
Centre of Gravity Analysis in Joint Military Planning and Design: Implications and Recommendations for the Australian Defence Force

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This article provides an overview for Australian Defence Force (ADF) planners on the use of centre of gravity analysis for joint military planning in an era in which traditional operational art has been joined by notions of operational design. It examines the dominant role that the centre of gravity has played in the development of Western joint planning doctrine since the 1990s. The article then assesses the impact of the contemporary debate in the United States between traditionalists, complex systems advocates and integrationists concerning the centre of gravity's status in the military art. The article goes on to analyse the influence of the integrationists in transforming the centre of gravity into an 'element of design' in recent American joint planning doctrine. The article considers the implications for the ADF of the evolving relationship in military theory between the centre of gravity, complex systems science and operational design. Finally, four recommendations are made on how the ADF might use a combination of centre of gravity analysis and operational design to improve its future joint planning doctrine.

The importance of centre of gravity analysis in Australian Defence Force (ADF) joint planning is captured in doctrine by the statement that:

the essence of operational art lies in being able to produce the right combination of effects in time and space, and purpose to neutralise, weaken, defeat or destroy an enemy's centre of gravity.¹

By disrupting or dislocating the enemy's centre of gravity, commanders ensure that all military effort contributes "to achieving the objective and end-state whether that is tactical, operational or strategic".² In ADF operational art, the four-step Joint Military Appreciation Process (JMAP) used by the ADF defines a centre of gravity as:

A characteristic, capability or locality from which a military force, nation, alliance or other grouping derives its freedom of action, strength or will to fight. Note: A centre of gravity consists of a number of critical factors.³

The current Australian concept of a centre of gravity helps military planners define a relationship between *ends* (strategic objectives), *ways* (operational

¹ Draft Australian Defence Doctrine Publication (ADDP) 5.0, *Joint Planning*, Edition 2 (Canberra: Department of Defence, June 2009), p. 4-7.

² *Ibid.*, pp. 5.0, 3-10.

³ Australian Defence Force Publication (ADFP) 5.0.1, *Joint Military Appreciation Process* (Canberra: Department of Defence, April 2009), p. 4-7.

concepts), *means* (available resources) and *risk* (likely cost) in military activity. The construct also facilitates a course of action analysis that culminates in the development of a concept of operations for use in the field.

Yet despite its doctrinal eminence, the centre of gravity, drawn from Carl von Clausewitz's *On War*, remains controversial as a practical tool of operational planning and has become a subject of theoretical dispute amongst Australian military theorists.⁴ Many ADF officers would agree with the American analyst, John Saxman, who wrote in 1992, "the term center of gravity means something to everyone, but not the same to anyone".⁵ Twenty years on and in given the rise of operational design in Western military doctrine, centre of gravity analysis has, if anything, become more, not less, controversial. Indeed, the evolution of design has served to exacerbate the central question about 'COG analysis': can a nineteenth century approach to warfare be applied beyond large-scale conventional military operations to embrace twenty-first century irregular conflicts with all their attendant civil-military complexities?

This article is an attempt to try to make the centre of gravity 'clearer to everyone'. Its aim is to try to assist today's ADF planners to grasp how the construct has evolved and, to explore its present and future significance against a background of operational design theories drawn from the world of complex systems science. Four areas are analysed. First, a snapshot of the centre of gravity concept as formulated by Carl von Clausewitz in his book, *On War* is presented, with consideration given to its subsequent interpretation by contemporary Western military theorists. Second, the way in which centre of gravity analysis as a methodology for operational planning has evolved—particularly in American military theory—is explored briefly. A focus on American military doctrine is important because much of the ADF's baseline thinking on campaigning is drawn from the US armed forces. Third, the future of centre of gravity analysis is considered against the background of conflicts where there has been an intermingling of military and civil elements and a consequent broadening of operational art to encompass the methodology of operational design. Finally, the doctrinal implications for centre of gravity analysis for the ADF in an era of operational design are analysed. Several recommendations are made that may assist Australian military practitioners to use the construct more effectively for future joint campaign planning.

⁴ See Trent Scott, *The Lost Operational Art: Invigorating Campaigning into the Australian Defence Force*, Study Paper No. 319 (Canberra: Land Warfare Studies Centre, 2011); C. R. Smith, *Design and Planning of Campaigns and Operations in the Twenty-First Century*, Study Paper No. 320 (Canberra: Land Warfare Studies Centre, 2011).

⁵ John Saxman, *The Concept of Center of Gravity: Does it Have Utility in Joint Doctrine and Campaign Planning?* (Fort Leavenworth, KS: School of Advanced Military Studies, US Command and General Staff College, 1992), p. 4.

Interpreting the Centre of Gravity

The concept of the centre of gravity is derived from Clausewitz's notion in *On War* that, in every military encounter between adversaries, there emerges a unity and cohesion which if attacked causes a loss of overall balance. Clausewitz derived the idea of the centre of gravity from nineteenth century physics and he believed that it was the key factor in military planning. As the Prussian thinker writes "the first task in military planning for a war is to identify the enemy's centers of gravity, and if possible, trace them back to a single one".⁶ In Book Six of *On War*, Clausewitz notes:

Where there is cohesion the analogy of a center of gravity can be applied. Thus, those forces will possess certain centers of gravity, which by their movement and direction govern the rest and those centres are found wherever the forces are most concentrated.⁷

Clausewitz believed that the idea of a cohesion which, if dislocated or destroyed, unhinged a military force was an enduring feature of the history of war. He attempted to codify the phenomenon in the context of the complexity of armed conflict. In Book Eight, he observes:

One must keep the dominant characteristics of both belligerents in mind. Out of these a certain center of gravity develops the hub of all power and movement on which everything depends. *This is the point against which all our energies should be directed.*⁸

It is important to note that, although Clausewitz's language may suggest a linear approach to war, the appearance is deceptive. As Alan Beyerchen demonstrated almost two decades ago, Clausewitz's methodological approach in *On War* is not that of a Euclidean thinker but that of a non-linear theorist writing at the time of the German Romantic Counter-Enlightenment.⁹ Beyerchen notes, "*On War* is suffused with the understanding that every war is inherently a nonlinear phenomenon, the conduct of which changes its character in ways that cannot be analytically predicted".¹⁰ For Clausewitz, military action is an unpredictable collision of living forces decisively shaped by politics—in which infinite variables merge and interact—so making war "more than a true chameleon". Interactivity in war is pervasive and "circumstances vary so enormously in war, and are so indefinable, that a vast array of factors has to be appreciated—mostly in the light of probabilities alone".¹¹

⁶ Carl von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), p. 619.

⁷ *Ibid.*, pp. 485-6.

⁸ *Ibid.*, pp. 595-6. Emphasis added.

⁹ Alan Beyerchen, 'Clausewitz, Nonlinearity, and the Unpredictability of War', *International Security*, vol. 17, no. 3 (Winter 1992/93), pp. 59-90.

¹⁰ *Ibid.*, pp. 61, 87.

¹¹ Clausewitz, *On War*, pp. 89, 112.

In Beyerchen's view, the centre of gravity masquerades as "the best-known and most popular of the linearities identified by Clausewitz", when it is really a nonlinear phenomenon reflecting politico-military interaction.¹² Thus, in *On War*, Clausewitz distinguishes between different types of centres of gravity. In Book Six of *On War*, he identifies what can be described as an 'operational' centre of gravity in the form of an enemy army. As he puts it, a centre of gravity in the field "is always found where the mass is concentrated most densely [the enemy army]. It presents the most effective target for a blow".¹³ Yet, in Book Eight, Clausewitz broadens his analysis of war to suggest that, depending on the political character of the armed struggle one confronts, there may in fact be several centres of gravity that are likely to be strategically located. Such strategic centres may both transcend, and withstand, the trial of operational battle between contending armies. Thus, centres of gravity differ according to their political context:

In countries subject to domestic strife, the center of gravity is generally *the capital*; in small states supported by a more powerful one, it lies in *the army of the stronger state*. Among alliances it lies in the *community of interest* and in popular uprisings it is the *personalities of the leaders and of public opinion*. It is against these that our energies should be directed.¹⁴

At no point in *On War*, does Clausewitz provide a prescriptive methodology for how best to determine centres of gravity in war. He believed that, in the conduct of war, it is impossible for operational variables to be isolated from strategic and political parameters. As Clausewitz puts it:

[we wish] to reiterate emphatically that here, as elsewhere, our definitions are aimed only at the centers of certain concepts; we neither wish [to] nor can give them sharp outlines.¹⁵

The result is, as Beyerchen suggests, that "even this most Newtonian-sounding analogy of a 'center of gravity' becomes swamped in qualifications and caveats intended to convey the complexity of real war".¹⁶

A major consequence of Clausewitz's preference for theoretical description over analytical prescription is that contemporary Western military theorists differ widely in the manner in which they interpret the centre of gravity. There are divisions as to whether the construct refers to linear or nonlinear warfare; whether it is concerned with capabilities or effects; and whether it can be used effectively in an age of information networks. As British scholar, Stuart Kinross, notes:

There is no consensus [in the Western profession of arms] as to whether the centre of gravity is a source of strength or a source of vulnerability; nor

¹² Beyerchen, 'Clausewitz, Nonlinearity, and the Unpredictability of War', p. 84.

¹³ Clausewitz, *On War*, pp. 485-6.

¹⁴ *Ibid.*, pp. 595-6. Emphases added.

¹⁵ *Ibid.*, p. 486.

¹⁶ Beyerchen, 'Clausewitz, Nonlinearity, and the Unpredictability of War', p. 84.

is there any agreement on whether the centre of gravity is singular or whether it resides in several sources; nor is there any realisation as to whether it is applicable across the spectrum of conflict or only applies to wars designed to overthrow the enemy completely.¹⁷

A few examples illustrate this lack of consensus. Some military theorists view the centre of gravity as synonymous with a decisive point, “whose attack or capture would imperil or seriously weaken the enemy”.¹⁸ On this basis, the Israeli military theorist Shimon Naveh—an advocate of postmodern systems theory in warfare—dismisses much of *On War* as linear and obsolete, indicative only “of a destructive trend aimed toward the main body of the army”.¹⁹ Another interpretation, advanced by the American soldier-scholar, Antulio J. Echevarria, suggests that the concept of a centre of gravity is closer in meaning to ‘a focal point’ at which both physical and psychological forces unite and condition human behaviour in war. In twenty-first century terms, the centre of gravity resembles an ‘effects-based’ rather than a ‘capabilities-based’ approach to war. “In one sense”, wrote Echevarria in 2007,

Clausewitz’s effects-based center of gravity resembles an emerging concept called Effects-Based Operations (EBO) more than it does the current capabilities-based notion, with the exception that only one particular effect is sought—total collapse of the enemy.²⁰

Echevarria’s interpretation has, in turn, been contested by the Naval War College scholar, Milan Vego. He argues that the centre of gravity concept is relatively simple to grasp since it refers to the direction of friendly strength against enemy strength, both tangible and intangible, in a quest for superiority.²¹ Vego dismisses Echevarria’s notion of a ‘focal point’ as representative of a Jominian geometric approach to warfare that “equates center of gravity with a decisive point” implying an attack on enemy parts rather than the whole. Since centre of gravity analysis is an ‘objectives-based’ rather than an ‘effects-based’ approach to military activity it “must [always] be directly related to the objective to be accomplished”.²²

Vego is correct to highlight how an effects-based approach to war has often been translated into a myopic quest for geometrical exactitude through the agency of precision targeting. In 2008, the difficulty in translating Effects-

¹⁷ Stuart Kinross, *Clausewitz and America: Strategic Thought and Practice from Vietnam to Iraq* (London: Routledge, 2008), p. 232.

¹⁸ Darfus L. Johnson, *Center of Gravity: The Source of Operational Ambiguity and Linear Thinking in the Age of Complexity* (Fort Leavenworth, KS: School of Advanced Military Studies, US Command and General Staff College, 1998), pp. 14-5, 46.

¹⁹ Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London: Frank Cass, 1997), p. 48.

²⁰ Antulio J. Echevarria II, *Clausewitz and Contemporary War* (Oxford: Oxford University Press, 2007), p. 186.

²¹ Milan Vego, *Joint Operational Warfare: Theory and Practice* (Newport, RI: United States Naval War College, 2009), chap. VII, pp. 29, 13, 18.

²² *Ibid.*, chap. VII, pp. 29-33.

Based Operations (EBO) to the human complexities of conflict, led to the concept's official demise in American joint doctrine. The then US Joint Forces Commander, General James N. Mattis, declared EBO to be contrary to the nature of war and abolished the very use of the term in the American joint planning community. Mattis appears to have been influenced in his decision by the experience of the Israeli Defence Force in employing effects-based operations and notions during the Second Lebanon War of 2006.²³

The contending views outlined by such theorists as Kinross, Naveh, Echevarria and Vego demonstrate the contentious character of the centre of gravity debate since the early 1990s. They also illustrate the supreme paradox of contemporary Western military doctrine: namely that the more the 'COG construct' is contested, the greater its importance seems to be in military planning. A fuller understanding of this paradoxical situation requires a brief excursion into the way in which Clausewitzian thought came to dominate Western military theory from the late Cold War onwards.

The Centre of Gravity Concept in Western Military Theory

The renaissance in Clausewitzian thought began in the United States in 1982 with the publication of Colonel Harry Summers' influential book, *On Strategy: A Critical Analysis of the Vietnam War*.²⁴ By exploring America's defeat in Vietnam with reference to Clausewitz's *On War*, Summers highlighted how, in seeing the Viet Cong as a separate enemy as opposed to an instrument of North Vietnam, "we [America] chose a center of gravity which did not exist".²⁵ In contrast, the North Vietnamese correctly selected the centre of gravity in the war as the alliance between the US and South Vietnam—particularly Clausewitz's notion of "the community of interest [and] personalities of the leaders and public opinion".²⁶

The impact of Summers' work, coinciding as it did with the dissemination of the new 1976 translation of *On War* by Michael Howard and Peter Paret, helped to spark a Clausewitzian revolution in American military theory. Indeed, interest in Clausewitz and the formal adoption of operational art by the US military proceeded in parallel fashion. This, in turn, led to the elevation of the centre of gravity as the main element in American, and later, Western English-speaking, operational planning. In the words of one American officer, from the mid-1980s onward, the idea of the centre of gravity was converted into "a giant lens for focusing military effort to achieve

²³ General James N. Mattis, 'USJFCOM Commander's Guidance for Effects-based Operations', *Joint Force Quarterly*, Issue 51 (4th Quarter, 2008), pp. 105-8; Avi Kober, 'The Rise and Fall of Israeli Operational Art, 1948-2008', in John Andreas Olsen and Martin van Creveld (eds.), *The Evolution of Operational Art: From Napoleon to the Present* (Oxford: Oxford University Press, 2011), pp. 187-8.

²⁴ Harry G. Summers Jr, *On Strategy: A Critical Analysis of the Vietnam War* (Novato CA: Presidion Press, 1982).

²⁵ *Ibid.*, p. 129.

²⁶ *Ibid.*, pp. 129-30, 132, 135-6.

decisive results in major operations”.²⁷ From the outset, the concept was defined in terms of capabilities as

that source of massed strength—physical or moral, or a source of leverage—whose serious degradation, dislocation, neutralization or destruction would have the most decisive impact on the enemy’s or one’s own ability to accomplish a given military objective.²⁸

Despite single service variations, it was this approach that underpinned the success of American joint forces during the First Gulf War of 1990-91 particularly in executing an air-land strategy against Iraq. The Gulf conflict:

illustrated the importance of Clausewitz’s centre of gravity at the strategic level, as modified by [John] Warden and his notion of concentric rings [aerial warfare against the layers of Iraq’s command and control system], though it was also applied to the operational level through the plan to nullify Saddam’s most effective military asset, the Republican Guard.²⁹

In the wake of the success of the First Gulf War, the centre of gravity construct was soon adopted by the US joint military community. In 1993, US JP 3-0, *Doctrine for Joint Operations*, defined the centre of gravity as “that characteristic, capability or location from which alliances, nations and military forces derive their will to fight, their physical strength, or freedom of action”.³⁰ This was followed in 1996, by Marine Corps scholar Joseph Strange’s development of centre of gravity analysis from the realm of abstract theory into that of practical methodology.³¹ The Strange Model (as it became known) was, and remains the most successful attempt to date, to offer an operational means of using the centre of gravity as a key element in military planning. Strange initially defined Clausewitzian centres of gravity as “primary sources of moral or physical strength, power and resistance” and, in later refinements as, “dynamic and powerful physical and moral agents of action and influence with certain qualities and capabilities that derive their benefit from a given location or terrain”.³²

Strange’s methodology teaches military planners that any centre of gravity contains a nest of critical factors which empower an enemy. Such critical factors, in turn, comprise three subsets: *critical capabilities*, *critical requirements* and *critical vulnerabilities*. Critical capabilities are those

²⁷ Rudolph M. Janiczek, *A Concept at the Crossroads: Rethinking the Center of Gravity* (Carlisle, PA: Strategic Studies Institute, US Army War College, 2007), p. 1.

²⁸ Quoted in Milan Vego, *Operational Warfare* (Newport, RI: US Naval War College, 2000), p. 634.

²⁹ Kinross, *Clausewitz and America*, p. 156.

³⁰ US Department of Defence, *Doctrine for Joint Operations*, Joint Publication 3-0 (Washington DC: Joint Chiefs of Staff, 1993), p. III-20.

³¹ Joseph Strange, *Centers of Gravity and Critical Vulnerabilities: Building on the Clausewitzian Foundation So We Can All Speak the Same Language*, 2nd edition (Quantico, VA: USMC Association, 1996).

³² *Ibid.*, pp. 27-42; Joseph L. Strange and Richard Iron, ‘Center of Gravity: What Clausewitz Really Meant’, *Joint Force Quarterly*, Issue 35 (October 2004), p. 27.

primary abilities or military instruments whose presence allows a centre of gravity to function and to be identified. Critical requirements are those essential conditions, resources and means that sustain effective critical capabilities. Finally, critical vulnerabilities can be deduced from recognising which of the enemy's enemy requirements can be converted into vulnerabilities by an attacking force using means of interdiction, neutralisation or destruction.³³

From the late 1990s onward, the Strange Model, and its lexicon came to provide an acceptable methodology for joint campaign planning within both English-speaking Western militaries such as Australia and the countries of the North Atlantic Treaty Organisation (NATO). By employing Strange's methods, military planners can proceed by focusing their attention on those critical capabilities that give the centre of gravity its source of power in terms of leadership, will, armed might and resources. When dealing with an enemy force, the latter's centre of gravity—the *requirements* that nourish its *capabilities*—can be identified and probed for weaknesses and these can be converted by an attacker into *vulnerabilities*.³⁴ The swift success of the conventional first-phases of the regime-change operations in Afghanistan and Iraq between 2001 and 2003 seemed a continuing vindication of Strange's centre of gravity methodology and the model continues to dominate both US and Western joint doctrine into the second decade of the new millennium.

Nonetheless, although Strange's methodology operationalised Clausewitz's centre of gravity, several of its key ideas have always been controversial. Some critics believe Strange's Model simply converts centres of gravity into 'centres of critical capabilities' and does so in a way that facilitates systems-based attrition doctrine. In Rudolph M. Janiczek's words, "this [Strange's] capabilities-based model amounts to an insightful but self-limiting form of systems analysis for targeting".³⁵ Moreover, it is important to note that while Strange's original methodology has been retained for twenty-first century doctrine, the actual structure surrounding US joint military planning has been altered by the adoption of new concepts. The latter have been absorbed into joint military planning regimes to deal with the globalised and interconnected irregular challenges of twenty-first century warfare. Over the past decade, several of these new concepts have been drawn from the world of complex systems science pioneered by such figures as the Austrian biologist, Ludwig von Bertalanffy.³⁶

The rise of a systems-approach to military doctrine is governed by the logic that twenty-first century enemies are networked actors and represent

³³ Strange, *Centers of Gravity and Critical Vulnerabilities*, pp. 27-42.

³⁴ *Ibid.*

³⁵ Janiczek, *A Concept at the Crossroads*, p. 10.

³⁶ Ludwig von Bertalanffy, *General Systems Theory: Foundations, Development, Applications* (New York: George Braziller, Inc., 1969).

complex adaptive systems (CAS) regulated by interaction or interdependence. Such systems are composed of *nodes* (tangible elements such as people, *materiel* and facilities) and *links* (intangible elements such as ideology, political behaviour and command relationships) that tend to be resistant to Strange's centre of gravity methodology. A good example of the injection of the philosophy of systemic interaction into the world of military doctrine is the notion that contemporary enemies are composed of political, military, economic, social, informational and infrastructural (PMSEII) nodes and links—as outlined in the 2006, US Joint Chiefs of Staff publication, JP 5-0, *Joint Operation Planning*. In order to deal with a PMSEII enemy, modern warfare would require the application of all elements of national power diplomatic, informational, military, economic (DIME elements). Accordingly, aspects of systems analysis—aimed at determining the full range of networked environmental conditions based on interacting nodes and links—were introduced in the 2006 version of JP 5-0 as an important additive to Strange's capabilities-based centre of gravity methodology.³⁷ As *Joint Operation Planning* states, “a center of gravity can be viewed as a set of characteristics, capabilities, and sources of power from which a *system* derives its moral or physical strength, freedom of action and will to act”.³⁸

Through a union between capability-based and systems-based approaches, a joint force can, in theory at least, harness new and old concepts to attack enemy *nodes* (using precision targeting) and cutting *links* (excising the behavioural or functional relationship between nodes) and increasing overall military effectiveness. However, reconciling the two approaches doctrinally has proved challenging. Indeed, the process has been described as a ‘shotgun marriage’ in which the merger of:

Clausewitz's ‘center-of-gravity’ theory and the ‘enemy-as-a-system’ concept seeks to permit joint doctrine to leverage the best aspects of old and new theory but has yet to confront the consequent intellectual contradictions and ambiguities that arise.³⁹

APPROACHES TO TWENTY-FIRST CENTURY JOINT MILITARY PLANNING: TRADITIONALISTS, COMPLEX SYSTEMS ADVOCATES AND INTEGRATIONISTS

Given the intractable character of irregular conflicts in Iraq and Afghanistan—the ‘intellectual contradictions and ambiguities’ arising from US attempts to harmonise a capabilities-approach with systems theory in joint military planning—have come to the foreground over the past decade. The joint planning process has become the subject of heated debate and

³⁷ See Thomas P. Galvin, *Assessing the New Joint Pub 5-0 Interpretation of ‘Center of Gravity’: Will It Help or Confuse Joint Planning?* (Carlisle, PA: Strategy Research Project, US Army War College, 2006), pp. 5-10.

³⁸ See *Joint Operation Planning*, (JP 5-0, 2006), p. IV-8. Emphasis added.

³⁹ Christopher R. Davis, ‘The Art of Strategy and Operational Warfare: Getting It Right’, *Joint Force Quarterly*, Issue 48 (1st Quarter, 2008), p. 95.

controversy with three strands of military thinking emerging in the United States: the traditionalists; the complex systems advocates; and the integrationists. Not surprisingly, the arguments of these three strands have tended to revolve around the alleged relevance or irrelevance of the centre of gravity construct.

Traditionalists such as Milan Vego and Dale C. Eikmeier argue that the rise of systems theory in joint military doctrine risks confusing a rash of decisive points, nodes and links with identified centres of gravity based on clearly-stated objectives.⁴⁰ For Vego, centre of gravity analysis remains applicable across the spectrum of warfare. It is a concentrated process in joint doctrine—and one that is not permanently fixed on simple destruction in the field—but which moves in a chameleon-like way as a ‘relational phenomenon’ covering such factors as political interests, leadership and public opinion. However, the caveat is, that when using ‘COG analysis’, all planning activity must be carefully focused and “directly related to the objective to be accomplished; otherwise, the entire concept has little, if any, utility”.⁴¹ The notion that complex systems science can act as a viable alternative to classical operational art is deeply flawed simply because:

as the Israeli failure in the Lebanon conflict of 2006 conclusively shows ... diffused warfare cannot replace the traditional focus on the enemy center of gravity.⁴²

For his part, Dale Eikmeier concentrates on redefining “how we want to use the COG concept in the 21st century”. He proposes that the centre of gravity is best seen as “the primary entity that possesses the inherent capability to achieve the objective”.⁴³ Such a definition concentrates on ‘hard’ traditional objectives-based warfare. It seeks to confine the ‘soft’ intangibles of warfare (such as moral strength, socio-cultural issues and public opinion) to the realm of Strange’s critical requirements, so avoiding the vagaries of complex systems theory. Eikmeier believes that the clarity of classical “ends, ways, and means” assessment is superior to “a system’s networked forest of nodes and links”.⁴⁴

Other traditionalists have noted that, in contemporary irregular conflicts, a contest for the allegiance of the population automatically becomes Clausewitz’s ‘hub of all power and movement’. As two American writers, Peter Mansoor and Mark Ulrich, observed in 2007,

⁴⁰ Vego, *Joint Operational Warfare*, pp. VII-26, XIII-85; Dale C. Eikmeier, ‘Redefining the Center of Gravity’, *Joint Force Quarterly*, Issue 59 (4th Quarter, 2010), pp. 156-8.

⁴¹ Milan Vego, ‘Systems versus Classical Approach to Warfare’, *Joint Force Quarterly*, Issue 52 (1st Quarter, 2009), pp. 40-8; Vego, *Joint Operational Warfare*, pp. VII-26, XIII-85.

⁴² Milan Vego, ‘A Case Against Systemic Operational Design’, *Joint Force Quarterly*, Issue 53 (2nd Quarter, 2009), p. 74.

⁴³ Eikmeier, ‘Redefining the Center of Gravity’, p. 157.

⁴⁴ *Ibid.*, pp. 157-8.

[in COIN], all energies should be directed at gaining and maintaining control over the population ... Without their support, neither the insurgent nor the counterinsurgent can win.⁴⁵

By linking intelligence preparation of an operational environment to a centre of gravity firmly located in the population, “an insurgent organisation’s various lines of operation [can] be exposed and made subject to interdiction by the counterinsurgent force”.⁴⁶ Finally, some traditionalists argue that even globally networked insurgent movement such as Al Qaeda possesses both a strategic centre of gravity (often viewed as Islamist ideology) and an operational one (the organisation’s ability to interact with local insurgents and host populations).⁴⁷

In contrast to the traditionalists, complex systems advocates question the retention in military doctrine of what they see as linear-based centre of gravity analysis for fighting new, globally connected conflicts. For this strand of American operational thought, the idea of “Clausewitz in the Caliphate” is an oxymoron.⁴⁸ From 2001 onward, the US Command and Staff College’s School of Advanced Military Studies (SAMS) became the leading centre advocating the adoption of complex systems science in general, and of operational design in particular, into US military planning doctrine. In 2002, James K. Greer, the then Director of SAMS, dismissed what he called the “Newtonian [linear] principles and physics of Clausewitzian thought” by writing:

Review of the planning of [current] campaigns and major operations reveals the difficulty of trying to apply current operational-design doctrine. Centers of gravity, lines of operations, and decisive points are difficult to discern in a complex mix of political, economic, and military peacekeeping efforts in the Balkans or when attacking a worldwide, weblike, self-organizing, transnational terrorist organization such as al-Qaeda.⁴⁹

Military theorists such as Huba Wass de Czege and Richard Swain followed Greer in recommending the adoption of complex systems science to improve the practice of contemporary operational art by a process of “learning in

⁴⁵ Peter Mansoor and Mark S. Ulrich, ‘Linking Doctrine to a New COIN Center-of-Gravity Analysis’, *Military Review*, vol. LXXXVII, no. 5 (September-October 2007), p. 46.

⁴⁶ *Ibid.*, pp. 47-51.

⁴⁷ David M. Witty, ‘Attacking Al Qaeda’s Operational Centers of Gravity’, *Joint Force Quarterly*, Issue 48 (1st Quarter, 2008), pp. 99-103; James Reilly, *A Strategic Level Center of Gravity Analysis on the Global War on Terrorism* (Carlisle, PA: Strategy Research Project, US Army War College, 2002).

⁴⁸ Jason D. Wood, ‘Clausewitz in the Caliphate: Center of Gravity in the Post-9/11 Security Environment’, *Comparative Strategy*, vol. 27, no. 1 (January-March 2008), pp. 44-56; John W. Jandoora, ‘Center of Gravity and Asymmetric Conflict’, *Joint Force Quarterly*, Issue 39 (4th Quarter, 2005), pp. 78-83.

⁴⁹ James K. Greer, ‘Operational Art for the Objective Force’, *Military Review*, vol. LXXXII, no. 5 (September 2002), p. 26.

action”.⁵⁰ De Czege, an advocate of systemic operational design derived from the writings of the Israeli military theorist, Shimon Naveh, wrote in 2008 that “conceptual aids derived from old, industrial age analogies are not up to the mental gymnastics demanded by 21st-century missions”.⁵¹ He called for the US military to adopt a postmodern ‘systemic cognitive methodology’ employing operational design principles. Such an approach was essential to deal effectively with PMSEII environments that defied the linear constructs of traditional operational art.⁵²

Richard Swain echoed De Czege’s views, arguing that the adoption of postmodern operational design required the use of collaborative, interdisciplinary design groups to cognitively ‘system frame’ and ‘problem formulate’ campaign dynamics. Swain argues that by using continuous ‘discourse and dialectics’ an operational design process can frame and visualise a conflict environment and so “constitutes the essential preamble to the practice of operational art”. Noting that the original ‘Key Concepts of Operational Design’ from the 1980s were based on a neo-Clausewitzian view of centre of gravity analysis, lines of operation and culmination, Swain concludes that “the practice of [postmodern] design, translating strategic guidance into tactical acts, is operational art for the 21st century”.⁵³

Between the traditionalists and the complex systems advocates stand the integrationists who favour continuing the evolutionary process of trying to convert the ‘shotgun marriage’ between capabilities and systems into a respectable union based on reconciling doctrinal contradictions and resolving methodological ambiguities. Perhaps the clearest statement of this position has come from two research professors at the US Army War College in Carlisle. In 2010, Charles D. Allen and Glenn K. Cunningham identified those aspects of a systems approach that they considered “most helpful for strategic thinking and campaign design”.⁵⁴ In terms of their approach to systems thinking, the duo view operational and campaign design as one and the same and seek to avoid the use of impenetrable and confusing postmodern jargon. Moreover, they situate much of their argument in the context of traditional operational art in general, and of

⁵⁰ Huba Wass de Czege, ‘Systemic Operational Design: Learning and Adapting in Complex Missions’, *Military Review*, vol. LXXXIX, no. 1 (January-February 2009), pp. 2-12; Richard M. Swain, ‘Commander’s Business: Learning to Practice Operational Design’, *Joint Force Quarterly*, Issue 53 (2nd Quarter, 2009), pp. 61-8.

⁵¹ De Czege, ‘Systemic Operational Design’, p. 2.

⁵² *Ibid.*, pp. 6-12.

⁵³ Swain, ‘Commander’s Business’, pp. 64-5, 68. See also Alex Ryan and Stefan J. Banach, ‘The Art of Design: A Design Methodology’, *Military Review*, vol. LXXXIX, no. 2 (March-April 2009), pp. 105-15; Celestino Perez Jr., ‘A Practical Guide to Design: How to Think About It, and a Way to Do It’, *Military Review*, vol. XCI, no. 2 (March-April 2011), pp. 41-51.

⁵⁴ Charles D. Allen and Glenn K. Cunningham, ‘Systems Thinking in Campaign Design’, in J. Boone Barholomees, Jr (ed.), *The US Army War College Guide to National Security Issues, Vol 1: Theory of War and Strategy*, 4th edition (Carlisle, PA: Strategic Studies Institute, July 2010), p. 253.

Clausewitz, in particular. For example, they uphold the Prussian thinker as a strikingly modern non-linear military theorist and 'systems thinker' whose great virtue is the subordination of theory to the trial of practice. Allen and Cunningham go on to point out that a key aspect of both systems thinking and of campaign design is actually Clausewitz's centre of gravity. Indeed, the selection of a centre of gravity serves to "solidify the commander's understanding of the operational environment and provides insights about the system and where and how operations should be executed".⁵⁵ Allen and Cunningham also state:

Centers of gravity may be transitory, shift over time or between operational phases, and may be largely intangible at the strategic level. That is, *a center of gravity is a design tool, not a magic talisman*. There may be more than one, but for campaign design and planning purposes it would be wise to limit proliferation, as that dilutes both planning focus and operational concentration of effort.⁵⁶

The two Army War College professors believe that, for all the claims made about the novelty of systems design, centre of gravity analysis still remains a vital 'mental model' for use in understanding any operational environment. A 'COG' need not be identified with certitude, but it does need to serve as the essential intellectual construct upon which to predicate the main effort in analysis and planning. As Allen and Cunningham put it, "without the identification of a reasonable center of gravity as the foundation of campaign design, *there is no place to enter the system and begin credible planning*".⁵⁷

Other examples of the integrationist approach include attempts to try to 'broaden COG analysis'. Some theorists argue in favour of identifying 'supplementary' and 'complementary' civil-military centres of gravity and applying these with aspects of systems theory to develop 'interagency operational art'.⁵⁸ Although differing on points of detail and emphasis, these theorists seek the common aim of reconciling conflict destruction with post-conflict reconstruction by orchestrating unity of civil-military effort in intractable campaigns. As Christopher Schnaubelt observes, these approaches to campaigning seek to "bridge the gap between traditional 'military' and 'civilian' activities in counterinsurgency and stability operations".⁵⁹

The traditionalist, complex systems and integrationist strands of thought in US military planning began to converge officially in joint doctrine in 2008.

⁵⁵ *Ibid.*, pp. 258-9.

⁵⁶ *Ibid.*, p. 259. Emphasis added.

⁵⁷ *Ibid.*, pp. 259-60. Emphasis added.

⁵⁸ See Richard K. Sele, 'Engaging Civil Centers of Gravity and Vulnerabilities', *Military Review*, vol. LXXXIV, no. 4 (September-October 2004), pp. 32-7; Bryan G. Watson, *Creating New Centers of Gravity: A New Model for Campaign Planning* (Carlisle, PA: Strategy Research Project, US Army War College, March 2006); Christopher M. Schnaubelt, 'Complex Operations and Interagency Operational Art', *Prism*, no. 1 (December 2009), pp. 37-50.

⁵⁹ Schnaubelt, 'Complex Operations and Interagency Operational Art', pp. 46-47.

Traditional operational art was not overturned but joint doctrine did begin to take into account some of the thinking promoted by systems advocates—suitably tempered by the work of integrationists. As a result, centre of gravity analysis is now intimately connected not just to the verities of operational art, but also to new notions of operational design using systems science. It is to an analysis of this relationship that this article now turns.

The Future of Centre of Gravity Analysis: Operational Design and the Question of Strategy

In January 2008, the US Army's Training and Doctrine Command (TRADOC) issued a *Commander's Appreciation and Campaign Design* (CACD) aimed at introducing a 'cognitive process' to guide design efforts in planning.⁶⁰ This Army publication was an important milestone in that it articulated to the US joint doctrine community the notion that "war amongst the people" was a systemic challenge containing "dynamics more complex than those of traditional nation state wars".⁶¹ The CACD introduced a four-stage conceptual framework based on complexity, problem structure, operational art and campaigning to deal with what it called "warfare [that] represents a clash between societies or cultures [in which] most operational problems are both structurally and interactively complex". The CACD recommended the use of "the discourse of operational design" as a new problem-solving tool to reinforce traditional operational art in dealing with the 'ill-structured' or 'wicked problems' of irregular warfare. The overall aim was to provide commanders with 'learning in action' design tools that improve the capacity of operational art to interrogate and translate strategy for tactical execution in the field.⁶²

The influence of the 2008 CACD can clearly be seen in the US Joint Forces Command (JFCOM) approach to operational design between 2009 and 2011. The JFCOM Commander, General James N. Mattis' views on the subject were outlined in late 2009 in an important memorandum entitled, *Vision for a Joint Approach to Operational Design*. Although Mattis possessed a reputation as both a military traditionalist and a doctrinal pragmatist—wasting no time in dispensing with EBO when he found it to be dysfunctional—he embraced the potential of operational design as a way of achieving more effective planning. Recognising that 'commander's design' and 'command intent' possessed clear historical roots and had been part of joint doctrine since the early 1990s, Mattis sought to develop a more coherent approach to the subject. Accordingly, he described operational design as "the conception and construction of the framework that underpins

⁶⁰ US Army Training and Doctrine Command, *Commander's Appreciation and Campaign Design*, Pamphlet 525-5-500 (Fort Monroe, VA: United States Army Training and Doctrine Command, January 2008), p. 1

⁶¹ *Ibid.*, p. 4.

⁶² *Ibid.*, pp. 7, 8-16, 26.

a campaign or major operation plan and its subsequent execution". The JFCOM Commander was careful to qualify his meaning by stating that "design does not replace planning, but planning is incomplete without design".⁶³ Finally, and perhaps with the failure of EBO in mind, he went on to caution against any attempt to doctrinally separate the practice of design from that of planning:

The balance between the two [design and planning] varies from operation to operation as well as within each operation. Operational design must help the commander provide enough structure to an ill-structured problem so that planning can lead to effective action toward strategic objectives. Executed correctly, the two processes always are complementary, overlapping, synergistic, and continuous.⁶⁴

In late 2011, operational design based on selected aspects of complex systems science formally entered US joint doctrine as a means for improving campaign planning in general, and for reconstituting the role of the centre of gravity in particular. The two publication vehicles for imparting design methodology into the US joint community are the August 2011 JP 5-0, *Joint Operation Planning* and its unofficial companion volume, the October 2011 Joint Staff *Planner's Handbook for Operational Design*.⁶⁵

From the perspective of centre of gravity analysis, the most significant innovation in the new edition of JP 5-0 is the integration of operational design with operational art and the US military's joint operation planning process (JOPP) as "complementary elements of the overall planning process".⁶⁶ In a real sense, the 2011 *Joint Operation Planning* reflects an integrationist approach toward joint military planning and avoids the more abstract language of systemic operational design promoted by purists such as Naveh and De Czege. The aim of JP 5-0 is to promote conceptual unity of thought and action to refine 'ends-ways-means-risk' issues and so build a stronger bridge to higher strategy. Accordingly, operational design is defined as:

a process of iterative understanding and problem framing that supports commanders and staffs in their application of operational art with tools and a methodology to conceive of and construct viable approaches to operations and campaigns.⁶⁷

By combining operational design methods with the verities of operational art and the rigour of JOPP techniques, a commander is given greater flexibility

⁶³ General James Mattis, *Memorandum for US Joint Forces Command, Subject: Vision for a Joint Approach to Operational Design* (Norfolk, VA: US Joint Forces Command, 6 October 2009), p. 7.

⁶⁴ *Ibid.*, pp. 7-8.

⁶⁵ US Department of Defense, *Joint Operation Planning*, Joint Publication 5-0 (Washington DC: Joint Chiefs of Staff, August 2011); Joint Staff, (J-7), *Planner's Handbook for Operational Design: Version 1.0* (Suffolk, VA: Joint and Coalition Warfighting Staff, October 2011)

⁶⁶ US Department of Defense, *Joint Operation Planning* (JP 5-0, 2011), pp. xxv, 1-5.

⁶⁷ *Ibid.*, p. III-1, III-6-III-18, IV-2.

to execute or revise his campaign course of action according to real-world strategic requirements. The aim is to learn in action, to be abreast of strategy and to “reconcile the reality of time-oriented deployment of forces and sustainment with the event-driven phasing of operations”.⁶⁸ As JP 5-0 puts it, the integration of design and planning keeps the commander’s “[operational-strategic] aperture as wide as possible [and allows him] to always question the mission’s continuing relevance and suitability”.⁶⁹

Under the newly integrated ‘operational approach’ framework of JP 5-0, the centre of gravity—along with other operational art concepts such as lines of operation and decisive points—is transformed into ‘an element of design’. However, despite this apparently novel role, the ‘COG construct’ continues to retain most of its traditional character and is defined as “a source of power that provides moral or physical strength, freedom of action, or will to act. An objective is always linked to a COG”.⁷⁰ In transferring the centre of gravity construct from detailed mission analysis to the initial ‘systems framing’ realm of conceptual design activity, JP 5-0 tries to further integrate the capabilities and systems approaches to planning. The premise seems to be that, the earlier a centre, or centres of gravity, can be determined through design learning, the more focused the resulting operational process will become. Conceptual design activity to determine the interactive dynamics of an operational environment is seen as facilitating a more precise approach toward the overlapping task of mission analysis. Finally, design ‘systems framing’ can also be used to inform the detailed campaign planning required for course of action development.⁷¹

Through the use of operational design as an adaptive problem-solving methodology, campaign planners can be made fully aware of the conceptual relationship that exists between a centre of gravity and the roles played by lines of operation (primarily for military effort), lines of effort (primarily for civil-military effort), decisive points (keys to attacking or protecting centres of gravity) and links and nodes (for understanding PMSEII). Through the agency of operational design the full range of potential interactions between all of these elements can be measured and weighed from the very outset of campaign development.⁷² Ultimately, then, despite the injection of systems-based operational design into US joint military planning, capabilities-based centre of gravity analysis endures and continues to span the joint planning spectrum. JP 5-0 describes the centre of gravity construct as “a linchpin in the planning effort” for use at the strategic and operational levels of both regular warfare (direct military confrontation) and irregular warfare (a contest for the population).⁷³ “Understanding the relationship between COGs”,

⁶⁸ Ibid., pp. III-6, 18-39, IV-2.

⁶⁹ Ibid., p. IV-2.

⁷⁰ Ibid., pp. xvi, III-22-23.

⁷¹ Ibid., pp. III-22-28.

⁷² Ibid.

⁷³ Ibid., pp. III-22-23.

states *Joint Operation Planning*, “not only permits but compels greater precision in thought and expression in operational design”.⁷⁴

Centre of Gravity, Operational Design and Military Planning: Some Implications and Recommendations for the ADF

As noted earlier, centre of gravity analysis is central to the theory and practice of Australian operational art. However, some ADF military theorists view the way it is conceived as overly-rigid and unrelated to new doctrinal trends evident in the United States, Australia’s indispensable military ally. For example, Trent Scott’s review of Australian operational art argues strongly that ADF’s particular use of the centre of gravity in the JMAP is invalidated by “the reductive [Clausewitzian linear] hypothesis that underlies the practical application of the concept”. He believes the ADF must update its approach to the COG construct with “intellectual capital ... invested into incorporating an appropriate operational design methodology into the JMAP and our planning doctrine”.⁷⁵ Scott’s work serves to highlight the superficial treatment of operational design in doctrine publications such as the ADF’s 2008 edition of ADDP 3.0, *Operations*. In the latter publication, there is no credible methodology linking the science of operational design to operational art in order to underpin the conceptual framework of campaign planning.⁷⁶

C. R. Smith echoes many of Scott’s views. In particular, he criticises the Australian JMAP as an overly-formulaic process which “has become a form of [planning] dogma; its prescriptions slavishly followed”.⁷⁷ Smith suggests that the ADF’s approach to joint military planning is hamstrung by the conflation of strategy, policy and operations with campaign imperatives. The result is an intellectual confusion between all of these elements—a confusion that may make campaign planning using centre of gravity analysis as a design element difficult, if not impossible, to accomplish. Like Scott, Smith sees the solution to this confusion as lying in the adoption of rigorous and creative systemic design teams using ‘divergent thinking’ to revitalise the practice of Australian operational art.⁷⁸

In recent official planning documents, the ADF’s approach toward centre of gravity analysis tends to support Smith’s assertion that there is a conflation of operations, policy and strategy with a corresponding lack of clarity in campaign planning. For example, both the ADF’s 2007 *Joint Operations for the 21st Century* and the 2008 ADDP 3.0, *Operations*, espouse a national effects-based approach (EBA) philosophy towards warfare. In the 2007

⁷⁴ Ibid., p. III-24.

⁷⁵ Scott, *The Lost Operational Art*, pp. 44-5, 122.

⁷⁶ See Australian Defence Doctrine Publication (ADPP 3.0), *Operations* (Provisional), (Canberra: Australian Defence Headquarters, February 2008), chap. 4.

⁷⁷ Smith, *Design and Planning of Campaigns and Operations in the Twenty-First Century*, p. 2.

⁷⁸ Ibid., pp. 58-87.

document, any coherent planning methodology is subordinate to a targeting regime that “seeks to negate the adversary’s strategy through the intelligent and creative application of an effects-based approach against an adversary’s critical vulnerabilities”.⁷⁹ Much of this EBA philosophy is retained and extended into the ADF’s March 2011 *Future Joint Operating Concept 2030* (FJOC 2030). The latter publication represents a broad speculation on future warfare trends and is based on the notion of the ADF applying national joint effects in a future battlespace using two new operating concepts. The first is *Control* (keeping the initiative)⁸⁰ and the second is *Influence* (managing and deterring armed competition).⁸⁰

A more intellectually refined example of Australian warfighting doctrine is the Army’s 2009 document, *Adaptive Campaigning: Army’s Future Land Operating Concept* (AC-FLOC). This publication is the closest the ADF has to a document that integrates capability-based and systems approaches to contemporary conflicts based on the influence of operational design. The AC-FLOC reflects a clear tension between what the document calls “traditional notions of operational art” and the introduction of a systems framework. For example, while accepting that “the Centre of Gravity construct remains valid” in dealing with identified critical vulnerabilities, the document proceeds to elevate lines of operation and decisive points to meet what it describes as strategic-level “accepted enduring conditions”.⁸¹ The latter construct is unrefined and seems to be an attempt to replace centres of gravity with a series of interacting lines of operation. The latter are seen as providing a “philosophical conceptual framework” that allow the employment of decisive points to achieve strategic objectives.⁸² The difficulty with AC-FLOC is that, in seeking integration between old and new operational concepts, it underrates the verities of operational art and lacks a supporting design framework. As a result, description is stronger than analysis and a practical synthesis proves elusive.

Given the weaknesses of joint doctrine, the rigidity of the JMAP and some of the conceptual contradictions inherent in AC-FLOC, the ADF will have to develop a more rigorous approach to campaign planning in the future. Any new Australian approach will almost certainly have to confront the ongoing task of integrating traditional capabilities and systems-thinking through the agency of design methodologies. In seeking to reinvigorate joint planning

⁷⁹ Department of Defence, *Joint Operations for the 21st Century* (Canberra: Strategic Policy Division, 2007), pp. 12, 13, 24; ADPP 3.0, *Operations* (Provisional), pp. 2-7-9. For a critique of the ADF’s approach see Michael Evans, ‘The Closing of the Australian Military Mind: The ADF and Operational Art’, *Security Challenges*, vol. 4, no. 2 (Winter 2008), pp. 119-22.

⁸⁰ Commonwealth of Australia, *Future Joint Operating Concept 2030* (Canberra: Department of Defence, 2011), pp. 3-4, 7-14.

⁸¹ Australian Army, *Adaptive Campaigning: Army’s Future Land Operating Concept* (Canberra: Department of Defence, 2009), pp. 41, 31-5. See also Alex Ryan, ‘The Foundation for an Adaptive Approach: Insights from the Science of Complex Systems’, *Australian Army Journal*, vol. vi, no. 3 (Summer 2009), pp. 69-90.

⁸² Australian Army, *Adaptive Campaigning*, pp. 40-1.

doctrine, the ADF needs to consider four areas—all of which have implications for the central task of using centre of gravity analysis. The first area is the need for Australian military planners to understand that employing operational design does not invalidate centre of gravity analysis in campaigning—particularly in an age of vulnerable information networks. Second, the requirement for an integrationist approach to design and planning must be understood by all Australian military practitioners. Third, the importance of ensuring that strategy guides design and planning needs to be ensured by the ADF. Finally, Australian planners must accept that design and planning will always be conditioned by command-led priorities.

RECOMMENDATION ONE:

The ADF must appreciate that the Centre of Gravity construct will continue to remain vital in Cyber Security and Networked Operations.

Centre of gravity analysis will remain vital to any future form of Australian design and planning simply because the construct is likely to become increasingly linked to issues of cyber security and information operations. For example, in 2009, the Defence White Paper announced the creation of a Cyber Security Operations Centre in the Defence Signals Directorate to serve Australian national security goals.⁸³ A feature of *Future Joint Operating Concept 2030* is a focus on cyber warfare to generate strategic effects and to maintain an Australian capability edge. Indeed, FJOC 2030 recommends that joint force commanders “incorporate the cyberspace domain in their planning, including the cognitive and physical effects desired”.⁸⁴

Like the population in irregular warfare, the information and communications (ICT) architecture of advanced militaries and their parent societies represent simultaneous ‘friendly and enemy COGs’. Since information networks lack firepower and manoeuvre capabilities, as centres of gravity they will become increasingly vulnerable to disabling attack at both the strategic and operational levels of a national security infrastructure. As Milan Vego explains:

This evolution in the [cyber] characteristics of the strategic center of gravity will create quite an anomalous situation, in which one’s center of gravity will be the single greatest source of both critical strength and critical weakness, simultaneously. Thus, protection of one’s strategic center of gravity will be a much more difficult task than it is today. At the same time, computer networks ... do not have the ability to physically destroy or neutralize the enemy’s strategic center of gravity.⁸⁵

⁸³ Commonwealth of Australia, *Defending Australia in the Asia Pacific Century: Force 2030* (Canberra: Department of Defence, 2009), p. 83.

⁸⁴ *Future Joint Operating Concept 2030*, p. 18, 24.

⁸⁵ Vego, *Joint Operational Warfare*, p. XIV-12.

For the above reasons, centre of gravity analysis for the cyber domain—suitably situated in the continuum of operational design, operational art and the joint planning process—needs to remain fundamental in any revised ADF JMAP as well as in future versions of ADDP 5.0, *Joint Planning*.

RECOMMENDATION TWO:

The ADF must understand that in devising any integrationist approach to Design and Planning, the Centre of Gravity construct will be of fundamental importance.

In the future, if the ADF is to undertake the task of integrating capabilities and systems-based approaches to planning effectively it must think in integrationist terms along the lines described earlier by Allen and Cunningham. In particular, the ADF needs to avoid any tendency to try to segregate design functions from planning processes. The attraction of separate J5-led design teams is that they may seem to avoid “paralysis through hyper-analysis” and so facilitate “learning in action” during the operational process.⁸⁶

Yet in the real world of warfare, any separation between design and planning is simply a prescription for lack of operational coherence. A notorious example of separating systems design from planning realities in the field occurred in October 2009 in the form of the ‘Afghan COIN System Dynamics’ slide graph briefed by a SAMS graduate to General Stanley McChrystal at International Security Assistance Force (ISAF) Headquarters in Kabul. On observing this systems model—which resembled a plate of spaghetti—McChrystal quipped, “when we understand that slide, we’ll have won the war”.⁸⁷ In all efforts to improve joint planning doctrine, ADF writers need to think in terms of ensuring that objectives in the form of centre of gravity analysis span integrated design and planning in operational activity along the lines recommended by such writers as Allen and Cunningham. At all costs, the lexicon that is adopted for an integrated operational approach must avoid Foucaultian-style postmodern gibberish such as ‘ontological ecology’, ‘problematization’ and ‘metacognition’. This was the unintelligible ‘language of discourse’ that repelled Israeli brigade commanders and impaired their military performance during the Second Lebanon War in 2006.⁸⁸ If it is to be effective, operational design must be simple and comprehensible to those military practitioners who have the responsibility for devising campaigns. In

⁸⁶ See Smith, *Design and Planning of Campaigns and Operations in the Twenty-First Century*, pp. 68-75.

⁸⁷ Elisabeth Bumiller, ‘We Have Met the Enemy and He is PowerPoint’, *The New York Times*, 26 April 2010, <<http://www.nytimes.com/2010/04/27/world/27powerpoint.html>> [Accessed 12 April 2012].

⁸⁸ Andrew B. Nocks, ‘The Mumbo-Jumbo of Design: Is this the Army’s EBO?’, *Small Wars Journal* (20 September 2010), pp. 1-6; Matt M. Matthews, *We Were Caught Unprepared: The 2006 Hezbollah-Israeli War*, US Army Combined Arms Center, Long War Occasional Paper, (Fort Leavenworth, KS: Combat Studies Institute Press, 2008), p. 63.

short, any form of Australian operational design must avoid becoming as one American writer has put it, “EBO repackaged”.⁸⁹

RECOMMENDATION THREE:

The ADF must consider strategic-level Centre of Gravity Analysis and issues of jurisdiction when introducing Operational Design.

The ADF must recognise that, as one military practitioner has noted, “design with its foundation squarely derived from the concept of ill-structured problems, is most appropriately applied in the strategic context”.⁹⁰ Indeed, as Harry S. Yarger points out, designing strategy “is systemic thinking at its most complex level”. Yet in recent conflicts, the classic equation of *ends* (objectives), *ways* (concepts) and *means* (resources) and *risk* (assessing potential mission cost) in strategy formulation has lacked clarity and purpose.⁹¹

This reality, combined with the criticism made by C. R. Smith of the ADF’s tendency to conflate strategy, policy and operations, means that an acceptance of jurisdictional guidelines in future Australian joint planning doctrine becomes important. ADF planners need to be aware that, ideally, there must be some kind of higher-level ‘strategic COG analysis’ that provides boundaries for operational design and directs activity. In an era in which media cycles drive decision-making and the political language is one of surges and ‘end-dates’ rather than of decisive battle and ‘end-states’, it is relatively easy for military officers to succumb to the temptation to use operational design to give meaning to what Hew Strachan aptly calls “the lost meaning of strategy”.⁹² A useful example how operational design can become a kind of ‘*ersatz* COG strategy’ in contemporary warfare comes from former British operational practitioner, Steven Jermy, who writes:

Visiting the various Regional Headquarters of NATO’s International Security Assistance Force (ISAF) in mid-2007, I asked the military planners in the Regional Command (West) and Regional Command (East) HQs the same question: “What strategy are you using for guidance to help you shape your operational designs?” The response ... was essentially the same. Paraphrased: “There’s nothing, Sir. We’re just getting on with it. We’re just

⁸⁹ Grant Martin, ‘A Tale of Two Design Efforts (and why they both Failed in Afghanistan)’, *Small Wars Journal* (7 July 2011), pp. 1-15.

⁹⁰ Dan McCauley, ‘Design and Joint Operation Planning’, *Canadian Military Journal*, vol. 12, no. 1 (Winter 2011), p. 36. See also Alex Vohr, ‘Design in the Context of Operational Art’, *Marine Corps Gazette*, vol. 94, no. 1 (January 2010), pp. 39-42.

⁹¹ Harry R. Yarger, *Strategy and the National Security Professional: Strategic Thinking and Strategy Formulation for the 21st Century* (Westport, CT: Praeger, 2008), pp. 19, 47, 8-10.

⁹² Hew Strachan, ‘The Lost Meaning of Strategy’, *Survival*, vol. 47, no. 3 (Autumn 2005), pp. 33-54.

doing what we think is best" ... There was no sense in these regional HQs of a strategy to guide the campaign.⁹³

In other words, in the West, strategy-making is running well behind operational innovations in design and planning. In this respect, Milan Vego has a case when he criticises current design theory as:

an artificial bridge between policy and strategy on the one hand and operational warfare on the other. It [operational design] includes many elements normally in the domain of policy and strategy.⁹⁴

In developing a coherent operational approach that seeks to integrate centre of gravity analysis as a 'design element' with operational art and planning, the ADF needs to be fully aware that no amount of military skill in these areas can compensate for flawed higher strategy. Neither design nor operational art can ever be autonomous activities and the activities of 'problem reframing' and 'learning in action' will always be the servants of strategy.⁹⁵

RECOMMENDATION FOUR:

The ADF must understand that effective Operational Design ultimately depends on a Commander's Judgment.

Operational design is a tool in a campaign work box. It is not and, can never be, a panacea for weak operational art based on a historical ignorance of the character of war. As we have seen, in recent US joint doctrine, centre of gravity analysis has become 'an element of design'. The aim is to ensure that, as soon as possible, planners are aware of both the conceptual relationships and interactions between centre of gravity identification, lines of operation, lines of effort, decisive points and PMSEII nodes and links.

However, the ADF needs to appreciate that operational design is ultimately a tool to assist a commander to understand the operational environment, frame its problems and develop a flexible approach to planning. The way in which design is employed will always be conditioned by command priorities. Ultimately, it is the commander who, in developing his operational approach, will decide where the 'discourse' of design framing 'as a journey' ends and mission analysis and detailed planning begins 'as a destination'. Operational design will be ineffective without active involvement by higher commanders and a wise commander will, as Allen and Cunningham suggest, use centre of gravity analysis as his means of 'entering the operational design system'. It also needs to be appreciated by ADF planners that, problems in using

⁹³ Steven Jermy, *Strategy for Action: Using Force Wisely in the 21st Century* (London: Knightstone, 2011), p. 3.

⁹⁴ Vego, 'A Case Against Systemic Operational Design', p. 74; and 'Systems versus Classical Approach to Warfare', pp. 40-8.

⁹⁵ Jacob W. Kipp and Lester W. Grau, 'Military Theory, Strategy and Praxis', *Military Review*, vol. XCI, no. 2 (March-April 2011), pp. 12-21.

operational design can be exacerbated by the related dilemma that commanders may often confront a lack of cross-disciplinary expertise on their staff—particularly in areas such as sociology, anthropology and languages. As the 2011 US *Planner's Handbook for Operational Design* notes,

understanding the *current system* [the current operational environment] and visualizing a transition to the *desired system* [future operational environment] requires expertise typically not available in the joint force, particularly for complex operational environments and ill-defined problems.⁹⁶

In short, operational design in campaign planning is not some sort of postmodern panacea for dealing with the uncomfortable realities of irregular and hybrid conflict. As a parallel activity, it is an approach that a future ADF commander may use at his discretion to improve his operational capacity and to change his concentration of effort. In some cases, a commander may find that the boundaries between cognitive design and mission analysis may simply be unclear. Command decision, not complex systems science, will decide where, and when, operational design is employed as a form of 'mission analysis on steroids'—and whether its problem framing methodology can be considered as constantly relevant for detailed campaign planning.

Conclusion

In his book, *The German Genius*, the British writer, Peter Watson describes Clausewitz's concept of the centre of gravity as the most significant method yet devised for confirming that strategy "require[s] some link between military activity and political objectives".⁹⁷ The aim of this article has been to try to make the evolution and application of that link 'clearer to everyone' and to do so against the background of the rise of operational design and complex systems science in the Western profession of arms. Although some design advocates view Clausewitz as a relic of a past era, it is striking how his theory of war applies to both non-linearity and to contemporary systems thinking. In the ongoing 21st century doctrinal debate between traditionalists, systems advocates and integrationists, the concept of the centre of gravity emerges as a theoretical constant. To be sure, the applied meaning of Clausewitz's construct continues to be disputed by adherents of these three strands of thought. Yet, like the great boulder in the mythical labour of Sisyphus the centre of gravity is never abandoned; whether it is being metaphorically rolled up or down the hill in arguments for or against, it still tends to form the essential basis for intellectual discussion in planning for the art of war.

⁹⁶ Joint Staff, (J-7), *Planner's Handbook for Operational Design: Version 1.0*, p. IV-5. Emphases added.

⁹⁷ Peter Watson, *The German Genius: Europe's Third Renaissance, the Second Scientific Revolution, and the Twentieth Century* (New York: HarperCollins, 2010), p. 185.

It is significant that centre of gravity analysis has defied its many critics with its chameleon-like capacity to adapt and reinvent itself—not least in its transition from traditional mission planning into an ‘element of design’ in a systems framework—in recent US joint planning doctrine. As a result, the construct remains vital in any attempt to create an integrated operational approach using design, operational art and planning. The ‘COG’, then, is one of what General Mattis calls “the time-honored principles [that] are tested in the crucible of battle and that are well grounded in the theory and nature of war”.⁹⁸ Thus, even in an era of cyber networks, operational design and complex systems science, Clausewitz’s centre of gravity endures—supported by some, contested by others—but a verity nonetheless. Ultimately, the concept is more about practice than theory and embodies the Prussian master’s wisest of all teachings that “everything in war is simple, but the simplest thing is difficult” for:

Action in war is like movement in a resistant element. Just as the simplest and most natural of movements, walking, cannot easily be performed in water, so in war it is difficult for normal efforts to achieve even modest results ... Theorists who have never swum ... are impractical ... they teach only what is common knowledge: how to walk.⁹⁹

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⁹⁸ Mattis, ‘USJFCOM Commander’s Guidance for Effects-based Operations’, p. 105.

⁹⁹ Clausewitz, *On War*. p. 119.