The Gulf War as a Harbinger of a Revolution in Military Affairs (RMA)

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Introduction

The Gulf War was the first major conventional conflict after the Cold War, and it had a number of implications, not least in influencing the future course of the world. First, the withdrawal of Iraqi forces from Kuwait, led by the United States with the cooperation of the then-Soviet Union and Arab states, was a critical moment that foreshadowed the heralding of the post-Cold War "new world order." For the United States, the Gulf War also became a "model of victory" in which it used its overwhelming economic power, advanced weapons, superior information and communication technologies, and an international coalition to defeat Iraq.[1]

On the military front, the Gulf War ended in a one-sided victory for the coalition force led by the United States. Highlighted in particular was the small number of coalition losses. Before the war began, many experts and military analysts predicted that between 12,000 and 30,000 U.S. troops would be killed in the war. In reality, there were less than 400 casualties throughout the Gulf War, resulting in a significant overturning of prewar predictions.[2] On the operations front, six weeks of aerial bombings preceded the ground war to liberate Kuwait, neutralizing the assets of the Iraqi forces, while the ground war itself ended after only 100 hours; this starkly contrasted with the existing way of war.

Accordingly, the Gulf War came to be regarded as a "Revolution in Military Affairs (RMA)" that fundamentally changed warfare. This paper revisits the argument that the Gulf War was an RMA and discusses its contemporary implications.

Revolutionary Change in Warfare

A number of factors contributed to the overwhelming victory in the Gulf War. Thomas Keaney and Eliot Cohen point out three factors based on their detailed study of the war: (1) the end of the Cold War enabled the United States to concentrate its military forces in Iraq; (2) the terrain and Iraqi force structure favored the effective application of air power; and (3) because Iraqi President Saddam Hussein underestimated U.S. capabilities and resolve, he conceded the initiative to the United States and gave enough time for the coalition force to form.[3]

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1 William C. Martel, *Victory in War: Foundations of Modern Strategy*, revised and expanded edition (Cambridge: Cambridge University Press, 2011), p. 245.

2 Anthony H. Cordesman and Abraham R. Wagner, *The Lessons of Modern War, Vol. IV, The Gulf War* (Boulder: Westview, 1996), p. 338.

3 Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare? Air Power in the Persian Gulf* (Annapolis: Naval Institute Press, 1995), p. 188.

Meanwhile, there is a deeply held view that this historic victory was brought about mainly by some discontinuous or revolutionary change in the way of war. This view led some observers to believe that this change was directly attributed to the new technologies used in the Gulf War, which attracted their keen attention. For example, William Perry, who served as under secretary of defense for research and engineering during the Carter administration and as secretary of defense during the Clinton administration, says the U.S. military edge was largely due to revolutionary new military technology employed for the first time in the Gulf War.[4]

Then what specific military technologies attracted attention? Keaney and Cohen identify five primary technologies that most characterized the Gulf War air campaign: (1) stealth technology; (2) laser-guided bombs; (3) aerial refueling aircraft; (4) high-speed anti-radar missiles; and (5) third generation Secure Telephone Unit (STU-III).[5] Although these technologies were used on a full scale for the first time in the Gulf War, all of them had been developed during the Cold War and already in practical use. Therefore, some U.S. uniformed and civilian officers and defense analysts came to believe that the capabilities demonstrated in the Gulf War represented RMA itself, and that the United States should continue to develop technologies further along the same trajectory.

In contrast, others viewed that an RMA did not occur during the Gulf War because the majority of bombs used in the air campaign were not precision-guided munitions, and furthermore, sensors and information technology did not function effectively. For example, only about 8% of the bombs used in the six-week air campaign were precision-guided munitions; the rest were unguided bombs.[6] In this vein, Keaney and Cohen conclude that, despite advances in information technology, the mechanism for air campaign planning and air tasking was similar to methods used since the Second World War and was not at the level expected of an RMA.[7]

Against this backdrop, Thomas Mahnken, a prominent American scholar on strategic studies, divided the RMA maturation process into (1) the embryonic phase, (2) the immature phase, and (3) the mature phase, and placed the Gulf War in the transition phase between the embryonic and immature phases.[8] That is, he perceived the Gulf War as a harbinger of future revolutionary change. The challenge after the war was achieving this change as quickly as possible.

Conceptualization of RMA

Perhaps particularly instrumental in disseminating the notion of the Gulf War as the starting

4 William J. Perry, "Desert Storm and Deterrence," *Foreign Affairs*, Vol. 70, No. 4 (Fall 1991), p. 68.

5 Keaney and Cohen, *Revolution in Warfare?* pp. 189-199.

6 U.S. General Accounting Office, "Operation Desert Storm, Evaluation of the Air Campaign," Report to the Ranking Minority Member, Committee on Commerce, House of Representatives, June 1997, p. 29, available at https://www.gao.gov/assets/nsiad-97-134.pdf, accessed on December 23, 2021.

7 Keaney and Cohen, *Revolution in Warfare?* p. 210.

8 Thomas G. Mahnken, "Weapons: The Growth & Spread of the Precision-Strike Regime," *Daedalus* (Summer 2011), pp. 46-48.

point of RMA was Andrew Marshall, known as one of the leading strategists in the U.S. Department of Defense (DOD). Dima Adamsky notes that Marshall is the individual most closely identified with the RMA concept.[9] Serving as director of the Office of Net Assessment since 1972, Marshall analyzed the U.S.-Soviet military balance from a long-term perspective during the Cold War and is also known for predicting the collapse of the Soviet Union as early as in the 1980s. Marshall was the first to conceptualize RMA, sparking debate within the DOD and beyond.

Marshall seemed to focus on the RMA concept through analyzing the activities of the Soviet forces and following the intra-military disagreements. Soviet forces increasingly viewed that the evolution of precision-guided munitions and information technology in the United States was bringing revolutionary changes to the battlefield, i.e., a "military-technical revolution" was occurring. Based on such arguments, Marshall became convinced that the U.S. forces were approaching an RMA.

The Gulf War prompted Marshall to study RMA in further depth, culminating in his memorandum entitled "Some Thoughts on Military Revolutions" in August 1993.[10] In this memo, Marshall called attention to two items related to the discussion of RMA. First, he warned that the RMA debate in the United States put too much emphasis on technology. He noted that an RMA takes place when new operations concepts are developed and, in many cases, new military organizations are established in addition to new technology. Since the term used by the Soviet forces, "military-technical revolution," had excessive connotations of technology, Marshall instead coined the term "revolution in military affairs" to lessen the suggestion of technology.

On this point, Stephen Rosen, who has extensively analyzed the past cases of U.S. RMAs, underscores that an RMA requires not only technological innovation but also a transformation in military organization. Specifically, he points out the importance of the military's senior leadership recognizing the need to develop a new way of war and creating long-term career paths to develop organizations and nurture experts that will enable this way of war.[11] It can thus be said that Marshall's view was also backed by Rosen's research.

Second, Marshall warned that it was incorrect to think an RMA took place in the Gulf War, albeit the debate suggests otherwise. He stressed that the Gulf War marked only the beginning of such a revolution and that a full transformation of warfare had not yet occurred. In order to better understand RMA, Marshall conducted historical case studies, focusing especially on

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9 Dmitry (Dima) Adamsky, "The Revolution in Military Affairs," in Thomas G. Mahnken, ed., *Net Assessment and Military Strategy: Retrospective and Prospective Essays* (Amherst: Cambria Press, 2020), p. 153.

10 Andrew W. Marshall, "Memorandum for the Record: Some Thoughts on Military Revolutions, Second Version," August 23, 1993, The Edward A. Feigenbaum Papers, Call Number: SC0340, Accession 2005-101, Box: 18, Folder: 16, available at https://exhibits.stanford.edu/feigenbaum/catalog/yx275qm3713, accessed on December 23, 2021. This memo was originally an internal DOD document and was circulated only to some officials. It is now publicly available as part of Stanford University's Edward A. Feigenbaum Papers.

11 For details, see Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca: Cornell University Press, 1994).

the RMAs that took place in the period between the First and Second World Wars.[12] Based on such case studies, he considered the 1991 Gulf War as a turning point equivalent to the Battle of Cambrai in 1917.

The Battle of Cambrai was the first major battle in which the British Army deployed tanks on a large scale during the First World War. The British attempted to break the stalemate in trench warfare by introducing tanks but were unable to achieve significant outcomes due to the primitive nature of the tanks, compounded by the immaturity of the tactics and organization for leveraging their potential. In the end, it was not until the Second World War, two decades after the Battle of Cambrai, that an RMA took place through armored warfare. Moreover, it was not the frontrunner, Britain, who succeeded in RMA, but the latecomer, Germany, through its "Blitzkrieg" campaign. In other words, Marshall used this case to call attention to the possibility of a leading country being reversed by a latecomer.

Against this backdrop, Marshall noted that while changes in warfare cannot be predicted with certainty, two major ideas could very plausibly influence future trends. The first was the idea that long-range precision strike would become the dominant operational approach. A glimpse of this was seen precisely in the Gulf War air campaign. Marshall predicted that precision strike operations would extend to maritime and space domains. The second idea was the emergence of "information warfare." Marshall predicted that information would become a core element in determining the outcome of battles, and that gaining information superiority would become a major focus of operations.

To ensure U.S. military superiority in these two areas, Marshall encouraged the U.S. forces to develop the RMA concept throughout the 1990s. As a result, the term "RMA" was adopted as a slogan for U.S. military reform during the Clinton administration, and the subsequent Bush administration pursued RMA aggressively in the name of "Force Transformation." However, the dramatic changes that Marshall had hoped for did not occur in the U.S. military. While introduction of precision-guided munitions and information technology certainly made progress in the three decades, such efforts were an extension of existing missions and organizations. Accordingly, there was no fundamental transformation in operational concepts and organization.

Further hampering the efforts of the U.S. forces was the September 2001 terrorist attacks in the United States. They prompted Washington to use force against Afghanistan and Iraq, and considerable effort and resources were devoted to counterinsurgency operations. As a result, interest in RMA declined within the U.S. forces, which may have been a reason why the expected changes did not take place.[13]

When Marshall reviewed the status of RMA in 2009, he judged that the U.S. forces had

[12] For a variety of reasons Marshall believed it was most fruitful to analyze the changes that occurred during the interwar period and funded numerous research projects on this period. He was particularly interested in the development of naval air power, i.e., aircraft carriers, by the United States, Japan, and Britain. Barry D. Watts and Andrew D. May, "Net Assessment after the Cold War," in Mahnken, ed., *Net Assessment and Military Strategy*, p. 82.

[13] Stephen Peter Rosen, "The Impact of the Office of Net Assessment on the American Military in the Matter of the Revolution in Military Affairs," *Journal of Strategic Studies*, Vol. 33, No. 4 (August 2010), p. 482.

not even reached the 1930 level in the analogy to the Battle of Cambrai.[14] Even after Marshall retired in 2015 and passed away in 2019, he seemed dissatisfied with the state of the U.S. military.[15] Marshall's concern was never fully dispelled—that the United States, the pioneer of RMA, whose potential had been demonstrated in the Gulf War, would find itself in the same situation as Britain in the interwar years.

Learning by a Third Country

While the lessons from the Gulf War impacted many countries, one of the most influenced states may have been China. This observation is supported by Taylor Fravel, a leading American expert on China, who points out that the Gulf War for China most symbolized a transformation in the way of war since the country's founding in 1949.[16] This view is shared in Japan; *China Security Report 2021*, released by the National Institute for Defense Studies (NIDS) in November 2020, states that, "[t]he sight of Iraqi forces overwhelmed by U.S. forces using high-tech weapons shocked Jiang Zemin and other members of the party leadership as well as senior officers of the PLA."[17]

In 1993, a little over two years after the Gulf War, China revised its strategic guideline of preparing for "local wars under modern conditions" and announced it would put emphasis on "local wars under high-tech conditions." Fravel notes this was the most significant change in China's strategic guidelines since the strategies of 1956 and 1980.[18]

Subsequently, China's military strategy was revised in 2004 to prepare for "local wars under informationized conditions," giving emphasis to information warfare. Chinese Defense White Paper released in 2006 outlines a three-stage development strategy: "The first step is to lay a solid foundation by 2010, the second is to make major progress around 2020, and the third is to basically reach the strategic goal of building informationized armed forces and being capable of winning informationized wars by the mid-21st century."[19] Although not publicly disclosed, it has also been confirmed that China's military strategy was revised in 2014 to aim for winning "informationized local wars." According to Fravel, this change in policy was driven by an assessment that information had not only become an important condition but also

14 Barry D. Watts, *The Maturing Revolution in Military Affairs* (Washington: Center for Strategic and Budgetary Assessments, 2011), p. 6.

15 According to David Goldman, who had contact with Marshall after his retirement, Marshall lamented the DOD's lack of effort in research and development of new technologies and was critical of the military services' emphasis on existing equipment. David P. Goldman, "Andrew Marshall, the Last Wiseman," Asia Times, April 1, 2019, available at https://asiatimes.com/2019/04/andrew-marshall-the-last-wise-man/, accessed on December 23, 2021.

16 M. Taylor Fravel, *Active Defense: China's Military Strategy since 1949* (Princeton: Princeton University Press, 2019), p. 187.

17 National Institute for Defense Studies (NIDS), ed., *China Security Report 2021: China's Military Strategy in the New Era* (Tokyo: NIDS, 2020), p. 9.

18 Fravel, *Active Defense*, p. 217.

19 State Council Information Office of the People's Republic of China, *China's National Defense in 2006* (December 2006), available at http://en.people.cn/whitepaper/defense2006/defense2006(2).html, accessed on December 23, 2021.

come to play a primary role in warfare.[20]

These changes in Chinese military strategy can be explained in part by the fact that some Chinese strategists were largely influenced by Marshall, as suggested by Michael Pillsbury, who analyzed Chinese strategic thought at Marshall's request. Pillsbury notes that the Chinese cited and embraced Marshall's definition of RMA which emphasized information warfare.[21] Outside experts whom Marshall commissioned to analyze as to how countries perceived RMA also found that, of the approximately 20 to 30 countries initially analyzed, China was the most attentive to and conducted an in-depth analysis of RMA.[22]

At the same time, China has put great energy into precision-guided munitions, another characteristic of RMA that Marshall had suggested. *Defense of Japan* published by the Japanese Ministry of Defense states that since the mid-1950s, China has continued independent development of nuclear weapons and missiles for their delivery for the purpose of ensuring nuclear deterrence, supplementing its conventional forces with nuclear capabilities, and securing its influence on the international community. Furthermore, it states that since the 1990s, China has given priority to conventional missile capabilities, underpinned by the growing significance of precision-strike capabilities as a global military trend.[23]

China's buildup of missile capabilities since the Gulf War has been remarkable. In particular, while the United States and Russia are prohibited from developing, producing, and possessing land-based intermediate-range ballistic and cruise missiles under the 1987 Intermediate-Range Nuclear Forces Treaty (INF Treaty), China, which is not a party to the treaty, has focused on developing missiles in this category. As a result, *Military and Security Developments Involving the People's Republic of China*, released by the U.S. DOD in September 2020, states that, after two decades of military build-up, China has surpassed the United States in the areas of land-based conventional ballistic and cruise missiles, along with shipbuilding and integrated air defense systems.[24]

Additionally, China identifies intermediate-range missiles as the primary means of preventing U.S. force projection in its periphery, or the main pillar of the so-called anti-access/area denial (A2/AD) capabilities. In particular, the DF-21, with a range exceeding 1,500 kilometers, and the DF-26, which is reported to have a range of 4,000 kilometers, can not only attack U.S. military bases located in China's surrounding countries, but can also be used as an anti-ship ballistic missile to attack surface ships, an unparalleled development in both quality and quantity. The U.S. DOD points out that China operationally deployed an intermediate-range ballistic missile equipped with the DF-17 hypersonic glide vehicle in 2020.[25]

In addition, China is unique in terms of having an independent military service centered

20 Fravel, *Active Defense*, p. 231.

21 Andrew W. Krepinevich and Barry D. Watts, *The Last Warrior: Andrew Marshall and the Shaping of Modern American Defense Strategy* (New York: Basic Books, 2015), pp. 239-241.

22 Watts and May, "Net Assessment after the Cold War," p. 84.

23 Ministry of Defense, *Defense of Japan 2021* (Tokyo: Ministry of Defense, 2021), p. 62.

24 U.S. Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020* (September, 2020), pp. 5-6.

25 U.S. Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2021* (November, 2021), p. 61.

on land-based missiles. After China conducted a successful nuclear test in 1964, it established the Second Artillery Corps two years later as a unit responsible for nuclear weapons. The Second Artillery Corps had been regarded as a substantially independent military service, but in December 2015 it was reorganized into the Rocket Force, officially elevating it to the same organizational status as the Army, Navy, and Air Force. While the transition to the Rocket Force does not significantly change the basic force structure or mission of the Second Artillery Corps, the move seems to embody China's particular emphasis on missile capabilities.

The Soviet Union, too, created the Strategic Rocket Forces as an independent branch of the armed forces during the Cold War, and the same organizational structure has since been inherited by Russia. Its main assets are long-range intercontinental ballistic missiles (ICBMs) carrying nuclear warheads, for which China's Rocket Force is responsible as well. However, the Chinese Rocket Force also possesses a number of conventional missiles, and the ratio of such missiles to ICBMs has gradually increased. According to David Logan, who analyzed the career paths of the Rocket Force's leadership, a growing number of its senior leaders have served as commanders of major conventional missile bases, demonstrating the Rocket Force's tendency to emphasize conventional missile units not only in the present but also in the future.[26]

Precision-guided munitions have been regarded as organic equipment for, or even attachment to, aircraft and naval vessels. Therefore, defense authorities in major countries often give priority to the procurement of major platforms, such as tanks, aircraft, and ships, resulting in lower priority given to the development and procurement of precision-guided munitions. The existence of a military service mainly for missiles, like China's Rocket Force, provides an organizational basis for developing precision-guided munitions, increases the supply of specialized personnel, and gives a greater organizational clout for uniformed officers specialized in precision-guided munitions. This is consistent with Rosen's aforementioned assertion, and in this regard, the Chinese People's Liberation Army (PLA) is in a conducive environment for an RMA centered on precision-guided weapons.

In fact, the Rocket Force seems to be rising in status in the PLA. Notably, with regard to the Rocket Force's political influence, Wei Fenghe, the first commander of the Rocket Force, was appointed to be among the seven members of the Central Military Commission, which stands at the apex of party-military relations in China. Furthermore, in March 2018, Wei became the first non-Army general officer to be appointed minister of national defense, a post which until then had been long monopolized by Army generals. Some observers note that this was an attempt by the Chinese supreme leadership to encourage change in the Army-centric organizational culture, which would in turn lead to increasing the authority and importance of the Rocket Force within the PLA.[27] Taken together, the change in military strategy triggered by the Gulf War has brought about a far-reaching transformation spanning missile capabilities, technology, and organization.

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26 David C. Logan, "Career Paths in the PLA Rocket Force: What They Tell Us," *Asian Security*, Vol. 15, No. 2 (2019), p. 114.

27 Bates Gill and Adam Ni, "The People's Liberation Army Rocket Force: Reshaping China's Approach to Strategic Deterrence," *Australian Journal of International Affairs*, Vol. 73, No. 2 (2019), p. 171.

Conclusion

To counter China's buildup of land-based precision-guided munitions, the United States withdrew from the INF Treaty, and thereby, considers developing and deploying ground-launched medium-range missiles. Such a measure has been prompted by former senior officials of DOD in both the Obama and Trump administrations, and there appears to be a bipartisan consensus.[28] For its part, Japan is working to strengthen its standoff defense capabilities by developing high-speed glide bombs for defending its islands and by deciding to increase the range of its surface-to-ship missiles in late 2020.

On the organization front, however, Japan, the United States, and China seem to have very different approaches to precision-guided munitions. If, in many cases, a new organization is essential for an RMA to take place as Marshall pointed out, China undeniably may have a lead over Japan and the United States, at least in that it has created a specialized organization, the PLA Rocket Force. Therefore, both Japan and the United States will need to further carry out organizational reform for an RMA centered on precision-guided munitions.

Furthermore, if the Gulf War prompted a change in military strategy and the buildup of the PLA's missile capabilities, it would imply that developments in another country influenced China's RMA. Scholars are divided on whether information obtained from other countries facilitates a country's RMA, and a conclusion has yet to be reached.[29] Nevertheless, Mahnken presents a case in which the United States detected RMA efforts by another country in the interwar period and drew on some of that information for its own RMA.[30] Accordingly, it would not be surprising if China's RMA was similarly encouraged by developments in other countries, the Gulf War in this case.

Meanwhile, Williamson Murray, a leading military historian on RMA, criticizes the tendency of most military organizations to show little interest in studying the lessons of recent conflicts that they themselves have experienced and to ignore the past.[31] In light of this point, the question of how seriously China took it upon itself to learn about the Gulf War, a conflict in which it was not involved, needs continued careful assessment.

The success or failure of RMA will be demonstrated on the battlefield, as interwar examples such as Blitzkrieg and carrier warfare have shown, needless to say. Fortunately, as of writing, there have been no opportunities since the Gulf War that tested the true value of RMA. Thus, if the Gulf War was a sign of RMA, the race for its realization may still be continuing.

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28 For details, see the discussion in Abraham M. Denmark, "Managing the Asia-Pacific's Second Missile Age," Quad-Plus Dialogue, February 20-21, 2019, available at http://thf_media.s3.amazonaws.com/Quad%20Plus/2019%20Conference%20Papers/Denmark,%20Abraham%20-%20Managing%20the%20Asia-Pacific%E2%80%99s%20Second%20Missile%20Age_JLedit.pdf, accessed on December 23, 2021; and Elbridge Colby and Walter Slocombe, "The State of (Deterrence by) Denial," March 22, 2021, War on the Rocks, available at https://warontherocks.com/2021/03/the-state-of-deterrence-by-denial/, accessed on December 23, 2021.

29 For example, Rosen argues that information about other countries' technologies has not had a positive impact, at least on RMA in the United States. Rosen, *Winning the Next War*, pp. 185-220.

30 For details, see Thomas G. Mahnken, *Uncovering Ways of War: U.S. Intelligence and Foreign Military Innovation, 1918-1941* (Ithaca: Cornell University Press, 2002).

31 Williamson Murray, "Innovation: Past and Future," *Joint Force Quarterly*, No. 12 (Summer 1996), pp. 52-53.

From this perspective, the Gulf War has contemporary significance, and it is worth revisiting its lessons.