has also been experienced on Australian training courses.

49 Personal observation has been that clear direction provided by the commander early considerably enhances the effectiveness of the process. In addition to the process efficiencies and focus thus provided, clear early direction from the commander has a powerful motivating effect on the staff, and enhances the credibility of the commander. Done well, this is the ultimate in MAP effectiveness. The converse is also true.

conduct of the MAP, and the training conducted in staff colleges should reflect the true dynamics of the process at work. Specifically, the commander should play a key role in producing COA options, he should personally write the Commander's Planning Guidance, and he should be proactive in directing the staff's planning. A lot of staff time and effort can be wasted on issues that would be quickly resolved by a command decision, for example by accepting risk to resolve ambiguity and by intervening to prioritise resource allocations.⁵⁰ Uncertainty is detrimental to efficient planning, but it is the commander's responsibility to manage the risks associated with making assumptions. For example, United States Secretary of State Colin Powell

has claimed that if he was ever less than 40 percent confident, he needed to gather more information. But we can't wait for all the data before taking action. Colin Powell also said that if he was more than 70 percent confident, he had probably gathered too much information.⁵¹

One variation on the MAP that addresses the problem is Schmitt and Klein's RPM, wherein the commander selects a broad single COA early in the process for subsequent analysis by the staff. The obvious concern with such an approach is that the initial COA selected may turn out to be fatally flawed or considerably less appropriate than another COA that subsequently comes to light. These are reasonable concerns, but there are two mitigations, both proffered by Klein after multiple extensive studies of military planning and decision-making processes. First, the principle of satisficing is that 'a good concept well executed is superior to a superior concept poorly executed';⁵² meaning that the benefits of a focused planning process are likely to outweigh the potential benefits of a better plan arrived at more slowly. Second, Klein has observed

50 This approach typifies that taken by Major General (now General) Peter Cosgrove when he was the Commander of the Deployable Joint Force Headquarters. During the period of his command, DJFHQ planned and commanded several complex operations around the South West Pacific region, including the International Force for East Timor (INTERFET). Cosgrove's clear and early expression of intent and proactive guidance to staff planners served extremely well to focus the staff and resulted in high quality plans which ultimately led to consistently successful military operations. Lieutenant Colonel Tim Grutzner (ex-DJFHQ), telephone interview with author, 27 April 2004.

51 Gary Klein, *Intuition at Work*, Doubleday, New York, 2003, p. 111.

52 Schmitt and Klein, *A Recognition Planning Model*, p. 524.

that it is very rare for an initial COA to prove infeasible, and that at most the initial COA is refined by wargaming, rather than rejected. '[In] our observation it is rare for the initial COA to be invalidated *in toto*. Most often, the initial COA is workable, with some alterations.'⁵³ This would be especially the case if the commander provided clear guidance early in the process.

Another option is to follow the standard MAP with multiple COAs, but use the Commanders Planning Group (the commander, plus a handful of senior advisers) to develop possible COAs very early in the process. These could be promulgated in the commander's planning guidance with a reasonable amount of detail, and the staff also directed to devise one or more additional COAs as appropriate. This would draw most effectively on the available expertise and also mean that COA development is conducted under ideal conditions: 'Even in organisations with large staffs, this type of activity [COA Development] is best performed in small groups of no more than five or six; it is not an activity suitable for a large team.'⁵⁴

The additional commander involvement here proposed does not preclude him from being available for other activities during the MAP. In fact, it is beneficial for the development of the plan, as well as other purposes, if he spends time in the field gaining situational awareness, discussing the developing plan with subordinate commanders, observing his formation's battle procedure, and meeting with key contacts in other agencies. The period of COA development, once the initial guidance has been provided, is generally a good opportunity for the commander to leave the headquarters and conduct such activities. The commander is busy, with diverse responsibilities, but ultimately his mission's success is heavily dependent on the quality of the initial plan. It is essential that the MAP be conducted in such a way as to fully harness his knowledge and judgment.

Personal Preparation for Execution Phase

There is another reason for the commander to play a significant role in the MAP, completely unrelated to those considered thus far. The maxim 'no plan survives first contact with the enemy' is well accepted and so there is a requirement for

decision-making post H-Hour as the plan is implemented. The dominant decision-makers during the execution phase are the G3 (current operations) cell and the commander. Generally this phase is characterised by traditional decision-making processes (as opposed to repeat iterations of the planning process), and therefore squarely within the realm of numerous studies of decision-making processes that have been completed. A common finding of such studies is that naturalistic ('real world') decision-making is typically a blend of intuitive reasoning and analytical processing, but with the former tending to dominate. This is especially the case in time-pressured situations. As Clausewitz explains, 'During an operation decisions have usually to be made at once; there may be no time to review the situation or even to think it through.'⁵⁵ The development of sound intuition is therefore very important and, as discussed elsewhere in this paper, the quality of intuitive reasoning depends heavily on the possession of relevant mental models and sound situational awareness. Long-term personal experience is important, but the MAP also provides an opportunity to develop intuitive capability for a particular operation in a concentrated time frame. However, the doctrinal MAP and the training methodology commonly followed do not fully exploit this opportunity, arguably to the detriment of the commander's intuitive decision-making post H-Hour. Consequently, a greater level of personal involvement by the commander is desirable across the board, with specific recommendations as follows.

It is already expected that the commander conduct an individual mission analysis. This is very important in allowing him to make decisions about shaping the MAP, and in providing an initial grasp of the situation. However, he is then not expected to participate further in mission analysis until he is backbriefed by the staff. There is therefore a risk that he will not develop the detailed understanding and problem familiarity required. Additionally, his personal knowledge of the superior commander's intent and strategic situation is likely to be gained through a variety of informal discussions that the staff would not necessarily be privy to, therefore his input into their MAP would be very valuable. Without needing to suggest a detailed process, it is recommended that the commander becomes more deeply involved in the staff mission analysis process than is currently often the case.

53 This validates the naturalistic theory that intuition allows good decisions and plans to be made on relatively little information, provided the criteria for sound intuitive thought are satisfied.

54 Schmitt and Klein, *A Recognitional Planning Model*, p. 524.

55 Carl von Clausewitz, *On War*; Michael Howard and Peter Paret (ed. and trans.), Princeton University Press, Princeton, 1984, p. 102.

As discussed above, but in this case for different reasons, it is important that the commander participate in the generation of COA. As found by Bryant, Webb and McCann:

Decision makers in the field are likely to rely on intuitive, recognition-based strategies to retrieve suitable course of actions during time-stressed events. If they have not themselves participated in generating pre-planned responses, it will likely be much harder for them to match the situation to planned contingencies and retrieve the pre-planned response.⁵⁶

Familiarity with the COA options, and the process of having developed them, will enhance the commander's ability to recognise decision points that arise during execution, and to select appropriate branch or sequel plans.

A highly effective means for the commander to further enhance his intuitive abilities is the wargaming conducted during COA analysis. The complex interdependencies and synchronisation issues of likely 'blue' and 'red' activities post H-Hour cannot be truly understood without being stepped through in sequence. Participation in wargaming therefore provides the best possible pattern recognition ability and mental models for sound intuitive reasoning. An example of the applicability of this is the CECA (Critique, Explore, Compare, Adapt) model for decision-making developed by Bryant.⁵⁷ This provides a replacement for Boyd's classic OODA Loop model, and accounts for the inter-relation between dynamic conceptual models developed during planning and decision-making processes during execution. Bryant states that 'goal-oriented mental models are central to human decision-making as the means to represent and make sense of the world', and then describes the process of comparing *conceptual models* with *situational models* as a step in the decision process.⁵⁸ Without fully developing such models during the planning phase, commanders will have difficulty making decisions. However, there is currently no doctrinal expectation or requirement for the commander to participate in wargaming, or reference to the potential benefits to be

56 Bryant, Webb and McCann, *Synthesizing Two Approaches*, p. 33.

57 Bryant, *Critique, Explore, Compare, and Adapt (CECA)*.

58 *Ibid.*, p. 24.

gained for execution phase decision-making by doing so.⁵⁹ Notably, in practice many commanders recognise this and choose to participate. It is therefore recommended that training and doctrine be updated to reflect the value of commander participation in wargaming as an aid to execution phase intuitive decision-making.⁶⁰

Summary

The individual with the greatest personal influence on the success of an operation is the commander. It is therefore essential that the plan clearly reflects his intent and is aligned with his situational awareness and tactical/strategic knowledge. The commander must play a strong personal role in the conduct of the MAP, both in establishing the conditions for good planning and in shaping the conduct of the MAP itself. It is also important that the commander uses the MAP to develop a deep understanding of the plan in preparation for post H-Hour intuitive decision-making. At present, the application of doctrine and the conduct of MAP training are sub-optimal in this regard, and must be amended in order to fully achieve the benefits of the commander's personal role in the conduct of the MAP.

59 See Chapter 7, *The Military Appreciation Process*.

60 The same also applies to G3 (current operations) staff, who will also need a deep understanding of the plan and the mental models required for intuitive decision-making. Another option would be to alternate personnel between plans and operations cells, so that they follow a given plan through all phases, however, in practice this is unlikely to be feasible.

Intuition

With many calculations, one can win; with few, one cannot. How much less chance of victory has one who makes none at all! By this means I examine the situation and the outcome will be clearly apparent.

Sun Tzu⁶¹

Even today, in spite of all the electronic suites available to commanders from all perspectives of war, perfection of the coup d'oeil by constant professional study remains virtually the only way a commander can realistically hope to penetrate the fog of war in any real way.

Clayton R Newell⁶²

Whether or not an analytical process is completed, in most cases decision-makers will have a 'gut feeling' about what their decision should be. Depending on circumstances, this may be relevant and accurate, or it may simply be unfounded. Intuition is therefore very useful in the right circumstances, but also potentially counter-productive. The above two quotes illustrate the two different approaches to decision-making, namely rational analytical processes and intuition.⁶³ This debate has become topical in recent years in both military and civilian spheres, with the trend being towards an increased appreciation for the value of intuitive reasoning. History records several incidents of intuition driving excellent decisions by military commanders. For example, General Patton made a tactical decision to attack at Neufchâteau against the objections of 'all the generals concerned', because his 'sixth sense told [him] that it was vital', and he was proved right when his attack destroyed a German flanking counter-attack

61 Sun Tzu, *The Art of War*, Samuel B Griffith (trans.), Oxford University Press, Oxford, 1971, p. 71.

62 Newell, *Framework*, p. 126.

63 Sun Tzu, like the Bible, can provide quotes to support most points of view with solemn legitimacy. It is not intended to imply that he did not appreciate the value of intuition, merely to illustrate the time-honoured value of rigorous analysis in military planning.

that would otherwise have posed the Allies grave problems.⁶⁴ General MacArthur's decision to conduct amphibious landings at Inchon, as described earlier, was intuitively based, and he was able to rely on his own personal experience as well as a holistic appreciation for the risk and return consequences that his staff did not grasp.⁶⁵ Similarly, General Schwarzkopf's decision to advance the commencement of Operation DESERT STORM's ground campaign by one day proved right, yet was based only on limited information and his intuitive belief that the Iraqi forces would provide little resistance.⁶⁶

Private industry has recognised the value of developing intuitive decision-making skills in managers: 'Not surprisingly, increasing numbers of companies invest in programs to help managers improve intuitive judgement.'⁶⁷ The same applies in the military world, with research and development being conducted by such organisations as the United States Marine Corps (USMC)⁶⁸ and Defence Research and Development Canada.⁶⁹ While this increased awareness of intuition is gradually working its way into doctrine and training, the concept is not yet fully embraced by the MAP.

Intuition is pertinent to the MAP for two important reasons. First, because the intuitive judgments of both the commander and his staff are important inputs to the planning process and they play a valuable complementary role to the analytical processes that occur. Second, because the conduct of the MAP in itself is potentially a highly effective means to establish the conditions for sound intuitive decision-making in the time-pressured environment of the execution phase of the operation.

The aim of this section of the paper is to show how intuition can be better incorporated into the conduct of the MAP, using specific examples. In order to establish the background for doing so, the scientific basis for the concept of intuition will first be explained, and a description provided of the inter-relation between intuitive and analytic approaches.

64 Patton, *War as I Knew It*, pp. 207, 387.

65 Heintz, *Victory at High Tide*, pp. 24–43.

66 Scales, *Certain Victory*, pp. 222–23.

67 Gross and Brodt, *Assumptions of Consensus*, p. 87.

68 Many studies with Dr Gary Klein, as referred to throughout this paper.

69 Various papers and conferences, as referred to throughout this paper. No doubt there are others, however, these are the most apparent in the military domain.

How Intuition Works

It is important to understand how intuition works, so as to be able to assess whether it is relevant in the particular circumstances and then apply it appropriately to aid decision-making. With this knowledge it is also possible to train and develop decision-makers in order to improve their instinctive decision-making.

Until relatively recently, intuition was seen as an unscientific concept. The ideas of 'gut feeling' and 'having a hunch' have always been accepted as somehow mysteriously valid, but lacking a scientific basis they were linked with such concepts as being gifted or possessing a 'sixth sense'. There was little understanding of where the 'gut feeling' came from, how decision-makers could incorporate it in their analysis, or whether some people were more capable of developing it than others. This is no longer the case, and there is a wealth of knowledge about intuition, ranging from scientific studies and experimentation, through theoretical concept development to applications for management.

A sample of definitions of intuition is as follows: 'a sense of feeling of pattern or relationships',⁷⁰ 'holistic thinking, immediate insight, seeing the answer without knowing how it was reached',⁷¹ 'compressed expertise, a way of rapidly accessing chunks and patterns of knowledge formed from previous experience'.⁷² A leading researcher in the military domain, Dr Gary Klein, defines intuition as:

the way we translate our experiences into judgements and decisions. It's the ability to make decisions by using patterns to recognize what's going on in a situation and to recognize the typical action script with which to react. Once experienced intuitive decision makers see the pattern, any decision they make is usually obvious.⁷³

70 Vicki I. Sauter, *Intuitive Decision Making*, p. 109.

71 P Thorne, 'Another critique of Pure Reason', *International Management*, Vol. 45, April 1990, G8.

72 K Seal, 'Decision-Makers Rely on Honed Intuition', *Hotel and Motel Management*, Vol. 205, March 1990, p. 104.

73 Klein, *Intuition at Work*, p. 13.

He further explains that 'experience buys you the ability to:

- Size up situations quickly;
- Recognize typical ways of reacting to problems;
- Mentally game out an option to see if it will work;
- Focus on the most relevant data elements;
- Form expectancies;
- Detect anomalies and problems;
- Figure out plausible explanations for unusual events.⁷⁴

Clearly, then, intuition is largely based on past experience combined with the ability to match such past experience with the current situation. It works by creating cognitive schema, defined as:

representations in the mind of an individual of how the world works ... [which] reflect a person's beliefs about the importance of the issues and about the cause and effect relationships between them, formed over time through education, experience and interaction with others.⁷⁵

When facing a new situation the decision maker compares it with previous experiences, recognises the most pertinent and makes his assessment based on cognitive schema drawn from that. This allows a rapid and holistic impression to be made, without detailed consideration of all the contributing factors. The other key aspect of intuitive processes is that they adopt a 'satisficing' approach, whereby a single option is considered rather than multiple possibilities, with that option openly being discarded if it becomes unacceptable.⁷⁶ Klein terms this the 'recognition-primed decision' model, which is the foundation for his recognitional planning model (RPM), discussed elsewhere in this paper.

With this knowledge it becomes clear that intuition can be developed through experience. Klein's concept for doing so is that of:

74 Gary Klein and Karl E Weick, 'Decisions', *Across the Board*, Vol. 37, No. 6, June 2000, p. 16.

75 Bob de Wit and Ron Meyer, *Strategy: Process, Content, Context*, International Thomson Publishing Business Press, London, 2002, p. 76.

76 This summary is based on the 'three basic principles' of intuitive theories described in: Bryant, Webb and McCann, *Synthesizing Two Approaches*, p. 31.

muscular intuition ... [which] treats our intuitions as skills that can be acquired, as strengths that can be expanded through exercise ... Experience is a powerful teacher, but experience by itself is not the most efficient way to learn. ... To learn as quickly as possible, we must be more deliberate, more disciplined, and more thorough in our approach in order to squeeze as much as possible from each experience.⁷⁷

Some people are more capable of developing their 'muscular intuition' than others, but it is no longer seen as a matter of either being gifted or not. Furthermore, experience does not automatically bestow intuitive judgment; it must be consciously nurtured by careful utilisation of experiences to create the correct cognitive schema and the ability to link previous and current mental models. As Aldous Huxley explains, 'Experience is not what happens to a man. It is what a man does with what happens to him.'⁷⁸ Klein's formula for achieving this is: *feedback*, *active interpretation* and *repetition*, which means assessing performance via some form of tangible measure, conducting a review to determine why the outcomes resulted and then repeating the cycle at a later date for reinforcement. The review should cover both the actual outcomes and the decision processes followed to arrive at them. Augmentation of this deliberate process with other measures to increase knowledge would also be beneficial.

Remembering the historical examples of Patton, MacArthur and Schwarzkopf referred to above, there is one other important consideration to bear in mind: in each of those cases the military commander's faith in his own intuition allowed him to take significant risks against the advice of others (who based their advice on rational analysis). The personal conviction they showed was crucial in allowing the success brought by their intuitive insight. Whether or not they actually did so at the time, they each could have assessed the validity of their intuition and concluded that it was likely to be sound, before actually making their decision. For this reason, a clear understanding of the theory of intuition is essential in equipping planners with the confidence and decisiveness to make crucial decisions under conditions of ambiguity. Clausewitz refers to this when he describes two indispensable qualities for

military commanders: 'first, an intellect that, even in the darkest hour, retains some glimmerings of the inner light which leads to truth; and second, the courage to follow this faint light wherever it may lead'.⁷⁹

Integrating Intuition and Analysis

With this understanding of how intuition works, it is possible to identify the optimal conditions for intuition to be usefully applied. Comparing intuition and rational analysis initially as distinct options, each has its more favourable circumstances. The conditions that favour intuition are: time pressure, ill-defined goals, dynamic conditions and experienced participants. Situations where intuition should be treated warily are those where decision makers lack pertinent experience (or such specific experience that they do not consider alternative possibilities), where the experience base is distorted (for example, by incorrect conclusions having been drawn), where insufficient information is available, or where decision-makers have an incorrect mindset (for example irrationality, bias or emotiveness). The conditions that favour analysis are: a need for justification, computational complexity, a requirement for optimisation and conflict resolution. Situations where analysis should be treated warily are those where time is short, where there is insufficient understanding of the decision factors or where there is insufficient support (in terms of useable information and computational aids) for analysis to occur.⁸⁰

Given these differing qualities of intuition and rational analysis, there is obvious value in combining them. The first potential benefit is to use the rational analysis conducted during the planning phase to improve intuitive decision-making ability during the execution phase. Bryant, Webb and McCann have identified this as a potentially useful area for further study in military decision-making, on the basis that:

analytic strategies could be used in planning to generate high quality courses of action to anticipated problems so that these courses of action can be

77 Klein, *Intuition at Work*, p. 14.

78 Aldous Huxley, quoted in: Klein and Weick, *Decisions*, p. 16.

79 Carl von Clausewitz, *On War*, p. 102.

80 This paragraph is a synthesis of information provided in the following two references: Gary Klein, *Intuition at Work*; and Bryant, Webb and McCann, *Synthesizing Two Approaches*, pp. 29–31.

rapidly selected and implemented by intuitive, recognition-based decision making during critical events.⁸¹

This is directly pertinent to the MAP, and is the basis for several of the key recommendations made by this paper, especially relating to the commander's personal role.

The second potential benefit of an integrated approach is to use intuition and rational analysis in a complementary manner during the planning process, in recognition of the fact that they each tend to compensate for the other's shortfalls. A general model has been provided by Sauter, which she terms the 'integrated style' of decision-making:

The analytical thought process filters information, and intuition helps decision-makers contend with uncertainty and complexity. Decision-makers reason, analyze and gather facts that trigger intuition. If intuition leads the thought process in a different direction, decision-makers reason and analyze again to verify and elaborate upon it. These additional facts and analyses again trigger intuition, and the process repeats. Decision-makers can also start with an intuitive hunch, and then analyze it to determine its appropriateness. They can also apply intuition at the end of the process to reveal false premises, invalid inferences and faulty conclusions.⁸²

The principle is to use intuition to focus analysis, which Klein also advocates, describing it as putting 'intuition in the driver's seat so that it directs analysis of circumstances'.⁸³ There is clearly value in this, especially as it removes some of the risks from reliance on purely intuitive assessments. De Wit and Meyer consider this to be a major benefit of combining the two: 'many academicians urge practitioners to bolster their intuitive judgements with more explicit rational analysis'.⁸⁴ Again, this is

81 Bryant, Webb and McCann, *Synthesizing Two Approaches*, pp. 29–33.

82 Sauter, *Intuitive Decision Making*, p. 110. Note that Sauter's description draws heavily on the model provided in: W H Agor, *Intuitive Management: Integrating Left and Right Management Skills*, Prentice Hall, New Jersey, 1984.

83 Klein, *Intuition at Work*, p. 54.

84 de Wit and Meyer, *Strategy: Process, Content, Context*, p. 77.

pertinent to the MAP and guides several of the specific improvements recommended in this chapter.

Application to the MAP

The MAP is an ideal mechanism for combining intuition with rational analysis. There are numerous steps in the process where intuition can be usefully incorporated, and these will be explained sequentially.

Initially, it would be valuable for planners to take stock of their intuitive potential by identifying what relevant experience there is within the staff and which individuals are therefore likely to have particularly valuable intuitive knowledge of the situation. The commander will often be the most experienced and situationally aware person in the headquarters; however, this will not always be the case and there are likely to be others with specific knowledge of value. For example, there may be members of the staff with more direct personal experience of the type of operation being planned, the enemy being faced and the physical and cultural environment within the area of operations. It would also pay at this stage to note any potentially counter-productive previous experiences that may distort perceptions of the new situation. This conscious action will greatly assist in shaping the process and allocating responsibilities.

Intuition has the potential to be very useful during the IPB. Intelligence gathering has many unknowns, and it is rarely possible to draw hard conclusions about potential enemy actions, yet planners need firm predictions to work from. While there is generally some useful data available, such as enemy doctrine publications and historical studies of past campaigns, there is no analytical process that will derive likely enemy COAs with absolute certainty. For this reason, intuition can play a valuable role, and the quality of intelligence provided can be significantly influenced by taking measures to enhance intuitive capability. Furthermore, intelligence assets available are invariably limited yet there are many potential sources of data. Intuition can focus resources towards likely productive areas. Overall, the iterative nature of IPB especially lends itself to adopting Klein's *feedback*, *active interpretation* and *repetition* process to improve intuitive capability among the intelligence staff.

Similarly, intuition should play a key role in COA development. This is discussed at length in the chapter about the role of the commander. In brief, the commander and senior advisers are likely to have well-developed mental models and cognitive schema relating to the operation being planned by virtue of their situational awareness,

experience and training. The intuition thus generated is extremely valuable in mapping out potential friendly COAs and identifying those most likely to be worth further development. This also applies to the planning staff themselves, in terms of their ability to generate additional COAs and provide lower-level detail to the broad initial COAs. Greater acceptance of intuitive reasoning would allow a higher planning tempo, due to reducing non-productive analysis (for example, COAs that can be discounted early by intuitive reasoning).⁸⁵

COA analysis is conducted by wargaming, where increased application of intuition can again provide improvements in both efficiency and effectiveness. There is no doubt that wargaming is a particularly beneficial component of the MAP; however, the tendency in both training and operations is for it to be abbreviated due to time constraints. As stated in the MAP doctrine:

The wargame process may become complex and laborious, however, the more time and detail put into it, the more useful are the results. This must be balanced with the reality that, during the conduct of operations, there will not normally be enough time to conduct in-depth wargames for more than one to three friendly COAs, against one or two enemy COAs. This is where the Commander's guidance is crucial in focusing the staff on which friendly and enemy COA or key aspects are to be wargamed.⁸⁶

Theoretically a war game should be conducted for each friendly COA under consideration (up to three) against the enemy Most Likely and Most Dangerous COAs; therefore there should potentially be six war games, and possibly more to evaluate branch and sequel plans. In practice this almost never occurs, and the norm is more akin to one detailed war game of the favoured COA against the enemy Most Likely COA then possibly an abbreviated version of another COA and/or a quick check of the enemy Most Dangerous COA against either. This is adequate, but there is potential for improvement. There are three benefits to be gained from wargaming: analysing the

relative merits of different COAs; refining COAs; and, as recommended by this paper, preparing the commander and operations personnel for time pressured decision-making post H-Hour. Given these benefits, the overall time taken for the process is justified; however, better use could be made of that time. A better approach would be to conduct more war games quickly, then conduct a confirmatory synchronising war game for the selected COA once it has been determined. At present there is a lot of note-taking and analysis (for example computer-generated combat ratios) that slow the process down considerably, yet generate products that tend never to be used again. There are two changes that would allow this to happen: first, establishment of strict time management (which is outside the scope of this paper), and second, greater reliance on intuitive judgment to decide outcomes during each war game. Adoption of this approach is more a matter of adjustment than major process change, but it would better permit each of the potential benefits of wargaming to be realised.

Decision and execution commences with the selection of the preferred COA, and once again intuition can be of considerable benefit. Doctrinally, this tends to be an analytical process with suggested methods being numerical, broad categories and comparison of advantages and disadvantages. Examples of these methods are shown at Figure 4.

Experienced MAP practitioners tend to find that the preferred COA is apparent well before this process is conducted, and that the analysis is actually used to support the desired outcome. Although this is an anecdotal observation, the phenomenon was studied by Fallesen and he drew the same conclusions. His findings were that teams who selected their preferred COA early and intuitively (i.e. without performing a matrix analysis) achieved 'neither ... poorer nor better solutions', and that the doctrinal additive weighting model for COA selection was generally subordinate to subjective factors as a determinant for selecting the preferred COA, even among adherents to the structured planning process. 'The matrix could be viewed as a means for documenting a choice rather than influencing it.'⁸⁷ That is not to say that these analytical methods

85 Schmitt and Klein's RPM is an example of this benefit fully realised: one COA developed early by the commander with analysis closely guided by the commander and therefore minimised. This is a possible option for the commander to select within the current MAP doctrine, and in the right circumstances is likely to be very effective.

86 *The Military Appreciation Process*, p. 6-11.

87 Fallesen, *Decision Matrices*, p. 49.

Criteria (a)	Weighting (b)	COA 1 (c)	COA 2 (d)	COA (3)
Shock Action	3	2/6	1/3	3/9
Security	2	2/4	3/6	1/2
Risk	2	2/4	1/2	3/6
CSS	1	2/2	3/3	1/1
Total		8/16	8/14	8/18
Priority of COAs		2	3	1

Numerical Analysis

Factor (a)	COA 1 (b)	COA 2 (c)	COA (d)
Shock Action	+	-	+
Security	0	+	-
Risk	0	-	+
CSS	+	+	0
Total	2+	0	1+
Priority of COAs	1	3	2

Broad Categories

COA (a)	Advantages (b)	Disadvantages (c)
1	Main attack avoids major terrain obstacles. Adequate manoeuvre room for main attack and reserve. Good concentration of initial fire support for main attack. Good LoFC for CSS.	Main attack faces complete enemy force in Ph One. High casualties likely initially.
2	Main attack gains good observation early. Support attack proves good flank protection to main attack in south.	Reserves must be deployed forward and may be exposed to enemy FS. Needs detailed rehearsal, C2 difficult.
3	Unexpected northern approach will probably achieve surprise. Allows direct attack on enemy decisive points in rear area and seizes objective early.	Difficult to concentrate FS to support ME flank move in north. CSS support for main attack difficult due to exposed LoFC in north flank.

Advantages and Disadvantages

Figure 4. COA Comparison Methods⁸⁸

are without merit; in situations where intuition has been recognised as of little value, they are the best method to use. Even when intuition is clearly applicable, these methods are appropriate for testing the validity of intuitive selection. The process of assigning weightings and values then conducting sensitivity analysis is very good at developing a feel for the robustness of preferences. An additional benefit is that of providing a record of the rationale for a particular decision: 'Intuitive thought can disappear as quickly as it appears, and so capturing the thought and what caused it can be critical.'⁸⁹ Whether it is analysis or intuition that prevails (if indeed they suggest different options), then the process of comparison will lead to a record for the rationale used, which can be used as a reference point for future review. The recommended change is therefore to combine the two reasoning processes, and give greater recognition to the contribution of intuition to COA selection.

The final part of the MAP is execution. This is the post H-Hour implementation of the plan with all its attendant uncertainties and time pressures. This phase is therefore unlikely to allow analytical decision-making and is dominated by rapid, intuitive decision-making. The best preparation for the execution phase is to ensure key decision-makers use the MAP to develop deep situational awareness and mental models to aid their intuitive decision-making: '...plans serve as bases for intuitive decision making. When time is available individuals can study potential events and conditions to make them easier to recognize during more time-stressed situations.'⁹⁰ Specifically, this means the commander should be more closely involved than is currently the case, and should always attend at least some of the COA analysis war games, as should representatives from the G3 (Current Operations) cell. 'Your ability to adapt successfully is only as good as your intuitions.'⁹¹

An additional step in the decision and execution phase of potential value to subsequent intuitive decision-making would be the conduct of collective quick decision exercises. For a small investment of time, the commander and his operations and plans staff could gain considerable shared appreciation of command intent as well as creating mental models for contingency planning. A simple round table discussion based on a handful of short scenarios would suffice. Possible scenarios

89 Sauter, *Intuitive Decision Making*, p. 109.

90 Bryant, Webb and McCann, *Synthesizing Two Approaches*, p. 33.

91 Klein, *Intuition at Work*, p. 163.

88 *The Military Appreciation Process*, p. 7-3.

for discussion might include: the loss of a key coalition partner at short notice, the unexpected use of weapons of mass destruction, significant weather events such as cyclones, and unanticipated success in a small part of the operation that could be exploited. It is suggested that the G5 (Future Plans) cell be allocated the responsibility for producing a small number of brief written scenarios for discussion.⁹² ‘Intuition improves as we acquire more patterns, larger repertoires of action scripts, and richer mental models.’⁹³

Finally, further development of the commander and his staff’s intuitive skills is dependent on the conduct of a post-activity analysis, as recommended by Klein above. Such after action reviews (AARs) are commonplace in military organisations, however their effectiveness is not always what it should be: ‘Some organizations, such as the military, already have lessons-learned sessions. However, we find that the sessions typically get into debates about facts and details, and ignore the intuitive decision-making perspective.’⁹⁴ In order to reap the full benefits of AARs they should address both the tangible issues of results achieved and the less tangible issues of decision-making effectiveness. Example questions for such an AAR are:

- Was a good balance achieved between command guidance and devolution of planning authority?
- Was the balance between satisficing and optimising appropriate?
- What additional command guidance would have been beneficial?
- Did we have the right people involved at each stage? Were the right tools available?
- Was enough time allocated to creative activities?
- What, if anything, was difficult about this decision, and why?
- Were our intuitions correct?
- Was our analysis correct? (Capture empirical findings for future reference).
- In hindsight did we pick the right COA?
- Did we fail to consider additional COAs that would have been better?
- If not, why not?

92 Personal observation of the conduct of such QDEs is that they are extremely effective at achieving the stated goals in a surprisingly short timeframe, as well as being a good team-building activity.

93 Klein, *Intuition at Work*, p. 34.

94 *Ibid.*, p. 51.

Such self-assessment can be difficult in any organisation, perhaps more so in something as hierarchical as the Army. Nonetheless it is possible with good leadership to create the appropriate environment. The US Army has a good technique for using command mentors during planning exercises, and they work to support the personal development of senior staff as well as contributing to the AAR process from an independent standpoint.

Another way of improving intuitive skills in key leaders, particularly commanders, is to conduct simulation exercises. These would offset one of the shortfalls of large formation training regimes; for cost and time reasons it is infeasible to deploy and manoeuvre large forces repeatedly and is therefore difficult to exercise the highest level of command. Even command post exercises are resource-intensive, and their training value is spread over large numbers of people. A Norwegian study contends that simulation can be used to enhance Combat Dynamic Intuition. As an adjunct to traditional staff exercises, Bakken proposes that simplified, time-compressed computer simulations can be used to train higher-level commanders:

The training focus is to rehearse the Commander’s ability to quickly form a mental image of a combat/conflict situation, and to intuitively comprehend what are the likely combined outcomes of the inherent dynamics governing the situation, and the decisions made to act upon the situation.⁹⁵

Relatively simple computer simulations can be created and used to conduct focused training for commanders and their key advisers. This approach conforms with the ‘muscular intuition’ theory; as Klein says, ‘a good simulation can sometimes provide more training value than direct experience’.⁹⁶

95 Bjørn Tallak Bakken, Martin Gilljam and Dr Bent Bakken, *Improving Combat Dynamic Intuition: The Minimalist Approach*, Proceedings of RTO NATO Modelling and Simulation Group (NMSG) Conference held in Breda, Netherlands, 12-14 November 2002, <<ftp://ftp.rta.nato.int/PubFullText/RTO/MP/RTO-MP-073/MP-073-05.pdf>> accessed 29 February 2004.

96 Klein, *Sources of Power*, p. 43.

Summary

Even if it has lacked scientific rigour in the past, the concept of intuition has been well accepted for a long time. Recent advances in theory have brought increased understanding and legitimacy to the incorporation of intuition in formal decision-making. The origins of intuitive thought are now much better understood and it is recognised that capacity for sound intuition can be developed through experience and conscious optimisation of cognitive development.

Coup d'oeil is not a new idea for military decision-makers, yet the MAP tends to favour rational analytic reasoning, to its detriment. The MAP could be improved by better incorporating intuition to complement the existing analytical process, and by better preparing the commander and his current operations staff for intuitive decision-making during plan execution. The doctrine makes some provision for this (at the commander's discretion), however, training methods and the intrinsic structure of the process obviate against it. Better incorporation of intuition will considerably enhance both the efficiency of the process and the quality of the plans produced, hence intuition is a key human factor that should be applied to improve the effectiveness of the MAP.

Creative Thinking

*Creativity is, after all, the engine that drives human progress.*⁹⁷

*The quality of an analyst's eventual recommendation is limited by the range of alternatives considered . . . The best solution will not be chosen unless it is included in the analysis.*⁹⁸

While not wishing to claim that today's strategic and military environment is any more challenging than that faced by earlier generations, it is clear that prevailing conditions such as the non-linear battlefield, asymmetric warfare, the Revolution in Military Affairs and terrorist threat create a complex environment wherein conventional solutions and approaches are inadequate. Creative solutions to unfamiliar problems outside traditional military domains are clearly required. This is exemplified by current operations by the US-led coalition in Iraq, where high intensity military operations, maintenance of law and order, governance, and nation-building are all closely integrated activities conducted largely by conventional military forces operating well outside their traditional roles.

The MAP is a very effective process, yet in itself does not create ideas—that is the role of the human beings involved. Paraphrasing the above quote, the MAP is only as good as the ideas fed into it. Even though following the MAP can ensure coherence, synchronisation, common intent and group situational awareness in any plan, the difference between a mediocre plan and a high quality plan (regardless of packaging) is the effective harnessing of the creative abilities of the staff.

97 Thomas B Ward, Steven M Smith and Jyotsna Vaid, 'Conceptual Structures and Processes in Creative Thought' in Thomas B Ward, Steven M Smith and Jyotsna Vaid (ed), *Creative Thought: an Investigation of Conceptual Structures and Processes*, American Psychological Association, Washington, DC, 1997, p. 4.

98 Andrew Lang Golub, *Decision Analysis: An Integrated Approach*, John Wiley and Sons, New York, 1997, p. 88.

Such creative input applies at several stages during the planning or decision-making process. The most important of these is in developing possible own force options (or COA), but creativity is also useful in other areas, such as identifying possible enemy courses of action or resolving the finer details typical of any large-scale collective endeavour (such as political issues arising from coalition operations or resolving complex logistic problems). This is one of the occasions when art takes over from science, and when human input plays a major role in determining the fundamental quality of the ultimate solution.

The aim of this chapter is to show how better understanding and management of human creative processes can significantly improve the quality of plans generated through the conduct of a MAP. Much has been written on this topic, and the ideas expressed here are a synthesis of several different researchers' writings. This chapter will provide an overview of the creative process, and then will describe the conditions under which it is most effective and the techniques that can be used to enhance it. The focus will then narrow to make specific recommendations for applying these principles to better harness the human process of creativity in military planning using the MAP.

How Creativity Works

It is important to first define what exactly is meant by the term 'creativity', as applied in this paper. There are various alternatives available. The *Oxford Canadian Dictionary* stresses the relevance of skill in its definition of 'creative' as: 'involving the skilful or manipulative use of something to produce e.g. a work of art'. Referring specifically to problem solving, cognitive psychologists Ward *et al* emphasise the mental processes involved and the importance of having a specific purpose in mind when they define 'creativity' as 'the business of constructing and modifying new mental representations that are relevant to some goal'.⁹⁹ Psychologist Dr Robert Sternberg defines 'creativity' as 'the process of producing something that is both original and worthwhile', thereby underlining the need for the product to be both new and useful.¹⁰⁰ Leadership theorist

99 Ward, Smith and Vaid, *Conceptual Structures*, p. 1.

100 Dr Robert J Sternberg, *Cognitive Psychology*, Harcourt Brace College Publishers, Orlando, Florida, 1996, p. 375.

John Adair makes a useful distinction between creativity and problem solving when he says:

... creative or original thinking takes a markedly different shape to decision making or problem solving ... Creative thinking can go on when there is no problem presented to the mind; as with aims and objectives it can throw up new problems and questions. On the other hand, the creative faculty of the depth mind can be harnessed to problem solving.¹⁰¹

Combining all these perspectives and focusing on the needs of military planning, 'creativity' is considered for the purposes of this paper to be the process of generating high quality and novel ideas suitable for application in problem solving or planning. Therefore, as well as being applicable to non warfighting military activities, the concept of creativity supports the manoeuvrist approach to warfare, which seeks 'to negate the adversary's strategy through the intelligent and creative application of effects against the adversary's critical vulnerabilities', as opposed to the 'non-creative' (and therefore predictable) attritionist approach.¹⁰²

Knowing what creativity is, it is also important to understand how it works. There are various different areas of research that have been applied to the topic of creativity, each approaching the subject from a different perspective. There are considered to be two main areas of research: those of 'mundane creativity' and 'exceptional creativity'.¹⁰³ Mundane creativity relates to the 'day-to-day activities of virtually all human beings' whereas exceptional creativity relates to 'the more striking forms of genius that seem to occur only rarely, and only among a limited set of individuals'.¹⁰⁴ It is mundane creativity that is pertinent for this paper, and therefore is where the discussion will

101 John Adair, *Training for Decisions*, McDonald Publishers, London, 1971, p. 93.

102 ADDP-D.02, *Future Warfighting Concept*, Department of Defence, 2003, p. 23.

103 This is an arbitrary division, and the research could equally be characterised in other ways. For example, an alternative would be to consider internal factors (studied by cognitive psychologists, related to mental processes) versus external factors (studied by personality, developmental and social psychologists, related to such issues as motivation, childhood/adolescence and social influences). Other areas of research focus on psychometric factors (related to individual characteristics), and the integrative approach (which seeks to synthesise the findings of all approaches). For further information see, for example: Sternberg, *Cognitive Psychology*, pp. 376–81.

104 Ward, Smith and Vaid, *Conceptual Structures*, p. 5.

focus.¹⁰⁵ The research of Ward *et al* draws the same conclusions about mundane creativity as does Sternberg's theory of *Successful Intelligence*, according to which it is considered that a useful level of creative potential exists within all people (albeit to varying degrees). Importantly for this paper, Sternberg has found that this ability can be enhanced, both within the individual and by establishing favourable conditions for him to work under.¹⁰⁶

There are various models that have been derived to explain the process of mundane creativity, and much of value has been learned from relatively recent research. However, the process is ongoing and there is no universal agreement on a single theory. Nevertheless, the creative cognition theory adopted by Ward *et al* is very useful for the purposes of this paper because it provides a sound and relevant framework for seeking improvements to the creative aspects of the MAP. Their theory is that 'Creativity in all domains . . . emerges from a relatively small set of basic mental operations', which can be summarised as follows:

- Conceptual Combination: merging two or more concepts results in a novel entity that is more than the simple sum of its component parts.
- Conceptual Expansion: modification and refinement of single concepts to fit new situations.
- Metaphor: figurative descriptions of commonplace objects, events and emotions that cause changes in existing cognitive representations, and thereby inspire thinking about otherwise familiar situations in new ways (for example, the idea that 'children are sponges' in terms of their ability to absorb learning quickly).
- Analogy and Mental Models: analogical mapping of some, but not all, properties from one domain to another, in order to develop new insights about the original domain (for example: Sun Tzu's analogy of military manoeuvre to water: 'Now an army may be likened to water, for just as flowing water avoids the highlands and hastens to the lowlands, so an army avoids strength and strikes weakness.

105 As an aside, it is noted that current research is inconclusive as to whether the two forms are actually the same, differing only by degree of capability, or whether exceptional creativity results from additional factors.

106 Dr Robert J Sternberg, *Successful Intelligence: How Practical and Creative Intelligence Determine Success in Life*, Simon and Schuster, New York, 1996.

And as water shapes its flow in accordance with the ground, so an army manages its victory in accordance with the situation of the enemy.¹⁰⁷¹⁰⁸

A given act of creative thought may derive from one of these mental operations or from a combination of several.¹⁰⁹ While beyond the specific context of Ward *et al*'s theory, it is also considered that the above mental operations apply to collective creativity, on the basis that a communicative group will share concepts, metaphors, analogies and mental models with each other during the process. An example of this would be for an analogy developed by one individual to be applied by another to combine previously unrelated concepts in a novel way. Thus, the mental operations listed above are those that must be harnessed in order to achieve a high level of creative thought amongst military planners using the MAP.

Optimal Conditions for Creativity

Having adopted the concept of creative cognition as the framework for enhancing creativity in the MAP, it is useful to examine what conditions best support the mental processes involved. There are several of these that can be identified and, in doing so, the theories of Ward *et al* will be complemented by those of other researchers in similar fields.

The role of existing knowledge is very important in understanding creativity, and there is much evidence that creativity is actually more a matter of applying existing knowledge in new ways than of inventing completely new ideas. This is a logical inference from Ward *et al*'s mental operations of creative cognition, and they acknowledge this in saying that, 'Creativity may even be better thought of as the entire system by which processes operate on structures to produce outcomes that are novel but otherwise rooted in existing knowledge.'¹¹⁰ It is also a common finding of other areas of creativity research; for example, Edward de Bono, in his writings about lateral thinking, states, 'Very often all the basic ingredients of a new idea are already to hand

107 Sun Tzu, *The Art of War*, p. 101.

108 Ward, Smith and Vaid, *Conceptual Structures*, pp. 4–18.

109 Ward *et al* acknowledge that this list may be incomplete and that their research is a work-in-progress.

110 Ward, Smith and Vaid, *Conceptual Structures*, p. 18.

and all that is required is a particular way of assembling them,¹¹¹ and John Adair writes that ‘Most solutions come about by the dialogue between previous experience and the present situation.’¹¹² General William ‘Gus’ Pagonis demonstrates a good appreciation for the value of prior knowledge when relating his experiences as a young officer commanding river barges in the Mekong Delta during the Vietnam War. When ordered to mount artillery pieces on his barges (a very unusual task), he realised that novel solutions would be required for the many challenges posed:

The first order of business, therefore, was to figure out how to mount these guns on the barges. I leafed through the available manuals, and found no guidance there. But having dabbled in military history during my several academic jaunts, I figured that in the long history of warfare, *somebody* must have tried to do something similar. I put in a call to the office of the Chief of Military History, who dug around a bit and finally came up with a Civil War manual that depicted some Union barges on which guns had been mounted. . . History, once again, proved to be very helpful.¹¹³

Prior knowledge is pertinent to all of the creative cognition mental operations, particularly conceptual combination and expansion. It also relates to Klein’s concept of Recognition-Primed Decision-Making, in the sense that assembling an intuitive solution based on recognised mental models is in itself a creative act. The ability to recognise apparently unrelated schemas as being applicable to a novel problem is desirable in achieving creative solutions, and it results from cognitive flexibility. It can therefore be concluded that it is important for planners to have a good fund of prior knowledge to draw upon in assembling creative solutions. That knowledge should relate both to the immediately relevant domain (for example, local and military situational awareness, military doctrine) and to wider matters that could prove transferable (difficult to provide examples, as virtually any field of knowledge has the potential to contribute). It is also important to develop the ability to recall and classify that prior knowledge in ways that lead to re-assembling it into creative solutions to new problems. Similarly, it

111 Edward de Bono, *The Use of Lateral Thinking*, Jonathan Cape, London, 1970, p. 148.

112 Adair, *Training for Decisions*, p. 84.

113 Lieutenant General William G Pagonis, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War*, Harvard Business School Press, Boston, 1992, p. 37.

is also necessary to develop the ability to perceive the ‘deep’ structure of problems, in order to be able to correctly identify concepts, metaphors and analogies that are applicable, as opposed to the potentially misleading ‘surface’ structures of problems.

Appreciating the value of prior knowledge for creativity leads to some valuable insights that can readily be applied to improve planning processes. In particular, it is a logical conclusion that the selection of personnel with diverse experience and broad education will likely result in enhanced creativity. At the individual level, this conclusion supports the expression that ‘ten years of experience always beats one year of experience repeated ten times’, in reference to enhancing professional judgment through variety of employment. For collective planning processes, this would indicate that planning teams should consist of people of various ages, diverse educational backgrounds and different personal life experiences. Civilian management writer Mark Sebell supports this principle in saying: ‘Experience begets innovation. Yes and no, since naïveté often does too . . . Without diversity, there can be no fertile ground.’¹¹⁴

A further development of this principle is that planning teams should comprise people with a combination of different thinking styles, as recommended by Jennifer James: ‘When forming a creative and productive team for problem solving or futuring consider combining different thinking styles.’ She cites the work of Geil Browning who identified analytical, conceptual, structural and social styles of thinking, and asserts that the different styles complement each other in group processes.¹¹⁵

Similarly, accepting the value of prior knowledge also suggests that external specialists can enhance the creative process. In creative cognition terms, their extra knowledge will provide new concepts and alternative ways to apply them in devising creative solutions (whether they ‘assemble’ solutions themselves, or simply provide ideas for others to integrate). Another benefit is simply that an outsider (specialist or otherwise) may bring a completely different perspective and freshness of approach that will widen the scope of the creative solutions devised by the planning team. De Bono acknowledges both of these potential benefits of external perspectives in saying:

114 Mark Sebell, ‘What American Business must do to remain innovative’, *Manage*, Vol. 45, No. 1, July 1993, p. 21.

115 Jennifer James, *Thinking in the Future Tense: Leadership Skills for a New Age*, Simon and Schuster, New York, 1996, p. 185.

The usefulness of an outside view of a problem is not only that special experience from a different field can be brought to bear but also that the outsider is not bogged down by the particular way of approaching things that has developed in those closest to the problem. The stages by which a problem develops may commit to a particular approach someone who has been with the problem all along; someone else who has not had to follow it stage by stage, however, but sees it complete at the final state, may be able to approach it in quite a different way. The value of an outside view of things is well recognized in the use of consultants in various fields, who are expected to not only provide a superior expertise in that field but also the benefit of looking at things in a new way.¹¹⁶

Thus it can be concluded that there is potential for enhancing creativity by incorporating specialist and external participants in the planning team.

Having dwelled on the benefits of prior knowledge, it is important to note that it is not unequivocally a positive factor. This is because ‘dominant ideas’ based on past experience can impede the development of new and different approaches. This relates to the creative cognition theory in the sense that the combination or expansion of concepts must be unconstrained by past experience or knowledge, as noted by Ward *et al*:

Prior knowledge is neither all good nor all bad; its utility must be judged in terms of the goals of the thinker and how it contributes to or detracts from those goals. Knowledge can lead to important advances or it can inhibit and constrain.¹¹⁷

Similarly, de Bono believes that ‘to realize that a dominant idea can be an obstacle instead of a convenience is the first principle of lateral thinking’.¹¹⁸ It is therefore apparent that another condition for enhanced creativity is the ability to override dominant ideas and comfortably adopt different approaches. Sternberg terms this

‘cognitive flexibility’ and describes it as an essential moderating factor in the application of prior knowledge.¹¹⁹

General George Patton displayed cognitive flexibility when accepting the surrender of the Vichy French forces in Morocco during the Second World War. His instructions (as well as common practice) were to completely disarm all surrendering French forces; however, he realised that the only thing preventing an Arab uprising in Morocco was the effectiveness and prestige of the French Army. He therefore opted instead to impose terms whereby the French would remain fully armed and carry on in all respects as they had previously, only under his orders and guaranteed by the word of honour of the French commanders. His creative solution proved completely effective:

I have never had reason to regret my decision. Had I done otherwise, I am convinced that at least sixty thousand American troops would have had to occupy Morocco; thereby preventing our using it to the maximum and reducing our already inadequate forces.¹²⁰

This requirement for cognitive flexibility mainly relates to internal process within individual thinking, however; its successful implementation is also dependent on the right environment for innovation. This relates to issues discussed in the earlier chapter—The Personal Role of the Commander—in particular his responsibility for establishing the conditions for good planning. This important human factor is well expressed by John Adair: ‘To a large extent the production of new ideas can be a social process, influenced by the organizational climate and directly encouraged by management.’¹²¹ John Milton further emphasises the value of constructive dissent and freedom of expression: ‘where there is much desire to learn, there of necessity will be much arguing, much writing, many opinions; for opinion in good use is but knowledge in the making’.¹²² This is essential for the interplay of individual mental operations described earlier in this chapter as the mechanism for creative cognition to become a

116 de Bono, *The Use of Lateral Thinking*, p. 149.

117 Ward, Smith and Vaid, *Conceptual Structures*, p. 23.

118 de Bono, *The Use of Lateral Thinking*, p. 34.

119 Sternberg, *Cognitive Psychology*, p. 380.

120 Patton, Jr *War as I Knew It*, p. 377.

121 Adair, *Training for Decisions*, p. 76.

122 John Milton, quoted in: de Wit and Meyer, *Strategy: Process, Content, Context*, p. 12.

synergistic collective process. Bennis and Biederman make a strong assertion about the challenge of doing so in a military environment when they say, ‘The military model of leadership, with its emphasis on command and control, squelches creativity.’¹²³ Their view is a little extreme, however, it does serve to highlight that military hierarchical structures and discipline risk inhibiting the establishment of ideal creative conditions. Therefore, it can be concluded that conscious efforts must be made by senior leaders to create the necessary environment, wherein novel ideas are freely expressed and innovation is viewed as positive and non-threatening.

While establishing the right environment is essential for creative thinking, it is also necessary to establish a structured process of some form. This is required to maintain direction and focus, as well as to provide a mechanism for the interplay of individual thoughts to be efficiently conducted. The term ‘brainstorming’ is often used for collective idea generation, and this originates from Alexander Osborn’s book *Applied Imagination*.¹²⁴ Osborn was the founder of a large advertising company, and he developed the now commonplace brainstorming process, typified by high-volume idea generation, non-criticism of ideas, building on others’ ideas and recording every idea suggested. However, several studies have shown that brainstorming is only effective in certain situations, and not universally applicable. Adair writes:

...brainstorming works best on specific and limited but open-ended problems. Given these criteria and the valuable suspension of judgement it is a technique for stimulating a quantity of ideas. Products and advertisements lend themselves to brainstorming. For original creative work, which requires extensive preparatory work, depth mind activity and the guidance-system of values, it is much less effective.¹²⁵

A recent study at University of Texas Arlington’s Group Creativity Lab found that groups with four members generated about half as many ideas as four individuals

123 Bennis and Ward Biederman, *Organizing Genius*, p. 26.

124 Alexander Osborn, *Applied Imagination*, Charles Scribner’s Sons, New York, 1953.

125 Adair, *Training for Decisions*, p. 114.

brainstorming alone, based on both field experiments conducted in an energy company and lab experiments using students.¹²⁶ Gary Klein drew the same conclusions:

brainstorming, a method that has been around for decades, seems primarily a social activity. If the participants generate their ideas individually, the resulting set of suggestions is usually longer and more varied than when everyone works together.¹²⁷

Fortunately research has been conducted to develop better alternatives. Klein proposes a model called ‘directed creativity’, which follows this sequence:

1. Present the dilemma
2. Individual consideration
3. Present ideas
4. Critique the ideas
5. Integrate the ideas
6. Repeat as necessary
7. Converge on solution(s).¹²⁸

A similar model has been proposed by Sebell:

- Set objectives (clear sense of vision)
- Develop creative expertise (establish the right conditions for creative thinking)
- Invention phases (idea generation)
- ‘Greenhouse’ phase (synthesis and development of ideas).¹²⁹

Additionally Golub has suggested seventy-three idea modifiers that can be used in an iterative process of collective idea generation, for example: ‘modify, magnify, minify,

126 Alison Wellner, ‘A Perfect Brainstorm’, *Inc.*, Vol. 25, No. 10, October 2003, p. 2.

127 Klein, *Sources of Power*, p. 143.

128 Klein, *Intuition at Work*, p. 151.

129 Sebell, *What American Business Must Do*, p. 23.

substitute, rearrange, reverse, combine'.¹³⁰ All these models provide a structured process, which allows for both individual idea development and collective refinement, and it can be concluded that such an approach is the most conducive to effective and efficient creative thinking.

With that iterative model of collective creativity in mind, the bulk of the creative work is likely to result from periods of individual reflection. This leads to another means of establishing good conditions for creativity, known as 'depth thinking'. In addition to the normal conscious thought processes, it has been found that many good ideas actually arise during periods of other activity. A historical example of this is the insurgency strategy Lawrence of Arabia developed when he was military adviser to the Arab leaders fighting against the Turks during the First World War. In his own words:

I had now been eight days lying in this remote tent, keeping my ideas general, till my brain, sick of unsupported thinking, had to be dragged to its work by an effort of will, and went off into a doze whenever that effort was relaxed. The fever passed: my dysentery ceased; and with restored strength the present again became actual to me. Facts concrete and pertinent thrust themselves into my reveries; and my inconstant wit bore aside towards all these roads of escape. So I hurried into line my shadowy principles, to have them once precise before my power to evoke them faded.¹³¹

Fortunately, dysentery and bouts of fever are not the only conditions that instil depth thinking. Golub relates:

often an analyst must contemplate a problem for an extended period of time before unusual ideas develop. Sometimes only thinking about the problem while engaging in other activities will lead to new connections ... Creativity can often be enhanced by engaging in activities that help one relax, reduce anxiety, let the mind roam.

130 Lang Golub, *Decision Analysis*, p. 102.

131 T E Lawrence, *The Seven Pillars of Wisdom*, Jonathan Cape, London, 1935, p. 196.

and he provides examples of sleeping, driving and playing sport.¹³² De Wit and Meyer add an important element to understanding of the process when they link depth thinking ('incubation') with conscious development afterwards: 'New solutions may come to the strategist in a flash (*eureka!*) or emerge over time, but usually require a period of incubation beforehand, and a period of nurturing afterwards.'¹³³ Robert Louis Stevenson attributes much of his literary creativity to depth thinking, even if his description is in itself a little creative:

the little people ... my Brownies who do one-half of my work for me while I am fast asleep, and in all human likelihood do the rest for me as well, when I am wide awake and fondly suppose I do it for myself.¹³⁴

It therefore can be seen that a process of conscious problem consideration and analysis followed by a change of mental activity or relaxation can provoke unconscious development of novel ideas. From this it can be concluded that it is worthwhile to make provision for depth thinking during the planning process.

Application to the MAP

Armed with the above series of conclusions about how creative thinking can be encouraged, it is now pertinent to consider their application to the MAP. In doing so, the primary recommendation is simply that practitioners acknowledge the importance of creativity to the effectiveness of the planning process and accord it the appropriate level of priority. Even with the best of intentions, it is necessary to make this conscious effort, because without doing so the pressures of time and process tend to predominate and result in a suboptimally creative environment. With this in mind, specific suggestions will be made for techniques that could be used to enhance the creative element of the MAP. In every case, the caveat of 'subject to command judgement and other priorities' is applicable; however, creativity is a key human factor that requires greater emphasis in military planning, so the caveat should be applied with caution.

132 Lang Golub, *Decision Analysis*, p. 91.

133 de Wit and Meyer, *Strategy: Process, Content, Context*, p. 87.

134 Quoted in Adair, *Training for Decisions*, p. 95.

Prior knowledge

As explained above, prior knowledge is a particularly important factor in creative thought, and there are several ways of maximising its benefits. Personnel development and training systems already in place serve well to develop a high level of knowledge within the officer corps. These include balanced and liberal tertiary education for officer cadets, support for further studies and numerous military training courses, as well as the posting system, which seeks to provide diverse developmental experiences for each officer. This provides a good base level of prior knowledge that can be further enhanced.

The IPB process, conducted with the MAP, provides one particularly useful opportunity for adding prior knowledge with a high potential for enhancing creative thinking, namely researching historical information of relevance to the operation being planned. In practice this would mean that the Intelligence staff is tasked to include historical material in their briefings to the planning staff.¹³⁵ The range of potentially useful material is wide, but the common aim would be to provide concepts and metaphors to aid creative thought. Possible examples might include:

- Previous military campaigns conducted in the same area, from which valuable ideas can be drawn about the terrain and other environmental considerations.¹³⁶
- Previous campaigns conducted by the same adversary, from which valuable ideas can be drawn about likely actions and possible means to defeat them.
- Similar campaigns conducted in any location, highlighting the schemes of manoeuvre that were used and the issues that arose, thereby providing useful ideas that may be applicable.

135 It is not, of course, strictly necessary that the Intelligence staff have this responsibility, and other functional areas within the headquarters could alternatively be tasked. Such a decision should be made by the commander (or his Chief of Staff), subject to the prevailing conditions.

136 An example of this occurred during a 3 Brigade planning exercise, when the Intelligence staff researched then briefed Second World War amphibious operations in the same area of the South-West Pacific as under consideration during the exercise. Their input provided valuable information about likely impacts of the terrain, and also sparked much creative discussion about tactical issues, such as potential manoeuvres, combat support elements siting and means of logistic sustainment.

The above list is by no means exhaustive. However, the basic principle is that the lessons of history have much to provide for future planning, and formally allocating responsibility for their incorporation in the MAP is very likely to result in better creative thinking among the staff.

Furthermore, longer-term personal development of a planning staff should incorporate individual and collective gaining of knowledge. This should include constant attention to developing knowledge, such as that provided by organisations such as the Australian Army's Centre for Army Lessons (and its many equivalents around the world) or documented in professional journals. As stated in the US Army's Operations manual: 'In many instances, solutions to tough questions may come from the reasoned application of historical study, a hallmark of professional development.'¹³⁷ This already occurs to varying degrees among individuals; however, it is in the interest of commanders to instil it more forcefully as an ethos among their planning staff. Specifically, it is suggested that standing headquarters formalise the process by conducting internal training on a regular basis. This could be achieved by the tasking of one officer per week to research a topic of potential value to forthcoming operations, and then provide a short brief to the staff. For example, a formation potentially deploying to Afghanistan would benefit from consideration of previous British and Soviet experiences there.

Planning Team Selection and Management

During the COA development phase of the MAP it is common for small teams to be formed to develop individual COAs, and on a larger scale, major campaigns are often planned by dedicated lead planning teams over lengthy periods.¹³⁸ Where practical, the selection of personnel for such planning teams should be optimised for the purpose of maximising creativity. Ideally, a given planning team should incorporate diverse personality types (flamboyant risk-takers and conservative risk-averters) and individuals with differing perspectives on the problem (academics, non-military members of other government agencies, technical specialists, members of pertinent ethnic/religious groups, etc). Similarly, it would be valuable to have a blend of ages,

137 United States Government (Department of the Army), FM3-0 Operations, June 2001, p. 5-13.

138 This occurred in the US Central Command during the lead-up to Operations ENDURING FREEDOM (Afghanistan, 2001 to present) and IRAQI FREEDOM (2003 to present), as described in Colonel Walter J Boyne, USAF (Ret.), *Operation Iraqi Freedom*, pp. 38–39.

and of levels of problem familiarity. Once again, this is a command issue and the simple action of considering creativity as a high priority would support this measure.

Additionally, the approach to management of the planning teams should address the organisational culture issues discussed above, such as encouraging dissent and cognitive flexibility. Various means of achieving this are discussed elsewhere in this paper, all applicable to the process of generating possible COAs. Those will not be repeated here; however, an additional technique that could be usefully applied is what Klein calls a 'PreMortem' procedure. In order to avoid the tendency for planning teams to be optimistic and 'on message' about their developing plan he devised the PreMortem procedure, whereby the team is presented with a scenario of their plan having gone disastrously wrong, and then tasked to identify possible reasons for its failure. Klein's experimentation has found that this is very effective at overcoming people's natural reluctance to express doubt or be critical, and is therefore a valuable process for refining plans and making them more robust.¹³⁹ The inculcation of such procedures into a headquarters planning process is another measure that will assist the commander to establish the conditions for good planning using the MAP.

Directed Creativity

The 'directed creativity' model discussed above is very applicable to the conduct of the MAP, and it is simply recommended that it be adopted as a structured activity within COA development. A key requirement would therefore be the clear expression of commander's intent, in order to focus the planning team productively. The result would be an iterative process of idea generation, discussion and refinement to produce broad COAs to be then further refined by dedicated planning teams.

Depth Thinking

Similarly, time should be allowed for depth thinking to occur. In practise this would mean such measures as breaking the COA development phase overnight, and making time for unrelated activities such as physical training or sport during the MAP. The temptation is for this not to occur, justified by time pressures; however, the value of depth thinking is such that it is time well spent in terms of value added to the quality

¹³⁹ Klein, *Intuition at Work*, p. 88.

of the planning process. The priority ascribed by the commander and senior staff to optimising creativity will be influential in successfully implementing such measures.

Summary

As effective as the MAP is, no planning process can transform dull ideas into brilliant plans. Creative thinking is the solution, as it is the means for generating the raw product of ideas that can be then worked on by the structural processes of the MAP. Creative thinking is heavily dependent on prior knowledge, and can be considered (largely, but not exclusively) as a combination of several mental processes that reorganise existing concepts to form new ideas, aided by metaphorically or analogously extrapolating concepts from one domain into another. Various measures can be taken to establish the right conditions for such mental processes to occur, and these relate to the inculcation of prior knowledge, diversity within planning teams, the use of a directed creativity process, and the establishment of conditions conducive to depth thinking. While all these measures must compete with other activities in a time-pressured situation, the process of creative thinking must be ascribed a high priority by commanders in order to fully harness 'the most precious and rare resource of all—the creativity of the human mind'.¹⁴⁰

¹⁴⁰ Adair, *Training for Decisions*, p. 75.

Integration of the Human Factors

The purpose of this chapter is simply to illustrate the interplay between each of the human factors discussed in this paper, and to demonstrate the complete picture of how they should be applied in practice. This information is presented in a tabular format at Figure 5. It should be noted that the integration of human factors is not restricted to the conduct of the MAP itself, rather it is a long-term process incorporating preparatory activities and subsequent review processes to prepare for future MAP iterations.

MAP Step & Associated Activities	Explanation	Applicable Human Factor		
		Pers Role of Comd	Intuition	Creativity
Long Term Preparations				
MAP Training in Staff Schools and Colleges	Realistic role-play by commander during MAP training (role modelling for future commanders under training, fidelity of MAP approach).	✓		
	Teach and practice incorporation of human factors.	✓	✓	✓
Organisational Culture	Effective use and management of dissent, avoidance of 'groupthink'.	✓		✓
	Conditions for creativity – innovation, risk acceptance.	✓		✓
Prior Knowledge	Ongoing 'balanced and liberal' education of officers to instil broad knowledge base and cognitive flexibility.		✓	✓
	Formalised professional development activities for HQ staff (case studies, lessons learnt from other HQs and operations etc).		✓	✓

Figure 5. *Integration of Human Factors into the MAP*

MAP Step & Associated Activities	Explanation	Applicable Human Factor		
		Pers Role of Comd	Intuition	Creativity
Personnel/Organisation	Minimal practical size of planning team, reliance on individual experience and judgment rather than analysis by large staff.	✓		
	Diversity among planners (training, experience, thinking style, perspective – i.e. external agents).		✓	✓
Mentoring of Commander	During training, to assist professional development and provide 'honest broker' feedback during AAR.	✓		
Simulation Exercises	Computer-based simulation involving commander and select key advisers, to develop intuitive decision-making skills.	✓	✓	
Throughout Conduct of MAP				
Commander Involvement	Provide focus.	✓		✓
	Shape process (optimising vs satisficing, analytical vs intuitive).	✓	✓	
	Harness SA and experience of the commander and senior staff.	✓	✓	✓
	Efficiency by minimising ambiguity and consciously accepting risk to maintain planning tempo.	✓		
Intelligence Preparation of the Battlefield	Develop own mental models for post H-Hour intuitive decision-making.	✓	✓	
	Intuition to focus intelligence-gathering and evaluation.		✓	
Mission Analysis	Directed creativity to devise enemy COAs.			✓
	Assess Intuitive Capability	Deliberate consideration of potential intuitive strengths and weaknesses among planning staff, as pertinent to operation being planned.		✓

MAP Step & Associated Activities	Explanation	Applicable Human Factor		
		Pers Role of Comd	Intuition	Creativity
Commander Involvement	Commander to conduct individual MAP	✓		
	Commander to write and personally brief to the staff the Commander's Planning Guidance	✓		✓
	Commander to participate (not necessarily full-time) in staff mission analysis.	✓	✓	
	Specificity in CPG to focus planning	✓		✓
	Commander to specify broad COAs for development (assisted by Commander's Planning Group) (Planning staff could still devise additional COAs).	✓	✓	✓
Historical Precedents	G2 (Intelligence) staff to research then brief to all staff historical precedents of potential relevance and assistance in creative process.			✓
COA Development				
Directed Creativity	Iterative briefing/individual/collective development of COAs.	✓		✓
Depth Thinking	Incorporation of breaks in process after initial briefing and consideration, in order to encourage depth thinking.			✓
COA Analysis				
Robust Approach	PreMortem procedure to identify potential flaws in plan.			✓
	External perspective – seek outsider view on developing plans.			✓

MAP Step & Associated Activities	Explanation	Applicable Human Factor		
		Pers Role of Comd	Intuition	Creativity
Wargaming	Use intuitive decision-making to hasten initial war games, then conduct more analytical confirmatory war games of selected COA.		✓	
	Commander participation to hasten decision-making and develop his own deep understanding of the plan.	✓	✓	
Decision and Execution				
Integrated Approach	Intuition and quantitative analysis to select COA.		✓	
	Attempt to record rationale for intuitive judgments.		✓	
Quick Decision Exercises	Conduct QDEs among key decision-makers to enhance understanding of commander's intent and intuitive decision-making post H-Hour.	✓	✓	
Intuitive DM	During execution phase, supported by SA and mental models developed during MAP.	✓	✓	
Subsequent to MAP				
After Action Review	Ongoing development of decision-making skills and incorporation of human factors in MAP.	✓	✓	✓
	Capture empirical observations as cognitive schema for future intuitive decision-making.		✓	
	Ensure mental models retained are accurate.		✓	

Conclusion

Summary

Military operations are increasingly complex, due to the impact of factors such as asymmetric threats, globalisation and rapid technological change. Military forces must therefore be capable of responding effectively to a wide range of unpredictable and often unfamiliar demands. Additionally, they must be able to do so at short notice, which requires them to maintain a high state of readiness for deployment on expeditionary operations. In order to satisfy these demands, the planning processes conducted by military organisations must be both rapid and innovative, yet must also be comprehensive and robust. Achievement of these requirements necessitates a doctrinal planning process that is consistently effective at producing quality plans in an efficient manner.

The MAP is the Australian Army's doctrinal planning tool; it is a bounded rational decision-making process, effectively equivalent to those used by other modern military organisations. The doctrine is mature and provides considerable flexibility, allowing it to be applied differently according to prevailing conditions and the commander's preferences. The MAP is an effective planning tool and has been demonstrated as such during numerous operational deployments. However, its effectiveness is not consistent, and peak performance is only achieved under certain conditions. This paper has argued that the key difference between adequacy and excellence in the use of the MAP is the application of human factors to the process. Peak performance is defined as the achievement of the right balance between timeliness, optimal plan development, inculcation of group 'ownership' of the plan, robustness of the plan itself, and the preparedness of the commander, his staff and subordinate elements to execute the plan. It is argued that the human factors of the personal role of the commander, intuition and creativity are those that must be incorporated collectively to achieve the best possible results from the MAP. Various historical examples have been provided to illustrate that these human factors have been significant contributors to

success in previous campaigns, demonstrating the abilities of the commanders and planners in each case at applying human factors.

The argument of this paper was initially devised according to personal observation and empirical judgment; however, the human factors in question are each the subject of extensive studies by behavioural scientists, and their findings are consistent with the argument. Notwithstanding this, it is acknowledged that the research is ongoing and that the current theories include elements that are inconclusive and/or contested. Nonetheless, sufficient clarity and certainty is considered to exist for actionable conclusions to be drawn from the research.

Each human factor has been considered in a separate chapter, first by examining military historic examples and summarising the supporting scientific theory, then by making specific suggestions as to how the human factor can be better applied to the conduct of the MAP. It was found that in practice there is much interplay between the human factors, so the concluding chapter illustrates this fact when it shows how they should all be integrated in the application of specific techniques to improve the MAP.

The personal role of the commander has been shown to require two main enhancements. First, greater personal involvement in the MAP will result in higher quality plans by better exploiting his knowledge and expertise, and by his shaping of the organisational culture and process. Second, greater personal involvement by the commander during planning allows him to develop a deep understanding of the plan and the mental models of its execution that will permit him to make good intuitive decisions during the time-pressured execution phase.

Intuition has been shown to be a sound aid to decision-making, and potentially beneficial to the MAP, especially when incorporated with analytical processes in an integrated approach. It has been shown that intuitive ability exists (to varying degrees) in all people, and that measures can be taken to develop it.

Creativity has been shown to be important in terms of providing the raw material of innovative ideas, on which the structured processes of the MAP can be applied to create sound plans. As with intuition, it has been shown that all people have the potential for creative thought and that certain conditions can be established to maximise creativity during the planning process.

Consideration of each of these factors led to the identification of specific techniques that should be applied during the conduct of the MAP. These were shown to be complementary to each other and to the more mechanistic doctrinal activities within

the process. Given that the MAP doctrine is designed to be applicable to a wide range of possible situations, and therefore flexible in the way that it can be applied, it is also acknowledged that the techniques suggested by this paper will not be applicable in every situation. The tailoring of the process, as always, should remain the prerogative of the commander and his Chief of Staff.

Implications

The implications of this paper relate mainly to the training of staff officers and future commanders in the conduct of the MAP, and to the practical application of the MAP during operations planning. Figure 5 provides a detailed summary of the specific recommended techniques for enhancing the MAP using human factors, however, they can be summarised as follows:

1. There is no need for major changes to the current MAP doctrine. However, future doctrinal publications should provide greater emphasis on the human factors discussed in this paper, and should include the specific techniques suggested for enhancing the process.
2. MAP training at staff schools and colleges should specifically address the human factors of the personal role of the commander, intuition and creativity.
3. Conduct of MAP exercises during staff training should more accurately reflect the optimal application of the process. Specifically, this relates to role-modelling the commander in a realistic fashion rather than allowing the process to be staff-driven in a manner that creates false precedents for the trainees.
4. Use of the MAP by 'live' headquarters should incorporate human factors by adopting the specific techniques described in Figure 5 of this paper.

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