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considered as we define the notions of military effectiveness in each level.

A hierarchical approach to military effectiveness is useful. It can be informed by themes that pervade all of the levels. For example, we have already identified seven trends in future warfare that can be applied in developing the framework for military effectiveness. The four themes of integration, responsiveness, skill, and, quality provide additional depth to the analytical framework to ensure military institutions' effectiveness in the twenty-first century.

However, one final aspect must be considered in this exploration: the pace of change in the environment. A consistent theme throughout this book has been the surge in innovation and the speed of change in the strategic environment. This means that military organizations must not only be effective at each level, but they must also be effective at adapting more rapidly to change—in peace and in war. Consequently, in addition to military effectiveness at the strategic, operational, and tactical levels, the ability to adapt at all levels will have a significant impact on military effectiveness and competitiveness. To that end, the capacity to adapt must be examined as a fourth and separate element of military effectiveness.

## **STRATEGIC EFFECTIVENESS**

War remains an enduring aspect of human existence. National governments must assume that they will need to defend their territory and their sovereignty. To do so, they must invest in military institutions. Any notion of effectiveness for these military organizations must be drawn from political purpose. There must be an alignment of what political outcomes are sought and what military strategies are developed, executed, and adapted (primarily a military activity). Military strategy is an integral part of higher-level national strategy, designed to meet the policy needs of government.

Strategy is a word, and a concept, that has resisted a single, agreed definition. As Beatrice Heuser writes, “Strategy is hard to press into one universally

accepted definition accepted throughout the ages.”<sup>29</sup> Hew Strachan has described strategy as a word “used by governments to describe peacetime policies more than by armies to shape wars” and that has “gained in breadth but has forfeited conceptual clarity.”<sup>30</sup> Colin Gray describes strategy as “a bridge between purpose and action.”<sup>31</sup>

Strategy comes into play when there is potential or actual conflict, where the interests of two or more actors collide, and where some type of resolution is needed.<sup>32</sup> A central idea in the theory and practice of strategy, and therefore in achieving strategic effectiveness, is that it exists in an environment where actors are competing and where there is some misalignment of larger objectives. As Heuser notes, “Strategy is a comprehensive way to pursue political ends, including the threat or use of force, in a dialectic of wills—there have to be at least two sides to a conflict.”<sup>33</sup> This capacity for strategic thinking is especially compelling given that the complex problem of running military activities is liable to occupy the skills and minds of senior commanders so completely that it is easy to forget what it is being run for.<sup>34</sup>

Millett and Murray have described the capacity for effective strategic thinking as being much more important than tactical or operational excellence. They stress the importance of getting strategy right (and the strategic education that enables this) when they state that “it is more important to make correct decisions at the political and strategic level than it is at the operational or tactical level. Mistakes in operations and tactics can be corrected, but strategic mistakes live forever.”<sup>35</sup> For this reason, strategic effectiveness is of profound importance to twenty-first-century military institutions and the nations to which they belong. Of all the levels of effectiveness explored in the following pages, this is perhaps the most vital.

### ***Integration***

A more integrated approach to national security will be required in the decades ahead. Brooks and Stanley reinforce this point, describing “integration” as one of their core elements of military effectiveness.<sup>36</sup> Western military organizations must continue to develop the mechanisms by which they link purpose and action. Military institutions must be able to

achieve desired military strategic objectives that complement economic, information, cultural, diplomatic, and other strategic goals. These must be combined to support a nation to secure its political goals.

The alignment of military strategy with other elements of national security demands that military leaders be politically aware (but not political). They must be able to sustain an effective and continuous dialogue with government. This dialogue, while central to effective civil-military relations, is not just about sustaining relations in accordance with the laws and norms of given countries; there also are important outcomes from it for strategic military leaders. They must be able to generate sufficient influence with political leaders so that they seek logical military goals, which must be consistent with the capabilities, size, and posture of military forces and be supportable by the logistic and industrial capacity of the nation. At the same time, strategic military objectives must possess a level of alignment with security partners and allies.<sup>37</sup>

The British in 2020 described something like this in their Integrated Operating Concept 2025.<sup>38</sup> To realize such an integrated approach, military institutions require the organizational mechanisms and procedures that can achieve this closer integration of national power. Therefore, the first element of strategic effectiveness for twenty-first-century military institutions is the alignment of national policy and strategy with military strategy in order to achieve desired defense and deterrence outcomes.

Without a pragmatic and integrated approach to policy and strategy, it is difficult to imagine how a nation might fare in addressing the challenges of the twenty-first century. But even if this aspiration is achieved, it is insufficient to assure national sovereignty in the decades ahead. The successful execution of national policy and military strategy will require all the institutions of national security to develop their relationship with, and exploitation of, information.

## ***Information***

Twenty-first-century technologies are providing methods for influencing

different populations in a way that has not been possible before. As such, military organizations must be able to leverage information to keep their own government and societies informed. Transparency and auditability are core responsibilities of military institutions in democratic societies. Military organizations also need the capacity to influence competitors and adversaries while countering the influence activities of those same entities.

The use of propaganda and disinformation by military organizations has long historical precedents. What is new, however, is the ease, global reach, speed, and low cost of such activities. The barriers for entry into the conduct of information activities are low. As such, they have become a core tool for both state and nonstate actors.

In their 2018 examination of social media and information operations, Peter Singer and Emerson Brooking propose several “rules” for this evolved information environment. One of them is that the Internet is now a battlefield, which changes how we must think about the nature of information. Further, because of how the information environment has evolved, war and politics have never been more intertwined.<sup>39</sup> It is an elegant summary of the challenge faced by societies, governments, and military institutions in the contemporary environment.

Therefore, another measure of the strategic effectiveness of twenty-first century military institutions will be their capacity to undertake information operations and generate what the British call an information advantage.<sup>40</sup> Successful military institutions in the coming decades must be able to leverage information to inform or enable their operations and deny information to adversaries while also building resilience in their institution. These resilience activities must be nested within, and aligned with, national approaches to resisting foreign disinformation and influence campaigns.

## ***Resources***

Military institutions need resources. Indeed, they are extraordinarily large resource-consuming organizations that demand a significant share of national wealth to build and sustain their capabilities. During war, the need to fund

personnel and technological resources exponentially increases this strain on the national coffers.

Leaders of military institutions must be able to make the case to their political leaders for sufficient budgets to build the military capacity that meets the policy objectives of their governments and the national security requirements of their nation. When there is no obvious threat, this is difficult. The 1990s and the interwar period serve as examples of where military institutions sometimes failed to offer compelling and evidence-based cases for sufficient investment. However, where there is a clear threat to a nation's interests or sovereignty, the case for sufficient resourcing is clearer.

Military institutions also need people. Their leaders must be able to justify an appropriate overall force size to their national leaders. Sub-elements of this will be the balance between different services and between regular and reserve forces. Providing the right evidence for force levels desired by the strategic leadership of military institutions involves both the art and science of our profession; long-term workforce planning, careful experimentation with existing and new workforce specialties, recruiting strategies, and sustaining an appropriate level of retention are all components.

The final resource is access to the technological (and industrial) capacity required to produce equipment and other elements of military capability. While technology rarely provides a silver bullet for military success, military institutions must be able to secure access to the right amount of high-technology weapons, communications, and other equipment to enable their activities. As Millett and Murray note, "A military organization that cannot or does not exploit either domestic or foreign industrial and scientific communities limits its effectiveness."<sup>41</sup> Therefore, effective twenty-first-century military organizations must seek and gain access to the technological and industrial capacity that underpins their capabilities. This requires investment in research and development, partnerships with civilian universities, collaboration with domestic and foreign industrial partners, and the sharing of sensitive technologies with close allies and partners.

In wrapping up this discussion on resources, the third element of strategic effectiveness for twenty-first-century military institutions is their ability to secure for themselves regular and sufficient allocations of a nation's budget,

people, and technological and industrial capacity to build competitive military forces and capabilities.

### ***Intellectual Competition***

Military institutions, working within a more integrated national security environment, must adapt to new technologies and other capabilities being fielded by our state-based competitors as well as those that might be wielded by nonstate actors. Besides the new high-velocity and low-signature weapons systems—potentially fielded in large quantities—an array of nonkinetic capabilities such as cyber, quantum encryption, stealth technologies, and influence activities must be dealt with.

Accompanying these new systems are new ideas about how to use them. Both the Chinese and Russians have invested in new operational concepts that are designed to attack Western systems and joint forces where they are weak. Therefore, the fourth element of strategic effectiveness for twenty-first-century military institutions is investment in winning the intellectual competition with strategic competitors and adversaries. Military institutions must be capable of generating competitive strategies that pit their strengths against potential adversary weaknesses, align with national strategies, and complement those of allies and security partners.

### ***Assessment***

Winning the intellectual contest in future competition and conflict will rely on evolved ways of analyzing the strategic environment. The United States has a multi-decade history of undertaking net assessments of its principal competitors and using the knowledge gleaned from these to build competitive strategies. More recently, the United Kingdom established its Strategic Net Assessment capability within the Ministry of Defence in 2018.<sup>42</sup> All Western nations need a capacity to undertake these kinds of assessments, and these assessments must be undertaken from national as well as alliance perspectives.

This approach is a well-worn path in the U.S. Department of Defense's Office of Net Assessment. As Paul Bracken has written, "Net assessment had its origins in the need to integrate Red and Blue strategy in a single place."<sup>43</sup> This was driven by a growing dissatisfaction with existing analytical tools within the U.S. military establishment in the late 1960s. In the wake of a 1971 study on U.S. intelligence operations by National Security Council staff, a recommendation was put forward to establish a "net assessment staff." That November, the president signed a directive to establish this new activity, and Andrew Marshall formed the new net assessment group in the spring of 1972.<sup>44</sup> Developed throughout the early 1970s and 1980s, the group offered a way of thinking and a process for comparing the United States with its principal adversary that evolved over the following decades.

What might these strategic net assessments look like in the contemporary era? One of the most important elements that strategic assessment must explore is the nature of the competition between nations. The appreciation of why states compete provides insights into areas where they might take action to either reduce tension or ameliorate the impacts of that competition. This description of the competition should include how both sides see the different areas of competition as well as the importance attached to each.<sup>45</sup> It also includes political systems, objectives, strategic cultures, differences in strategic competencies and characteristics, and the impact of interaction between competing nations.

Another element of these strategic assessments is the development of hypotheses about the future security environment in which military forces will operate. There are a range of different futures methodologies currently used by military organizations in countries such as the United Kingdom, the United States, Singapore, Australia, and others. Products include the British Defence Concepts and Doctrine Centre Global Strategic Trends and the U.S. National Intelligence Council Global Trends reports.<sup>46</sup> They provide trends analysis, alternative scenarios (an approach pioneered by Shell in the 1970s), and detailed analysis on the potential impacts on military operations and institutions. This is vital in developing future force structures and concepts and in exploiting new technologies as well as developing competitive strategies at the national level.



Therefore, the fifth element of strategically effective military institutions in the twenty-first century will be their ability to undertake rigorous strategic assessments, including hypotheses about the future security environment, upon which they might base the development of competitive strategies. These assessments and competitive strategies will be significantly more effective if they are prepared, executed, and adapted in partnership with other like-minded nations. As such, strategic engagement comprises another measure of strategic effectiveness.

### ***Engagement***

Engagement between like-minded military institutions and like-minded nations must continue to evolve and embrace a greater sharing of ideas on every aspect of military endeavors. This will include strategy and joint operations but will also extend to logistic support, technological research and development, and the full spectrum of personnel training, education, and development. Strategic engagement between Western military institutions already includes alliances such as the North Atlantic Treaty Organization (NATO), the Australia–New Zealand–United States Treaty Alliance, the U.S.-Japan Treaty of Mutual Cooperation and Security, and the “Five Eyes” arrangement between the United States, Britain, Australia, Canada, and New Zealand. But engagement across a wider range of activities and with more nations in the Indo-Pacific and beyond will be required in the coming decades.

Strategic engagement beyond military institutions is also vital. Industry-military links have long been critical in the development of military capability and are generally robust in Western nations. These relationships remain important for the provision of cutting-edge equipment and other services. However, this only provides physical capacity. Military institutions can better augment their intellectual capacity through strategic engagement activities.

Therefore, the ability to undertake enhanced collaboration with civilian universities and think tanks is also essential. These institutions provide a level of diversity in intellectual capacity that is almost unthinkable in military

institutions. In essence, engagement between the military and academia should ensure a broader and more diverse range of strategy options to be considered by military leaders. While there are a range of collaborations with universities on the technological front, collaboration on new strategies and ideas could be significantly improved. It demands more investment across Western nations and represents a low-cost, high-return activity compared to investments in advanced technologies. Consequently, the sixth element of strategic effectiveness for twenty-first-century military institutions is the capacity to strategically engage with civilian industry and academia in a more seamless and collaborative way, to produce new ideas and technology that will provide a competitive military edge.

### ***Sustainability***

Aligning strategy and policy, securing resources, investing in intellectual competition, and strategic engagement are vital. However, even in their optimal combination, they remain insufficient to build effective twenty-first-century military organizations. Another element of strategic effectiveness involves the long-term sustainability of military institutions in future warfare. This has several components.

First is a nation's ability to logistically support its military forces through sovereign industrial output. The capacity of nations to provide critical supplies, particularly medicines and protective equipment, came to the fore during the COVID-19 pandemic. Effective military institutions must assure themselves of enduring access to critical military supplies during peace and war. This requires arrangements with national industries and with allies. The coercive behavior of China in 2020 is also driving nations to reexamine their internal capacity for manufacturing a range of products, many of which have dual civilian and military uses (including food, fuel, chemicals, computing technology, AI, biotechnology, and pharmaceuticals).

A second element of military sustainability is the capacity of a nation to mobilize an expanded military in a reasonable amount of time—that is, before that nation is defeated by an adversary. The subject of mobilization has received greater attention in many Western military institutions over the

last several years—and so it should. Military institutions are expensive in peacetime. Wars, however, impose much larger human and financial costs and are decided as much by attrition and exhaustion as they are by the will of the belligerents. The planning for this must start well in advance of any hostilities.

A 2020 study conducted by the Australian National University has explored mobilization issues from an Australian perspective. Three separate papers approach the topic from different perspectives, but clear themes emerge. First, mobilization is a national (and potentially an alliance) issue, not a military undertaking. Nations need to decide which national and military capabilities and supplies will be developed indigenously, which ones will be sourced on a shared basis with friends and allies, and which ones might be procured off the open market. Second, it demands a rational assessment of what is possible through mobilizing industrial capacity for military ends. Most likely, it will be scaled against the size of the external threat; total mobilization is unlikely except for the most perilous of threats to a nation. Finally, mobilization is a social issue—taking hundreds of thousands (if not millions) of people from civilian to military occupations is a statement of national will.<sup>47</sup>

While industrial output has been a long-standing subject of study in strategy, the events of the past two years have brought to the fore the importance of national sovereignty in some forms of critical manufacturing capabilities. In the wake of COVID-19, a range of countries are reassessing the costs and benefits of importing goods versus manufacturing them domestically. Developing domestic sources of supply, especially for technologically advanced systems, is both time-consuming and expensive. But if nations wish to possess greater surety in supply in certain classes of manufactured items, the concept of national resilience will be an important consideration in the development of national security strategies.

In his 1973 book *The Causes of War*, Geoffrey Blainey writes that “it is doubtful that any war since 1700 was begun with the belief by both sides that it would be a long war. No wars are unintended or accidental. What is often unintended is the length and bloodiness of the war.”<sup>48</sup> Wars nearly always last longer than expected and are generally more expensive and exhausting than

the belligerents are prepared for. Therefore, the next element of strategic effectiveness for twenty-first-century military institutions is to effectively plan and design systems for strategic resilience, industrial sovereignty, and mobilization.

Future victory or possibly national survival will hinge on how well a nation can harness both its material and its moral strengths. A significant contributor to how it might do so is the focus of the final element of strategic effectiveness: organizational culture.

## ***Culture***

Culture has a significant impact on military institutions. It influences military organizations' success and failure in all their activities. Cultural factors determine the professionalism and discipline of individuals and teams in military institutions. These factors drive battlefield and broader military effectiveness.

The rise of the power of Western nations was due in large part to changes in military culture since the seventeenth century. Before this time, military institutions were often masses of ill-disciplined individuals and groups. Beginning with the seventeenth-century reforms of Maurice of Orange and Gustavus Adolphus, military institutions reformed and imposed strict professional discipline, which in turn assisted in the creation of the modern state. As Murray notes, "It is military culture, rather than technology, that explains the extraordinary record that Western military institutions have achieved over this period."<sup>49</sup>

In their landmark study of military culture, *The Culture of Military Organizations*, Peter Mansoor and Williamson Murray have defined organizational culture in this context as "ideas, assumptions, norms, beliefs, rituals, symbols, and practices that determine how the institution functions and give meaning to its members."<sup>50</sup> Importantly, culture in military institutions establishes distinct organizational identity (and sub-identities) and expectations about how members of the institution will act in given circumstances. It is shaped by external factors such as geography, history,

and the strategic culture of the nation to which the given military institutions belong.

The culture of a military institution is foundational to its overall effectiveness. Almost every action taken by individuals and groups in a military organization is in some form shaped by its overall military culture.<sup>51</sup> There are five elements of culture that will underpin successful military institutions in the decades ahead. The first is that all members of a military institution must be imbued with a service ethic. Their first duty is service to their nation. Part of that service is adherence to the values of that nation, including its laws and norms around ethical conduct and the use of force. A second element of an effective military culture is a focus on professional excellence, at the individual and collective level. This is honed through training, education, experience, and good leadership. A third desirable element is that institutions must be capable of honest studies of military history and future challenges that then can be exploited to develop the concepts, structures, and equipment of the institution. This requires building diverse viewpoints within the organization, as well as investment in education and the organizations that can analyze operational and tactical lessons. It also demands sufficient bureaucracy to ensure the maintenance of key functions, but not so much that it gets in the way of innovation and rapid adaptation where required.

There are two final components of an effective military culture in the twenty-first century. The first is that institutions must be learning organizations. From top to bottom, the incentive systems (promotion, medals, and so forth) of military organizations must nurture creativity, self-critique, and new ideas, which mid-level leaders can invest in and senior leaders can champion. This culture must nurture individuals who can creatively outthink and outplan potential adversaries. At the same time, there must be a cultural affinity with harnessing the disparate and diverse intellects of all its people to solve complex institutional problems in the short, medium, and long term. This must be applied to force design challenges, operational concepts, the integration of kinetic and nonkinetic activities, and personnel development and talent management. Frank Hoffman has recently made a detailed exploration of the ability to leverage learning by military institutions. In *Mars Adapting*, he describes the process as organizational learning capacity.<sup>52</sup> This

capacity is a vital part of the culture of military institutions.

The final component of an effective military culture in the twenty-first century is excellent leadership. Leadership is the art of influencing and directing people to achieve organizational goals. The best military organizations emphasize this as a central element of the military profession where leaders trust and are trusted, nurture innovation, build diverse and capable teams, learn from many and varied experiences, and strengthen their understanding of ethical decision-making. Good leadership is a defining element of successful institutions. The outcome of good leadership is a military institution that is not only effective but also legitimate in the eyes of the government and the civilian population.

Rapid change in the environment is also driving developments in command and control that embrace greater decentralization of decision, self-synchronization, and self-organization. This allows an integrated military organization to more rapidly reorient toward new and evolving missions and is essential at every level of military institutions.

While military institutions around the world have many common traits—uniforms, the use of force, ranks, traditions, hierarchies, and such—they are also uniquely influenced by their national cultures, conventions, history, and geography. There is a careful balancing act between national and military cultures. In a democratic system, we must never allow military cultures to override those of the nation they serve. This is the pathway to civil-military problems. Therefore, effective military institutions in the twenty-first century must develop and nurture an organizational culture that is subordinate to national culture, encourages professional excellence, possesses a strong learning culture, and incentivizes ethical leadership that is legitimate in the eyes of government and the people.

## **OPERATIONAL EFFECTIVENESS**

The operational level of warfare links tactical actions to strategic outcomes.

The theory of the operational level of war and operational art has been the topic of significant investigation and debate over the last several decades. While a small minority retain some skepticism about this as a level of war, Western military institutions have reached a consensus that it does exist, and they possess doctrine in this element of the military art.<sup>53</sup> It is therefore appropriate that effectiveness at this level of war be part of our analytical framework for effective twenty-first-century military institutions.

Because a common definition of the operational level has been broadly agreed among NATO allies, it is perhaps the most relevant one for our purposes here. NATO doctrine defines the operational level as “the level at which campaigns and major operations are planned, conducted and sustained to achieve strategic objectives within theaters or areas of operations.”<sup>54</sup> Tactical operations by joint forces involving position, logistics, intelligence, influence operations, maneuver, and other tactics are prioritized, orchestrated, and combined so that desired objectives can be achieved at the strategic level. A large proportion of planning and command at the operational level is highly mechanistic, requiring staff coordination and synchronization. However, there is another aspect to the operational level, which is known as the operational art.

Operational art is the creative and skillful use of tactical means in order to achieve strategic ends. This demands the resolution of the tension between tactical realities and strategic demands through a continuous process of design, planning, and execution of operations.<sup>55</sup> But the fact remains that the most important function of the operational level is to ensure that tactical actions are orchestrated in place, time, and resources to achieve strategic outcomes. If this is not the case, the chosen method of operational design is inappropriate or potentially negligent. Therefore, the first element of operational effectiveness for twenty-first-century military organizations is that their operational concepts must align with the strategic objectives that have been assigned to them.<sup>56</sup>

Operational art provides an overarching framework for the operational level of warfare to align with strategic objectives. It also provides the intellectual power and imagination to outthink an adversary, deny them their desired goals, and destroy or interfere with their operational design and plans. It is

this intellectual battle that drives the second element of operational effectiveness for twenty-first-century military institutions: operational concepts.

### ***Operational Concepts***

Nearly twenty years ago, Hans Binnendijk and Richard Kugler produced an insightful paper exploring the pathways for the U.S. military to transform itself for the challenges of the twenty-first century. At the heart of their argument was the need for new and evolved operational concepts: “If defense transformation remains anchored in old concepts, it risks perpetuating the status quo, even if it alters forces and weapons.”<sup>57</sup>

The requirement for effective operational concepts was also a central aspect in Millett and Murray’s three-volume assessment of operational effectiveness. Therefore, a second element of operational effectiveness for military institutions is their capacity to generate the ideas and concepts that link strategy and tactics, to test them thoroughly, and to implement them in concert with new technologies, organizations, training, and education.

An important requirement of operational concepts is that they must pit the strength of Western military forces against the weaknesses of their competitors and potential adversaries. A recent historical example of this would be the United States targeting Iraqi operational command and control (an assessed weakness) with its overwhelming dominance of airpower (a U.S. strength) during the 1991 and 2003 Gulf wars. In the contemporary environment, the PLA has assessed that a key weakness in Western military organizations is the operating systems that link forces in the different domains and their supporting logistics, intelligence, space, and information systems. Based on their close observation of joint military operations since the 1991 Gulf War, military theorists in the PLA developed the theory of operational success called systems destruction, which we explored in the previous chapter.

The concept of systems destruction relies on the possession of a range of operational systems that are sufficiently multifunctional and



multidimensional to confront Western military systems in all domains concurrently. It seeks to build a system comprised of elements (command and control, firepower, intelligence, information, etc.), structures (a matrixed work organization with all systems linked through information technology), and entities (the smallest units within the operational system). Applying these in a highly integrated network, systems destruction warfare then aims to paralyze an adversary's operational system.<sup>58</sup>

Western military organizations must match and improve on this Chinese conceptual development. Testing new military concepts must include open debate within and outside military institutions. A historical example of this is the multiyear institutional debate in the U.S. Marine Corps in the 1980s that underpinned its transition from methodical battle to maneuver warfare.

In the contemporary environment, the profusion of blogs, seminars, and other information technologies of the past two decades must be exploited to enable this debate. Experimentation, the creation of virtual avatars of existing military forces, classified wargames, and live exercises also must be used to identify the strengths and weaknesses of new operational concepts, force structures, service balances, and interdomain cooperation.<sup>59</sup> Testing is time-consuming and resource-intensive, but it is nowhere near as expensive as going to war, or being in a strategic competition, with the wrong operational concepts. The process of testing can also expose large parts of military institutions to new ideas and underpin buy-in from across the force for new operating concepts.

These new operational concepts must also be integrated with other concepts as part of a family of operational ideas. Like weapons, there will never be a single operational concept that will cover the breadth of military activities at the operational level. Also, like weapons systems, joint operational concepts are most effective when they are integrated with other operational concepts. The aggregation of operational concepts should overwhelm a potential adversary's capacity to think, plan, and act at the operational level and deny them the ability to attack our systems. Integration of this sort is a multidomain undertaking, necessitating land, sea, air, space, and cyberspace integration. It is also a functional integration issue, incorporating military capabilities such as air defense, logistics, intelligence, command and control,

and influence operations. Finally, new operational concepts must be integrated across different nations to ensure mutual support and understanding, complementarity across slightly different approaches and systems, and the capacity to generate unified action at the operational level.

Since the end of World War II, various nations have invested in their development of the theory and practice of joint operations. Military institutions must now take another step forward in developing the next generation of joint operations and joint operational concepts. They must cover the operation of military and other elements of national power in all domains concurrently. New concepts must be tested, integrated, supportable, and aligned with available technology. Therefore, another measure of operational effectiveness is how well new operational concepts across the spectrum of strike, mobility, targeting, deep operations, missile defense, and other areas are developed and then rigorously tested and exercised in the field regularly.

### ***Matching Concepts to Capacity***

Operational concepts are important, but there is little point in developing ones that are beyond the military capacity of a nation. Consequently, part of the testing of operational concepts must be their validation against the intelligence, logistics, personnel, transport, infrastructure, army, air force, navy, and other capabilities possessed by the military institution.<sup>60</sup>

The technological capabilities of a particular military force must be adequate to achieve the objectives of new operational concepts. Where new or disruptive technologies appear, they must be considered by new operational concepts. Artificial intelligence is likely to result in different ways of conveying information and sharing lessons. It will probably support decision-making at all levels of military endeavor. It will also significantly affect cyber operations and the conduct of influence operations.

Hypersonic weapons are likely to change the pace of operations at the operational level, requiring new and more rapid ways of communication, analysis, and decision-making. Autonomous systems in the air, on the land,

and at sea will change how logistic support is undertaken and how joint forces are structured to move, deny, or seize territory through fires and presence, to fight, and to influence the activities of an adversary. All these are foreseeable now. It demands that military institutions refocus their energies on new ways of thinking if they are to be effective operational forces in the twenty-first century. Therefore, new operational concepts must also be supportable by the means available to the military institutions of individual nations and align with available technology.

### ***Flexibility***

Finally, for new operational concepts to be most effective, they must also be flexible enough to adapt to the changing character of war. The interaction of two military forces, during strategic competition or in war, drives rapid adaptation in tactics, concepts, equipment, training, and leadership. Consequently, the third element of operational effectiveness for twenty-first-century military institutions is their ability to anticipate surprise or change and adapt their operational concepts to retain their effectiveness for current and future operations. This will be explored in more detail later in this chapter.

## **TACTICAL EFFECTIVENESS**

As a young staff cadet at the Royal Military College in Canberra, I spent days in the military theater receiving lectures on tactics. We spent many more days out at the Majura Training Area, just outside of Canberra, undertaking tactical exercises without troops (TEWTs). These provided my classmates and me with on-the-ground experience in the application of what we had learned in the lecture theater.

Leadership and tactical acumen were central to being an effective junior officer in the Australian Army. Professional courses at our Land Warfare Centre in Canungra and more TEWTs at the company and battalion levels

served to hone my tactical knowledge. It is a foundational skill for military leaders in any service and in any nation.

At the most basic level of military operations, armies, navies, air forces, and their supporting elements must be able to fight and win battles. While this may now incorporate space-based capabilities as well as nonkinetic actions such as cyber and influence activities, the fact remains that military forces must be raised, trained, and sustained in peacetime to form a credible deterrent. In war, they must be able to fight and win battles and campaigns—period. The tactical level is focused on the planning and employment of military forces in battles, engagements, and other activities to achieve military objectives. Normally, these tactical actions are undertaken within joint task forces, but in rare circumstances, military activities by a single service might be undertaken. Important foundations for tactical action are tactics and leadership.

Tactics have both artistic and scientific elements. The artistic realm of tactics lies in military leaders' capacity to apply imagination to the use of the means available to them—forces, weapons, and procedures—in order to seize, retain, and exploit the initiative against an adversary. Another element of the art of tactics is the construction of cohesive, combined arms, joint units that are able to successfully execute tactical activities. This demands a deep understanding of the moral, ethical, and physical impacts of tactical actions on military personnel. Fear, friction, uncertainty, and Clausewitz's "fog of war" are most proximate at this level of war. It demands well-honed leading and planning capabilities in all military leaders who are able to sustain tactical cohesion under the worst of circumstances.

The science of tactics incorporates a deep understanding of the capabilities and effects of one's own weapons as well as those of the enemy. It also includes understanding the different tactical formations and specialties that comprise combined arms, task force, and joint organizations and how these can be swiftly reorganized and retasked depending on rapidly changing tactical situations. Finally, the scientific element of tactics incorporates an appreciation, and constant rehearsing, of the procedures and techniques required to achieve specific missions. These might include drills for obstacle crossings, quick attacks, relief in place, defensive activities (in all domains),

and other tactical actions. The artistic and scientific elements of tactics have been an essential aspect of learning for military leaders throughout history. This will remain the case in the twenty-first century.

A final aspect of the tactical art is leadership. Good leaders are good tacticians who also possess the presence of mind to remain calm in the most austere and difficult circumstances and can make good decisions about their people in uncertain, rapidly changing environments.<sup>61</sup> Those who can keep their head in the awful chaos of battle are more likely to win than those who cannot. However, military leaders need to master the scientific aspects of tactics as well.

### ***Dispersed but Unified Forces***

The history of tactics in the past century has largely been a story of the increased dispersal of forces. This trend has been driven primarily by the enhanced capacity of military forces to find their enemy and to attack them with a greater weight of fire and with significantly improved precision. While this trend was under way in the 1860s and 1870s, it matured during the world wars of the twentieth century and reached its ultimate expression with reconnaissance and strike complexes guided by GPS during two wars in Iraq and Kuwait in 1991 and 2003.

The continued improvements in reconnaissance and strike capabilities have forced military institutions to spread their forces and people over greater distances. The German solution to this problem in 1917–18—mission command and mission tactics—was to emphasize decentralized command and control, allowing junior commanders down to the lowest level to make tactical decisions on their own and in accordance with higher intent rather than tasks.<sup>62</sup>

Throughout history, forces that have debuted new tactics and doctrine have often had the advantage of surprise. As Trevor Dupuy notes in his book *The Evolution of Weapons and Warfare*, “Twice within the lifetime of men now living, the German Army has scored stunning tactical surprises over its opponents—in 1918 and in 1940—yet in neither case did it use new weapons.

Every item in the German arsenal was familiar, yet revolutionary use of these weapons came as a great surprise.”<sup>63</sup> New tactics and doctrine therefore provide a much greater return on investment for military institutions than new weapons systems.

The trend in dispersed tactical forces continues into the twenty-first century. Precision weapons and dense networks of advanced sensors result in a much more lethal environment. This means that the advantage in the contemporary environment has shifted to defensive tactics. As one of the foremost contemporary experts on this topic, Robert Scales, notes, “A battlefield dominated by firepower and the defensive compels units to disperse, disaggregate, and go to ground. Disaggregation is good in that it lessens the killing effects of firepower but bad because dispersed forces are less able to mass, and mass is essential if maneuver is to be restored. The purpose of small units changes on a distributed battlefield. In the future, small units will become virtual outposts, in effect the eyes and probing fingers of a larger supporting operational force placed out of reach of the enemy’s long-range fires.”<sup>64</sup>

Some contemporary military institutions have experimented with this more distributed form of tactical operations. The U.S. Marine Corps has undertaken multiple experiments to examine different unit structures and capabilities that might be required to achieve a disaggregated effect in future operations. Its 2005 Concept for Distributed Operations is described as a concept to “create advantage through the deliberate use of separation and coordinated, interdependent, tactical actions.”<sup>65</sup> The arrival of Gen. David Berger as commandant in 2019 heralded even greater transformation. His strategy to redesign the Marine Corps to provide for small, hard-hitting, and distributed forces envisions a fundamental shift in the design of the Marines. It features the disposal of larger, harder-to-deploy, and higher-signature platforms such as tanks and towed artillery and increased investment in long-range rocket artillery and unmanned platforms.<sup>66</sup>

The Russians have also been active in this area. Their operations in Ukraine in particular have highlighted doctrinal innovation in the structure and operations of their tactical forces. These tactical changes align with an evolution in strategic thinking driven by Gen. Valery Gerasimov called new-

generation warfare. Encompassing almost the entire breadth of activities in warfare (less weapons of mass destruction), it includes cyber, influence, private military forces, and different tactical units. The most prominent new tactical force is the battalion tactical group (BTG).

First employed in operations in Donbas, BTGs were formed by almost every Russian field army and corps and deployed for operations around Ukraine. Comprised of tanks, mechanized infantry, air defense, artillery, and anti-armor troops, these battalion-sized units possess more firepower than most Western brigade-sized formations. The BTGs have proven to be highly resilient and quite deadly, able to bring massive amounts of firepower to bear on an adversary in very short order. This new form of disaggregated tactical operations has proven so successful that the Russian army plans to double the number of BTGs from 66 to 120.<sup>67</sup>

These changes are not without some risk. Dispersing forces means that military institutions must trade efficiency for survivability. Large, common organizations that are concentrated are easier to command, provide for better mutual support between units, and are simpler to support logistically. But they also have a large targetable signature, which must be reduced if survivability of the force is to be enhanced. Additionally, without robust, secure communications networks, new ways of resupplying distributed units, and the provision of well-trained leaders able to apply mission command, these new forms of tactical units and maneuver are unlikely to be successful.

In the decades ahead, concentrated bodies of troops, regardless of leadership or tactical acumen, will have easily detectable signatures and will be very attractive targets for enemy recon-fires complexes. Therefore, the capacity to operate in a unified fashion but as much more dispersed tactical forces to defeat signature detection and enemy lethality will be an important measure of twenty-first-century tactical effectiveness.

### ***Mission-Focused Organizations***

The conceptual work being undertaken by the U.S. Marines and the Russians emphasizes not only small signature tactical organizations but also the

integration of different capabilities under a unified command structure. The combination of the different “arms and services” within a military institution, usually called combined arms, was developed in its modern form on the Western front by allied forces to smash through German defenses in 1918. The combination of armor, artillery, infantry, engineers, communications, logistics, and aircraft featured heavily in the 1918 August offensives. In the interwar period, it was elevated to an art form by the Germans and used most effectively in France in May and June 1940.

At the same time, the United States and the United Kingdom were developing concepts for the integration of land, air, and sea power (amphibious operations). As the war progressed, combined arms and air-land integration became more sophisticated. The latter half of the twentieth century saw this integration elevated to the operational level, with joint task forces becoming more capable and more frequently used in operations in the Middle East and beyond.

In the twenty-first century, space, cyber, and influence operations are essential elements of any form of joint or coalition activity. These functions must be integrated better into existing forms of tactical activities. Therefore, the capacity to build mission-focused organizations, which combine a variety of air, land, sea, cyber, and information capabilities and then wield these effectively, will be another measure for effective tactical organizations in the twenty-first century.

### ***Aligning Activities with Objectives***

More dispersed, combined arms joint forces must conduct their activities so that they achieve desired outcomes of operational commanders and strategic leaders. Strategic and operational objectives provide vital context for planning, executing, and measuring the success of tactical actions by military forces. They must guide the undertaking of operations and, thus, of tactical activities.

This comes with a caveat, however. Strategic aims and operational goals must be in alignment with the tactical competence and capabilities of military



forces. For example, a strategic objective that insists on achieving a military strategic deterrent effect would be ineffective if that nation's military institutions lack any form of offensive long-range strike, intelligence collection, or strategic influence capabilities. As Williamson Murray writes, "What is tactically feasible should shape the selection of strategic objectives and plans."<sup>68</sup>

In his 2017 book *On Tactics*, B. A. Friedman explains many of the most vital tactical approaches and places them in a framework of physical, moral, and mental tenets.<sup>69</sup> In the book, he connects tactics to policy through the use of strategy: "Overwhelming military success was once enough to bridge the gap between tactics and policy, and thus was a sufficient strategy. Military success alone is no longer enough.... Military success is only the means to an end. If we do not understand our end, no means will accomplish it, and the battle becomes only slaughter."<sup>70</sup> To that end, a third measure of tactical effectiveness for twenty-first-century military forces will be their ability to carefully align tactical activities with operational and strategic objectives.

### ***Training and Education***

Another area of tactical focus is the development of people. Effective tactical organizations, even with the best equipment and the most rigorously thought-out techniques and procedures, are useless without well-trained and -educated people at every level. The last two hundred years of warfare—whether large-scale massed conventional forces, low-level insurgent campaigns, or influence campaigns—have demonstrated that highly developed training systems and a focus on good leadership founded on mission orders provide a better chance of success.

Well-trained personnel can perform their duties at a high level in the arduous and confusing crucible of combat. Instinct, born of years of individual and collective training, provides the essential tool for military personnel to endure and overcome the fog and friction of war. At the same time, well-selected, -trained, and -educated leaders—officers and noncommissioned officers—provide the discipline, tasks, unit cohesion, and purpose that are essential in effective tactical forces. Institutional training systems cannot be static,

however. They must constantly evolve to take account of changes in weapons systems, enemy threats, new tactics, and changes in the broader strategic environment.

The rapidly evolving capabilities of artificial intelligence, coupled with new robotic systems, hold the promise of achieving more effective outcomes from military operations, underpinned by better decision-making by our military leaders and their political masters. Humans must now be able to work in concert with swarms of robots as partners. They will often do so in environments and organizations where there may well be five, ten, twenty, or even hundreds of robotic systems for every human being.

Contemporary military institutions possess limited doctrine for this emerging technology. They also lack fully developed training and education regimes to ensure that both the people and the robotic systems in this new environment are optimized for mission success. Those nation-states that are early adopters and have the vision to embrace this evolving technology while in its embryonic state will win themselves a significant military advantage into the future.

Moreover, the partnership between humans and algorithms (represented by what we currently refer to as artificial intelligence) signals an even more profound transformation for human decision-making and future warfare. The rapid pace of change—one of the key themes of this book—is being driven by the proliferation of big data exploitation and artificial intelligence. At the same time, these tools (and they are just tools) offer humans the capacity to use their biological cognitive skills in new, different, and more meaningful ways.

The result of the partnering of human cognitive abilities with artificial intelligence will be faster and better quality of military decision-making at every level. We have only just started thinking about the impact this will have on our people and on the training, education, and other development mechanisms employed by military institutions. We need to move much more quickly in this endeavor.

Therefore, another measure of tactical effectiveness in twenty-first-century military institutions will be the capacity to sustain an effective and adaptive

training and education system that is outcomes-focused, builds cohesive teams, and constructs effective human-machine capability that can achieve tactical success.

### ***Systemic Integration of Technologies***

We have already explored how new and disruptive technologies are changing the character of war. Better and more secure communications, more precise and longer-range weapons, unmanned systems with greater persistence, an enhanced capacity to generate global influence through the Internet and social media, and new forms of artificial intelligence and biotechnology all have an influence. With some exceptions, development of these technologies has taken place outside of military institutions. They must, however, be absorbed into military organizations and combined with new ideas and organizations to be truly effective.

There is some basis in fact for the common perception that military institutions are resistant to change. Records of Western forces at the start of the two world wars, as well as in Vietnam and Iraq, illustrate how slow military organizations can sometimes be to change. However, the historical record of military innovation also demonstrates that military organizations, with the right incentives, can be very creative and highly adaptive. The adoption of aircraft, radios, armored vehicles, submarines, computers, GPS, space-based sensors, and information operations are all evidence of the inherent capacity of military organizations to evolve. Each has had a profound impact on tactics and the conduct of tactical operations.

New technologies alone are not decisive; they must be combined with new forms of thinking and new ways of organizing tactical units to have meaningful impact. This “trinity” of technology, thinking, and organizing is not just important to the continued enhancement of tactical capacity. The process of developing new ideas and organizations that can absorb new technologies also drives the cultural change that is essential to progressive and adaptive military institutions. Therefore, the final element of tactical effectiveness in the twenty-first century is the capacity of a military institution to possess a systemic approach to integrating new and evolved

technologies into organizations in concert with new tactics and tactical organizations.

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In many contemporary militaries, the competition between the development of broader management, governance, and interagency skills and the development of tactical excellence is tremendous. The demands of joint operations, unit administration, and governance and the myriad of secondary responsibilities forced on our junior officers prevent all but the most disciplined from building anything other than average tactical acumen. But tactics and tactical excellence matter. They provide the foundational knowledge for every military leader. Importantly, this level of war has been highly consequential in past conflicts and will be in the future. Military leaders must be brilliant at this basic aspect of the military art and science if they are to have any chance of success in the competitive environment of the twenty-first century.

### **ADAPTATION: A MULTIPLIER OF EFFECTIVENESS**

The development of military effectiveness at the strategic, operational, and tactical levels should provide well-resourced, cohesive military institutions that are integrated within a national schema to produce effective, strategically coherent outcomes. However, there is one final element of twenty-first-century institutions and ideas that is vital. This is the capacity to change quickly and remain effective in a rapidly changing geopolitical and technological environment.

The breadth of change, and the speed at which it is occurring, must be considered to ensure all levels of military institutions are open to opportunities and resistant to the effects of surprise. Regardless of industry, the generation of a competitive advantage in the “era of accelerations” is