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Understanding Military Innovation: Chinese Defense S&T in Historical and Theoretical Perspective

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Summary

Given the high stakes involved in China's rise, both in Asia and globally, understanding the scope and pace of Chinese military modernization is an important undertaking. This brief applies insights from the theory and history of military innovation to the task of understanding China's development of anti-access and area denial capabilities and provides recommendations on how the United States can improve its ability to detect and recognize Chinese military innovation.

UNDERSTANDING MILITARY INNOVATION

Most major military innovations come about due to the recognition of a pressing strategic or operational problem that cannot be handled through improvements to the existing force, but rather requires a new approach. Past cases of military innovation show that military services tend to develop new approaches to combat in three distinct but often overlapping phases: speculation, experimentation, and implementation. Each phase yields indicators that can give us an estimation of the pace and scope of innovation (see Table 1).

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

Table 1. Potential indicators of innovation

Phase	Potential indicators of innovation
I. Speculation	• Publication of concept papers, books, journal articles, speeches, and studies regarding new combat methods • Formation of groups to study the lessons of recent wars • Establishment of intelligence collection requirements focused upon foreign innovation activities
II. Experimentation	• Existence of an organization charged with innovation and experimentation • Establishment of experimental organizations and testing grounds • Field training exercises to explore new warfare concepts • War gaming by war colleges, the defense industry, and think tanks regarding new warfare areas
III. Implementation	• Establishment of new units to exploit and/or counter innovative mission areas • Revision of doctrine to include new missions • Establishment of new branches and career paths • Changes in the curriculum of professional military education institutions • Field training exercises to practice and refine concepts

BARRIERS TO UNDERSTANDING INNOVATION

Observers face a number of challenges in trying to identify and characterize foreign military innovation. These include the pervasive tendency to extrapolate, whether consciously or unconsciously. In some cases, the paucity of available data regarding the effectiveness of new technology and doctrine abets the tendency to perceive continuity with the past. In other cases, preconceived notions of technological superiority can blind observers to foreign developments. Received wisdom about the character and conduct of war can also warp analysis. Specifically, one would expect observers to underestimate the capabilities of rising powers and overestimate those of declining ones.

Observers are more inclined to monitor the development of established weapons than to search for new military systems; detect technology and doctrine that have been demonstrated in war rather than weapons and concepts that have not seen combat; and pay greater attention to innovations in areas that their own armed services are exploring than those that they have not examined, are not interested in, or have rejected.

ASSESSING CHINESE MILITARY INNOVATION

For China, the need to coerce, or if necessary defeat, Taiwan to ensure its reunification with the mainland serves as a powerful driver of Chinese military capabilities. As part of its planning for a Taiwan contingency, China is emphasizing measures to deter or counter U.S. intervention in a future cross-Strait crisis, including the acquisition of innovative systems such as precision-guided conventional ballistic missiles and anti-ship ballistic missiles.

Openly available evidence suggests that China has moved beyond the speculation and experimentation and has begun the implementation of an anti-access strategy:

- Speculation has manifested itself in statements by Chinese leaders, collection of information regarding analogous foreign systems, and statements in doctrinal manuals and technical publications.
- China has conducted numerous tests of its precision-guided conventional munitions. Moreover, China has moved

beyond talking about anti-ship ballistic missiles to testing them.

- There is at least some openly available evidence suggesting that China has progressed to deploying advanced ballistic missiles.

IMPROVING THE ABILITY TO DETECT INNOVATION

There are several additional ways that the United States can improve its ability to detect and recognize Chinese innovation. These include:

1. Systematically analyze open sources such as military newspapers, professional journals, and books, as well as semi-open sources such as doctrinal publications, to improve knowledge of foreign doctrinal debates.
2. Establish multi-disciplinary research centers to examine Chinese military affairs.
3. Identify and track Chinese innovators.
4. Develop relationships with foreign professional military education institutions.
5. Examine Chinese military exercises.

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