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ABSTRACT   The roots of the information technology Revolution in Military Affairs (RMA) can be traced to the mid-1970s, when the West capitalized on scientific-technological developments to neutralize the threat posed by Soviet second echelons. However, the cultivation of the technological seeds of the American RMA preceded the maturation of the conceptual ones. Although it was the US that was laying the technological groundwork for the RMA, Soviet, rather than the American military theorists, were the first to argue that the new range of technological innovations constituted a fundamental discontinuity in the nature of war, which they dubbed the 'Military-Technical Revolution' (MTR). About a decade later, this fundamental Soviet approach to the transformations in military affairs was analyzed, adapted and adopted by the US, and designated the RMA. This article deals with the intellectual history of the Soviet MTR and the American RMA.

KEY WORDS: Transformation, Revolution in Military Affairs, Soviet Military Doctrine, Military Technology, High-technology Warfare, Military-Technical Revolution

> One thing was certain, that the white kitten had had nothing to do with it: it was the black kitten's fault entirely
> Lewis Carroll, *Through the Looking Glass* (1872)

The post-Cold War era has witnessed the most dramatic transformation in warfare since the introduction of nuclear weapons. The information technology Revolution in Military Affairs (RMA) integrated precision-guided weapons, command, control and intelligence, into a system that completely changed the combat environment and altered the way we think about the aims and methods of conventional

warfare. Classical patterns of advancement along fronts with discernible lines and rear areas have disappeared; the number of platforms has become far less important than networks and communications; operations aim at defined effects rather than attrition of enemy forces or occupation of territory; instead of massive forces, precise fire is maneuvered; the sensor to shooter loops have been shortened considerably; the role of stand-off and airpower capabilities have increased at the expense of heavy ground formations; a far smaller, lighter and more mobile force can operate on a greater range and with higher precision and lethality.[1]

The roots of this RMA can be traced to the mid-1970s, when the US shifted its attention away from Indochina and back to the European theater. The West immediately faced a daunting strategic situation: increasing realization of mutually assured destruction was eroding the option of nuclear war. Yet, in the balance of conventional forces, the Soviets were predominant. The early 1980s saw the Western response – an introduction of two new doctrines: Air Land Battle (ALB) and Follow on Force Attack (FOFA). Basing itself upon state-of-the-art scientific-technological developments in the field of microelectronics, the West capitalized on precision guided munitions (PGMs) to destroy the menace of Soviet second echelons deep in the rear.

This article argues that although it was the US that was laying the technological groundwork for the RMA, Soviet, rather than the American military theorists, were the first to intellectualize about its long-term consequences. In contrast to the West, which focused on the weapons' narrow implications, the Soviets were pioneers in championing the argument that the new range of technological innovations constituted a fundamental discontinuity, which they dubbed the 'Military-Technical Revolution' (MTR). Beginning in the late 1970s, the Russians produced a significant number of seminal works on the MTR. They actually predated the West by almost a decade in its realization and in elaboration of the revolutionary essence embodied in US and North Atlantic Treaty Organization (NATO) military-technological shifts. Although both countries capitalized on the notion of *deep battle* using the latest technologies, in terms of 'military thought' the Soviets went further in their conceptual findings than their Western counterparts. Only from the early 1990s, following almost a decade of Western conceptual disregard, was a fundamental Soviet MTR vision analyzed, adapted and adopted by the US, and designated the RMA. It was by studying the reflections of American military power

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[1]Eliot A. Cohen, 'Change and Transformation in Military Affairs', *Journal of Strategic Studies* 27/3 (2004); for an overview of the RMA, see *Project of Defense Alternatives*, <www.comw.org/rma/>.

in Soviet eyes, that American strategists fully comprehended in early 1990s the significance of what they had produced.

Although this conceptual interaction created revolutionary break-throughs in military thought, provided a striking example of adaptive learning by the two rivals and illustrated the diffusion of military ideas from West to East and back again, insufficient attention has been devoted to its intellectual history. Most of the studies which concentrate on the history of the Soviet MTR are, a priori, deficient, because their authors had no access to critical collections of declassified Soviet materials. The American case has been dealt with extensively, but there is still a conspicuous lacuna regarding the role of intellectual emulation of the Soviet MTR. Utilizing declassified Soviet materials and professional publications, and relying on American primary sources, this paper contributes to strategic studies by bridging the gap between the significant impact of this conceptual interaction on the development of modern military thought, and the meager academic debate about how it actually took place.

Following the introduction, the discussion will be divided into four parts: the development of the ALB and FOFA during the early 1980s is described in the first part; the second part concentrates on the theoretical evolution and the dual roots of the Soviet MTR; the third section deals with the operational applications of the MTR; the conceptual birth of the American RMA and Western adaptive learning from the Soviets are discussed in the fourth part. At least two important questions are outside the scope of this research. The article deliberately refrains from analyzing the question of whether the process described actually represents revolutionary discontinuity in warfare.[2] It also refrains from addressing the Soviet reaction to the Strategic Defense Initiative.[3]

Air Land Battle and Follow On Force Attack – Origins and Development

Soviet force development policy addressed two basic issues during the 1960s: First, because the enormous mobility of the enemy's nuclear weapons allowed the massing of firepower over great distances, friendly forces had to be dispersed in order to avoid an enemy nuclear

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[2]See Stephen Biddle, *Military Power: Explaining Victory and Defeat in Modern Battle* (Princeton UP 2004) and the special issue of the *Journal of Strategic Studies* 28/3 (June 2005).

[3]See Oleg Grinevskii, *Perelom: ot Brezhneva k Gorbachevu* (Moscow: Olma Press 2004); Anton Pervushyn, *Zvezdnie voiny: Amerikanskaia respublika protiv Sovetskoi imperii* (Moscow: Exmo 2005).

attack. Second, the same maneuver forces had to mass, in order to break through the breaches in the enemy's defense. In keeping with the operational tempo of the modern battlefield and assuming a vast array of forces, the requirements simultaneously to *disperse* and to *mass* were impossible to achieve at once. The Soviet found solution to the problem of these mutually conflicting requirements. To decrease vulnerability to nuclear attack the forces would be deployed in several echelons in the Soviet rear. When the offensive got underway, they would all advance and concentrate at the line of contact with the enemy, too close to enable NATO forces to use tactical nuclear weapons. Where enemy defenses had been destroyed by Soviet nuclear strikes, the first-echelon forces would open breaches and the echelons that followed could move rapidly through them, maneuvering and striking in-depth. This strategy was expected to collapse the NATO defensive front.[4]

In the mid-1970s NATO and the US Army became cognizant of the Soviet technique of echelonment of forces combined with high speed offensive, and realized that in their current state, their defenses could not stand up to the challenge. The ALB and FOFA concepts grew out of this fear of Soviet conventional superiority afforded by the echelonment technique. The West sought a remedy and found it in emerging technologies. Since the mid-1970s, highly advanced technological achievements particularly in the field of microprocessors, computers, lasers and electronics, had enabled the production of so-called smart weapons – an assortment of conventional munitions that were precision guided to targets – even at stand-off over the horizon ranges. The combination of range and accuracy resulted in a new warfare mission: to *strike deep* against enemy offensive follow on forces.[5] Developments in weapons technology and the evolution of thought about future war in Europe led to similar innovations in the US and NATO.

The US response was a *deep attack* doctrine known officially as US Field Manual 100–5 or Air Land Battle.[6] It rested on the premise that

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[4]William E. Odom, *The Collapse of the Soviet Military* (New Haven, CT: Yale UP 1998), 72–5; Idem. 'Soviet Force Posture: Dilemmas and Directions,' *Problems of Communism* (June–August, 1985), 1–14; V.D. Sokolovskii, *Voennaia strategiia* (Moscow: Voenizdat, 1962).

[5]Odom, *The Collapse of the Soviet Military*, 75; Richard Van Atta, *Transformation and Transition: DARPA's Role in Fostering an Emerging Revolution in Military Affairs* (Alexandria, VA: IDA 2003), Vol. 2, Chs. 3–4.

[6]Odom, *The Collapse of the Soviet Military*, 75; Formulated in 1976 as the US Training and Doctrine Command (TRADOC) publication *FM 100–5 Operations*, it was revised and rewritten by TRADOC during the early 1980s to make it more relevant and effective vis-à-vis the threat of Soviet echelons strategy. See Donn A. Starry, 'Extending

follow-on echelons of Soviet ground forces had to be slowed or stopped before arriving at the line of contact. Attacking the second echelons, disrupting their movement or destroying them, and degrading their command and control, became the overriding aim of US tactics and weapons development. The ALB envisioned attacking the Soviet second echelons with both stand-off precision fire and ground offensive operations. To disrupt the follow-on Soviet forces, deep attack required improved air support and more accurate long-range artillery and missile capabilities.[7] The 'father' of the ALB, General Donn A. Starry, believed that deployed conventional forces could continue to fight the advancing Soviet first echelon, and in the meantime, before the second echelon had time to regroup after its initial deep-strike bombardment, release authority for battlefield nuclear weapons could be obtained from US political leaders.[8]

Similarly, the impetus for NATO's 'Follow-On Forces Attack' evolved from concern about the Soviet second echelon forces and from the development of emerging technologies. During the 1970s, steps were taken to improve NATO conventional defense capabilities to reduce the ratio of enemy forces arriving at NATO's general defensive positions to a manageable level, by using conventional munitions only. With that in mind, NATO undertook a study aimed at improving its air in-depth interdiction capabilities for addressing Soviet second echelon forces. Thus, FOFA, like its US counterpart, was designed to attack the enemy as far into the rear as the target acquisition and conventional weapons systems permitted. Final FOFA proposals were submitted to NATO's Military Committee in October 1981 (ALB doctrine was formally released a year later in 1982).[9]

The Soviets never placed much emphasis on the distinctions between the offensive posture of the ALB and the defensive one of FOFA,[10] anticipating that the combat outcome of both would be essentially the same – attacks on Warsaw Pact 'operational' depths which would result in disorganization and distraction of its second echelons.[11]

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the Battlefield', *Military Review* 61/3 (1981), 31–50; and 'To Change the Army', *Military Review* 63/3 (1983).

[7]Richard Lock-Pullan, *US Intervention Policy and Army Innovation* (New York: Routledge 2006), Ch. 4.

[8]Ibid.; Kimberly Marten Zisk, *Engaging the Enemy: Organization Theory and Soviet Military Innovation, 1955–1991* (Princeton UP 1993), 121–32.

[9]Richard Lock-Pullan, 'How to Rethink War: Conceptual Innovation and Air Land Battle Doctrine', *Journal of Strategic Studies* 28/4 (Aug. 2005), 687–8.

[10]Odom, *Collapse of the Soviet Military*, 76; Zisk, *Engaging the Enemy*, 134.

[11]V. Kozhin and V. Trusin, 'Voprosy primeneniia vooruzhennykh sil v operatsiiakh', *Zarubezhnoe voennoe obozrenie* (hereafter ZVO) 10 (1983) pp. 18–19.

The Soviet Military-Technical Revolution

Soviet theoretical variations on the MTR were an outgrowth of two interrelated professional discussions which took place in Soviet military circles.

The first one started around the mid-1970s. It was disconnected from debating Western military doctrines, which at that time were far from their final formulation,[12] but identified a new military-technical revolution, and concentrated on the inquiry into the impact of the scientific progress on the scope, scale and methods of future military operations.

The second discussion, which started in the early 1980s, focused on the remedies for the recent Western doctrinal innovations. It generated an enormous amount of insight which confirmed the previous MTR assumptions and greatly influenced the formulation of Soviet operational concepts. Notwithstanding the enormous number of mutual emulations between the two blocks,[13] it would be an oversimplification to assert that the MTR concept merely constituted a response to Western doctrines. While posing the doctrinal antipode to Western 'deep striking' capabilities, the Soviets went far beyond any particular doctrinal countermeasure and offered a new, comprehensive theory regarding the future battlefield under the impact of scientific-technological progress. The merging of the two discussions produced a cogent military theory, which, while relying in part on Western technological achievements, was nonetheless highly original.

The Authentic Soviet Views

Soviet military science obliged military theoreticians to attend to and to diagnose discontinuities in the nature of war – those fundamental changes taking place in military operations and organizations under the impact of the new technologies.[14] To conceptualize the

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[12]The Soviets did not figure new Western doctrinal postulates and weaponry associated with the Active Defense into its wargaming at least until 1977; See *Materialy razbora operativno-stratgecheskogo komandno shtabnogo uchenia 'Zapad-77'* (Moscow: Ministerstvo Oborony SSSR 1977), 10–11.

[13]V.A. Zolotarev, *Istoriia voennoi strategii Rossii* (Moscow: Institut Voennoi Istorii MO RF 2000), 380.

[14]V.K. Konoplev, *Nauchnoe predvidenie v voennom dele* (Moscow: Voenizdat 1974), 6, 13, 32–3, 65–70, 127; S.I. Krupnov, *Dialektika i voennaia nauka* (Moscow: Voenizdat 1963), 100–26; I.A. Grudinin, *Dialektika i sovremennoe voennoe delo* (Moscow: Voenizdat 1971); V.M. Bondarenko, 'Nauka kak factor ukrepleniia oboronsposobnosti strany', in A.S. Milovidov, *Voenno-teoreticheskoe nasledie V.I. Lenina i problemy sovremennoi voiny* (Moscow: Voenizdat 1987).

scientific-technological breakthroughs which bring radical shifts in ways and means of waging war, the terms 'revolution in military affairs' and 'military-technological revolution', were introduced in Soviet military science after World War II.[15]

Applying the methodology of 'forecasting and foreseeing', the Soviets systematically analyzed the emerging technologies in order to identify them as either revolutionary or evolutionary with regard to the future conflict.[16] At that time they identified two RMA/MTRs: the mechanization of warfare in the 1920s and the merging of nuclear and missile technology in the 1950s.[17] In about the mid-1970s, Soviet military forecasters became engaged in theorizing about the forthcoming MTR, observing that the current phase of military development was characterized by the unprecedented emergence of qualitatively new technologies and revolutionary equipment.[18] Military applications of microelectronics, laser, kinetic energy, radio frequencies, electro-optic, electro-magnetic pulse, remote control and particle beam technologies figured prominently in their professional discussions. Particular attention was devoted to automated decision support systems, telecommunications, and enhancing accuracy, range and lethality of stand-off and the direct attack PGMs. The Soviets believed that the emerging technologies could potentially extend the depths to which

[15]V.M. Bondarenko, *Sovremennaia nauka i razvitie voennogo dela* (Moscow: Izdatel'stvo Ministerstva Oborony 1976); I. Anureev, 'Nauchno tekhnicheskii progress i voennaia nauka', *Voennaia mysl'* (hereafter *VM*), 2 (1970), 27–39; M. Cherednichenko, 'Nauchno tekhnicheskii progress i razvitie vooruzhenia i voennoi tekhniki', *VM* 4 (1972), 29–41. G.P. Otuytsskiy, 'K Voprosu o sushchnosti voenno-tekhnicheskikh revoliutsii', *VM* 2, 1998, 52–49.

[16]A.O. Baranov, *Suschnost' i soderzhanie sovremennoi voenno tekhnicheskoi revoliutsii* (Moscow: Ministerstvo Oborony 1977); N.A. Lomov, *Nauchno tekhnicheskii progress i revoliutsiia v voennom dele* (Moscow: Ministerstvo Oborony, 1973); Bondarenko, *Sovremennaia nauka i razvitie voennogo dela*.

[17]P.M. Derevianko, *Revoliutsiia v voennom dele. Vchem ee sushchnost'?* (Moscow: Ministerstvo Oborony SSSR 1967); F.F. Gaivoronovksii, *Evoliutsiia voennogo iskusstva: etapy, tendentsii, printsipy* (Moscow: Voenizdat 1987).

[18]I.E. Shavrov and M.I. Galkin (eds.), *Metodologiia voenno-nauchnogo prognozirovaniia* (Moscow: Voenizdat 1977); V.F. Krest'ianinov, *Nauchno tekhnicheskaia revoliutsiia i revoliutsiia v voennom dele. Ikh sotsial'nye problemy* (Leningrad, Voennaia Akademiia Tyla i Transporta 1971), 14–31; I.I. Anureev, *Nauchno tekhnicheskii progress i ego ispol'zovanie v voennom dele* (Moscow: Obshchestvo Znanie 1982); A.Z. Gilmanov, *O Nauchno tekhnicheskoi revoliutsii kak vazhnom faktore sozdaniia material'no-tekhnicheskoi bazy kommunizma* (Kazan': Vysshee Voennoe Inzhenernoe Uchilishe 1982); V.M. Bondarenko, *Nauchno tekhnicheskii progress i voennoe delo* (Moscow: Voenizdat 1973), 26–41.

future systems – both sensor technologies and means of fire – would operate.[19]

As a consensus about the arrival of the MTR emerged, Soviet theoreticians were expected to conceptualize its consequences. In keeping with their military culture which gave primacy to theory over praxis, the Russians stressed that the future introduction of these new means of combat into the tactical, operational and strategic levels, had to be accompanied by the development of a new concept of operations.[20]

An unprecedented level of theoretical activity gathered momentum under Marshal Nikolai Ogarkov, who was promoted to the position of Chief of the General Staff (GS) in 1977. In Ogarkov's view, a completely revolutionary change was indeed underway. It was owed in large part to the qualitative improvement of conventional weaponry brought on by the evolution of technology based on 'new physical principles'.[21] Presented initially in professional periodicals, his views were further consolidated in a number of monographs. In these publications, Ogarkov continuously utilized the term *military-technical revolution*, indicating that both the latest state-of-the art technology, which made it possible to 'see and to strike deep' in the future battlefield, and the organizational changes, which had to be made to accommodate this emerging weaponry, would not constitute a phase in a process of evolutionary adaptation but a genuine discontinuity in military affairs. The impact of the 'scientific-technical revolution' required exploitation of emerging technologies to devise radically innovative ways of conducting operations, to adjust force build-up and structure, and revamp methods of waging war in each military service.[22]

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[19]A.O. Baranov, 'Sovremennaia voenno-tekhnicheskaia revoliutsiia, ee soderzhanie i osobennsoti' (PhD Dissertation, Moscow: Voenno Politicheskaia Akademiia 1974); and *Suschnost' i soderzhanie sovremennoi voenno tekhnicheskoi revoliutsii*, esp. 16–18, 28–32; Iu.V. Man'ko, *Dialektika razvitiia sposobov i form vooruzhennoi bor'by* (Leningrad: Voennaia Akademia Sviazi 1975); Dmitri Trendafilov, 'Ideologicheskie aspekty sovremennoi voenno-tekhnicheskoi revoliutsii' (PhD Candidate dissertation, Moscow: Voenno Politicheskaia Akademiia 1977); D.D. Gorbatenko, *Faktor vremeni v sovremennom boiu* (Moscow: Ministerstvo Oborony 1972).

[20]Bondarenko, *Sovremennaia nauka i razvitie voennogo dela*, 94–5, 109; N.V. Mikhalkin, Logiko-gnoseologicheskii analiz voenno-tekhnicheskogo poznaniia (PhD Candidate dissertation, Moscow: Voenno-Politicheskaia Akademia 1983).

[21]Microelectronics, laser, kinetic energy, radio frequencies, electro-optic, electro-magnetic pulse, remote control and particle beam technologies.

[22]N. Ogarkov, 'Sovetskaia voennaia nauka,' *KZ*, 18 Feb. 1978; *Vsegda v gotovnosti*, 31–43, 59–67; *Istoriia Uchit Bditel'nosti* (Moscow: Voenizdat 1985); 'Na strazhe mirnogo truda', *Kommunist* 10 (1981), 80–91; 'Nadezhnaia zashchita mira', *KZ*,

Other leading Soviet military theoreticians echoed Ogarkov's premises on the emerging MTR. They attributed the change to a 'qualitative leap' in the modernization of the means of armed conflict, resulting from the latest developments in science and technology – first and foremost as applied to conventional 'high precision' means of warfare. The appearance of these new weapons, they argued, could be considered a turning point in the development of military science and art.[23]

On the strategic level, the MTR made nuclear war a less desirable option in the eyes of Soviet strategists and shifted the equilibrium towards conventional confrontation. The Soviets were convinced that conventional PGMs, in combination with timely detection of targets, were becoming so accurate, destructive and extensive in their range, that they were approaching the effectiveness of tactical nuclear weapons. They argued that within the context of the emerging revolution in military technology, nuclear weapons would continue to play an important but diminishing role in establishing the nature of the future war, which could well maintain its conventional character throughout.[24] This in turn, boosted the development of a new theory of conventional war based on the latest technological principles.[25] The possibility of a large-scale conventional conflict was raised for the first time during the strategic wargames in 1981. Two years later the General Staff formulated its first vision on waging the future war deploying conventional weapons alone.[26]

On the doctrinal level, analyzing the introduction of high-accuracy systems, and particularly the depths to which these systems were

23 Sept. 1983; 'Pobeda i segodniashnii den', *KZ*, 9 May 1983; 'Zashchita sotsializma: istoricheskii opyt i tekushchii moment', *KZ*, 9 May 1984; G.P. Otiutzkii, *Voenno tekhnicheskaia politika gosudarstva kak factor razvitiia sistemy 'chelovek-voennaia tekhnika',* (Moscow: Voenno Politicheskaia Akademiia 1982).

[23]Makhmut Gareev, *Frunze-Voennyi teoretik* (Moscow: Voenizdat 1985), 425, 438–9; V.G. Reznichenko, *Taktika* (Moscow: Voenizdat 1984) 23–4. 'Vysokotochnoe oruzhie' in S.F. Akhromeev (ed.), *VES* (Moscow: Voenizdat 1986), 172.

[24]Zolotarev, *Istoriia voennoi strategii Rossii*, 442; N.V. Ogarkov, 'Voennaia strategiia', *Sovetskaia Voennaia Entsiklopediia*, Vol.7 (Moscow: Voenizdat 1979), 564–5; Oleg Grinevskii, *Stsenarii dlia tret'ei mirovoi voiny* (Moscow: Olma Press 2002), 353–7.

[25]Grinevskii, *Stsenarii dlia tret'ei mirovoi voiny*; Georgii Kornienko, *Kholodnaia Voina: svidetel'stvo ee uchastnika* (Moscow: Olma Press 2001), 363–7; N.V. Ogarkov, *Pravda*, 6 Dec. 1983; Zolotarev, *Istoriia voennoi strategii Rossii*, 446; Makhmut Gareev, *Esli zavtra voina* (Moscow: Vladar 1995), 86–8; Gareev, *Frunze*, 239–41; Ogarkov, *KZ*, 9 May 1984; idem, *Istoriia uchit*, 68–69; idem, *Vsegda v gotovnosti*, 16.

[26]Zolotarev, *Istoriia voennoi strategii Rossii*, 379–80; 407–19 and 456; Odom, *The Collapse*, 65–9 and 433; Gareev, *Esli zavtra voina*, 80–1.

capable of operating, the Soviets declared that the line which had divided combat into offensive and defensive was increasingly disappearing, since these two forms of conducting war were making use of the same weapons to achieve their operational goals.[27] Equipped with a deep-striking precision guided arsenal, a defender's strikes would not be limited to the traditional tactical zone but would achieve a range across the operational depth of the enemy's deployment.[28] With these new capabilities, the Soviets believed, a defender was capable of thwarting an attacker's preparations, and launching a counteroffensive under very favorable conditions.[29] The massive theater maneuvers which exercised full-scale strategic defensive operations, took place in various military districts of the USSR. Even before Mikhail Gorbachev's reforms, and purely out of MTR considerations, the defensive build-up of forces and defensive posture of operations began to gather momentum in the Soviet military.[30]

Reflections of Western Doctrines in the Soviet Professional Literature

Soviet 'military thought' had developed a significant range of its own vision even before the introduction of deep-striking concepts in the West. At the same time however, beginning in the late 1970s Soviet military forecasters inquired intensively into Western doctrinal innovations. The Soviets saw Western developments of conventional technologies as a confirmation of their initial assumptions about the MTR and exploited them as an auxiliary frame of reference to consider how emerging technologies would be used in future war.

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[27]V.V. Turchenko, 'Tendentsii razvitiia teorii i praktiki strategicheskoi oborony', *VM* 8 (1979), 13–24; and 'O strategicheskoi oborone', *VM* 7 (1982), 16–27; Ogarkov, 9 May 1983; Zolotarev, *Istoriia voennoi strategii Rossii*, 409–10 and 457.

[28]A.Z. Ekimovskii, 'Puti sozdaniia ustoichivoi i aktivnoi oborony', *VM* 7 (1983), 19–28; I.N. Manzhurin, 'Otrazhenie kontrudarov protivnika v khode nastupatel'noi operatsii', *VM* 10 (1986) pp. 14–22; V.A. Nazarenko, 'Narushenie upravleniia voiskami – vazhnaia boevaia zadacha', *VM* 7 (1983), 46–51.

[29]I. Vorob'ev, 'Sootnoshenie i vzaimosviaz' nastupleniia i oborony', *VM* 4 (1980), 49–59. I.G. Zavialov, 'Oboronitel'naia napravlennost' Sovetskoi voennoi doktriny', *VM* 1 (1981), 15–26; A.A. Danilevich, 'Voenno teoriticheskoe nasledie M.V. Frunze i sovremennost', *VIZh* 6 (1985), 80–7; M.A. Gareev, 'Ob opyte boevoi podgotovki voisk', *VIZh* 4 (1983), 11–20; Gareev, *Frunze*, 214, 241–3, 437–8.

[30]Zolotarev, *Istoriia voennoi strategii Rossii*, 425, 474–6. A.G. Khar'kov, 'K voprosu o nachal'nom periode voiny', *VM* 8 (1984), 25–34; M.M. Kozlov, 'Organizatsiia i vedenie strategicheskoi oboroni po opytu Velikoi Otechestvennoi Voiny', *VIZh* 12 (1980), 9–17; *Akademiia General'nogo Shtaba*, (Moscow: Voenizdat 1987) pp. 184–7; Valentin Varennikov, *Nepovtorimoe* (Moscow: Sovetskii pisatel' 2001), Vol. 4.

US and NATO innovations were carefully monitored by Soviet analysts. The professional military periodicals indicate that the Russians had identified technological developments in the field of conventional warfare almost immediately after the first discussions were held in the US in the mid-1970s on deep-strike capabilities (moving target indication radar, stand-off missiles and terminally guided munitions), and certainly before the official US and NATO shifts had been made in favor of ALB and FOFA in the early 1980s.[31] From 1978 onward, *Zarubezhnoe voennoe obozrenie* (*ZVO*) and *Voennyi vestnik* (*VV*), published an unprecedented number of articles which recognized that emerging technologies were combining precision target location capability[32] with increased distance striking capacity from the land[33] and air,[34] and linking them via automatic command and control equipment.[35]

For the next three years, *ZVO* focused intensively on emerging Western capabilities and by early 1980 reflected a clear realization that such a combination would allow a *deep, stand-off striking* capability, either offensive or defensive, enabling adversary formations to hit with forces located far behind the zone of immediate contact.[36] By 1980 and onward, in issues of the the classified Soviet General Staff's *Voennaia Mysl'* (*VM*), the flood of articles on Western military technological innovations were accompanied by profound discussions of US and NATO military doctrines based on the new stand-off PGMs. Analyses

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[31]Van Atta, *Transformation and Transition*, 16–18.

[32]V. Filippov, 'Soedineniia novogo tipa v armii SShA', *ZVO* 7 (1978), 29; A. Solov'ev and L. Guliaev, 'Radio-elektronnaia razvedka SShA', *ZVO* 7 (1978), 12–18; V. Afinov, 'Sredstva REB sukhoputnykh voisk SShA', *ZVO* 4 (1980), 55–7.

[33]A. Bulatov, 'Bor'ba s tankami na bolshikh dal'nostiakh', *ZVO* 12 (1979), 12–13; N. Fomich, 'Protivotankovye sredstva armii SShA', *ZVO* 8 (1981), 35–40.

[34]V. Dmitriev and N. Germanov, 'Upravliemye aviatsionnye bomby', *ZVO* 3 (1981), 55–60; B. Semenov, 'Takticheskie upravliaemye rakety klassa "vozdukh-poverkh-nost"' *ZVO* 5 (1981), 49–57.

[35]I. Loshchilov, 'Sredstva avtomatizatsii upravleniia voiskami v boiu', *ZVO* 5 (1978), 35; V.A. Aleksandrov, 'O razvitii avtomatizirovannykh system upravleniia v armii SShA', VM 3 (1983), 74–8.

[36]V. Afinov, 'Amerikanskaia sistema PLSS', *ZVO* 4 (1980), 55–7; V. Dmitriev, 'Amerikanskaia sistema SOTAS', *ZVO* 4 (1982), 40–2; P. Isaev, 'Bor'ba s tankami', *ZVO* 12 (1982), 37–42; N. Dmitriev, 'Vzaimodeistvie aviatsii s sukhoputnymy voiskami', *ZVO* 6 (1980), 48; N. Stapenko, 'Batal'ionnaia takticheskaia gruppa v aktivnoi oborone', *ZVO* 2 (1981), 29–34; R. Simonian, 'Tendentsii v razvitiii voennoi doktriny SShA', *ZVO* 8 (1983), 15; G. Vasil'ev, 'Voprosy operativnogo iskusstva v vooruzhennykh silakh SShA', *ZVO* 12 (1983), 3–7.

concentrated on the emerging ALB and on the possible adaptations of such deep fighting concepts by NATO forces.[37]

By analyzing NATO exercises, the Soviets succeeded in reconstructing the operational logic of Western doctrine. Among the conclusions, three were underscored by the Soviets: (1) deep-strike precision guided and reconnaissance capabilities were deemed capable of destroying the second echelons of the potential enemy; (2) the previously limited non-nuclear stage in any given conflict had increased considerably; and correspondingly, (3) an increase had occurred in the volume of tasks resolved by troops utilizing only conventional weapons.[38] The Soviets argued that the emerging ability to conduct massive and precise conventional strikes into the entire depth of the operational rear could, at the very least, disrupt the successful implementation of assigned missions and, at worst, have profound strategic implications for the entire front of operations.[39]

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[37] E.G. Evgeniev, 'Novye napravleniia gonki vooruzhenii v stranah NATO', *VM* 1 (1977), 90–6; V.A. Tumas, 'Voennoe iskusstvo sukhoputnykh voisk NATO na sovremennom etape', *VM* 8 (1977), 79–87; K.M. Popov, 'Zarubezhnaia pechat' o kosmicheskom oruzhii', *VM* 1 (1979), 59–66; A.N. Ponomarev, 'Sostoianie i osnovnye napravleniia razvitiia aviatsionnoi tekhniki VVS SShA i drugikh stran NATO', *VM* 6 (1977), 71–81; V. Borisov, 'Organizatsiia voennykh nauchno-tekhnicheskikh issledo-vanii v NATO', *VM* 2 (1975), 84–9; V.A. Aleksandrov, and V.A. Tumas, 'Sovremennaia oborona po vzgliadam NATO', *VM* 10 (1978), 89–96; M.V. Vasilchenko, 'Operativnaia podgotovka vooruzhennykh sil NATO v 1980 godu', *VM* 4 (1981), 62–9; N.S. Nikolaev, 'O kharaktere i soderzhanii operativnoi podgotovki ob'edinennykh sil NATO', *VM* 6 (1980), 66–72.

[38] Iu.I. Dmitriev and V.A. Mashchenko, 'Priminenie navigatsionnykh sputnikovykh system SShA v voennykh tseliakh', *VM* 10 (1983), 79–80; A.A. Zhovannik, 'Kosmichiskie sistemy sviazi i ikh ispol'zovanie dlia upravleniia vooruzhennymy silami', *VM* 4 (1983), 34–42; N.I. Ivliev, 'Operativnaia i boevaia podgotovka vooruzhennykh sil NATO v 1982 godu', *VM* 6 (1983), 70–5; I.N. Loschilov, 'Perspektivy razvitiia ASU operativno takticheskogo naznacheniia sukhoputnykh voisk SShA', *VM* 7 (1985), 69–77; and 'Amerikanskaia kontseptsiia upravlenie, sviaz' i razvedka', *VM* 7 (1986), 63–72; Kozhin and Trusin, 'Voprosy primeneniia vooruzhennykh sil v operatsiiakh', *Zarubezhnoe voennoe obozrenie* 10 (1983), 18–19; N. Ivlev and V.Viktorov, 'Kompleksnoe uchenie voisk tsentral'noi gruppy armii NATO', *ZVO* 9 (1983), 10; L. Levadov and V. Viktorov, 'Manevry i ucheniia NATO – ugroza miru', *ZVO* 7 (1984), 8–9 and 'Itogi operativnoi podgotovki ob'edinnenykh vooruzhennykh sil NATO v 1984 godu', *VM* 3 (1985), 64–72.

[39] I. Golushko, 'Tyl v usloviah ispol'zovaniia protivnikom vysoko-tochnogo oruzhiia', *Tyl i snabzhenie* 7 (July 1984); N.G. Popov, 'Dostizhenie zhivuchesti voisk v operatsiiakh', *VM* 1 (1983), 32–44; S. Yegorov, 'Mekhanizirovannaia diviziia SShA v nastuplenii', *ZVO* 4 (1984), 23–8; V. Lamkhin, 'Vozdushnaia nastupatel'naia operatsiia', *ZVO* 11 (1984), 47–54; V. Sidorov, 'Vedenie operatsii s primeneniem obychnykh sredstv porazheniia', *ZVO* 1 (1985), 7–15.

A review of the Soviet publications indicates an exceptionally sophisticated level of professional understanding by Warsaw Pact officers of Western military-technological innovations. Particularly striking is the fact that the Soviets placed these innovations in a much deeper and broader context, reflecting a far more profound grasp of these developments' implications than the West itself possessed. For the Western military leadership, the massive equipping of forces with new means of combat in the framework of ALB and FOFA represented little more than the development of a new form of combat action against the enemy's second echelons in the Central Front. However in Soviet eyes, the ability to 'see and to strike' through the entire depth, precisely and simultaneously, was treated as a yawning discontinuity which had significant ramifications in terms of the methods of employing corps and armies, and which shaped the nature of war in a revolutionary way. The Soviets saw ALB and FOFA as much more than simply a doctrinal update or an operational threat and sought broader theoretical frames of analysis in order to describe these developments.[40]

In summary, the insights acquired through inquiring into the operational concepts of the West and seeking a countermeasure, provided the Soviets with a frame of reference and intellectual fuel for previously developed MTR concepts. Describing the dialectical relation between the scientific-technical revolution and military science, the Soviets emphasized the primacy of the latter over the former.[41] Consequently, Soviet sources assumed that future equipping of the military with new means of fire, reconnaissance and control would occur at an equal rate on both sides. The superiority however would be gained by whichever side realized their application more rapidly and on a broader scale.[42]

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[40]V.V. Afinov, 'Razvitie v SShA vysokotochnogo oruzhia i perspektivy sozdania razvedovatel'no-udarnikh kompleksov', *VM* 4 (1983), 63–71; V.G. Krymtsev and Iu.I. Molostov, 'Vysokotochnoe protivotankovoe oruzhie armii stran NATO i perspektivy ego razvitiia', *VM* 10 (1984), 73–9; N.I. Ivliev and L.V. Levadov, 'Strategicheskoe KShU NATO Zima-83', *VM* 12 (1983), 70–3.

[41]A.F. Volkov, 'Leninskie printsipy voenno-tekhnicheskoi politiki KPSS', *VM* 4 (1980), 31–8; I. Anureev, 'Znachenie nauchno tekhnicheskoi revoliutsii dlia ukrepleniia oborony i povysheniia boevoi gotovnosti Sovetskikh Vooruzhennykh Sil', *VM* 6 (1975), 65–76; 'O vzaimosviazi voennoi nauki s estestvennymi naukami', *VM* 1 (1981), 27–35; 'Vyshe effektivnost' i kachestvo voenno-nauchnykh znanii', *VM* 5 (1983), 3–16; M.M. Kir'ian (ed.), *Voenno-tekhnicheskii progress i vooruzhennie sily SSSR,* (Moscow: Voennoe Izdatel'stvo 1982), 262–4; Shavrov and Galkin, *Metodologiia voenno-nauchnogo prognozirovaniia,* 3–5; Bondarenko, *Sovremennaia nauka i razvitie voennogo dela.*

[42]N. Maksimov, 'Kontseptsiia 'vystrel-porazhenie', *ZVO* 11 (1979), 13–14; Y.G. Yevgen'iev, 'Novye napravleniia gonki vooruzhenii v stranakh NATO', *VM* 1 (1977),

The Operational Implications of the MTR on the Soviet Military Power

In analyzing the impact of the MTR, the Soviets forecasted trends that would mold and ultimately transform the concepts of future operations. The MTR attributed greater importance to future automated information processing, which would potentially compress the 'planning-decision' and 'detection-destruction' cycles.[43] Long range and highly accurate fire systems in tandem with expanded sensor and target acquisition capabilities would increase lethality and attrition rates against fixed and mobile targets.[44] Explosive substances with greater destructive power would expand the zone of destruction from hectares to kilometers.[45]

The future battlefield was seen as increasingly complex with various kinds of forces participating simultaneously in combined arms theater operation.[46] In Ogarkov's view, given the scope and tempo of the MTR, previous forms of employment of military forces had become obsolete; mere modifications and adjustments could no longer produce the desired results, and an elaboration of new forms of combat operations was urgently needed. The 'theater-strategic operation', namely, orchestrating several armies and fronts in a simultaneous single action, had to be instituted as the principal method of waging a campaign. In order to execute such an operation successfully, the military had to be able to achieve actual deep targeting within the

88–96; A.G. Sinitskii, 'Nekotorye voprosy razvitiia vooruzheniia i boevoi tekhniki sukhoputnikh voisk NATO i ikh boevogo primeneniia', *VM* 10 (1977), 83–91; A.S. Baturin, 'Nauchno tekhnicheskaia revoliutsiia i voennye prigotovleniia SShA', *VM* 1 (1981), 75–80.

[43] M.G. Popkov, 'Metodologicheskii analiz informatsionnykh protsessov v sisteme 'chelovek-voennaia tekhnika', PhD candidate dissertation, Moscow: Voenno-Politicheskaia Akademiia 1983; N. Nechaev, 'Voennye sistemy sviazi: tendentsii ikh razvitiia', *Tekhnika i vooruzhenii*a 6 (July) 1986; Gen. Ye. Kolibernov, interview in *KZ*, 21 Nov. 1985.

[44] V.A. Gorbunov, *Effektivnost' obnaruzheniia tselei* (Moscow: Ministerstvo Oborony, 1980), Chs. 2, 5; I. Vorob'yev, 'Sovremennie vooruzheniia i taktika', *KZ*, 15 Sept. 1984; V.Makarebskyi, 'Blitskrig v epokhu nauchno tekhnicheskoi revoliutsii, *VZ* 9 (Sept.) 1986; A.Dvoretskyi and V. Potashev, 'O kontseptsii vozdushno-nazemnoi operatsii,' *Vestnik PVO* 8 (Aug. 1984); V.P. Shipovalov, 'Bor'ba s tankami,' *ViZh* 9 (Sept.) 1986.

[45] V. Makarevskyi, 'Gonka obychnyh vooruzhenii i problemi ee ogranicheniia,' *Mirovaya ekonomika i mezhdunarodnye otnosheniia* 5 (May 1984); Golushko, 'Tyl v usloviah ispol'zovaniia protivnikom vysoko-tochnogo oruzhiia'.

[46] Reznichenko, *Taktika*, 51–71; P.K. Altukhov, *Osnovy teorii upravleniia voiskami* (Moscow: Voenizdat 1984), 32–4.

theater, so that Soviet ground forces would be able to rely on theater fire support to the full depth of their deployment.[47]

Traditionally, the development of Soviet military doctrines leaned heavily on historical analyses for the assessment of new operational models.[48] This time as well, the fresh vision posited by the GS led many to turn to the old doctrines in search of new operational forms. Since the MTR elaborated on the notion of applying the new technology in conducting operations in 'depth', the Soviets had no need to invent the wheel; they had merely to revive Deep Battle Theory of the early 1930s. Professional publications pointed out the relevance and the importance of emulating this early concept of Soviet military science and called for applying its essence to contemporary and future operations.[49] In 1976 Marshal Ogarkov himself contributed a historical article to the Soviet military encyclopedia where he maintained that the general principles of the original Deep Battle Theory had not lost their relevance.[50]

These theoretical discussions examined modern requirements for *deep operations* in the framework of emerging weaponry. They realized that combining this early concept with the new technology could mean significantly increasing the intensity of the strike to the entire depth of the enemy, penetrating its defense and providing rapid tempos for swift 'success development'. The Soviets stressed the need for better command, control and methods of targeting, and noted the increasing importance of deep rapid maneuver under long-range high precision fire.[51] They argued that emerging forms of weapons made war in the MTR era extremely dynamic: relying on PGMs and precise intelligence, forces could now attack with a smaller density of personnel and

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[47]Ogarkov, *Vsegda v gotovnosti*, 31–5, 40–3 and 59–67; 'Na strazhe mirnogo truda', *Kommunist*, 10, (1981), 80–91; 'Nadezhnaia zashchita mira', *KZ*, 23 Sept., 1983; *KZ*, 9 May 1983; Odom, 'Soviet Force Posture', 7–8.

[48]Shavrov and Galkin, *Metodologiia*, Chs. 6 and 14.

[49]L.I. Voloshin, 'Teoriia glubokoi operatsii i tendentsii ee razvitiia', *VM* 8 (1978), 14–26; A.M. Maiorov, 'Proriv oborony: teoriia i praktika mirovykh voin', *VM* 5 (1978), 79–94; R. Savushkin, 'K voprosu o vozniknovenii i razvitii operatsii', *VIZh* 5 (May 1979); and 'K voprosu o zarozhdenii teorii posledovatel'nikh nastupatel'nikh operatsii', *VIZh* 5 (May 1983), 12–20; Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London: Frank Cass 1997), 166–7.

[50]Ogarkov, 'Glubokaia operatsiia', *SVE* (Mosow: Voenizdat 1976), 574–8.

[51]A.F. Bulatov, 'Aktual'nye voprosy sovremmennogo nastupatel'nogo boia', *VM* 11 (1984), 60–9; Ogarkov, 'Glubokaia operatsiia'; V.F. Mozolev, 'Ob obshchikh osnovakh teorii sovetskogo operativnogo iskusstva', *VM* 3 (1979), 13–22; M.I. Bezkhrebetnii, 'Sovmestnaia operatsiia – glavnaia forma sovremennikh boevikh deistvii', *VM* 7 (1979), 27–34; and 'Podgotovka posleduiushchikh nastupatel'nikh operatsii', *VM* 7 (1982), 28–38.

equipment, yet at considerably greater depth and momentum.[52] At least in theory, the concept of the Soviet MTR era operations coalesced into the notion of simultaneous, uninterrupted strike by fire and maneuver against the enemy to the entire depth of his operational formation.[53] This conclusion resulted in the development of two interrelated operational concepts: (1) the reconnaissance strike (RUK) and fire (ROK) complexes and (2) Operational Maneuvering Groups.

The Reconnaissance Strike (RUK) and Fire (ROK) Complexes

Soviet theorists argued that given the tendency toward greater mobility and deception, the time available for destroying a target once it was identified would be limited. Thus, there was an acute need to develop an architecture that would consolidate the reconnaissance systems with high precision, fire-destruction elements, linked through the command and control channels. The quintessence of that ability was a 'system of systems' which was to consist of an integrated triad of (1) ground, air, and space reconnaissance, surveillance, and target acquisition assets; (2) direct fire elements and deep-strike weaponry; and (3) advanced command-and-control that ensured the delivery of strikes close to real time. The manifestation of the new concept on the operational level was dubbed the reconnaissance strike complex (RUK) and its tactical expression known as the reconnaissance fire complex (ROK). This combination of sensors and weapons was designed to permit conduct of the war over much greater distances and with greater precision, coordination and pace than ever before.[54]

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[52]Rezhichenko, *Taktika*, Ch.2; G.E. Peredel'skii, 'Tendentsii razvitiia polevoi artilerii NATO', *VM* 11 (1983), 62–9.

[53]A.G. Khar'kov, 'Voevat' ne chislom a umeniem', *VM* 6 (1983), 34–42; P.G. Skachko, 'Odnovremennoe vozdeistvie na vsiu glubinu operativnogo postroeniia protivnika – vedushchaia tendentsiia v razvitii teorii operativnogo iskusstva', *VM* 7 (1985), 18–24.

[54]I.N. Vorob'ev, 'Novoe oruzhie – novaia taktika,' *VM* 2 and 6, (1984); N.M.Vinokur, 'Nekotorye voprosy razvitiia teorii sovremennogo boia,' *VM* 4 (1985); L.V. Leonidov and V.P. Vinokur, 'Veroiatnye sposoby razviazyvaniia I vedeniia obychnoi voiny', *VM* 12 (1985); The American 'Assault Breaker' and PLSS were commonly referred as a basic example of such a development. Krymtsev and Molostov, 'Vysokotochnoe protivotankovoe oruzhie armii stran NATO i perspektivy ego razvitiia'; V. Chernukhin, 'Taktika aviatsii NATO po preodoleniiu sistem PVO', *Vestnik PVO*, no. 8 (Aug. 1981); A. Sergeev, 'Razvedovatelno-udarnye kompleksy', *KZ*, 14 Feb. 1985; M. Belov and V. Shchukin, 'Razvedovatel'no-porazhaiushchiye kompleksy armii SShA', *Voennyi Vestnik* 1 (1985), 86–9; Iu. Molostov, 'Zashchita ot Vysokotochnogo Oruzhiia', *Voennyi Vestnik* 2 (1987), 83–6; V. Shabanov, 'Material'naia osnova oboronnoi moshchi', *KZ*, 15 Aug. 1985; Skachko,'Odnovremennoe vozdeistvie na vsiu glubinu operativnogo postroeniia protivnika'; Stanislaw Koziej, 'Przewidywane

The chain of developments which led to the birth of RUK and ROK was as follows: The *deep strike* PGMs incorporated in ALB and FOFA presented the main combat threat to the Warsaw Pact, and stimulated Soviet military thought to create its own concepts to invalidate Western innovations and to improve capabilities against the enemy's depth. Consequently, destroying Western *deep strike* capabilities with Soviet deep strike measures became the first operational priority even before launching an offensive or counter-offensive.[55] The first, although somewhat obscure, mention of the *reconnaissance fire complex* appeared as early as 1979[56] and by 1982, the Warsaw Pact officers had already discussed tactical ROK fire coordination.[57] The Russians argued in the early 1980s that the side against which RUK was being directed, was obligated to achieve parity in the effectiveness of weapons.[58] Addressing the principle of high-precision fire strikes on the enemy at maximum distance, the possibility of linking ROK and RUK by a widespread computer network was suggested in subsequent years. Laborious discussions on the definition of RUK and ROK emerged from 1983, where the concept was attributed to the US military,[59] not unlike the Soviet military dictionary which defines it as a 'foreign term'.[60]

Attributing certain military-technical concepts to foreign sources was a common Soviet practice intended to avoid revealing tactical technical characteristics of their own state of the art systems. The US defense specialists who analyzed these Soviet concepts, referred to RUK and ROK as an exclusively Soviet innovation with no analogies in Western

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kierunki zmian w taktyce Wojsk Ladowych', *Przeglad Wojsk Ladowych* (Sept. 1986), 1–8.

[55]I.N. Vorob'ev, 'Novoe oruzhie i razvitie printsipov obshchevoiskovgo boia', *VM* 6 (1986), 35; 'Sovremennoe vooruzhenie i taktika', *KZ*, 15 Sept. 1984; Gareev, *Frunze*, 245.

[56]Zolotarev, *Istoriia voennoi strategii Rossii*, 475.

[57]*Armeiskii Pregled* 1 (1983), 98 and 2 (1983), 79.

[58]Afinov, 'Razvitie v SShA vysokotochnogo oruzhia i perspektivy sozdania razvedovatel'no-udarnikh kompleksov', 69–74; Skachko, 'Odnovremennoe vozdeistvie na vsiu glubinu operativnogo postroeniia protivnika'.

[59]Ye.G. Korotchenko, 'Ob evoliutsii printsipov voennogo iskusstva', *VM* 9 (1988), 22–3. A. Karemov, 'Voennaia doktrina SShA', *ZVO* 4 (1983), 11; Afinov, 'Razvitie v SShA vysokotochnogo oruzhia i perspektivy sozdania razvedovatel'no-udarnikh kompleksov'. The author noted the US ALB and ROK and RUK as the operational core of this modern doctrine. Skachko, 'Odnovremennoye vozdeistvie', 18–24.

[60]Razvedovatel'no udarnyi kompleks', the term in *Voennyi Entsiklopedicheskii Slovar'* (Moscow: Voenizdat 1986).

military vocabulary.[61] According to the American sources, the Soviets, while analyzing the tests of systems, such as *Assault-Breaker* in the late 1970s, gave the US military far more credit than it deserved for developing the *reconnaissance strike complex*.[62] The technologically inferior Soviets relied successfully on the Western scientific advantage and exploited it as a frame of reference for their conceptualizations. The Americans treated the Soviet RUK and ROK concept as revolutionary, studied it intensively and later emulated its rationale.[63]

The Operational Maneuvering Groups

'Leaning into the artillery', was a classical operational imperative for a deeply maneuvering force. ROK and RUK capabilities operating as an integrated system with the OMG, enabled, at least in theory, a deeply and swiftly maneuvering force to 'lean into' long-range supporting fire and intelligence. The OMG notion derived from the Soviet operational experience of the Great Patriotic War. At that time, the Soviets often lacked means to extend air and artillery support to the entire depth of their troops' penetration. However in the late 1970s, it became theoretically possible to lean on deeper, air, stand-off and precise fire support.[64] OMG was a reworked version of the mobile group concept, when autonomous armor formations, using stealth and mobility, infiltrated into the enemy's operational rear and, using shock and firepower, created command and control chaos from within. Modified in light of the deep precision strike and enhanced intelligence capabilities, the essence of the OMG adhered to the principles laid down in Marshal Mikhail N. Tukhachevsky's original theory. The OMG concept committed part of the force across the front much earlier and deeper, to avoid an ALB and FOFA attack, thus carrying out a Soviet preventive blow into NATO's rear. Swift infiltration of a group of armored divisions into through several axes, would create a deep and dynamic center of gravity in NATO's rear. It would turn over the

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[61]Larry A. Brisky, 'The Reconnaissance Destruction Complex: A Soviet Operational Response to Air-Land Battle', *Jornal of Soviet Military Studies* 1/2 (Summer 1990), 297–8. Timothy L. Thomas, 'Information Warfare in the Second Chechen War', in Anne C. Aldis and Roger N. McDermott, *Russian Military Reform, 1992–2002* (London: Frank Cass 2003), 216–17.
[62]Jeffrey McKitrick, 'The Revolution in Military Affairs', in From *Battlefield of the Future: 21st Century Warfare Issues* (Maxwell AFB, ALA: Air UP Sept. 1995).
[63]Jeffrey R. Cooper, 'Another View of the Revolution in Military Affairs', 124–5 in John Arquilla and David Ronfeldt, *In Athena's Camp* (RAND: National Defense Research Institute 1997); and see the following section of this article.
[64]Interview with Makhmut Gareev, Moscow, July 2006; I. Krupchenko, 'Kharakternye cherty razvitiia i primeneniia tankovykh voisk', *ViZh* 9 (1979), 25–32.

defense, create operational shock of the command and control, paralyze the enemy's ability to react and would result in operational chaos and disorganization.[65]

In theory, the OMG consisted of a reinforced combined-arms armor division with integral logistics, mechanized artillery and an airborne assault brigade. It operated in conjunction with fixed- and rotary-wing air support. At least two OMGs would operate on different axes on the fragmented and non-linear deep battlefield. They would act in support of a unified plan as autonomous but not as isolated formations. The common mode of combat would be encounter engagements and meeting battles, intended against PGMs, command and control, intelligence capabilities or the tactical nuclear weapons of the enemy.[66] The OMG concept was inaugurated during the 'Zapad-[19]81' exercise and practiced extensively during the 'Soyuz-[19]83' maneuvers.[67] At the later stage of concept development, the coordination between ROK/ RUK and OMG resulted in their eventual organic unification under the term the Reconnaissance-Fire Group. In theory, intelligence assets, stand-off fire capabilities and maneuvering elements of the extended battlefield should be orchestrated as one integrated whole.[68]

Although the American technological capability to execute deep battle using PGMs and target acquisition assets was significantly more advanced than that of its Soviet counterpart, the Soviet military had fuller comprehension of the revolutionary impact that the ALB and FOFA arsenals would have on the future battlefield than did the US military. It took the Pentagon almost a decade to 'become converted to the MTR' and to acknowledge the correctness of the Soviet proposition which envisioned major changes in the character of operations on all levels of warfare, and which saw the 'reconnaissance strike complex' as the dominant architecture for future operations.[69]

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[65]Interview with Gareev; V.V. Tkachev, 'Vzaimodeistvie v nastupatel'nom boiu', *VM* 8 (1983), 51–6; V.V. Krysanov, 'Massirovanie sil i sredstv na glavnykh napravleniiakh-iskusstvo i raschet', *VM* 5 (1984), 26–32; Naveh, *In Pursuit of Military Excellence*, 166–7; Odom, 'Soviet Force Posture', 9.

[66]Vojtech Mastny and Malcolm Byrne, *A Cardboard Castle? An Inside History of the Warsaw Pact, 1955–1991* (New York: CEU Press 2005), 482; Interview with Gareev; A. Babadzhanian, *Tanki i tankovie voiska* (Moscow: Voenizdat 1980); Ch. 2; Reznichenko, *Taktika*, Ch. 3, 152–63.

[67]Mastny and Byrne, *A Cardboard Castle?*, xlii, 482.

[68]Zygmunt Czarnotta, 'Uzycie artylerii w wojnach lokalnych', *Przeglad Wojsk Ladowych,* Vols. 5-6 (1987).

[69]Andrew Marshall, Director of Net Assessment, *Some Thoughts on Military Revolutions – Second Version* (Washington DC: Office of the Secretary of Defense, 23 Aug. 1993), 1.

From the Soviet MTR to the American RMA

The Intelligence Assessment of the Soviet MTR

The disregard of the American defense community for the emerging change in the military regimes lasted for about a decade. This inattention is particular striking in light of the wealth of information accumulated in US intelligence about the Soviet theoretical writings on the MTR.

By the mid-1970s, the US had developed a general understanding of the mechanisms of how the Soviets developed their military thought, including exercises to test theoretical propositions, doctrinal discussions, and scientific conferences.[70] The intelligence community translated and disseminated Soviet writings on military thought, doctrine, strategy and operational concepts to make important information easily available across the services.[71] The Central Intelligence Agency (CIA) had at its disposal a considerable amount of open Soviet sources which reflected the intellectual debate about the emerging MTR and its implications for the Soviet vision of the future war.[72] These sources, which included translations from the classified journal *Voennaia Mysl'*, shed a great deal of light on the term *military-technical revolution* within the context of Soviet military thinking at the time.[73] In 1974, the seminal work *Scientific-Technical Progress and*

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[70]National Foreign Assessment Center, SR 79-10338X, *Soviet Military Theory: Structure and Significance*, Oct. 1979; CIA FOIA Electronic Reading Room [hereafter ERR]; 6.

[71]Deputy for National Intelligence Officers, to Assistant Chief of Staff/Intelligence, Dept. of the Air Force, *Soviet Military Thought*, 17 May 1974; Deputy to the DCI for Collection Tasking to Director of Central intelligence, *Possible Reductions of Air Force Translation of Soviet Documents*, 21 Aug. 1978; Gen. James Brown, Asst Chief of Staff, Intelligence, Dept. of the Air Force, to Director, Central Intelligence, *USAF Efforts in the Filed of Literature Intelligence*, 21 Nov. 1977, The US National Archives and Records Administration [hereafter NA].

[72]FBIS, *War and the Army: A Philosophical and Sociological Study*, edited By D.A. Volkogonov, A.S. Milovidov and S.A. Tyushkevich, JPRS L/9649, 7 April 1981, 1–7, 16–17, 21,24, 136, 141, 148, 167–171; FBIS, *Methodology of Military Scientific Cognition*, JPRS l/8213, 11 Jan.1979, 12–29; NA.

[73]US Joint Publications Research Service, *Translations on USSR Military Affairs: Basic Military Training*, FOUO 11/79/ JPRS L/8421, 25 April 1979. For the reference to the MTR see esp. 33–4 and 222; FBIS, *Translations from Voyennaia Mysl'*, No. 12, 1971, FPD 0003/73, 17 Jan. 1974, 87–8; FBIS, *Translations From Voyennaya Mysl'*, No. 10, 1971, FPD 0008/74, 11 Feb. 1974, 6; FBIS, *Translations From Voyennaya Mysl'*, No. 7, 1971, FPD 0014/74, 7 March 1974, 1–3, 6; NA.

The Revolution in Military Affairs, was translated and disseminated by the CIA.[74]

In 1981, a special report was dedicated to the Soviet methodology of 'forecasting in military affairs', which inquired into the nature of the paradigmatic changes in the nature of war and into the essence of the current MTR in particular.[75] In its analysis of the Soviet perception of Western military capabilities, US intelligence detected at a very early stage, and with a high level of accuracy, the new direction of military thought which was evolving in Soviet military circles during the 1980s.

From the late 1970s, US intelligence closely monitored the growing Soviet interest in microelectronics, computers and signal processing, and Moscow's continuous efforts to acquire them by both legal and clandestine means.[76] The CIA reported conspicuous Soviet concern with regard to the technological lag vis-à-vis NATO, particularly in key technologies which provide precision weaponry capabilities.[77] The analysts argued that the Soviet search for technologies was a necessary starting point in the implementation phase of the MTR decreed by the Soviet Chief of Staff. They estimated that the Russians intended to use the MTR concepts, and especially PGM, in order to change total force structure and combat potential of Soviet forces.[78] The 'smart' precision-guided munitions, which the Soviet military reckoned would alter the nature of war, relied on a variety of technologies in the field of

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[74]ACS/AF/Intelligence to Deputy for national Intelligence Officers, '*Soviet Military Thought*' Translation Series, 13 May 1974; NA.

[75]FBIS/USSR Report/Military Affairs, *Military Science, Theory, Strategy: Forecasting in Military Affairs, Vol. 6, 1978*, FOUO 1/1981, 26 March 1981, 1–6; FBIS/Translations on USSR Military Affairs, *Sociological Study of the Soviet Military Engineer*, FOUO 3/79; esp. 396 and 408; NA.

[76]National Foreign Assessment Center, SR 81-18935X, '*The Development of Soviet Military Power: Trends Since 1965 and Prospects for the 1980s*', 13 April 1981, 67; ERR. Nikolai Pushkarev, *GRU: Vymysly i real'nost'* – *spetsluzhba voennoi razvedk*, (Moscow: Eksmo 2004), 121–7; Ivan Potapov, 'Ot Khrushchiova do Gorbacheva', *KZ*, 11 Feb. 2006.

[77]National Foreign Assessment Center, SR 81-18935X, '*The Development of Soviet Military Power: Trends Since 1965 and Prospects for the 1980s*', 13 April 1981, 67–9; and Central Intelligence Agency Directorate of Intelligence, SW-86 20026DX, *Soviet Artillery Precision – Guided Munitions: A Conventional Weapons Initiative*, Sept. 1986; Special National Intelligence Estimate, *Soviet Acquisition of Military Significant Western Technology*, Sept. 1985; ERR.

[78]Directorate of Intelligence, SOV 84–10173, *Soviet Ground Forces Trends*, 1 Oct. 1984, 19–20. and National Intelligence estimate, NIE 11–14–79, *Warsaw Pact Forces Opposite NATO*, 31 Jan. 1979, 78; ERR.

microprocessors and computers, and consequently their acquisition became a more urgent necessity.[79]

On the heels of monitoring the Soviet quest for advanced technology, US intelligence soon began to arrive at the operational essence of the MTR – Soviet experimentation with reconnaissance strike and fire complexes. Discussing Soviet conventional doctrine, the CIA understood that the Soviets considered conventional weapons so accurate, lethal and destructive, as to approach the potential of nuclear munitions.[80] A series of CIA estimates from the early 1980s refer to so-called *reconnaissance strike organizations* (RSO), which had been developed out of the Soviet concern for the threat posed by the 'Assault Breaker', precision guided, deep striking, theater level systems, capable of firing on follow-on moving Soviet echelons. According to the same estimates, the RSOs were a further expression of the new MTR concept of integrated, deep, simultaneous fire destruction of the enemy. The analysts grasped that the Soviet RSOs consisted of an integrated triad of reconnaissance and target acquisition complexes, automated command and control elements and long-range striking systems. They correctly attributed the *ROK* and *RUK* to the operational (army) and to the tactical (division) levels and envisioned them as the main trend in future Soviet force development.[81] Towards the end of the Cold War, the CIA achieved additional clarification of the Soviet doctrinal vision. It reckoned that the outcome of the future war would be determined mainly by a massed strike of conventional PGMs linked to real-time reconnaissance systems and complementary ground maneuver and not by masses of tanks, infantry and artillery.[82]

However, in forecasting the development of Soviet military power for the 1980s, US intelligence concluded with an assessment which minimized the overall implications of the Soviet innovation. US intelligence predicted that if current trends continued, 'new technology, whether developed or illegally acquired, was expected to lead to evolutionary improvements in individual systems. However, not one of

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[79]Central Intelligence Agency Directorate of Intelligence, SW 86–10062, *Soviet Microelectronics: Impact of Western Technology Acquisitions*, Dec. 1986; and National Intelligence Estimate, NIE 11–12–83, *Prospects for Soviet Military Technology and Research and Development*, 14 Dec. 1983; ERR.

[80]Director of Central Intelligence, *Trends and Development in Warsaw Pact Theater Forces and Doctrine Through the 1990s*, NIE 11–14–89, Feb. 1989; ERR.

[81]Directorate of Central Intelligence, NIE 11/20–6–84, *Warsaw Pact Non-nuclear Threat to NATO Airbases in Central Europe*, 25 Oct. 1984, 41–2; and National Intelligence Estimate, NIE 11–14–85/D, *Trends and Developments in Warsaw pact Theater Forces*, 1985–2000, Sept. 1985, 9–13, 29–33; ERR.

[82]Maj. Gen. Shlipchenko, cited in the CIA Directorate of Intelligence, '*The USSR: Initial Military Reaction to the Desert Storm*', 26 Feb. 1990, 3; ERR.

these technological developments or even their combination in the foreseeable future was expected to revolutionize modern warfare'.[83] Similarly, while discussing Soviet writings on the MTR and RUK concept during the early 1980s, senior Pentagon officials treated the issue according to arms-race Cold War logic: if the notion of what the Soviets termed Western *'reconnaissance-strike capabilities'* caused a certain strategic discomfort in Moscow, then the US should expand its investment in this area.[84] This logic was in keeping with various administrations' efforts – economic ones among them – to neutralize Soviet influence, to place them at a competitive disadvantage and to bring the struggle to an end on America's terms.[85]

The wealth of information concerning Soviet views on the discontinuity in military affairs, accompanied by the poverty of comprehension regarding its consequences, was a state which endured within most of the US defense community for almost a decade. Only a few American analysts, most notably Gen. William Odom, focused on the validity of the MTR and recognized it as more than just another Soviet innovation.[86] Most Soviet watchers in the West, in their analysis of Soviet theoretical writings, were unable to see the forest for the trees of specific technologies and tactical-operational problems.

The Conceptual Birth of the American RMA

The American concept of discontinuity in military affairs did not develop simultaneously with new RMA-type weapons; it lagged behind the military technology for more than a decade. In his study of American air power, Barry Watts has described how 'smart' high technology was developed and used effectively by the US Air Force

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[83]National Intelligence estimate, NIE 11–14–79, *Warsaw Pact Forces Opposite NATO*, 31 Jan. 1979, 79; National Foreign Assessment Center, SR 81–18935X, '*The Development of Soviet Military Power: Trends Since 1965 and Prospects for the 1980s*, 13 April 1981, 67–9; ERR.

[84]Statement by Andrew Marshall at Center for Strategic and Budgetary Assessments roundtable on future warfare, 12 March 2002; in Michael G. Vickers and Robert C. Martinage, *The Revolution in War* (Washington DC: Center for Strategic and Budgetary Assessments 2004), 11; and Andrew Marshall, in Andrew F. Krepinevich, *The Military-Technical Revolution: A Preliminary Assessment* (Washington DC: Center for Strategic and Budgetary Assessments 2002), i.

[85]Tomes, *US Defense Strategy*, Ch. 4; Derek Leebaert, *The Fifty-Year Wound: The True Price of America's Cold War Victory* (Boston: Little, Brown 2002), 507; Ronald E. Powaski, *The Cold War: The United States and the Soviet Union, 1917–1991* (New York: OUP 1998), 233.

[86]Most notably Gen. William Odom, Mary Fitzgerald, Notra Truelock and experts at Andrew Marshall's Office of Net Assessment.

during the last stages of the Vietnam War. However, the very community that developed the weaponry failed to recognize its broader implications for the future of warfare. The techno-tactical focus of American analysts prevented them from seeing anything revolutionary in the greater accuracy of laser guided bombs.[87]

The technological seeds of the American RMA were sown in the mid-1970s, when the means of precision strike, intelligence, target acquisition and communication, were developed by Defense Advanced Projects Agency (DARPA), in the framework of 'offset strategy'.[88] Pursued consistently by several administrations, this strategy shifted the competition to a technological arena. Western technological superiority was expected to offset, exhaust and eventually neutralize the quantitative advantage of the Soviets. The two decades of the 'offset strategy' must be recognized as a 'technological precursor, a period of maturing capabilities of the future American RMA'.[89] However, as in most military innovations, technology only set the parameters of the possible and laid the groundwork for a military revolution. It was the response to technology that produced seismic shifts in warfare.[90] The mere existence of smart weapons and technologies did not, in itself, produce the RMA. Without a deeper understanding of their operational and organizational consequences, they were no more than an evolutionary force multiplier. Thus, a clear distinction must be made between the maturing of a host of US capabilities since 1980s, and the realization of the RMA in the early 1990s.[91]

MacGregor Knox and Williamson Murray argue in their work on the dynamics of military revolutions, that Andrew Marshall and his experts within the Office of Net Assessment (ONA) were the first to register the significance of Soviet writings on the MTR and to introduce the notion

[87]Barry Watts, 'American Air Power', in Williamson Murray, *The Emerging Strategic Environment: Challenges of the Twenty-first Century* (Westport, CT: Praeger 1999), 183–218; MacGregor Knox and Williamson Murray, *The Dynamics of Military Revolution, 1300–2050* (New York: Cambridge UP 2001), 4.

[88]Tomes, *US Defense Strategy*, Ch. 4; Vickers and Martinage, *The Revolution in War*, 8–9; Richard H. Van Atta, Seymour J. Deitchman, and Sidney G. Reed, *DARPA Technical Accomplishments, Volume III* (Alexandria, VA: Institute for Defense Analyses 1991), II–14; William Owens, *Lifting the Fog of War* (New York: Farrar Straus Giroux 2000), 80–3; William J. Perry, *Preventive Defense: A New Security Strategy for America* (Washington DC: Brookings Institute Press, 1999), 179–80. 'Desert Storm and Deterrence,' *Foreign Affairs* 70 (Fall 1991), 66–2.

[89]Robert R. Tomes, *US Defense Strategy from Vietnam to Operation Iraqi Freedom*, (New York, Routledge, 2007), Chs. 4–5.

[90]Max Boot, *War Made New: Technology, Warfare, and The Course of History, 1500 to Today* (New York: Gotham Books 2006), 9–11.

[91]Tomes, *US Defense Strategy*.

of the revolutions in military affairs into the American defense community.[92] Their claim was echoed by General Makhmut Gareev, the President of the Russian Academy of Military Sciences. He characterized Andrew Marshall as a theoretical luminary who fully grasped the essence of the Soviet MTR and was a founding father of the American RMA.[93] Indeed, only a small group on the margins of the American defense planning mainstream in the early 1980s would recognize the approaching RMA future.[94]

Albert Wohlstetter is often considered to be the first senior figure within the American defense establishment to understand the dramatic impact of the new accurate weapons on the nature of war.[95] Envisioning the first generation PGMs deployed in the latter stages of the Vietnam War, he realized their potential for substantial reduction of the inefficiencies and uncertainties that had plagued large-scale industrial age combat. In the face of what he called the 'enormous inertia' of the armed services, Wohlstetter, supported by a few defense intellectuals, campaigned vigorously through the 1980s, to consider more carefully the strategic implications of an expanding family of PGMs. In his view, the 'revolution in microelectronics' opened up whole new vistas for the application of force and an increasingly wider variety of political and operational circumstances.[96]

It was, only at the very end of the Cold War that a genuine interest in Soviet MTR theories gathered momentum in the American defense establishment. The highest point of Wohlstetter's efforts to incline the defense community to reconceptualize the nature of warfare came in 1987, when he co-chaired with Fred Ikle the Commission on Integrated Long Term Strategy. By this time, it was no longer the standard intelligence analyses on the doctrinal action-reaction dynamic in the European theater which attracted American attention, but the essence of the discussion about the emerging nature of the future security environment. The commission discussed the necessity of extending its

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[92]Knox and Murray, *Dynamics of Military Revolution*, 3.
[93]Interview with Gareev; Also see Sergei Modestov, 'Serii Kardinal Pentagona Andrew Marshall – ideolog novoi amerikanskoi revoliucii v voennom dele', *Nezavisimoe Voennoe Obozrenie*, no. 4, 14 Dec. 1995.
[94]Tomes, *US Defense Strategy*.
[95]Andrew Bacevich, *The New American Militarism* (Oxford: OUP 2005), 161–3.
[96]Ibid.; Albert Wohlstetter, 'Threats and Promises of Peace: Europe and America in the New Era', *Orbis* 17 (Winter 1974); idem, 'Between an Unfree World and None: Increasing Our Choices,' *Foreign Affairs* 63 (Summer 1985); idem, 'The Political and Military Aims of Offensive and Defensive Innovation,' in Fred Hoffman, Albert Wohlstetter, and David Yost, *Swords and Shields: NATO, the USSR, and New Choices for Long-Range Offense and Defense* (Lexington, MA: Lexington Books 1987).

studies beyond Cold War military balance assessments, even though the USSR was still alive and kicking.[97] The commission's report credited American technological advances such as stand-off PGMs, space, 'stealth', radar and targeting capabilities. However, it argued that while the Soviets fully appreciated the potential of these changes, the Pentagon did not. Yet, in the commission's view, if the US awoke to the opportunity at hand, it might acquire a more versatile, discriminating and controlled capability to employ this technology-driven change in warfare.[98]

In 1988, the Commission established a working group, co-chaired by Andrew Marshall and Charles Wolf, entrusted with the task of projecting the likely contours of military competition in the future security environment. The report stated that the Soviets had identified roughly the same list of technologies as important for future war, but considered their implications more systematically. Rather than identifying only ways to improve specific systems or perform existing missions, Soviet writings suggested that the conduct of war would be broadly transformed by a 'qualitative leap' in military technologies. The report found that Soviet writings tended not to focus on questions of feasibility, cost, and timing for specific innovations, but rather to assume that families of new technologies would eventually be introduced, and to examine the tactical, operational, and strategic implications of technological trends. Besides identifying the combined effects of emerging technologies in extending the area and speed of battle and transforming the conduct of operations, the report argued that the Russians were envisioning a more distant future than American military experts. The working group allowed that the Soviets might be correct in their assessment that the advent of new technologies would revolutionize war, and not merely make current forces marginally better at what they already did. It concluded that if that were the case, then a transformation in the nature of war would affect American force structures and command practices in some cases more profoundly than the introduction of nuclear weapons.[99]

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[97]Bacevich, *New American Militarism*; Krepinevich, *The Military-Technical Revolution*, i–iv.

[98]Fred C. Ikle and Albert Wohlstetter, *Discriminate Deterrence Report of the Commission on Integrated Long Term Strategy* (Washington DC: DoD Jan. 1988), 8, 29,49,65; Bacevich, *The New American Militarism*, 160–2.

[99]Andrew W. Marshall and Charles Wolf, 'The Future Security Environment', *Report of the Future Security Environment Working Group, submitted to the Commission on Integrated Long Term Strategy* (Washington DC: DoD, Oct. 1988), 34–5, 40, 42, 64, 69–71.

Andrew Marshall eclipsed Wohlstetter as the leading proponent of inquiring into a potential change in the future military regimes. Building upon its work for the above commission, the ONA within the Pentagon embarked under Andrew Marshall and Andrew Krepinevich on a more detailed assessment of the Soviet MTR vision starting from 1989.[100] The preliminary lessons from the 1991 Gulf War provided further stimulus for this inquiry, as the US sought to conceptualize the new type of warfare seen during Operation 'Desert Storm'.[101] The ONA experts had picked up on the writings by the Soviet military and offered an evaluation which had two related goals: to identify whether or not the Soviet analysts were correct in their conviction that they were witnessing a fundamental discontinuity in military affairs; and second, if a military revolution was indeed on the horizon, to pinpoint critical issues which had to be given a prominent place on the US defense management's agenda.[102]

Today, this assessment of the Soviet MTR, which was completed in 1992 (with a more comprehensive assessment a year later), is perhaps the best-known document ever prepared by the ONA. The ONA intellectual effort yielded what seemed to be a total consensus that Soviet theorists had been correct since the late 1970s about the character of the emerging MTR. The assessment confirmed Soviet postulates that advanced technologies, especially those related to informatics and precision guided weaponry, employed at extended ranges, were bringing military art to the point of revolution in the nature of warfare. Along with information warfare, the report identified the concept of reconnaissance strike complexes as the main determinant of future warfare. It stated in no uncertain terms that: 'the integrated range-fire, information and automated control systems, which can engage accurately a wide array of critical targets in the

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[100]Bacevich, *New American Militarism*; Krepinevich, *The Military-Technical Revolution*.

[101]Western specialists claim and the Soviets concur, that during the war, the allies successfully executed a perfect version of the Soviet conventional theater offensive which encapsulated most of the doctrinal principles developed by Soviet military theoreticians in frames of the MTR. Naveh, *In Pursuit of Military Excellence*, 238 and 330; Stephen J. Blank, *The Soviet Military Views of Operation Desert Storm: A Preliminary Assessment* (Carlisle Barracks, PA: Strategic Studies Institute, US Army War College 1991), 31–3; Cooper, 'Another View of the Revolution in Military Affairs'; and Norman C. Davis, 'An Information-Based Revolution in Military Affairs', 85, in Arquilla and Ronfeldt, *In Athena's Camp*.

[102]Statement by Andrew Marshall at a CSBA roundtable on future warfare, 12 March 2002; in Vickers and Martinage, *The Revolution in War*, 12; Krepinevich, *The Military-Technical Revolution*, i–iv.

extended ranges and called by the Soviets the reconnaissance strike complex, is changing the nature of war dramatically'.[103]

According to William Owens, the then Vice Chairman of the Joint Chiefs of Staff, Soviet ideas regarding the MTR had stirred enough interest among observers of Russia in the West, to reduce it to the official Pentagon acronym: 'A higher form of praise of Pentagon officials does not exist'.[104] The ONA experts argued however, that the phrase MTR connoted too great an emphasis on technology and therefore an alternative term, the RMA, was adopted. It is interesting to note, that this expression also has its roots in Soviet military thought, though ONA experts considered it preferable because it emphasized *revolution* rather than *technology*.[105] The ONA assessment was circulated in the US defense community in subsequent years, generally to favorable reviews, initiating the most comprehensive reforms in the Department of Defense since the Vietnam War and shaping American military power for the post-Cold War environment.[106]

This Cold War episode provides an interesting example of the diffusion of military ideas and a recurring type of military emulation. As in the case of the ALB, when the US utilized the 1930s Soviet 'Deep Battle Theory' to rethink its warfare priorities during the late 1970s,[107] the Soviet vision of the MTR was studied, adapted and eventually adopted by the American theoreticians. Paraphrasing a statement by the historian John Erickson's, one may claim that two of the most remarkable American military innovations after World War II (i.e. the ALB and the Revolution in Military Affairs) owed their conceptual copyrights to their Soviet rivals.[108]

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[103]Marshall, *Some Thoughts*, 2–4; Krepinevich, *The Military-Technical Revolution*, iii–iv and 5–7; Vickers and Martinage, *The Revolution in War*, 10–13.

[104]Owens, *Lifting the Fog of War*, 83.

[105]Krepinevich, *The Military-Technical Revolution*, iv; Cooper, 'Another View of the Revolution in Military Affairs', 135, note 1; See for the Soviet 'use' of the RMA term: Derevianko, *Revoliutsiia v voennom dele*; and esp. Bondarenko, *Sovremennaia nauka i razvitie voennogo dela*, 109–11; Anureev, 'Nauchno tekhnicheskii progress i voennaia nauka'; Cherednichenko, 'Nauchno tekhnicheskii progress i razvitie vooruzhenia i voennoi tekhniki'.

[106]Krepinevich, *The Military-Technical Revolution*.

[107]Lock-Pullan, *US Intervention Policy and Army Innovation*, 92–3.

[108]Naveh, *In Pursuit of Military Excellence*, Chs. 7 and 8; Referring to the roots of the ALB, Erickson noted : 'General Svechin, General Isserson and Marshal Tukhachevskii would at once be impressed and flattered, sufficiently so even to overlook the protracted intrusion upon their copyright', John Erickson, 'The Development of Soviet Military Doctrine; The Significance of Operational Art and the Emergence of Deep Battle', in John Gooch (ed.), *The Origins of Contemporary Doctrine* (Camberley, UK:

One may argue as well, that the Soviet futuristic vision of *operational maneuvering groups* operating on the future battlefield as an orchestrated whole with the *reconnaissance strike/fire complexes* and synchronized through *command and control systems*, may be seen as a conceptual twin of what would be termed in the American RMA a *dominating maneuver* under the *precision strike*, executed in accordance to the principles of *network centric warfare*. From the mid-1990s on, the term RMA established itself among specialists as an authoritative frame of reference within which the debate over the future of war unfolded.[109] This can be also seen as an authentic Soviet contribution to Western military thought.

Conclusion

The intellectual history of this RMA is particularly puzzling because of the diverse paths which led each nation to the same innovation. While the US was ahead in the process of deploying much of the new weaponry, the Soviets were more deeply engaged in thinking through the implications of new technologies on the nature of war. Whereas Soviet writings foresaw a broad revolution in military affairs, requiring new forms of military organization and concepts of operations, American thinking appeared to focus more on how new technologies could be used to enhance performance of existing missions. While the Soviets undertook a broad-gauged study of all of the many facets of the MTR, the US military focused on the narrow technological and tactical aspects in frames of the ALB. Until the very late 1980s, and not until the ONA assessment was introduced, US forecasting efforts tended to be more piecemeal and less ambitious, extrapolating ahead from current capabilities, assessing the impact of the new technologies on a system-by-system basis, rather than trying to anticipate qualitative leaps that could bring about what the Soviets called a 'revolution in military affairs'.[110]

The cultivation of the technological seeds of the American RMA preceded the maturation of the conceptual ones. The US developed technology and weaponry for about a decade, without realizing its revolutionary implications. Functional and mostly tactical application of the advanced technologies took center stage. The ALB demonstrates

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Strategic and Combat Studies Institute 1997), 106; Lock-Pullan, *US Intervention Policy and Army Innovation*, 682 and 686.

[109]Bacevich, *The New American Militarism*, 164–6.

[110]Marshall and Wolf, 'The Future Security Environment', 26–7, 34–5, 40, 64, 69; Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, NY: Cornell UP 1991), 257–8.

that the level of US military thinking became far more sophisticated as it made the transition from sequential tactical attrition to under-standing combat on a broader operational level.[111] However, no further conceptual advancements and no attempt to reconceptualize the existing paradigm about the nature of warfare in futuristic terms, was made in those years. The PGMs were seen as just another, albeit significant, force multiplier in the military arsenal. The innovative ideas of ALB indicate that the US possessed only an intuitive understanding of the revolution that was about to occur.

Despite the US intelligence community's acquaintance with the Soviet MTR from the early 1980s, it was primarily ONA experts who recognized the prescience of Soviet prediction, and not until the early 1990s. Although the technological groundwork for the innovation had been laid down since the 1970s, for the American defense community, the RMA thesis had been nothing but a vague, abstract term, when Andrew Marshall and Andrew Krepinevich first circulated their memorandum in the early 1990s. The US armed forces (similar to the British when they first began experimenting with armored and mechanized warfare in the mid-1920s) were not consciously thinking in terms of a revolution.[112] For Stephen Rosen and Michael Horowitz, the RMA is a combination of new organizational structures with innovative operational practices that are usually but not always driven by new technologies.

According to this definition even the 1991 Gulf War, which was fought by information era weaponry, must be characterized as an industrial age war, due to the absence of a significant shift in organizational structures and in concepts of operations.[113] As one scholar remarked, the US military, like Molière's character in the *The Bourgeois Gentleman*, had been 'speaking in prose' (the RMA) but did not know it.[114] Not until Andrew Marshall and his colleagues from ONA introduced the notion of the RMA into the discourse of the American defense community did this conceptual innovation reach its consciousness.

In contrast, Soviet MTR concepts represented a form of theoretical conceptualization which chronologically preceded technological pro-curement and combat experience. The Soviet vision of the MTR prefigured the technical capabilities of the Soviet Army to implement it.

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[111]Lock-Pullan, *US Intervention Policy and Army Innovation*, 685.
[112]Knox and Murray, *The Dynamics of Military Revolution*, 4; James Der Derian, *Virtuous War* (Oxford: Westview Press 2001), 29–32.
[113]Michael Horowitz and Stephen Rosen, 'Evolution or Revolution?' *Journal of Strategic Studies* 28/3 (June 2005), 441, 445.
[114]Cooper, 'Another View of the Revolution in Military Affairs', 139, note 39.

The Russians coined the term 'revolution in military affairs' and produced seminal theoretical works without possessing either weapons or technologies. At a latter stage, owing to their technological inferiority, the Soviets relied on Western scientific advantage and exploited it as a conceptual frame of reference for their own doctrinal innovations. No other nation has invested as much intellectual capital in the study of war as the USSR.[115] The primacy of developing theory over technology was established by Soviet military tradition as a professional norm.[116] The belief in the ability systematically to anticipate, discern and to interpret the emerging revolutions in military affairs, constituted for the USSR a near sense of intellectual omnipotence. When the new technologies arrived in the mid-1970s, the Soviets already possessed the conceptual consciousness, the scientific framework and the advanced system of military terminology for bridging the gap between the mechanical (the introduction of high technology) and the abstract (the emerging change in the nature of war).[117]

One would expect that countries accustomed to similar technologies would undergo analogous and simultaneous paradigmatic changes in doctrine. However, in the cases in question, the evidence is counter-intuitive: enormous variation is evident in the intellectual paths taken toward conceptual innovation and there were considerable gaps of time between familiarity with the technology and systematic understanding of its potential implications. Why did the technologically inferior USSR prevail qualitatively over the West in the conceptualization of the emerging military-technological realities? Why did it take the US defense community close to a decade to acknowledge the accuracy of Soviet assumptions and to translate MTR theoretical postulates into a radical military reform?

Borrowing models of analyses from constructivism, anthropology and cognitive psychology, one can suggest plausible explanations for the varying intellectual conduct of the two countries with regard to the same innovation. Applying these frameworks of analysis to the historiography of the MTR and RMA, one may assume that different 'strategic cultures' and distinct 'thinking styles in military affairs' led

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[115]Harriet Scott and William Scott, *The Soviet Art of War* (Boulder, CO: Westview Press 1982), 385.
[116]F.F. Gaivoronovskii and M.I. Galkin, *Ku'ltura voennogo myshleniia* (Moscow: Voennizdat 1991).
[117]Naveh, *In Pursuit of Excellence*, 164–76. S. Kozlov, 'K voprosu o razvitii sovetskoi voennoi nauki posle vtori mirovoi voiny', *VM* 2 (Feb. 1964), pp. 64–73.

US and Soviet theoreticians to ask different questions about emerging new types of weapons. The two countries seemed to generate very different approaches to developing professional knowledge about 'the new theory of victory'.[118] The differences in thinking styles, in tandem with the distinct strategic cultures of these countries, account for this variance. Such a comparative analysis will serve as the topic for a separate study.[119]

Acknowledgements

Bibliography

Afnov, V.V., 'Razvitie v SShA vysokotochnogo oruzhia i perspektivy sozdania razvedovatel'no-udarnikh kompleksov', *Voennaia mysl'* 4 (1983), 63–71.

Afnov, V.V., 'Sredstva REB sukhoputnykh voisk SShA', *ZVO* 4 (1980), 55–7.

Aldis, Anne and Roger N. McDermott, *Russian Military Reform 1992–2002* (London: Frank Cass 2003).

Aleksandov, V.A., 'O razvitii avtomatizirovannykh system upravleniia v armii SShA', *Voennaia mysl'* 3 (1983), 74–8.

Aleksandov, V.A., 'Sovremennaia oborona po vzgliadam NATO', *Voennaia mysl'* 10 (1978), 89–96.

Altukhov, P.K., *Osnovy teorii upravleniia voiskami* (Moscow: Voenizdat 1984).

Anureev, I.I., 'Znachenie nauchno tekhnicheskoi revoliutsii dlia povysheniia boevoi gotovnosti Sovetskikh Vooruzhennykh Sil', *Voennaia mysl'* 6 (1975), 65–76.

Anureev, I.I., 'O vzaimosviazi voennoi nauki s estevstvennymi naukami', *Voennaia mysl'* 1 (1981), 27–35.

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[118]The term is borrowed from Stephen Rosen, *Winning the Next War.*

[119]The author deals with that question extensively and suggests plausible theoretical explanations in the framework of his doctoral dissertation 'The Impact of Cultural Factors on Military Innovations: Comparing the Revolution in Military Affairs in the USSR, the US and Israel'. A full discussion on the relevant research findings will be presented in a forthcoming publication.

Anureev, I.I., 'Vyshe effektivnost' i kachestvo voenno-nauchnykh znanii', *Voennaia mysl'* 5 (1983), 3–16.

Anureev, I.I., *Voennaia mysl'* 2 (1970), 27–39.

Anureev, I.I., *Nauchno tekhnicheskii progress i ego ispol'zovanie v voennom dele* (Moscow: Obshchestvo Znanie 1982).

Arquilla, John and David Ronfeldt, *In Athena's Camp* (RAND: National Defense Research Institute 1997).

Babadzhanian, A.V., *Tanki i tankovie voiska* (Moscow: Voenizdat, 1980).

Bacevich, Andrew, *The New American Militarism* (Oxford: OUP 2005).

Baanov, A.O., *Suschnost' i soderzhanie sovremennoi voenno tekhnicheskoi revoliutsii* (Moscow: Ministerstvo Oborony, 1977).

Baturin, A.S., 'Nauchno tekhnicheskaia revoliutsiia i voennye prigotovleniia SShA', *Voennaia mysl'* 1 (1981), 75–80.

Belov, M. and V.I. Shchukn, 'Razvedovatel'no-porazhaiushchiye kompleksy armii SShA', *Voennyi Vestnik* 1 (1985), 86–9.

Bezkhrebetnii, M.I., 'Sovmestnaia operatsiia – glavnaia forma sovremennikh boevikh deistvii', *Voennaia mysl'* 7 (1979), 27–34.

Bezkhrebetnii, M.I., 'Podgotovka posleduiushchikh nastupatel'nikh operatsii', *Voennaia mysl'* 7 (1982), 28–38.

Biddle, Stephen, *Military Power: Explaining Victory and Defeat in Modern Battle* (Princeton UP, 2004).

Blank, Stephen, *The Soviet Military Views of Operation Desert Storm: A Preliminary Assessment* (Carlisle Barracks, PA: Strategic Studies Institute, US Army War College 1991).

Boots, Max, *War Made New: Technology, Warfare, and The Course of History, 1500 to Today* (New York: Gotham Books 2006).

Borisov, V.I., 'Organizatsiia voennykh nauchno-tekhnicheskikh issledovanii v NATO', *Voennaia mysl'* 2 (1975), 84–9.

Brisky, Lay, 'The Reconnaissance Destruction Complex: A Soviet Operational Response to Air-Land Battle', *Journal of Soviet Military Studies* 1/2 (1990), 297–8.

Bondarenko, V.M., *Nauchno tekhnicheskii progress i voennoe delo* (Moscow: Voenizdat 1973).

Bondarenko, V.M., *Sovremennaia nauka i razvitie voennogo dela* (Moscow: Izdatel'stvo Ministerstva Oborony 1976).

Bulatov, A.F., 'Aktual'nye voprosy sovremmennogo nastupatel'nogo boia', *Voennaia mysl'* 11 (1984), 60–9.

Bulatov, A.I., 'Bor'ba s tankami na bolshikh dal'nostiakh', *Zarubezhnoe voennoe obozrenie* 12 (1979), 12–13.

Cherednichenko, M.I., 'Nauchno tekhnicheskii progress i razvitie vooruzhenia i voennoi tekhniki', *Voennaia mysl'* 14 (1972), 29–41.

Chernukhn, V.A., 'Taktika aviatsii NATO po preodoleniiu sistem PVO', *Vestnik PVO* 8 (Aug. 1981).

Czanotta, Zygmunt, 'Uzycie artylerii w wojnach lokalnych', *Przeglad Wojsk Ladowych*, Vol. 5–6 (1987).

Danilevich, A.A., 'Voenno teoriticheskoe nasledie M.V. Frunze i sovremennost, *Voenno Istoricheskii Zhurnal* 6 (1985), 80–7.

De Derian, James, *Virtuous War* (Oxford: Westview Press 2001).

Derevianko, P.M., *Revoliutsiia v voennom dele. Vchem ee sushchnost'?* (Moscow: Ministerstvo Oborony SSSR 1967).

Dmitriev, V.I., 'Amerikanskaia sistema SOTAS', *Zarubezhnoe voennoe obozrenie* 4 (1982), 40–2.

Dmitriev, V.I., 'Vzamodestve avats s sukhoputnymy voskam' *Zarubezhnoe voennoe obozrenie* 6 (1980), 48–51.

Dmitriev, V.V. and N.I. Germanov, 'Upravliemye aviatsionnye bomby', *Zarubezhnoe voennoe obozrenie* 3 (1981), 55–60.

Ekimovskii, A.Z., 'Puti sozdaniia ustoichivoi i aktivnoi oborony, *Voennaia mysl'* 7 (1983), 19–28.

Evgeniev, E.G., 'Novye napravleniia gonki vooruzhenii v stranah NATO', *Voennaia mysl'* 1 (1977), 90–6.

Filippov, V.I., 'Soedineniia novogo tipa v armii SShA', *Zarubezhnoe voennoe obozrenie* 7 (1978), 21–9.

Fomich, N.A, 'Protivotankovye sredstva armii SShA', *Zarubezhnoe voennoe obozrenie* 8 (1981), 35–40.

Gareev, Makhmut, *Frunze-Voennyi teoretik* (Moscow: Voenizdat, 1985).

Gareev, Makhmut, *Esli zavtra voina* (Moscow: Vladar 1995).

Gareev, Makhmut, 'Ob opyte boevoi podgotovki voisk', *Voenno Istoricheskii Zhurnal* 4 (1983), 11–20.

Gaivoronovksii, F.F., *Evoliutsiia voennogo iskusstva: etapy, tendentsii, printsipy* (Moscow: Voenizdat, 1987).

Gaivoronovksii, F.F., *Ku'ltura voennogo myshleniia* (Moscow: Voenizdat 1991).

Gilmanov, A.Z., *O Nauchno tekhnicheskoi revoliutsii kak vazhnom faktore sozdaniia material'no-tekhnicheskoi bazy kommunizma* (Kazan': Vysshee Voennoe Inzhenernoe Uchilishe 1982).

Golushko, I.V., 'Tyl v usloviah ispol'zovaniia protivnikom vysoko-tochnogo oruzhiia' *Tyl i snabzhenie* 7 (July 1984).

Gooch, John (ed.) *The Origins of Contemporary Doctrine* (Camberley, UK: Strategic and Combat Studies Institute 1997).

Gorbatenko, D.D., *Faktor vremeni v sovremennom boiu* (Moscow: Ministerstvo Oborony 1972).

Gorbunov, V.A., *Effektivnost' obnaruzheniia tselei* (Moscow: Ministerstvo Oborony 1980).

Grinevskii, Oleg, *Perelom: ot Brezhneva k Gorbachevu* (Moscow: Olma Press 2004).

Grinevskii, Oleg, *Stsenarii dlia tret'ei mirovoi voiny* (Moscow: Olma Press 2002).

Grudinin, I.A., *Dialektika i sovremennoe voennoe delo* (Moscow: Voenizdat 1971).

Hoffman, Fred, Albert Wohlstetter and David Yost, *Swords and Shields: NATO, the USSR, and New Choices for Long-Range Offense and Defense* (Lexington, MA: 1987).

Horowitz, Michael and Stephen Rosen, 'Evolution or Revolution?' *Journal of Strategic Studies* 28/3 (June 2005).

Ikle, Fred and Albert Wohlstetter, *Discriminate Deterrence Report of the Commission on Integrated Long Term Strategy* (Washington, DC: DoD Jan. 1988).

Isaev, P., 'Bor'ba s tankami', *Zarubezhnoe voennoe obozrenie* 12 (1982), 37–42.

Ivliev, N.I., 'Operativnaia i boevaia podgotovka vooruzhennykh sil NATO v 1982 godu' *Voennaia mysl'* 6 (1983), 70–5.

Ivliev, N.I., 'Kompleksnoe uchenie voisk tsentral'noi gruppy armii NATO', *Zarubezhnoe voennoe obozrenie* 9 (1983), 10

Ivliev, N.I. and L.V. Levadov, 'Strategicheskoe KShU NATO Zima-83' *Voennaia mysl'* 12 (1983), 70–3.

Karemov, A. 'Voennaia doktrina SShA', *Zarubezhnoe voennoe obozrenie* 4 (1983), 10–13.

Khar'kov, A.G. 'K voprosu o nachal'nom periode voiny', *Voennaia mysl'* 8 (1984), 25–34.

Khar'kov, A.G. 'Voevat' ne chislom a umeniem', *Voennaia mysl'* 6 (1983), 34–42.

Kir'ian, M.M. (ed.), *Voenno-tekhnicheskii progress i vooruzhennie sily SSSR* (Moscow: Voennoe Izdatel'stvo 1982).

Knox, MacGregor, and Williamson Murray, *The Dynamics of Military Revolution 1300–2050* (New York: Cambridge UP 2001).

Konoplev, V.K., *Nauchnoe predvidenie v voennom dele* (Moscow: Voenizdat 1974).

Kornienko, Georgii, *Kholodnaia Voina: svidetel'stvo ee uchastnika* (Moscow: Olma Press 2001).

Korotchenko, Ye.G., 'Ob evoliutsii printsipov voennogo iskusstva', *Voennaia mysl'* 9 (1988), 22–3.

Kozhin, V., and Trusin, V. 'Voprosy primeneniia vooruzhennykh sil v operatsiiakh', *Zarubezhnoe voennoe obozrenie* 10 (1983), 18–19.

Koziej, Stanislaw, 'Przewidywane kierunki zmian w taktyce Wojsk Ladowych', *Przeglad Wojsk Ladowych* (Sept. 1986), 1–8.

Kozlov, M.M. 'Organizatsiia i vedenie strategicheskoi oboroni po opytu Velikoi Otechestvennoi Voiny', *Voenno Istoricheskii Zhurnal* 12 (1980), 9–17.

Kozlov, M.M. *Akademiia General'nogo Shtaba* (Moscow: Voenizdat 1987), 184–7.

Kozlov, M.M. K voprosu o razvitii sovetskoi voennoi nauki posle vtori mirovoi voiny', *Voennaia mysl'* 2 (Feb. 1964).

Krepinevich, Andrew, *The Military-Technical Revolution: A Preliminary Assessment* (Washington DC: Center for Strategic and Budgetary Assessments, 2002).

Krest'ianinov, V.F., *Nauchno tekhnicheskaia revoliutsiia i revoliutsiia v voennom dele. Ikh sotsial'nye problemy* (Leningrad: Voennaia Akademiia Tyla i Transporta 1971).

Krupchenko, I., 'Kharakternye cherty razvitiia i primeneniia tankovykh voisk', *Voenno Istoricheskii Zhurnal* 9 (1979), 25–32.

Krupnov, S.I., *Dialektika i voennaia nauka* (Moscow: Voenizdat 1963).

Krymtsev, V.G., and Iu. I. Molostov, 'Vysokotochnoe protivotankovoe oruzhie armii stran NATO i perspektivy ego razvitiia', *Voennaia mysl'* 10 (1984), 73–9.

Krysanov, V.V., 'Massirovanie sil i sredstv na glavnykh napravleniiakh-iskusstvo i raschet', *Voennaia mysl'* 5 (1984), 26–32.

Lamkhin, V., 'Vozdushnaia nastupatel'naia operatsiia', *Zarubezhnoe voennoe obozrenie* 11 (1984), 47–54.

Leebaert, Derek, *The Fifty-Year Wound: The True Price of America's Cold War Victory* (Boston: Little, Brown 2002).

Leonidov, L.V. and V.P. Vinokur, 'Veroiatnye sposoby razviazyvaniia I vedeniia obychnoi voiny', *Voennaia mysl'* 12 (1985).

Levadov, L., and V. Viktorou, 'Itogi operativnoi podgotovki ob'edinnenykh vooruzhennykh sil NATO v 1984 godu', *Voennaia mysl'* 3 (1985), 64–72.

Lock-Pullan, Richard, *US Intervention Policy and Army Innovation* (New York: Routledge 2006).

Lock-Pullan, Richard, 'How to Rethink War: Conceptual Innovation and Air Land Battle Doctrine', *Journal of Strategic Studies* 28/4 (Aug. 2005).

Lomov, N.A., *Nauchno tekhnicheskii progress i revoliutsiia v voennom dele* (Moscow: Ministerstvo Oborony 1973).

Loschilov, I.N., 'Perspektivy razvitiia ASU operativno takticheskogo naznacheniia sukhoputnykh voisk SShA', *Voennaia mysl'* 7 (1985), 69–77.

Loschilov, I.N., 'Amerikanskaia kontseptsiia upravlenie, sviaz' i razvedka', *Voennaia mysl'* 7 (1986), 63–72.

Loschilov, I.N., 'Sredstva avtomatizatsii upravleniia voiskami v boiu', *Zarubezhnoe voennoe obozrenie* 5 (1978), 35–41.

Maiorov, A.M., 'Proriv oborony: teoriia i praktika mirovykh voin', *Voennaia mysl'* 5 (1978), 79–94.

Makarebskyi, V., 'Blitskrig v epokhu nauchno tekhnicheskoi revoliutsii, *VZ* 9 (Sept. 1986).

Maksimov, N.I., 'Kontseptsiia 'vystrel-porazhenie', *Zarubezhnoe voennoe obozrenie* 11 (1979), 13–14.

Man'ko, Iu. V., *Dialektika razvitiia sposobov i form vooruzhennoi bor'by* (Leningrad: Voennaia Akademia Sviazi 1975).

Manzhurin, I.N., 'Otrazhenie kontrudarov protivnika v khode nastupatel'noi operatsii, *Voennaia mysl'* 10 (1986), 14–22.

Marshall, Andrew, Director of Net Assessment, *Some Thoughts on Military Revolutions – Second Version* (Washington DC: Office of the Secretary of Defense, 23 Aug. 1993).

Marshall, A.W., and C. Wolf, 'The Future Security Environment'. Report of the Future Security Environment Working Group, submitted to the Commission on Integrated Long Term Strategy (Washington DC: DoD Oct. 1988).

Mashchenko, V.A., 'Priminenie navigatsionnykh sputnikovykh system SShA v voennykh tseliakh, *Voennaia mysl'* 10 (1983), 79–80.

Mastny, Vojtech and Malcolm, Byrne, *A Cardboard Castle? An Inside History of the Warsaw Pact 1955–1991* (New York: CEU Press 2005).

McKitrick, Jeffrey, 'The Revolution in Military Affairs', in *Battlefield of the Future: 21st Century Warfare Issues* (Maxwell AFB, ALA: Air UP Sept. 1995).

Milovidov, A.S., *Voenno-teoreticheskoe nasledie V.I. Lenina i problemy sovremennoi voiny* (Moscow: Voenizda 1987).

Modestov, Sergei, 'Serii, Kardinal, Pentagona Andrew Marshall – ideolog novoi amerikanskoi revoliucii v voennom dele', *Nezavisimoe Voennoe Obozrenie* 4 (14 Dec. 1995).

Molostov, Iu., 'Zashchita ot Vysokotochnogo Oruzhiia', *Voennyi Vestnik* 2 (1987), 83–6.

Mozolev, V.F., 'Ob obshchikh osnovakh teorii sovetskogo operativnogo iskusstva', *Voennaia mysl'* 6 (1979), 13–22.

Murray, Williamson, *The Emerging Strategic Environment: Challenges of the Twenty-first Century* (Westport, CT: Praeger 1999).

Naveh, Shimon, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London, Frank Cass 1997).

Nazarenko, V.A., 'Narushenie upravleniia voiskami – vazhnaia boevaia zadacha', *Voennaia mysl'* 7 (1983), 46–51.

Nechaev, N., 'Voennye sistemy sviazi: tendentsii ikh razvitiia,' *Tekhnika i vooruzheniia* 6 (July 1986).

Nikolaev, N.S., 'O kharaktere i soderzhanii operativnoi podgotovki ob'edinennykh sil NATO', *Voennaia mysl'* 6 (1980), 66–72.

Odom, William, *The Collapse of the Soviet Military* (New Haven, CT: Yale UP 1998).

Ogarkov, N., *Istoriia Uchit Bditel'nosti* (Moscow: Voenizdat 1985).

Ogarkov, N., 'Na strazhe mirnogo truda', *Kommunist* no. 10 (1981), 80–91.

Ogarkov, N., 'Voennaia strategiia', *Sovetskaia Voennaia Entsiklopediia*, Vol. 7 (Moscow: Voenizdat 1979).

Otuytsskiy, G.P., 'K Voprosu o sushchnosti voenno-tekhnicheskikh revoliutsii', *Voennaia mysl'* 2 1998).

Otuytsskiy, G.P., *Voenno tekhnicheskaia politika gosudarstva kak factor razvitiia sistemy 'chelovek-voennaia tekhnika'* (Moscow: Voenno Politicheskaia Akademiia 1982).

Owens, William, *Lifting the Fog Of War* (New York: Farrar Straus Giroux 2000).

Peredel'skii, G.E., 'Tendentsii razvitiia polevoi artilerii NATO', *Voennaia mysl'* 11 (1983).

Perry, William, *Preventive Defense: A New Security Strategy for America* (Washington, DC: Brookings Institute Press 1999).

Perry, William, 'Desert Storm and Deterrence', *Foreign Affairs* 70/3 (Fall 1991).

Pervushyn, Anton, *Zvezdnie voiny: Amerikanskaia respublika protiv Sovetskoi imperii* (Moscow: Exmo 2005).

Ponomarev, A.N., 'Sostoianie i osnovnye napravleniia razvitiia aviatsionnoi tekhniki VVS SShA i drugikh stran NATO', *Voennaia mysl'* 6 (1977).

Popov, K.M., 'Zarubezhnaia pechat' o kosmicheskom oruzhii', *Voennaia mysl'* 1 (1979).

Popov, N.G., 'Dostizhenie zhivuchesti voisk v operatsiiakh', *Voennaia mysl'* 1 (1983).

Powaski, Ronald, *The Cold War: The United States and the Soviet Union, 1917–1991* (New York: OUP 1998).

Pushkarev, Nikolai, *GRU: Vymysly i real'nost' – spetssluzhba voennoi razvedki* (Moscow: Eksmo 2004).

Reznichenko, V.G., *Taktika* (Moscow: Voenizdat).

Rosen, Stephen Peter, *Winning the Next War: Innovation and the Modern Military* (Ithaca, NY: Cornell UP 1991), 257–8.

Savushkin, R., 'K voprosu o vozniknovenii i razvitii operatsii', *Voenno Istoricheskii Zhurnal*, (May 1979).

Savushkin, R., 'K voprosu o zarozhdenii teorii posledovatel'nikh nastupatel'nikh operatsii', *Voenno Istoricheskii Zhurna* 5 (May 1983).

Scott, Harriet and Scott, William, *The Soviet Art of War* (Boulder, CO: Westview Press 1982).

Semenov, B., 'Takticheskie upravliaemye rakety klassa "vozdukh-poverkhnost"', *Zarubezhnoe voennoe obozrenie* 5 (1981), 49–57.

Shavrov, I.E., and M.I. Galkin (eds.), *Metodologiia voenno-nauchnogo prognozirovaniia* (Moscow: Voenizdat 1977).

Sidorov, V., 'Vedenie operatsii s primeneniem obychnykh sredstv porazheniia', *Zarubezhnoe voennoe obozrenie* 1 (1985), 7–15.

Simonian, R., 'Tendentsii v razvitiii voennoi doktriny SShA', *Zarubezhnoe voennoe obozrenie* 8 (1983), 15–17.

Sinitskii, A.G., 'Nekotorye voprosy razvitiia vooruzheniia i boevoi tekhniki sukhoputnikh voisk NATO i ikh boevogo primeneniia', *Voennaia mysl'* 10 (1977).

Skachko, P.G., 'Odnovremennoe vozdeistvie na vsiu glubinu operativnogo postroeniia protivnika – vedushchaia tendentsiia v razvitii teorii operativnogo iskusstva', *Voennaia mysl'* 7 (1985).

Sokolovskii, Vasilii, *Voennaia strategiia* (Moscow: Voenizdat 1962).

Solov'ev, A., and L. Guliaev, 'Radio-elektronnaia razvedka SShA', *Zarubezhnoe voennoe obozrenie* 7 (1978), 12–18.

Stapenko, N., 'Batal'ionnaia takticheskaia gruppa v aktivnoi oborone', *Zarubezhnoe voennoe obozrenie* 2 (1981), 29–34.

Starry, Donn, 'Extending the Battlefield', *Military Review* 61/3 (1981).

Tkachev, V.V., 'Vzaimodeistvie v nastupatel'nom boiu', *Voennaia mysl'* 8 (1983), 51–6.

Tomes, Robert, *US Defense Strategy from Vietnam to Operation Iraqi Freedom* (New York: Routledge 2007).

Tumas, V.A., 'Voennoe iskusstvo sukhoputnykh voisk NATO na sovremennom etape', *Voennaia mysl'* 8 (1977).

Turchenko, V.V., 'Tendentsii razvitiia teorii i praktiki strategicheskoi oborony', *Voennaia mysl'* 8 (1979).

Turchenko, V.V., 'O strategicheskoi oborone', *Voennaia mysl'* 7 (1982).

Van Atta, Richard, Seymour Deitchman, and Sidney Reed, *DARPA Technical Accomplishments, Volume III* (Alexandria, VA: Institute for Defense Analyses 1991).

Van Atta, Richard, Seymour Deitchman, and Sidney Reed, *Transformation and Transition: DARPA's Role in Fostering an Emerging Revolution in Military Affairs* (Alexandria, VA: IDA 2003).

Varennikov, Valentin, *Nepovtorimoe* (Moscow: Sovetskii pisatel' 2001).

Vasilchenko, M.V., 'Operativnaia podgotovka vooruzhennykh sil NATO v 1980 godu', *Voennaia mysl'* 4 (1981), 62–9.

Vasil'ev, G., 'Voprosy operativnogo iskusstva v vooruzhennykh silakh SShA', *Zarubezhnoe voennoe obozrenie* 12 (1983), 3–7.

Vickers, Michael, and Martinage Robert, *The Revolution in War* (Washington, DC: Center for Strategic and Budgetary Assessments 2004).

Vinokur, N.M., 'Nekotorye voprosy razvitiia teorii sovremennogo boia,' *Voennaia mysl'* 4 (1985).

Volkov, A.F., 'Leninskie printsipy voenno-tekhnicheskoi politiki KPSS', *Voennaia mysl'* 4 (1980), 31–8.

Voloshin, L.I., 'Teoriia glubokoi operatsii i tendentsii ee razvitiia', *Voennaia mysl'* 8 (1978), 14–26.

Vorob'ev, I.N., 'Novoe oruzhie – novaia taktika', *Voennaia mysl'* 2 and 6 (1984).

Vorob'ev, I.N., 'Novoe oruzhie i razvitie printsipov obshchevoiskovgo boia', *Voennaia mysl'* 6 (1986), 35.

Vorob'ev, I.N., 'Sootnoshenie i vzaimosviaz' nastupleniia i oborony', *Voennaia mysl'* 4 (1980), 49–59.

Wohlstetter, Albert, 'Threats and Promises of Peace: Europe and America in the New Era', *Orbis* 17 (Winter 1974).

Yegorov, S., 'Mekhanizirovannaia diviziia SShA v nastuplenii', *Zarubezhnoe voennoe obozrenie* 4 (1984), 23–8.

Yevgen'iev, Y.G., 'Novye napravleniia gonki vooruzhenii v strankakh NATO', *Voennaia mysl'* 1 (1977), 88–96.

Zavialov, I.G., 'Oboronitel'naia napravlennost' Sovetskoi voennoi doktriny', *Voennaia mysl'* 1 (1981), 15–26.

Zhovannik, A.A., 'Kosmichiskie sistemy sviazi i ikh ispol'zovanie dlia upravleniia vooruzhennymy silami', *Voennaia mysl'* 4 (1983), 34–42.

Zisk, Kimberly Marten, *Engaging the Enemy: Organization Theory and Soviet Military Innovation, 1955–1991* (Princeton UP 1993).

Zolotarev, V.A., *Istoriia voennoi strategii Rossii* (Moscow: Institut Voennoi Istorii MO RF 2000).