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Connecting GPS Interference with Russia's A2AD Concept

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CONNECTING GPS INTERFERENCE WITH RUSSIA'S A2AD CONCEPT

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Introduction

From a Russian perspective, the title of this article is misleading. According to Russia's *Military Encyclopedia*, there is no Russian equivalent to the West's anti-access, area denial (A2AD) concept. This is a Western construct that suggests how Russia may deny access to its territory using its weapons and missiles in offensive or defensive operations against the West.

However, there is a Russian term/concept that describes a method for denying access to its territory. That term is "disorganization" and it is the topic of this article, especially as the term is applied to the disruption of command and control (C2) using radio-electronic warfare (REB) capabilities under circumstances such as Global Positioning System (GPS) jamming. Disorganization is designed to disrupt elements of the information environment. Analysts need to become acquainted with the disorganization concept, since REB could even be used to reflexively control Western actions and make it appear that the latter was the aggressor.

Recent Russian GPS jamming activities of aircraft in Norway and Finland are indicative of this effort to disorganize an opponent. Finnish Prime Minister Juha Sipilä stated that "This is not a joke. The air safety of ordinary people is under threat," regarding GPS interference in Lapland during a recent NATO exercise. Norwegian authorities stated that the interference was carried out by the Russians.¹ Finnish Foreign Minister Timo Soini promised to provide a report to Parliament regarding Russia's alleged jamming.² At this time the disorganization is limited to aircraft, but Russian plans clearly focus on numerous command and control issues.

This article initially notes how the disorganization concept has risen in importance. It then divides the discussion into two parts. Part One discusses Russian use of the disorganization concept in Syria as well as Russian thoughts for its potential use against nation-states. Part Two examines several recent and important references to disorganization that have appeared in the work of Russian REB authors. The discussion also demonstrates how REB and kinetics are working together to win future confrontations.

Background

Very seldom have Western assessments of Russian capabilities focused on the disorganization concept, most likely because the concept has lurked quietly in the background.

¹ *Interfax* (in English), 12 November 2018, no author or title provided.

² *The Independent Barents Observer* (in English), 9 November 2018, no author or title provided.

That appears to be changing. In mid-2017 the C2 discussion stated that a special disorganization subgroup needed to be created. By the end of 2017 REB authors stated that a “C2 Disorganization Plan” was now a part of REB planning. Whether the plan was the work of the subgroup is unknown, but the timing implies it is plausible. Further, the authoritative journal *Military Thought* published four articles with the disorganization concept in the title in 2017.

Russia’s disorganization effort aims to disrupt/jam adversary C2 links, whether by soft (REB, cyber, etc.) or hard (physical destruction) means. The concept has been under discussion since at least the early 1990s.³ Disorganizing an opponent’s C2 can collapse his ability to coordinate and integrate nearly every aspect of his plans, whether it be logistic support, the use of fire support means, or his command over troops in the field. Disorganization successes lead to Russian decision-making superiority and chances of winning a conflict.

Western planners have mainly focused, for good reason, on what they see as Russian attempts to attain A2AD superiority with various types of weaponry. Missiles are usually portrayed with schematic arcs that denote their reach and thus ability to hit Western territory. The US Defense Intelligence Agency’s (DIA) 2017 document *Russia: Military Power*⁴ stated that Russian A2AD plans are accomplished using information operations (which appears closest in content to disorganization, since it focuses on information control), strategic air operations, integrated air defense systems, and modern precision strike capabilities. *The Economist*, in a January 2018 special report on “The Future of War,” published a schematic of Europe overlaid with Russian missile arcs and the legend “Russia’s anti-access/area denial capabilities.”⁵

Russian theorists consider the West to be the aggressor (while denying that their actions in Crimea and Ukraine precipitated Western reactions) and, along with the use of missiles, have developed a disorganization plan to disrupt or attack C2 nodes to slow adversary logistic support, tempo of advance, and other activities. Since Russia can be expected to employ its missiles and disorganization concept in an integrated fashion, there remains much for analysts to consider about the shape of Russia’s future war capabilities. Disorganization is a priority focus here.

Part One: Disorganizing Control: From Syria to Future War

A serious discussion is underway to define the disorganization concept, determine its goals, and establish likely targets of the C2 disorganization effort. Several articles published in 2017 offer a good description of the concept, to include a road map for its future development. However, the seeds of disorganization had been planted as far back as 1990 and interest in the concept continued in a variety of discussion forums. For example, two important military authors, S. G. Chekinov and S. A. Bogdanov, addressed disorganization in eight of their articles since 2010.

In 2015 Russia entered combat with ISIS in Syria. A year later, *Military Thought* published an article on “Disorganizing the Command and Control of Illegal Armed Groups (IAG) during

³ See, for example, A. A. Anokhin, “New Forms and Methods of Adversary Troop and Weapons Command and Control Disorganization,” *Scientific Collection*, No. 1, 1993. Further, a Russian information specialist told this author in 1996 that the key element behind information warfare was the ability to disorganize an opponent.

⁴ *Russia: Military Power*, Defense Intelligence Agency, 2017, pp. 32-34.

⁵ *The Economist Special Report*, “The Future of War,” 27 January 2018, pp. 5-6.

Counterterrorist Operations.”⁶ Russian combat experience and lessons learned in its recent wars in Chechnya indicated that blocking and annihilating illegal armed groups largely depended on the efficiency of disorganizing adversarial C2.⁷ When the IAG commander was located with the control group, zonal electronic blocking was used. When the commander was located some distance from the combat zone, both zonal and point electronic blocking were used or the annihilation of the commander was recommended using drones. The conclusion reached was that the disorganization of the function of IAG C2 bodies permitted the ability to disorient militants, demoralize them, and rapidly annihilate them.⁸ Many of the same concepts will likely be used to confront larger opponents.

In another example, this time from 2016, a Russian officer noted the following when discussing command and control disorganization, tempo of advance, and correlation of forces issues:

...the resolution of problems of creating and maintaining superiority in forces and means on operational (strategic) axes at the required level is the main thing for achieving the goal of an operation. In connection with this, disorganizing a spatially distributed system of command and control of the enemy’s operational reserve—reducing the tempo of his advance to the required level—becomes one of the key tasks...⁹

Disorganizing enemy command and control at the initial stage of combat operations, it was noted, makes it possible to accelerate the accomplishment of tasks and goals. Radio-electronic destruction and aviation assets occupy lead positions in the resolution of tasks associated with disorganizing the command and control of operational reserves. When the volume of timely information is reduced, so is command and control efficiency and decision-making. Blocking information transmission channels by 40-60 percent can decrease the correlation of forces of the advancing side twofold, for example from a 6:1 to a 3:1 advantage.¹⁰

The disorganization topic was highlighted in Russian discussions in 2017. Four articles in the journal *Military Thought* are summarized here (with titles) in the order in which they appeared.

***Military Thought* (6/17): “About the Complex Defeat of an Enemy and the Methods of its Implementation during the Disorganization of Command and Control”**

General Major S. I. Pasichnik wrote that to defeat an adversary, a major operational task is the disorganization of adversary control over its troops and weapons. The electronic and information boom of this century has offered new methods, apart from force, such as the use of

⁶ S. A. Gritsenko, L. B. Ryazantsev, O. N. Sklyarova, and I. Yu. Cherednikov, “Disorganizing the Command and Control of Illegal Armed Groups during Counterterrorist Operations,” *Military Thought*, No. 5 2016, pp. 22-27.

⁷ *Ibid.*, p. 22.

⁸ *Ibid.*, pp. 24-27.

⁹ V. I. Stuchinskii, “Methodological Approach to Assessing the Effect of Disorganizing Command and Control by Operational Reserves at the Tempo of the Enemy Advance,” *Military Thought*, No. 11 2016, pp. 43-49. The author wishes to thank Dr. Harold Orenstein for his translation of this article.

¹⁰ *Ibid.*

electromagnetic radiation weapons to disable electronic assets. These weapons will be used in concert with traditional firepower and electronic damage, such as electronic suppression.¹¹

Pasichnik believes the construction of a subgroup for “disorganizing adversary C2 bodies that should include officers who are experts in electronic and fire damage of the aggressor’s information-driven systems in operations (combat actions)” is required.¹² To efficiently disorganize an opponent’s C2, it is necessary to: compose the REB forces and assets required to defeat information-driven systems; define the tasks for electronic versus fire damage coordination; devise temporal models for comprehensive damage to specific adversary systems; and elaborate approaches to assess the comprehensive damage to these systems.¹³

Military Thought (8/17): “On the Issue of Disorganizing the Command and Control of Troops (Forces) and Weapons”

The authors of this article believe that the *Strategic Rocket Forces Military Encyclopedic Dictionary* defined the command and control of troops best:

Command and control of troops is the purposeful activities of commanders (chiefs), staffs, and other command and control organs regarding the guidance of subordinate troops by means of working out and organizing the execution of control actions (decisions) and specifying tasks to subordinates and the sequence and methods of accomplishing them, ensuring the most effective realization of the potential capabilities of troops for accomplishing assigned tasks of preparing for and conducting combat operations.¹⁴

Command and control tasks must consider assessments of information about the situation and forecasts of potential changes to troop actions, as well as controlling and analyzing the accomplishment of assigned tasks. Information, computers, means of storing information, automated C2 systems, and telecommunication systems comprise the technical basis of C2 systems.¹⁵

The authors wrote that a C2 system is the object of disorganization, leading to the following definition:

The disorganization of command and control is a process aimed at the disruption of the functioning of a command and control system or its elements, leading, in

¹¹ S. I. Pasichnik, “About the Complex Defeat of an Enemy and the Methods of its Implementation during the Disorganization of Command and Control,” *Military Thought*, No. 6 2017, pp. 38-42.

¹² *Ibid.*, p. 42.

¹³ *Ibid.*

¹⁴ Iu. E. Donskov, A. L. Morarescu, and V. V. Panasiuk “On the Issue of Disorganizing the Command and Control of Troops and Weapons,” *Military Thought*, No. 8 2017, pp. 19-20. This quote from the *Rocket Forces Encyclopedia* was on page 548 of the encyclopedia. The author wishes to thank Dr. Harold Orenstein for his translation of this article.

¹⁵ *Ibid.*, p. 20.

fact, to a state of disorganization of command and control that does not allow for the effective accomplishment of assigned tasks by troops.¹⁶

Disorganization requires an appreciable C2 breakdown. Three types were listed: collapse (enemy loses C2 of troops, and friendly effectiveness is above 0.7); disruption (disorganization only periodically lost, effectiveness is less than 0.7 but more than 0.4); and impediment (information exchanges are reduced but loss of C2 does not occur, effectiveness is more than 0.2 but less than 0.4). If the effectiveness of the disorganization is less than 0.2, then the adversary's system is still considered stable. Using these criteria, another way to measure the disorganization of enemy command and control of troops and weapons is "the totality of coordinated measures and actions aimed at the substantive reduction of the capabilities or full cessation of the functioning of his organs and technical resources for command and control of troops and weapons."¹⁷

Disorganization aims to impede C2 organs from obtaining information, or distorting said information; reducing the timeliness and quality of decisions; and impeding C2 action transmissions. The authors added that killing an opposing side's commander and his staff is the best way to assure disorganization. Disorganization targets include: decision-makers, command posts, information resources about the situation, automated C2 systems and their software, information transmission resources, and telecommunications channels. Fire destruction, REB interventions, software and hardware effects, and disinformation can cause disorganization.¹⁸

The adversary's hierarchy C2 structure also can be disorganized by "fragmentation," such as eliminating elements of the information management system. Fragmentation can be selective, paired, or group oriented using any of the methods described above. The goals of fragmentation include the physical elimination of decision-makers from the C2 process, isolating them from information, or blocking REB or information that serve decision-makers. The authors noted that there is no planning document to disorganize enemy C2, and that a disorganization plan needs to be developed for subsequent versions of regulation documents.¹⁹

Military Thought (9/17): "On the Provisions of Troop (Forces) Command and Control Disorganization Theory"

This article discussed C2 disorganization theory. A C2 systems efficiency under various forms of influence (such as electronic, fire, or electromagnetic) was examined for weaknesses and places to introduce disorganization methods. C2 disorganization can result in C2 superiority for Russian forces and the ability to influence operations. It was noted that "in the coming years gaining superiority in C2 will become the principal task of troop groups in operations."²⁰ The theory is not mature yet, the authors state, since it still requires the development of basic concepts, disorganization assets, forms and methods, a place in the military science structure, and a methodology for C2 disorganization efficiency assessment. The theory should eventually become

¹⁶ Ibid., p. 21.

¹⁷ Ibid.

¹⁸ Ibid., pp. 22-23.

¹⁹ Ibid., pp. 23-25.

²⁰ A. N. Klyushin, D. V. Kholuyenko, and V. A. Anokhin, "On the Provisions of Troop (Forces) Command and Control Disorganization Theory," *Military Thought*, No. 9 2017, pp. 65-69.

an independent part of operational art and tactics, since the C2 disorganization effort is “defined as a principal task for troops, whose performance is an indispensable prerequisite for obtaining success in carrying out other operational (tactical) tasks.”²¹ Disorganization’s goal is to reduce “or totally exclude its [C2’s] functioning according to its inherent purpose,” thereby reducing adversary C2 capabilities “of implementing controlled combat potential of troops or a military formation.”²² Disorganization efficiency can be classified as sustainable, hindered, disturbed, or undermined.²³

C2 disorganization targets are automated control systems or information-driven systems. Three disorganization methods are isolation, division, and severance.²⁴ Isolation distorts the operational (tactical) group’s interaction among elements of its operational order of battle. Division reduces strike and fire potential by distorting interactions among service arms and task forces. Severance reduces firepower or striking force by distorting the interaction inside a functionally homogeneous group of forces.²⁵

Military Thought (11/17): “Determining the Methods for Disorganizing Enemy Command and Control of Troops and Weapons”

This article discussed methods to disorganize command and control. Initially enemy actions must be clarified. A descriptive model of an enemy’s C2 is then made, examining execution elements and processes, tactical tasks, critical C2 organs in an adversary’s process, and elements of information support. The model supports a disorganization plan against specific directions that the enemy might take in executing tasks and helps in the administration of fire control guidance against enemy C2. Temporal changes in the tactical situation influence which effects are chosen.²⁶ A determination is made of the minimum number of objects to be affected by fire destruction and the use of REB. Three methods are used to “fragment” enemy C2: single (one C2 organ is selected); paired (two C2 organs selected); and group (three or more organs selected). The type of effects selected help designate the forces and means to be used. Principle disorganization methods include radio-electronic blockades of C2 organs and radio-electronic blocking of information support elements. Proper resources are then allocated to accomplish disorganization’s goals.²⁷

Part Two: REB Theory and Disorganization

REB has become a major method to deny communications and information to opponents and to disorganize them. REB Chief General-Lieutenant Yuriy Lastochkin, for example, mentioned REB’s ability to disorganize adversary troops and weapons eight times in a 2017

²¹ Ibid., p. 66.

²² Ibid.

²³ Ibid., p. 67.

²⁴ Ibid., p. 68.

²⁵ Ibid., pp. 68-69.

²⁶ P. V. Kaminsky, “Determining the Methods for Disorganizing Enemy Command and Control of Troops and Weapons,” *Military Thought*, No. 11 2017, pp. 33-34. The author wishes to thank Dr. Harold Orenstein for his translation of this article.

²⁷ Ibid., pp. 34-35.

article.²⁸ Lastochkin and two other authors described how operational art is developing in conjunction with improvements in weaponry and ways to conduct combat. Capabilities, it was noted, have always determined methods. Weapon improvements have resulted in new operational tasks for REB and allowed the force to both disorganize adversary troops and weapons and repulse aerospace attacks.²⁹ Destroying circuitry, distorting or destroying information, or simple electronic suppression all contribute to the C2 disorganization effort.³⁰

Several other REB articles in 2017 and 2018 in *Military Thought* referred to the disorganization concept but not always directly to the issue of C2. For example, REB specialists were instructed on how to confront adversary unmanned aerial vehicles (UAVs) and robots with new tasks and disorganization methods. Tasks involved organizing ground and airborne REB forces and assets along with special software to disorganize UAVs and robotic control. This requires that REB specialists understand a potential adversary's UAVs and robots, their characteristics and employment methodologies, purpose of equipment functions, control systems, REB assets, and guidance systems. Equally important is understanding Russian methods to employ such assets to disorganize adversary systems.³¹ One discussion noted that what merited scrutiny was the specific content of the "Plan of Disorganizing Adversary Troop Control."³²

REB assets are now designed to carry out the operational task of "adversary control disorganization."³³ In the past the use of fire operations and force characterized disorganization control, but now intelligent disorganization methods, such as "software impact complex weapons," have started to appear more often.³⁴ It appears that with REB's new status as an arm of the service, control disorganization can be assigned to REB forces. The rational strength and methodological support plan for a Ground Force formation's REB control bodies must be ascertained.³⁵

Another 2017 *Military Thought* article described REB use not in operational art, as Lastochkin advised, but in tactical situations. Since the information domain is now considered a key element of the military environment, C2 from the tactical to the strategic realm has become a priority target.³⁶ REB forces and assets as a Task Force "carry out operational support of the main tactical tasks performance in combat by a Ground Force formation" and these forces are intended to accomplish the following: disablement of adversary electronic assets; technical control over electronic countermeasures; countering adversary reconnaissance technical assets; camouflaging one's own troops; disorganizing adversary troops and weapon C2 systems; reducing the

²⁸ Yu. Lastochkin, Yu. Koziratsky, Yu Donskov, and A. Mororescu, "Combat Employment of EW Forces as an Element of Ground Forces Operations," *Military Thought*, No. 9 2017, pp. 18-25.

²⁹ Ibid.

³⁰ Ibid., p. 24.

³¹ S. V. Golubev, S. V. Plotnikov, and V. K. Kiryanov, "Training EW Specialists to Counter Foreign Armies' Unmanned Aerial Vehicles and Robotics," *Military Thought*, No. 4 2017, pp. 74-80.

³² Yu. L. Koziratsky, A. L. Morarescu, and P. N. Besedin, "Assessing the Efficiency of an EW Force's Command and Control in a Combined-Arms Operations," *Military Thought*, No. 2. 2017, pp. 67-71.

³³ V. V. Andreyev, O. G. Nikitin, and A. V. Marasanov, "Substantiating Ground Forces EW Control Bodies Composition," *Military Thought*, No. 6, 2017, pp. 51-54.

³⁴ Ibid., p. 52, 54.

³⁵ Ibid., p. 54.

³⁶ V. F. Lazukin, I. I. Korolyov, and V. N. Pavlov, "Basic Elements of the Tactics of Radio Electronic Warfare Troops," *Military Thought*, No. 11 2017, pp. 15-20.

application of the efficiency of adversary weaponry and electronic assets; and ensuring friendly force stability in control over one's own troops and weapons.³⁷ The main planning documents will be the "Adversary C2 Disorganization Plan" and the "REB Forces and Assets Employment Plan in Operations."³⁸

In 2018, C2 and disorganization of an adversarial force were discussed in an article that used the C2 term over 20 times and the disorganization term some 13 times. The authors stated that "superiority in C2 constitutes a component of superiority over the adversary."³⁹ Two important C2 components are the abilities to disorganize an adversary's C2 and to stabilize Russian C2.⁴⁰ C2 disorganization of an adversary is a main operational task for ground force formations in operations. Isolating an adversary from C2 information prevents him from receiving timely information support. On today's battlefield, special software and REB can disorganize decision-making, offsetting military and technological advantages by reducing the timeliness of adversarial plans and precision weaponry efficiency.⁴¹ Perhaps GPS signals are a focus of REB.

In October 2018 it was reported that electromagnetic weapons "can be regarded as a further development of electronic warfare devices. So far, they can operate at a distance of several tens of kilometers..."⁴² These ultra-high-frequency weapons disable radio-electronic and optical elements of equipment and weapons, but also disorganize control.⁴³ Another report noted that there are plans to "install electromagnetic guns on 6th-generation Russian unmanned aerial vehicles."⁴⁴

Conclusions

While Russia does not appear to have a specific A2AD concept, it has various capabilities that can accomplish that mission. The disorganization concept is perhaps a key one. It has been a part of Russian military thought for at least three decades, if not earlier, and requires immediate consideration. The disruption of an adversary's intentions and plans is the intended goal of the concept and is behind the use of many types of Russian weapons, from information operations to underwater cables⁴⁵ to (the focus of this work) command and control issues. Recent GPS interruptions near Russia's borders indicate that work on jamming GPS signals is clearly being tested.

The disorganization of command and control was stated to be a process that prevents an opponent's effective accomplishment of assigned tasks. Three types of disorganization were specified: collapse, disruption, and impediment. These "types" sometimes appear in descriptions

³⁷ Ibid., p. 16.

³⁸ Ibid., p. 20.

³⁹ Yu. Ye Donskov, A. L. Morarescu, and P. N. Besedin, "Achieving Superiority in Command and Control as the Goal of the Use of Radio-Electronic Warfare in Army Operations," *Military Thought*, No. 1 2018, p. 28-32.

⁴⁰ Ibid., p. 30.

⁴¹ Ibid., p. 31.

⁴² Oleg Bozhov, "We Have It! The Invisible Sword; Russia is Testing Electromagnetic Weapons That Burn the Insides of Enemy Missiles," *Armeyskiy Standart*, 12 October 2018.

⁴³ Ibid.

⁴⁴ No author provided, "Microwave Guns: Tests of New Weapon Have Started in the Russian Federation, Russia Has Begun Field Tests of an Electromagnetic Weapon," *Gazeta.Ru*, 1 October 2018.

⁴⁵ Unattributed report, "Secret 'Rus' Surfaces Successfully," *Argumenty Nedeli Online*, 17 December 2015.

of Russian exercises. For example, on 20 September, the Eastern Military District Press Service wrote that the Borisoglebsk-2 electronic warfare system was used to disrupt a notional enemy's system of command and control of troops.⁴⁶

In addition to types of disorganization, two articles discussed various methods and ways to disorganize an opponent by the fragmentation of one or several C2 organs: single, paired, and grouped. Together, the disorganization types and fragmentation methods compose measures aimed at the substantive reduction of the capabilities or full cessation of the functioning of an opponent's technical resources for control.

The disorganization of command and control issues is Russia's method for attaining one part of what the West would label as A2AD superiority. REB's development of a disorganization plan should be followed closely. REB superiority is not easy to achieve, since it can involve knowledge of an adversary's UAVs and robots, command and control processes, employment methodologies, equipment functions, and control systems, not to mention how to employ Russian disorganization assets.

Developing Russia's C2 capabilities remains a center of attention for Russia. Defense Minister Sergey Shoygu recently noted that new tasks for the Armed Forces' C2 systems related to informatization have increased. Automation has increased sevenfold regarding the recording, analyzing, and generalizing of data at all levels of C2. The time to exchange information between military C2 organs has been reduced 30 times, he added.⁴⁷ Meanwhile President Putin and other military officials have trumpeted many significant advances in Russian weaponry and missiles. Perhaps the disorganization concept is still maturing or perhaps it is the confidential asymmetric counter of Western weaponry to which Putin and others often allude.

The concept is worthy of immediate Western consideration as a means Russia's military may use (or is using) in various situations. Developing serious security measures and counters to Russian disorganization plans, especially as concerns command and control issues, are vitally important areas for future attention.

⁴⁶ No author provided, "Electronic Warfare Subunits of a Tank Formation and a Motorized Rifle Formation in the Eastern Military District Conduct Exercise in Which They Disrupt a Notional Enemy's System for Command and Control of Troops," *Ministry of Defense of the Russian Federation*, 20 September 2018.

⁴⁷ No author provided, "Session of the Russian Defense Ministry Collegium Held in Moscow," *Ministry of Defense of the Russian Federation*, 18 September 2018.