

UC San Diego

SITC Research Briefs

Title

US-China Competition in Defense Technological and Industrial Development: Implications for the Balance of Power Over the Long Term

Permalink

<https://escholarship.org/uc/item/3nx3n18x>

Journal

SITC Research Briefs, Series 9(2017-13)

Author

MONTGOMERY, Evan Braden

Publication Date

2017-02-28

RESEARCH BRIEF

2017-13 January 2017

US-China Competition in Defense Technological and Industrial Development: Implications for the Balance of Power Over the Long Term

Evan Braden MONTGOMERY

The United States and China are engaged in an intensifying struggle for relative power, geopolitical influence, and positional advantage within East Asia and beyond. The military dimension of this bilateral competition has focused on the effectiveness of US conventional force projection capabilities versus the effectiveness of Chinese conventional anti-access and area denial (A2/AD) capabilities. As the back-and-forth between the rivals continues to evolve, emerging technologies such as those associated with the US Third Offset Strategy could significantly change the dynamics. It is difficult, however, to predict which side will gain and which will lose. The brief presents key factors to consider when assessing the long-term effects of these new technologies.

The Study of Innovation and Technology in China (SITC) is a project of the University of California Institute on Global Conflict and Cooperation. SITC Research Briefs provide analysis and recommendations based on the work of project participants. Author's views are their own.

This material is based upon work supported by, or in part by, the US Army Research Laboratory and the US Army Research Office through the Minerva Initiative under grant #W911NF-09-1-0081. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the US Army Research Office.

INTRODUCTION

The United States and China are currently engaged in an intensifying competition for relative power, geopolitical influence, and positional advantage within East Asia and beyond. To date, the military dimension of this bilateral competition has focused on the effectiveness of US conventional force projection capabilities versus the effectiveness of Chinese conventional anti-access and area denial (A2/AD) capabilities.

China is working to field capabilities that directly threaten the three pillars of contemporary US air and maritime force projection: 1) large theater bases; 2) high-signature platforms; and 3) complex information networks. This includes a variety of land-attack, sea-denial, counter-air, and counter-C4ISR weapons, along with the supporting infrastructure required for over-the-horizon targeting and the training needed to engage in combined-arms strike warfare. In response, Washington is taking steps to preserve its ability to operate in highly contested environments, from concept development and procurement to research and development.

Emerging technologies associated with robotics, directed energy, hypersonic propulsion, additive manufacturing, large-scale data analytics, and autonomous operating systems, among other areas, might change the competition in significant ways.

The impact of these and other technologies is difficult to predict and will depend on a variety of factors, such as the maturity of the technologies, how they are integrated with existing capabilities, how proficiently they are employed, and domestic or international political constraints on their use. Some of the key considerations that should be kept in mind when assessing these technologies and how they might alter the balance of power over the long run follow.

LOCAL VERSUS GLOBAL EFFECTS

How might new technologies alter China's emphasis between trying to shift the distribution of power within its home region versus developing extra-regional force projection capabilities?

For the most part, China's military modernization has been consistent with "local balancing," or efforts to shift the distribution of power within its home region to enhance its security and improve its leverage over neighbors. It has been far less focused on "global balancing," which involves developing extra-regional force projection capabilities that can be used to challenge its chief competitor in more distant locales, although it has taken significant steps in this direction.

New technologies might alter this emphasis. If they improve the ability of the United States to fight in contested environments, China might need to preserve or even increase its focus on local balancing. If they further undermine the US forward defense posture in the Western Pacific, China might be able to turn more of its attention to global balancing. At the same time, new technologies might make China's global balancing efforts more or less difficult. They could influence the ease with which it can directly project force from its own territory to far-flung regions or impact its ability to deploy and sustain its forces despite a relative lack of supporting infrastructure in other theaters.

EVOLUTION VERSUS REVOLUTION

Will emerging technologies enhance current modes of operation or enable new modes of operation? That is, does an adopter use the technology to increase the effectiveness of its existing forces and operational concepts (evolution), or does it use the tech-

nology to develop something entirely new (revolution)?

Looking at the evolution of conventional precision-strike capabilities over the past several decades, the United States by-and-large has incorporated more sophisticated remote sensing platforms, communications networks, delivery systems, and munitions into its preferred way of war, rather than using these capabilities to develop novel methods of conducting combat operations. China, by contrast, has used conventional precision strike systems to enable a way of war that represents a much sharper break from its past practice—and a much more significant challenge to its neighbors and the United States.

HARDWARE VERSUS "SOFTWARE"

Which side will better marry emerging technologies with their existing human capital? Will they extend US advantages in the quality of its military personnel or compensate for Chinese disadvantages in this area? Many analysts believe that a key advantage the United States enjoys over China is the quality of its military personnel. New technologies may exploit and extend this advantage, or they may narrow it instead.

The influence of technology on the balance of power also depends in part on social, institutional, and cognitive factors that shape its use. For example, domestic political norms can foreclose some applications and motivate others. This is particularly relevant in a competition between a democratic and a nondemocratic power, which might have very different views when it comes to target discrimination, collateral damage, force protection, pain tolerance, and risk propensity.

Organizational structures and cultures also can have a significant impact on military innovation, fostering it in some cases and stifling it in oth-

ers. Such factors might be especially pronounced during times of organizational reform such as the People's Liberation Army is currently undergoing, or resource scarcity, which the US military has spent years managing.

PERCEPTION VERSUS REALITY

Will the United States exploit emerging technologies effectively enough to retain its image as a leader in innovation—an image that has benefitted it during past strategic competitions?

The relative military balance between two parties is difficult to gauge unless they engage in combat, in part because military power is often too complex to measure accurately, and in part because rivals have incentives to exaggerate their strengths and disguise their weaknesses. Perceptions influence the bargaining leverage each side has as well as the behavior of third parties who are constantly re-evaluating their alignment decisions. This is especially the case in the context of an ongoing power shift and potential power transition.

The ability of the two countries to develop and leverage new technologies will provide more data on just how far China can rise and the extent to which United States is really in decline. Perceptions might be more im-

portant for the United States, because of the widely-held view that technological superiority is one of its main competitive advantages. Since 1945, the United States has made one scientific leap after another, and previous adversaries have constantly worried that the United States would take military competitions in unexpected directions or field capabilities that would negate their greatest strengths. If the United States were perceived as falling behind China in emerging technology areas, this would undermine the aura of innovation that that it enjoys—and that has benefited Washington during past strategic competitions.

CONVENTIONAL VERSUS PARAMILITARY VERSUS NUCLEAR COMPETITION

Despite the tendency to assess the impact of emerging technologies through the lens of the conventional military balance, their influence on the paramilitary and nuclear competitions that are taking place must also be considered.

Competition between China and the United States is not just taking place at the conventional level. It is also taking place at the paramilitary level, as China uses its coast guard

and maritime militia to chip away at the status quo while the United States and its allies search for an appropriate response, as well as the nuclear level, where China is taking steps to upgrade its deterrent while the United States continues to rely on its arsenal as the ultimate backstop to its security commitments.

New technologies could directly impact all three areas. Advances in technology could produce new capabilities that directly impact paramilitary or nuclear operations. New technologies that alter the conventional military balance could lead one side or both to place more emphasis on paramilitary coercion or nuclear brinkmanship. Those making the effort to think through the implications of technological change on the US-China competition should be mindful of all three levels of competition and the possible interactions between them.

Evan Braden MONTGOMERY is a senior fellow at the Center for Strategic and Budgetary Assessments. His principal research areas include long-term competitions, trends in future warfare, alliance management, and East Asia security issues.