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RELEVANCE OF THE US TRANSFORMATION PARADIGM FOR THE AUSTRALIAN DEFENCE FORCES

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ABSTRACT
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A survey of the Classical Paradigm explores the way in which the search for the 'decisive act' has been retranslated throughout the theory of warfare and strategy. This analysis links classical ideas with Boyd's OODA –loop model and 'Fourth Generation Warfare' theorem, which provides the tools for accelerating the OODA -loop. I identify a schism between Classical Paradigm scholars and 'Fourth Generation Warfare' theorem. This concludes with a model for understanding this relationship namely transactionalism as a means of linking technological, military and political strategies.

THE CLASSICAL PARADIGM

The Classical Paradigm or more specifically Continental Theory has its roots in the circumstances of symmetrical strategy. From the 15th to 19th Centuries – European theater combatants shared common cultural, political, technological and economic systems, as well as sharing similar warfare styles. The concept of decisive action was defined in physical terms – underpinning the notion that destroying an army or navy was the ultimate aim of all protagonists, as well as the ultimate symbol of political power.

Continental Theory counter-pointed between two different paradigms. On one side there were the political theorist of State (Machiavelli and Clausewitz) who sought to understand war in terms of the violent expression of political power. This thinking underpinned the search for a methodology explaining the relationship between warfare and strategy. Counter to this, the material philosophers – Jomini and Delbruck – set out the basic principles of how industrial level warfare was caught within the cycle of a materiel and logistics equation. In the case of Delbruck's reinterpretation of Clausewitz' ideas - strategy rendered by economics - he reattached economic/ material constraints with politics constraints.

Recognition of the role of technologies, while historically creating totally new circumstances for war, was not fully developed within Continental Theory – partly because the technology of war changed little, as did its employment. Strachan[1] observes the impact of technology on tactics fundamentally changed the nature of military experience. Fighting battles with shock action was revolutionised over the 19th Century with the emergence of defensive warfare technology. Thus, from 'Breitenfeld' to 'the Marne', Continental Theory paradoxically sought decisive engagement as the 'object of battle', at the same time recognised that the employment of firepower and fortifications served to make battle more indecisive.

By the late 19th Century, the emergence of variations on Clausewitz - namely the doctrine of absolute war - made military confrontation the sole means of settling disputes between countries; and in such circumstances the tactical became the consort of politics. In the final stages of this development, Ludendorff stated, 'tactics have to be considered before purely strategic objectives, which it are futile to pursue unless tactical success is possible'. The disengagement of military action from strategy largely inhibited Continental Theory from making the realisation that the aim of the war was achievable by any number of instruments. Thus, Continental Theory continued to remain where it had first developed in the circumstances of the 18th Century dynastic wars. The army and navy remained the agents through which nation-States acted, and mirror to this - the concept of nation-State action was largely restricted to the means at its disposal.

In late World War One, Delbruck's realised that war and politics could be molded together to achieve strategic results. This pushed Continental Theory in a new direction, and decisive action was redefined as including a broad range of fronts — diplomatic, economic and psychological. World War One was a watershed representing the refinement in a concept of nation-State conflict – in part the realisation of air power and mechanical mobility, firepower,

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[1] Strachan, H. (1983) *European Armies and the Conduct of War*, Allen & Unwin.

armour and electronic communications. In the later stages of this technological transition - air power, nuclear weapons and eventually missiles evolved into a new concept of all-out wars of firepower aimed at annihilating opposing countries.

Decisive action in Continental Theory, by World War Two according to Earle[2], was reinterpreted into a form of political ideology. For instance, Nazism sought 'the transfer of the spirit of the front-line comradeship into strategy'. Fighting itself was valorised on the personal level and at the level of the State. In this new form, the notion of strategy became associated with symbolic meaning, which under the Hegelian concept of national struggle was turned into an all-inclusive ideology that locked citizens and states equally into a pattern of violence rudely called politics and strategy. Into this milieu, the new technology of communications created a political context in which military action could take place. The key point of this concept was that the mass global broadcast of political rhetoric came to encase the use of military force. The new equation realised a symbolic level of meaning equated with strategic and political programming.

In the 20th and 21st Centuries, Continental Theory's commitment traditionally to the naked use of military power had fundamentally changed with access to new technologies. The conceptual basis of decisive action in warfare and strategy became more than defeating opposing nation-States' militaries. Modern wars became long, drawn-out struggles where countries harness the full potential of their national, economic and social forces. A new emphasis emerged as to the importance of considering economic capabilities as the equivalent of military capacity as well as use of other measures –diplomatic and psychological. The military option came to be seen as an element of, rather than the decisive factor in conflict. This new paradigm emphasised the fundamental significance of the three-fold nature of modern nation-State conflict. Dominated by political and economic ties, military campaigns could only achieve significance in the context of a political program. In this sense, the ability to think in terms of purely military action merged with the general political and economic background.

As the 20th Century gave way to the 21st technology tended progressively too reduce the number of combatants and increased their mobility, communications, visibility, intelligence and weapons capability. The resources needed to support, equip and maintain these warriors however seemed to be drawn from ever deeper within the body of the nation-State. The civil and military distinction collapsed in the face of a broadening definition of decisiveness, where the focus shifted away from the military battlefield toward action aimed at destroying or neutralising the opposing nation-State's capacity to operate as a political entity.

As an epilogue, Continental Theory transitioned in the 20th Century into International Relations Theory, the focus on the nation-State as an actor reduced decision-making to a singular activity. That is, there was no actual focus on decision-making as a process. At the same time, however, the understanding of decision-making was generalised. In Clausewitzian terms it was seen as a form of interpretive discourse periodically subsumed by violent-action. While in Jominian terms it was viewed mechanistically. This distinctive factor at a methodological level separates Continental Theory from 'Fourth Generation Warfare' theorem's new focus on systemic and iterative decision-making[3], and sets the two paradigms at an impasse.

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[2] Earle, E. M. eds. (1943) *Makers of Modern Strategy*, Princeton.
[3] Defense and the National Interest features an extensive collection of articles on 4GW, including the paper that coined the term: http://www.d-n-i.net.

BOYD'S *OODA –LOOP*

Boyd's work in the 1970s and 1980s represents a paradigm transition between Continental Theory and technology driven thinking of more contemporary times. To properly understand Boyd's *OODA –Loop* it has to be realised that this model operates astride two contradicting frames of reference. Boyd articulated his decision-model in the context of an emerging global communications and information utilities infrastructure. Thus, Boyd was talking about a model for decision-making positioned within a symmetrical framework for strategy. At the same time, Boyd was able to realise that decision-making processes depended on varying sets of relationships that could sufficiently distort the strategic framework into an asymmetrical set of circumstances. It was from this perspective that Boyd's theory finds expression in the formula:

> 'The key to success in conflict is to operate inside the opponent's decision cycle, where advantages in observation and orientation enable a tempo in decision-making and execution that outpaces the ability of the foe to react effectively in time'.

Boyd's theory, on one level can be considered as a branch of discourse theory. Genealogically as well, it is consistent with the empirical tradition of Clausewitz' critical hermeneutics.

Boyd's theory deliberately transcends the orthodox epistemology of a hierarchy of tactics, operations and strategy. It is for these reasons that Boyd's theory argues Grey can apply to the operational, strategic and political levels of war, as well as to tactics for aerial dogfights[4]. Boyd's model presents decision-making as having a similarity of form, however, there are in reality crucial differences for Boyd between decision-making at the immediate level and decision-making at the level of strategy.

Boyd's decision model presents as a single act. However this is not entirely the case, as Boyd's model takes place at individual, organisational, societal and systems-technological levels. What is more, there are at any one time multiple - if not infinite occurrences of the *OODA –Loop* occurring relationally as coils of decision-loops, as well embedded in a hierarchy and often overlapping. As well, reversed or negative decision-loops can also play out within organisations and systems.

Boyd always looked at his *OODA –Loop* model in the context of his much broader identification of the patterns of conflict, he saw emergent historically. Boyd's strategy was based on the analytical distinction found in the experiential world of physical combat. For Boyd, there were two essential components: fire and movement. Boyd explained this distinction in historical terms,

> "although all warfare uses both fire and movement, these components provide the foundation for two distinct styles of warfare: an attrition style, based on firepower, and a maneuver style, based on movement"[5].

[4] Grey, C. (1999) *Modern Strategy*, Oxford: Oxford University Press, 91.
[5] United States of America Marine Corps. (1989) *Warfighting FMFM1*, Department of the Navy, Headquarters United States Marine Corps.

Boyd's concept carries with it the notion that, 'historically maneuver war is in some type of ascendance'. As a consequence, military forces have to reform both materially, as well as ideologically into the types of forces able to wage maneuver war. The important distinction however, between Boyd and the other *Manoeuvrist* strategists in the Classical Paradigm (Trotsky and Liddell-Hart), was that Boyd posited his concept on a duality – fire and movement - much in the same frame as Clausewitz' 'two pole strategy'. Both these ideas fundamentally express the view that warfare is driven by ideology – this is remarkably similar to Luttwak's thesis - that strategy is driven by a culturally based logic, or in other words strategy operates at the symbolic level of interpretation of action and its meaning.

NEW THEOREM OF 'FOURTH GENERATION WARFARE'

Boyd's decision-making *OODA –Loop* model at the immediate level underpins much of the application of 'Fourth Generation Warfare' theorem. Richards notes that the "term basically describes anyway of dealing with US military forces other than confronting them on the battlefield"[6]. Wyly defined 'Fourth Generation Warfare' as:

> "Fourth generation war is war between cultures. It defies the old boundaries of nation-State. It is war between special interest groups, races, and religions. It is war that seeks to avoid our military power and neutralize it by dividing us from within"[7].

The key argument for the emergence of this new war has been the US declaration of war on the Al Qaeda terrorist network. In terms of history, it is observed that this represents a conflict between 'a non-State globalisation phenomenon' and the US (a nation-State). Thus expressing a 'Fourth Generation Warfare' phenomenon. This concept identifies several areas of changed circumstances in the pattern of warfare, namely that nation-States are in conflict with non-national organisations and networks. This includes fundamentalist extremists, ethnic diaspora, criminal mafias and illegal traffickers. The key driver of 'Fourth Generation Warfare' is genealogically an evolution beyond guerrilla warfare, and the Leninist theory of insurrection. The key argument put forward by exponents of 'Fourth Generation Warfare' is that non-State protagonists have become more potent through utilisation of technology generally, greater global mobility, miniaturised instrumentalities, and use of the internet and mass communications. As well, the emergence of non-State actors historically sits in opposition to the nation-State, a feature of International Relations Theory since the *Treaty of Westphalia*.

Richards conceptually organises the theory of strategy and warfare along two forms of reference, firstly a progression of the 'styles of warfare' from a first to the current - fourth generation, as well as a broad distinction between symmetrical and asymmetrical strategic frameworks[8]. Within this conceptual framework there have been two levels of change. Broadly, warfare can be understood as a balance between the strategic and the tactical – defined in terms of a relationship between political (or symbolic interpretation) and material or technological

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[6] Richards, C.W. (May 2001) *A Swift, Elusive Sword: What if Sun Tzu and John Boyd Did a National Defense Review?* Prepared for the Center for Defense Information. 1779 Massachusetts Ave, NW, Washington, DC 20036-2109., see Backgrounder.

[7] Wyly, C.D. Colonel USMC (Ret), (March 1995) 'Forth Generation Warfare: What Does it Mean to Every Marine', in *Marine Corps Gazette*, Quantico, VA 22134.

[8] Richards, op. cit.

application. Throughout these processes – a progression of ideas (ie Continental Theory) have developed as methodologies for the analysis of the relationship between warfare and strategy.

Symmetrical strategy has tended to encompass the early limited linear wars, and the later nationalist and industrial based wars of the first to third generations, while asymmetrical strategy has tended to underpin the emergence of the fourth generation of wars – counter-insurgence, guerilla and the war against the Al Qaeda network. The employment of Information Age technology at the material level or war (in the fourth generation) has also lifted tactics into the realm of strategic action. It is in this context, that the new theorem of 'Fourth Generation Warfare' emerges. This theory encapsulates several diverse theorem with the essential object of speeding Boyd's decision cycle at the immediate level, while realising the strategic implications of action. Retranslating Boyd into terms that are applicable to the Information Age challenges the usefulness of many of Boyd's assumptions as these are tied to kinetic warfare. Thus, where as 'fire and movement' make sense in terms of what is called conventional 'kinetic' warfare, these ideas tend to have less application in the circumstances of the Information Age[9]. The real relevance of Boyd, however, is contained in the *OODA -loop* model.

Network Centric Warfare (NCW) is the most well developed high level warfare and strategic theory of the 'Fourth Generation Warfare' family of theorem. NCW is developed upon the basis of a strategic doctrine advocating attack and defence of centers of gravity, such as specific national command and control infrastructure, as well as communications and information utilities. Defining NCW Alberts and Garstka identify a,

> 'concept of operations that generates increased combat power by networking sensors, decision-makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronisation'[10].

At its core NCW has realised the global significance of the world communications utilities infrastructure that provides the conduct of warfare with access to high-quality information services.

The *Revolution in Military Affairs* (RMA) concept is not attempting to define the complete meaning of 'war' merely a particular dimension. Evans states that the "phase RMA more accurately describes a continuum of advances surrounding the advent of information technologies and their potential impact on advanced armed forces"[11]. Biddle, observes that three general types of technologies are represented, namely: the accelerated integration of computerisation into weapons systems and command-and-control networks (namely C4ISR); and long range precision strike, and use of stealth or low-observable platforms[12]. The primary object of these methods is to enabled the constricting, or allowed for the favorable distortion of the symmetrical/ asymmetrical strategic framework. In the US, the experience of rapid expansion of

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[9] Boyd's OODA loop model identifies the gathering, processing and exploiting information to gain an advantage. Whereas in kinetic warfare that advantage is manifested in manoeuvre to gain position and fire to inflict attrition.

[10] Alberts, D.S., J.J. Garstka, et. al. (1999) *Network Centric Warfare: Developing and leveraging Information Superiority*, C4ISR Cooperative Research Program, US Department of Defense.

[11] Evans, M. (August 2001) *Australia and the Revolution in Military Affairs*, Land Warfare Studies Centre Working Paper No. 115., 3.

[12] Biddle, S. (Autumn 1998) 'The Past as Prologue: Assessing Theories of Future Warfare', in *Security Studies*, vol. 8, no. 1, 1-74.

information technology has tended to constitute a revolution in military thinking. Richards describes the RMA mainly "as a US led phenomenon"[13]. This links the RMA into the NWC theories, and the suit of *Technology Specific Strategy* theories.

Frater and Ryan observe that 'the ultimate aim of NCW is that the employment of future precision-weapons is designed around information'[14]. The provision of nearly ubiquitous information services globally independent of nation-State enterprises puts combatants on an equal footing in terms of material conditions. Boyd himself posited that the physical circumstances of warfare – in this case framed by the global internet, the *Global Positioning System* - all contribute to a repositioning of military forces within a symmetrical strategic famework. The challenge for the use of military power, is achieving the ability to maneuver out – off this set of circumstances, and seek the advantage of asymmetric strategies. Identifying operational concepts that can help achieve this aim, are *Electronic and Information Battles*. In some circumstances, this relates to infrastructure attacks by special operations forces targeting command-and-control. The other branch of this concept, has been *Electronic Warfare*. The military utilisation of the electromagnetic sphere has a well-established history in warfare, and the current technological revolution in *Digitalization* has tended to merge *Electronic Warfare* with NCW[15].

Technology Specific Strategy primarily develops the 'Technological Strategy Paradigm' into distinct strategies a force can adopt/ support/ utilise in a future conflict. An important strategic sub-issue has been the development of architectural systems, platforms and force structures designed to support a range of operational concepts. One important principle of the Technological Strategy Paradigm has been an emphasis on the ability for rapid strategic adaptation to change. Murray and O'Leary observe that, "planners should think about transformation in terms of how best to combine new concepts in war with new technologies in order to extend capabilities rather than radically transform the armed forces as a whole"[16]. Akin to this point is the dual-proposition, that poor technological strategy (or none) can lead to force structuring choices which impose bounds or indeed prevent the execution of strategies or families of strategies. Murray and O'Leary argue that "in most cases, technology and platforms have been enablers that allow forces to maximise intangibles such as doctrine, training and leadership"[17].

Effectively, there is no single concept that underpins *Technology Specific Strategy*. The term relates to a collection or taxonomy of alternative but specific technologies implicitly linked to known strategic possibilities of particular weapons platforms – vehicular, aerial or afloat - or to operational application of technological techniques (for instance, employment of operational concepts like *Electronic and Information Battles*). The decision as to the employment of either of which is underpinned by *Escalation Theory*. Overarching this structure operates a highly developed doctrine of graduated response, which connects technology application to political strategies. An additional point about *Technology Specific Strategy*, is that highly specialised and complex mathematical, engineering and information technology frames of reference ground

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[13] Richards, op. cit.

[14] Frater, M. Ryan, M. (October 2001) *Communications Electronic Warfare and the Digitalised Battlefield*, Land Warfare Studies Centre: Working Paper No. 116, 16.

[15] Frater, op. cit., 22.

[16] Murray, W. O'Leary, T (Spring 2002) 'Military Transformation and Legacy Forces', in *Joint Force Quarterly (No. 30)*, Institute for National Strategic Studies: National Defense University, 27.

[17] Murray, op. cit., 21.

strategic possibilities (as well as the implications of the utilisation of particular weapons platforms).

Linearly and Simultaneous Actions

Betts makes the important distinction philosophically separating the Classical Paradigm from its modern relations, namely the view "that political decisions and military implementations should be discrete functions, sequential and independent"[18]. However, the main impact of Information Age thinking has been, Frater and Ryan obverse, the inter-linking of systems integration as,

> "the latest revolution – an information revolution centered on the concept that the dominant factor in war is the ability to collect, analyse, disseminate and act upon battlefield information"[19].

The *Systems Integration* approach embodies tactical communications as the linchpin of much of the thinking about *Simultaneous Actions* combining arrays of combat radios, vehicle intercoms and computer links into a single, seamless communications environment.

At a higher more abstract level there is *Complex Adaptive System Theory*, the application of which too military theory presents a new paradigm that 'assumes continuous change and dynamic interactions, rather than equilibrium as the norm'[20]. The *Complex Adaptive Systems* approach "more accurately reflects the dynamic and inter-dimensional nature of conflict"[21]. This is set up in opposition to the 'linear analytical systems nature of military thinking'[22]. Echevarria argues that the *Complex Adaptive System* approach enables 'military theory to accommodate – in particular with the aid of Information Age technologies "nearly simultaneous and continuous action"[23]. Frater and Ryan interconnect network thinking with the Informational Age paradigm observing, "in the Information Age, conflict will largely be about knowledge, and the mastery of the network and networked organsans will provide major advantage in conflict"[24]. These approaches challenge conventional strategic decision-making. Intuitively, this framework tends to accommodate Boyd's *OODA –Loop* model as oscillating between rational logic within the symmetrical strategic framework, and exploitation of irrational logic within the asymmetric strategic framework. Interestingly, the identification of non-linearity –*logic* (which is a requirement for chaotic behavior), can be related back into classical terms of Clausewitz' concept of 'friction in war'[25].

Underpinning all these notions is a basic belief in the relevance of Boyd's decision-making model. This, however, is not seen as a singular even but is repeated in an infinite

[18] Betts, R. K. (Autumn/ Winter 2001/ 2002) 'The Trouble with Strategy: Bridging Policy and Operations', in *Joint Force Quarterly (No. 29)*, Institute for National Strategic Studies: National Defense University, 24.
[19] Frater, op. cit., 9.
[20] Echevarria, A.J. (Spring 1997) 'Dynamic Inter-Dimensionality: A Revolution in Military Theory', in *Joint Force Quarterly (No. 15)*, Institute for National Strategic Studies: National Defense University, 34.
[21] Echevarria, op. cit., 34.
[22] Echevarria, op. cit., 33.
[23] Echevarria, op. cit., 33.
[24] Frater, op. cit., 10.
[25] Echevarria, op. cit., 33.

number, throughout complex systems – whether these are networks, organisations or nation-States. As well, metaphorically the application of systems ideas, chaos thinking or the use of fractals - explain infinite composites of parts and the interrelationship of these. The value of these theoretical perspectives rests in the ability to go further than International Relations Theory in the analysis of internal operations of entities (ie organisations or nation-States); rather than analysis pitched at the external actions of these as figurative 'game-players'. Thus, within this perspective large numbers highly complex equivalencies, transactions and relationships can be analysed as parts off – or wholes, rather than solely rely on heuristics explanations.

US TRANSFORMATION PARADIGM

The US *Transformation Paradigm* occupies the same conceptual space as the RMA, and the catch*all* concepts of 'Fourth Generation Warfare' theorem. In 2001, the *US Quadrennial Defense Report* annunciated officially the *Transformation Paradigm* aimed to reform US defence strategy[26]. The review focused on the "objective to shift the basis of defense planning from a 'threat-based' model that has dominated thinking in the past to a 'capabilities-based' model for the future"[27]. The transformation approach, was adopted due to recognition that the 'capabilities-based approach to planning would enabled the US to adapt its existing military capabilities and institutions to new circumstances, and extend asymmetric advantages well into the future'[28]. Richards in his review of the US military, identified the challenge:

'Elevated defense spending represents evidence of a failed paradigm, that "capability" and hence "security" are functions of how much money is pumped into them. If the US spends more, it must be getting more. The fact that this paradigm has failed is evident. To begin to answer the question of "What could be done to improve the Defense Department and its forces?" one must first ask, "What makes one force more effective than another?" Which immediately leads to the question of "Effective at what? What role should military forces play in furthering our national interests?" It does not take much imagination to see that differences in the answers one gives to this question will make large differences in the types of forces one buys and operates'[29].

Wolfowitz explaining transformation states, giving the example of the *US Army Stryker brigade*,

"So they're doing transformational experiments. They are using this new structure to look at innovations and how they organise and train and innovations in doctrine. And the truth is at the end of the day those are much more important for transformation than equipment decisions are. So in some sense one might argue it's more transformational, but that interim brigade by itself I don't think is going to be the transformational capability. I think it's going to be the test bed on which some of those ideas are developed, and by being on-line sooner it let you work with those ideas more quickly"[30].

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[26] United States: Department of Defense (September 30, 2001) *United States. Quadrennial Defense Review Report*.
[27] United States: Department of Defense , op. cit., IV.
[28] United States: Department of Defense , op. cit., IV.
[29] Richards, op. cit., 9-10.
[30] Wolfowitz, P. (Tuesday, June 18, 2002) *Deputy Secretary Wolfowitz Interview with Peter Boyer, New Yorker*. United States Department of Defense: News Transcript: On the web: http:// www.defenselink.mil/ news/ Jul2002/ t07022002_t0618ny.html

Wolfowitz calls the object of transformation the "objective force", namely:

> 'And one reason why I believe it's very important to accelerate the objective force is precisely because until you have some of these capabilities you really don't know how to maximize their potential, and that I think is the main justification is that having something you can actually work with and put your hands on and start having people develop doctrine for and think of careers for and so forth changes the most important thing which is the organisation, the doctrine, the culture'[31].

From a material perspective the US *Transformation Paradigm* is understood as resting on "four pillars"[32]. The four pillars of transformation are: strengthening joint operations; experimentation with new approaches to warfare; exploiting US intelligence advantages; and developing transformational capabilities through increased and wide-ranging science and technology; selective increases in procurement, and innovations in Defence processes[33]. The pillars as these are defined tend to "approximate the four elements of national power – political, socio-psychological, military, and economic" [34]. In similar terms, Krulak listed some of the key elements of US national power in an interview as: diplomatic, military, industrial might, the laboratories and the academic environment, and the information element[35].

Partly underpinning the US *Transformation Paradigm* has been a realisation that the RMA phenomenon sweeping the US military, is largely a result of the transition of the US into a high technology based society. The US having become a center of gravity, politically speaking of a globalised and utility networked world economy has tended to force a repositioning of the US military strategically. A clear recognition of this, is that "without transformation, the US military will not be prepared to meet emerging challenges"[36]. This transition, from a planning and thinking point of view is referred to as the "paradigm shift in force planning"[37]. This is defined as the need for the,

> "civilian and military leadership approaching force planning task acutely aware of the need to provide over time a richer set of military options across the operational spectrum than available today and to ensure that US forces have the means to adapt in time to surprise" [38].

A key component of the US *Transformation Paradigm* is that transformation is argued to,

> "result from the exploitation of new approaches to operational concepts and capabilities, the use of old and new technologies, and new forms of organisation that more effectively anticipate new or still emerging strategic and operational challenges and opportunities and that render pervious methods of conducting war obsolete or subordinate"[39].

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[31] Wolfowitz, op. cit.
[32] United States: Department of Defense, op. cit., 32.
[33] United States: Department of Defense, op. cit., 32.
[34] Echevarria, op. cit., 31.
[35] Krulak, C. (June 25, 1999) Semper Fidelis. Interview with Jim Lehrer, PBS News Hour. Downloaded 5 Nov 2002 from http://www.pbs.org/newshour/bb/military/jan-june99/krulak_6-25.html.
[36] United States: Department of Defense, op. cit., 6.
[37] United States: Department of Defense, op. cit., 17.
[38] United States: Department of Defense, op. cit., 17.
[39] United States: Department of Defense, op. cit., 16.

Richards notes, "US doctrine (needs to be) built around third and fourth generation warfare ideas"[40]. In a sense, this understanding is underpinned theoretically by Boyd's assertion that the US military must materially and intellectually transform itself from a firepower based force, into a maneuver force. Richards fundamentally links his review and those of the *Transformation Paradigm* to the ideas of Boyd[41]. For instance, Boyd's ideas of have played a fundamental role in US military thinking over the last decade, the most notable being the US Marine Corps 1989 doctrine manual - *Warfighting*[42]. As Richards' notes, "recently, officers primarily in the US Army and Marine Corps have completed detailed recommendations on how to change personnel management systems to foster Boyd's organisational climate"[43].

Fundamentally, the US *Transformation Paradigm* seeks to relate theory and practice into a consistent methodology for the transition of US military power from traditionally a firepower force into a maneuver force adaptable to the highly integrated and changing landscape of communications, transport and information utilities. The US *Transformation Paradigm* is set "at the heart of the new strategic approach"[44]. The central issue recognises that 'without change, the current defence program will only become more expensive to maintain over time, it will also forfeit many of the opportunities available to the US today'[45]. There is however, an important caveat on the US *Transformation Paradigm*, namely: "At the same time, it would be imprudent to transform the entire force all at once. A balance must be struck between the need to meet current threats while transforming the force overtime"[46].

TRANSFORMATION PARADIGM RELEVANCE FOR THE ADF

Translating the US *Transformation Paradigm* into terms applicable to Australian circumstances requires an adjustment in scale. The key issue, like that facing US thinking which underpins the *Transformation Paradigm* is recognition of the imperative to take advantage of major new directions or emergent technology. Australia's Defence White Paper in 2000 states this as fundamental strategic policy[47]:

> "More broadly, we have given close attention to the potential for revolutionary changes in the nature of warfare and the composition of armed forces flowing from current and prospective technological innovations".

Australia and the US share a similar definition of the *Transformation*. However, the key difference, in the US context, is that acknowledging the *Transformation* has fundamentally been about reducing duplication. In the Australian context, the adaptation of innovation is contained on the one hand by limited resources[48], and on the other by the need to minimise gaps in capability[49]. Australia's *Force 2020* identifies that *Transformation* is based on 'experimentation

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[40] Richards, op. cit., 7.
[41] Richards, op. cit., 9-10.
[42] United States of America Marine Corps., op. cit.
[43] Richards, op. cit., 5.
[44] United States: Department of Defense, op. cit., 29.
[45] United States: Department of Defense, op. cit., 16.
[46] United States: Department of Defense, op. cit., 16.
[47] Commonwealth of Australia (2000) *Defence 2000: Our Future Defence Force*, Defence Publishing Service, 56.
[48] Department of Defence (June 2002) *Force 2020*. National Capital Printing, 6.
[49] Department of Defence, op. cit., 17.

and simulation'[50]. In the Australian context, *Transformation* is focused on people culturally and intellectually overcoming organisational inertia, and embracing bold and innovative ways of operating[51]. Another important aspect of *Transformation* is that it is seen as an 'action' (very similar to the US conception) in the sense that the responsibility to transform the ADF from conceptual vision into reality is 'up to each and every defence member'[52].

The Australian and US visions of *Transformation* both place high importance on experimentation. In the Australian context, experimentation is underpinned by an "Effects-Based Approach to Operations" (EBO)[53]. Similarly, in the US context, experimentation relies on 'experimental units that organise and train with innovations', using an EBO –*based* methodology. In both cases, however, the object is to 'capitalise on the opportunities offered by technological advances'[54]. Broadly, the emphasis on experimentation in the US is the same as in Australia, namely – the key impact of innovation is on doctrine, being seen in the US context (as well as the Australian) as much more important for *Transformation* than equipment decisions. As well, in both the Australian and US contexts the importance of people's 'aptitude for technological innovation' is recognised'[55].

Australian's *Force 2020* emphasises Network-Enabled Operations, as a means to introduce the relevance of NCW concepts. In the US context, the tendency has been to link (within the US *Transformation Paradigm*) application of NCW concepts and the RMA. This has given US formulations of NCW concepts more RMA –*type* characteristics. However, in both the US, and Australia a technological –*based* approach to NCW is emphasised as important. Thus, both Australian *Transformation* –concepts and the US *Transformation Paradigm* place a high level of emphasis on the application of core NCW concepts: connectivity, bandwidth, fast-decision and agility. The only major difference, is that the Australian view of NCW developed by the authors of *Force 2020* tends to preserve some of the more classical concepts about maneuver –*based* operations[56].

The notion of history used in the US *Transformation Paradigm* is more theoretical. US thinking is underscored by a highly conceptual approach derived from Boyd's patterns of conflict model. Comparatively, Australia's *Force 2020* emphasises the importance 'of building on the past success and tradition'[57]. The view of history taken by the authors of *Force 2020*, is based on a much more factual (or empirical) description of key historical factors – which have been identified as important in Australia's military heritage. Golderick, makes the same point in respect to military history that historians need 'improved historiography, through technical mastery of the subject, and equally sophisticated methodologies that can grapple with a broad range of complex detail'[58]. On a broader level, the thinking in Australia tends to favor an International Relations based theorem for explicating the use of military power[59]. As well, much of the thinking is derived from a conception of an enduring geo-political and geographical

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[50] Department of Defence, op. cit., 25.
[51] Department of Defence, op. cit., 25.
[52] Department of Defence, op. cit., 25.
[53] Department of Defence, op. cit., 22.
[54] Department of Defence, op. cit., 11.
[55] Department of Defence, op. cit., 11.
[56] Department of Defence, op. cit., 19.
[57] Department of Defence, op. cit., 5.
[58] Goldrick, J (1995) 'The Problems of Modern Naval History', in Hattendorf, J.B. *Doing Naval History: Essays Toward Improvement*, Naval War College Press, Newport: Rhode Island, 11, 23.
[59] Commonwealth, op. cit., VIII.

environment[60]. Added to this, is an emphasis on jurisprudential limitations – in particular the 'defence of Australia is considered the fundamental role of the Government'[61].

Australian thinking about change is moderated with the need to sustain the existing pace of technical and doctrine evolution within it's military forces. This selective approach, is advocated because Australian governments have successively faced the strategic problem of devising an effective defence strategy limited by geography, population and infrastructure distribution. Thus the, "Australian situation, in the end, is and will remain unique, ... encompasses some 10 percent of the earth's surface - and the lack of resources, both of people and money"[62].

Australia's material constraints present a unique problem for contending with change. Baker summed up Australia's strategic situation as "a mismatch between our ability to change and the pace of events in the world around us"[63]. Australia's perceived material and resource limitations have given latitude to a largely conservative methodology managing change. Comparatively, while Australian thinking can be broadly called 'a transformation -*based* strategy', it differs from the US paradigm in its recognition of the need to preserve a conservative balance in the ADF. Identifying key differences between Australian thinking and the US *Transformation Paradigm* are twofold. Firstly, there is the material difference in scale. Secondly, there is a different methodological emphasis.

In Australian strategy, this is expressed as the "middle way response to RMA"[64]. This perspective justifies selecting and adopting technologies that give an edge strategically to Australia. Thus, in Australian terms the conceptual understanding of military strategy is largely supported by definitions couched in terms of the material components operationally applied. Evans identifies that sustaining Australian thinking about change is "preference and process" approach[65]. To explain this point, Evans frames his analysis in the context of Black[66], the core of this argument is:

> "The RMA incorporates both a political preference for minimum risk warfare and a technological quest for continued military potency"[67].

Australian thinking choosing new technology to enhance defence capability tends to accept the premise of a dynamic link between technology and its operational application; however, the

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[60] Commonwealth, op. cit., X. This has been a long term view in Australian strategy. For instance Australia's Regional Security, Ministerial Statement by Senator the Hon. Gareth Evans QC, Minister for Foreign Affairs and Trade, December 1989, at paragraphs: '2. … the protection of Australia's security … must be maintaining its physical integrity and sovereignty'; and, at: '3. The first duty of any Australian Government is the protection of our physical integrity, i.e. the protection of our territory, including our maritime territory, from armed attack or threat of armed attack … [sovereignty is recognised as a broader concept than physical integrity] … but … for a country like Australia, it is difficult to imagine our sovereignty being put at risk except in the context of a serious threat to our physical integrity'.

[61] Commonwealth, op. cit., 29.

[62] Stevens, D., ed. (1997) *In Search of a Maritime Strategy: The Maritime Element in Australian Defence Planning since 1901,* Canberra: Strategic and Defence Studies Centre, The Australian National University.

[63] Baker, J.S. (Nov/Dec 1998) *Supporting Australian Defence*, The Australian Academy of Technology Science and Engineering Focus, No. 104.

[64] Evans, op. cit., 24.

[65] Evans, op. cit., 5.

[66] Black, J. (2000) *War: Past, Present & Future*, Sutton Publishing, Phoenix Mill, Gloucestershire.

[67] Evans, op. cit., 4.

former tends to be seen as an applied requirement of the latter. This notion conservatively bounds the level of utilisation of technologies at the ADF's disposal. Black proposes a more revolutionary process, as Evans' concludes, namely:

> 'From a historical perspective, the contemporary RMA is best seen as a blend of political preference as well as a technological process adapting to uneven, but continuous military transformation under rapid changing post-industrial and post-Cold War political conditions'[68].

Black proposes a radical interpretation of history. This same line of thinking continues through Boyd and into the US *Transformation Paradigm*, where it has been realised that the 'new' circumstances of the Information Age economy realised new abilities of military power.

The Australian and US concepts of *Transformation* accept that military forces have been transforming through out the recent past. Two key elements can be identified here; firstly Murray and O'Leary observe that:

> "To point at a date when transformation of a force will be complete is to miss reality, for by that time a host of factors will have changed – the strategic environment, technologies, defense budgets, and concepts that underlie peacetime preparations for wars. Transformations occurs in human organisations on an ongoing basis"[69]

Secondly, McCaffrey argues underpinning the success of US forces in the *Persian Gulf War* (1991) had been its ongoing transformation following the lessons for the Vietnam War[70]. McCaffrey, like Murray and O'Leary, observes that US forces have not been static in their development, but have been shaped and reinvented by a revolution in miliary affairs relating to personnel, equipment, doctrine and training[71]. Thus, annunciation of the US *Transformation Paradigm* tends to reflect recognition of historical process and the need to fight organisational and cultural conservatism. Importantly, the *Transformation* in many respects captures Clausewitz' concept of *Criticism*. In Clausewitz' view military thinking had the tendency to be trapped into conforming with practice, as opposed to actually seeking to meet changing circumstances with new solutions. Thus, he wrote:

> What is more natural than that the War of the French Revolution had its own way of doing things? … The evil is only that such a manner originating in a special case easily outlives itself, because it continues whilst circumstances imperceptibly change. This is what theory should prevent by lucid and rational criticism.[72]

Knowledge Edge

Evans identifies that Australia's pursuit of technology tends to focus on the notion of achieving a *Knowledge Edge*[73]. Evans clarifies the *Knowledge Edge* "as a philosophy involving

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[68] Evans, op. cit., 5.
[69] Murray, op. cit., 20.
[70] McCaffery, B.R. (Winter 2000-01) 'Lessons of Desert Strom', in *Joint Force Quarterly (No. 30)*, Institute for National Strategic Studies: National Defense University, 12.
[71] McCaffery, op. cit., 13, 17.
[72] Clausewitz, Carl Von, (1976) *On War*, translated and edited by Howard, M. Paret, P. Princeton, Chapter 4. Or see Clausewitz, Carl Von, *On War*, (1968) edited by Rapoport, A. Penguin, Chapter 4.
[73] Evans, op. cit., 23.

the rapid dissemination of real-time surveillance and targeting data as the most realistic outcome likely to emerge from RMA technologies over the next two decades"[74]. Defining the *Knowledge Edge* is however complicated by terminology. The concept is broadly underpinned by a focus on use of Information Age technology, which Evans equates with tactical and operational application.

Burke in the Australian context, proposed to extend the *Knowledge Edge* concept through his notion of *Thought Systems*[75]. Based on the observation that 'knowledge superiority' (read as *Knowledge Edge –Dominance*) explicitly stresses the importance of the role of humans as necessary to make sense of the information in defence systems. Burke's concept in many respects has a theoretical relationship with Boyd's emphasis on people as the defining factor in warfare. Richard explains this in the following terms:

> "Not that weapons are not important, but his [Boyd] study had shown that time and again, the smaller or less technologically advanced force could win, whereas there are relatively few instances where technology or size alone was able to overcome deficiencies in people or ideas. Thus Boyd would insist on "People, ideas, and hardware – *in that order!*"[76].

Malone observes that the concept referred to, as *Knowledge Operations* (or *Knowledge Warfare*) could also include activities, which are currently encompassed within more conventional understandings of Information Operations (IO)[77]. However, Malone argues the concept extends:

> 'Well beyond the concept of IO as it is presently understood within the ADF and elsewhere. In particular, it implies a far closer functional relationship between the operational conduct of IO-related activities and the development and maintenance of capability, in particular the human dimension of capability'[78].

In the Australian context, the concept of *Knowledge Operations* poses an approach to bridging the 'interpretation' and 'action' aspects of Boyd's model. Other approaches in the Australian context, established as a theoretical means of resolution have been utilisation of 'Rules of Engagement'. In which case, legal rules are utilised as a mechanism for translating objectively the political agenda, into the use of military power both tactically, and operationally[79].

EQUIVALENCE AND TRANSACTIONALISM:

THEORIES OF THE RELATIONSHIPS BETWEEN STRATEGY AND ACTION

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[74] Evans, op. cit., 23.
[75] Burke, M. (July 2000) *Information Superiority, Network Centric Warfare and the Knowledge Edge* (DSTO-TR-0997), Department of Defence: Defence Science and Technology Organisation: Electronics and Surveillance Research Laboratory, 2.
[76] Richards, op. cit., 27.
[77] Malone, J. (August 2002) 'Introduction to IO in Australian Defence Force', draft chapter for *Information Operations: The Hard Reality of Soft Power*, Washington D.C.: Brasseys (to be published Jun 03).
[78] Malone, op. cit.
[79] Flaherty, C. (January/ February 1997) *Law as a Factor in Australian Special Forces Strategy,* Defence Force Journal, No. 122., 27-33.

Conceptually, Boyd's model at the immediate level (the tactical and operational) can be enabled by technology – which can be understood by applying 'Fourth Generation War theorem'. The supra level of decision-making in Boyd's model operates more on the human level, which is symbolic and discourse-*based*. The theory constructs underpinning these nations are found in the corpus of International Relations Theory, and the reinterpretation of the Classical Paradigm.

Clausewitz' concept of war is that it is a procedure for the resolution of disputes between countries[80]. Underpinning this, it is an essential requirement that nation-States agree on military objectives, which serve as symbolic or equivalent of the political conflict – namely, a town, or territory gains metaphorically political significance. *Equivalence* theory was left ill defined by Clausewitz, however it was later developed by Delbruck, who introduced the concept of *waging war on the opponent's home front*. In the 20th Century mass and global communications gave truly practical application to *Equivalence* theory, in terms of realising the possibility of coordinating military force within a political program. The new media technology enabled aggressor governments to enter the domestic politics of neighboring nation-States in an unprecedented way, with devastating propaganda campaigns. These weaken the resolve and rendered impotent the military capacity to resist.

In the modern context of the Information Age the relevance of *Equivalence* theory can be challenged as it more relates to human-to-human relations. The significance of this point is that, strategy and warfare thinking in the Information Age has to inter-link technology, military and political strategies – however, these due to the overlapping nature of each, tend to be hard to relate. Betts conceptualises this problem by arguing:

> "Think of strategy as the bridge between policy and operations. A bridge allows elements of either side to move to the other. As a plan that bridges the realms of policy and operations, effective strategy must integrate political and military criteria rather than separate them"[81].

The basis of 'Fourth Generation Warfare' theorem has been to mobilise in terms of *Technology Specific Strategy* mathematical concepts to adequately explain technological processes. The theory called *Transactionalism* presents a more relevant means to draw relationships where there is a human-to-technology interface – found in the circumstances of NCW. The fundamental distinction between *Equivalence* –relationships in strategy and *Transactional* –relationships is,

- *Equivalence* –relationships in strategy are represented as approximate values; while

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[80] Smith, H. (January 1990) 'The Womb of War: Clausewitz and International Politics', in *Review of International Studies*, Vol. 16, No. 1, Smith observed Clausewitz believed war offers a procedure for the resolution of disputes that cannot be settled by peaceful means. The essential requirement of the procedure is that states agree on a military objective which will serve as a symbol or 'equivalent' [*Äquivalent*] of the political conflict. Both sides must therefore agree that the outcome of a clash of arms will carry certain consequences for the political relationship between them. Here the idea is not so much that victory in war carries its own power of enforcement but that states agree to accept the verdict made manifest in a clash of arms. In some wars the military goal may be identical to the political; Clausewitz gives the example of a war for the control of a province. In other cases where the stakes are relatively small the outcome of a single battle or even the threat of a battle may be accepted as decisive by sides. In major wars numerous battles, even a war of peoples, may be necessary before one side acknowledges defeat. But this will normally be before the point of total exhaustion. It is the equivalent of the boxer or his seconds throwing in the towel before being knocked unconscious.
[81] Betts, op. cit.

- *Transactional* –relationships represent a direct exchange in kind or value between one part/ entity and another.

Broadly applying a *Transactional* based argument to explain human-to-technology links Kopp interlocks technological strategies in parallel with military and political strategies through the adaptation of the hypergame model. Thus, strategy in Kopp's view is reducible to a complex decision algorithm, which in the context of *Information Warfare* "models the fundamental paradigm"[82]. In Kopp's view, it follows logically that most strategies can be mapped into canonical forms[83]. This argument however presumes the 'tools' which are the troops, weapons, and nation (people) are able to translate the player's intentions into actions (that the players' want). Kopp's 'tools' concept effectively recasts Earle's observations, that central to the Classical Paradigm is reduction of the elements of combat into automatons[84].

In relation to Boyd, Kopp describes the applicability of hypergame paradigms as:

"this model can be related to the well established Boyd *Observation-Orientation-Decision-Action* Loop model insofar as a player's perception of the game is the outcome of the *Observation-Orientation* phases of the loop, and the *Decision-Action* phases of the loop reflect the choices made by the player, based upon the player's perception of the game and what constitutes the best choice to make"[85].

Thus, according to Kopp the ability of a player to perform the 'Orientation-Decision phases' in Boyd's model is inherently tied to the algorithm the player applies'. Kopp argues, however each player for cultural reasons will interpret phenomenon differently. That is, players are each likely to draw entirely different conclusions about what 'Action phase' to execute[86]. For Kopp, if there is subjectively on the player's part – this is explicable in canonical terms[87]. That is, players use strategies/algorithms as models to orient themselves and make decisions[88]. The game is thus one of identifying the opponent's algorithm, while denying identification of one's own algorithm. Kopp, further argues

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[82] Kopp, C. (28 - 29, November 2002) *Shannon, Hypergames and Information Warfare*, SCSSE, Monash University. Paper presented at the 3rd Australian Information Warfare and Security Conference, Perth: Western Australia, 6.

[83] Kopp, op. cit., 9.

[84] Earle, E. M. (ed.) (1943) *Makers of Modern Strategy*, Chapter 3, 'Frederick the Great Guilbert, Bülow: From Dynastic to National War'. The author notes: 'Frederick insisted on exact discipline … Prussia was famous for its drillfields … The aim was to achieve tactical mobility, skill in shifting from marching order to battle order, steadiness under fire, complete responsiveness to command. Any army so trained, Frederick repeatedly said, allowed full scope to the art of generalship. The commander could form his conceptions in the knowledge that they would be realised. With all else shaped to his hand, his presiding intelligence would be free'. Eighteenth century absolutism realised the conception of nation-States as being like billiard balls—that collide in the field of international relations. Key to the realist conception is the view that in conflict nation-States have uniform policy positions. In the 18th century the conception of strategy and international relations was one largely referenced to the individual personalities of ruling monarchs. The end of 18th century absolutism and the emergence of a new political pluralism with the French Revolution created circumstances for the broader conceptions as to war between nation-States. These new concepts recognised that the relative political positions of nation-States were equally prone to self-contradiction. This later view gave rise to Delbruck and his political strategy.

[85] Kopp, op. cit., 7.

[86] Kopp, op. cit., 6.

[87] Kopp, op. cit., 6.

[88] Kopp, op. cit., 6.

"Hypergames are games in which the respective adversaries (players) may not be fully aware of the nature of the engagement that are participating in, or indeed that they are actually participating in an engagement"[89].

The hypergame model sees strategy and operations as theoretically operating in similar terms, whether we consider human-to-human interactions or human-to-technology interactions. For example, Kopp reinforces this point by demonstrating that "nature is clearly abundant in instances where canonical strategies of Information Warfare have evolved as survival aids"[90]. The close parallel with technological issues is made more plausible when consideration is given to *Rational Deterrence* theory[91], where the basic frame for decision-making can be expressed mathematically[92]. The value of transactional approaches is gained in the utility of thinking in terms of application-relationships. For instance, Kopp argues that approaches such as modeling 'canonical strategies', simulates transactional relationships between opponents' in strategic games[93].

Richards, notes that Boyd placed importance 'at the individual level"[94] As well, that intuitive competence applied at the command levels'. This, Richards describes as:

"The 'feel' great commanders have for the progress of the battle, and in particular to their seemingly uncanny abilities to detect and exploit openings while they still present opportunities comes from years of practice at ever increasing levels of complexity. The Germans called it *fingerspitzengefühl*, literally 'finger tip feeling' and it implies such a high level of competence that decisions can be made without hesitation. Perhaps similar to the Zen notion of action without a sticking mind"[95].

The 'intuition' aspects of strategy are still relevant. Boyd, explains that human-to-human transactions are underpinned by each person's ability at intuitive understanding[96]. Echevarria notes that, "paradoxically, a flood of real or near-real time information puts greater demands on intelligence gatherers and decision-makers alike, forcing them to rely more on their intuition and Clausewitzian *coup d'oeil* than ever before"[97]. Explaining the concept of the intuitive aspects of the *Transactionalism* construct, Chris Boyd writing from a contemporary psychology approach, observes

"One might even go so far as to agree that in everyday life we learn more, and more truly, through intuition than we do through verbalized observations and logic. We are tempted to be proud of verbalizations, but it is possible that in many of our most important judgments the small and fragile voice of intuition is a more reliable guide.... Verbal processes are additive, while intuitive processes are integrative - It appears that the most important judgments which human beings make concerning each other are the products

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[89] Kopp, op. cit., 9.
[90] Kopp, C., Mills, B. (28 - 29, November 2002) *Information Warfare and Evolution*, SCSSE, Monash University. IIMS, Massey University. Co-authored Paper presented at the 3rd Australian Information Warfare and Security Conference, Perth: Western Australia, 8.
[91] Harvey, op. cit., 25.
[92] Harvey, op. cit., 61.
[93] Kopp, op. cit., 10.
[94] Richards, op. cit., 27.
[95] Richards, op. cit., 27.
[96] Boyd, C., (January 28, 1999) 'Science and TA', *Transactional Analysis Journal Internet*, Vol. 2, 1999.
[97] Echevarria, op. cit., 30.

of preverbal processes - cognition without insight - which function almost automatically below the level of consciousness "[98].

Introducing the notion of human intuition can be problematic in relation to mathematical based approaches to strategy. The problem is also fundamentally one of trying to relate - object (technology) to thinking – as Richards observes: "In 'Conceptual Spiral', Boyd concluded that the *OODA –loop* could be applied to technology as well as to strategy and tactics. The process of developing, testing, and using technology is iterative, and the process of iterating must move through the people and doctrine elements"[99].

In the context of Information Age asymmetries, however, Evans notes that a "defining characteristic of coherent strategic analysis lies in exploring the relationship between the empirical and the hypothetical – particularly when research is focused on the crucial task of integrating policy with operations, systems and technology"[100]. For Evans the solution rests, similar to Burke[101] in the creation of "knowledge officers"[102]. These intermediaries act *Janus* – like, as the point of connection between the human-to-human and human-to-technology networks. Presumably, these intermediaries would transact and translate human-to-human, and human-to-technology. In Evans words, these individuals would "help reinforce the linkages between the worlds of policy, military theory and operational practice"[103].

A key philosophical issue that needs to be considered – to resolve the modelling of the relationship between strategy and operational actions – is the fact, that the capacity of technology to speed the operation of Boyd's loop is possibly beyond human comprehension. Thus, the theory of strategy needs to set up a methodology, which from the perspective of Evans should 'emphasis the continuing dominance of the concepts of friction and uncertainly in war'[104]. However, this is only part of the problem, and one is reminded of Earle's epilogue to 1943, when he observed that:

> "Hitler's opponents in the field and in the chancelleries of Europe were still thinking, until the fall of France, in terms of the 17th century, when politics and war, strategy and tactics, could in some measure be put into separate categories. But in our day politics and strategy have become inseparable"[105].

In this paragraph, Earle took the opportunity to take stock of the major theories that dominate strategic thinking. In the field of strategic thinking, the issues are always the same. The academic interest lies in investigating the role of military power in political life. For the practitioner, the problem is to reconcile the tension between the politician holding the general to the political aims and objectives of the government, and the claim that policy should be subservient to the conduct of operations. However, since 1945, technology appears to have dethroned strategy. The means of waging war have outstripped the objectives war can achieve. To put it simply, in the

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[98] Boyd (January 28, 1999), op. cit.
[99] Richards, op. cit., 33.
[100] Evans, op. cit., 51.
[101] Burke, M. (July 2000) *Thinking Together: New Forms of Thought Systems for a Revolution in Military Affairs* (DSTO-RR-0173), Department of Defence: Defence Science and Technology Organisation: Electronics and Surveillance Research Laboratory.
[102] Evans, op. cit., 52.
[103] Evans, op. cit., 52.
[104] Evans, op. cit., 52.
[105] Earle, E. M.(ed.) (1943) *Makers of Modern Strategy*, Introduction.

post-nuclear era, there is no correlation between means and ends. The Gulf War in 1991 proved that conventional weapons could be as lethal and destructive as nuclear ones. Thus, a war involving nuclear and/or conventional weapons might begin as a political act but its course would probably destroy the political identity of the nation-States that waged it. While in the Information Age, the problem is even greater – as the entire planet shares the same technology, which ironically makes NCW possible.

CONCLUSION

Comparisons between Australia and the US tend to reflect the perception that there are many things which only the US seems able to achieve under the RMA, due to the US military's mass, scale, and size factors. However, Australian thinking while more conservative never the less seeks the same *Transformation* advantages While Australian thinking adopts a more conservative approach, theoretically where Australian strategy can benefit from 'Fourth Generation Warfare' theorem is in the utilisation of Transactionalism. Application of the key tenets of the NCW model favours a manoeuvrer force over a firepower force. Thus, the US's perceived materiel advantages may, however not be truly relevant. Numbers/ scale/ mass becomes less important in term of considering issues such as connectivity, bandwidth, fast-decision and agility. In effect, the bottom *-line* is set by Boyd's argument - if a protagonist intellectually defeats his opponent across the three domains of interest - political, military, and technological - that protagonist will achieve decisiveness over their opponent. Thus, in relative terms it would be no less easy or difficult for Australia to produce its own *Objective Force,* equivalent to that of the US.