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Technologies of information and psychological influence on people in modern wars

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Abstract. The article analyzes trends in the development of methods and means of information-psychological warfare in the world and in Russia. The types, principles of operation and features of the use of information and psychological weapons, as well as the technical means and technologies on which they rely, are considered. Information is provided on existing models of information-psychological weapons and examples of their use by different countries. The possibility of Russia using information and psychological weapons against the defense forces and citizens of Ukraine is considered as a real threat to the national security of the state. The risks of transformation of the consciousness and subconscious of the population under the influence of information and

psychological weapons are analyzed. The mechanisms of influence of television and the Internet on human consciousness are indicated, as well as the principles of their use by the enemy during psychological operations against Ukraine. The need for Ukraine to take preventive measures to protect military personnel and citizens of Ukraine from the effects of information and psychological weapons is pointed out.

Keywords: information and psychological warfare, information and psychological weapons, psychophysical influence, psychological operation, psychometrics, Big Data, psychoprobing, neurolinguistic programming, artificial intelligence, conscious warfare, laser weapons, acoustic weapons.

Introduction

In modern wars, the role of non-lethal types of weapons based on technologies of psychophysical influence on a person, the so-called information and psychological weapons (IPWep), is increasing. Such technologies can be implemented in various ways, including through the use of mass media and social networks, electromagnetic radiation of various types (laser, light, radio frequency) and mechanical (acoustic) waves.

It should be understood that identifying cases of the enemy's use of informational and psychological weapons and taking appropriate countermeasures requires special equipment, appropriate software (in particular, using AI) and trained specialists. At the same time, artificial intelligence (AI) technologies can be used both for the formation and for the purpose of detecting the psychophysical impact on a person.

IPsS has an informational and psychological impact both on an individual person and on large groups of people, or on the vast majority of the population of the affected country (victim country). The main means of influence are mass media (printed materials, television, radio, Internet, social networks) (Makarenko, 2017), (Anisimovych-Shevchuk, 2022), (Kopan,2016), (Vorobyova, 2010), (Volkogonov, 1983), (Smirnov, 2013).

A state that conducts information and psychological warfare (IPW) forms its policy of influence on information and information resources. This policy is aimed at the population and armed forces of the victim country, its own population, as well as at the public consciousness of the international community.

Psychophysical influence is one of the important tools of IPWep. Technical means and technologies that can be used for psychophysical influence include (Makarenko, 2017):

- generators of electromagnetic radiation;
- infrasound and ultrasound generators;
- laser and light emitters;
- computer technologies for the use of large databases (Big Data), AI, virtual reality.

Psychophysical weapons include means of transmission:

- subconscious acoustic information;
- subconscious visual information;
- subconscious combined information.

Subliminal combined information is transmitted through technical means and methods:

- visual and acoustic information;
- neurolinguistic programming;
- training effects on groups of people.

The use of informational and psychological weapons and their countermeasures require knowledge of the methods and mechanisms of their action. Therefore, the task of analyzing and summarizing the methods and mechanisms of action of these types of weapons is urgent.

The purpose of the work: analysis of the state and trends in the development of methods and

means of information and psychological warfare in the world and Russia using:

- information and psychological weapons;
- computer technology as a weapon;
- psychophysical weapons;
- methods of using AI for informational, psychological and psychophysical influence.

Methodological Framework

1. Information and psychological warfare.

Informational and psychological warfare is understood as intentions, efforts, planned psychological operations, applied with the help of methods of propaganda, disinformation, manipulation to a certain audience in order to influence its consciousness, will, emotions, motives, objective judgments (Makarenko, 2017), (Kopan,2016), (Vorobyova, 2010).

The main goals of IPW are usually (Smirnov, 2013), (Pocheptsov, 2002), (Mukhametov, 2010):

- ensuring decision-making and encouraging the authorities of the victim country to take actions that would satisfy the needs of the aggressor country;
- undermining the legitimacy of the political power and international authority of the victim country;
- destabilization of the situation in the victim country, provoking political protests, social conflicts, undermining the moral and psychological state of the population of the victim country;
- undermining the defense capability of the victim country and the combat capability of its armed forces;
- supporting the actions of internal forces aimed at destroying or harming one's state, including by corrupting the authorities and political elite;
- replacement of the socio-cultural identity of the entire population or its part in the victim country, change of national values and foundations of state formation.

As shown in works (Zorina, 2016), (Karyakin, 2014), (Yudin, 2021), (Biloborodov, 2022), the main forms of IPW are:

- psychological operations against the top leadership, population and troops of the victim country;
- public diplomacy, which is the main means of implementing the so-called "soft power" and consists of foreign policy information, scientific and educational exchanges, programs in the field of culture and other forms of humanitarian cooperation;
- foreign policy propaganda aimed at the dissemination of views, ideas and theories for the formation of citizens of the worldview set by the leadership of the aggressor country, concepts that reflect the interests of the subject of propaganda - the aggressor country and stimulate appropriate practical actions;
- special secret psychological operations that stimulate political and social destabilization in the victim country.

Psychological operations. Psychological operations against the top leadership of the state, the population, and the armed forces are based on destabilization technologies and methods of destroying legitimate power (Akhmadullin, 2007). These technologies are used by mass media (mass media), which in one way or another depend on the enemy. Such mass media turn into information and psychological weapons and carry out the enemy's orders, manipulate people's consciousness, deliberately fabricate messages that distort real social reality (Aronson, 2003).

The basis of political destabilization is the simultaneous actions of the centers of generation of appropriate content for all types of mass media with Internet resources located outside the state, the so-called "fifth column" and corrupt high-ranking officials. As a rule, this content is directed to the audience using all the listed technologies of information warfare.

The IPW scheme is quite simple and consists of the following:

- development of predetermined content;
- organization of content delivery channels;
- engaging the audience of viewers, listeners and readers.

TV. Television, which combines video and audio channels of information perception, has an extremely powerful effect on human consciousness. When watching television, people perceive events as happening before their eyes, as if they were witnessing the events, which gives them credibility. The term "zombie fighter" describes it very accurately. People under the influence of television often behave like zombies, obediently carrying out the programs laid down by the authors of hostile propaganda.

In order to present the materials programmed by the aggressor country, programs are created that are understandable in terms of content and do not require intellectual tension, while at the same time stirring emotions. The predominance of emotions over the mind is a feature of the standard behavior of an unconscious person who is not familiar with the psychotechnologies of influencing the human mind.

In media manipulation, the content customer uses factors (Aronson, 2003):

- short memory of a person;
- there is no objectivity for people if they are personally involved in a conflict that threatens their interests and values;
- in order to understand a phenomenon, a person needs to have the name of this phenomenon, and the name in a hidden form explains and programs the reaction to it. Through words and concepts, a picture of the world is created, and with media manipulation, this picture is deliberately distorted.

To ensure media manipulation, the main methods of information dissemination are fragmentation and immediacy. Fragmentation (shredding, localization) is the dominant method of information dissemination. Immediacy (reporting directly from the scene of events) is currently one of the main principles of journalism. A false sense of urgency leads to the loss of the ability to distinguish information according to the degree of importance. The mental process of sorting, which under normal conditions contributes to the understanding of information, is not able, in conditions of time shortage, to perform this function. Concentration of attention on the events taking place at the moment destroys the necessary connection with the past, prevents the full picture of the event from being understood.

That is why one of the tasks of the state media policy should be a qualified analysis of the content of television content and the adoption of appropriate response measures.

Internet. The Internet is a relatively new tool of social engineering, which radically changes the cognitive balance of a modern person. You can instantly find the information you need on the Internet, despite the fact that the average citizen usually does not think about whether this information is true. Content generators on the Internet use the traditional trust of a person in the printed word, even if this word is not in a book, but on a computer screen.

According to the conclusions of the Global Digital report, in 2023, 5.16 billion people were Internet users. This means that 64.4% of the world's population has access to the Internet (Global Digital, 2023).

Despite the fact that there are system centers of content generation on the Internet, users of the Internet and social networks believe that the content is created by ordinary users like them, therefore they trust this content and are not inclined to check the authenticity of news and facts given on the networks.

In Ukraine, according to a USAID-Internews study, 92% of Ukrainians cannot distinguish fakes from the truth (Omelianenko, 2020). The lack of critical thinking and the availability of so much information makes people vulnerable to the imposition of views and values by other people and states.

In order to preserve the conscious attitude of the citizens of Ukraine to the content on the Internet and the formation of a statesman's position in them, it is necessary to strengthen the

information policy in Ukraine and take measures to protect its citizens from hostile narratives.

Computer technology as an informational and psychological weapon. Psychometrics and Big Data. Psychometrics, or psychometrics (from the Greek psyche - soul and metron - measure), is the field of knowledge of the theory and practice of measuring phenomena in the field of psychology. This is an applied branch of psychology, which is aimed at the development of measurement procedures (tests, questionnaires, questionnaires, projective methods). This is a branch of science about such properties of psychological tests as the type of measurement scales, reliability, validity, discriminability, internal consistency, etc.

The purpose of psychometric measurement is to establish the individual psychological differences of an individual by comparing his indicators with the indicators of other people. This makes it possible to explain the behavior and predict the development of the individual (Glushko, 1994).

Before the cybernetization of society, in world practice, the results of psychometric research conducted by means of questionnaires were used to determine the psychological properties of a person. After the research, a psychometric portrait (profile) of a person was compiled, based on which a person's behavior in extreme conditions, in a team, career growth, etc. was predicted.

Of course, understanding how a person will react to certain stimuli provides a rich set of tools for manipulating a person.

The development of the Internet, computer databases and social networks gave access to information about a person without his consent.

The paradox of the situation is that the author of modern approaches to psychometrics and Big Data is a person (Michal Kosinski), who warned many times about the huge risks of uncontrolled use of psychometric technologies for processing large sets of data about people (Kosinski, 2015). In some ways, this story is reminiscent of the creators of the hydrogen bomb, who created the most powerful weapon to destroy humanity, and then began to advocate for its ban.

American scientist, Stanford University professor Michal Kosinski, a Pole by origin, one of the world's leading scientists in the field of psychometrics and Big Data, proved back in 2012 that the analysis of 68 likes on Facebook is sufficient with a probability of 95 percent to determine skin color. with a probability of 88 percent - homosexuality, with a probability of 85 percent - for which party a person will vote in the elections. Belonging to a certain religion, parental divorce, addiction to alcohol or drugs were also taken into account. Kozinsky claimed that after analyzing 150 likes, he will know a person better than his parents (The Insider, 2016).

Using the methods of M. Kozinsky, the consulting company Cambridge Analytica has developed a model that allows you to assess the personality of every adult US citizen according to certain parameters, as well as to influence their behavior.

The Cambridge Analytics company in D. Trump's previous election campaign divided the country's population into 32 personality types. Personal messages were prepared for each type of personality, based on the analysis of specialists (Kosinski, 2015), (The Insider, 2016), this technology played one of the decisive roles in the voting results. Similar approaches were used when voting for the exit of Great Britain from the European Union (Brexit) and in the election campaign of the President of France (The Insider, 2016), (Madanapalle, 2017), (Grassegger, 2017).

Based on the use of similar technologies in the Russian Federation, the Social Data Hub company was established in 2014, which offers its solutions to advertising agencies, analysts, banks, marketing specialists in social networks, politicians and other consumers. Another company of the same founder, Fubutech, "helps officials look for dissidents, cooperates with large corporations" (Pisarev, 2017).

Neurolinguistic programming. The KGB of the USSR, and today the special services and the military of the Russian Federation, together with scientists and political technologists, developed and are developing methods of changing people's behavior by forming their given programs. One of the

most effective methods is neuro-linguistic programming (NLP). NLP is an influence on people's thoughts at the conscious and subconscious levels, aimed at changing behavior by forming predetermined behavioral programs in a "disguised" verbal and linguistic form, including hypnosis techniques and technical means of information influence (Mikhailov, 2002), (Makarenkov, 2019).

Psychotechnologies of psychoprobing (psychodiagnosis), psychocorrection and NLP are a fundamentally new direction in science, which allows non-pharmacological diagnosis and correction of a person's psychophysiological state by accessing semantic memory (subconscious).

Conscientious war. The development of methods of influencing human consciousness and social consciousness led to the formation of even more sophisticated theories and technologies of IPW, which are the basis of the so-called "conscientious war".

According to the publication (Zadorozhny, 2021), "conscientious war is a war on the destruction of consciousness. At the heart of such destruction lies the destruction of a person's ability to freely identify who a person wants to become and within the limits of which cultural and historical tradition."

Since 2015, Ukrainian scientists and political scientists in their publications (Yudin, 2021), (Biloborodov, 2022), (Kolodiy, 2015), (Vashchenko, 2020), (Mulyava, 2021), (Shumka, 2022), (Ostapenko, 2022) predicted the destructive consequences of Russian-oriented mass media in the information space of Ukraine. It was these mass media that waged a war aimed at the destruction of consciousness.

Therefore, for a long time, the world and the citizens of Ukraine were forced to impose the "Russian peace" and the Russian Orthodox Church, which, as evidenced by criminal cases against its hierarchs in Ukraine, often acted as agents of an enemy country.

Consciousness war, in contrast to overt military actions, is not aimed at capturing foreign territories, but is aimed at capturing the consciousness of people who live in these territories.

The experience of Russia's aggression against Ukraine proved that a war of conscience can be used before the start of open aggression, both with the aim of making another country an obedient puppet of the aggressor country, and to shake the mood of the population of the victim country, aimed at destabilizing society and forming a "fifth column ".

Thus, media manipulation technologies on television, influence on people's behavior through social networks, use of a person's psychological profile as a result of psychoanalysis and Big Data information to control human behavior - all these are manifestations of informational and psychological weapons.

2. The use of Russian AI in information and psychological warfare.

AI is increasingly being used in the information and psychological warfare waged by Russia.

As stated in (Oracle, 2023), "AI is the ability of artificial intelligent systems to perform creative functions that were traditionally considered the prerogative of man, the development of science and technology for the creation of intelligent machines, especially intelligent computer systems."

The use of AI in PSV is based on the ability of the system during self-learning to create programs for solving PSV tasks (Google, 2024). Generative AI (Google, 2024), (Infobae, 2022), (Malevskaya, 2023) is crucial for content creation, which in the process of learning and processing information creates new content, both textual, audio and visual.

Generative AI can talk, write software codes, create images from scratch, describe videos, and create personalized content, chatbots, virtual assistants, and more. Generative AI is primarily a type of machine learning model, it does not have emotions and does not think independently, but it is able to find patterns effectively.

It is precisely these capabilities of AI that are used by the Russian side to conduct ISv against Ukraine. Russian propagandists use AI to create a large number of fakes, manipulations and pseudo-television stories purporting to be from Ukrainian TV channels and other mass media on YouTube, FB and distributed in other social networks. The main tasks of these stories are to manipulate public

opinion, spread misinformation, sow panic and despair among the citizens of Ukraine. At the same time, AI is used by propagandists of the Russian Federation to distort the domestic and foreign policy of Ukraine among the population of partner countries, for example (Infobae, 2022), (Malevskaya, 2023).

A dangerous factor for the national security of Ukraine is the dissemination of hostile information by the domestic mass media, which often cannot distinguish that this is content specially created by the enemy, succumb to emotions, and sometimes representatives of the "fifth column" in the mass media do it deliberately at the behest of their masters from Russia.

The enemy's use of AI simultaneously with the intensification of hostilities, bombings and shelling of the territory of Ukraine and the IPSO aims to achieve psychological destabilization of society and the Defense Forces of Ukraine.

It should be noted that Ukrainian specialists are already introducing AI into the system of combating Russian propaganda (Pylypov, 2023).

3. Psychophysical influence.

Radio frequency weapons of thermal action. Weapons based on electromagnetic radiation (EMF) of the radio frequency range of thermal action are based on the effect of human absorption of EMF energy, as a result of which body tissues are heated, the higher the field intensity and the longer the exposure time.

Excess heat is removed to a certain limit by increasing the load on the thermoregulation mechanism. However, starting from the value of the radiation intensity I = 10 mW/cm^2, which is called the thermal threshold, the body cannot cope with heat removal, and the body temperature rises.

The leaders in the field of development and use of thermal microwave weapons are, of course, the USA. The first sample of such a weapon was produced in 2005 with the purpose of dispersing crowds. The principle of its action consists in irradiating people with 3 mm waves. Rays with a wavelength of 3 mm penetrate the human body by only 0.3-0.4 mm, while water and blood molecules boil almost instantly at this depth in the subcutaneous layer. A person feels unbearable pain. The surface of the skin heats up to 40-50°C, which exceeds the human pain threshold. In this state, a person tries to leave the radiation zone. The official tactical and technical characteristics are closed, but in the literature (Military informant, 2010), (Bin.ua, 2012) it is believed that an antenna with a diameter of up to 2 meters is used as a emitter. The wavelength is 3 mm, the range is 1000 meters.

The installation called ADS was developed by the American company Raytheon in 2007. It has a radiation wavelength of 3 mm, a range of 500-1000 meters (Military informant, 2010), (Bin.ua, 2012).

These installations were used in Iraq and Afghanistan. It is planned to be used both in land and sea operations of the US Armed Forces, and in police operations (Bin.ua, 2012), (Cairns, 2010).

In the People's Republic of China, a WB-1 microwave installation with a radiation wavelength of about 8 mm has been developed (Computerra, 2014).

For decades, publications of the Russian Federation covered the theoretical foundations of the creation of microwave installations and the medical consequences of the influence of microwaves on the human body. The paper (Military informant, 2015) provides information on the creation of a high-power microwave weapon for countering high-precision weapons and UAVs at long distances (tens of kilometers). Such weapons can be used on the battlefield against the personnel of the defense forces of Ukraine.

Radio frequency weapons of information action. As mentioned above, a power flux density of 10 mW/cm^2 is considered the limit of thermal impact on a person. All other powers of microwave influence are attributed to non-temperature (informational) influence and are associated with the occurrence of ionic currents and electric potentials in cell molecules, changes in the permeability of cell membranes and corresponding processes.

The non-thermal (informational) electromagnetic influence on biological objects consists in the

excitation of oscillations of the body's components at the level of cells, subcells, neurons, DNA, and others. These excitations of the components of the body at their own frequencies, or close to them, affect the state of the body as a whole. By choosing the frequency of irradiation or the frequency of modulation of irradiation, it is possible to influence the physical state, the state of consciousness and subconsciousness of a person (Khabarova, 2000), (Uzdensky, 1999), (Devyatov, 1991), (Khabarova, 2002), (Gryzlova, 2004), (Kravkov, 2006), (Kolesov, 2000), (Nikulin, 2002), (Sidorenko, 2009).

Excitation of the organism at low-level EMF is due to the fact that any living organism is a complex oscillatory system of self-consistent modes. When such a system is affected by an external disturbance with a frequency that coincides with the resonant system or is close to it, an organism's reaction occurs, either therapeutic (for example, microwave resonance therapy), or destabilizing the work of individual subsystems of the organism or the organism as a whole. In other words, the body and its subsystems down to the subcellular level can be excited at resonant frequencies.

In addition, the body is a non-linear self-oscillating system, so periodic external disturbances lead to periodic changes in some parameters. With appropriate ratios of parameters and frequency of external disturbances, the system can enter parametric resonance.

Further studies (Khabarova, 2000), (Uzdensky, 1999), (Devyatov, 1991), (Khabarova, 2002), (Gryzlova, 2004), (Kravkov, 2006), (Kolesov, 2000), (Nikulin, 2002), (Sidorenko, 2009) established that, firstly, the human nervous system, especially the higher nervous activity sensitive to the electromagnetic field, and, secondly, that EMF has a so-called informative effect when affecting a person at intensities below the threshold value of the thermal effect. The degree and nature of the impact of EMF on the human body depends on:

- radiation intensity;
- frequency of oscillations;
- surface area of the irradiated body;
- individual characteristics of the body;
- irradiation mode (continuous or intermittent);
- duration of exposure;
- the combined action of other factors.

Thus, by selecting the necessary frequency range and density of the EMF flow, it is possible to influence individual organs and the general condition of a person.

EMFs in the centimeter and decimeter range artificially create auditory hallucinations (Hmong, 2003), (Corera, 2021). The technology for creating auditory hallucinations is based on the fact that radio frequencies generate sounds in absorbing materials in a pulse mode of sufficient peak power. The phenomenon of auditory response depends on the energy per pulse, and not on the average density of the EMF flow.

Based on the publications (Membrana, 2008), (Hambling, 2008), (Borger, 2021), a model based on the influence of low-intensity radio frequency radiation MEDUSA has already been created in the USA. Microwaves generate sound of any intensity in a person's head.

The work (Borger, 2021) provides information about the repeated use of radio frequency radiation weapons by the former USSR against US citizens. Based on the testimony of the victims, the effect of this weapon coincides with the effect of the MEDUSA installation. The authors assume that such a weapon, in addition to the Russian Federation, may be in service in the People's Republic of China.

Based on the lack of appropriate war ethics on the part of the Russian Federation, it is possible to predict the use of radio frequency weapons by the enemy on the battlefield.

Acoustic weapon. Summarizing the materials of publications (Kirsanov, 2014), (Belous, 2009), (Gakaev, 2015), (kara881, 2018), (Smirnov, 1990) on the creation of acoustic weapons shows that the influence of high-power acoustic radiation can lead to the loss of the human body’s performance, and on the other hand, sub-noise acoustic signals create the possibility of managing the

psychophysical state of a person.

The effect of acoustic radiation of different levels on a person is determined as follows (Gakaev, 2015):

- up to 50 dB usually does not cause a harmful effect on a person;
- 50-60 dB can cause a psychological effect, manifested in deterioration of mental activity, weakening of attention, speed of reactions, difficulty in working with masses of information;
- 60-90 dB, the pulse accelerates, blood pressure rises, vessels narrow, which worsens the blood supply to organs and systems;
- above 90 dB, significant functional disturbances occur: hearing sensitivity decreases, the activity of the stomach and intestines deteriorates, a feeling of nausea, headache, tinnitus appears;
- at a noise level of 120 dB and above, a mechanical effect is exerted on the organ of hearing, which manifests itself in the disruption of connections between individual parts of the inner ear, a possible rupture of the eardrum. Such high noise levels affect not only the hearing organs, but also the whole body. Sound waves, penetrating through the skin, cause mechanical vibrations of body tissues, as a result of which nerve cells are destroyed, small blood vessels rupture, etc. The indicated pathological changes of the ischemic or hemorrhagic type can lead to epileptiform attacks on the part of the nervous system, to ulcerative defects in the digestive system, to myocardial infarction in the heart, and to acute circulatory disorders in the myocardium, brain, pancreas, and other organs.

High and ultrasonic frequencies (from 5 to 30 kHz) can cause overheating of internal organs up to deadly high temperatures, tissue burns and dehydration.

Resonance phenomena of the influence of acoustic vibrations on a person. Man, as a complex biological system, has its own frequencies of oscillations of biological subsystems. Resonance effects can be achieved at low sound levels, but when the vibration frequencies coincide with the excitation frequencies. When the natural frequencies of the internal organs and the acoustic impact coincide, vibration occurs in the corresponding organs, which is accompanied by painful sensations. At the same time, infrasound can "shift" the tuning frequencies of internal organs (Studfile, 2008).

Thus, acoustic waves cause a wide range of reactions of the human body. The severity of the consequences increases with increasing sound pressure. Some researchers point to the spectral dependence and resonant nature of the body's reaction to acoustic influence.

The main elements of acoustic weapons are a generator and a sound converter. The most common are piezoelectric and magnetostrictive transducers.

The United States achieved the greatest success in creating acoustic weapons. The LRAD (Long Range Acoustic Device) series, developed by American Technology Corporation using the technology of piezoelectric acoustic emitters, became the most famous. According to known data, the frequency range is 0.72-6.6 kHz (according to other data, it is 2.1-3.1 kHz). The main sound energy of the LRAD samples is focused in a sector of about 30°. The effective range of use of these means is 50-300 m (Slavaland, 2013), (Rambler, 2002).

Another well-known model series is the HS (HiperStrike) and MA of the Ultra Electronics Corporation (USA) using the technology of electrodynamic generation of acoustic waves. Open sources note a wide frequency range of samples (0.375-18 kHz for HS-24, 0.21-10 kHz for HS-60) and high directional properties of samples (the main sound energy of HS samples is focused in a sector of about 10-25°), and samples of the MA series were developed for circular action (360°).

Another example of an acoustic weapon is the MAHD-R (MOOG Acoustic Hailing Device) model from MOOG (USA). According to known data, the frequency range is 0.02-20 kHz. The main sound energy of the specified sample is focused in a sector of about 30°. The sound pressure at a distance of 1 m is 151 dB. It is interesting that this sample is the only one that is positioned on the market as an acoustic weapon.

LIPE (Laser-Induced Plasma Effect, developed by the U.S. Department of Defense's Joint Non-Lethal Weapons Program) was developed in the United States in order to increase the selectivity of

the action and the reliability of operation. The principle of operation of the specified sample of acoustic weapons consists in the formation of a plasma cell in the area of the target location with the help of a laser and its subsequent rapid heating and formation of an explosive acoustic wave with a power of 130-140 dB (Dsnews, 2020).

Loudspeaker devices in service with the Russian Federation can be considered examples of acoustic weapons: sound broadcasting stations ZS-82, ZS-88 (nominal frequency range 0.3-3.5 kHz, sound pressure about 100 dB), ZS-96.03.

The Russian Federation is also conducting research on the use of acoustic antenna arrays. This technology is used in acoustic emitters AI-40, AI-91. They work in the frequency range of 2-5 kHz, the main sound energy of AI samples is focused in a sector of about 7-15°.

Although the purpose of powerful acoustic devices is officially presented as a means of transmitting sound data (commands, alerts) over long distances, the experience of use clearly indicates their purpose to influence the psychophysiological state of a person. Examples of this are the use of acoustic weapons during anti-terrorist and anti-piracy operations on the coast of Somalia, during police operations (Pittsburgh, Ferguson, USA), Georgia, Israel, Afghanistan, Iraq (Slavaland, 2013), (Rambler, 2002), (Dsnews, 2020), (Offshore-energy, 2019), (Russon, 2012), (Popkov, 2021), (Lederman, 2008).

Attention should be paid to the factors that can bring non-lethal weapons into the category of lethal, since a number of samples of acoustic weapons have a lower limit of the frequency range of about 100 Hz, and acoustic vibrations with a frequency of 100 Hz have a destructive effect on the human body (Kirsanov, 2014).

An important uncertain influence is the modulation of acoustic oscillations, in which the fundamental (carrier) frequency is safe, but the coincidence of the modulation of the carrier frequency with human resonant frequencies can turn a non-lethal weapon into a lethal one.

Based on the level of open scientific research and available samples of acoustic weapons, there is a possibility of its use by the aggressor against servicemen and citizens of Ukraine.

Laser non-lethal weapon. Laser non-lethal weapons can be used to blind military personnel and to psychologically affect them.

The effect of blinding laser radiation on enemy servicemen is achieved by the fact that a directed red or green laser beam causes temporary blindness and a psychological effect. Military personnel lose combat capability and the ability to coordinate actions. This can especially affect the work of snipers and military personnel who observe through optical devices (Topwar, 2015). At a specific power of laser irradiation of human eyes of 1 mW/cm2, temporary blinding of a person is achieved. The International Electrotechnical Commission established that the specific radiation power of lasers should be no more than 2,5 mW/cm^2. Such power of radiation does not cause irreversible consequences for human vision (Doswald-Beck, 1996).

In the former USSR, experimental blinding complexes "Sangvin" and "Stiletto" were developed. In the Ministry of Internal Affairs of Russia, blinding weapons, for example, the Potok complex (Apocalypse, 2021), have been adopted.

Pulsating light. Pulsating light that hits the retina is perceived by humans as continuous light (Jyngli, 2022), (Gmleds, 2011), but the human brain registers these pulsations. The work of the human brain is disturbed at a pulsation coefficient of 5-8 % and frequencies of 100 Hz. Pulsations of 20 % and 100 % cause the same negative effect on the work of the central nervous system (CNS), and to a greater extent on the neural elements of the cerebral cortex and the photoreceptor elements of the retina.

Developments of LED devices are known, in which a large number of colored LEDs that emit low-frequency pulses of light are installed. These pulses of light affect most people, causing nausea, dizziness and spatial disorientation. The greatest impact on the human psyche is pulsed radiation of the red spectrum with a frequency of 15 Hz, at a very low intensity (almost invisible light) with a

steep leading edge of the pulses. With such radiation, people experience epilepsy, a feeling of malaise, nausea, dizziness, and loss of consciousness during rapid movements (Zaur, 2019).

In addition, a prototype stroboscopic weapon has been developed based on a green laser that emits strobes of radiation. This weapon does not allow effective shooting, causes loss of balance and orientation in space, and in some cases is accompanied by a feeling of nausea (Yuferev, 2014).

The stroboscopic system "Owls" was created in the Russian Federation. This stroboscope is designed to suppress the visual-optical and optical-electronic channels of observation and aiming of small arms at night and in the twilight. This system causes spots of light at a distance of 2 km in front of the eyes, and in 45 % of cases dizziness, nausea and disorientation. The radiation of the "Owl" in the visible and part of the infrared spectrum with high-frequency brightness modulation effectively suppresses night vision devices, infrared laser rangefinders, ATGM guidance systems at a distance of up to 5 km. In the USA, a similar system is called the "Protective Light Channel" (Wikipedia, 2012).

Psychophysical weapons based on subliminal acoustic information are means of psychophysical weapons intended for covert violent action on the subconscious mind of a person or group of people. Psychophysical means are based on the principle of suggestion (suggestion), which consists in influencing an individual or a group of people and is perceived at the subconscious level. People have a desire to obey and change their behavior under the influence of an outsider, while the person is sure that this is his choice or initiative.

The Russian scientist, academician I. V. Smirnov (Smirnov, 1994/1), (Smirnov, 1994/2), (Smirnov, 1994/3), (Smirnov, 1990), (Smirnov, 2013).

These methods are based on psychoprobing and psychocorrection of a person under the influence of sound. Psychoprobing is an assessment of a person's personality, which is based on the method of encoding language, preserving its semantic content. Thanks to psychoprobing, they get relevant answers to the questions asked. In addition, a psychological portrait (profile) of a person is created. A person unconsciously answers the questions. Psychoprobing is the most accurate tool for researching a person's mental activity. Psychocorrection is the correction of a person's internal picture of the world, the initiation of a person's state and behavior adequate to the given program. Psychocorrection is carried out with the help of stories developed based on the results of psychodiagnostics specifically for each person. The psychotechnology of correction is based on neurolinguistics – programming with the help of specially prepared language and acoustic structures (suggestive stories), so these technologies have the names "psycholinguistics" and "psychosemantics". A specially developed plot programs a person, but the person does not suspect it. The plot is conveyed to a person when listening to audio recordings. She listens to the recording, but only hears music or acoustic noise.

Psychophysical influence based on subconscious visual information. Unlike audio suggestion, subconscious visual information is instantly perceived by a person. This influence on the human psyche is more profound and long-lasting, since visual systems affect not only the intellect, but also the emotional and sensory basis of a person.

Today, methods of presenting information frame by frame are intensively developed. Each frame contains only a part of the suggestive image, which is not enough for its conscious perception. With the successive presentation of such frames, on a subconscious level, the parts of the figurative suggestion are combined into a single image. This approach is close to NLP methods and is used, including, in computer viruses.

One of the effective methods of influencing the human psyche is color, which can cause both positive and negative emotions. A specially organized effect of color dynamics can be an effective way of modifying a person's consciousness, behavior and physical state.

The effect of psychological influence is significantly enhanced with the combined use of audio and visual influences.

Conclusions

Based on the results of the analysis of the current state and trends in the development of methods and means of informational and psychological warfare in the world and in Russia, it can be concluded that today a powerful scientific and technological basis for conducting such wars has been created, and an increase in the scale of the aggressor's use of informational and psychological weapons can significantly increase the risks for of national security of Ukraine.

Some developments are already being used by Russia against Ukraine, and in the near future it is possible to expect the aggressor to use the entire arsenal of technical means available to him and conduct organizational measures aimed at escalating information and psychological warfare.

First of all, it concerns the use of:

1. Psychotechnologies of psychoprobing, psychocorrection, and neurolinguistic programming for the purpose of non-medicinal correction of the psychophysiological state of Ukrainian citizens by accessing and influencing semantic memory (subconscious). The use of media manipulation technologies with the use of television, the Internet, Big Data and social networks for this purpose creates the prerequisites for increasing the vulnerability of the population of Ukraine to hostile influences and increasing the risks of transforming people's consciousness and the formation of favors with parameters set in advance by the enemy.

2. Artificial intelligence in information and psychological warfare. Its use can greatly increase the effectiveness of these wars. Generative intelligence is capable of creating personalized content, which leads to the appearance in the information space of a large number of pseudo-television stories and various fakes, the task of which is to manipulate public opinion, disinformation, sow panic and despair among the citizens of Ukraine, and distort the domestic and foreign policy of Ukraine.

3. Psychophysical effects of weapons, namely:

- radio frequency weapons of thermal action based on electromagnetic radiation, which causes unbearable pain on the surface of the skin of military personnel, as a result of which he is forced to leave the radiation zone;

- a radio-frequency weapon of information action, which affects individual organs and the general condition of a person and can cause auditory hallucinations by selecting the frequency range and density of the electromagnetic flow;

- acoustic weapons, based on the fact that acoustic waves cause a wide range of reactions in the human body (acceleration of the pulse, increase in blood pressure, headache, nausea, etc.). The degree of severity of the consequences of its use depends on the sound pressure and spectral characteristics of the sound;

- laser weapons for blinding military personnel and psychological pressure on them on the battlefield;

- weapons based on pulsating light, which can cause epilepsy, a feeling of malaise, nausea, dizziness, and with rapid movements, loss of consciousness, depending on the radiation parameters.

The specified circumstances require awareness of the necessary protective measures and the development of appropriate technologies and means of countermeasures against informational and psychological weapons.

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