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Volume 11, Issue 2, Fall 2026

Editorial

It would not be hyperbole to suggest that any current discussion of strategy in relation to the current US-Iran war is a lesson in confusion and everything Clausewitz warned against. It also sharply contrasts with the simple objectives of Operation Rising Lion from 2025.

Strategy is the use of engagements for the object of the war; it is thus the use of an instrument for a practical purpose. Strategy is done as tactics against an enemy force or to affect the actions or condition of an enemy force. So far, so good. Very clearly, strategy is not about making deals. It is about the violence that forces the enemy to accept your terms, though it is rarely that clear-cut.

In the current campaign, passion, reason, and chance are all on display in ample quantity, with the chance of uprisings that have yet to materialise placed front and centre. The coercive intent and nature of air campaigns have a chequered history and an even more doubtful body of literature on the for-and-against argument, but the simple truth is that if you are bombing and destroying things the enemy can do without or simply rebuild and if the enemy has the time and the money, and you don't, then the race isn't being run.

Destroying the enemy is not the object of war, it is the object of warfare. They are not the same. You destroy the enemy to impose your will upon what they protect. If you want a change in behaviour from a regime whose most prized behaviour is fighting you, you need to find what they prize most and step on their neck until you gain compliance. Very obviously, the threat of force only very rarely has any deterrent effect these days. Bin Laden conducted 9/11 with no fear of US military might. Iran ran its nuclear program with no fear of reprisal and continues to do so. HAMAS perpetrated 7/10 knowing full well that Israel would be walking their tunnels unopposed in a matter of months, for whatever perceived advantage that might create on the global stage.

It is no revelation that no amount of military skill can compensate for political stupidity or misjudgements, and that applies as much to almost all parties in current conflicts, as it supposedly does to the current US administration.

We fight wars to alter conditions or behaviours, and nothing else. Only some conditions and behaviours accept change within an acceptable level of violence, and violence, as in military action, comes at a cost—economic, moral and physical.

History remains our only guide, and so-called strategic theory can only be a product of statements that explain extant phenomena and allow a degree of prediction.

William F. Owen
Editor-in-Chief, *Military Strategy Magazine*
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This article argues that contemporary Western military innovation has become a strategic dead end. Tracing the evolution of military innovation from the Revolution in Military Affairs through counterinsurgency adaptation to today's emphasis on disruptive innovation, experimentation and artificial intelligence, it shows how technological change has increasingly become an end in itself. This technological determinism encourages governments and armed forces to substitute innovation for difficult choices about political purpose, force structure, industrial capacity and mobilisation. Growing dependence on private technology companies further constrains strategic autonomy. The challenge, therefore, is not whether militaries should innovate, but how innovation can be subordinated to strategy.

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Strategy is commonly concerned with relating political purposes to the means available for their achievement. This article asks a prior question: what conditions make strategic judgement necessary in the first place? It argues that strategic problems arise from the contradictory character of political life, in which competing purposes cannot be permanently reconciled, and every decision alters the circumstances confronting those that follow. Strategy therefore requires practical judgement rather than the application of predetermined solutions. Drawing upon Clausewitz and examining deterrence, alliances and insurgency, the article conceives strategy as an inherently recursive practice directed towards accommodating, rather than eliminating, political contradiction.

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Hammers and Nails: Military Innovation as a Strategic Dead End

Matthew Ford - Swedish Defence University

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About the author

Dr Matthew Ford is an Associate Professor in War Studies at the Swedish Defence University in Stockholm. His research interests focus on military innovation, hyperconnectivity and the conduct of war and how this is reshaping the patterns of participation in conflict. His latest book, *War in the Smartphone Age* came out in 2025 and is published by C. Hurst & Co., London and Oxford University Press, New York.

In *Learning to Eat Soup with a Knife*, John Nagl argues that the US military entered the Second Iraq War institutionally shaped by its preparation for a conventional conflict against the Warsaw Pact, rather than for the counterinsurgency it was ultimately required to fight.[1] For Nagl, the armed forces privileged their institutional preference to avoid another Vietnam above all else. As a result, in the early stages of the Iraq occupation, the Department of Defense had fashioned a conventional warfighting instrument that repeatedly reframed emerging problems to fit the tools it already possessed. Nagl neatly encapsulated this in a pithy reference to Maslow's law of the instrument: if the only tool that was available was a hammer then every problem looked like a nail.

This paper argues that the logic Nagl identified has not disappeared but has instead re-emerged in a new form and metastasised around NATO. Two decades later, the armed forces' preoccupation with disruptive innovation

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reproduces the same institutional failure. This is born out of a belief that all military problems can be solved through technology. Every new problem demands its own unique solution. This privileges the demand for change as a necessary precondition for military success. What starts out as a mandate to field new equipment eventually involves reorganising the military bureaucracy, restructuring the armed forces to make use of it and rewriting doctrine to accommodate it. Seduced by the technology's magic, decision-makers overestimate what is achievable, and confuse technological possibility with practical reality.[2]

This is eroding the West's capacity for strategic thought. What was once a discrete process designed to enhance military effectiveness has become an end-in-itself. Military structures are reorganised around the expectation of permanent change. The contemporary focus on artificial intelligence exemplifies this tendency: a technology promised to revolutionise war and deliver decisive strategic advantage, yet it is a technology that remains in a constant state of flux. This orientation encourages a form of tunnel vision in which innovation increasingly substitutes for strategic choice when really it ought to be viewed as a means by which to create these choices. In this respect, this mode of thinking constitutes yet another instance of military thought as technological determinism. For the purposes of this paper, technological determinism is framed as an assumption that military effectiveness primarily flows from technology rather than from political purpose, industrial capacity, organisational competence, or strategic judgement.

The determinisms underpinning this mode of thinking have a long intellectual lineage that oscillates between the language of revolution and adaptation.[3] Emerging from analyses of Soviet military innovation, the concept of a revolution in military affairs assumes a civil–military vanguard bringing about victory through technology. By contrast, where bureaucracies fail to manage change, battlefield success is framed as the product of adaptation to challenges imposed by the enemy. Revolutions, in this sense, are driven from the top of military organisations, while adaptations emerge organically from problems encountered in the field. Taken together, these frameworks share a common assumption: that military effectiveness ultimately flows from the successful alignment of organisations with technological change, rather than from sustained political clarity about the purposes for which force is employed.

More recently, the language of revolution and adaptation has been displaced by the imperative of disruptive innovation. This semantic shift does not resolve the tension between long-term planning and battlefield learning; instead, it obscures it by casting adaptation as an institutionalised experimental mindset.[4] Within this framing, the armed forces are depicted as lacking the capacity to understand the nature of technological change.[5] Militaries are cast as incapable of defining their own requirements and instead must adopt idealised innovation practices originating in the private sector.[6] Yet while the military is accountable to the polity, private firms innovate to secure market dominance rather than to defeat an enemy. This shift imports market logics into military organisation, with profound implications for strategy, authority, and the conduct of war.[7]

In the decade after the Cold War, debates about military innovation could be treated largely as historical or theoretical exercises rather than as guides for allocating defence resources. Under conditions of renewed geopolitical competition, the emphasis on perpetual innovation offers political cover for postponing difficult decisions about force structure, spending priorities, and risk. Rather than clarifying how military power underpins deterrence, innovation discourse defers commitment by projecting solutions into underspecified technological futures. In doing so, it displaces responsibility from political leaders onto processes of experimentation that promise eventual advantage without requiring present sacrifice.

It is the duty of the armed forces to prepare for the possibility of war. The question at stake, however, is how prevailing concepts of innovation obscure and displace strategic thinking. This paper argues that innovation has become an end-in-itself, supplanting the much harder challenge of defining a meaningful, justifiable and achievable strategy. The argument advances in three steps. First, discussion focuses on the origins and context behind the Revolution in Military Affairs (RMA). Second, it shows how approaches to this RMA were upended by counterinsurgency in Iraq and Afghanistan. Finally, the article turns to the decade after the end of the Global War on Terror (GWOT) and contextualise this against two challenges to Western military dominance: global competition and private sector innovation.

Forging the Hammer

Generating military power in ways that deliver war-winning results has long been a central concern of governments. It is therefore unsurprising that the foundational literature on military innovation was initially inspired, funded, and shaped by state institutions themselves. Nowhere was this more evident than in the United States, where Andrew Marshall, director of the Office of Net Assessment (ONA), played a pivotal role in establishing the analytical study of military innovation. Having begun his career at RAND, Marshall went on to help found the ONA within the US Department of Defense (DoD) in 1973. Stimulated by the failure in Vietnam and the continuing conventional threat posed by the Warsaw Pact, the ONA was tasked with estimating the likely performance of US forces against potential adversaries as part of a long-term defence planning process. Its objective was not prediction for its

own sake, but the optimisation of investment decisions to maximise the prospects of success in future wars.

By the mid-1970s, as the US military struggled to recover from Vietnam, this approach informed what became known as the Offset Strategy. This strategy envisaged the United States would field technologies that would make it possible to fight the Warsaw Pact in Europe and win. The plans put in place by the DoD, plans underpinned by ONA research, ultimately led to the creation of the Big Five weapon systems that delivered success in the First Gulf War and now shape much of war in the early 21st century. These systems included the AH-64 Apache attack helicopter, the M-1 Abrams main battle tank, the UH-60 Black Hawk utility and transport helicopter, the M-2 and M-3 Bradley fighting vehicles, and the Patriot air defence missile system.[8]

If these systems were going to be brought into service, however, then the US DoD would have to solve the central challenge facing all defence planners: how to identify and when to back particular technologies. Innovation takes time to mature, and poor investment choices risk locking armed forces into ineffective force structures. Linking innovation to future battlefield performance therefore required clear analytical criteria. From this perspective, three conditions had to be met for change to qualify as military innovation: it had to alter how military formations operated in the field; it had to be significant in scope and impact; and it had to result in increased military effectiveness.[9]

In the early 1970s, however, the analytical tools available for assessing effectiveness were weak. Technology Readiness Levels (TRL), a method for assessing the maturing of a technology, were in use with NASA but the US Department of Defense only adopted TRLs in the 2000s. Consequently, existing approaches relied largely on comparing quantities of equipment or projecting the impact of future acquisitions on the balance of forces. Marshall argued instead that understanding military change required close attention to how decision-making processes worked in different political-military bureaucracies.[10] Developing this understanding would depend on identifying historical cases of successful and unsuccessful change across different countries and periods.[11] To this end, the ONA sponsored a major historical research programme led by Allan Millett and Williamson Murray, examining military effectiveness across seven countries from 1914 through the Second World War.[12]

Millett and Murray defined military effectiveness as the process by which armed forces convert resources into fighting power.[13] Maximum effectiveness depended on the efficient mobilisation of political will and material resources, and could be judged by the ability to destroy the enemy while limiting damage in return. Crucially, explaining effectiveness required attention not only to material capabilities but also to "non-quantifiable organisational attitudes, behaviours, and relationships" operating across political, strategic, operational, and tactical levels.[14] From the outset, then, military innovation studies were multidimensional, combining material and human factors in an effort to understand how organisations translated resources into battlefield success.

Because the ONA sought projects with strategic impact, it showed little interest in incremental change. This skewed early scholarship toward what Adam Grissom later characterised as top-down innovation: large-scale change driven by senior leaders with command authority and control over budgets. Only innovations that mobilised the full organisational capacity of the armed forces were thought capable of producing decisive effects.[15] Scholars disagreed, however, on how such top-down innovation occurred. Some emphasised civil–military interaction, with political leaders harnessing maverick officers to deliver new solutions aligned with national strategy.[16] Others pointed to resource scarcity and inter-service rivalry, arguing that competition for missions and budgets generated innovation.[17] A third approach focused on competition within services, stressing the need to align senior leadership, mid-level officers, and institutional resources to embed innovation securely.[18]

With the end of the Cold War, America's armed forces confronted a strategic dilemma: how could military effectiveness be sustained in the face of the funding cuts that were expected to follow the collapse of bipolar competition? One influential answer emerged from the work of Andrew Krepinevich, a former US Army lieutenant colonel, Harvard-trained scholar, and analyst at the Office of Net Assessment. Drawing on his study of Soviet approaches to military innovation, Krepinevich highlighted what Russian theorists described as a Military Technical Revolution (MTR)—a transformation driven not by new weapons alone, but by the integration of emerging technologies into coherent operational systems.

At the centre of this analysis was the Soviet concept of the reconnaissance–strike complex (RSC), which envisioned the close coupling of sensors, precision-guided munitions, and command-and-control networks to produce decisive battlefield effects. In a 1992 ONA report, Krepinevich argued that such integration could fundamentally reshape warfare by collapsing the distance between detection and destruction.[19] Soviet thinkers, he suggested, believed that the effective fusion of sensors and fires could yield either temporary advantage or even decisive victory. For US defence planners, the lesson appeared straightforward: a comparable Revolution in Military Affairs (RMA) promised a way to offset declining resources and restore battlefield dominance through technological integration.

From an American point of view, the origins of these ideas could be traced back to a General Westmoreland speech from 1969. In this speech he argued that "on the battlefield of the future, enemy forces will be located, tracked and

targeted almost instantaneously through the use of data links, computer assisted intelligence evaluation, and automated fire control…".[20] Making this happen in 1969 was not possible. Nonetheless, following the revolution in personal computing the prospects of networked war were explored in the seminal 1993 RAND paper *Cyberwar is Coming* by John Arquilla and David Ronfeldt.[21] In this paper Arquilla and Ronfeldt argued that the Military Technical Revolution implied the need for a period of re-evaluation and experimentation "…not unlike the one in the 1920s and 1930s that resulted in Germany's breakthrough formulation of the *blitzkrieg* doctrine". This was needed because "future wars will be fought mainly by 'brilliant weapons', robots, and autonomous computers; that man will be subordinate to the machine; and that combat will be unusually fast and laden with stand-off attacks".[22] All of this would be made possible by a revolution in Intelligence, Surveillance and Reconnaissance (ISR) underpinned by sophisticated Command, Communication, Computers and Information technology at both the strategic and tactical levels.

The ideas underpinning the MTR emerged in a particular strategic context. This was bracketed by defeat in Vietnam and the end of the Cold War. Neatly encapsulated in the Weinberger and Powell Doctrines, American foreign policy placed strict control on the use of military power.[23] Specifically, the two doctrines in effect limited the chances that the United States would find itself dragged into another low intensity war. Consequently, the only war the US DoD needed to prepare for was a high-intensity conflict against a conventional force. Given the financial constraints that followed the end of the Cold War that meant finding technological ways to do the same with less. To, in-effect, have the capacity to fight another Gulf War even if the size of America's armed forces had been cut.

Nailing the Coffin

The war the United States was forced to fight in 2001 was, of course, not the war it had prepared for in the aftermath of the Cold War. This was not immediately obvious, given the apparent success of early operations against al-Qaeda in Afghanistan. There, special forces, supported by remote fires and operating alongside local alliance partners, rapidly toppled the Taliban regime and came close to delivering a decisive blow against al-Qaeda. By contrast, the 2003 invasion of Iraq subjected the Department of Defense's planning assumptions to far closer scrutiny. This was partly because the invasion quickly gave way to occupation, counterinsurgency, and civil war, but also because the Army Chief of Staff, General Eric Shinseki, publicly warned that the operation would require several hundred thousand more troops than the force envisioned by Secretary of Defense Donald Rumsfeld.[24]

Committed to reforming the Army in line with prevailing views about the RMA and the future of war, Shinseki was responsible for introducing the experimental Stryker Interim-Force Brigade Combat Team. This medium-weight force was built around an eight-wheeled Infantry Carrier Vehicle (ICV) that exploited networked technologies for reconnaissance and strike and thus compensated for a lack of heavy protection.[25] The new formation was not ready for the initial invasion in March but was later deployed in December 2003. Facing insurgent use of Improvised Explosive Devices, the ICV was quickly upgraded with extra armour.[26] This did not mean that the Stryker brigade concept was inappropriate, but it did imply that the concept as initially conceived was not fit for the sort of fight the US military faced in Iraq.

This pointed to the limits of top-down defence contracting arrangements. Systems designed to deliver the kind of 'Force Transformation' envisaged by Rumsfeld and advocates of the RMA proved unable to keep pace with events in the field.[27] Picking up arguments made by Adam Grissom in his seminal paper, *The Future of Military Innovation Studies*,[28] scholars such as Farrell, Osinga, Russell and Serena[29] sought to highlight military–technical adaptation driven by the demands of combat. This work emerged largely from the counterinsurgency campaigns in Iraq and Afghanistan, where forces adjusted existing tactics, technologies, and procedures in response to enemy action. In this framing, whereas innovation involves ''new technologies, tactics, strategies and structures…adaptation involves adjusting existing military means and methods".[30]

The resulting tension between top-down innovation and bottom-up adaptation reflected a systemic problem that had to balance long-term planning with immediate operational demands. Earlier scholars often attributed resistance to innovation to military conservatism, citing historical reluctance to abandon established weapons and doctrines.[31] Thus the slow take-up of the machine gun or the desire to maintain the lance and sword over magazine rifle was the product of an officer corps or regimental system unwilling to introduce weapons that might change social structures.[32] More recent work instead emphasised military culture.[33]

Whatever the underlying causes, however, what became apparent is that DoD RMA programmes could not keep up with or account for the demands of the battlefield. This appeared to be the nail in the coffin for the RMA. At the same time, for the advocates of adaptation, localised innovation might generate tactical success but simultaneously produce contradictions, fragmentation, or inefficiencies across the wider organisation. From this perspective, adaptation alone was insufficient to deliver the war-winning outcomes envisaged by planners such as Andrew Marshall. Without institutional mechanisms to diffuse and integrate local lessons, adaptation risked becoming compatible with tactical success and strategic failure[34]—a critique frequently levelled at Western forces during the counterinsurgency campaigns of the early twenty-first

century. The question facing defence planners, therefore, was how to institutionally map long-term investment programmes to immediate battlefield problems. For the answer to this, they turned to the private sector and the language of disruptive innovation.

Institutionalising Problems

If Afghanistan showed that light infantry backed by Special Forces and remote precision fires could bring about regime change then Iraq showed that the Force Transformation as understood at the beginning of 2003 was insufficient for fighting a counterinsurgency. To bridge these lessons, defence planners needed to map together, both conceptually and rhetorically, the language of the RMA with that of adaptation in the field. This stood the chance of institutionalising processes of innovation in ways that reflected the post-GWOT strategic context. In this new world, America was not preparing for air-land battle and the defeat of the Warsaw Pact but air-sea battle and the defence of Taiwan from China.[35]

Key to making these conceptual changes was the rhetorical need to avoid defining the difference between adaptation and innovation. Thus, Farrell et al. argued that accumulated adaptations could generate comprehensive innovation. They rejected the notion that innovation must be large-scale to be analytically significant, suggesting instead that small-scale changes across multiple levels of war were worthy of study.[36] This shift redirected attention to how local conditions shaped organisational change. By choosing to avoid drawing distinctions between adaptation and innovation, Farrell et al. sidestepped the question of where innovation originated. This in turn made it possible to put aside ten years of failed counterinsurgency and instead introduce a new conceptual framework that allowed the US armed forces to move on from defeat in Iraq.

Broadly speaking, then, the scholarship that emerged from the first ten years of the GWOT emphasised the importance of adaptation through in-field experimentation as a source of military change.[37] This was subsequently reconfigured by the DoD and institutionalised as the third offset strategy and embodied in technology incubators, such as the Defense Unit Experimental(x), controlled by the services.[38] These incubators would help introduce new technologies and drive change into the armed forces by shortening the time required to field militarily relevant systems. This shift recast the battlefield as a site of experimentation, where equipment is deployed, evaluated in combat, and modified on the basis of experience gained under fire.[39] US special operations forces figured prominently in this literature, reflecting their continued centrality to the conduct of the GWOT following withdrawal from Iraq and the drawdown in Afghanistan. To support more agile forms of technology adoption, these forces established their own specialist innovation incubator, SOFWERX. According to Nina Kollars the goal was, "to improve the agility and performance of its technology acquisitions process".[40] This was going to be achieved by leveraging, "commercial off-the-shelf technologies to extend the battlefield and win the fight for information".[41]

Advantageously, the scholarly interest in SOFWERX also made it possible for those who had been in favour of networked remote fires and the RSC to reassert their arguments. John Arquilla, for example, addressed the matter of the MTR, developing situational awareness and gaining information dominance through networked ISR platforms in his 2021 book *Bitskrieg*.[42] Lamenting the GWOT as a wasted decade, Arquilla drew attention to the work of Stanley McChrystal's Joint Special Operations Command (JSOC) in Iraq. Specifically, this considered JSOC's approach to intelligence collection and analysis and JSOC targeting.[43] Whereas earlier accounts of military adaptation prioritised mass and force protection, analyses of this period reframed innovation in terms of accelerating the production of military analysis and decision-making through automation and AI.[44]

Much of the ambition behind the Third Offset Strategy has been centred on technologies that render the battlefield transparent. In military doctrinal terms this is intimately connected with the emergence of Multi-Domain Operations (MDO) and the Joint All Domain Command and Control (JADC2) technologies that support MDO.[45] Here the objective is to gain information dominance, that is to say to have total situational awareness such that US forces have a complete picture of adversary units wherever they are located across the battlefield. This then makes it possible to target an enemy with fires and thereby enable ground forces to manoeuvre.[46] Built out of Palantir's Maven Smart System, JADC2 puts a premium on having the military platforms, weapon systems, munitions supply chain and industrial capacity to not only find targets but also to service them. By definition, this means collecting, integrating, synthesising and then visually representing enormous amounts of data in such a way that commanders can take decisions at speed and at the pace of events on the ground. At the same time, and as we are discovering from Operation Epic Fury, the US air assault on Iran, identifying 1000 targets a day is the easy part.[47] Sustaining the operation, even when the country is a superpower like the United States, depends on munition supply and what is needed to maintain conventional deterrence across multiple theatres.[48] This ought to remind us that war is a matter of strategy not simply innovation.

Nonetheless, in this context, data processing and the application of AI for pattern recognition continue to be the focus of attention given their role in JADC2 and for MDO. Indeed, the growing importance of these technologies has generated a body of scholarship focused on optimising information flows, flattening organisational hierarchies, and developing novel approaches to problem-solving, including

hackathons and other forms of open innovation.[49] Unlike earlier RMA scholarship, this more recent literature has engaged critically with the role of dual-use technologies and the ways in which existing civilian data infrastructures are increasingly being integrated into military operations.[50] The strategic significance of these infrastructures was highlighted by Iran's recent attacks on data centres across the Middle East, which the Islamic Revolutionary Guard Corps justified on the grounds that they were supporting "the enemy's military and intelligence activities."[51]

The growing importance of dual-use technologies has created new forms of military dependency. Critical data and battlefield functions increasingly flow through commercially developed networks and platforms rather than state-controlled systems.[52] This matters because these systems lie at the heart of military command and control (C2) and thus shape military strategic decision making. At present many of these systems are proprietary and have few, if any, substitutes. There is, for example, no functioning market in digital military operating systems comparable to Palantir's Maven Smart System (MSS). Once adopted, such systems become embedded across military organisations, making them difficult and costly to replace. Technological adoption therefore creates dependencies that can lock armed forces into particular vendors, architectures and development pathways.

These dependencies raise a second problem concerning sovereignty. When critical military functions depend upon privately owned software, infrastructure and expertise, states no longer exercise exclusive control over the systems through which military power is organised. Corporate actors instead acquire significant influence over how armed forces operate. Military institutions and Big Tech can reinforce this relationship because both increasingly privilege optimisation, integration and technological mastery, encouraging war to be understood as a technical management problem.[53] Software updates consequently become both battlefield requirements and commercial imperatives.[54] Military hardware can then begin to resemble consumer technology: networked, expendable and rapidly replaced. If militaries develop along these lines, sovereign military power becomes increasingly contingent upon commercial contracts and privately controlled infrastructure.[55]

The acquisition of MSS illustrates the sovereignty problem. NATO's Communications and Information Agency acquired the AI-enabled situational-awareness platform in April 2025.[56] Yet NATO cannot compel member states to adopt particular technologies. European governments must therefore decide whether to integrate a critical command-and-control capability supplied by an American company. This question has acquired additional political significance because Palantir has close connections to Donald Trump,[57] whose administration has questioned support for Ukraine[58] and challenged Danish sovereignty over Greenland.[59] Dependence upon MSS therefore potentially places core European C2 capabilities within commercial and technological relationships that European governments do not themselves control.

The third problem goes beyond dependency or sovereignty. It concerns whether technological innovation is beginning to displace strategic choice itself. Once a proprietary system becomes embedded across an alliance, interoperability and technological development create powerful incentives for further adoption. Decisions about military organisation can consequently become framed as questions of technological effectiveness—whether states can adopt and integrate the newest systems—rather than political questions about what capabilities governments actually want and under whose control they should operate.

The European response to MSS illustrates this displacement. Admiral Pierre Vandier, NATO's Supreme Allied Commander Transformation, has argued that European companies must produce an equivalent to MSS as quickly as possible. This framing is revealing. The strategic question is no longer whether armed forces should organise command and control around this particular technological model. Instead, the assumed requirement is the technology itself; the remaining choice concerns who supplies it. Without a European alternative, governments face proprietary dependence and interoperability lock-in. But even with one, the deeper issue remains: technological and market-driven cycles may increasingly determine the direction of military transformation, narrowing the space in which governments can exercise strategic choice.

Arguably, however, a more important challenge for European powers does not lie in acquiring situational awareness technology like MSS but in rebuilding their munitions capacity.[60] Software by itself cannot produce battlefield results. To achieve victory in war, nations need sufficient kinetic effect to produce military outcomes. At its core that depends on propellant production, ordnance assembly lines and the recruitment of sufficient personnel to make it possible to hold ground. Yet, Europe's governments have shown themselves to be unwilling to place contracts for armaments even when they claim to be rebuilding European security.[61] Nor have they been especially effective at overcoming the challenge of recruiting service personnel into the ranks.[62] The implication, then, is that Western governments are ducking the political and economic costs of re-engaging with civil society and rebuilding European defence and instead assuming that optimised decision-support technology will substitute for poor strategic choices.

Underlying these developments is a broader political mechanism through which innovation becomes a substitute for strategic choice. The promise of future technological advantage creates the expectation that military effectiveness can be secured without confronting the costs of preparing

for war in the present. Investments in software, artificial intelligence, experimentation, and digital transformation offer the prospect of increased capability while avoiding more politically contentious questions concerning mobilisation, industrial capacity, force structure, and societal resilience. Because emerging technologies are assumed to generate future solutions, governments face reduced pressure to make immediate sacrifices or articulate clear strategic priorities. Innovation therefore performs an important political function: it manages uncertainty without resolving it. Rather than determining what military power is intended to achieve and allocating resources accordingly, policymakers can defer difficult decisions by projecting advantage into an increasingly technological future. The result is not the absence of strategy, but the gradual displacement of strategic judgement by the expectation that technological change will compensate for unresolved political and military problems.

Taken together, the post-GWOT turn has not so much resolved the tension between innovation and adaptation as dissolved it through a new organising logic: experimentation.[63] By treating combat and operational practice as an iterative testbed for software-enabled solutions, the literature recast military effectiveness as a problem of speed—accelerating data, targeting, and acquisition cycles—rather than of strategy, mass, munition production, or political purpose. This imperative was first identified by the RMA scholars working on ISR and RSC. Yet the rhetorical synthesis of RMA and adaptation has carried a cost. By blurring the distinction between learning and transformation, it has imported private-sector imaginaries of disruption into questions of force design and authority and encouraged the assumption that advantage could be engineered through software, data processing and AI rather than secured through hard choices about missions, resources, and risk. In this sense, "institutionalised adaptation" became a way to move on from Iraq without confronting what Iraq revealed: that technological dynamism cannot compensate for strategic choice, and that innovation, however agile, cannot substitute for a coherent theory of victory.

Conclusion

This article has argued that contemporary military thinking is increasingly shaped by a form of technological determinism that privileges innovation over strategy. Innovation is clearly an important way to overcome adversary capabilities. While the Revolution in Military Affairs and later adaptation literature emerged from different historical experiences, both ultimately shared a belief that military effectiveness could be generated through successful alignment with technological change. In the post-GWOT period, this logic has been reformulated through the language of disruptive innovation, experimentation, and digital transformation. However, what appears at first glance to be a more flexible and adaptive approach to military change has instead institutionalised the expectation of permanent transformation.

The consequence is not simply a growing dependence on emerging technologies such as artificial intelligence, autonomous systems, and data infrastructures. More fundamentally, it is the displacement of strategic judgement by technological possibility. The promise of future technological advantage provides a powerful justification for organisational reform, procurement programmes, and new operational concepts, while simultaneously deferring difficult debates about force structure, deterrence, mass, and political purpose. In this respect, innovation functions as a substitute for strategic choice, promising military and political outcomes that cannot be claimed given the complexities of war.

This tendency is particularly visible in contemporary concepts such as Multi-Domain Operations and Joint All-Domain Command and Control. These approaches assume that information superiority and accelerated decision-making can compensate for uncertainty and complexity in war. Yet the pursuit of ever-greater transparency risks encouraging the belief that strategic problems can be reduced to technical ones.

As the experience of Iraq demonstrated, however, technological sophistication cannot compensate for the absence of coherent strategic objectives. Political leaders have invoked AI and innovation as enablers of control, while avoiding decisions about mobilisation, industrial capacity, and sustained readiness. The result has been a strategy of postponement, sufficient to manage uncertainty rhetorically, but insufficient to shape outcomes materially. As in Nagl's account of Iraq, the problem is not a matter of innovation, tools or data, but a political move to avoid making tough choices. The growing role of private-sector actors further amplifies these dynamics. As military capability becomes increasingly dependent on commercial software, cloud infrastructure, and data services, the boundaries between public authority and private enterprise become blurred. The result is a model of military power shaped not only by strategic necessity but also by commercial imperatives that prioritise continual innovation and market expansion.

The challenge facing Western armed forces is therefore not whether to innovate, but how to subordinate innovation to strategy. Preparing for future war undoubtedly requires technological innovation. Yet military effectiveness ultimately depends on the ability to connect means to political ends. Without that connection, innovation risks becoming little more than a technologically sophisticated version of Nagl's hammer: a solution searching for a problem.

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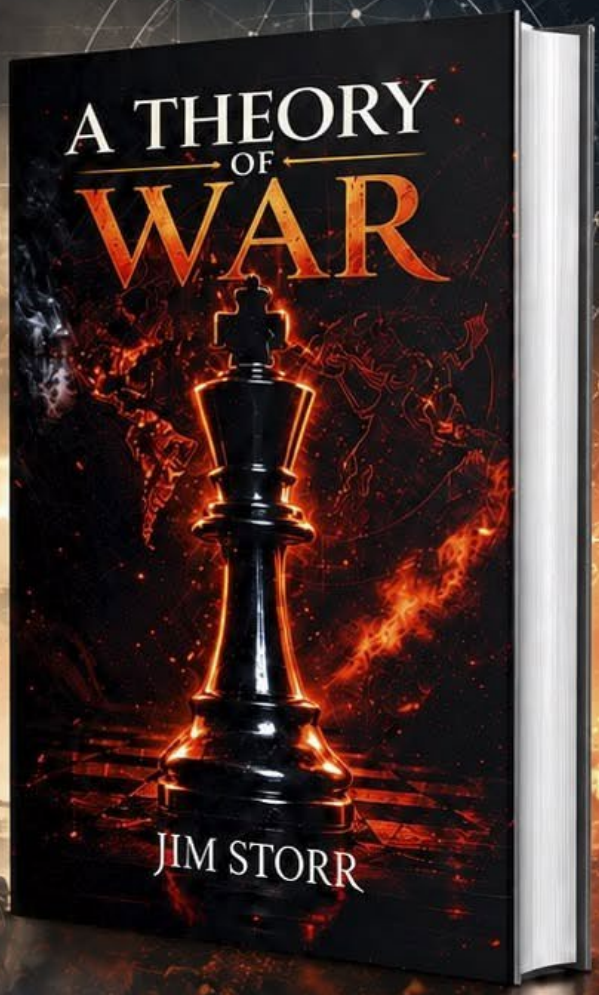

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Outpacing: A Grand Strategy for Avoiding the Carthaginian Error

Antulio J. Echevarria II – U.S. Army War College

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The historic struggle between Rome and Carthage represents a classic strategic rivalry. A strategic rivalry is essentially a pattern of perception and behavior in which the participants see each other not just as threats capable of inflicting harm but as inveterate adversaries vying to displace each other.[1] The rivalry between Rome and Carthage played out over 118 years and three wars, the last of which left the Phoenician city-state in ruins.[2] Influential Roman politicians such

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as Marcus Porcius Cato (Cato the Elder) saw the struggle as a zero-sum game, while the Carthaginians mistakenly believed the rivalry had ended and they could co-exist with their Mediterranean counterparts.[3] That error proved tragic for Carthage. Currently, the United States and its partners face several inveterate foes, strategic rivals, and the West's leaders require a strategy for dealing with them. This article describes how a grand strategy of Outpacing—gaining and keeping a commanding lead over one's rivals—can help the Western powers confront their strategic rivals and avoid the Carthaginian error.

Strategic Rivalry vs Strategic Competition

Strategic rivalry is a particular species of strategic competition in the same way nuclear arms are a specific species of weaponry: both involve extreme outcomes. The object of strategic rivalry is not just to pursue one's interests, as in day-to-day interstate competition, but to pursue a specific interest, namely, weakening one's rival in any way possible.[4] Rivals also tend to weaponize bargaining, if it occurs at all, not only to obtain the best deal for themselves but also to ensure the agreement diminishes their rivals in some way.

While some scholars consider strategic competition and war to be distinct activities, this view is untenable, especially for strategic rivals.[5] If war is merely the continuation of policy by other means and a state's policy is to engage in strategic competition, then it follows that war can be an instrument of that policy. Recent examples of war serving such policies include Midnight Hammer and Epic Fury, the joint US-Israeli operations aimed at eliminating Iran's nuclear program and reducing its military and economic power, its capacity to compete.[6] Moreover, rivals have a broad array of conflict tools at their disposal: conventional and unconventional, regular and irregular, gray zone and hybrid, covert and clandestine, as well as economic blockades and political isolation.[7] As the Prussian military theorist Carl von Clausewitz once wrote: "war is thus an act of force (*Gewalt*) to compel our opponent to do our will."[8] Nothing in his definition says force must satisfy the traditional notion of war in the sense of shots being fired and blood being spilled. In any case, force and violence are interchangeable terms in English dictionaries.

Furthermore, wars among rivals should not be seen as discrete events: they are serial in nature—interconnected and recidivistic—meaning each incidence of armed conflict between rivals makes another armed conflict more likely.[9] Historical data show rivalries have caused or been responsible for 80 percent of wars globally; simply put, when rivals go to war, "they tend to go to war with each other."[10] Historical data also reveal consequential patterns in rival perceptions and behavior. For instance, rivalries develop most frequently over (a) spatial motives, the desire to acquire territory; and (b) positional motives, the desire to establish hegemony or to enhance regional or global status.[11] Ideological incompatibilities constitute a distant third motive, as ideology often becomes intertwined with the desire to acquire territory or status; motives based on ethnic differences, political dissidence, the acquisition of resources, and the drive to gain market access rank fourth, fifth, sixth, and seventh, respectively.[12]

Not all rivalries are existential in nature. But they tend to evolve (or devolve) in that direction unless the rival parties can de-escalate before the clashes become too recidivistic and the hostile feelings too deeply seated. Rivals will typically battle each other until (a) both become exhausted and agree to de-escalate or both find off-ramps before that point; or (b) because a third party emerges that poses a serious threat to the other two; or (c) one party loses its capacity to compete whether due to a decisive military action or to a political or economic collapse following a prolonged struggle; or (d) one party decides to forfeit the competition, and thus "bends the knee" or acknowledges the superiority of the other.[13]

Currently, some 42 strategic rivalries remain unresolved in today's dynamic global environment (see map).[14] Interestingly, the smallest US geographic combatant command, Central Command, currently contains the largest number of unresolved rivalries (15) as well as some of the most recidivistic ones. Israel and Iran have four strategic rivals each (including each other); three of Israel's rivals—Egypt, Iraq, and Syria—have had adversarial relationships with it since Israel became a state in 1948.[15] The United States currently has three strategic rivals: China since 1996, Russia since 2007, and Iran since 1979. North Korea has been an adversary of the United States since 1950, and its conventional forces and nuclear weapons make it a serious threat. But it lacks the capacity to compete politically and economically with the United States; typically, rivals must be in the same competitive league. However, Iran has been a rival of the United States for almost 50 years, longer than either China or Russia, even though Tehran is not in the same competitive league as Washington economically or militarily. Tehran has indirect political, economic, and military leverage in the Persian Gulf and the Strait of Hormuz (especially through proxies) that qualify it as a strategic rival of the United States. Tehran has used that leverage to undermine US interests in the Gulf, to disrupt the political and economic stability of US partners in the region, and to kill or wound thousands of Americans. It is, therefore, unquestionably a rival. Nonetheless, a state can implement a strategy that prioritizes its rivals without ignoring its threats.

The serial nature of hostilities between strategic rivals means strategies of decapitation or of "mowing the grass" rarely achieve more than temporary results. Such strategies may, in fact, worsen the situation by arousing further enmity and by motivating the rival to become more resilient. The stricken rival simply reconstitutes, installs

new leaders, acquires new capabilities, and develops more countermeasures to reduce its vulnerabilities, thereby making the next strike potentially more difficult and more costly. Admittedly, not all states have the political will or the physical wherewithal to execute much more than temporary solutions. But recidivism means states will face recurring cycles of hostility and violence unless they can find ways to develop "alternative military and diplomatic approaches."[16] A grand strategy such as Outpacing, described below, would provide just such an alternative military and diplomatic approach.

Outpacing as a Grand Strategy

Today, America and its partners need a grand strategy that can address all three of their strategic rivals simultaneously, not sequentially, and obviously not at the expense of other threats. Put differently, they need a grand strategy capable of accomplishing the goals of Containment, as inspired by the American diplomat George F. Kennan, as well as the anticipatory measures of a strategy one might call preclusion.[17] Together, these elements amount to a grand strategy of Outpacing. Outpacing avoids the backward-looking connotations of Containment and explicitly emphasizes the idea of gaining and keeping a commanding lead over one's rivals; whereas Containment did so in a manner that was secondary to, and supportive of, containing the spread of Soviet Communism. If China is America's "pacing challenge," which has been the case across several US administrations, then Outpacing accepts that challenge without overlooking the need to surpass other rivals such as Russia and Iran.[18] In practical terms, Outpacing means maintaining conventional and nuclear deterrence, building antihegemonic coalitions not just across the Pacific region, as Elbridge Colby's *Strategy of Denial* recommends, but also in eastern Europe (via NATO) and within the Middle East; crucially, it also entails surpassing America's strategic rivals in the generation of all forms of national—and by extension—coalition power.[19]

Conventional and nuclear deterrence continue to hold in Asia and Europe: China has not invaded Taiwan, and Russia has not invaded a NATO country. (The failure of the Transatlantic alliance to deter Russia's invasions of Ukraine in 2014 and 2022 is another matter.[20]) Nor has a nuclear clash occurred, though nuclear proliferation has accelerated; Beijing is building land-based ICBM missile silos at a pace of approximately 30-50 per year and is expected to have 1000 operational sites by 2030.[21] Deterrence and antihegemonic coalitions work hand-in-hand: the latter serve as counterweights to regional threats and thus help to strengthen the former. Under Outpacing, the United States would continue to strengthen its commitments to its Pacific partners vis-à-vis its alliances with the Republic of Korea, with AUKUS (Australia, United Kingdom, United States), the Quad (Australia, India, Japan, United States), and its security agreements with Japan and the Philippines, as well as other Asia-Pacific states.[22] With respect to Europe, NATO's European members may yet take the proposed path of "strategic autonomy," but that path would likely need to include deterring Russia from further expansion into eastern Europe and along the Arctic Circle, as well as from gaining greater influence over the Bosporus Straits.[23] Even though Ukraine is not a member of the Transatlantic alliance, it currently forms the heart of NATO's denial effort, since it drains Russian attention and resources; it thereby warrants Western support for as long as Kyiv wishes to resist Moscow. In addition, the United States should continue to support its Middle East partners—Egypt, Saudi Arabia, the Gulf States, and Israel—by helping them to build antihegemonic coalitions against Iranian dominance of the Persian Gulf, including the Strait of Hormuz.[24] Clearly, denying Iran a nuclear weapon remains of vital importance. But a security arrangement that is too weak to prevent Iran from dominating the Strait of Hormuz would permit Tehran to hold much of the global economy hostage, possibly making a nuclear Iran more likely over time. The issue is not just that 20-25 percent of the world's oil, liquified natural gas, and fertilizer chemicals pass through the Strait; it is also the second- and third-order effects that closing the Strait would have on global stock markets that are of concern.[25]

Despite (or because of) the fact that conventional and nuclear deterrence has largely held, armed conflict has migrated into the so-called gray zone. Over the last decade, Beijing has used "nearly 80 different gray zone tactics across all instruments of national power against Taiwan, Japan, Vietnam, India, and the Philippines."[26] By "synchronizing the armed CCG [China Coast Guard], PLA Navy warships, vast fishing fleets serving as maritime militia, maritime survey vessels, and an expanding fleet of UAVs, China has transformed the traditional gray zone into a darker, more volatile spectrum that precariously borders on armed conflict."[27] Moscow, too, has upped the ante with its gray-zone violence, employing such tactics as sabotage, drone overflights, assassination attempts, cyberattacks, among other activities, to test and perhaps intimidate NATO.[28] Iran's gray-zone activities have declined due to recurring Israeli and US strikes against the IRGC and its chief proxies, namely, Hezbollah, Hamas, and the Houthis. Unfortunately, these proxies will reconstitute, and Tehran will continue to exploit the space below the threshold of armed conflict to coerce its Gulf neighbors, to disrupt peace talks, and to interdict commercial traffic in the Bab al-Mandeb Strait and the Strait of Hormuz.[29] Hence, Outpacing would seek additional countermeasures for hybrid tactics.

China, Russia, and Iran collectively possess almost 12 times the economic power (defined as gross domestic product) as the Soviet Union possessed at its peak.[30] Of the West's

three strategic rivals, China obviously poses the most serious challenge—it may even serve as something of an economic center of gravity for the other two. The PRC has a rapidly growing economy that now has more global trading partners and, according to some polls, it has gained more soft power than the United States.[31] China evidently has enough economic might to sustain Russia in its war with Ukraine, despite Western sanctions.[32] The PRC's influence has already spread to the Global South, to Africa, and to South America. While Beijing's strategies for competing vary across regions, it owes much of its success to the Belt and Road Initiative (BRI).[33] The BRI has not achieved everything Beijing wanted; however, it has vastly expanded the number of China's trading partners and extended its political and economic reach. As former Australian Prime Minister Kevin Rudd aptly stated: "countries either will join with other powers (e.g. the U.S.) to help balance against China's growing influence, or countries will 'bandwagon' with China given its rising power in the region and globally."[34] The decisive factor, he later explained, is that the West should provide alternative economic opportunities for Asia-Pacific states.[35] Outpacing would thus need to provide such opportunities, and it could do so through economic partnership programs designed to offer benefits greater than those available through BRI.

However, the deterrence and defensive measures will not help America and its strategic partners outpace their rivals in the generation of national power, an essential component of strategic competition. To surpass their rivals, they will need to think more in terms of preclusion, of getting "there" first—where there can mean a physical location or taking a qualitative or quantitative lead. Preclusion entails taking anticipatory measures and these can assume any number of forms: preempting a rival's military actions; preventing the weaponization of geographic and economic chokepoints by gaining control of them first; guaranteeing access to vital resources including critical minerals and rare earths through legal agreements; rendering a rival's military power obsolete or noncompetitive through leap-ahead or offset technologies (as in the fields of artificial intelligence, cyber power, space capabilities, ballistic and cruise missiles, attack drones, aerial defense interceptors, labor-saving robotics, and nuclear arms).[36] Preclusion thus adds a proactive element to Outpacing, one that complements containment and denial.

Admittedly, preclusion may have political and ethical baggage. Like strategic preemption, it can be abused by governments that use it as an excuse to circumvent laws and norms to gain a first-mover advantage. Nonetheless, as shown above, preclusion has any number of nonmilitary applications and can and should be done legally and ethically. Doing so would contribute to the West's soft power and augment its collective legitimacy within the established rules-based order.[37] Obviously, the West should ensure it outpaces its rivals in the realms of ethics and soft power.[38]

Hurdles in the Near Term

Unfortunately, in some of the fields mentioned above, the United States and its partners have considerable work to do to establish a commanding lead over their rivals. In the field of AI, for instance, determining whether the United States or China has the lead depends on what is being measured.[39] As Stanford University's 2026 AI Index Annual Report indicates, the United States hosts some 5,427 AI data centers, 10x more than any other country, and the US private sector has invested $285.9 billion in AI, more than 23x that of China's private sector, America's closest competitor.[40] Yet the 2026 Report also states China has effectively closed the "US-China AI performance model gap," meaning the difference in quality between the best US and best PRC AI models is now negligible.[41] The danger is that buyers of AI technology may opt for the cheaper but good-enough Chinese model, leaving US companies with a smaller market share and thus in second place in the AI race in one important metric.[42] The point is that the metrics one uses to measure progress matter.[43]

Another shortfall lies in rare-earth refining capacities, which Beijing effectively weaponized in 2025.[44] According to the International Energy Agency, China accounted for roughly 70 percent of global rare-earth mining in 2025 and still controls about 90-93 percent of refinement and magnet production.[45] (For context, one F-35 fighter requires 50 pounds of samarium magnets.[46]) To break Beijing's chokehold on rare earth refinement facilities, Washington must find ways to exceed China's mining and refinement capacities by rapidly building its own (which will require cutting through red tape) and by entering into agreements with friendly parties.

In addition, the value of inexpensive military hardware, such as attack drones and low-cost interceptors, has been the topic of debate literally for decades. Whether such weapons will truly revolutionize warfare was never the right debate. The right debate, as the wars in Ukraine and Iran have demonstrated, concerns the types and quantities of such weapons modern militaries need, and what can be done more effectively and more efficiently with them. Had the United States moved more quickly as drones began to dominate the battlespace in the Russia-Ukraine war, US leaders surely would have had more defensive options available during the 2026 Iran conflict.[47] In truth, America and its strategic partners need cheaper, good-enough systems to outpace their rivals—not in lieu

of the sophisticated weapons they already have but as a complement to them.[48] Otherwise, Western leaders may self-deter rather than engage in future confrontations because their sophisticated systems are at a disadvantage in high-volume, low-cost situations.

Questions of affordability inevitably arise with any grand strategy. America's Cold War Containment strategy consumed approximately 5–10 percent of US GDP annually, including notable spikes for the Korean Conflict (1950–53) and the Vietnam War (1965–74).[49] When those spikes are subtracted, the annual cost of the Cold War (1946–1991) drops to 4.5–6 percent of GDP.[50] The post-Cold War peace dividend dropped defense spending to 3 percent of GDP, while the wars in Iraq and Afghanistan pushed it back to 4 percent.[51] The bottom line is the wars a state fights (some of which are discretionary) have a greater impact on defense spending than the type of grand strategy a state follows. One of the benefits of employing a strategic-rivalry framework, moreover, is that it helps avoid overspending by prioritizing the allocation of resources against America's rivals rather than against every potential threat. It is in Europe's interest to shoulder most of the burden of containing Russia (which is its rival, too) while the United States and its allies collaborate on containing China and Iran. Again, the United States should not attempt to do it all—but it should have enough skin in the game to assist in leading any efforts that have a bearing on its security.

Furthermore, by establishing commanding leads in the competitive fields mentioned above, Washington will revitalize the US economy through infusions of government spending, greater private sector investment, new employment opportunities, and an expansion of the workforce. A useful analogy is the economic revitalization America experienced at the beginning of the Second World War. President Franklin D. Roosevelt's New Deal and other social programs gave a much-needed boost to the US economy during the Great Depression. But the country's full recovery did not truly begin until it mobilized its industries for war after the attack on Pearl Harbor.[52] By the same token, engaging in Outpacing will generate positive momentum for Western economies. Conversely, opting for a strategic pause under a Consolidation strategy, or "taking a knee" in military parlance, is risky and gains little for America and its partners.[53] Instead, doing so merely affords America's strategic rivals time to strengthen their own positions. America must carry out its economic revitalization in stride, that is, as part of—or indeed because of—its Outpacing strategy. Thus, while Outpacing demands swift and energetic action in the near term to close gaps in the generation of power before they become unbridgeable, it should not be seen as a drain on Western economies but rather an opportunity to generate gains while engaging in competition.

Finally, America's allies and partners have always been indispensable to the success of its grand strategies. They have begun to move in the direction of increased burden sharing, if not strategic autonomy. But America needs to keep enough "skin in the game" to be able to exert meaningful leadership when crises occur. Washington cannot assume the interests of its partners will align wholly with its own. Some overlap will occur, to be sure, but the proverbial rub lies in the disparities, which always seem to widen when the costs mount. Nor is it safe to assume that what happens in one region will stay in that region; today's security environment is a global village not a Las Vegas.

Conclusion

Strategic competition never truly stops; nor can strategic rivalry be wished away or ignored. Attempting to do so risks committing the Carthaginian error. Avoiding that error means understanding the difference between adversaries and rivals. The latter wage serial wars, whether hot or cold or something in between. Carthage's leaders misjudged how insecure and uncompromising their Roman rivals were and paid dearly for their error.[54] America and its partners may not face annihilation on a scale analogous to that of Carthage (though a catastrophic nuclear exchange with either Russia or China is certainly possible). Nevertheless, the West can lose the struggle against its strategic rivals if they cause its competitive power to erode, its global influence to decline, its political and social institutions to lose credibility, and its standards of living to fall relative to their own. Thus, defeat is conceivable.

Outpacing succeeds if the United States and its partners can establish advantages so great that their rivals exhaust themselves attempting to close the gaps. Outpacing can put the Western powers in a better position to achieve victory, should war come. It can also put them in a position to be magnanimous, should war prove unnecessary. Outpacing can also facilitate deterrence by creating situations in which war is an unattractive option for rivals, which in turn may reduce the incidence of wars. However, creating situations in which war is unattractive will require deftly managing "red lines" and reassurances to avoid provoking a rival into taking preemptive action. Outpacing is not a risk-free strategy.

It is also possible that Outpacing will unfold in a series of "fits and starts," a form of punctuated equilibrium, rather than with one party gaining an insurmountable lead; one party may gain a lead due to some sort of technological breakthrough or through intense investments but its rivals eventually close the gap, either by stealing secrets or by some other means.[55] Indeed, one of the ironies of contemporary technological progress—especially in cyber

power or AI—is that it facilitates the appropriation of another party's technological progress. Accordingly, the West should avoid the tempting assumption that strategic competition is linear and that a particular technological lead is sustainable by simply doing more of the same. Progress has linear and nonlinear elements. Thus, the Western powers must hedge themselves against their rivals' inevitable progress through the anticipatory development of asymmetric countermeasures.

Should it prove impossible for Western economies to achieve a commanding lead, Outpacing will prevent them from falling too far behind. The West's culture of innovation and adaptation should enable it to put serious pressure on its rivals' economic and political systems and to close the most important gaps. Outpacing is a strategy of patience but not of complacency. It offers guidelines for the long haul, but not at the expense of the short term. However, its chief value may lie in its ability to keep Western leaders' heads in the game, as it were, and thereby to prevent them from assuming, as the Carthaginians did, that their rivals have turned a new leaf or that the struggle has ended.

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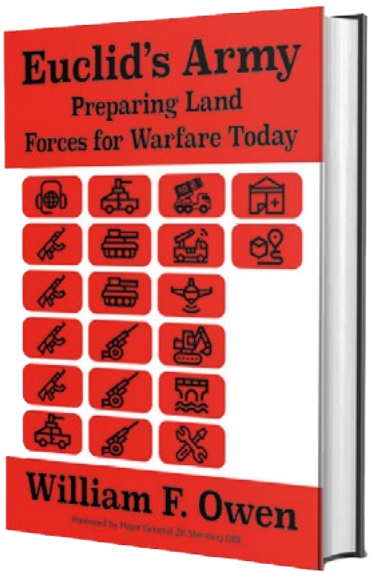

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Tropical Bastions: It's Time for a Pacific Bastion Strategy in the First Island Chain

John T. Kuehn - U.S. Army Command and General Staff College (CGSC)

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Dr. John T. Kuehn is Professor of Military History at the U.S. Army Command and General Staff College (CGSC). He was awarded a Moncado Prize from the Society for Military History in 2011 and a Vandevort Prize from the same organization in 2023. His latest book is *Strategy in Crisis: The Pacific War*, 1937-1945 (2023), from Naval Institute Press.

Discalimer: The views are those of the author and do not reflect the official policy or position of the Department of the Army, Department of War, or the U.S. Government.

As the U.S. Navy struggles with how to contest littoral seas in the Western Pacific should deterrence fail against China, its leaders might consider the past for examples and patterns that could support a crisis response or even winning approach. One of the great questions of today is how to employ the U.S. fleet and its potential partners should China become more bellicose in the South China Sea (SCS), in the waters around Taiwan,

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or both. This analysis does not aim to examine so much the advisability and policy objectives that might lead to a direct war with China over Taiwan or in the SCS. Rather, it addresses a possible worst-case contingency where the United States might have to fight somewhere in the tropical areas of the so-called "First Island Chain." Parts of the island chain, particularly its tropical component that lies in the sovereign waters of the Philippines, could be the key maritime terrain should a future crisis or conflict occur between the naval, air, and land forces of China, the United States, and the latter's treaty allies such as the Philippines. [1]

The United States cannot choose the time and place for crises, and the Western Pacific is no exception. Almost one hundred years ago, when the U.S. Navy was at its lowest point in the period between the First and Second World Wars, the General Board, the Navy's premier strategic and fleet design organization, advised the President of the United States as follows:

> Present preparedness must not be sacrificed to an illusory future readiness. National emergencies cannot be foreseen and must be met by existing forces.
>
> The General Board of the Navy, January 1933[2]

This analysis will not base its recommendations for strategic and operational employment of the U.S. fleet on some yet-to-be-delivered future force, but on those warships and joint capabilities and international partnerships that *exist today*. Too often the leadership of the U.S. Navy does this, projecting use of exquisite "pie-in-the-sky" systems, while doing it entirely in a vacuum without the joint force or allies. In other words, the Navy often goes to war (and crisis) with the Navy it has, to paraphrase a previous Secretary of Defense, and nothing else.[3]

The Rules Based Maritime Order and Alternatives to War

The higher purpose for the United States and its partners in the Western Pacific revolves around defense of the international rules-based order at sea as outlined in the United Convention Law of the Sea III or UNCLOS III.[4] China currently contests the use of the seas of the Western Pacific against a wide variety of its "neighbors," most especially Taiwan, the Republic of the Philippines, and, especially in the past, Vietnam, from whom it seized the Paracel Islands in the 1970s. The most grandiose violation of UNCLOS III occurred with China's demarche claiming sovereignty over almost the entirety of the so-called South China Sea (which is called different names by the other nations bordering it) with its "nine-dash line."[5] The other pertinent geopolitical situation involves Taiwan, and the free flow of shipping into and out of Taiwan should the PRC employ a more muscular policy to attain its goal of uniting the island politically with the regime in Beijing.

There are alternatives to armed conflict regarding these contested seas, which the introductory assumes as a worst case. In the case of Taiwan, the alternative to armed conflict with the PRC is its opposite—non-belligerent, neutral status. The Taiwan Relations Act, despite all its ambiguities, does not commit the United States to Taiwan's defense.[6] Thus, the problems in the waters around Taiwan revolve around imposition of a Chinese blockade and how the United States might address that. There are many examples of the United States remaining neutral when one nation seized or attempted to seize another nation's claimed sovereign territory. Ukraine comes to mind most recently, but the British War with Argentina over the Falklands-Malvinas is another historical example that fits better.[7] And then there is complete non-intervention, what an earlier age called "strict neutrality."[8] The United States could be presented with an ideal environment to practice its own form of lawfare as well as "gray zone" operations if it remained a non-belligerent in the case of armed conflict between the PRC and Taiwan.[9] Most of these sorts of activities would involve the air, sea, and cyber domains. Sanctions short of war against Chinese shipping (versus an outright distant blockade), could be quite effective, especially as a deterrent to something like an overt Chinese invasion or strategic bombardment with aircraft, missiles, or unmanned drones. [10]

Similarly, the SCS and the nine-dash line offer opportunities short of war to contest Chinese activities and claims. In this area the United States has far more support against China's high-handed and illegal maritime claims. The United States already has in place a regime of freedom of navigation transits in place that challenge Chinese claims, establishing continually the precedent and custom required by UNCLOS and international law. That alternative is already playing out. SCS transits by the U.S. Navy have occurred continuously in these waters for over a century and have been critical not just to international maritime practice, but essential to the Navy's ability to move its forces rapidly between its theaters in the Pacific and the Indian Ocean-Persian Gulf. However, the alliance and partner relationships may prove more efficacious in dealing with China in this region because the United States is on much firmer ground. Agreements like AUKUS and the beefing up of the Philippine Navy and Coast Guard (with the participation of Japan) already "push back" on Chinese aggression in this region.[11]

Looking to the (Recent) Past

It might seem odd to this readership, but the late Cold War and especially the operationalization of the 1980s Maritime Strategy offers some ideas about how to address the Chinese challenge. This holds especially true in the waters around the northern Philippines adjacent to Taiwan or the other crisis area north of China's illegal nine-dash line in the SCS

west of the Philippines.[12]

The United States' 1984 Maritime Strategy came about during a period dubbed by some a "Naval Renaissance" in naval strategic thinking.[13] The crafting of this strategy took place against the backdrop of the Reagan administration's goal of building a "600-ship" Navy. The key advocate, for both the strategy and the large fleet, was Secretary of the Navy John Lehman. The strategy contained both conventional and nuclear components; however, it is the conventional component that compares most favorably to offer insights for the Western Pacific. This conventional component included plans to contest Soviet "bastions" in the Far East, principally in the remote and forbidding Sea of Okhotsk.[14] The conventional and nuclear components were directly tied to each other, with the conventional deployment of carrier and battleship strike groups as precursors to threatening the Soviets' submarine fleet, especially its sea-based ballistic missile submarines. U.S. groups would steam onto the seaward flanks of Soviet bastions and would use bastions to threaten them in turn.[15]

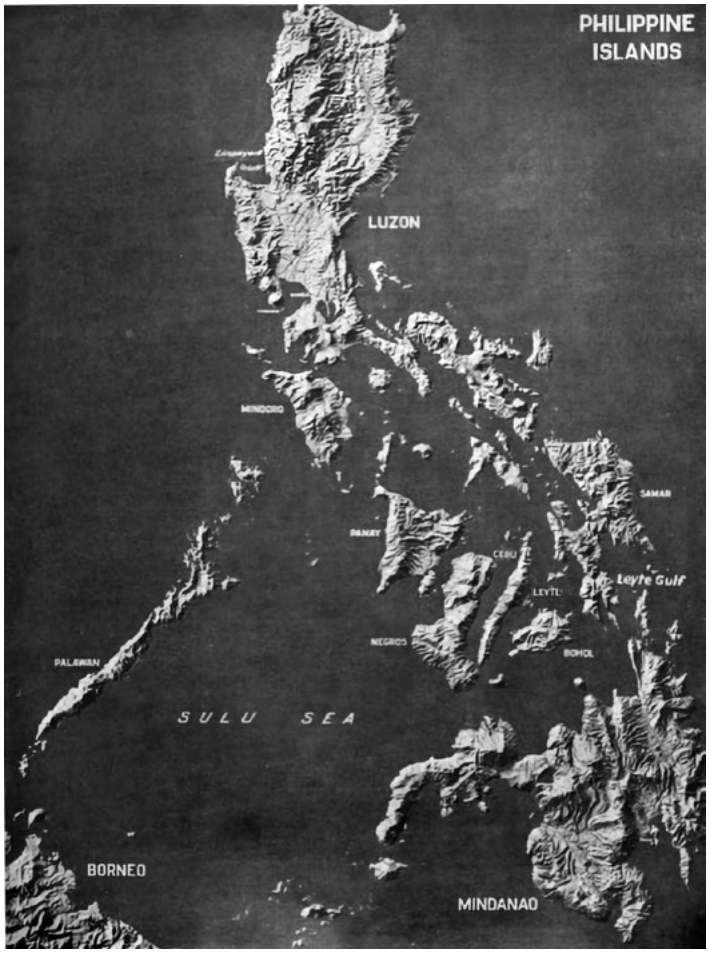
During the Cold War, various numbered Fleet "Fighting Instructions" were developed from the Maritime Strategy template to use the concept of mini-bastions, especially in Norwegian fjords and the Kurile and Japanese islands (in the Pacific) to "hide" Navy ships from enemy systems, especially air- and sub-delivered anti-ship cruise missiles.[16] This approach took advantage of lessons learned from the British Falklands War (1982) that leveraged terrain masking to protect ships. Radar, including radar homers on anti-ship missiles (and presumably drones), cannot see through rock and granite, and thus terrain features, such as the steep cliffs that surrounded the British landing site at San Carlos in the Falklands in 1982, protected ship-to-shore movement from Argentinian air and missile attacks. This tactic is known as radar masking. Navy planners created fleet fighting instructions that disseminated this "bastion" tactic of putting Navy ships, including carrier groups, inside constrained bodies of water to radar mask them from Soviet anti-shipping air- and sub-attacks using cruise missiles as they conducted strikes in the opening days of a hot war with the Soviet Union.[17] Similarly, many of the Kurile and Japanese islands (themselves part of the First Island Chain), were to be used in a similar manner for stand-off carrier and even battleship strikes with Tomahawk cruise missiles in the Pacific. The Navy's approach added a new wrinkle, what one can call dynamic terrain radar masking, where the radar masked target is maneuvering to further complicate targeting. This technique for counter-targeting was practiced by aircraft carriers in Norwegian Fjords. It was also practiced in the Aegean between the island of Lesbos and the Turkish mainland by the USS *America* carrier battlegroup during the NATO exercise DISPLAY DETERMINATION 1989.[18] The irony here, at least in the Cold War, was that the U.S. planned to attack Soviet submarine ballistic missile bastions by creating its own terrain-based bastions at the periphery of the Soviet ones.[19]

The Philippines: Ideal Bastions for Deterrence

Let us return to the geography of the Philippines to understand how this approach from the past might be leveraged for operationalization today by Indo-Pacific Command vis-à-vis the Chinese challenge.[20] Readers must be reminded at this point that the Philippines is one of the United States' oldest military treaty allies, pre-dating NATO. A.T. Mahan, in the first chapter of his masterpiece on sea power, wrote about the concept of "Geographical Position." His discussion emphasized the importance of geography and the sea, especially with respect to both trading routes and threats to those trading routes, but also as a means to advantage fleets. He wrote:

…if a nation be so situated that it is neither forced to defend itself by land nor induced to seek extension of its territory by way of land, it has, by the very unity of its aim directed upon the sea, an advantage as compared with a people one of whose boundaries is continental.[21]

Let us now apply this to the Philippines, China, and the United States. Firstly, the geography matches Mahan's description—China has land borders but none of them are contiguous with the Philippines, which itself has no contiguous land borders with any other nation. The same Mahanian geographical advantage also accrues to the United States. One could advance the possibility of a Chinese seaborne invasion of the Philippines (as remote as that might seem), but if the problem is occurring in the SCS or to the north off Taiwan, China would hardly put the cart before the horse, invading Taiwan or grabbing more land in the SCS *after* it had attempted to invade the Philippines. Recall, the Japanese possessed Taiwan *prior to* their invasion of the Philippines in 1941. This confers an advantage for the United States vis-à-vis the Philippines. Its waters and littoral areas could become bastions and bases for U.S. naval and joint forces, very difficult to engage if at the same time one is fighting somewhere else.



Sibuyan Sea

This leads to a specific analysis of the actual geography, which, in Mahanian prose, can be characterized as very blessed indeed. Beginning with Subic and Manila Bays in the north, the Philippines is a virtual archipelago of "bastions," especially its inland seas (see map) such as the Sulu and Sibuyan Seas in the middle of the island group. The islands and inland seas offer a "porcupine" of terrain-protected features from which to launch long-range strikes with ships, air, and land-based missile and drone forces against the Chinese, either in the waters south of Taiwan or those west of the long Philippine island of Palawan (where Marines are stationed today).[22]

Carrier Strike Groups (CSGs) can operate with relative impunity from these bastions as long as land-based defenses, manned by the Marines, US Army or the Philippine Armed Forces are on the intervening terrain (such as Luzon or Palawan). One might even speculate that this is a particular nightmare scenario for the Chinese Politburo and Central Military Commission (the Chinese analog of the United States' National Security Council), which controls the People's Liberation Army. Additionally, long-range anti-ship, anti-air, and unmanned air systems can be operated against Chinese forces from this terrain. Finally, including the full capability of the joint force, the U.S. Air Force could provide additional strike, tactical, and refueling capability to make the problem immeasurably more difficult for the Chinese. History illustrates that it was precisely this nightmare scenario in 1941 that caused the Japanese to attack the United States in the first place—its superior (but poorly defended) geographical position in the Philippines that lay astride its planned sea lines of communication (SLOC) to the territories it wanted to conquer and exploit for resources to the south.[23] Air Force refueling ("tanking") will prove vital to any use of CSGs and other naval forces from these bastions given the relatively short range of current carrier airwings. Additionally, air force tanking is not a *sine qua non* for the use of these watery areas.

The People's Liberation Army Navy (PLAN) is a powerful force, with more actual warships than the U.S. Navy, but unlike the Japanese in 1941, all its assets will be focused on just one theater, the Western Pacific, not as many as the U.S. was in World War II and still is today. Also, the bulk of China's numbers are in smaller surface combatants and submarines while the U.S. Navy has the equivalent of 11 large (nuclear powered) and 9 small (amphibious warfare) aircraft carriers.[24] Also, the PLAN is not a long-range Navy, its carrier forces are still in their relative infancy, and not inclined to leave the defensive "bubble" provided by the proximity of the motherland, even in the SCS. So much less will it be able to do counter-bastion operations if it is conducting major operations elsewhere, especially in locations where sea control is vital and the primary mission. As for the bastions themselves, like the Cold War bastions, the entrances to all those mentioned have adjacent land-based features that would be under control of a Filipino-American force. These forces could actually bring an enemy under artillery as well as shorter range missile fire should they try to penetrate and address their antagonists inside the bastions. They can also be easily mined, making their penetration by missile corvettes and submarines dangerous, to say nothing of what land-based Western integrated air defense systems (IADS) might do to the People's Liberation Army Air Force (PLAAF) strike bombers, whose own refueling capability is also in its infancy.[25] Having forces on intervening land terrain, like Palawan, also makes defense against drones easier than if there was clear sea space to American warships.

The long pole in the tent is something that Sunzi (Sun Tzu), the sage Chinese strategist wrote about millennia ago—"Thus the highest realization of warfare is to attack the enemy's plans; next to attack their alliances… ."[26] This all assumes that the Philippines would allow the United States to operate here. However, the United States is already doing this, for example on the ground in Palawan, and not just with the Filipinos but with another treaty ally, Australia.[27]

However, what if the Philippine government decides not to allow the U.S. to position aircraft, drone defenses, cruise missiles, as well as ground troops on its territory? Fortunately, the U.S. has experience in this as well, although this would eliminate the northern bastions to a great degree

(Manila and Subic Bays), it does not eliminate operating to the east of Luzon (southeast of Taiwan) in the Philippine Sea and thus deny the PLAN or the PLAAF western approaches to U.S. naval forces, simplifying defense challenges and threat axes. The ranges here, in particular, pose problems for Chinese kill chains, especially those involving First Person View (FPV) Drones, which are subject to electronic warfare unless optical-fiber guided as in Ukraine and Lebanon. Optical fiber guidance is itself severely degraded in range unless optical-FPV drones are deployed on a mother ship of some sort. The weak link here, as always, is the mother ship, easy to target and kill with relatively cheap weapons. [28]

As for a potential conflict in the SCS, the U.S., using transit passage (allowed under UNCLOS), could transit into the Sulu and Sibuyan Seas to operate (see map); the Sulu Sea is an optimal bastion. Additionally, the Sulu Sea can be operated in as international waters due to its size. Similarly, say for USAF tanking, the International Aeronautical regime allows the airways equivalent of archipelagic transits that lead to international waters in the international waters of inland seas, which means tanking is still viable without an ally's permission as are strikes out of and then returning to the bastion. However, these sorts of measures come with significant diplomatic consequences.[29] They could in fact alienate the very nations the U.S. is trying to help, which is why this concept needs to be included in Theater Cooperation Security exercises, for example Rim of the Pacific (RIMPAC) or as bilateral exercises with the Philippines.[30] U.S. naval forces, including the all-important CSGs and Amphibious Readiness Groups already routinely transit the SCS both coming and going to the Persian Gulf. Adding a transit and time for a proof-of-concept type exercise into the Sulu Sea, for example, would be easy enough to schedule. One might imagine that other regional partners like Malaysia and Indonesia might show interest for similar operations in the Java Sea. As Rear Admiral Wayne Meyer, the "father" of the AEGIS weapons system said, "…test a little, learn a lot."[31]

The People's Liberation Army (PLA) and its space-based Intelligence, Surveillance, and Reconnaissance (ISR) pose a formidable challenge to this approach. That challenge is often portrayed as a fait accompli that borders on technological determinism. Simply saying that space-based ISR exists does not mean that such systems are impossible to deceive, confuse, and to create multiple dilemmas for PLA decision-makers. Some have argued that the PLA's centralized system of control is weakest in this area—the ability to make decisions in an uncertain information and targeting environment.[32] The PLA's command and control has not been employed in such an environment, in an open war across domains, and never with the ISR technology it has now. A tropical bastion strategy with naval forces further thickens this fog. As one author has put it, "[the PLA's] reliance on information superiority is a vulnerability, and the assumption by China that they [sic] will have it is a slippery slope…."[33] This particular author favors marrying up space-based electronic warfare (EW) to further degrade the resolution of the Chinese picture of terrestrial events. [34] However, even without bringing space EW assets into play, the dilemmas and information challenges posed to Chinese space-based systems are worth investigating all on their own.

Returning to Sunzi's quote above, one might ask, "Why tell the Chinese in an article like this of this approach, won't they take his advice and attack the plan, and particularly U.S. alliances?" Paradoxically, knowing that a wicked problem like this exists, especially for the fiction that the waters north of the nine-dash line in the SCS are Chinese, itself is a form of deterrence that aims to prevent reckless Chinese adventures in the region, especially with their military. Anything that introduces a strategic dilemma into an adversary's calculations is generally good, especially prior to the outbreak of actual conflict.

This approach need not be restricted to a wartime option. Training and exercises in the waters of seas like the Sulu, Sibuyan, and Celebes offer escalation options for signal sending to China as a means to control its actions and send strategic signals. For example, should China attempt even more aggressive actions toward the Philippines and its fishing fleets in the Eastern part of the SCS in the vicinity of Palawan, U.S. forces, especially carrier forces, could be deployed to the Sulu Sea as a show of force and for interoperability and training with local Philippine maritime forces. Imagine the signal received at the People's Liberation Army Navy headquarters for the South Sea Fleet when its forces report the presence of F-18s, F-35s, and SH-60 aircraft above its "bully boys" inside the Philippines' Economic Exclusion Zone. But such operations need not wait – in fact should not wait – on crisis, they can be scheduled under the rubric of Theater Security Cooperation now, something already occurring on Palawan between the U.S. Marines and the Philippine Armed Forces.[35]

Mahan Would Approve

In summary, this article proposes that the Navy in particular, and the entire joint force generally, get serious about taking advantage of both geography and American alliances in the region to address Chinese adventurism in the Western Pacific (and perhaps beyond). The United States' strategic leaders need to realize that nations like the Philippines, and Japan, which make up key areas of the first island chain, are absolutely essential to security and stability in this region of the world, which has more economic interests for the U.S. than any other.

Returning to the example of the 1980s Maritime Strategy, it did have its critics. Some, including the author, argued that the strategy risked lowering the bars to escalation, particularly for the potential use of Soviet tactical nuclear weapons pre-emptively against carriers operating in the constrained littoral areas of Norwegian fjords and the Kurile Islands. However, historical analogies must weigh ends,

ways, and means within context. A maritime dispute in the SCS with targets at some distance east of the PRC's core strategic capabilities and interests compares poorly with the Cold War scenario of the 1980s. It is unlikely that China will go "nuclear" or escalate exponentially in response. Also, the deterrent value is more focused on challenging an excessive maritime claim that is already codified in international law. Finally, the signal an aircraft carrier operating in the Sulu or Sibuyan Seas sends is powerful indeed. It offers both assurance and opportunity to American allies and partners in the region, not just the Republic of the Philippines, which is in an ongoing gray zone war with China in these waters.

The United States will not "go it alone" in any major war in this region. Thus, partners like Australia are also critical to developing concepts like this and are in fact already part of concept development for other approaches to regional stability.[36] There are challenges in this approach, just as there were with the original Maritime Strategy in 1984. But those challenges should not prevent investigation, testing, and exercises that themselves are part of the calculus of deterrence and escalation. This approach is not a one-size-fits-all solution. It is an operational approach designed to get the maximum advantage out of geographical position. Mahan would smile, and approve.

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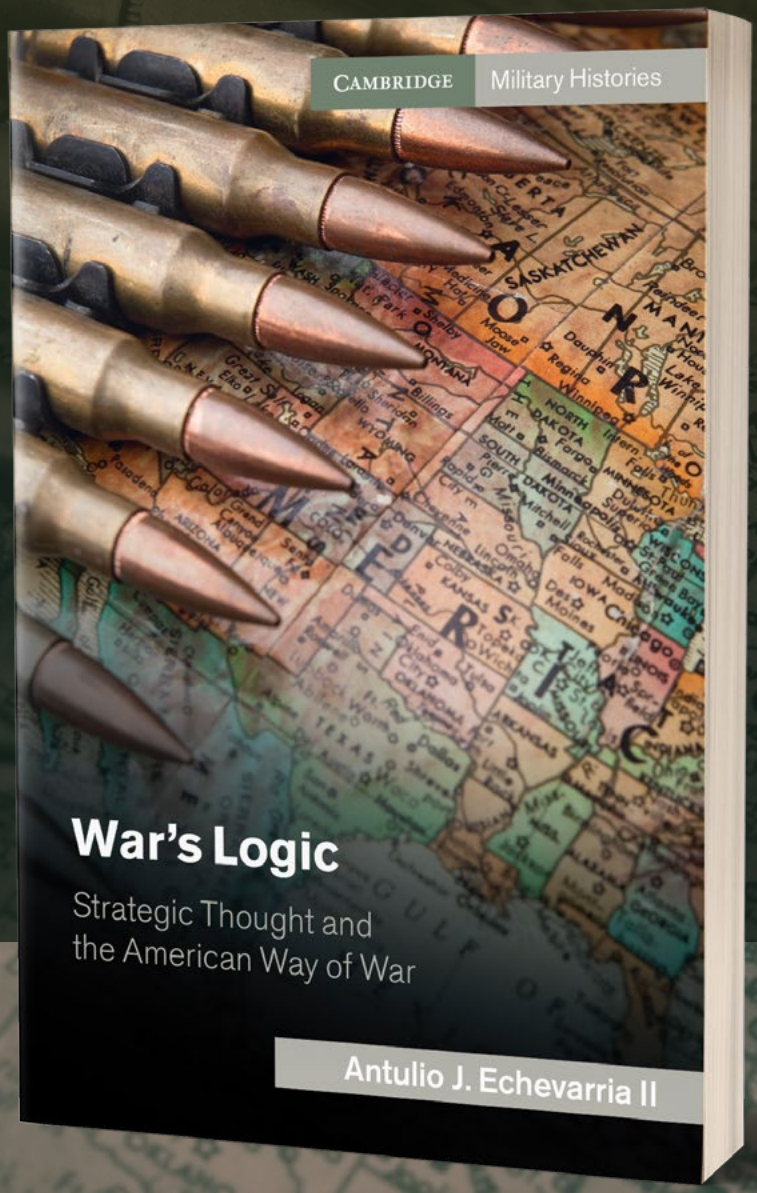
War's Logic

Strategic Thought and the American Way of War

Antulio J. Echevarria II



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Strategy and Contradiction: Towards a Theory of Strategic Judgement

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Strategy is often understood as the intellectual process through which political purposes are related to the means available for their achievement, usually under conditions of uncertainty and opposition.[1] It is this understanding that provides the starting point for most strategic thought.[2]

Conceiving strategy in these terms, however, invites an earlier question. Before political ends can be related to available means, before courses of action can be compared or resources committed, a situation must first be recognised as requiring strategic judgement. Such recognition is easily overlooked because it appears self-evident. Yet it underlies every strategic consideration that follows.

Rather than asking how strategic judgement should respond once a strategic problem has been identified, this study goes back one step and asks what conditions of political life make strategic judgement necessary in the first place. Only then does it become possible to understand what distinguishes it from other forms of practical reasoning.[3]

The argument advanced here is theoretical rather than prescriptive. It does not propose a new method of strategic practice, nor does it seek to replace the accumulated insights of the strategic tradition or offer practical guidance for future conduct. Its purpose is more modest: to clarify the conditions that make strategic judgement necessary in the first place.

That clarification is nevertheless important. The way strategic problems are understood influences the kinds of questions that are asked of them and the range of responses that appear intelligible. By locating the origins of strategy in the contradictory character of political life, this study offers a more lucid way of reasoning about strategic problems before particular solutions or courses of action are considered.

This enquiry is necessarily conceptual, though it will seek to illustrate its claims through historical examples and allusions. It begins by clarifying the concepts from which strategic practice originates before turning to their historical expression. Deterrence, alliances and insurgency are examined as recurring expressions of the political relationships that give rise to the necessity for strategic judgement.

Although related themes have appeared throughout the strategic literature, from Clausewitz's reflections on friction and reciprocal action to Edward Luttwak's account of the paradoxical logic of strategy, those works have been primarily concerned with the dynamics of strategic interaction itself. The present study instead begins with a prior question. It seeks to identify the conditions of political life from which strategic interaction itself emerges.

What is a Problem?

If strategic judgement begins with the recognition of a problem, the first question is what a problem actually is. The language of strategy is saturated with references to problems. Governments confront strategic problems. Military organisations distinguish between strategic, operational and tactical problems. Policymakers seek solutions to security problems, alliance problems and problems of deterrence.[4] The word itself appears so familiar that it rarely invites closer scrutiny.

Yet familiarity should not be mistaken for precision or clarity. To describe something as a problem is already to believe something about the kind of reaction it may require.[5] Scarcity may be described as a problem. Uncertainty may be described as a problem. Violence, instability and political disagreement are all routinely characterised in the same way. The same word is therefore applied to circumstances that differ profoundly in the adjudications they require.

Difficulty alone does not make something a problem. Problems emerge where circumstances require deliberation because not every purpose can be realised simultaneously. It is therefore the necessity of judgement in choosing how to deal with a particular difficulty, as opposed to the presence of adversity per se, that gives the concept of a problem its distinctive meaning for strategy.

Such an observation may appear elementary, yet its implications are far-reaching. If problems are distinguished by the judgements they require, the next question is what gives political problems their particular character, and why some of those problems assume a specifically strategic form.

The Character of Political Problems

Political problems differ from technical problems because they arise from a different set of human connections. Technical problems may be highly complex, yet complexity alone does not make them political. The construction of a bridge may present formidable engineering challenges. Curing a disease may require extraordinary scientific ingenuity. Such problems demand expertise, but they do not ordinarily require the reconciliation of competing collective interests and purposes that gives human endeavour its political character.[6]

Political life differs from technical questions because it consists of individuals and organised groups pursuing purposes that only partially, if ever, coincide. Cooperation is therefore always accompanied by tension because agreement is never, or at least very rarely, complete.[7] Agreements remain contingent because interests evolve, priorities shift and circumstances change. Political exertion,

and perhaps human interrelationships more generally, is consequently characterised not by the existence of isolated disagreements or discrete challenges as in fields of science or engineering, but by the persistent generation of new contradictions.

The shifting alignments of European diplomacy before 1914 illustrate the point: alliances did not remove political contradiction so much as rearrange competing interests and tensions that ultimately set the scene for the subsequent conflagration. The outcome of the First World War sowed the seeds for the Second, which in turn laid the foundation for the period of the Cold War.[8] The pattern recurs throughout the history of international politics.[9] Political settlements therefore remain transient rather than permanent. Every settlement establishes a new accommodation from which further disagreements emerge. Political order is not the elimination of contradiction but its temporary alleviation.

Political problems thus possess a distinctive quality. Every settlement becomes part of the circumstances from which subsequent problems arise, making political life less a process of resolution than of continuing accommodation.[10] The effort of politics therefore becomes a perpetual practice of situational management whose purposes, interests and circumstances remain in constant motion. The question, then, is what distinguishes those situations under which political judgement assumes a specifically strategic character.

The Orientation of Strategic Judgement

If political problems surface from the ever-shifting dynamics of collective human experience, strategic judgement cannot consist merely in the application of fixed principles. The social circumstances which politics reflects are themselves altered by strategic action, ensuring that each judgement contributes to the conditions within which subsequent deliberations must be made. Strategy therefore cannot be understood as the application of predetermined solutions to recurring problems. Rather, it consists in the exercise of judgement within webs of association whose political meaning remains contingent.

Here, then, we can discern clearly how strategic acumen differs fundamentally from technical expertise. Technical expertise depends upon stable relations between cause and effect. By contrast, strategic expertise requires the interpretation of political circumstances whose future development cannot be known in advance. The strategic problem lies in understanding the context within which available means acquire their political significance.

Statesmen from Metternich to Castlereagh to Kissinger recognised that successful strategic conduct depended less upon solving social contradictions than their prudent management.[11] Strategy requires the capacity to reconcile competing purposes while recognising that every judgement becomes part of the political circumstances confronting those that follow. The exercise of strategic judgement is therefore inherently provisional because the contradictions from which strategic problems arise admit no final settlement.

Clausewitz and Strategic Judgement

One of Carl von Clausewitz's crucial insights was to recognise that strategy cannot be reduced to the application of formal rules because war unfolds within this evolving social milieu.[12] Seen in this light, his conception of friction, chance and uncertainty reflects the deeper appreciation that strategic judgement must respond to circumstances whose course cannot be foreseen.[13]

It is from these observations that Clausewitz's rejection of strategy as the mechanical application of universal principles can be readily appreciated, in contrast to the approach associated with contemporaries such as Antoine Henri Jomini. Strategic judgement must therefore be exercised because every decision, whether large or small, contributes to the environment within which subsequent decisions are made. No solution, whether victory in a single battle or success in war itself, can remain stable because every strategic success creates new dynamics upon which it depends.[14]

Clausewitz's insight has since been developed in different ways by later strategic theorists. Edward Luttwak, for example, argues that strategy operates according to a distinctive 'paradoxical logic', in which actions frequently produce outcomes opposite to those originally intended. Strategic success generates new vulnerabilities; strength invites countervailing responses and attempts to impose order often create fresh instability. Luttwak's account, like Clausewitz's, rejects linear or technical conceptions of strategy in favour of an understanding rooted in interaction, adaptation and political contingency.[15]

The present argument shares this rejection of linear strategic reasoning but asks a prior question. Rather than examining the paradoxical character of strategic outcomes themselves, it seeks to explain why such paradoxes arise in the first place. The answer advanced here is that strategy unfolds within a political world whose contradictory character ensures that every successful judgement simultaneously transforms the circumstances within which subsequent judgements must be exercised.

Clausewitz's analysis points towards a more fundamental conclusion. Human societies are characterised by contradictions that no settlement can ultimately resolve. It is this condition that makes strategic judgement

indispensable, since no rule can determine the appropriate course of action. Wherever competing political purposes interact under conditions of persistent contradiction, judgement is required. War represents the most intense manifestation of this wider condition, as he discerned in his acknowledgement that 'the result in war is never final'.[16]

If no result is ever final, strategy cannot expect to seek the closure of political problems as it is a mode of reasoning directed towards the accommodation of contradiction rather than its elimination. Strategy, in that sense, is the classic exemplar of the infinite game.[17]

The Problem of Strategic Success

If strategic reasoning exists to manage political contradiction, the question becomes how its success should be judged. Conventional discussions of strategy generally assume that success consists in the attainment of preset objectives. Actions are regarded as successful where intended purposes are realised, and unsuccessful where they are not. That understanding is straightforward enough but becomes increasingly difficult to sustain once politics is recognised as a process rather than a sequence of discrete events.

Political purposes are themselves subject to revision. Objectives that appear attainable at one moment may lose their significance at another, while new contradictions emerge even where earlier ones have been successfully accommodated. Strategic success therefore cannot consist simply in the attainment of particular objectives, because the purposes those objectives are intended to serve are themselves subject to revision.

All this may seem highly theoretical, or even slightly tautologous. Yet this is not merely a theoretical proposition. It is the historical experience from which modern strategic thought itself materialises. Clausewitz's reflections on the Napoleonic Wars were shaped by precisely this phenomenon.[18] Napoleon's victories ultimately produced the hostile coalition that brought about his downfall, demonstrating that military success generated political circumstances requiring further strategic management.[19]

Likewise, although the United States prevailed in nearly every major force-on-force engagement in Vietnam, military success proved insufficient to secure its political objectives.[20] More recently, Western interventions in Iraq and Afghanistan achieved repeated battlefield successes without producing durable settlements.[21] In each case, military success remade the social environment without resolving the contradictions that gave rise to conflict in the first place.[22]

From Clausewitz onwards, the relationship between military success and political uncertainty has been repeatedly recognised, yet it is equally repeatedly rediscovered. That continuous rediscovery should be enough to give scholars of strategy pause for thought, but it rarely does.

Each generation appears tempted to believe that decisive military success will finally resolve political contradictions rather than merely create new political circumstances requiring further judgement. The persistence of this expectation is itself revealing. It reflects, seemingly, a recurring human desire to search for certainty and closure in a domain where certainty is inherently elusive, together with a preference for determinate solutions over the complex, and contingent, human sphere.

In summary, then, effective strategy should concern the exercise of judgement rather than the pursuit of definitive solutions. Success consists not in escaping contradiction but in responding to it as competing purposes confront new circumstances. Strategy remains an infinite game because no political settlement can exhaust the contradictions from which strategic problems arise.

The Practice of Strategic Judgement

If strategic success depends upon sound judgement, it becomes necessary to ask what this involves. The concept of 'judgement' in this context can be held to denote the capacity to determine how competing purposes may best be reconciled in particular circumstances. It is less a matter of applying doctrine than of reasoning practically about contingent situations, where every decision becomes part of the context within which subsequent decisions must be taken. Strategy is therefore inherently recursive: each attempt to resolve one problem creates the conditions in which the next must be addressed.

Accordingly, strategic judgement requires the capacity to distinguish between contradictions that can be accommodated, those that can only be managed, and those that, for the time being, cannot be reconciled. It relies on recognising which possibilities remain open, which should be preserved, and which courses of action unnecessarily foreclose future political choices. Strategy thus demands prudence rather than certainty, discrimination rather than mechanical consistency, and continual reassessment rather than adherence to established plans.

President Abraham Lincoln's conduct of the American Civil War illustrates the practical operation of strategic judgement. Throughout the conflict, the relationship between military operations, constitutional authority and political purpose demanded successive adjustments in strategic direction while preserving the overarching objective of restoring the Union.[23]

The Emancipation Proclamation exemplified this process. Introduced as a wartime measure under the President's constitutional war powers, it simultaneously transformed the political character of the U.S. Civil War, strengthened

the Union's diplomatic position by making European recognition of the Confederacy politically more difficult, and altered Confederate strategic calculations. Strategic success came to depend less upon adherence to an original plan than upon the exercise of political judgement as each major decision created new conditions requiring further strategic adaptation.[24] The war itself would continue, but the purposes and strategic opportunities through which it was prosecuted did not remain the same.

Pulling these threads together, it can be asserted that strategic judgement is the disciplined exercise of prudential political reasoning directed towards the accommodation of contradiction in the pursuit of political purposes. Its task is neither to eliminate contradiction nor to discover permanent solutions, but to determine how competing political purposes may best be reconciled in practice.

The explanatory value of this conception ultimately rests on its power to illuminate strategic practice across diverse contexts. The following sections examine some common themes across the spectrum of strategy – deterrence, alliances and insurgency – to consider whether viewing each through the lens of strategic judgement reveals more clearly their underlying strategic logic.

Demonstration I – Deterrence

Deterrence usually refers to the prevention or dissuasion of an opponent from taking a particular course of action through the ultimate threat of force.[25] While this captures its immediate purpose, it can also encourage deterrence to be viewed principally as a stable correlation between threat and compliance.[26]

Under the conception of strategy advanced here, deterrence should be more accurately conceived as the exercise of strategic judgement directed towards conditioning the judgements of others. Its purpose extends beyond preventing conflict to influencing adversarial behaviour through the management of perceived costs, risks and opportunities. Its effectiveness therefore depends upon the quality of judgement brought to bear upon particular circumstances rather than upon assuming that deterrence, once established, can sustain itself.[27]

Deterrence illustrates this broader conception of strategic deliberation. Its successful practice rests upon the prudent interpretation of political purpose, strategic risk and adversarial intent. It seeks to render political contradiction manageable by sustaining enduring strategic rivalry without allowing that rivalry to culminate in war. In this respect, deterrence is less a stable strategic condition than a political accomplishment.

Demonstration II – Alliances

Alliances are institutional arrangements through which states pursue common security interests.[28] This understanding, however, can encourage alliances to be seen as enduring structures of security cooperation rather than as political associations requiring interpretation, reinterpretation and adjustment.

Through the lens of strategic judgement alliances are better appreciated as instruments through which governments pursue common purposes while accommodating divergent interests. Shared interests may bring governments together, yet those interests remain open to political reinterpretation. Alliances survive because governments regard cooperation as preferable to available alternatives despite the persistence of underlying political contradictions.[29]

The repeated realignments of European coalitions during the Napoleonic Wars or within NATO since 1949 remind us that those alliance systems that persist over time do so because governments judge them politically expedient rather than because interests are permanently shared. Changes in leadership, domestic politics, external threats and shifts in the distribution of power always alter the context within which alliances are maintained. Strategic judgement therefore remains essential because policymakers are repeatedly required to determine whether alliance cooperation still serves their long-term goals.

Alliances illustrate the wider argument in this article. Their management depends upon judgement rather than institutional permanence, because cooperation must continually be reassessed in light of ever-changing circumstances.

Demonstration III – Insurgency

At first sight, insurgency might appear a less obvious illustration of strategic judgement than deterrence or alliances, since it is commonly treated as a form of warfare rather than as a political relationship. Yet it is precisely for this reason that insurgency provides an instructive example. It demonstrates that even forms of conflict conventionally understood in military terms derive their strategic significance from political judgement.

The notion of insurgency is often cast as a form of warfare through which organised groups employ military force to challenge established political authority.[30] Framed in these terms, insurgency can readily be viewed principally as a military contest rather than as a political struggle. Military action acquires strategic significance through its political effects, with tactical success inseparable from the deliberations through which its consequences are interpreted. Each operation contributes to the circumstances informing subsequent strategic decisions.[31] The value of insurgency as an illustration lies precisely in demonstrating that even forms of conflict commonly treated as military problems derive their strategic

significance from political judgement

Across widely differing examples of insurgency, military operations alter the political relationships upon which the conflict itself depended, demonstrating that strategic success can never be understood in purely military terms.[32] Changes in governance, public support, external assistance and the legitimacy of political authority require governments and insurgents alike to reassess the political consequences of military action.[33] The eventual strategic success of either an insurgent or counter-insurgent force therefore depends not solely upon military performance, but upon recognising how each operation reconfigures the political setting in which subsequent decisions should be taken.

The condition of insurgency illustrates the wider conception of strategy proposed in this article. Military action derives its strategic value from the political effects it produces rather than from tactical success alone. Strategic judgement therefore remains indispensable because military success cannot eliminate the competing purposes that sustain political conflict.

Conclusion

This article has articulated the proposition that strategy constitutes a distinctive form of political judgement arising from the contradictory character of political life. It has sought to make explicit a conception of strategic thought that has often remained implicit within the strategic tradition. Strategic problems emerge because collective political life generates contradictions that cannot be permanently resolved. The need for strategic judgement therefore reflects the enduring character of politics itself.

Strategy is consequently less a search for definitive solutions than the disciplined exercise of practical reasoning directed towards the accommodation of contradiction. Every political judgement becomes part of the circumstances within which subsequent judgements are made. The work of strategy therefore lies in interpreting political relationships, weighing competing purposes and determining what accommodations remain possible.

The discussions of deterrence, alliances and insurgency illustrate the broader applicability of this conception across diverse strategic contexts. Although these domains differ markedly in their purposes, methods and historical circumstances, each demonstrates that strategic success depends upon continual reassessment rather than the application of fixed solutions. Taken together, strategy is an ongoing practice of political judgement.

Plainly, the foregoing argument in no sense seeks to redefine the practice of strategic theorising so much as to clarify its underlying logic. The central implication of this argument is that strategy should be conceived as a form of practical wisdom through which political contradiction is accommodated. It follows that strategy cannot culminate in definitive solutions, because political contradiction remains an enduring condition, perhaps the only truly permanent condition, of political life.

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The Fortified Disposition, Part I: Strategic Complexes, Historical Attenuation, and the Return of the Guarded City

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About the author

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This is the first of two companion papers on the return of a fortified disposition to the centre of strategy. The present paper establishes fortification as a movement-slowing strategic complex rather than a simple barrier, traces the long attenuation of that disposition in Western military practice, and examines the first of three contemporary trends: the return of fortified cities through dual-use infrastructure and regulation. The second paper takes up the revival of large-scale static defensive systems and the renaissance of tunnelling and subterranean engineering and draws the overall argument to a close.

The last paragraph of Ian Hogg's classic *The History of Fortification* remains as relevant today as when it was written some forty years ago:

> It is however undeniable that these recent examples [referring to post-1945 field fortifications] of the art of fortification are usually architecturally and aesthetically less interesting than the imposing products of earlier ages. In recent years, as a result of the activities of preservation societies and groups dedicated to the subject, many more people have discovered the fascinating history of fortification, and many works which would otherwise have been destroyed are being preserved and restored. This is as it should be. The fortress and the fortress engineer have played a vital role in history; it is only meet that their efforts should be respected, preserved and remembered.[1]

Hogg was right to honour that past. He was wrong if the implication is that fortification is finished. Prepared positions still shape operations, often in camouflaged form, and they are likely to weigh more heavily over the next three decades than most strategists now assume. What is returning is a historically normal fortified disposition: fortress design as part of the officer's expected competence, and protected ground as a first-order strategic asset.

The drivers are only partly technological. Manpower is tight, high-end platforms are expensive, surveillance is persistent, and open movement is increasingly costly. Those are the same structural conditions that once made fortification central. The rest of this paper treats fortification as a movement-slowing strategic complex rather than a simple barrier; traces its long attenuation in Western practice and its present reversal; and then considers the return of fortified cities through dual-use infrastructure and regulation.

Fortified Strategic Complexes

Contemporary strategists should think more about fortifications, but they should also think about them differently. Fortifications are not merely technical solutions to the problem of ballistic protection against particular weapons. They are pieces of monumental architecture, often of immense cost, that reshape landscapes, absorb vast quantities of labour and material, and leave enduring social and cultural marks on the societies that build them. Whether a given fortification 'works' against the weapons of its day is only one measure of its significance.

In the popular imagination, fortifications are often conceived as impermeable barriers that either succeed or fail absolutely. In reality, they function more as filters or valves—strategic mechanisms for regulating movement between a controlled interior and an uncontrolled exterior. In military terms they are best understood as movement-slowing machines. By artificially creating friction they compel an adversary's forces—armies, fleets, logistics trains, or even flows of information and capital—to decelerate, concentrate, expose themselves, and operate at a tempo the defender can absorb and counter. Every successful fortification converts the enemy's velocity into vulnerability.[2]

The fortified strategic complex—the larger system of mutually supporting works, garrisons, supply nodes and doctrinal practices—is designed precisely to manage that decelerated threat.[3] In slowing the opponent, the complex buys time for reserves, intelligence, political will and the inherent advantages of the defence. A classic illustration is the French fortress system under Vauban, in which individual places were never expected to hold indefinitely but to delay and channel an invader, creating the window for field armies to concentrate or simply exhaust the attacker's campaigning season.

It must be said that the strategic logic is older than the *trace italienne*. Crusader and military-order holdings in the Levant functioned as constellations of points that forced an invader to besiege or to leave dangerous garrisons in his rear; Edward I's castles in Wales hemmed a rebellious principality against mountain and sea; the later Capetian reconstruction of the so-called 'sons of Carcassonne' turned a belt of ridge forts into a frontier system covering the approaches to Languedoc. In each case individual places were not expected to hold forever. They were expected to slow, to channel, and to give a thin field force

time. Vauban did not invent the fortified strategic complex; he standardised it.[4]

That tradition continued in various forms in France, the Low Countries and elsewhere. Although such systems are often judged to have failed in the Franco-Prussian War, professional soldiers—including the Prussian victors—did not regard fortification as obsolete. Belgian forts suffered spectacularly in 1914, yet elsewhere permanent works proved their value: at Przemyśl, during the prolonged defence of Verdun, and even in the updated Brialmont and Séré de Rivières positions that delayed Patton's army for three months in 1944.[5] All forts can ultimately be defeated; the relevant question is the cost, in time, men and materiel, of defeating them.

Moltke and the Prussian General Staff were sceptical of the large, self-contained systems associated with Brialmont and Séré de Rivières because they risked absorbing excessive garrisons and constraining the field army. This did not mean they rejected the utility of fortification. On the contrary, they regarded permanent works as valuable when properly subordinated to operational needs—securing flanks, covering concentration areas, or protecting lines of communication—so that the main force retained the ability to manoeuvre and concentrate for decisive action.[6]

It follows that a fortification cannot be evaluated in isolation as a self-contained engineering artifact. Its true value emerges only within a wider operational, logistical and societal architecture that encompasses combined-arms integration, the economic base that sustains prolonged defence, the demographic reservoir that supplies manpower, and the cultural propensity of a people to endure hardship. Strategy, on this view, is never purely military; it is an expression of the total resources and character of a political community.[7]

The Long Attenuation of the Fortified Disposition

In the sixteenth and seventeenth centuries a gentleman—practically by definition an officer—was expected to possess a working knowledge of military engineering. The period produced a wide range of manuals and treatises that a competent military man was assumed to know. That expectation attenuated over subsequent centuries for reasons that were only partly technological. Advances in artillery, and later air power and precision munitions, mattered. Yet there were other, deeper causes. Cities are first and foremost machines for living and centres of economic production; urbanisation eventually pushed them beyond the scale that could be enclosed by continuous defences, while industrialisation and the expansion of commerce rendered walled circuits an economic and spatial burden.[8]

Equally important was the broader strategic shift of the Western world. For much of earlier history, when the West was not the preeminent military power, a relatively guarded disposition had been ordinary. Mobile peoples remained a serious threat well into the early modern period, as John Keegan observed, and settled societies invested enormous effort over millennia in linear barriers to contain them. With the rise of European and later Western imperialism, the principal military efforts of the West were conducted abroad against far less capable opponents. Fortification did not disappear, but its character changed: forts increasingly served as outposts of conquest, fortified trading posts, and armoured administrative centres rather than as the central strategic posture of the metropolitan powers. The open, mobile, expeditionary orientation that characterised much of the nineteenth, twentieth and early twenty-first centuries was therefore the historical exception, not the baseline.[9]

Larry Addington, writing in 1984, portrayed the eighteenth century as a decisive pivot away from a fortified disposition toward systems of war centred on mobility, linear tactics and the open battlefield. Robert O'Connell's analysis of the cultural and psychological dimensions of weapons and warfare points in the same direction: periods of high lethality and constrained manpower tend to favour defensive depth and the deliberate slowing of enemy movement, while eras of relative resource abundance and lower casualty sensitivity reward mobility.[10]

An economic lens clarifies both the earlier centrality of fortification and its later relative decline. In *Castles, Battles, and Bombs*, Jurgen Brauer and Hubert van Tuyll show that rulers in the High Middle Ages rationally substituted capital (fortification) for scarce labour. When later resources and relative military superiority permitted large mobile forces and power projection, the opportunity cost of locking capital into fixed works rose sharply.[11]

The literature on strategy is currently seriously lagging reality. Leaving aside narrower contemporary treatments, the last serious English-language study to approach fortification as a living strategic art with a past, present and future was George Sydenham Clarke's *Fortification* of 1907. Thereafter the subject largely retreated into specialised engineering or heritage preservation. Fortification never truly disappeared; rather, it expanded in camouflaged and dual-use forms across the global political economy.[12]

That literature has not caught up. The relative prices have changed again: trained manpower and high-end platforms are scarce, open movement is expensive, and prepared ground is once more a rational substitute.

That reversal is already visible in the form still widely assumed to be the opposite of a fortress: the contemporary city. What is returning is not a circuit of medieval walls so much as a guarded, closable urbanism assembled through surveillance, dual-use fabric and regulation. This is the first

of the contemporary trends treated in these papers.

The Return of Fortified Cities

To the modern mind, accustomed to the ideal of the open, globalised city, one of the more striking developments is the return of guarded, closable, and increasingly fortified urban forms. In important respects this process is already well advanced. Most major developed cities now operate extensive peripheral electronic monitoring systems—epitomised by the evolution of the City of London's 'Ring of Steel' into a metropolitan-wide surveillance grid—while crowded or high-value sites such as government buildings, transport hubs, stadiums and hospitals have undergone progressive internal hardening.[13]

What is emerging now is a further stage: the physical reinforcement of city peripheries through dual-purpose infrastructure that can function as walls when required, the systematic protection of urban life-support systems (power nodes, communications, bridges and transport arteries), and the development of layered air and missile defences against both high-altitude ballistic threats and low-altitude, low-cost drones.

Three interconnected drivers stand out. The first is the changing character of the military threat. Urban areas are increasingly likely to be central to future operations simply because of the urbanisation of human life. For much of the last century, thinking about city defence treated urban terrain as an incipient fortress. Contemporary doctrine still emphasises the defensive potential of dense and even ruined structures. Ukraine's Fortress Belt in Donetsk has demonstrated the operational value of prepared urban and peri-urban positions; and similar considerations now shape planning in the Baltic states and Poland.

Lukas Milevski has argued that political imperatives and tactical conditions in the Baltic make static and positional defence more appropriate than classic manoeuvre warfare.[14] The Baltic Defence Line, treated more fully in the companion essay, reflects precisely this recognition: the need to slow, channel and attrit an attacker while protecting key urban centres and buying time for reinforcement.

Israel after 7 October 2023 makes the second driver unmistakable: the return of serious aerial and missile defence as a problem of urban form, not only of batteries in open ground. The border barrier was reinforced, but so were the settlements behind it—walls, protected buildings, strengthened safe rooms, reconfigured approaches. At the same time the existing layered system against rockets and ballistic missiles has been driven downward, toward the low, slow and small threats that now arrive over streets and roofs. Iron Dome, David's Sling and Arrow still matter. What has changed is the requirement to fold counter-UAS sensors and effectors into the same inhabited fabric those systems were built to protect. The city is no longer merely the object of air defence. It is becoming one of its platforms.[15]

The literature on urban air and drone defence underscores why this is driving physical fortification. Effective defence against low, slow and small drones in cluttered urban environments requires dense sensor coverage, short reaction times and distributed effectors; pure mobile coverage is expensive and incomplete. Layered architectures—detection and tracking, electronic warfare or soft-kill options, and hard-kill interceptors—are widely regarded as essential.

Directed-energy weapons, increasingly discussed as a solution to saturation drone attacks, impose additional demands: they require substantial, reliable power supplies and benefit from pre-prepared, hardened firing positions. The result is pressure to integrate sensors, command nodes, ammunition or power storage, and firing points into the urban fabric in advance rather than relying solely on reactive deployment. Modern flak-tower equivalents—elevated, protected sites for sensors and effectors—are therefore reappearing in planning discussions and sometimes on the skyline, just as hardened shelters and protected critical infrastructure are becoming standard.[16]

In Moscow the process is visible in compressed form. Pantsir systems first appeared on the roofs of the Defence and Interior ministries in 2023 as an improvised answer to long-range drones; they have since been joined by further batteries on civilian high-rises and by purpose-built towers around the capital. What began as an emergency expedient is becoming a standing feature of the urban defence architecture. The same logic, in milder form, is visible wherever counter-drone sensors and effectors are being designed onto rooftops, stadium masts and critical-infrastructure nodes rather than left to mobile teams that arrive after the raid.[17]

The third driver is more controversial but increasingly difficult to ignore. Where the risk of serious internal conflict or contested control of territory rises, cities develop a more guarded relationship with their hinterlands. Infrastructure becomes a target; boundaries harden; and siege-like dynamics reappear in new forms.[18]

A crucial and often underestimated mechanism propelling these changes is regulation. The extensive alteration of cities for counterterrorism has been an enormous collective effort, yet it frequently escapes notice precisely because the instruments that drive it are so banal. Instead of dramatic political declarations or large, visible defence budgets, the process advances through incremental changes to design codes for the protection of crowded places, revisions to actuarial tables, adjustments in insurance contracts, and planning requirements imposed on developers.

These measures shift the burden of expense onto private actors and local authorities while steadily embedding protective features into the built environment. In the United Kingdom, for example, the National Barrier Asset—a substantial stockpile of concrete and other barriers controlled by the Home Office and deployed across the country—remains almost invisible even to the eyes of many security and strategy specialists, largely because its components are so prosaic. The cumulative effect, however, is a significant hardening of urban space achieved through administrative and regulatory channels rather than overt military programmes.[19]

The same regulatory logic can be extended to more explicitly military considerations. Imagine a development project in a city whose building-approval guidelines now incorporate defence-planning criteria. A developer submits plans for four buildings of equal height, spaced evenly and oriented to maximise sunlight on the most expensive units. Approval is granted only on condition that three buildings are lowered and one raised to give its upper floors clear observation along an anticipated avenue of approach; that selected floors are structurally strengthened to support heavy weapons; that the complex is reoriented so an artillery piece sited in the central courtyard is shielded on all sides by the surrounding structures; and that part of the underground parking garage is heightened to allow a self-propelled gun to enter and exit.

Does this not sound remarkably like a classic gun bastion, with casemates for the protection of shot and shell and an elevated cavalier serving as a central command and fire-control position? That is precisely what it is—while remaining a perfectly functional apartment complex. The additional costs are borne by the developer and passed on to purchasers; they do not appear as a direct charge on the military budget. The defensive function of the complex remains entirely latent until activated. Multiplied across numerous projects, such requirements would gradually reshape the urban fabric into a latent fortified strategic complex without the political visibility or fiscal profile of a conventional fortification programme.

If all of this sounds strange or improbable, one must recognise that cities are constantly mutating. Contrary to ordinary human perception, cities on a macro scale are highly fluid. Some morphological changes respond to defence considerations; many others respond to economics, technology or simple fashion. The concept of dual-purpose defensive architecture is not new. In numerous historic walled towns, the outer circuit was formed simply by requiring that buildings on the perimeter connect to one another and present blank or minimally fenestrated walls at lower levels. At times defensive needs predominate, and walls are raised or boulevards are turned back into bulwarks; at other times the reverse occurs, and bulwarks are converted into boulevards.

Vienna provides the classic historical precedent for this transformation. The city retained its walls and broad glacis longer than most major European capitals. In December 1857 Emperor Franz Joseph I ordered their demolition and the creation of a grand circular boulevard on the freed land. The resulting Ringstraße converted a military perimeter into a prestigious civilian artery lined with monumental public buildings, parks and residences. The old gates disappeared as fortifications, yet their locations remain legible in street names and the alignment of the boulevard itself. The later wartime flak towers—massive concrete structures that proved too costly to demolish—further illustrate how heavily reinforced works, once built, tend to persist within the urban fabric. Arterial structures created by the removal of walls can, under new strategic conditions, be adapted back toward defensive roles.

More prosaic examples exist closer to home. In 1940 a village in Kent incorporated into its anti-invasion defences a ditch-and-berm barrier originally constructed a thousand years earlier by Alfred the Great against the Danes; a modern pillbox was simply dug into the still-functioning ancient earthwork. The defences of Dover Castle, and of Dover more generally, exhibit the same layering: Roman walls, medieval and later fortifications, twentieth-century anti-aircraft positions and dragon's-teeth anti-armour obstacles, together with an extensive underground command-and-control complex.[20] New and old elements continue to coexist and, when required, to reinforce one another.

The open, sprawling city of the late twentieth century was the anomaly. The Chinese character for city, 城, is a walled enclosure; that older morphology is returning, more often through regulation and dual-use fabric than through declared walls.

Conclusion

That character is not an ornament but a reminder. For most of urban history a city was a place that could be closed, watched and held. The unfortified, globally open metropolis of the late twentieth century was the exception, made possible by Western military preponderance, cheap movement and the assumption that serious war would happen somewhere else. Those conditions are eroding. Manpower is scarce, high-end platforms are expensive, surveillance is persistent, and open movement is costly. Under those conditions the city again becomes a machine that can be hardened.

None of this should surprise anyone who has looked carefully at Seoul since the end of the Korean War, during which time it has prepared dual-use buildings against the possibility of renewed conflict. River-front blocks from the 1970s contain stairwell gun ports and reinforced firing floors; at least one mixed-use complex on an approach to the old presidential compound was built heavy enough

to serve as a barricade. Contemporary reporting has also described estates designed for rapid demolition to throw rubble across axes of advance, though the documentary trail is firmer for the first two practices than for the third. [21]

What looked like a Korean peculiarity is becoming ordinary far from the peninsula, and not for dissimilar reasons. Persistent aerial threat, thin field forces, and the political necessity of protecting dense civilian centres are no longer a Northeast Asian special case.

Ian Hogg closed his history by honouring the fortress and the fortress engineer as figures who had played a vital role and deserved to be remembered. He was right about the past. The implication that their role had ended does not survive contact with the present city. Fortress design is returning to the officer's expected competence, even when it arrives disguised as a planning code, an insurance requirement or a latent structure in an apartment block. The engineer who can read ground, integrate sensors and effectors into fabric, and treat the city as a fortified strategic complex is no longer a heritage specialist. That is the first contemporary face of the disposition whose older history this paper has traced.

The companion essay turns to the other two: the revival of large-scale static systems and the renaissance of tunnelling.

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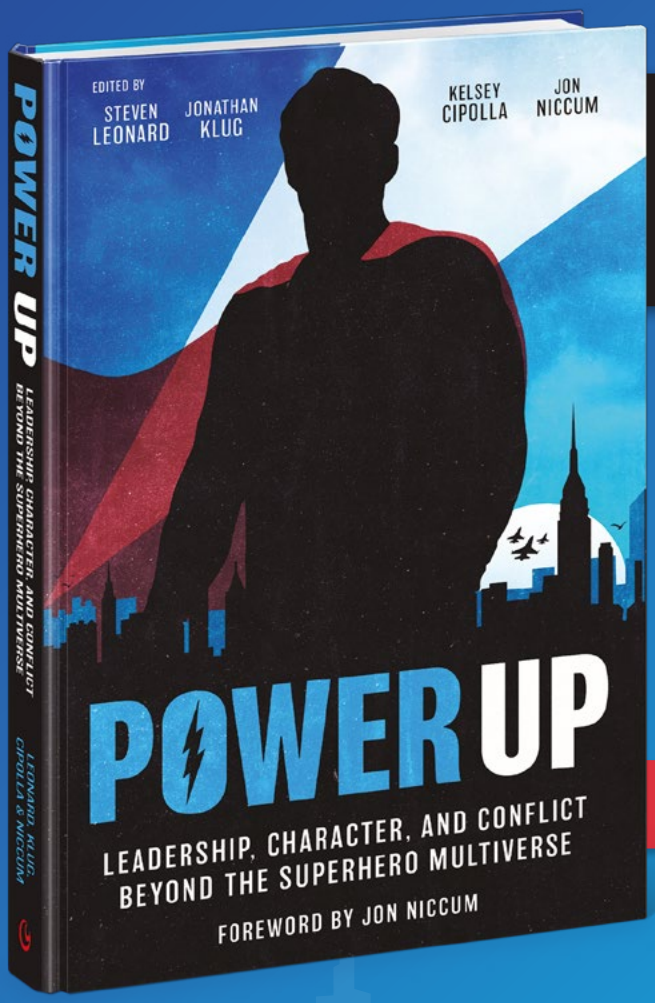

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The Golden Dome, Missile Defenses and Deterrence

Stephen J. Cimbala - Penn State Brandywine

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President Donald Trump has proposed the development and deployment of a comprehensive missile defense shield to protect the continental United States against nuclear attack. The so-called Golden Dome will draw upon advanced technology to provide new systems for intercept of attacking ballistic, hypersonic and cruise missiles and other advanced aerial attacks. The objectives of the system would include space-based interceptors capable of boost-phase intercept; deployment of underlayer and terminal phase intercept capabilities postured to defeat a countervalue attack; and, capabilities to defeat missile attacks prior to launch and in the boost phase.[1] Speaking from the White

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House on May 19, 2025, President Trump noted that he was "completing the job" that former President Ronald Reagan began in the 1980s with his proposal for the Strategic Defense Initiative, an ambitious plan that the technology of that era was insufficient to fulfill.[2] Although the President expressed the hope that the system could be developed and deployed within three years, experts anticipated a longer time period would be necessary, given the ambitious objectives of the system and the variety of new technologies that would need to be developed and tested under realistic conditions.

As aerospace and other defense contractors line up to take part in early phases of research and development for Golden Dome, there are important questions to be considered. First, how will the missile defense shield play into the more comprehensive U.S. strategy for deterrence of near-peer competitors and others? Second, how might a missile defense affect the national approach to nuclear crisis management and extended deterrence? Third, how will the nuclear warning and command, control and communications (NC3) systems coordinate the management of offensive nuclear force operations with the performance of missile defenses during crises or wartime?

I. The Missile Defense Shield and Deterrence

Deterrence is presumably based on the ability to deny any potential attacker his objectives or to inflict retaliatory punishment unacceptable to the attacker, regardless of the size or character of the attack. During the Cold War and well into the twenty-first century, it was assumed that offensive weapons deployed on intercontinental missiles and heavy bombers in sufficient numbers could overwhelm any strategic antimissile defenses deployed by the United States, Russia or other states. Nuclear deterrence was therefore assumed to rest on the credible threat of unacceptable and unavoidable second strike retaliation by the defender. Arguments raged throughout the Cold War and afterward about "how much was enough" for deterrence, but U.S. and Soviet (and later Russian) political leaders and their principal military advisors came to accept the fact of assured retaliation as the basis of stable deterrence.[3]

Nevertheless, research and development efforts on missile defense continued even after the end of the Cold War, and the U.S. withdrawal from the ABM Treaty of 1972 during the George W. Bush administration was received with disappointment and concern in Moscow. Subsequent deployment by the Barack Obama administration of the European Phased Adaptive Approach (EPAA) for regional missile defense of NATO Europe, based primarily on the Aegis missile defense system ashore and afloat, caused additional complaints from Russia.[4] The existing U.S. Ground-based Midcourse Defense (GMD) system for ballistic missile intercept is the only U.S. system for defense against missile attacks by weapons of intercontinental range. It is based on 44 interceptors located in Alaska and California and has had a mixed record of success in tests carried out by the U.S. Missile Defense Agency. It might deflect limited strikes from North Korea or Iran or another state capable of attacks with small numbers of weapons.

The advanced technologies necessary for space-based missile defense interceptors, compared to those based terrestrially, are still in the early phase of development. If these interceptors are to be based in low earth orbit, they will have to be able to defend themselves from space or earth-based attackers. The orbital mechanics of space-based interceptors in LEO will also require many thousands of interceptors in order to defeat even light attacks. For example: CBO's notional constellation consists of 7,800 satellites in nearly polar LEO costing about $720 billion to develop, deploy, and maintain for 20 years, and an additional $1 billion annually to operate.[5] This constellation was sized to engage nearly 10 simultaneously launched ICBMs during their boost phase.

The other layers of a proposed Golden Dome system are based on existing or imminent defense interceptors. An Upper Wide-Area Surface Layer would include three fields of interceptor silos: the existing field at Fort Greely, Alaska, with ground-based interceptors (GBIs); and two new fields with Next-Generation interceptors (NGIs). These GBIs and NGIs are designed to intercept ICBMs in the midcourse of part of their flight. A Lower Wide-Area Surface Layer would include four Aegis Ashore facilities similar to those already deployed in Poland and Romania, based on Standard Missiles, presumably the SM-3 Block IIA. This missile has a demonstrated capability against ICBMs and shorter-range ballistic missiles. Finally, the Surface-Based Regional Sector Layer of Golden Dome would provide terminal defenses against ballistic and hypersonic missiles in addition to cruise missiles and other airborne threats. CBO's notional system would include 35 regional sectors, each capable of defending about 270,000 square kilometers. The estimated costs for the Upper Wide-Area site, Lower Wide-Area Site, and Regional Sectors are: 46 billion; 29 billion; and 187 billion, respectively.[6]

The deployment of a Golden Dome system to protect the entire North American continent would, if uncontested, provide for the U.S. a nullification of both Russian and Chinese long-range nuclear forces. If the U.S. system could defeat a Russian or Chinese nuclear first strike, then it presumably could also nullify Russian or Chinese second-strike capabilities. This would undermine the basis of stable deterrence and almost certainly encourage both Russia and China to develop their own advanced missile defense systems and to modernize and increase the sizes of their current strategic retaliatory forces. An accelerated nuclear

arms race is a conceivable outcome in this scenario, with newer generations of offenses chasing advanced defenses and vice versa. Following the example of Golden Dome, Russian and Chinese systems would also have space-based as well as terrestrial layers of defense protection, requiring the deployment of antisatellite and defensive satellite weapons (ASATs and DSATs) by all sides. Absent any development of an agreed arms control regime for space-based military assets, a potlatch of heavenly competition in satellites for inspecting, tracking, and if necessary, destroying another state's satellites is almost inevitable.

II. Crisis Management and Extended Deterrence

Nuclear crisis management has been studied extensively since the Cuban missile crisis of 1962, but thankfully for civilization, the number of these close calls in U.S. – Soviet and then U.S. – Russian relations has not been as large as some pessimists feared. On the other hand, this is not a reason for complacency. The Cuban missile crisis and other dustups in which the possibility of nuclear first use or first strike was on the table, so to speak, remind us that nuclear crises are more stressful than other decision-making episodes in national security policy. Vladimir Putin's repeated threats of nuclear first use during the present war between Russia and Ukraine have been dismissed by some as bluffs to deter U.S. and allied NATO conventional military escalation against Russia. But the Joseph Biden administration, although providing considerable security assistance, including long-range strike weapons and vital intelligence, to Ukrainian forces, nevertheless remained mindful that boundary maintenance between counterpunching and overreaction to Russian moves could trip the wire of crossing the nuclear threshold. So long as Russia perceived its prevailing circumstances in battle as generally favorable compared to those of Ukraine, Russia could deny itself the option of nuclear first use (supported by periodic oblique or explicit threats of same).

On the other hand, suppose the Golden Dome spun off regional stepchildren in antimissile defense technology that placed in doubt the effectiveness of Russian short-, medium-, or intermediate-range missiles, or air delivered weapons, in the European theater of operations. Russia's superior numbers of theater nuclear weapons compared to those of NATO have long been regarded as a mainstay of its deterrent capability against any serious reversal of its fortunes in a large-scale conventional war. Russian military doctrine specifically avers that nuclear use is an option in case of a conventional military attack that places in jeopardy the survival of the Russian regime, presumably to include its territorial integrity. Faced with this possibility of neutralization or erosion of its capability for limited nuclear war, Russia would in all likelihood seek to develop countermeasures, including its own theater defenses and wider varieties of less than strategic offensive forces. China, looking down the barrel at this same scenario of potentially diminishing returns from its short and medium nuclear forces, might also compensate with modernization of its theater offensive and defensive missiles and antimissiles.

Another aspect of the regionalization of Golden Dome spinoffs is the issue of extended deterrence provided by the United States to its European NATO allies. European allies that are outside of the protected envelope of Golden Dome might demand U.S. technology support for deploying their own regional or even national antimissile systems – Extended Dome, so to speak. This might reassure those Europeans who have expressed concerns about the steadfastness of the Trump administration's commitment to defend European allies against future political coercion or Russian military aggression. One could imagine a Baltic or Scandinavian regional missile defense regime supported by American security and financial assistance, as well as several antimissile upgrades for specific countries ready to participate in bilateral agreements with the U.S. Missile defenses against Russian advanced conventional as well as nuclear missile attacks would also be important symbols of NATO solidarity and European commitment to defense burden sharing.

III. Command and Control

Space experts and technology developers underscore the arrival of the democratization of space, so to speak, or new space. Previously, major powers would deploy high-end satellites in geostationary orbit (GEO) that were beyond the capability of less scientifically advanced or resource-constrained actors. In a new space environment, more players can deploy smaller satellites in large numbers in low earth orbit (LEO), leveraging COTS (commercial off-the-shelf) technologies with comparatively smaller development costs. In addition, small satellite architectures in LEO offer operational resilience by proliferation. Larger numbers of satellites create redundant survivability and raise the cost for opponents who might seek to seriously degrade or deny missions performed by the larger network. Efforts to destroy numerous small satellites by kinetic means could result in the creation of space debris that, in extremis, endangers the viability of LEO for all spacefaring actors. This raises the possibility that future attacks on larger constellations of smaller satellites may emphasize cyber rather than kinetic means. As Captain Luke Stensberg, US Space Force, has noted:

> Despite relative simplicity in design, small satellites can scale in numbers to produce constellations that can provide key DPS (Data, Products and Services) to NATO warfighters such as C2, ISR, and more. However, cybersecurity experts are warning that this ease of development, scalability, and operations may encourage potential design shortcuts that bring cybersecurity trade-offs. Interconnectivity and standardization can diminish the obscurity of space

systems, which once deterred malicious cyber actors from targeting such historically foreign systems.[7]

In addition, NATO considers space as having four segments: ground, user, link and space. In the case of large constellations of satellites deployed in LEO, these satellites will require an expensive global network of ground stations. Satellites in GEO remain relatively stationary with respect to any given point on the surface of the earth. On the other hand, satellites in LEO move at higher velocities in lower orbits and may move in and out of view in less than fifteen minutes.[8] The numerous ground stations also provide additional points of potential cyber vulnerability to malicious attackers.

Apart from technology, another issue with respect to command and control involves the U.S. National Command Authority and its decision premises with respect to activation of the Golden Dome. Traditionally, it has been assumed that only the American President can authorize the first or retaliatory use of nuclear weapons. Presumably, if time permitted, the President would consult with members of the National Security Council and ranking leaders in the military chain of command. In the latter case, the wartime military chain of command goes from the President to the Secretary of Defense (with a dotted line to the Joint Chiefs of Staff) and then to the Combatant Commanders of the various unified and specified commanders (in case of possible nuclear attack, the COCOMs of USSTRATCOM, NORTHCOM and NORAD).

On the other hand, the activation of Golden Dome space-based weapons against nuclear ballistic missile attacks would, in all likelihood, involve the use of non-nuclear weapons (kinetic or otherwise) in defense against a presumed nuclear or other massive attack on the United States and-or its allies. Especially if the attack involved large numbers of hypersonic weapons, allowing little time for deliberation and decision, the activation of Golden Dome might not require as extensive an involvement of political and military principals as would the authorization for an American nuclear response to attack. Protocols could be established within the software of an advanced AI system for warning and attack assessment that, under certain exigent circumstances, anticipated Presidential authorization for the use of non-nuclear strategic defensive weapons against large-scale attacks on the American homeland and-or its allies.[9] The "delegation" or automation of strategic defensive response in this fashion would have to be sufficiently nuanced beyond a simple "yes" or "no" decision so that policy makers and military advisors had a menu of options from which to choose, depending on circumstances. More controversially, some experts have also suggested that AI-enhanced decision procedures for nuclear retaliation should also be implemented in order to increase the surety and credibility of U.S. strategic nuclear deterrence.[10] The head of U.S. Army Space and Missile Defense Command anticipates that future AI-enabled drone and missile defenses may have to be accurate enough and sufficiently trustworthy to take out large numbers of drone and missile attackers by auto-selection without involving a human.[11]

Another aspect of command and control decision making that relates to the possibility of a nationwide antimissile defense system is the likelihood that even a less than perfect missile defense system is still useful in some respects. First, during a process of nuclear crisis management, decision makers may be less anxious to opt for prompt launch or launch on warning if they have high confidence that at least some significant number of attackers will be intercepted before arriving at their intended targets. Second, and related to the first point, the presence of a missile defense system complicates the process of estimation by the attacker as to the actual outcome of any first strike. Deterrence is stronger if the attacker's calculation of estimates is more uncertain compared to the expectations of the defender. Third, and somewhat ironically, if both the prospective attacker and the defender have deployed national missile defense systems of plausible effectiveness against large scale attacks, the calculations of expected loss from any nuclear exchange become exponentially more difficult. Both sides must reliably estimate not only their own offenses and defenses in terms of their probable performance under exigent (and unprecedented) conditions, but also those of the opponent.

IV. Modelling Offenses and Defenses

The preceding discussion challenges planners and military theorists to consider the interaction between newer generations of strategic nuclear offenses and antimissile defenses. The following is an admittedly oversimplified exercise in doing just that. First, we generate hypothetical but not unreasonable strategic nuclear forces for future U.S., Russian and Chinese deployments in the early to mid-2030s, say 2032 – 2035. Second, we compare the second-strike capabilities of each force relative to that of its opponent in three scenarios: the U.S. versus Russia; China versus the U.S.; and Russia versus China. Third, we calculate the effect of defenses of variable capability on the outcomes of the second step, as noted. Effectiveness of defenses against second strike offenses is measured on a scale: Level I defenses successfully intercept or otherwise deflect at least 20 per cent of the retaliators; Level II defenses at least 40 per cent; Level III defenses at least 60 per cent; and Level IV defenses at least eighty per cent. The results of these estimates are summarized in Charts One through Six, following below. For the sake of discussion and consistency, we assume that each state deploys forces that remain within the limits of the recently expired New START guidelines for numbers of operationally deployed weapons and launchers.[12]

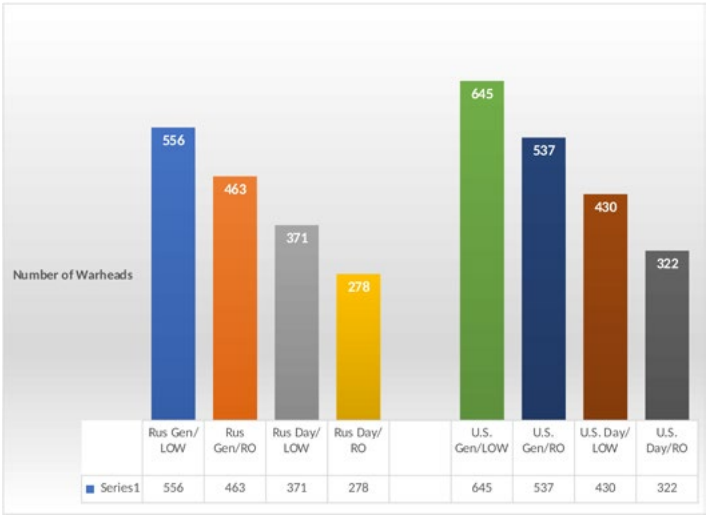

Chart One: Russia – United States
Surviving and Retaliating Warheads

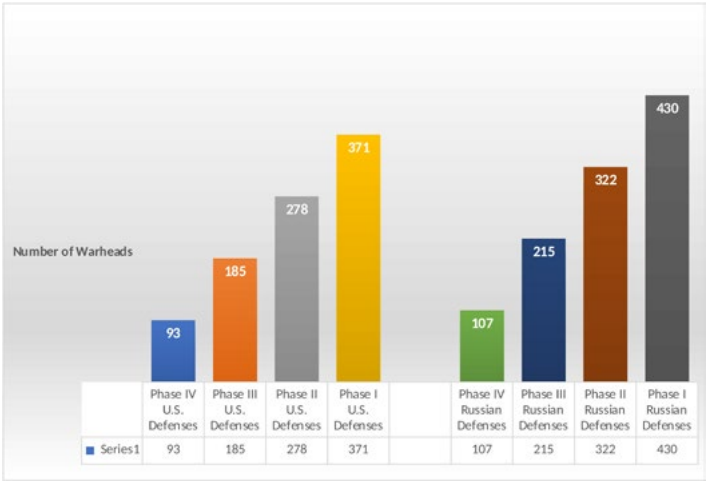

Chart Two: Russia – United States
Surviving and Retaliating Warheads vs. Defenses

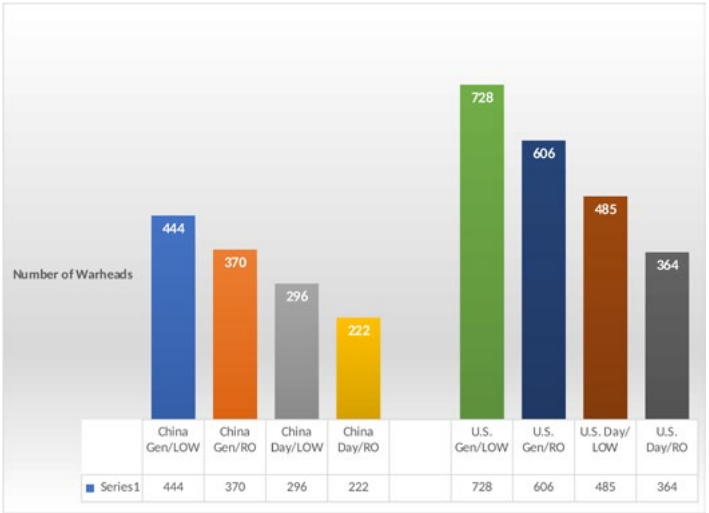

Chart Three: China – U.S.
Surviving and Retaliating Warheads

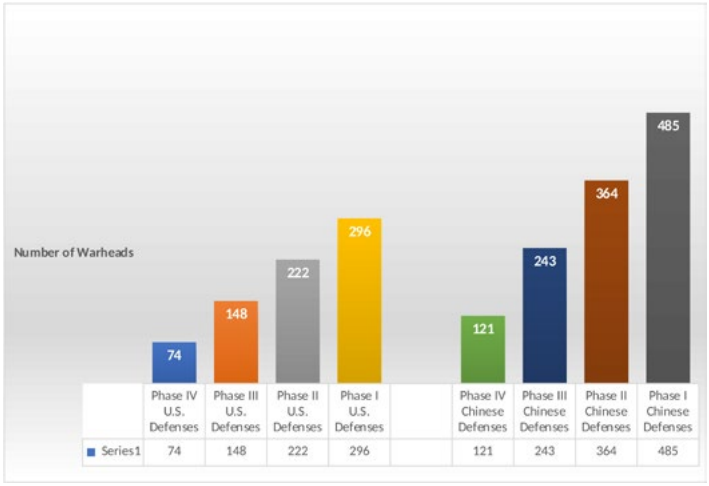

Chart Four: China – U.S.
Surviving and Retaliating Forces vs. Defenses

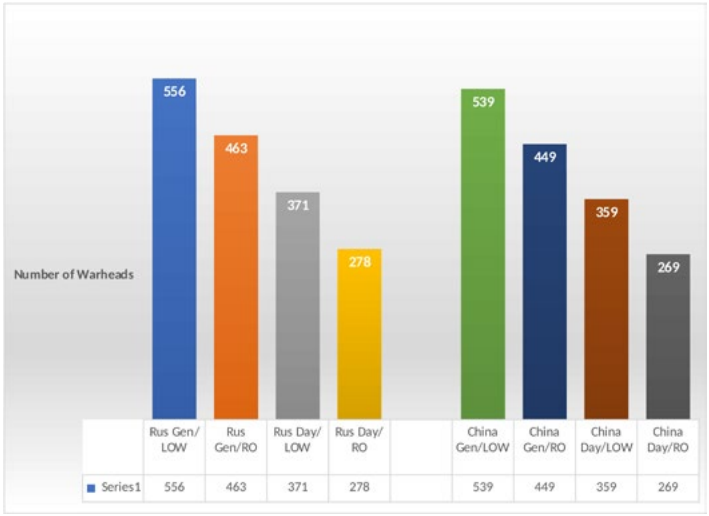

Chart Five: Russia – China
Surviving and Retaliating Warheads

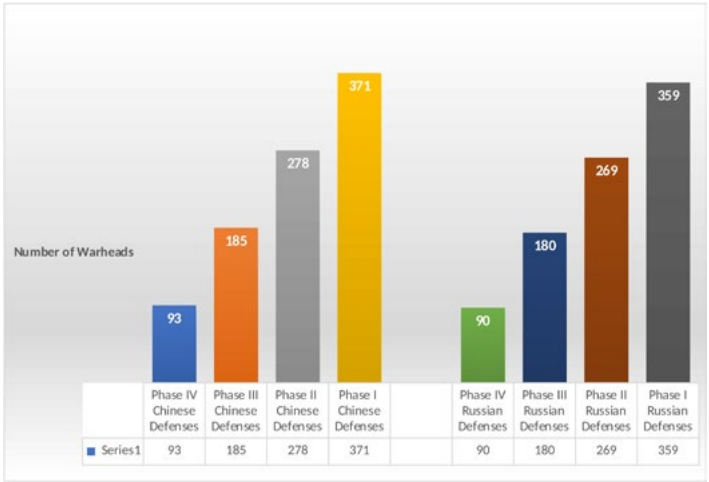

Chart Six: Russia – China
Surviving and Retaliating Warheads vs. Defenses

Source: Charts One – Six are author's estimates, based on a model first developed by Dr. James J. Tritten and subsequently modified by the author. For additional information, see Stephen J. Cimbala, War Games: US-Russian Relations and Nuclear Arms Control (Boulder, Colorado: Lynne Rienner Publishers, 2017), Appendix One, pp. 241-243

The data summarized in Charts One through Six show that, if offenses are constrained to New START or comparable levels, then antimissile defenses could impose significant attrition against second strike forces. Therefore, to the extent that deterrence rests on the assumption of assured retaliation, defenses could weaken confidence in deterrence and stimulate additional offensive force building. On the other hand, defenses could also reduce the confidence of putative first-strikers in their attempt to preemptively disarm their opponents' second-strike capabilities. For this purpose, it might be preferable to task defenses primarily for the defense of nuclear retaliatory forces instead of entire national territories and populations. A third consideration with regard to ballistic missile defenses is the extent to which defense interceptors are based in space as well as terrestrially. Space-based interceptors will require protection against enemy space- and ground-based attackers by friendly defensive satellites (DSATs) and other means.

V. Conundrums and Continuing Controversies

The arguments about development and-or deployment of Golden Dome leave unresolved a number of related issues that deserve mention. The first of these is the underlying theory of deterrence in which missile defense technologies are embedded. One theory regards a combination of offenses and defenses as the most reliable approach to deterrence. From this standpoint, missile defenses should not be intended to supersede offenses but to support deterrence based on denial as well as on assured retaliation. The second theory aspires to missile defenses that are dominant over competing offenses, gradually leading to a defense-dominant world. A third approach to deterrence would use defenses primarily to protect the strategic nuclear retaliatory forces, i.e., to support deterrence based mainly or solely on assured retaliation. At some point, policy makers and strategic planners will have to choose among these and other competing approaches to deterrence.

A second unresolved issue as U.S. planners move forward with Golden Dome is how geographically and politically inclusive it will be. For example: in addition to the national territories and populations of North America, will European allies be included within the missile defense umbrella? If so, should the entirety of NATO's membership be included or a subset of that membership, and on what basis should inclusion or exclusion be decided? States not included might resent being slighted. The United States might decide to demand a *quid pro quo* for Golden Dome protection: such as, for example, a commitment of additional conventional forces to NATO defense or a greater percentage of their gross domestic products to military production and innovation in support of the alliance.

Third, U.S. political leaders and military advisors will have to decide what proportion of future defense budgets will be allocated for modernization of strategic offensive nuclear forces, compared to the amounts designated for Golden Dome or other strategic defenses. Even in a growing American economy, competing budgetary priorities will limit "how much is enough" for national defense. Rising national budget deficits will add pressure for deleting or delaying some military modernizations and other defense expenditures. President Trump's request for a national defense budget of $1.5 trillion in fiscal 2027 has created some sticker shock even among Republican members of Congress. Depending on which political party has a majority in Congress, support for Golden Dome may hit speed bumps and delays that create technology turbulence and strategic impasses.

Fourth, there is the issue of deterrence, not only of Russia, but also of China, since the latter is determined to join the ranks of nuclear superpowers by 2035.[13] There is a military alliance of sorts between Beijing and Moscow, including joint military exercises, but this bonhomie conceals some important differences in strategic priorities. China thinks about strategy in holistic terms: its comprehensive approach includes, in addition to military matters, political, social, economic, cultural and other dimensions.[14] Therefore, Beijing is also interested in deepening post-Putin ties with Russian economic, cultural and political sectors, beyond military cooperation *per se*. With regard to the United States, China's priorities include dominance of the South China Sea and extending China's military reach throughout the Indo-Pacific theater of operations. In the near term, China is focused on Taiwan and the deterrence of any U.S. attempt to interfere with its plans for reunification. Will Golden Dome also be extended to allies in Asia, including Australia, Japan, and South Korea?

Fifth, will the U.S. determination to proceed with Golden Dome inspire a bow wave of international competition for the military uses of space, and if so, what are the consequences of that situation? One of the sidebars of the Cold War was the more or less *de facto* agreement on the part of major powers to regard space as a domain for peaceful scientific cooperation. That period of space pacifism is now behind us, and space has already emerged as a domain of military competition and potential future warfare. If space is the new "high ground" for deterrence, it might turn out that nuclear weapons are less important than hitherto because their detonation in space would be counterproductive to the successful conduct of any space-based missions by the U.S. or other parties. Specifically, even conventionally armed space weapons that destroy the brain and central nervous systems of states' capabilities

for reconnaissance, communications, geolocation, cyber security, and intelligence collection, inter alia., could return militaries to their World War II-era dependency on industrial age technology. Further to the point: how well will AI decision aids and advanced robotic systems perform in a digital vacuum?

Sixth, in addition to the importance of strategic nuclear forces, a more immediate concern for nuclear crisis stability and for arms control is presented by the possibility of first use of non-strategic or tactical nuclear weapons (NSNW). President Vladimir Putin and other high-ranking Russian officials have made repeated references to the possibility of nuclear first use against opposed forces in Ukraine and-or NATO. Partly in response to longer-range drone attacks by Ukraine on military and economic assets deep in Russian territory, Russia earlier this year held large-scale drills of its theater nuclear forces, including practice launches of nuclear-capable ballistic and cruise missiles. Earlier, Putin in 2024 also announced a revised nuclear doctrine that included a stipulation that any conventional attack on Russia by one nation that is also supported by a nuclear power would be considered a joint attack by both.[15] In turn, the United States has discussed with its NATO allies the possibility of deploying tactical nuclear weapons to additional alliance member states. Currently the United States deploys B61-12 nuclear gravity bombs to five host countries: Belgium, Germany, Italy, the Netherlands, and Turkiye, in support of NATO's dual-capable aircraft (DCA) mission. In addition, the UK, while maintaining its own fleet of strategic ballistic missile submarines (SSBNs) and submarine launched ballistic missiles (SLBMs), might also have quietly rejoined the DCA program. Among other states that might be interested in hosting American tactical nuclear weapons, Poland and the Baltic states are serious candidates. And Finland's parliament voted June 17, 2026 to lift its ban on nuclear weapons, allowing that country to receive, transport and facilitate the movement of nuclear weapons on its territory as part of allied operations.[16] Additional NATO nuclear forwardism is adumbrated in recently revised French nuclear doctrine that anticipates greater shared mission planning and readiness training with European allies.[17] All of this signaling and diplomacy supported by non-strategic nuclear weapons raises the visibility of extended deterrence and, perhaps, moves the issue of theater missile defenses, connected to Golden Dome or otherwise, higher on the military and political to-do lists.

Conclusions

Strategic antimissile and air defenses are almost certainly headed for technological improvement and increased significance in the portfolios of nuclear superpowers. The basing of missile defense components in space as well as terrestrially creates challenges in nuclear C3, in warning and attack assessment, and in estimation of missile defense performance under conditions of enemy countermeasures. The United States will be competitive in a new environment that privileges the space and cyber domains as the front ends of deterrence credibility, but success will require perseverance across U.S. government agencies and coordination with NATO allies. Whether nuclear deterrence among three nuclear superpowers will remain grounded primarily in assured retaliation, or become more dependent on a blend of assured retaliation and defense assertiveness, takes scientists and military theorists into terra incognita.

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