

# Управління в складних системах

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## TO QUESTION OF DEVELOPMENT OF RADIO ELECTRONIC FIGHT IN THE ARMED CONFLICTS OF CONTEMPORANEITY

*The analysis of progress of radio electronic fight, newest control the system by troops (by forces) and weapon of leading countries of the world trends is conducted in the article. The basic stages of development of radio electronic fight are resulted, what characteristic for Military Powers of all of the world states, including Ukraine.*

**Keywords:** *informative safety, radio electronic fight, priv, hertzian wave, electromagnetic compatibility.*

### Introduction

One of major lines of сьогодення there is active transformation of all of spheres of conduct of the armed fight. Soldierly specialists [1] much attention spare the questions of conquest of advantage on earth, pestilence, air and space, but at the same time forget about another space – electromagnetic, without domination in which it is impossible to attain advantage in a management troops (by forces) and weapon in war of the future.

Leading position in providing of advantage in a management troops (by forces) and weapon a radio-electronic fight (REF) [2, 3] which presently occupies in modern operations (battle actions), as never, needs native alteration of ideology of conduct, careful, scientifically grounded revision of ramshackle conceptions and stereotypes taking into account world progress of this specific type of the armed fight trends.

Therefore purpose of this article – to analyse world progress of radio electronic fight trends and form the basic stages and its progress trends.

### Basic part

Beginning from the first steps and for a present tense, a radio electronic fight in a world theory and practice of the armed fight passed the way of both evolutionary and revolutionary changes in the development. The stages of development of radio electronic fight are characteristic for military powers of all of the states and they can be traced, coming from such high-quality index, as a role of EW in the system of the armed fight, thus, examining this index in two aspects – to military and technical.

On the basis of such approach in development of radio electronic fight it is possible to select three basic stages [1, 4].

The first stage engulfs a period from Second world war to beginning of war in Vietnam. Him basic lines is:

– from the point of view of technical point of view, it is the use of facilities of obstacles against communication and radio-location means with the purpose of to complicate their application;

– from the military point of view, as a rule, it is a tactical reception with the limited scales of application at times and in space.

Basic maintenance of this stage of development of radio electronic fight in world practice was expansion of arsenal of facilities of REF and improvement of them тактико-технічних descriptions.

The second stage engulfs a period from 1964 to 1991 year. A radio electronic fight becomes one of basic types of the operative (battle) providing.

Main achievement of the stage is high-quality transformation as a military aspect – transformation of radio electronic fight in the independent type of the operative (battle) providing with expansion to strategic, operative, tactical scales, so technical is creation of the automated complexes and systems of REF.

The third stage was begun with 1991 year and lasts for a present tense and already brought a number of revolutionary transformations to industry of REF. Specify basic from them [1, 2].

1. First in practice of the armed fight within the limits of operation „Storm in the desert” (on January, 17 – on March, 1 1991p.) was conducted operation of REF [5].

It was directed on disorganization of state and military administration of opponent, small for the purpose of achievement of complete advantage in a management troops (by forces) and weapon, as one of basic components of the armed fight on the modern stage. Application of airplanes of REF was carried out

from the areas of баражування, located out of air space of Iraq and reach of his facilities of air defense, and also directly from the battle-orders of striking forces. Pays attention on itself circumstance that the producers of obstacles were used it is massed, making to 50% facilities of air attack in the echelon of подавлення of air defense. First for the decision of tasks disorganization of management of opponent an electromagnetic weapon (4...8 winged-rockets are with electromagnetic war-heads) is applied, the concept of „weapon of REF of functional defeat appeared”.

2. During battle actions in the area of the Persian bay by military powers of the USA first in world practice for implementation of tasks of REF (defeat radars systems of air defense of Iraq) the shock helicopters of AN-64 „Apache” are applied. In May, 2004 this approach is successfully approved in air space of German federal republic within the framework of leadthrough of studies of VPS of German federal republic of „Elite – 2004” (took part also subsections of VPS of Great Britain, Greece, Spain, Netherlands, Norway, Slovenia, USA, Turkey, France, Austria, Switzerland and Sweden ). The feature of studies of „Elite-2004” was become by the first application of shock helicopters of land-forces of German federal republic for implementation of tasks of REF.

3. Operation „Interallied force” (on March, 24 – on June, 10 1999p.) gave a shove intensive development of not only reconnaissance and shock unmanned aerial vehicles (UAV) but also UAV of radio electronic fight. Electromagnetic bombs are actively inculcated in practice of REF. First researches of their influence on an armament and military technique, a personnel is conducted during an operation „Storm in the desert”. Action „ electronic” or „electromagnetic” bombs look like striking the action of electromagnetic impulse of nuclear explosion. An electromagnetic impulse is created by them incapacitates the electronic systems and complexes, computers, radio engineering systems of secret service and connection, control the system, and also electronic components of all of types of weapon.

A radio electronic impulse is able to get to the underground bunkers and incapacitate stationary communication and management networks. Unlike traditional facilities of radio electronic подавлення, which is on the armament of armies of entire leading countries of the world, a new electronic weapon is able to strike the eliminated electronic systems.

4. During the leadthrough of operation „Shock and trembling” (on March, 20 – on April, 14 2003p.) a radio electronic fight was planned and conducted as the special operation for disorganizations of management troops (by forces) and weapon of Iraq. on March, 26, 2003 by military powers of the USA experimental electromagnetic bombs were applied in Iraq. As a re-

sult were put out of action satellite television centre in Baghdad and radar system of air defense of Iraq.

The detailed military-scientific analysis of local wars and armed conflicts after Second world war allowed to formulate next basic progress of maintenance, forms, methods and facilities of radio electronic fight trends in wars of sixth, seventh generations.

**1 tendency.** The role of REF in achievement of purpose of the armed fight grows constantly. It is related to that the role of REF is straight proportional rigging of military powers by radio electronic facilities, and the basic source of development and transformation of REF is constantly existent contradiction between perfection of control the system by troops (by forces) and weapon of all of levels and possibility of forces and facilities of REF in relation to the decision of the tasks fixed on them [4].

**2 tendencies.** A radio electronic fight appears not so much as a type of the operative (battle) providing, how a specific form of battle actions. These actions is gaining the end of advantage in efficiency of management troops (by forces) and weapon. The model example of awareness of this progress of REF trend in the world is active work of defensive departments of the USA, Russia and China in relation to creation and perfection of separate sort of troops – troops of REF. Unfortunately, in Military Powers of Ukraine this question does not even come into a question, opposite, parts and subsections of REF are actively abbreviated.

REF also grows into the constituent of informative fight which is conducted in specific electromagnetic space and has for a purpose achievement of domination in this space. Transformation of REF is carried out in the independent form of operational-strategic actions – transition from single (separate) radio electronic influences, that was characteristically for the first stage of development of REF, to the massed electronic attacks and operation of REF. Develop and inculcated in practice of battle actions the new combined forms and methods of conduct of REF and fire defeat: radio-fire blow, radio electronic - striking blow, operation of REF. Forces and facilities of REF are engaged in the decision of tasks of operative and operational-strategic levels.

**3 tendencies.** The relative amount of forces and facilities of REF is increased in operations. Yes, in Arab-Israeli war of 1973 relative weight of forces of REF was 4%, in an operation „Storm in the desert” already 9%, and in the echelon of подавлення of air defense in the first massed aviation blow it was involved to 50% airplanes of REF. Thus the general amount of forces of REF in military powers of leading countries of the world remains stable at the level of approximately 2%. [3, 4].

**4 tendencies.** Distribution of scales of radio electronic fight, gradual distribution of REF on space, applica-

tion of the space systems for organization and conduct of REF on earth, in mid air, at the seaside and in space which grounds to characterize the actions of REF as global.

**5 tendency.** Increase of role of REF at implementation of tasks soldiery formings of tactical link. This tendency swims out from experience of application of soldiery contingents of different countries of the world,

in thereby Ukraine, during international peacemaking operations. It is related to the necessity of fight against the radio guided weapon, application of which against peacemaking contingents purchased the massed character. In particular, for the decision of such tasks the small technique of REF (fig. 1), which is built on a modularity, is actively used.

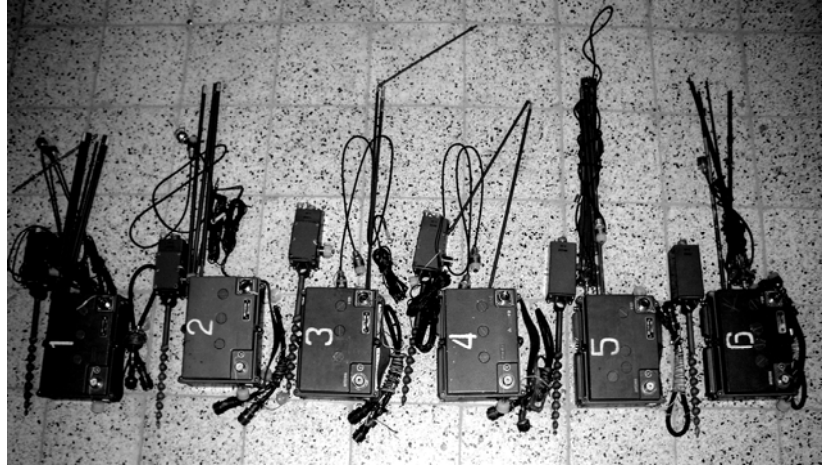


Fig. 1. Small technique of radio electronic fight

**6 tendency.** Integration of forces and facilities of REF is with facilities of secret service and fire defeat at combined radio-fire inflictions blows (prime example to it is war in the area of the Persian bay in 1991) [5]. The degree of automation of processes of secret service and радіоподавлення rises sharply, the methods of artificial intelligence are used the components of complexes of REF are utilized in control the system, system of radio electronic secret service by the complexes of REF in quality informative. The USA has creation and permanent modernization the example of such approach to ACE by forces and fa-

cilities of secret service and REF «ACAC», computer-integrated system of secret service and REF «WULFPAK».

**7 tendency.** Passing ahead development of facilities of REF is marked taking into account the prognoses of development of military radio electronics, but not only reacting, on development of radio electronic facilities of opponent.

Battle possibilities of forces and facilities of REF rise due to expansion of range of workings frequencies, подавлення, and powers of подавлення is conducted in which (fig. 2).

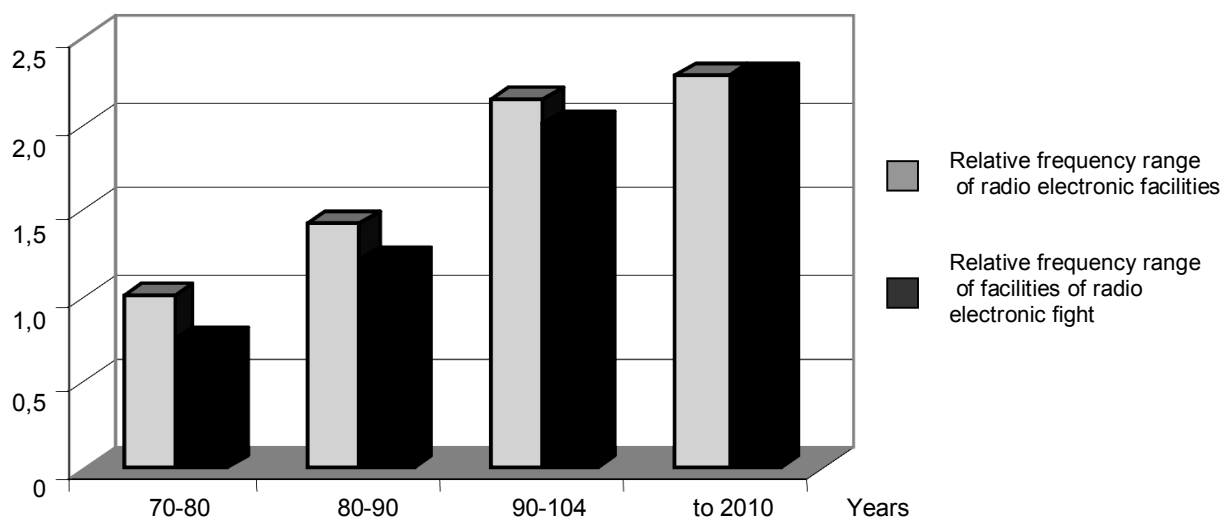


Fig. 2. Growth of ceiling of frequency range facilities of radio electronic fight

The complexes of REF are developed with a high degree adaptations, capable automatically real-time to

estimate a radio electronic situation and carry out the choice of optimum influence on radio electronic facilities.

**8 tendency.** Large attention is spared безпілотним aircrafts as facilities of radio electronic fight. Lately large interest of soldiery appears to small, including miniature безпілотних aircrafts-transmitters of obstacles for application in operatively tactical and tactical links.

**9 tendency.** Active development was purchased by the methods of introduction of destructive programmatic facilities (programmatic computer weapon of REF) on a radio channel for the decision of tasks management disorganization by influence on the newest telecommunication systems of opponent. Thus, a programmatic computer weapon after the properties can look closely as an analogue of high-fidelity weapon (HFW) in informative space. A new constituent is formed RAP is programmatic computer suppression;

**10 tendency.** An increase of role of facilities of REF is in a fight against the HFW of opponent. Facilities of REF can be utilized for creation of obstacles both the heads of aiming of winged-rockets and systems of space navigation as GPS. It is impossible to consider that facilities of REF in full will decide the question of complete derangement of implementation of tasks a high-fidelity weapon, but on the modern stage of development they become substantial addition of fire weapons of defeat [5].

### Conclusion

Thus, the analysis of progress of REF, newest control the system by troops (by forces) and weapon of leading countries of the world trends specifies on the necessity of revision of the traditional going near the conduct of REF in the armed fight of contemporaneity and future. Therefore for Military Powers of Ukraine sharply the problem of leading to of the state and level of development of REF appears to the requirements of wars of the future taking into account the necessity of asymmetric and passing ahead character of development of technique of REF in the world.

Basic directions of decision of this problem in Military Powers of Ukraine is:

creation at state level of terms is for development of scientific base and development of complexes and facilities of REF;

stimulation of development of domestic scientific potential and proper industrial base is in industry of development of the newest standards of weapon of REF and protecting from the analogical weapon of control the system all of levels;

conditioning is for development and production in Ukraine of безпілотних aircrafts with the apparatus of REF;

conditioning is for development of theory of conduct of REF in the operations (battle actions) of the future (in a that number peacemaking and counterterrorist).

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### К ВОПРОСУ РАЗВИТИЯ РАДИОЭЛЕКТРОННОЙ БОРЬБЫ В ВООРУЖЕННЫХ КОНФЛИКТАХ СОВРЕМЕННОСТИ

В.Д. Карлов, Е.В. Лукашук, О.В. Бесова

*В статье проанализированы тенденции развития радиоэлектронной борьбы, современных систем управления войсками (силами) и оружием ведущих стран мира. Приведены основные этапы развития радиоэлектронной борьбы, которые характерны для Вооруженных Сил мировых стран, в том числе и Украины.*

**Ключевые слова:** информационная безопасность, радиоэлектронная борьба, защита информации, электромагнитная волна, электромагнитная совместимость/

### ДО ПИТАННЯ РОЗВИТКУ РАДІОЕЛЕКТРОННОЇ БОРОТЬБИ В ЗБРОЙНИХ КОНФЛІКТАХ СУЧАСНОСТІ

В.Д. Карлов, О.В. Лукашук, О.В. Бесова

*У статті проаналізовано тенденції розвитку радіоелектронної боротьби, сучасних систем управління військами (силами) та зброєю провідних країн світу. Наведено основні етапи розвитку радіоелектронної боротьби, які характерні для Збройних Сил світових країн, у тому числі і України.*

**Ключові слова:** інформаційна безпека, радіоелектронна боротьба, захист інформації, електромагнітна хвиля, електромагнітна сумісність/