THE ROLE OF REMOTE SENSING IN COMBATING TERRORISM AND ENSURING STATE SECURITY

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Abstract

This study aims at analyzing remote sensing which represents a scientific activity by means of which information related to the use of satellites is obtained and processed. The procedure used to obtain this information is becoming increasingly important, even vital, when it comes to ensuring state security against external aggression, against all forms of terrorism, and, especially, against cyber terrorism. Thus, regional conflicts and security crises are on the rise, leading to the emergence of global risks and threats. This can be counteracted by remote sensing, a science which is in significant progress, due to technological development characterizing the 21st century. Under these circumstances, the aerospace component has become critical in the conduct of the latest armed conflicts, as the information on the movements of large groups of people is a key element in carrying out military operations.

Keywords: *remote sensing, national security, terrorism, self-defense of national territory, cyber-terrorism*

1. The concept of remote sensing

Remote sensing is the science that deals with the receipt of information related to elements located at a certain distance, starting with multi-spectral or radar images obtained by means of remote sensors (satellites). The term remote sensing indicates obtaining information about an object situated at a distance, without any material contact between the observed object and the observer. Remote sensing does not only include the processes and the apparatus that allow obtaining an image of the earth's surface from a distance, but also further processing, in the context of certain determinations.

Remote sensing is an applied science, dependent on the state of technological development existing at a certain moment.

In legal doctrine, the concept of remote sensing comprises the same basic elements, but sensitively interpreted, given that the method of remote sensing involves high resolution technology concepts.

However, all definitions have as reference the definition included in the UN General Assembly Resolution no. 41/65 of December 3, 1986.

In Romanian doctrine, remote sensing is defined as a method that can determine the nature and condition of the natural resources of the Earth environment, through observations and measurements made from space objects, or 'space activity through which information about geophysical phenomena, human activities, natural resources from the Earth surface or underground, both in the territory under the sovereignty of states, and in areas not subject

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to their sovereignty, is collected and stored'[1].

'*Teledetecție*' is the Romanian translation of the English phrase '*remote sensing*', used ever since the 1960s to define this specific technique for obtaining information, once the first Earth observation satellites were launched into their orbit[2].

In fact, remote sensing comprises any method of obtaining and recording information from a distance, including not only the processes and the apparatus that allow obtaining a remote image of the earth surface, but also the necessary processing in the context of certain determinations.

From this point of view, remote sensing activities include the procedures subsequent to obtaining satellite information, as listed in the UN General Assembly Resolution no. 41/65/1986. The UN document provides that the term 'remote sensing' is different from the technical term and it has two limitations: the goals and objectives that have military use are limited and airborne remote sensing is excluded.

Corpus iuris spatialis, which is regulated in the Space Treaty opened for signature simultaneously in Moscow, London and Washington on January 27, 1967, as well as the entire body legislation in this area, provide that the activities of states in outer space are subject to international law and include the phrase national territory 'self-defense'.

If, initially, remote sensing implied remote observing all natural resources, their changes and their role in the productive and economic processes of the states, today, remote sensing supplements its functionality by observing the actions of the states considered to represent a threat to the international community.

2. The concept of national security

One definition of the term 'national security' refers to the body of all political, economic, diplomatic, military, administrative, legislative processes, actions and measures by means of which national-state existence, as well as human rights and fundamental freedoms are guaranteed.

Characterized by multiple dimensions, security involves a complex structure, comprising various elements among which information security is included. Information security represents the body of all measures dealing with identifying and storing information for determining risk and establishing measures to protect the processing, storage and transmission thereof.

As far as the defining scope of the NATO security concept is concerned, the domain was updated within the Istanbul Summit (June 2004), when the organization highlighted the following objectives: collective defense; applying the principle of indivisibility of allied security; creating a 'multilateral bridge' across the Atlantic; and countering threats to allied territory, whatever their source (considering that security challenges are global, NATO opts for global cooperation as the only effective response). At present, one of the most important partners of NATO is the European Union. In the last decade, the EU has faced the need to complete the objectives of the Maastricht Treaty, through a security strategy of its own.

3. The concept of terrorism

The concept of 'terrorism' was first used at the second Conference for the unification of criminal law in Brussels, in

[1] Raluca Miga Beşteliu, *Drept internațional. Introducere în dreptul internațional public* (International Law. Introduction to International Public Law), All Publishing House, Bucharest, 1997, p. 260.

[2] http/coello.ujaen.es

1930, and it was defined as 'the intentional use of means capable of producing common danger represents acts of terrorism consisting in crimes against life, liberty and physical integrity of persons or which are directed against private or state property.'

Terrorism is defined in the literature as 'deliberate and systematic use of means likely to cause widespread terror to achieve criminal purposes.' Terrorism is a different kind of war – new in terms of intensity, ancient as origin – a war of guerrillas, rebels, assassins; a war by ambush, not combat, by infiltration, not aggression, in which the victory is obtained by eroding the enemy and not by getting them involved[3].

'Contemporary terrorism' well exemplifies the main types of terrorism: nationalist / ethnic-separatist terrorism, religious terrorism, ideological terrorism (far left or far right), anarchic terrorism, terrorism sponsored by states.

According to some authors, terrorism can be international, 'when seeking to complicate or to cause to break peaceful relations between states, to remove certain politicians undesirable in foreign circles or to influence domestic or foreign policy of a given country, through intimidation.'

In Romania, Law no. 535/2004, art. 4 para. 7, defines terrorist actions as 'preparing, planning, promoting, committing, directing, coordinating, controlling a terrorist act, as well as any other activities unfolding subsequent to terrorist act being committed, if related to the terrorist act.'

4. Remote sensing and state security

We have been able to refer to space activities and remote sensing itself, as it is defined at present, ever since the launch of the Soviet satellite Sputnik 1, on October 4, 1957, when Korolev (a researcher, space enthusiast) showed Khrushchev the first satellite project for approval.

In response, the United States of America launched the satellite Vanguard 1 in 1958 and then placed into orbit the first geostationary Earth observation satellite, equipped with an optical sensor, the satellite being manufactured for military purposes.

Subsequently, the production of reconnaissance satellites developed, as they were used by space powers in armed conflicts: in the war between Israel, Egypt and Syria, after the attack of the Egyptians on the Suez Canal on October 6, 1973 (the so-called Yom Kippur war). In the seventh decade of the 20th century, other states started to develop space programs in order to reach strategic goals, especially in their specific geographical area. China has developed space programs since 1975, launching reconnaissance satellites, being followed by France and Israel.

Nowadays, outer space is no longer dominated by few countries (USA, Russia). Almost 150 countries, many of them belonging to the so-called 'third world' are directly or indirectly involved in space activities for the benefit of national development.

However, the privatization and commercialization of space activities, including those related to remote observation, have not remained entirely under state supervision. Thus, prior to 1984, in the US, only NASA was entitled to launch civil remote sensing satellites.

In France, remote sensing has been regarded as a business activity, in which the public and the private sectors have been associated. The Spot satellite was given to CNES (the French Space Agency), which is a public entity with industrial and commercial character[4].

[3] www.arduph.ro – General considerations on terrorism.
[4] V. Crețu, *Drept penal internațional* (International Criminal Law), Tempus Publishing House, Bucharest, 1996, p.245.

Commercial activities have unfolded by means of transferring and selling the data obtained by remote sensing to the states concerned, as well as by exchanging or transferring the data, under various forms, between the countries possessing space technology.

In the past, in the military, remote sensing proved its value through the results obtained from processing data received from the ground. The exchange of information between the member states of the North Atlantic Treaty, as well as the data from the former USSR, useful for member states of the Warsaw Pact, had an important role in maintaining a military balance in Europe. The capacity of the reconnaissance satellites on the state of war was proved in the 1991 Gulf War, carried out as an operation under the name 'Desert Storm'. In this regard, the French Defense Minister, Louis Joxe, pointed out that 'the outcome of the war in favor of the allies was due to the reconnaissance satellites, which provided valuable information, thus the war being extremely dependent on the American technology.'

The responsibility of the states, regulated by international incomplete rules, in terms of globalization, privatization and commercialization of remote sensing activities, should also be viewed in terms of ownership, through this technology, of military data obtained by a state or a private entity, which, if disseminated, can affect the national security of the state being observed.

The existing legal regulation in this area is obsolete, considering the fact that the states, being responsible for space activities developed and operated by an entity under their jurisdiction, cannot fully control the information obtained by remote sensing.

Another issue is that, once the 'Cold War' ended, the number of states which have artificial satellites in the geostationary orbit has significantly increased due to the production of ballistic missiles.

In 1969 only the US and the former USSR had ballistic missiles. In 1989, 15 countries had such weapons: France, Britain, Germany, and countries in Eastern Europe such as Poland, Hungary. In Asia, China had such weapons, and subsequently countries in Africa and Asia added to the list.

The importance of producing and possessing such military arsenal lies in the fact that this type of weapon penetrates both the atmosphere and the outer space, and in order to detect these missiles it is necessary to possess sensing and remote sensing technology, the interception being made in the outer space[5].

Therefore, at present, remote sensing and the operations carried out using this technology play a significant role in the missile system designed to defend the security of states, but they can also be used to attack another state.

The principles of such systems, in the outer space, refer to the right of self-defense of the state in danger. The provision in the Space Treaty, as well as the entire legislative body in this field, provides that the activities of the states in the outer space are subject to the provisions of the rule of international law, which include the phrase 'self-defense of national territory.'

On this particular aspect, the International Court of Justice, being notified in 1996 with a request for the use of nuclear weapons, could not decide the legitimacy of their use when the existence of states is in danger.

As by means of remote sensing, one could see not only the areas and the spaces

[5] Jorje Guttierez del Olmo, Miguel Victoriano Moreno Burgos, INDRA Espacio - Departamento de Teledeteccion, Pasado, Presente y Futuro de la Teledeteccion de Alta Resolucion,conform www..mappinginteractivo.com.

outside national sovereignty, but also those under the jurisdiction of states, legal and political issues debated at the UN were thorny and numerous. Thus, the legal Subcommittee of COPUOS within the UN became responsible for finding solutions to the divergent points. Institutionally, they proved that it is impossible to ban to remotely observe the territories of the states, others than those states launching the satellites. Some theorists[6] believe that the states do not comply with the recommendations of the UN General Assembly in that they relate outer space to military activities and use technology as a means of strengthening security at national, not international level. Although as far as disarmament is concerned, multilateral, bilateral treaties have been signed or resolutions of the UN General Assembly have been adopted, in the context of developing and placing remote sensing satellites in outer space, the international community is concerned about the use of this high-resolution technology for military purposes, even under the pretext of 'self-defense' or 'preemptive strike', concepts which have long been debated in the institutional framework or doctrine[7].

In space law, disarmament is reserved an important place as principle, but with the advent of remote sensing technology, we estimate that the current provisions in the treaties require reconsideration. Thus, as long as space technologies have a dual use (civil and military), defense strategies of the states will also use them for dual purpose. Currently, the global satellite navigation system is not illegal, as long as it does not spread nuclear weapons, but it can be categorized as a weapon, if it provides data and information for military purposes.

5. Remote sensing in the fight against terrorism

The effort to determine the current threats to international security is closely related, in the view of most NATO member states, to the existence of non-military threats: terrorism, proliferation of weapons of mass destruction, corruption, organized crime, border insecurity, trafficking and illegal trade (weapons, drugs, persons), illegal migration, ethnic and religious conflicts, depletion of natural resources, which can affect the security status by having a huge impact on the political and economic security, as well as other fields.

The complexity of the current security environment has numerous implications for the aerospace component. Because of the multiplication of regional conflicts and security crises (terrorist, environmental, economic, food, health, human trafficking, weapons and drugs, the needs to extract third-country nationals and civilians, cyber-threats), which have resumed their international character and require multipolar management, in tune with the architecture of the geopolitical powers of the 21st century, new risks and threats have emerged, and thus the importance of the aerospace power has grown to reach a new dimension[8].

The current security environment, characterized by fragmentation and major danger represented by terrorists, armed clans, cartels, mafias, extremists and criminals, gives way to a new type of

[6] Yasuaki Hashimoto, Missile Defence and International Law Tokio, 2002, p. 149, in Proceeding of the Forty-Fifth Colloquium on the Law of Outer Space, Houston, 2002.

[7] André Lebeau, *L'espace en héritage*, Paris, 1986, Editions Odile Jacob, Seuil, p.148.

[8] Loren B. Thomson, Satellites over Iraq: A report Card on Space-Based ISR during Operation Iraqi Freedom, în Intelligence, Surveillance and Reconnaissance Journal, mars 2004, p. 20, apud William B. Danskine, ISR offensif dans la guerre contre le terrorisme, Air & Space Power Journal en français – Printemps 2006.

conflict, without a battlefield and without clearly identified armies, with an opponent ready to use chemical, biological or nuclear weapons against populations. In a new war, waged in such conditions, marked by nonlinearity and uncertainty, by the chaos strategy, the role of the aerospace component becomes paramount. The experts, belonging to those states dominating aerospace, use the aforementioned arguments to structure their demonstrations about the importance of this field, acknowledging that this domain has developed in line with the 21st century technology[9].

State terrorist threat – by hosting terrorist networks and providing them access to weapons of mass destruction – was the basic motivation for the outbreak of current wars, which have definitely capitalized on the aerospace component[10].

Remote sensing is mainly working either on movement of certain larger groups of people, considered to be related to terrorist groups, or on combating terrorist actions in certain countries that host groups which are well known to be conducting terrorist related acts.

Space activities have developed a vast network of satellite telecommunications, which constituted the first recognized application of space activities with real social and economic benefits. Through satellites, useful information is disseminated to all participants in the international society, but, in some cases, it may also have a criminal component.

The defining elements of terrorism are also manifested by means of telecommunications networks, by satellites and by the Internet.

The cyber-terrorism field covers many definitions, many of them attempting parallelism with the classical definition of terrorism. Essentially, according to the definition of the Federal Bureau of Investigation of the United States of America, we are dealing with 'a premeditated, politically motivated attack against information, computer systems, programs and data operations, leading to violence against civilian objects and non-combatants, an attack exercised by subnational groups or clandestine agents.'

Nowadays, cyber attacks represent a means to maintain an electronic terror on governments, business environments or persons, even if only on the grounds that they are cheaper than any other established, traditional method.

From this perspective, electronic terrorism is to be limited by means of locating the sources of distribution of these activities, by exchange of data and information, by using means of logistical, institutional investigation[11].

Although satellite telecommunications was regulated by a series of international agreements and treaties, the globalization and privatization of this industry, by increasing the number of companies that launch satellites and provide cheaper services to consumers, have led to the separation of regulatory functions from the operating ones. Because of the gaps created in this manner, satellite telecommunications can be used to propagate terrorist acts.

Taking into account the brief considerations on the phenomena affecting the security of states, the possibilities offered by technological developments in the fight against terrorist acts and given the globalization of international society, it is

[9] Vasile Popa, Evoluția mediului de securitate, riscuri, amenințări și elemente acționale în dimensiunea aerospațială, Editura Universității Naționale de Apărare „Carol I", București, 2009.
[10] Loren B. Thomson, ibidem
[11] http://www.airpower.maxwell.af/

mandatory to adopt viable rules, well adjusted to current needs, at both national and international levels.

However 'the battle is waged by man, not rifle or revolver. The will to win represents the strength and makes the victory possible. War is a struggle between two wills eager to win; the one stronger in its action becomes victorious. Being a winner means being able and willing to fight when the opponent neither can do it nor want it. The stake of the battle is to destroy the enemy's will to fight, while maintaining one's own will up[12].'

6. Conclusions

The considerations on the role of remote sensing in the fight against terrorism are important due to the developments of cyber terrorism, as a form of attack on the states and their security. Counteracting these actions requires improving the states' information security systems, therefore it is necessary to continually develop satellite technology, legislation and regulatory framework on outer space law, as well as international rules on satellite telecommunications that should meet the needs of the new world order and the circumstances that currently require strategies attuned to the process of reconfiguration and adaptation in order to successfully deal with the methods used to threaten the stability of the international society.

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