

The American origins of the Multi-Domain concept

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The notion of Multi-Domain (MD) would seem to be the latest avatar in a series of American military concepts, often referred to by their acronyms, that have sprung up over the past 30 years. The appearance of other variations, requiring longer abbreviations, such as MDB, MDO or MDC2¹, seems likely to ensure a promising future, even if the concept of Mosaic Warfare may soon supplant it.

Despite this encouraging start, Multi-Domain has not escaped, like its predecessors, the recurring questions that arise with the emergence of a new concept. The legitimacy and appeal of such concepts are slow to convince some experts, who wonder if it is not a question of stating, in an obscure and complicated manner, approaches that have been followed for centuries, or of restating common-sense methods of action. Others wonder if they do not correspond to fashions launched by a political administration or chiefs

1. Respectively Multi-Domain Battle, Multi-Domain Operations, Multi-Domain C2.

of staff to assert their power, to mark their own legacy, only to fade into oblivion once these people have been replaced.

Do the recipes for triumphing on the battlefield thus need to be constantly renewed? S. Biddle believes, for example, that the roots of land combat have remained the same throughout the 20th century². They correspond to the search for minimal exposure to fire and the possibility of encouraging the movement of one's troops while slowing down the opponent's³. Victory goes to the side that can master the "Modern System" of tactics, the offensive side of which consists in cover, concealment, dispersion, suppression, independent maneuvers of small units, and combined arms integration⁴, while the defensive side values the use of ground, deep positions, reserves and counterattack⁵. Simply put, this litany of concepts and acronyms is not fundamentally necessary. It is better to understand how modern warfare works in order to think about how best to utilize one's troops and to articulate sustainable principles.

In this article, we will attempt to ascertain whether, despite their diversity, the main concepts that have shaped the thinking of the American military community over the last forty years have shared some common ground. Without passing judgment on their quality, their relevance, or the institutional, partisan or opportunistic causes that have fueled their development, our goal is to show that the same quest has been driving the originators of American military doctrine for decades: to think as accurately as possible about the contribution of technology and the articulation between joint forces in varied environments in an ever-expanding battlefield.

In an attempt to answer this question, a brief history of the MD concept will be traced by exploring the origins and content of Airland Battle, Revolution in Military Affairs (RMA), Air-Sea Battle (ASB), Anti-Area, Anti-Denial (A2/AD), and Third Offset Strategy (TOS).

2. S. Biddle, *Military Power*. Princeton, Princeton University Press, 2004.

3. *Ibid*, p.190.

4. *Ibid*, p.35.

5. *Ibid*, pp. 44-48.

How to face the Soviets? *Airland Battle*

Containment was the overarching strategy that guided the actions of American administrations from the late 1940s to the 1980s. Its goal was to prevent the expansion of the Soviet Union throughout the world. This “containment” was achieved in Western Europe through the deployment of American forces (Forward Deployment), positioned facing the Warsaw Pact troops and ready to take immediate action if the “Iron Curtain” was breached.

However, the success of this grand strategy was called into question in the mid-1970s. Despite its strong involvement, the US Army left Vietnam without having won decisively on the ground. It was going through an unprecedented crisis in morale. The reconstruction of this institution required numerous measures, including studies to renew its doctrinal foundations. General W. E. DePuy contributed to this intellectual renewal by creating TRADOC⁶, the Army doctrine center. While examining the recent Yom Kippur War between Israel and its Arab neighbors in 1973, he was struck by the extent of the losses suffered by the various adversaries as a result of the increase in the range, precision and lethality of weapons⁷. In 1976, when a new version of the FM-100-5 was published, his recommendation⁸ was to take advantage of this increased firepower, to rely on the terrain and to use all available manpower to win the very first battle against the communist forces that were penetrating Western Europe. They would be stopped in this way along the front line renamed Forward Edge of the Battle Area (FEBA)⁹. This is Active Defense, where units are expected to move from one holding position to another to exhaust the momentum of their enemy.

This new doctrine was slow to gain support. Many criticized its static approach or the risk of losing the war during the very first clashes. The policy was again reviewed under the aegis of the new commander of TRADOC, General D. A. Starry. A new version of the doctrine, FM-105, was soon submitted and tested in 1981, putting forward the Airland Battle concept¹⁰. The program may seem demanding to implement, since the goal was now to defeat the enemy by conducting sustained operations in a specified space-time, by fighting simultaneous and sequential battles. More simply, this insistence on temporal aspects embodied a strong ambition, by emphasizing

6. United States Army Training and Doctrine Command

7. The FMs are the field manuals, C1, *FM 100-5*. Headquarters Department of the Army, Washington DC, 29 April 1977, p.2.1-2.10 , available at <http://www.survivalebooks.com/free%20manuals/1976%20US%20Army%20Vietnam%20War%20OPERATIONS%20201p.pdf>

8. C1, *FM 100-5*, Headquarters Department of the Army, Washington DC, 1 July 1976.

9. The line formed by the most advanced friendly troops.

10. C1, *FM 100-5, Operations (Final Draft)*. Headquarters Department of the Army, Washington DC, 4 September 1981.

the need for tactical maneuvers to counter Soviet military “art”. A greater autonomy was granted to subordinate cadres who had to take advantage of the opportunities that appeared on the battlefield by their own means. The use of nuclear weapons was not mentioned, although they were available in significant numbers in the arsenals of the actors.

Above all, the way in which the battlefield was conceptualized evolved. Now far from being reduced to a single dimension (as a cursory reading of the previous FM 100-5 might lead one to believe¹¹), it now extended in depth¹² and over three dimensions. General Starry spoke of an “extended battlefield”¹³. Rather than limiting attacks to the forces in actual contact, he advocated taking action against the forces of the second echelon of the Warsaw Pact. These forces of the Warsaw Pact, whose role was to exploit the gaps created by the first echelon forces, were located about 50 km from the FEBA. But the whole operation could be extended to a depth of about a 150 km, to maintain the thrust in case of a prolonged halt or slowdown of the forces engaged in the first line. By preventing, or at least hindering, the arrival of these reinforcements, by striking even more distant logistics centers and supply depots, the momentum of Warsaw Pact troops could be seriously impacted. Local superiority could even be reversed, opening up “windows of opportunity” for ground forces to exploit¹⁴.

The US Army did not have the capability to disrupt enemy forces so far from its lines. It then turned to the US Air Force (USAF) to consider how to cooperate more closely. Discussions began between TRADOC and the Tactical Air Command (TAC), which brought the two organizations’ points of view closer together. Although infantrymen and airmen were becoming more aware of each other’s requirements, serious differences remain. NATO air forces¹⁵ were considering alternative responses to Army requests. The TAC would prefer to strike with vigor and force into the depth of the Soviet posture, while the Royal Air Force was more in favor of repeated strikes within close range of the FEBA, undertaken by patrols of two aircraft. Furthermore, it was a struggle for the Army and the Air Force to match the respective levels of command that should be in charge of air operations. They were unable to agree on the criteria for the linear separation of ground and air force areas of operation. Each claimed the largest possible area of command.

11. General DePuy also relied on the USAF to stem the advance, but did not make it the cornerstone of his concept.

12. This notion of depth is imported from the Soviet vision of the battlefield.

13. General D. A. Starry, “Extending the Battlefield”, *Military Review*, March 1981, pp. 31-50.

14. *Ibid*, p. 44.

15. North Atlantic Treaty Organization.

The legacy of Airland Battle doctrine is still under discussion. The concept was never adopted by the USAF. Its influence on the way the Gulf War was fought remains a source of dispute¹⁶. But this attempt at joint cooperation is emblematic of a decade in which solutions were sometimes sought to overcome the way armed forces worked in “silos”, and to remedy their lack of interoperability, as highlighted by the Vietnam War or the Grenada expedition in 1983¹⁷. A division of labor between the joint forces was envisaged to reduce the striking power of an invading army by extending the coverage of its combat forces over an average depth of 100 km.

Dominating the battlefield

The end of the Cold War and the triumphant victory in the Gulf War heralded a new era for the United States. In the absence of enemies of its own size, and despite a few setbacks such as Somalia in 1993, it was able to impose its methods on the battlefield and enforce the democratic international order. Air power was the strong arm of America as a superpower, to the point that renowned experts warned of its limits¹⁸. The American air force played a decisive role in the coercive campaigns conducted in the Balkans in the 1990s to bring the enemies to the negotiating table.

One question remains, however. How to maintain this military superiority over time? An answer was emerging with the dissemination of the concept of the Revolution in Military Affairs (RMA). Two of the most prominent members of the Center for Strategic and Budgetary Assessments (CSBA) think tank, A. Marshall and A. Krepinevich, sought to further extend the insight of Soviet thinkers who believe that the advent of electronics will bring about major changes in the art of warfare. In accordance with the spectacular results of the Gulf War, these two American researchers’ conclusions confirm those of the Soviets, but they also point to the decisive role that the mastery of information will play on the battlefield. A RMA was underway.¹⁹

16. Cf. for example M. Dietz, “Towards a More Nuanced View of Airpower an Operation Desert Storm”, *War on the Rocks*, 6 January 2021, available at <https://warontherocks.com/2021/01/toward-a-more-nuanced-view-of-airpower-and-operation-desert-storm/> and D. Deptula, “Desert Storm at 30: Aerospace Power and the US Military”, *War on the Rocks*, 1 March 2021, available at <https://warontherocks.com/2021/03/desert-storm-at-30-aerospace-power-and-the-u-s-military/>

17. At the same time, in 1986, the Goldwater-Nichols Department of Defense Reorganization Act was passed, which significantly modified the services’ procurement policies and imposed the figure of the Chairman of the Joint Chiefs of Staff as a link between the political authorities and the Joint Chiefs of Staff.

18. E. A. Cohen, “The Mystique of US Air Power”, *Foreign Affairs*, January-February 1994, p.109-124.

19. A. F. Krepinevich, “Cavalry to Computers: The Patterns of Military Revolutions”, *The National Interest*, n°37, Fall 1994, p.30-42; E. A. Cohen, “A Revolution in Military Affairs”, *Foreign Affairs*, March-April 1996, p.37-54.

Thanks to the integration of New Information and Communication Technologies (NICT) in the American arsenal, it was now possible to deploy a multitude of sensors on the battlefield to collect, process and distribute data to headquarters, troops and firing platforms through a networked architecture. This Network-Centric Warfare was revolutionizing the way armies fought. The proverbial fog of war was expected to largely dissipate, revealing enemy targets that would be systematically destroyed by precision fire from a distance. Some senior military authorities estimated that such operations could extend over a 200-mile-by-200-mile box²⁰, significantly increasing the area over which operations would be conducted compared to the Airland Battle. The new American battlespace was defined less by the characteristics of the opponent's system than by the available volume of American assets. The war would be transformed into a sort of gigantic naval battle game, where one side would have a clear view of the placement of the opposing assets. The enemy's command posts would be hit to paralyze them, and their equipment would be destroyed to render them useless. The enemy could no longer retaliate effectively, and friendly troops could infiltrate between the wrecks of enemy trucks, tanks and guns to conquer the objective.

The U.S. military had to rethink its organization within this new framework. They needed to forego their "verticality" in order to better distribute the information that those in the field require. Information must no longer be owned by a leader who jealously guards it to underline his or her authority. Moreover, formal concerns about grade, status or hierarchical "ownership" of the kill chain platforms need to lose importance. It is better to have simple, available effectors, possibly robots, but in sufficient numbers to be able to flood the battlefield and seized every opportunity that arises, than to have a few highly sophisticated machines. It also does not matter if it says Army, Navy or Air Force on the side of the robot, so long as the desired effect is achieved. Network and flow take precedence over hierarchy and ownership. What matters is that all the components of the network form a "system of systems", capable of exchanging data and operating in unison.

The agenda is now clear. The U.S. military needed to gradually move out of the industrial age and into the digital information age. If this conversion was undertaken with vigor, the U.S. military would have the opportunity to maintain the control and operational superiority it demonstrated in the Gulf in 1991. They would be able to dominate the enemy on a vast battlefield where distinctions between services tend to become secondary.

20. B. Tertrais, « Faut-il croire à la révolution dans les affaires militaires ? », *Politique étrangère*, n°3/1998, p. 617.

While the G. H. W. Bush and Clinton administrations sought to significantly reduce the defense budget in order to reap the dividends of peace, while the Pentagon preserved its funding by obtaining a directive to be able to conduct and win two regional conflicts simultaneously, the wave of the RMA shattered administrative and financial preconceived assumptions. The theses of Marshall and Krepinevich were discussed, then gradually accepted. In July 1996, General J. Shalikashvili, Chairman of the Joint Chiefs of Staff, published the Joint Vision 2010²¹. This doctrinal text was to become the reference for the American armed forces at the operational level. It laid out the main lines of the RMA. It clearly indicated that the use of NICTs must allow for Dominant Battlespace Awareness, i.e., an interactive image providing precise assessments of friendly and enemy operations. Long-range precision strikes, combined with a wide range of platforms, will significantly increase lethality on the battlefield. Within this framework, U.S. armed forces must be prepared to dominate in the area of maneuvers to enable precision strikes while protecting American forces, assets and logistics.

Donald Rumsfeld, appointed Secretary of Defense in the first G. W. Bush administration, was one of the most ardent defenders of RMA. He intended to bring this “revolution” to fruition by initiating the process of “Transformation” of the American armed forces. He took advantage of the September 11, 2001 attacks to strongly encourage the Army to accelerate the transformation by adopting a new generation of modular combat units that were to be robust, yet light enough to be transported quickly by air. He also strongly encouraged military leaders to think like business leaders. They had to invest in new technologies related to information warfare, space-based weapons and UAVs. Weapons of precision were to be promoted, as opposed to deploying large numbers of soldiers on the ground²².

The conquest of Iraq in 2003 provided an opportunity for American forces to test the relevance of these new concepts. They invaded and reached the capital in a three-week *blitzkrieg*. They progressed steadily, even if a pause was allowed for logistics reasons. The Iraqi cities and pockets of resistance were deliberately left aside in order to reach Baghdad as quickly as possible, dethrone Saddam Hussein and seize power in the vacuum. This campaign was a triumph, but it is difficult to draw any final conclusions. It pitted the world’s superpower against a country weakened by an embargo that had been in place for more than 10 years. However, the verdict fell quickly. The transformation was buried under the Iraqi sands as disastrous American governance fueled a popular uprising, *jihad* and a civil war between Sunni

21. Gen. J. M. Shalikashvili, USA, Chairman of the Joint Chiefs of Staff, *Joint Vision 2010*. Washington, DC, Office of the Chairman, July 1996.

22. P. C. Light, “Rumsfeld’s Revolution at Defense”, *The Brookings Institution Policy Brief* No. 142, July 2005.

and Shia factions. Washington wavered on the course to take, as the insurgency gained momentum, U.S. casualties mounted, and the War on Terror entered a stalemate²³.

Uncomfortable echoes of the Vietnam syndrome were looming. General Petraeus saved the day by suggesting with others in 2006 to surge reinforcements to better control the country. His ideas were attractive, and he obtained the command of American forces in Iraq. He succeeded, rallying the moderate Sunni tribes, and engaging extra soldiers against the insurgents to defeat them and win the hearts and minds of the population. COIN (or counterinsurgency) trumped the other grand military designs. As the new Secretary of Defense R. Gates repeatedly stated that energy and resources must be mobilized to win actual irregular conflicts rather than the potential wars of the future²⁴. As long as the Army and Marines are fighting insurgents on a daily basis, they will take priority. The Air Force, Navy and RMA could wait.

China enters the scene

The arrival of the Obama administration prompted a shift in the main focus of American policy. Eager to put an end to the American adventure in the Middle East and Central Asia, which had been ruinous in terms of American lives and disastrous in terms of finances and international image, President Obama was above all preoccupied by the irresistible rise of China. Secretary of State H. Clinton confirmed this orientation by writing in 2011²⁵ that the Asia-Pacific region was considered to be the geographic area where the future of the world's geopolitical balance would be played out. Potential competitors such as China, were able to increase their capabilities or global influence by taking advantage of the relative absence of the United States as it attempted to rebuild an unlikely stable state in the Middle East. Those days were over. The center of gravity of foreign policy was now pivoting to Asia.

One of the first problems raised by this competition between Beijing and Washington was the risk of erosion of American control over the commons. The commons are areas or spaces that do not belong to anyone in particular,

23. See for example D. Filkins, *The Forever War*. New-York, Knopf, 2008; T. E. Ricks, *Fiasco: The American Military Adventure in Iraq*. London, Penguin Group USA, 2006.

24. A. Gray, "US must Focus on Iraq, not on Future Wars: Gates", Reuters Word News, May 13, 2008, available at <https://www.reuters.com/article/us-usa-military-gates/u-s-must-focus-on-iraq-less-on-future-wars-gates-idUSN1233548020080513>

25. H. Clinton, "America's Pacific Century", *Foreign Policy*, November 2011, p.56-63.

but whose use by everyone is a source of well-being and wealth. The sea, the air, space and cyberspace all meet this definition – all lie outside the artificial borders drawn up by the Nations. Access to these areas is essential for the proper functioning of globalization and the international order that the United States supports²⁶.

Secretary Gates was not mistaken when he declared in 2008 at the Air War College that protecting the Global Commons is part of the United States' agenda for the 21st century. Beyond the geopolitical stakes, the military aspect of controlling the Commons is fundamental. The Commons are requisitioned as soon as American forces deploy to intervene in any region of the world. They could do so without hindrance until then. In 1990 or 2003, the Americans could pour in their troops from the air or the sea without being threatened by the Iraqis.

But the Chinese could pose far more serious problems. Aware that American forces were stronger if they were to make contact, the People's Liberation Army (PLA) had a vested interest in preventing such confrontation. An acronym destined for posterity summarizes their strategy: A2/AD (Anti-Access, Area-Denial)²⁷. Anti-Access refers to enemy actions that inhibit military movement into a theater of operations. They are based on long-range capabilities. Area-Denial refers to enemy activities that attempt to impede military freedom of action within a theater of operations. It is based on short-range capabilities. The idea is to prevent the enemy from approaching a contested strategic area or to severely constrain its freedom of maneuver.

A RAND study published in 2009 asserted that U.S. forces would have the greatest difficulty in resisting an invasion of Taiwan around 2015²⁸. The Chinese could destroy the Taiwanese air force on the ground by raining down a hundred short-range ballistic missiles²⁹ on their airbases. American USAF or Marine squadrons, present in limited numbers in Japan, could be put out of action in the same way, so that China could win the air war without even fighting in the air. If aerial combat were to occur anyway, the increased sophistication of Chinese aircraft, as well as the protection offered by ground-to-air artillery assembled in layers of overlapping short-, medium-, and long-range artillery that support each other, would make the Chinese confident of ultimate victory.

26. B. Posen, "Command of the Commons", *International Security*, Summer 2003, p.5-46.

27. A. F. Krepinevich, B. Watts, R. Work, *Meeting the Anti-Access and Area-Denial Challenge*, Washington DC: CSBA, 2003, available at <https://csbaonline.org/uploads/documents/2003.05.20-Anti-Access-Area-Denial-A2-AD.pdf>

28. D. A. Shlapak, D. T. Orletsky, T. I. Reid, M. S. Tanner, B. Wilson, *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute*. Santa-Monica, RAND, 2009.

29. More precisely, between 90 and 240 missiles.

The Navy was no better off. Experts had been pointing out for years the danger posed by Chinese DF-21 missiles, with a range of over 1,500 km, to ships and aircraft carriers that come too close to Chinese shores³⁰. The range of the more recent DF-26 missiles would even reach 4,000 km. Chinese cyber-attacks could disrupt American logistics. The potential battlefield would now extend over thousands of kilometers, over an area as large as an ocean. Setting the boundaries of potential conflict had become a daunting challenge and may even seem laughable in light of actions in cyberspace, which eliminate any notion of distance, or even time, in the immediacy of the effects produced.

The American military response was swift. The 2010 Quadrennial Defense Review announced that “the Air Force and Navy are jointly developing a new Air-Sea Battle (ASB) concept to defeat ... enemies equipped with anti-access and area denial capabilities”³¹. Building on the publication of “Why Air-Sea Battle”³² by CSBA and A. Krepenevich, both armed forces were in fact developing an operational concept that was shrouded in mystery. Few elements transpired towards the public. A first official document, based on ASB and called the Joint Operational Access Concept (JOAC), was issued by the Pentagon in 2012. Another portion of ASB was declassified in 2013. A list was drawn up of thirty capabilities needed in order to have the necessary means to neutralize a protective bubble. The new American art of war was becoming clearer. U.S. forces must develop the ability to disable enemy C4ISR capabilities to disrupt attacks against friendly targets, to destroy enemy A2/AD weapons systems, before successfully confronting the armed forces they would then face. Most importantly, the possibility of attacking along several axes by mobilizing all the armed forces and initiating a complex choreography in the cyber, space and electromagnetic arenas was discussed.

Towards Multi-Domain

Victory on the battlefield, however, would not originate only from a merely conceptual point of view. In November 2014, Secretary of Defense C. Hagel noted in an address to the Reagan National Defense Forum³³, that potential adversaries of the United States were developing disruptive capa-

30. The most modern version of the Xian H6 bomber could carry this type of missile under its wings since 2019, significantly increasing its range.

31. *Quadrennial Defense Review 2010*. Washington DC, Secretary of Defense, 1 February 2010, available at <https://archive.defense.gov/qdr/QDR%20as%20of%2029JAN10%201600.pdf>

32. C. Hagel, “Secretary of Defense Speech, Reagan National Defense Forum Keynote”, *US Department of Defense*, November 15, 2014, available at <https://www.defense.gov/Newsroom/Speeches/Speech/Article/606635/>

33. J. Louth, T. Taylor, “The US Third Offset Strategy: Hegemony and Dependency in the Twenty-First Century”, *The RUSI Journal*, June-July 2016, p.69.

bilities over the entire spectrum of conflict. He noted that the United States was able to re-establish itself on the strategic stage in the 1970s and 1980s thanks to developments in precision reticular attacks and stealth. He then announced the launch of a Third Offset Strategy (TOS), designed to give the United States a new competitive advantage in the area of projection over the next few decades. This strategy is based on the adoption of innovative development processes, inspired by those of start-ups, and on the mastery of new technologies such as robotics, autonomous systems, miniaturization, Big Data³⁴ and 3D printing. Above all, artificial intelligence (AI) must make it possible to manage and usefully exploit the mass of data collected by sensors, which literally overwhelms human operators, who are only capable of exploiting a small quantity of it. TOS is obviously an extension of RMA. The Pentagon decided to apply the same recipe by identifying innovative technological solutions that could help solve tactical and operational problems.

While TOS disappeared from official discourse with the advent of the Trump administration, its spirit remains, and the focus continues to be on AI development. Yet it is Multi-Domain that has ultimately taken up the vacant space. While the National Security Strategy (NSS), released in 2015, did not address the issue, the 2017 NSS and the 2018 National Defense Strategy recognized that U.S. military superiority can no longer be taken for granted. Both documents then tout the MD approach to ensure that U.S. interests are preserved. The following narrative now dominates the thinking of the U.S. strategic community: potential adversaries understood that American strength relies in achieving military superiority in fluid environments and taking advantage of that to facilitate ground maneuvers. They therefore develop elaborate means to prevent conquest of air or sea. Since the components can no longer proceed sequentially as they did in the 1991 Gulf War, first dominating the air, exploiting the benefits of that supremacy, and then launching a land offensive under very favorable conditions, U.S. forces are considering maneuvering in a synchronized manner, both physically and cognitively, in all environments and across all scopes that form the battlefield. The enemy then faces multiple dilemmas, which can create temporary windows of opportunity that must be seized. U.S. forces can then step into the gap and regain the initiative by adapting their actions to the new environment. For example, successful air raids can be generated by taking advantage of a cyber attack that temporarily disables surface-to-air weapons. By manipulating the magnetic spectrum, enemy satellites can be momentarily blinded in parallel, facilitating the approach of friendly ships carrying troops or launching a salvo of missiles to enlarge the temporary gap.³⁵

Obviously, in this new approach, the necessary degree of joint coopera-

34. The USAF adds hypersonic technologies, directed energy and quantum computing to this list.

35. P. Gros, V. Tourret, "Multi-domain synergy", FRS, *Future Conflicts Observatory*, note n°7, April 2019. The authors speak of cascading effects.

tion is a much higher bar than before. The various components of a force must no longer simply coordinate closely. Ideally, they must be integrated, if only to reduce the friction of information transfer or to fully understand the precise nature and effects of maneuvers of other components operating in a different environment or scopes. Only then can convergence be achieved, that is, the creation of simultaneous effects at the operational level, at a higher speed than that of the enemy.

While the discussions on Multi-Domain did not lead to a merger of the American services, it did allow the Army to join the doctrinal debate. It first developed the Multi-Domain Battle concept in cooperation with the Marine Corps, but the latter withdrew to produce its own body of text. The Army then published the Multi-Domain Operations (MDO) concept, which it tested in the Indo-Pacific theater, hoping to arouse the Navy's interest and develop cooperation. However, the Navy has been only moderately involved in this dialogue, believing that it has been practicing multi-domain operations naturally for decades, operating daily in all three environments. The USAF, on the other hand, was very interested in C2-related aspects. It is involved in Multi-Domain Command and Control (MDC2), seeking to develop solutions to link actors from different environments or scopes.

The dimensions of the battlefield are not really specified anymore. The Army does refer to a Multi Domain Extended Battlefield³⁶, but the essential lies elsewhere. It is now a question of fighting an adversary that occupies less a given volume, transformed into sources of vulnerability, than several generic systems of systems, networked together, protecting each other, which must be disarticulated by acting on their nodes and datalinks.

Today, publications around Mosaic Warfare, launched by DARPA, are expanding the initial thinking around MD. This new term refers to how elements of reduced force, consisting of various weapons systems, could be rapidly assembled or disassembled on the battlefield to produce the most appropriate kill chains for a particular situation at a given time. In particular, automated platforms could be employed to perform a large number of tasks and increase the lethal potential of the whole. The operation of these ad-hoc structures would be driven by AI and ensured by robust networks, composed of redundant nodes to ensure their survival³⁷.

Over the last forty years, American military experts have had to take into account the development of new technologies, accelerating the digitalization

36. C1, *FM 3-0*. Headquarters Department of the Army, Washington DC, 6 December 2017, p. 1.6 available at https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN6687_FM%203-0%20C1%20Inc%20FINAL%20WEB.pdf

37. B. Clark, D. Patt, H. Schramm, *Mosaic Warfare: Exploiting Artificial Intelligence and Autonomous Systems to implement Decision-Centric Operations*. Washington DC, CSBA, 2020.

of the battlefield. They have had to reflect on the effects of these technologies and have progressively expanded the size and scope of the battlefield, to the point of transforming it into an abstract space, reconfiguring regularly the articulation between the different forces with the overarching tendency being towards integration. It is remarkable that the complexity of the battlefield has been regularly resolved by apolitical, non-strategic principles, which focused essentially on the operative aspects. Thus, the harnessing of the new opportunities offered by technology should lead to quick, sure, and decisive victories, provided that one understands their potential and their impacts on the art of war. Principles and rules of engagement can be derived from this, based on a greater speed of decision and action in a reticular environment. In this respect, it may be relevant to speak of the quest for a Jominian³⁸ technological approach to characterize at least the last forty years and probably the decades to come, of American strategic thinking.

38. B. Colson, *La culture stratégique américaine: l'influence de Jomini*. Paris, Economica, 1993.