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Floyd D. Kennedy Jr.

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The Evolution of Soviet Thought On "Warfare In The Fourth Dimension"

Commander Floyd D. Kennedy, Jr., US Naval Reserve

A number of authors lately have expressed proper concern about the readiness of the US Navy to conduct warfare in a dimension other than the three conventional media: sea, air, and land.¹ This additional dimension, the electromagnetic spectrum, is as vital a battlefield in wartime as any of the other three, perhaps even more so. While Americans have consistently been in the forefront of the technical development of electronic warfare (EW) equipment, we have not, at the same time, been quick to exploit its operational utility across the entire spectrum of warfare. Fortunately for us, neither have the Soviets; but they are learning. Their learning process is reflected in their literature, an examination of which can generate insights into their concepts for employing EW in the future. This article will therefore trace the Soviets' perspectives on the development of naval warfare in the "fourth dimension."

In 1965, the Soviets' *Dictionary of Basic Military Terms* carried an entry for "radio warfare" (radiovoyna) that described it as a foreign concept, one not yet in the Soviet military syntax. The definition read: "Measures directed toward prohibiting or diminishing the effective use of radio-electronic facilities by the enemy, and conversely. Radio warfare includes: radio-technical reconnaissance; creation of active and passive jamming of enemy radio-electronic facilities; radio camouflage; radio misinformation; protection of organic radio-electronic facilities from enemy jamming, etc."² The majority of the measures contained in this Western concept were included under the Soviet principle of maskirovka, which can be loosely defined as camouflage, cover, and deception.³

It was not until the 1970s that the Soviets adopted a concept of electronic warfare separate and apart from their maskirovka measures. To mark its entry into their lexicon, the Soviets christened this Russified EW as radioelectronnaya bor'ba (literally, radioelectronic struggle), which they then shortened to the acronym REB. The Soviet term will be used

Commander Kennedy is a senior analyst with Ketron, Inc. and maritime editor for *National Defense* who publishes widely on US and Soviet naval and aeronautical affairs.

throughout this article when discussing Soviet usage because, although the Soviet concept of REB and the American one of EW have considerable overlap, they are not identical.

To understand the differences between REB and EW, and thus gain insights into how the Soviets intend to employ radioelectronic means in the war at sea, one must first understand the evolution of Soviet concerns regarding the employment of electronics in naval warfare. Available issues of the Soviet equivalent to the US Naval Institute *Proceedings*, *Morskoy Sbornik*, provide insights into those concerns. From the time of its initial post-World War II availability in the West (1962) until July 1970, *Morskoy Sbornik* carried not one article dedicated to any form of electronic warfare. By way of contrast, during that same period, *Morskoy Sbornik* ran thirteen articles on command, control and communications (C³), a subject of apparently great concern to the expanding Soviet Navy.

In electronic warfare the winner will be the one able to secretly develop and quickly employ the means of neutralizing the enemy's electronic means, while ensuring the stability of his own control systems.

The July 1970 *Morskoy Sbornik* article that broke the long period of Soviet literary indifference to EW as a separate element of naval warfare was a joint effort by Captain First Rank V.S. Pirumov, Engineer-Captain Third Rank A.B. Yemel'yanov and Engineer-Captain Third Rank A.P. Il'ich.⁴ None published on the subject again, but this seminal piece set the stage for a variety of authors who would later examine REB in considerable detail. As is customary for the introduction of a new subject in the Soviet military literature, this article served as a tutorial, instructing the reader in both content and importance of the radioelectronic struggle at sea.

Pirumov et al. made the point very early in their article that electronics were a key element in not only the C³ systems of all navies, a fact recognized by the more than a dozen articles on C³ that had appeared in *Morskoy Sbornik* over the preceding eight years, but they were an integral part of naval weapons systems as well—in effect, tying all naval operations to a dependence on radioelectronic means. This dependence, according to the authors, made both C³ and weapons more vulnerable to enemy action. The consequences of such a vulnerability could have strategic significance; for example, a delay in the receipt of a launch order by an American SSBN “. . . could have, if not a decisive effect, at least a very considerable effect on the outcome of the combat operations.” Therefore, combat operations at sea were unthinkable without the active employment of measures against the electronic means of the enemy, and that requirement continued to grow.

The focus of the Pirumov article was clearly on combating control mechanisms of the enemy, whether used for forces or weapons, although the authors made it clear that control was not the only element of the radioelectronic struggle. Another key element was developing electronic systems that were superior to those of the enemy, whether they were measures designed to counter enemy systems or, more importantly, radioelectronic systems that would resist enemy actions against them. Pirumov and his colleagues quoted the foreign press in conclusion: ". . . in the radioelectronic struggle the one will win who is able to secretly develop and suddenly employ more effective means and methods of neutralizing the enemy's electronic means and at the same time ensure the stability of operation of the electronic means of his own control systems." Therefore, naval REB begins with research and development and only later becomes concerned with operational issues. But an important aspect of REB is surprise.

Not quite a year later, in the May 1971 issue of *Morskoy Sbornik*, Captain First Rank V.K. Rachkov and two coauthors examined a specific element of the radioelectronic struggle, radioprotivodeystviya, an early term for radioelectronic countermeasures or, in English usage, ECM. Rachkov et al. picked up on a main theme of Pirumov's earlier piece that electronics were central to conduct of modern naval warfare, especially in the control of forces and weapons. Radioelectronic countermeasures, as a crucial and indispensable part of REB, were designed, according to the authors, ". . . for active action against the operation of the enemy's electronic means, systems, and complexes, and for their destruction."⁵ The meaning of this last passage is particularly clear in the context of the article. The 1971 Soviet view of radioelectronic countermeasures was an offensive one; they were to be used in an aggressive fashion against the enemy's means of control. Furthermore, Soviet ECM measures were not limited to the employment of electronic means. The physical destruction of enemy radioelectronic capabilities was also included in the Soviet definition of radioelectronic countermeasures.

The radioelectronic struggle at sea was not a burning issue in the pages of *Morskoy Sbornik* during the early 1970s. One 1973 article reiterated the importance of electronics to modern warfare and described how Nato navies were focusing great attention on electronic warfare, but the relative obscurity of the single author (Captain Second Rank Il'in), the brevity of the article, and its position in the back pages of *Morskoy Sbornik* tend to diminish its overall importance in the literature.⁶ It did, however, at least keep the subject alive.

A concerted effort to address the radioelectronic struggle in general began in 1975. Normally, any such effort begins with the historical background of the subject under study; REB was no exception. *Voyenno-istoricheskii Zhurnal* (Military-History Journal) ran an article, "From the History of the

Radioelectronic Struggle" in its March 1975 issue which was written by Major General of Communications Forces V. Grankin and Colonel V. Zmievskiy. The authors discussed the early applications of radioelectronic warfare in World War II and the Great Patriotic War (WW II on the Eastern Front, 1941-45), briefly touched upon the postwar period, and concluded, ". . . in the present time, radioelectronic warfare is in a new phase of its rapid development. As events have demonstrated, not one battle, not one operation of any branch of the armed forces is begun or conducted without wide application of the means and forces of radioelectronic warfare." The events to which the authors were probably referring were the successful application of electronic countermeasures by US and Israeli forces against Soviet-built equipment in the Vietnam War and 1973 Mid-East war respectively. Their message was clear: the worth of REB had been proven in combat and EW developments were moving very fast in the West; if the Soviets were not to fall behind they had best redouble their REB effort.⁷

Two specifically naval-oriented articles on the radioelectronic struggle followed in 1976, the first dealing with submarines and REB, the second with REB and naval aviation.⁸ Both articles used foreign systems as examples for discussion, and each may be considered a tutorial on the peculiar aspects of the radioelectronic struggle in its subject medium. Of particular interest was the article written by Captain First Rank M. Mikhed'ko entitled "Radioelectronic Struggle and Submarines." The author contended that of all spheres of naval combat, the underwater realm was the most dependent upon radioelectronic systems and was therefore the most effective zone for radioelectronic warfare. He cited "foreign specialists" as being particularly concerned that REB means constituted ". . . a direct threat to their so carefully and so laboriously adjusted system of ASW surveillance" The underlying basis of Mikhed'ko's article appears to have been the identification of submarine warfare as the most profitable application of REB methods and means.

In his 1976 *magnum opus*, *Sea Power of the State*, Admiral of the Fleet Sergei Gorshkov synthesized the REB discussions of those who came before him and gave his blessing to the points that were made. He wrote, quote:

All forms of naval activity are to a greater or lesser degree, of necessity, linked to the employment of electronic equipment. The trends toward the automation of the control processes of shipboard systems, weapon complexes, and ships and forces attest to the growing role of electronics in the functioning of all control and weapons systems. That is precisely why superiority in the field of development of military electronics is becoming one of the indispensable conditions for military superiority over the enemy.

However, in improving the combat capabilities of weapons and forces, electronics at the same time makes control of systems and equipment more

vulnerable to enemy action. Now it is possible to hinder control not only by destroying the control systems themselves, but also by affecting their electronic equipment, as was convincingly demonstrated in the course of the Egyptian-Israeli wars of 1967 and 1973 and the combat operations in Vietnam.

On the whole, electronics, by penetrating deeply into all spheres of operations of the armed forces, and by occupying an important place in force and weapons control systems in all units and at all levels, is assuming the role of one of the decisive factors determining the actual relative strength of the forces and equipment of the opposing sides.

This circumstance is of special significance for the navy, in whose spheres of operations electronic equipment is being employed considerably more widely and more diversely than in any other branch of the armed forces. Today the navy has in its inventory the latest electronic equipment, which is built in shipboard (including airborne) and stationary versions. It is distinguished by its great operating range, accuracy in measuring target coordinates, high reliability, and extensive automation. All of this assures high-speed analysis of observational data, issuance of target indication data and current coordinates, and selection of optimal decisions for employing forces and weaponry.⁹ Unquote.

Gorshkov did not assign priorities to the media in which the REB means were employed, as Mikhed'ko did, but instead discussed the employment of radioelectronic means in each of the media. The second edition of his book, published in 1979, repeated the same points, but replaced Gorshkov's original reference to electronic equipment being employed in the navy *more* widely than in any of the other services with the simple phrase "especially widely."¹⁰ As the most junior of five Soviet services, the navy cannot (diplomatically) do more of anything than the more senior services, except perhaps operate ships.

In 1977, available articles dealing with REB became more technical in two instances, and returned to the historical treatment in a third case. In the April *Morskoy Sbornik*, Engineer Captain Second Rank Byakin discussed foreign radar countermeasure techniques, going into great detail and calculations on means for reducing effective scatter area, active and passive jamming, and the creation of false targets. He emphasized the importance of radar by ascribing to foreign specialists the belief that ". . . in the near term radar will remain the basic means of detecting surface and air targets at sea." The tone and context of the article support the contention that that was also Byakin's and the Soviet Navy's belief.¹¹

Of the two other articles from 1977, one is notable in that it was a historical piece in *Voyenno-istoricheskii Zhurnal* which introduced to the open press Engineering Major General A.I. Paliy, who would become the most authoritative Soviet writer on REB,¹² and the second, because it was devoted exclusively to evaluating the effects of a nuclear blast on communications.

The Paliy article discussed much the same information as the 1975 Grankin piece, but Paliy was accorded the position of the lead military article while Grankin's was buried in the back of the March 1975 issue. Since both authors held the rank of Major General and the articles' contents were remarkably similar, the only apparent rationale for the disparity in placement of the two articles is the level of importance attached to the subject matter. If this is the case, REB had increased in importance markedly in the two years between the two articles.

Written by Engineering Colonel Pertsov and published in *Technika i Vooruzheniye* (Technology and Armament), the last 1977 article explored the effects of a very high-altitude nuclear burst on a variety of communications. It was apparent from the discussion that such a burst would be set off with the intent of interfering with communications and not for any other military purpose. According to Pertsov, such a burst would least affect low-frequency, short-wave communications—he was apparently recommending the adoption of such for strategic control to the Soviet High Command.¹³

Control returned to the forefront of REB concern in two 1978 articles in *Morskoy Sbornik*. The first, by Captains First Rank Charkin and Solov'yev, discussed the most important aspects of controlling forces in a naval battle. They made three specific points: first, and above all, effective control must be retained over friendly forces; second, concurrently with retaining control must come disruption of enemy control by means of electronic countermeasures (elektronnogo protivodeystviya), firepower, and nuclear weapons; third, the first strikes in a battle should be against control and communications ships.¹⁴ The authors did not specify whether nuclear weapons would be used directly against targets or as high-altitude bursts for communications disruption as discussed by Colonel Pertsov the previous year.

The second 1978 article was by Admiral V. Sysoyev, a frequent author on command and control subjects. He repeated and enlarged upon Charkin and Solov'yev's arguments, defining the main objective of REB as a whole to be leaving the enemy without control while providing stable control over friendly forces. Sysoyev went on to argue that with approximately equal combat capabilities in two opposing naval forces, the side that applied radioelectronic means to best advantage would win the battle. Since domination of the radioelectronic spectrum could not be achieved over an extended period of time, the application of countermeasures must be coordinated so that domination occurred at the most opportune moment. Targets for such countermeasures, both electronic and physical, were, according to Sysoyev, command posts (afloat, ashore, or airborne), communications systems, and situation reporting/intelligence systems.¹⁵

A third 1978 article published in *Morskoy Sbornik* dealt for the first time with the use of radioelectronic means in the antiship missile defense (ASMD) problem. The authors, Captain First Rank Rodionov and N. Novichkov, have

together published numerous articles on cruise missiles and ASMD, including a very important one on ASMD in the Falklands war which will be discussed below. This article almost seemed to be a rejoinder to those who were looking at REB solely in the context of anti-C³ measures. Rodionov and Novichkov contended that REB was a vital part of ASMD, and for evidence they pointed out that Israeli ECM by itself caused fifty Arab (Soviet-made) antiship missiles (ASM) to miss their mark in the 1973 Mid-East war; not one ASM fired against Israeli ships found its target. The authors therefore were advocating radioelectronic measures for defensive as well as offensive means.¹⁶

In late 1979, the seventh volume of *Sovetskaya Voyennaya Entsiklopedia* (Soviet Military Encyclopedia) was published containing an entry written by Major General A.I. Paliy on the radioelectronic struggle. Inasmuch as the encyclopedia is the official publication of the Soviet military, its definitions are particularly authoritative. Paliy defined REB as "... a complex of measures conducted for the purposes of reconnaissance and the subsequent radioelectronic suppression of the radioelectronic means (RES) and systems of the enemy, in addition to the radioelectronic protection (REZ) of friendly RES and systems. REB measures are conducted in conjunction with the destruction of RES" According to Paliy, REB no longer included physical destruction of enemy electronics, but was now limited to radioelectronic measures alone that were conducted alongside attacks on enemy facilities. The author went on to discuss both the offensive and defensive employment of radioelectronic means and briefly expanded upon the interrelationship of the terminology. He concluded by equating the official Soviet term, "radioelectronic struggle," to the term "radioelectronic warfare," indicating that the meanings of the Soviet and Western terms were converging.¹⁷

Paliy followed his 1979 encyclopedia entry with a 1981 book entitled *Radioelectronic Struggle: Means and Methods of Suppression and Protection of Radioelectronic Systems* in which he devoted a special chapter to naval REB. He explained that the West conducted REB to conceal ships, bases, and aircraft from detection and to protect them from damage by guided weapons, to conduct reconnaissance, and to control forces. Current developments in the West were centered on automating measures for ASMD and for reducing physical fields of ships, in particular acoustic signatures of submarines. The author concluded his discussion by describing the sequence of events associated with, first, Nato submarines employing radioelectronic means, followed by the employment of REB by Nato surface ships. It is impossible to determine from the context whether the same procedures were employed by Soviet naval forces.¹⁸

Discussions on the control of naval forces preoccupied many authors in the pages of *Morskoy Sbornik* in the second half of the 1970s and into the 1980s. Gorshkov himself published an important two-part article on the subject in

the pages of the May and June 1980 issues.¹⁹ Between 1978 and late 1982, however, no new ground was broken on the subject of the radioelectronic struggle. One article on US Navy shipboard ECM equipment appeared in April 1980, but that merely completed the trilogy of USN EW capabilities begun in the two 1976 articles on USN submarine and aircraft EW measures.²⁰

The 1982 Anglo-Argentine war over the Falkland/Malvinas Islands brought a new surge of writings on REB. From November 1982 through April 1983, no fewer than five major *Morskoy Sbornik* articles addressed the importance of radioelectronic warfare in the war in the South Atlantic or in naval combat in general. The first by Engineer-Rear Admiral G. Popov was a treatise on the multitudinous benefits provided to naval operations by electronic systems, particularly in the area of intelligence/reconnaissance. Radioelectronic means, according to Popov, permitted both the identification of air and surface attackers for defensive purposes and the determination of envelopes of defensive coverage for offensive purposes. Recent events in the South Atlantic had proven the value of such capabilities.²¹

In the same November 1982 issue of *Morskoy Sbornik*, Rear Admiral I. Uskov asserted that radioelectronic means were instrumental in ensuring the combat stability (survivability) of surface ships in conflict at sea, as proven by the Falklands campaign. He offered as proof the fact that “. . . in all cases when English ship captains promptly used passive jamming, the attacks of Argentine antiship missiles were unsuccessful, as a rule.”²² This conclusion was echoed by Captain First Rank Rodionov, Captain Second Rank Nikitin and N. Novichkov in a January 1983 article that specifically examined REB in the Falklands campaign. They dismissed the sinking of *Sheffield* as the exception that proved the rule of the importance of REB to ASMD. If *Sheffield*'s electronic surveillance equipment had been operating, according to the authors, her crew would have had 55 km (30 nm) warning of the approach of the attacking Argentine Super Etendard, and 37 km (20 nm) warning of the Exocet, more than enough time to initiate defensive measures.

Rodionov et al. then made some particularly interesting observations of cause and effect relationships that applied not only to the British experience in the Falklands, but to the current Soviet Navy as well. Since the British had no airborne early warning (AEW) inherent to their naval grouping, according to the authors, they were forced to make exceptionally wide use of REB means to combat the antiship missiles of the enemy. This experience pointed up specific improvements that should be made to the existing systems—the two most important being the adoption of automatic systems that can switch rapidly from one form of ASMD (against radar homing heads) to another (against infrared or laser homing heads), and the installation of completely automated antiaircraft missiles and guns with a high rate of fire.

The authors concluded the article with their version of the Royal Navy's own recommendations based on Falklands events. They were: equipping naval groups with AWACS aircraft; creating an AEW remotely piloted vehicle or tethered aerostat to perform the AWACS mission; improving active and passive ECM systems for countering ASMs; equipping carrier groups with long-range, highly maneuverable interceptors to keep enemy aircraft at great distances from their targets (the VTOL [sic] Sea Harrier was effective only in close-in air battle); improving VTOL aircraft's capability for intercepting low-flying targets by modifying their air intercept radars and equipping them with advanced air-to-air missiles (AAMs); developing more effective long-range, surface-to-air missiles; deploying more anti-aircraft gatling guns on ships; and improving ships' damage control capabilities.²³ Inasmuch as the Soviets have in their fleet systems similar to those of the Royal Navy, the above recommendations could apply equally to Soviet naval procurement policies. Particularly appropriate are the suggestions in regard to arming VTOL aircraft with AAMs; Forgers with AA-8 Aphids on wing hard points were observed for the first time on board *Minsk* in the Indian Ocean in December 1982. Unfortunately, Soviet improvements in radioelectronic means are less visible and therefore not as easily verified.

The focus on air defense of British electronic warfare in the Falklands was noted in a February 1983 *Morskoy Sbornik* article by Commander-in-Chief of the Soviet Baltic Fleet, Admiral I. Kapitanets. He contended that conventional weapons by themselves were proven by Falklands events to be ineffective against ASMs, and that ASMD was accomplishable only through careful integration of radioelectronic countermeasures and weapons. Kapitanets also remarked that the employment of radioelectronic countermeasures did nothing to discourage "old" aircraft delivery tactics which in turn had proven very effective. The author quoted Nato military specialists as concluding that early warning about the air threat is basic to successful defense against it.²⁴

The last article on REB reviewed for this paper was a particularly technical one by now Engineer-Captain First Rank A. Il'in, author of the 1973 article on Nato and EW, and Captain Third Rank B. Azarov. They took the radioelectronic countermeasures discussion one step further and wrote of electronic counter countermeasures (ECCM) specifically as they applied to radar jamming. The article broke no new ground but was instead a simple review of the measures taken by Western powers to protect their radar systems from jamming. Unlike the previous articles of late 1982 and 1983, no attempt was made to relate the lessons of the Falklands to the discussion.²⁵

From 1965 to the present, the Soviet perspective on the radioelectronic struggle has obviously changed considerably. No longer are means for REB considered simply as an extension of maskirovka. The priority of offensive employment of REB means has apparently yielded, at least in the literature,

to the overwhelming importance of defensive employment, particularly against antiship missiles. And the rather blunt expedient of destroying an enemy's electronic means seems now to be accompanied by more sophisticated radioelectronic countermeasures as part of an overall, multifaceted radioelectronic battle. Even the terminology of Soviet REB and Western EW seems to be converging.

Some basic principles of the Soviet perspective on the radioelectronic struggle stand out and warrant emphasis in conclusion. While physical destruction of enemy systems may no longer be a category of REB, it will most certainly be attempted if feasible, in company with offensive radioelectronic countermeasures. True to the Soviet concept of massing, REB measures will be "massed" to ensure dominance of the electromagnetic spectrum at the most opportune time for accomplishment of the mission. Similarly, surprise will be employed in REB whenever possible, most likely by using equipment, frequencies, and/or tactics not before seen by the enemy. Soviet employment of very high altitude bursts of nuclear weapons to interfere with C³ should be expected.

If the literature is any indication, the West can expect to see larger numbers of automatic ASMD gatling-type guns on Soviet ships and considerable improvements in both passive detection means and active ASMD countermeasures in the near future. Also, Rodionov and Novichkov have for many years been advocating the development of airborne early warning capabilities that would be organic to Soviet naval groupings, whether airplane, helicopter, or airship based; the Falklands War has proven the validity of their arguments. The results may be a new Soviet AEW capability by the end of the 1980s.

It is clear from the literature that the radioelectronic struggle is the focus of Soviet naval attention for the mid-1980s. The United States and Nato must therefore be prepared for considerable Soviet strides in naval electronic warfare.

Notes

1. For example, G. Guy Thomas, "Warfare in the Fourth Dimension Is the Navy Ready for it? How Can the Navy Prepare for It?" *Naval War College Review*, January-February 1983, pp. 16-23; Christian Eliot, "Trends in Electronics in Warfare," *NATO's Sixteen Nations*, April-May 1983, p. 62; "The Falklands Experience: Electronic Warfare," *Navy International*, June 1983, pp. 373-378; Stefano Silvestri, "The New Electronic Warfare," *World Press Review*, January 1983, pp. 36-37; and James Preeze, "Exocet Threatens the Navy's Position," *Military Electronics/Countermeasures*, March 1983, pp. 65-67.

2. *Dictionary of Basic Military Terms: A Soviet View* (Translated by the DGIS Multilingual Section, Translation Bureau, Secretary of State Department, Ottawa, Canada), (Washington: U.S. Govt. Print. Off., 1976, SN 008-070-00360-1), pp. 181-182.

3. See Floyd D. Kennedy, Jr., "Maskirovka: A Pervasive Element of Soviet Naval Doctrine," *Fleet Antisurveillance Tactics Digest*, December 1982, pp. 2-8.

4. V.S. Pirumov, A.B. Yemel'yanov and A.P. Il'ich, "Radioelectronic Struggle in War at Sea," *Morskoy Sbornik*, July 1970, pp. 46-49.

5. V.K. Rachkov, M.S. Mikhed'ko, and D.M. Makarov, "Development of Radioelectronic Countermeasures in Naval Warfare," *Morskoy Sbornik*, May 1971, pp. 27-31.

6. A. Il'in, "How NATO Naval Forces are Preparing for Electronic Warfare," *Morskoy Sbornik*, March 1973, pp. 75-77.
7. V. Grankin and V. Zmierskiy, "From the History of the Radioelectronic Struggle," *Voyenno-istoricheskii Zhurnal*, March 1975, pp. 82-88.
8. M. Mikhed'ko, "Radioelectronic Struggle and the Submarine," *Morskoy Sbornik*, January 1976, pp. 90-94; V. Grisenko, "Naval Air Power and the Radioelectronic Struggle," *Morskoy Sbornik*, June 1976, pp. 99-105.
9. Sergei G. Gorshkov, *Sea Power of the State* (Moscow: Voenizdat, 1976), pp. 339-340.
10. Sergei G. Gorshkov, *Sea Power of the State*, 2nd ed. (Moscow: Voenizdat, 1979), p. 301.
11. G. Byakin, "Radar Countermeasures Abroad," *Morskoy Sbornik*, April 1977, pp. 79-83.
12. A.I. Paliy, "Radioelectronic Struggle During the (Great Patriotic) War," *Voyenno-istoricheskii Zhurnal*, May 1977, pp. 10-19.
13. Pertsov, "The Effect of a Nuclear Burst on Communications," *Tekhnika i Vooruzheniye*, July 1977, p. 14.
14. V. Char'kin and V. Solov'yev, "Controlling a Force in a Naval Battle," *Morskoy Sbornik*, January 1978, pp. 22-26.
15. V. Sysoyev, "Evolution of Force Control," *Morskoy Sbornik*, February 1978, pp. 53-59.
16. B. Rodionov and N. Novichkov, "Is the Missile Defense Problem Solvable?" *Morskoy Sbornik*, May 1978, pp. 96-103.
17. A.I. Paliy, "Radioelectronic Struggle," *Sovetskaya Voyennaya Entsiklopediya*, v. 7 (Moscow: Voenizdat, 1979), pp. 29-30.
18. A.I. Paliy, *Radioelectronic Struggle: Means and Methods of Suppression and Protection of Radioelectronic Systems* (Moscow: Voenizdat, 1981), pp. 272-280.
19. For a discussion of the issues debated in Soviet articles on control of naval forces in maritime theaters of operations see Floyd D. Kennedy, Jr., "Soviet Doctrine for Mutual Cooperation: the Naval/Air Force Context," *Naval Intelligence Quarterly*, December 1981, pp. 9-32.
20. V. Grisenko, "Shipboard ECM Equipment in the U.S. Navy," *Morskoy Sbornik*, April 1980, pp. 78-82.
21. G. Popov, "The Role of Electronic Systems in the Activities of Navy Forces," *Morskoy Sbornik*, November 1982, pp. 75-77.
22. I. Uskov, "Lessons of the Anglo-Argentine Conflict and the Role of Surface Ships in Conflict at Sea," *Morskoy Sbornik*, November 1982, pp. 87-92.
23. B. Rodionov, Ye. Nikitin, and N. Novichkov, "Radioelectronic Warfare in the South Atlantic," *Morskoy Sbornik*, January 1983, pp. 77-85.
24. I. Kapitanets, "The Navy's Role in the Anglo-Argentine Conflict," *Morskoy Sbornik*, February 1983, pp. 14-20.
25. A. Il'in and B. Azarov, "Protection From Radar Jamming," *Morskoy Sbornik*, April 1983, pp. 65-68.

