The ability to make effective decisions and exercise judgement

Dominating the cognitive environments in all areas of deployment and operation

Effective leadership who can deal with ambiguity and uncertainty

Effective structures that allow for flexibility, value adding work and effective outcomes

A common lingua franca for leadership and work

Strong trusting relationships aimed at achieving task directed outcomes

Submission 2015 Defence White Paper

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EXECUTIVE SUMMARY

Decision-making and judgement are constantly referred to in the ADF Defence Issues White Paper as crucial factors (see pages 8, 12, 13, 15, 25...). Long-term success as well as short-term effectiveness requires sound judgement to be exercised throughout an organisation.

Cognitive Dominance is a comprehensive strategy developed by the RAND organisation in the mid-nineties and has continued to develop and expand. The central concept is the ability to be ready for multiple scenarios and to be able to out-think, out-plan and out- manoeuvre opposition forces.

The ADF needs to create and sustain Cognitive Dominance across the environmental spectrum. This requires filling the organisation with people who have spare capability at all levels and the development of managerial capacity to think and act in value adding ways.

Ultimately, cognitive dominance is to make decisions that are more timely, far-sighted or holistic than those of one’s opponents and to exploit the situation more skilfully.¹ This definition is just as valid for successful business.

The Cognitive Environment is far more than just sophisticated technologies, computers or real time information and intelligence. Cognitive dominance can only happen when the human element can encompass the detailed complexity of work at the tactical level (referred to as Levels I – III) and deal with the uncertainty and complexity at the strategic command level (referred to as Levels IV- V)².

One of the key requirements in building cognitive dominance is the ability to execute strategy effectively. This means getting all the required levels of work clear and in place. Research has shown that missing or compressed work levels results in operational confusion, escalating cost, wasted resources and risk to delivery.

Hand in hand with planning the cognitive capacity of the system, senior military leaders will need to ensure leaders at all levels possess the cognitive capability to actively leverage and exploit cognitive dominance. Current planning at certain levels of work may need to create scenarios for timeframes of ten years, twenty and beyond. This rests on being able to deploy personnel in such key billets who are comfortable operating in time horizons of more than three years. Reliable methods, independently validated by the US Army Research Institute and already partially trialled by the ADF are available in this regard.

Cognitive dominance can only happen when the organisation is designed and talent is in place so the human element can encompass the detail complexity of work at the tactical level and deal with the uncertainty and complexity at the strategic command level.

There are three recommendations for a pilot project to build a cognitively dominant force. First to ensure work levels are clear and intact; secondly to ensure they are staffed by people comfortable to deal with the uncertainty and complexity of decision making at each work level; and thirdly to provide them with requisite managerial leadership skills to see work effectively delivered.

¹ Rand Organisation. 1996
CONTEXT

Over the last twenty years a strategy has been emerging which is shaping the “high-tech” military of the 21st century. It calls for smaller, flexible, multi-purpose structures, staffed with carefully selected and highly trained people, equipped with cutting edge technologies which can be deployed to meet a range of situations, internally and externally. Initiative, compassion, aggressiveness, high degrees of connectivity, flexibility, mobility, autonomy, synchronisation, cost effectiveness and minimal precision force are highly valued characteristics.

In this new strategy possibly the key factor weaving it all together is the overarching need for dominating the cognitive environment. Dominating the cognitive environment is about effectively and in a timely manner identifying, managing and exploiting the uncertainty and complexity that exists at all levels of endeavour. This submission seeks to illustrate the growth in importance of cognitive dominance as a concept, while identifying leverage points for building cognitive dominance in the ADF over the next decade and beyond.

The concept of dominating the cognitive environment is one that originated out of the concepts of C³I or Command, Control, Communication and Intelligence as the requisites for successful attainment of military objectives. Ultimately cognitive dominance is to make decisions that are more timely, far sighted or holistic (than one’s opponents) and to exploit the situation more skilfully. This definition is just as valid for successful business as for an offensive or peacekeeping force. Dominating the cognitive environment is at best nebulous, given the high degree of uncertainty and ambiguity that exists in making decisions and choosing operating scenarios.

However, it is possible to create the conditions that make such a strategy possible and create a fighting force or business enterprise with the capability for such dominance of the cognitive environment. This is not a short term process, but one requiring vision, commitment, leadership and a great deal of courage to look at oneself critically.

Our Changing Environment: The Growth in Complexity and Uncertainty

Alvin Toffler, futurist who has predicted and analysed current global trends with such insight has seen warfare move through three macro trends, which is a reflection of the way we make wealth.

First wave
The first trend was that associated with what he terms First Wave (dominated by agrarian style of life, when humankind learnt to grow crops and domesticate animals and live in settlements) which was the longest of the three cycles.

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4 Some observers believe this may have been the reason the 2002/3 project was initially discontinued.
Here warfare was dominated by;

- Hand to hand combat.
- Leaders measured on their combat prowess.
- Primitive weapons.
- Small armies, mostly badly equipped, irregularly paid and dependent on the land for supplies. War was often waged seasonally as 90% of manpower was required simply to work the land.
- Slow and unreliable communication.
- Quality of leadership varying vastly.

These key elements of size, weapons, logistics, tactics and communication remained essentially unaltered over more than 2,000 years.

Second Wave
The industrial age heralded the arrival of a radical new form of warfare with the birth of the modern nation state and huge changes washed over the military. The state could now afford to maintain standing armies. Violent confrontations occurred between the small, ill equipped and part-time armies of the first wave agricultural based civilisations and the new industrial armies in the latter half of the 19th and 20th century as the two civilisations battled for supremacy (American Civil War, the Anglo Boer Wars and the Russian Revolution).

The hallmarks of the Second Wave military were;

- Professionalism.
- New and revolutionary technology providing new weapons.
- Mass destruction - just as mass production was the core principle of second wave society, so was mass destruction in military matters. Mass production was paralleled by Levée en masse.
- Wars of attrition (World War I & II).
- Growing bureaucracy in business and military, as new specialised corps grew up, standard training, standard organisational structures and standard doctrines emerged.
- A social system that linked mass production, mass education, mass communication, mass consumption, mass entertainment and weapons of mass destruction.

Winds of Change
By the 1960’s the weapon systems of second wave had reached their maximum capabilities in terms of lethality, range and speed. Truly the ultimate war of mass destruction lay in the offing. During the Cold War the US military suffered its worst defeat in Vietnam. Here advanced Second Wave forces battled resilient and committed First Wave insurgents. Like the giant corporations of Second Wave, the war was managed centrally from the White House. The US military was designed for concentrated, mass, linear operations, run top down, it was heavily bureaucratic, torn by internal wars, branch rivalries and operated with conflicting doctrines. By 1975 the US Military was reeling and as General H Norman Swcharzkopff said, he “realised that the army had lost its way”

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Yet within a decade a profound new revolution had swept the US Army and led to the overwhelming victory we all saw in the Gulf War. What happened? How did an organisation as large as the US Army suffering from a severe credibility crisis succeed in turning itself about? How did it manage to perform so much better in the Iraq and Afghanistan situations when committed to essentially no-win conflicts where the enemy stood with the commitment and resilience of the Vietcong?

**Third Wave**

The answers to this question are complex but essentially there were major changes underway in parts of the world. New ideas, new thinking, and new possibilities emerged from the 1960’s onward. This proliferation of the human spirit was aided by the liberating technologies such as the microchip. The old bi-polar world of East against West was vanishing and a world of increasing uncertainty and complexity rising toward our now multi-polar world where flexibility, short term alliances, networks, co-operation and integrated communication and command systems are needed to deal with wide ranging crises (nuclear, chemical, biological e.g. Ebola) that may flare up at any time in any part of the world.

As the US economy moved away from old-style mass production toward a demulsified, diverse and technologically liberated Third Wave system for producing wealth, the US Army began a parallel development. Exciting new ways have been opened up by microelectronics to achieve dominance. As never before, a commander can know the exact location of friendly forces, their condition and their contact with opposing forces in near real time. They can detect opposing forces with unprecedented accuracy even in darkness and even when the opponent has attempted to conceal their forces. Information and intelligence can be rapidly fused and displayed graphically in the fighting compartment of an armoured vehicle or the command centre of a ship, as well as operations centres at each echelon. The US Army’s digitised battlefield of 1996 deployed a network larger than that one managed by AT&T6.

It was not until the Gulf War that the outside world recognised that significant steps had been taken towards formulating a new way of war and that the framework for a Third Wave War had been born. New standards had been set and established doctrines crumbled. Toffler’s view of the Third Wave military is proving to be uncannily accurate.

**Cognitive Dominance**

With some prescience the then Chief of the General Staff for the Australian Army, Lieutenant General J.M Sanderson said in October 1996 that “the Review outcomes demand an Army organisation that is based on brains and ability; one that is always in the right place at the right time, that can conduct operations day and night, and that can endure. Such an Army must take advantage of emerging technology to have a flexible command and control system, continuous field communications, discriminating target acquisition, precision weapons and rapid ground and air mobility. It must be an Army able to operate with, and use the power and reach of the Navy and Air Force.”7

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Creating the impetus for change, be it in a military or business enterprise, is very difficult. Even in the business world change is often neglected by the captains of industry, as attested by the statistics of survival rates of the Fortune 500 companies.

Historically, persuaded by the Vietnam disaster the US Army created TRADOC (Training and Doctrine Command). In addition to hundreds of university courses for officers and training centres, it devotes great attention to theory and advanced training techniques. TRADOC also focused heavily on formulating new weapons systems (e.g. The M1 Abrams tank, Apache helicopter, Patriot and Tomahawk missiles). It was responsible for the AirLand Battle Doctrine. TRADOC created an intellectual ferment in the US Army post-Vietnam by attracting some of the brightest, intellectual and well qualified officers.

TRADOC developed the doctrine of the AirLand Battle, seeing a shift in the increased management and integration of detail complexity at the Tactical Levels and an overall cognitive upgrade in the Operational and Strategic Levels of War (see Figure II). The main thrust was the move from single service to interdependence through joint operations and operational interaction between air-ground forces, integrated combined arms, fire support, electronic warfare, deception and intelligence with manoeuvre. This was seen as taking place in a highly fluid, non-linear battlefield in which ground and air operations were combined throughout the theatre. By the mid 2000’s the new Army was defined by five characteristics; doctrinal flexibility, strategic mobility, modularity, joint and multinational operations and versatility in war and peace.8

In parallel with the TRADOC initiatives, the US Army Research Institute (ARI) looked at the leadership attributes required to support the emerging doctrine. This work had originated in 1983 when the Senior Leadership Coordination Counsel examined past studies about leader development issues, and established the means of addressing the most significant leader development issues facing the Army then and into the foreseeable future. Following this the ARI worked with the US Army War College and National Defence University to develop an effective approach to assessing capability, personal styles and performance. Key requirements were published in 2003 as six ‘meta-competencies’

The original “dominating the cognitive environment” evolved into more sophisticated thinking that integrates the understanding of the human domain. Early actions, through a joint entry task force that works across government agencies, the services and all other relevant sectors (using big data) is now added to the doctrine. Global Trends 2030 contends that “the adoption of irregular warfare tactics by both state and non-state actors as a primary mode of war fighting will be a common characteristic of conflicts beyond 2022.”9

**Dominating the Cognitive Environment: The Three Inter-linked Building Blocks for Building Cognitive Capacity**

Creating Third Wave cognitively dominant modular armed forces of the 21st century revolves around doing more with less and using scarce resources intelligently. Cognitive dominance is more than just

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technology, computers or communications, it is actively focused on higher human quality, not only on training to increase each soldier’s capabilities, but on leadership.

Consider this from a US Army Technical Report of 1993: “The challenge is to maintain the effectiveness of the force, both Active and Reserve, in an era of ill-defined national objectives and in competition with domestic programs that demand increased resources. In addition…, the social, economic and ethnic composition of the pool from which officers are selected and promoted has changed. This change creates pressure to either improve the ability to identify candidates who will be successful at higher military ranks or enhance the quality of the pool through more refined selection, training and development strategies.”

One needs to ask what analogous revolutions are going on in command, structures and human resource management. The current White Paper seeks to address these issues. It would appear that progressive forward-thinking planners have quietly being developing a paradigm for creating the cognitively dominant and supremely versatile force. Appropriate C³ may rest on the foundations of a combination of three inter-linked factors.

KEY BLOCK #1: Levels of War and Work

Third Wave military, like business, is still emergent and part of a process of loosening its rigid top down control to allow decisions to be made where they have the most impact. New organisational development tools, like smart weapons systems, are being used to create organisational structures that allow for flexibility and autonomy, while at the same time ensuring more relevant control through performance management and a common leadership language.

One of the tools adopted by the US military is the Levels of Work concept. The Levels of Work Model originated with Elliot Jaques and was called Stratified Systems Theory (SST). The US Army has extensively evaluated SST and found the model to be valid. Newer developments have seen the SST model updated by Levels of Work, which is an organic growth out of SST and sees the work themes grouped into modular units arranged into a hierarchy. One level is not ‘better’ than another, each is vital and each has a different role to play. Each work level requires decisions of quantitatively and qualitatively greater complexity and as the complexity increases, so does uncertainty and ambiguity in the decision making.

These crucial factors of decision-making and judgement are often referred to in the ADF Defence Issues White Paper:

- The Panel will test the key assessments and judgements in the White Paper, (page 8)
- Once the type of capability is identified, there are still capacity judgements to be made—how much of each sort of capability is required. (page 13)
- The size and shape of the future ADF will be determined by the best judgements that can be made about these factors as will the priority Government affords to the ADF. (page 15)
- Designing a defence force is a complex undertaking… The size and shape of the future ADF will be determined by the best judgements that can be made about these factors… (page 25)

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31 Levels of work is a non-linear approach to organisational structures and is based on complexity adaptive systems theory. This body of knowledge has been built upon by many contributors world-wide.

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**Decision Making and Levels of Work**

There are found to be seven levels of work with each level contributing or adding value in a unique way through the decisions it is required to exercise. The levels are based on increasing complexity, with each level distinguishable through having longer time horizons before one can see the results or discern patterns of successful decision making.

Figure I shows time horizons, work themes and approximate military roles. The Levels of Work is composed of three domains, the Tactical Matrix (levels I - III), the Operational Matrix (levels IV & V,) and the Strategic Matrix (levels VI and VII).

<table>
<thead>
<tr>
<th>Levels of Work</th>
<th>Fundamental National Goals</th>
<th>Time Span</th>
<th>Type of work</th>
<th>Roles (diff in countries and scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Levels of War</td>
<td>National Security Goals</td>
<td>25+ years</td>
<td>Perspectives of high level of decision makers leading the Nation</td>
<td>4 Star General, Field Marshall (Army)</td>
</tr>
<tr>
<td></td>
<td>National Military Objectives</td>
<td></td>
<td></td>
<td>3 Star General, Lt General (Corps)</td>
</tr>
<tr>
<td>Operational Levels of War</td>
<td>Mission of Combatant Commanders</td>
<td>10 years</td>
<td>Perspectives of high level Commanders conducting major operations &amp; major operations</td>
<td>Two Star, Major-General (Division)</td>
</tr>
<tr>
<td></td>
<td>Operational Objectives - Executing the strategy</td>
<td>5 years</td>
<td></td>
<td>One Star General Brigadier-General, Col. (Brigade)</td>
</tr>
<tr>
<td>Tactical Levels of War</td>
<td>Delivery of Objectives and Achieving TASKS</td>
<td>2 years</td>
<td>Perspectives of Commanders fighting battles, engagements &amp; deployments</td>
<td>Lt-Colonel (Battalion),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 year</td>
<td></td>
<td>Capt, Maj, WO (Company)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 months</td>
<td></td>
<td>Lieutenant NCO (Platoon)</td>
</tr>
</tbody>
</table>

**Figure I: Levels of Work in the Smart Military**

Thus the question of dominating the cognitive environment should begin from an overall macro national security planning level. Failure at these strategic levels of complexity may have significant implications along the time horizon line (e.g. Vietnam, Independence Struggles of Southern Africa and Apartheid, Iraq and Afghanistan, the unexpected arrival of ISIS).

Figure II shows how the levels of war / work model provides for performance management linked to the setting of relevant level specific objectives. By ensuring all the relevant Levels of Work are addressed, organisational Cognitive Capacity can be developed.
**Key Point Summary**

One of the key requirements in building cognitive dominance is the ability to execute strategy effectively. This means getting all the requisite levels of work in place so the complexity of the organisational mission right through to the decisions at the frontline are all delivered. Research has shown that missing or compressed work levels results in operational confusion, escalating cost, wasted resources and risk to delivery.

A study on levels of work and cognitive capability was carried out on the first private military company who operated in a range of unconventional setting with great success.\(^\text{12}\)

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\(^\text{12}\) Olivier, A. *Organisational Design – what your university forgot to teach you. See case study on Executive Outcomes.* Xlibris, 2013
KEY BLOCK #2: Individual Cognitive Capability; a Requirement for Effective Judgement.

The Cognitive Environment is far more than just sophisticated technologies, computers or real time information and intelligence. Cognitive dominance can only happen when the human elements through the organisation can encompass the detail complexity of work at the tactical level and deal with the uncertainty and complexity at the strategic command level.

Figure II indicates the cognition at each level that needs to be present. Individual Capability is vital at all levels of enterprise in both business and military endeavours. Cognitive power is defined by Elliot Jaques as “the mental force a person can exercise in processing and organising information and in constructing an operating reality”\(^\text{13}\). As the level of work increases so does the demand for cognitive capability. The time span before one can see the results of a decision increases with each level of work. A one star general performing work at Level IV may be working with time spans of three to five years before they see the results of some of their more complex tasks.

Leaders at all levels of work need to have spare cognitive capability in order to deal with complex issues. Career Path Appreciation (CPA) is an approach that identifies an individual’s current level of capability and forecasts how that capability will grow over time. Independently validated by the US ARI, CPA has excellent predictive validity and reliability\(^\text{14}\). It has been employed in both face-to-face interviews and in modified form in an online environment (MCPA) at both the US National Defence University (ICAF) and the US Army War College. Research has also been conducted at the UK Army Staff College.

To quote from the same US Technical Report:

*In the increasingly complex world relationships that have unfolded in recent years, a major thrust of the United States Army has been toward understanding and developing senior leaders capable of dealing with that increased complexity and uncertainty.*

*In fact, today’s amorphous, multi polar world is in many respects more complex and potentially more volatile than the bi-polar world of the past. The need for a flexible and cognitively agile general officer corps thus is not diminished.*\(^\text{15}\)

Hand-in-hand with planning the cognitive capacity of the system, *senior military leaders will need to ensure leaders at all levels possess the cognitive capability to actively leverage and exploit cognitive dominance*. Current planning at certain levels of work may need to create scenarios for a timeframe of ten years, twenty or beyond. This requires the deployment of personnel in such key billets who are comfortable operating in time horizons required of the work itself. Likewise investing in new smart technologies is self-defeating if it is then grafted onto old tired Second Wave C²I systems. Hand-in-hand with this, one should expect that similar developments are taking place on the people side.

Cognitive Dominance is a complex systems approach.

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\(^\text{14}\) More than 90,000 CPA/MCPA applications have been made globally.

\(^\text{15}\) ibid, see footnote 6.
Some Australian companies have used this approach, some for over forty years.

An Early Project by ADF
In 2000 this author submitted similar ideas for the then White Paper. This was published and resulted in a project for a number of CPA interviews with one-star and middle-career officers. The project was undertaken in 2003 – 2005 by BIOSS Australia, partnering with IBM and later PWC, and was informed by our colleague and former British Army Colonel Richard Sale, now CEO of EDAC. Supporting documents were presented on work done by the US and British Military. The project was not completed when the project champions were redeployed. The ADF sponsors at this time included General Cosgrove, the then CDF and Col (now Major General) Craig Orme in his time as DSOM.

We now have the opportunity to revisit this project in an updated format.

At that time consideration was also given to employing the psychometric tool LPA and the ELDI 360 performance report. Both these tools formed part of the intervention in the US military. Subsequently the LPA has been successfully employed in one of the UK’s Special Forces units and a second NATO Special Forces group.

KEY BLOCK #3: Requisite Leadership Competencies

For effective deployment at all levels of an organisation, a common managerial leadership language of practices and thought associations is required. Over the last fifty years Dr Elliott Jaques and others have researched and drawn together “best practices” based on testable definitions and everyday practices. This body of work is loosely referred to as Requisite Leadership.

It is estimated that in the leading armies of the early to mid-21st century there may be more soldiers carrying computers than guns. The new military needs soldiers who use their brains, can deal with ambiguity, can deal with a diversity of people and cultures, can take initiative and ask questions, even to the point of questioning authority. Smart weapons need smart soldiers and a smart shared way of doing and understanding.

Training and competencies at level I of the Tactical Matrix are very specific and directly related to the task, which can be fully specified and the training or operational procedures comprehensively documented. As the complexity and time horizon increase, competencies become abstract and less easy to define and measure successfully.

The Requisite Leadership Competencies are valid at all levels of managerial leadership work and serve to hold the levels in place. They are underpinned by Systems of Work to ensure the enterprise is staffed by people at the right level of work at the right time and who share a common mental model for carrying out work effectively and building strong, trusting two way relationships.

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17 As employed by Col Sale in his study of Brigadiers: Towards a Psychometric Profile of the Successful Army Officer, Defense Analysis, Vol 8, 1992.
18 Col (RM) Andrew McInerney’s Master of Defence Administration dissertation is classified and the unit is now disbanded.
Defence Industries
These three building blocks are also directly relevant to the Defence Industry where savings and operational efficiencies could be gained through the applications of these same concepts, thus making retention of core capacities in Australia a more attractive economic option.

RECOMMENDATIONS

Recommendation 1
That the requisite principles of structural design are used to conduct a pilot study to ensure;

- Roles are adding value at the required level of complexity
- Roles have authority to match their accountabilities
- The vertical structure allows for the complexity required to achieve organisational and functional goals without gap or compression between levels
- Cross function role clarity and relevant authority and accountability exists

Recommendation 2
That a number of capability interviews are conducted in the same site as the structural review to ensure employees are comfortable with and in flow with the level of decision making.

Recommendation 3
That a pilot project is run on Requisite Leadership Practices for evaluation in the same area as the above pilot project is undertaken.

CONCLUSION

The Defence White Paper is fundamentally about the complexity and ambiguity that those faced with making decisions must handle. For a country to ensure its military capability and capacity for the 21st century, it requires the capability to deliver across a broad section of risk, but it is also important to envisage potential deployments and build for flexibility and the smart of use of limited resources.

Attention must be increasingly focused on ensuring that hand-in-hand with smart technologies, attention is focused on appropriate levels of specific command and control structures and that cognitively competent personnel are identified and appropriate level-specific development is taking place.

Key leverage points for creating a cognitive dominant force may well focus on how well structures, people, development and technology are geared around complexity management and the degree of focus that exists on the opportunities and vulnerabilities presented by uncertainty at levels. In reality the Levels of Work model, individual cognitive capabilities and competency based development flow together to create the capacity and capability for Cognitive Dominance and allows for the most effective deployment of leading edge technologies.

Lorraine Dodd, Director of Research at the Centre for Applied Systems Studies, Defence Academy of the United Kingdom sums up the value of this approach to organisations as follows:

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“I think that [this approach] is providing a language, a way of thinking, a way of being almost that would take them towards a position where they can be adaptive, agile, and then wholly resilient in the way that they do business.”

References

5. *ISIS, Abbott, Submarines, South Australia & Levels of Work* LinkedIn Blog

Some Information on Us

**Established** 2001

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