Revolution in Military Affairs as Technology-Driven Change in Military Operation

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INTRODUCTION

Revolution in Military Affairs (RMA) is a general term describing a fundamental change in the character and conduct of armed conflicts. The majority of RMAs rely on the development of new technologies, however, they also include different aspects. RMAs typically consist of three elements: technological change, innovative operational concept, and organizational adaptation (Krepinevich, 1994). The RMA term was introduced by Michael Roberts in the context of revolutionizing the methods of waging war based on changes in tactics and technology between 1560 and 1660 (Roberts, 1956).

The subject of this article is the last RMA. The crux of it is to apply information technology (IT) in warfare. Being precise, the last RMA should be called Information-based Revolution in Military Affairs (Davis, 1996). However, the RMA term has been commonly attributed to Information-based Revolution in Military Affairs since the 90s. In 1993, Andy Marshall, the Pentagon's Director of Net Assessment, replaced the previous term "military-technical revolution" with "Revolution in Military Affairs" to underline a comprehensive change in military. It not only represents a technological change, but also a change in doctrine and organization (Watts, 2001).

BACKGROUND

Looking for the roots of RMA, it is necessary to recall a number of technological breakthroughs, whose synthesis provides the foundation of the revolution. RMA – similarly to the majority of military revolutions in the history – it is not based on one groundbreaking innovation, but it takes advantage of a number of technological changes. In this case, the miniaturization of computer hardware and creation of highly efficient, decentralized data communication networks are the crucial technologies.

Applying these technologies in military was for the United States and others NATO countries the way to overcome the Warsaw Pact's quantitative dominance in conventional forces. A number of new types of weaponry were developed in the 80s, and they are generally divided into two groups: reconnaissance systems and striking systems (Technologies for NATO's Follow-On Forces Attack Concept, 1986). The JSTARS (Joint Surveillance Target Attack Radar System) airborne reconnaissance system was the example of the first group, whereas the MGM-140 ATACMS (Army Tactical Missile System) surface-to-surface missile system represented the second one. These two elements were based on new technologies and cooperated closely thanks to highly-efficient data communication networks. They built together the innovative reconnaissance-attack system, and created background for further transformation.

The roots of RMA go to a given strategic problem, that is, anticipated confrontation with outnumbered Soviet forces. It is typical for military revolutions, which occur at a certain time and place just because they offer solutions to actual, not hypothetical, problem (Cohen, 2002; Bjerregaard, 2012).

The assumptions of the new concept were successfully tested during the Desert Storm operation in 1991. Hence, RMA indicated the direction of transforming the American army, and afterward other modern forces. In simple terms, the transformation was aimed at converting armed forces into one coherent reconnaissance and striking system. It should be based on all available sensors and effectors connected with decentralized data networks (US Department of Defense, 2005).

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REVOLUTION IN MILITARY AFFAIRS: ASSUMPTION AND PRACTICE

The Key Elements of RMA

The core of RMA consists of the following interpenetrated elements:

1. Computerization and Networking

Battlespace awareness would replace traditional determinants of dominance like firepower, survivability and mobility. Constantly updated knowledge about location of friendly and foe forces should become a critical factor which determines the military success. The quest for the information superiority has been the leading motive of military transformation. Implementing the new types of weapon is not considered as the essence of the revolution. The integration of all elements of battle formation with information distribution network is regarded here as the novelty. The C4IRS (Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance) system has become a critical component of modern armed forces. It is designated to the real-time coordination of the stimulus-response (from sensors to effectors) process. This modus operandi should overcome the eternal problem of warriors, which is uncertainty and opacity inherent in any military campaign, and should "lift" the Clausewitz's "fog of war" (Owens, 2001).

RMAs are often linked to a broader change (Vickers, Martinage, 2004). Consequently, the transformation driven by computerization and networking harmonizes with a wide-ranging social change toward an information society. The "Internet metaphor" is often recalled in each sphere (Shapiro, 1999). The background of RMA consists of elements typical for Internet: lack of central control over a system (creative anarchy), easy access to information from almost every place all over the world, and interconnectivity (peer-to-peer architecture) (Shapiro, 1999).

2. Smart Weapon (Precision-Guided Munitions)

It allows hitting the target with accuracy which was not accomplishable earlier. This capability implies the decrease in material requirements. Destroying an enemy object needs considerably less munitions compared to "dumb" munitions, but it requires precise information provided by "battle networks" (Watts, 2007). This trend corresponds with contemporary business, where information is the substitute of material and transport resources (Cebrowski & Garstka, 1998). Information dominance makes it possible to manage resources optimally.

3. Stand-Off

Increasing combat distance means the use of weapons can be launched far from the target. It makes a launcher invulnerable to enemy countermeasures. This kind of weapons is represented, for example, by cruise missiles used among others to carry out "punished" operation (the so-called Tomahawk diplomacy, which is a modern incarnation of gunboat diplomacy). A particular part of this trend is a widespread tendency towards robotisation. The use of robots is more and more common not only in aviation (drones) and navy (first of all for minesweeping), but also on land. However, land is more demanding environment and projects of fully autonomous armed vehicles are still under development.

All these things may lead to make warfare resemble a computer game. Direct combat will be the exception rather than the rule as it increases the security level of own forces. Thus a stand-off operational model provides a means to carry out a military campaign despite the casualty aversion, typical for post-heroic Western societies.

RMA's Influence on Military

Deep transformation of leading (first of all American) armed forces is the effect of implementing the elements mentioned above. The crux of the transformation could be summarized as the list of the following oppositions:

1. Quantity vs. Quality

Since technological advantage is much more important than numerical superiority, the tendency toward decreasing the amount of armed forces is very clear. Modern technology replaces the potential expressed in simple numbers, that is, in the number of soldiers, tanks, guns or planes. It means that the tendency observed since the French Revolutionary Wars (the beginning