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CONCEPTUAL MILESTONES TO APPROACH THE SPACE DIMENSION FOR SECURITY AND SECURITY'S ENVIRONMENT ANALYSIS

Constantin MOȘTOFLEI, PhD

Any theory is new when nobody reads the books which inspired it.

Brigadier General dr. Maricel POPA¹

The approaches of the security and defence issue have been marked, during the post-Cold War period, by a certain conceptual confusion and this situation hasn't been resolved yet, although the specialty literature has been enriched with numerous volumes, articles and other paper works. The conceptual scheme proposed by us comprehends terms (conceptual milestones) that would allow thinking out the issues of security and security environment from a unitary perspective in its space-time dimension, in terms of causality and giving up the metaphors.

Keywords: paradigm; causality; space; time; security; safety; defence; risk factor; challenge; risk; danger; threat.

After the participation in the paperwork of the 34th Congress of American-Romanian Academy of Arts and Sciences (on 19th – 20th of May) held in Bucharest, Romania at "Carol I" National Defence University, which was also the co-organizer of this event, we realized that we still confront with a certain conceptual confusion situation at least as regards the security and defence field. The words stated two decades ago by a British researcher saying that the future decade will be one of conceptual confusions proved to be true and they will continue to mark us during the following

decades.

There were notes to the **paradigm** term without considering that its content's sense regards all the scientific community acceptances (our emphasis) at a given moment or time period² considering as determinant the solutions given into the official document but not the ones coming from the specialty scientific literature. The paradigm, model or example that helps in thinking organizing and research directing can present the adequate research issues and methods, identify the important variable and propose a series of questions for the research³.

We all agree that security is necessary. Perhaps this is the reason for the non-unity of opinions regarding "security" meaning, a very disputed concept as seen into a UN study, from 1986, elaborated by a group of experts, referring to "Security concepts", wherein existed a limited conceptual similitude and this only among the East, West and South participants⁴⁵. Presently, the situation remained the same.

The security concept expressed through its component elements suffered, in time, visible modifications. Accepting as temporal milestone the beginning of the last decade of the second millennium, for the Romanian speciality literature which also has references to the universal one, one can identify the existence of two paradigms corresponding to the security concept: the military security paradigm (competition - conflict paradigm) and multidimensional security paradigm⁶. There are obvious efforts to focus the security issue on two points of view thought as



being distinct: the first, pure military and, the latter, of great enlargement putting together the military aspects and the economic, diplomatic, cultural etc. ones. Therefore, more dimensions were associated to security. At what an extent is such an association correct from a scientific point of view? In the same context, we notice other conceptual codeterminations: is the field synonym with the dimension? Is the level (landing) compatible with the field?

At the American-Romanian Academy Congress of Arts and Sciences, in a scientific communication specific to the exact sciences⁶, there were pointed out two principles we consider available for the security and defence analysis too: **the causality principle and space-time principle**. According to these principles which allow taking new attitudes, new intellectual postures, new ways of being, all the processes and phenomena pass through the cause-effect route, respectively, they are described from the perspective of space and time.

The causality represents the bounding usually attributed by an observer tiding two or many variables into a temporal sequence to generate a certain event. A causality analysis is meant to identify the previous action or to transform it into a so-called independent variable producing or contributing to the production of a transformation into a second variable, called dependent variable. The causality investigation aims to explain the events settling a cause – effect regulated pattern⁷.

This mean of approaching is also specific to the researchers from the Centre for Defence and Security Strategic Studies here exemplifying with a text from a study elaborated in 2004: “The transformations produced into the last decade, peculiarly in the last time, determined that all the international community attention to be concentrated on the clarification of a vision, which would contribute in strengthening world’s peace and security and therefore, in the mitigation of all the conflict situations and, consequently, in the diminution and even the elimination, where it is possible, of the causes that generated them (our emphasis). Essentially, this vision globally presumes the identification of vulnerabilities, possible risks and threats able to lead to the apparition of some instability sources or the worsening of the existent ones. An important element is to accompany their identification process by analyses allowing the creation of

needed instruments for this vision’s practical accomplishment, therefore to obtain a solid stability state at different levels (global, regional or national) and also to hinder the apparition of new sources. We can presume this process will gain more span in its space dimension and also in the time one (our emphasis) involving resources, multiple strategies and diversified actions concordantly with the major instability sources’ nature”⁸.

In conformity with the dictionaries, the space represents the fundamental, objective and universal form of substance’s existence, inseparable of this, with the aspect of an un-interrupted wholeness with three dimensions expressing the order in which there are disposed concomitantly the existent objects and processes.

The same dictionaries define that one the position of a location can be settled in a plan or in space by Cartesian coordinates: abscise ordinate and height. We used to position our subjects into a relative plan at globe surface by directions toward cardinal points. There is correct to take into consideration the third coordinate because space in its ensemble comprises maritime space (the geographic area including the seas and oceans’ waters, their bottom and subsoil), the terrestrial surface (place, layout limited to the land surface), atmosphere (place, limited layer over the land and seas and oceans’ waters), the airspace (portion from the atmosphere corresponding to a state’s territorial limits where it exercises its sovereignty), cosmic space (unlimited range situated beyond Earth’s atmosphere). We shall not forget that human can be present and act in locations from all these space areas and, concomitantly, his existence might be threatened by factors from these areas. We shall also mention that, presently, the threats to the existence of wide or little human groups’ come from various sources, ranging from the oil resulted after the Mexico Gulf accident to the volcanic ashes present into the atmosphere at more than 10 kilometres.

The approach of the space dimension of security/ security’s environment is also realised appealing to linear algebra (branch of the mathematics studying, among others, the vectors and the vectors’ spaces) specific methods considering **n-dimensional spaces**. Although many people can’t easily visualize the vectors in n dimensions, these vectors are useful in representing data and for an



easier understanding, we shall give an example of such application: in economy we can create and use 8-dimensional vectors, representing the Gross Domestic Product (GDP) for 8 countries. We can decide to note the GDP for 8 countries in a certain year, having formerly specified countries' order by a vector $(v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8)$, for example, United States, the United Kingdom, France, Germany, Spain, India, Japan, Australia, with every country's GDP on the respective position⁹. In the security field, this technique is used to associate security with space and the reference fields with its dimensions.

Security is the most important of all human basic needs. Very generally, it represents the situation of being sheltered from any danger corroborated with a feeling of trust and peace given by the absence of dangers¹⁰. Indeed, despite millions of volumes consecrated to the human being, until today, there isn't much to say about him, with the exception of the fact that he has been dominated since the beginning by two essential factors: **fear** and **time**¹¹.

Fear (apprehension, anguish, panic, terror, anxiety etc.) represents one of the essential data of human being: fear in front of nature, fear of alterity, fear of the future etc. Fear is always bigger than our capacity to confront it, to infringe it. Fear generates uncertainty manifested at individual, social-organizational and decision-makers levels, determining the involved individuals to have an efficient counteraction, but also maintaining them in the hypotheses, suppositions and hesitations field.

Time is one of the basic components for every individual's security. In every alive and thinking creature there is an ensemble of physiological, biological and cultural rhythms, a succession of moments, terms, periods, hopes etc. which make the majority of individuals to be exposed to routine, to remaking what it was done or seen already, an attitude involving a tendency of immovability, difficulties in confronting the unforeseeable, and also a relative long period of accommodation to changes of rhythm. Every person or human group have their on "time", therefore one of the main difficulties in conducting a group, inclusively a nation, consists in the ability to find a global tempo to allow the harmonized functioning of the ensemble.

At the already mentioned congress, amongst

the presented communications, the papers on human security were considered to be very interesting. There was emphasized the fact that "the roots of the human security concept can be identified in the liberal philosophical writings but, its real manifestation is specific to the post-Cold War scepticism in regard to security's traditional paradigm"¹².

There are two essential conceptual aspects: **for whom** and **against what** we need security? Security is associated with a person or with a community of individuals, perceived as a socio-organization¹³. The community is defined, in its turn, by a series of characteristics, the most important being the affiliation to a territory, assigned by house, locality, county (region), country, group of states belonging to a formal union, sub-continental or continental geographic region and, finally, world.

Security's subject is individualized on levels in accordance with a set of criteria defined by the degree of communities' coagulation in structures referring to state organization or societal organization.

Relying on the state-type structure associated with the national characteristics, there are emphasised three levels corresponding to the following types of security: sub-national, national and international.

The sub-national security has as subject the socio-groups constituted on different criteria disposed exclusively on the national territory and being in a subordination relation to the state authority.

The national security refers, in fact, to state's security comprising into its territorial limits the titular nation of which accomplishment and assessment the respective state is responsible.

The international security refers to groups of states having inter-conditioning relations from their own security perspective. In regard to nature of the bindings between states (inexistent, diplomatic, alliance, association relations etc.), we can speak about collective security – for the political-military alliances – or about security complex – where there is a group of states, wherein all the members are strongly tied with the others, but having weak connections with the states outside this group¹⁴.

The idea that the security of an individual or of the community he belongs to may be



threatened without affecting at a large extent the national security gains more ground. This time the security's subject is the society which is also perceived on levels, delimited by the degree of the individuals' integration in socio-organizations with clear shaped identity characteristics. Also, this is not only the case for the existent socio-organizations into state's territory (national minorities, ethnical groups affiliated to the titular nation itself living in the same area with the national minorities, immigrants etc.), but also the case of socio-organisations living in the territories of more states (trans-boundary regions, trilateral or institutionalized interstate unions as the European Union, the Organization for Security and Co-operation in Europe etc.). The subjects of the international security may also be characterized as world (global), continental, zone, regional, sub-regional etc. accordingly to the size of the territory they occupy.

The relations between individuals, communities, between them and the state as the relations between states are based on power. We refer not only to the physical (military) power, but also to the economic, financial, political etc. power.

Relying on their strength, states become subjects or objects of the international policy. The current notions of superpower, global power or big power mark the hierarchy of power¹⁵. Even if the economic and technological powers dominate the world in the future, or if the military power loses its importance, power, generally speaking, will remain a determinant factor in the international relations. The fight for influence and supremacy won't disappear from the face of the Earth either regionally or globally.

Therefore this is the reason for which we reckon that subjects of security we have already mentioned will struggle to grow their power. How? Firstly, this will be done by the multiplication and increase of the coagulation degree of the potentials of community's members. Operationally, the respective effects are obtained by the integration of all the components in the respective socio-organization.

When asserting that one's security can't be provided by personal resources, it will turn to the association with another community or it will simply enter in another socio-organization. The host socio-organization will also try to integrate

fast the newly came organization.

The integration and isolation are the extremes of a state evolutions spectre in the international community. The actors and directors of the activities composing the respective evolutionary ensemble are identified by a more or less visible (observable)/declared affiliation to the game of powers by enclosure among power's equation terms or by the disclosure from them.

States' efforts to increase their own security by threatening other state's security even if they characterise their actions as being motivated "only by defensive reasons" were considered by some specialists a **security dilemma**¹⁶.

The resolution of the mentioned dilemma isn't simple. Its settlement could be possible if it was considered the existence of the levels that individualize the subjects of security and if Barry Buzan's idea was accepted, namely that a subject of security may both support and threaten the security of other subjects situated on an inferior level¹⁷.

And, in our opinion, there could be also identified two conditions: a) the recognition and acceptance of state's exclusive right to provide, even partially, the security of the socio-organizations; b) the third party's role importance in the accomplishment of compromise regarding the security arrangement.

The second question was: Against what do we need security?

The general valid answer is: against **threats**. More exactly, there are concerned their recognized bearers. But, before threats we shall consider the dangers, and before them the *possible dangers*, also known as *risks*. The Romanian Language Explanatory Dictionary defines *risk* as *possible danger* and *the danger* as *threat* but also as a *risk*. We can observe that a tautological perspective is induced and, even if, in all the situations, the negative influence over the one representing the object of the action is underlined, there is missing a differentiation of terms on the basis of time relations, which may exist among this and action's agent (subject). In our opinion, on a time evolution scale, according to their sequence of manifestation, their range is: possible danger (risk); danger; threat. As far as the possible danger is concerned, there are no strong relations of determination between the involved parties; this situation determined the diplomatic language to speak about risks and,



more recently, about a concrete manifestation of the real relations between states, alliances and coalitions of states and between different socio-groups inside them. Unlike danger, the threat shows not only the potential possibility but also the manifested intention from one party to act against its opponent's interests; it represents the higher level of escalation of the tensioned relations between subjects.

In what concerns the risks (possible dangers), there are usually undertaken actions of **monitoring** the environment where they are the most likely to appear; when risks turn into genuine dangers which doesn't affect us directly, there are undertaken actions of **protection**. When the danger regards us explicitly, it is considered a threat, and there are undertaken **defence** actions.

Lately, it is considered that security must be also provided against **challenges** perceived of us as processes of risks' factors activation that finally lead to risk's (possible danger) generation. In our regard, the risk's factors represent those elements, phenomena, actions, processes being able to generate by their existence or by the escalation possible dangers (risks) or, directly, dangers and threats able to damage the state of normality (security) of individuals, socio-organizations, their institutions or technical systems they depend on.

A certain state of conceptual confusion can be noticed, concerning the mentioned facts, in two documents relevant for Romania's security and defence. Both The Romanian National Security Strategy and The National Strategy for Country's Defence include the following identical text: "The risks and threats against the national security can be aggravated by vulnerabilities and shortcomings amongst which the following phenomena cause **concerns** (our emphasis) or dangers: the serious dependence on vital that are hard to access; persisting negative demographic trends and massive migration; high social insecurity; chronic poverty state and ever wider social gaps; the low percentage, fragmentation and insufficient involvement of middle class in the socio-economic life; the frailty of the civic spirit solidarity; poorly developed and insufficiently protected infrastructure; the poor state and effectiveness of the healthcare system; organizational flaws, lack of the resources and difficulties of the education system in adjusting to society's requirements;

inadequate organization and precariousness of crisis management resources; insufficient commitment of civil society to debating and solving the security problems". We observe that risks and threats are treated as having a determinant role in the relation between dangers and ... preoccupations. In an acceptable conceptual approach, we reckon that the relationship shall have been done on the mentioned line without excluding the bi-univocal perspective between them and considering the term "challenge" (that was replaced, probably because of a typing error and of an abstraction, with the word concern). In Romanian, the equivalent terms for "concern" – preocupare – and "challenge" – provocare – are very similar.

Coming back to the threats, their types give the names for security's dimensions: military, political, economic, environmental, social etc.

The apparition and use in the XX century's conflicts of the air forces and of the nuclear missiles determined the military threats to be considered, until the end of the Cold War, the most dangerous and, more often, the only one that could seriously affect the national security.

The political initiatives concerning the security re-thinking¹⁸ and, in part, some pertinent conceptual and theoretical analyses¹⁹, the registered transformations that happened after 1989, engendered the idea that, along the military threats, there are also other types of threats: economic, ecological, political etc. From easily guessed reasons, the attention continued to be focused on military threats even if there were affirmations that their preponderance decreased and the political threats, having a determinant role over the others, are, in many cases, only mentioned.

In Buzan's opinion, there are three ways a state can be threatened. The first is the classical military threat. The second threat is the overthrowing the national legitimate political institutions by means that are often and evasively called **subversion**, with or without the use of violence, with or without support from abroad. The third threat regards the **idea of state**, by creating conditions for wide groups of state's inhabitants, important states or both to question the existence of the state, its constitutional definition or its frontiers²⁰.

In our opinion, the idea of state is also threatened by supra-dimensioning the interest



given to society's security (more correctly, of a minority group) in the detriment of the national security. The societal security separation from the national one damages the state's functions and, finally, the idea of rule of law.

In our regard, **the security paradigm** includes all the conceptual options (more or less clearly expressed) adopted by a certain scientific community, referring to the form and content of security, emphasizing the theory, the scientific work instruments and the research methodologies fields. From this point of view, it is correct to accept the paradigm/the concept of security as being affiliated to certain school (scientific community), national or international and also the official ones affiliated to a state or an international organization.

We consider it must be made a distinction between security, safety and defence, defining them as follows:

Security is considered the community cohabitation having its functioning institutions; this state is characterized by the absence of threats against their normal existence.

Safety is the feeling had by an individual or a community, about their existence, their institutions or some technical elements they benefit of, generated by the acknowledgement that they are protected by certain types of dangers.

Defence is the action (with or without destructive effect) and its results against a hostile manifestation.

The relation between security and defence is determined by the perception of the way in which the existential normality is affected and by the fact of being aware of the existence of some protection and defence means and actions. Briefly, we mention that the general valid answer to the question "Security against what?" is: against threats. More exactly, there are regarded their recognized vectors; in what concerns the priority of actions, one shall take into consideration first the threats, then the dangers, then the possible dangers, the so called risks.

NOTES:

1 In Observatorul militar no. 42 (120) / 22-28.10.2003.

2 The paradigm concept is launched in 1962 by Thomas KUHN, in his paperwork, **Social Theory and**

Social Structure, translated and printed in Romania as **Structura revoluțiilor științifice**, Editura Științifică și Enciclopedică, Bucharest, 1976.

Dr. Dumitru IACOB, in **Competență și schimbare - o perspectivă politico-militară și educațională**, Editura Academiei de Înalte Studii Militare, Bucharest, 1996, p. 45, considers that, from the multiple senses given to this concept, the one designating the "totality of options (explicit or no), of a network of conceptual, theoretical, instrumental and methodological options adopted by a scientific community (our emphasis)" has come into prominence and is currently used. Dr. Simion BONCU, in **Securitatea europeană în schimbare. Provocări și soluții. Evaluare critică**, Amco Press Publishing House, Bucharest, 1996, p. 177, considers that the term paradigm refers to: a) the essential elements of a knowledge system: a scientific result which is universally recognized at a certain moment (e.g. – Newton's physics, Copernicus' astronomy) containing laws, theories, theories' applications, instrumental preferences, hypothesis, philosophical and methodological presuppositions; this theoretical ensemble constitutes a common and accepted source of issues, research and resolution procedures and also criteria for solutions' evaluation; b) a model, a prototype, a time structure, an archetype; c) a philosophical or scientifically pattern orienting thinking in pre-designed directions which are sometimes inadequate.

See also ZAMFIR Cătălin, VLĂSCĂNEANU Lazăr, **Dicționar de sociologie**, Babel Publishing House, Bucharest, 1993, p. 420 and **Dicționar de filozofie**, Political Publishing House, Bucharest, 1978, p. 523.

As far as we are concerned, we accept the definition given by Gheorghe BOLDUR-LĂȚESCU in **Logica decizională și conducerea sistemelor**, Romanian Academy Publishing House, Bucharest, 1992, p. 26: the concept of paradigm refers to "an exceptional scientific result, influencing the scientific creation at a certain moment".

3 Jack C. PLANO, Robert E. RIGGS, Helenan S. ROBIN, **Dicționar de analiză politică**, Editura ECCE HOMO, Bucharest, 1993, p. 109.

4 Barry BUZAN, **People, States and Fear: An Agenda for International Security Studies in the Post-Cold War Era**, London, 1991 (*Apud*, Hakan WIBERG, *Probleme de securitate ale națiunilor mici, în NATO: ce este. Ce va fi Noua Europă și securitatea statelor mici*, R.A. Monitorul Oficial, București, 1996, p. 154).

5 Hakan WIBERG, opere citato, p. 154.

6 See, Mihai HODOROGIA, *The end of quantum theory*, Scientific Research - Security Sustainable Development – Connections (Proceedings), May 18th – 23th 2010, Bucharest, Romania, PRESSES INTERNATIONALE POLYTECHNIQUE, Montreal, Quebec, 2010, p. 35-39.



7 Apud, Jack C. PLANO, Robert E. RIGGS, Helenan S. ROBIN, *opere citato.*, p. 26.

8 Alexandra SARCINSCHI, Mihai DINU, **Crize și instabilitate în Europa**, Editura Universității Naționale de Apărare „Carol I”, Bucharest, 2004, pp. 3-4.

9 According to : http://ro.wikipedia.org/wiki/Algebr%C4%83_liniar%C4%83.

10 ***, *Dicționarul explicativ al limbii române (DEX)*, Editura Academiei RSR, Bucharest, 1984, p. 846.

11 LABROUERIE, G., *Des principes de la guerre*, in *Defense Nationale*, France, vol. 48, April 1992, pp. 9-18.

12 Teodor FRUNZETI, *Realizarea securității umane – provocări ale actualului context de securitate*, in *Scientific Research - Security Sustainable Development – Connections (Proceedings)*, May 18th – 23th 2010, Bucharest, Romania, PRESSES INTERNATIONALE POLYTECHNIQUE, Montreal, Quebec, 2010, pp. 26-31.

13 See Major General dr. Lucian CULDA, *Mondializarea socialului și insecuritatea omenirii. Posibilitatea gestionării mondializării*, in **Situația**

statelor într-o lume în curs de mondializare, Editura Academiei de Înalte Studii Militare, Bucharest, 1992, pp. 28-29.

14 Hakan WIBERG, *opere citato*, p. 164.

15 W. EHLERT, *Nu există pace fără putere armată*, in *Truppenpraxis*, RFG, no. 5, Sept.-Oct. 1990, p. 513.

16 Apud, Hakan WIBERG, *opere citato*, p. 154.

17 Ibidem.

18 *Common Security: A Blueprint for Survival*, The Independent Commission on Disarmament and Security Issues, New York, 1982. Sverre Lodgaard and Karl Birnbaum (eds), *Overcoming Threats to Europe*, Oxford, 1985. *Concepts of Security, Disarmament Study Series No. 14*, United Nations, New York, 1986 (Cf. Hakan WIBERG, *opere citato*, pp. 154-172).

19 Gert KRELL, **The Development of the Concept of Security**, *Frankfurt, 1979*. Carolyn M. STEPHENSON (ed.), **Alternative Methods for International Security**, Washington, DC, 1982 (Cf. Hakan WIBERG, *opere citato*, pp. 154-172).

20 See widely, Hakan WIBERG, *opere citato*, pp. 158-159.

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SPACE AND SECURITY – EUROPEAN DIMENSION

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The importance of space in security and defence matters was inferred since the Cold War time, when the main super-powers reckoned that space had the potential to become the new environment of armed conflicts. Since then, the international community has been strained to bring under regulation states' activity in space. SALT I and SALT II, START I and START II agreements marked the beginning of this process.

The present paper describes and analyses the main EU concerns regarding the space dimension of security. Moreover, it reviews not only the main documents that approach this issue, but also the institutional framework within which they are elaborated.

Keywords: security; defence; EU; ESA; EDA; ESDP; CFSP.

Initially, space activities were the prerogative of two superpowers: the United States and the Soviet Union. Due to the geopolitical context of the time, meaning the beginning of the Cold War, there was always a fear, shared by both of the two antagonistic superpowers and by other smaller powers, that space could become another environment for future military confrontation. Thus, the international community reacted by initiating the development of a legal framework to regulate and restrict the activities of the states in space.

In 1959, two years after launching the first satellite in space, within the United Nations, there was established the Committee on Peaceful Uses of Outer Space (COPUOS)¹, where the debates were led by the principles which should guide states being active in this area.

In 1963, it was elaborated the Partial Test Ban Treaty (PTBT), also known as the Limited Test Ban Treaty (LTBT)², being the first international

text that limits the use of weapons in space, and distinguishes between permitted terrestrial military activities and prohibited activities in the atmosphere and in the extra-terrestrial space.

A few years later, in 1967, the basic principles for the use of outer space were set, within the Treaty on the principles governing the activities of states in the exploration and use of outer space, including the Moon and other celestial bodies (OST)³. Some of the most important principles of this Treaty are:

- Art. 1 – space is declared universal heritage ("province of all mankind") and the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries;
- Art. 3 – Space activities shall be carried out aiming at maintaining international peace and security and promoting international cooperation and understanding;
- Art. 4 – explicitly prohibits placing and testing nuclear weapons or any weapons of mass destruction in space;
- Art. 7 and art. 9 – restrict the use of space providing that „one country's use of space should neither interfere with other countries' current space activities nor degrade the space environment for future users”;

Other international treaties followed, aiming to eliminate the vagueness of legal aspects related to security and defense contained in OST. Thus, USA and Soviet Union started negotiations on the demilitarization of space, initiating a series of treaties SALT I and II (Strategic Arms Limitation Talks), that were continued with START I and II Treaties (Strategic Arms Reduction Treaty), which were first limiting and then reducing the number of ballistic missiles held by the two countries and which contained provisions on banning the deployment and testing of Ballistic Missile



Systems in space and interference with national technical means (in particular, spy satellites)⁴.

Thus, although originally designed to limit the arms race between the two superpowers, these documents have also influenced the regulations on the use of space for the prevention of placing such weapons in space and developed rules for the use of national technical means for verification⁵.

Until the beginning of the 21st century, the security threats were mainly coming from outside and space systems and applications had to face them. Presently, as a result of events like the terrorist attacks in New York (September 2001) and in Madrid (March 2004) or the disasters in the Indian Ocean tsunami, in December 2004, it is accepted that space activities should be aligned to meet new threats and challenges such as terrorism, organized crime, natural disasters etc⁶.

Events of the early 2000's engendered the debate on how space can contribute to ensuring and maintaining security in Europe.

The report "Towards a Space Agency for the European Union"⁷, known as the "Three Wise Men Report", was published in 2000. Regarding the importance of space security, the three experts concluded that:

- Space systems are the main means for global scale information collection, transmission and distribution, being also the only non-invasive means;
- European Security and Defence Policy (ESDP) is incomplete without a space component;
- Earth Observation Satellites play an important role not only for environmental security, but also for development of ESDP;
- Several space programs contain a relevant dimension for ESDP, such as Galileo – the U.S. GPS counterpart – whose security and defense applications are well known;
- Telecommunications satellites have an important role in defense systems due to their capability to quickly and safely transmit and distribute large amount of information;
- It is logical to use the capabilities of European Space Agency (ESA) for the development of the more security oriented aspects of the European Space Policy.

In 2003, the same year when the European Security Strategy was launched, the "Green Paper: European Space Policy"⁸, a document prepared jointly by the European Commission (EC) and

ESA, was also published. The document devotes a separate chapter on improving the security of citizens. It reiterated the importance of space for the Common Foreign and Security Policy (CFSP) and ESDP and for enhancing the security of citizens; the dual nature of space technologies that can be used both in civil and military environment is also shown.

Later, during the same year, the European Commission presents a further document entitled "White Paper – Space: a new European frontier for an expanding union: an action plan to implement European Space Policy"⁹. The document states that "space technology, infrastructure and services are an essential support for ESDP and CFSP". Most space systems are inherently capable of multiple uses and the credibility of those policies will be significantly enhanced due to the benefits of using space applications¹⁰. The document also states that space assets can be used to identify security threats and humanitarian crises. Moreover, being clear that the civil and military users have special requirements, there is a need to develop protocols to reconcile the multiple uses of assets in the two areas.

At the end of the same year, at the request of the European Space Agency, another study is conducted on "Space and security policy in Europe"¹¹. Given the multiple-use technology development, the document called for "a European approach to space security, linking the present national defense programs with mainly civilian European programs. [...] ESA take full advantage of the dual nature of the area through a cooperative agreement with the EU"¹².

The Cooperation Agreement between the EU and ESA was signed in 2003 and entered into force in 2004¹³. It establishes the legal framework for cooperation between the two institutions. Moreover, the document states that "bearing in mind the nature of space technologies and infrastructure, both Parties, in implementing this, Agreement shall take into account their security dimensions".

In a report adopted by the Western European Union in 2004, entitled "The Space dimension of the ESDP"¹⁴, is noted that in terms of budget, European cooperation in space has special advantages, remarking, at the same time, that such cooperation is underdeveloped. Moreover, the document suggests that the European Defence



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Agency (EDA) could play an important role, particularly in defining the requirements, research and joint procurement and that future capabilities must be developed taking into account the tasks defined by the ESDP (Headline Goal 2010)¹⁵.

The Council has adopted, in 2004, the document “European Space Policy: ESDP and Space”¹⁶, that once again emphasized the importance of space capabilities for ESDP and called on EU Member States to enhance cooperation in the field, for maximizing the benefits provided by the dual-use technologies.

In 2005, it was published the “Report of the Panel of Experts on Space and Security” (SPASEC)¹⁷. In this paper, there are reminded the five threats identified in the European Security Strategy: terrorism, proliferation of weapons of mass destruction, regional conflicts, failed states and organized crime. It also states that, in order to meet the objectives of the CFSP, Member States must transform their capabilities, considering the role of space. Finally, the document refers to the lack of interoperability between different systems. The report’s recommendations are:

- Creating a platform to enhance security related user needs; its activities should be linked to EDA activities;
- Implementing a global system for situational awareness;
- Enhancing the security of critical infrastructure in the space sector, including space assets and ground facilities.

In 2006, the General Director of ESA presented “Agenda 2011”¹⁸, a document calling for the exploitation of the synergies between space services for civil and military areas.

In the context of the Fifth Space Council, in 2007, it was adopted the “Resolution on European Space Policy”¹⁹. The document seeks to enhance cooperation between the EU, ESA and their Member States, to avoid duplication and to maximize the efficient and rational use of available funds to meet European needs. The document also refers to the importance of increasing the synergies between the civil and military space programs and technologies. Thus, the document acknowledges that “space technologies are often common civil and defense applications and that Europe can, based on an approach in line with user needs, to enhance coordination between civil and defense space programs, aiming in particular synergies of

security and respecting the specific requirements of both sectors”. The document also specifies that “military utilization of Galileo and GMES (Global Monitoring for Environment and Security) should be in accordance with the principle that Galileo and GMES are civil systems, under civilian control”.

In addition to the above, the documents set the following priorities for action:

- Galileo and GMES – the successful completion of these programs;
- Climate change – monitoring the capital parameters, developing the necessary data processing capabilities;
- Space and Security – exploiting the space capabilities for: protection of the citizens against natural and man made hazards, maritime and border surveillance, bringing together the military and civil requirements;
- Space exploration;
- Research and development – remaining a priority for the EU;
- Innovation – the need for supporting measures for new technologies and for expanding the results of space research in other domains.

Later, in 2007, the Treaty of Lisbon was signed. Article 189²⁰ provides that, in order „to promote scientific and technological progress, industrial competitiveness and implementation of its policies, the Union shall draw up a European Space Policy. To this end, it may promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space”. Paragraph 2 of the same article stipulates that Parliament and the Council must take “necessary measures, which may take the form of a European space program” for the purposes set out in European Space Policy.

During the same year, 2007, at the request of the Subcommittee on Security and Defence of the European Parliament, it has been prepared a study on “The Cost of Non-Europe in the field of Satellite Based Systems”²¹. It stated that “space technologies have evolved to become central enabling assets in modern defense and security systems.” Stressing out that space systems could be used to support security in general, the authors of study call for creating a „European security architecture, using civil and military systems as well as space-based and non-space based



technologies”²².

This idea is reinforced in a memorandum jointly issued in 2007 by the Institute for Peace Research and Security Policy of the University of Hamburg (IFSH) and the European Space Policy Institute (ESPI) - “Memorandum calling for a European Security Strategy (E3S)”²³; this document is meant to increase current and future synergies between space and security in Europe, aiming to ensure the security and stability in the enlarged EU. The document recognizes the dependence of modern societies on the space infrastructure and, therefore, the need to protect these systems from any interference. Moreover, the document proposes to define, within such a strategy, the civil-military balanced space-based information collection for the purposes of the CFSP, taking into account data protection issues between EU and the Member States and associated partners.

In 2008, the European Parliament adopted the report of the Committee on Foreign Affairs: „Report on Space and Security”²⁴, also known as “von Wogau Report” (named after its originator). The report stressed out that space activities developed under the auspices of the European Space Policy should not contribute to the militarization and arming of the space, and emphasizes the importance of protecting strategic space assets, such as satellite surveillance systems. Finally, the report states that space activities should be financed from the Community budget.

During the Fifth Space Council²⁵, held in the last quarter of 2008, there were assessed the progresses made in implementing the European Space Policy and there have been set new priorities in the field:

- Space and Climate Change;
- Space contribution in support of the Lisbon strategy;
- Space and security,
- Space exploration.

As for the security, it was underlined the need for Europe to develop its own space infrastructure and space waste monitoring and surveillance capability and the EU, together with ESA, should determine the governance of this capability. Thus, there was acknowledged the importance of the space contribution for CFSP and ESDP, including the Petersberg tasks, and for the security of the European citizens in general. The document included a call to continue structured

dialogue, started in 2007, between the European Commission, EU Council Secretariat, European Defence Agency, European Space Agency and the Member States to enhance coordination of activities related to space security and defense.

As far as Galileo and GMES are concerned, it was reiterated the fact that these programs will provide services that could be of interest for applications related to security, but the utilization of these services should take into account the civil character of these systems.

The priorities related to space dimensions of the security are as follows:

- Defining modalities and means for civil and military space programs coordination by long term commitments;
- Developing European user driven situational awareness capabilities;
- Developing a capacity to respond to the European users’ needs in situational awareness;
- Ensuring independent access to space for Europe by developing strategies and concrete actions in order to reduce Europe dependencies on external providers for critical technologies.

In October 2009, with the occasion of the Conference on Space Policy in Brussels, José Manuel Durão Barroso, President of European Commission, referred to the close connection between space and security and presented the vision on Europe’s ambitions in space²⁶.

First, he stated that Europe needs to ensure the successful implementation and effective operability of Galileo and GMES. Moreover, by saying that „we need more security in space and from space”, he stressed out the importance of exploring the space infrastructure for protection of the citizens and of the ground infrastructures against any kind of natural or man made disaster, for achieving the objectives of ESDP.

Presently, the European Commission is drafting the future European Space Program that will include the future involvement of the European Union in space. The document is planned to be released in September 2010, followed by a draft proposal for actions and funding²⁷.

In support of the High Level Space Policy Group (HLSPG), that will define the European Space Program, it has been established a working group at expert level, that identified the following directions to be taken into consideration for the future space program:



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- Access to space;
- Earth Observation;
- Navigation;
- Telecommunication;
- Human Spaceflight and Exploration;
- Technology;
- Science (space science, earth science, microgravity);
- Security and defence.

On defence, the group recommended that HSPG to decide upon two options:

- Keeping defence as a separate line in the ESPro;
- For each theme, make a subdivision into civil and security applications.

Current priorities and actions related to security based on space, as shown in the official documents listed above, can be summarized in two major directions: security in space and security of space.

On security in space, the preparatory program for European space situational awareness capacity, jointly developed by the European Commission, EU Council Secretariat, EDA and ESA, is currently focused on defining the requirements of civil and military users, including the aggregation of both sets of requirements (ESA has already collected the civilian user requirements and EDA published the military user requirements) and the involvement of Member States.

Regarding security from space, meaning the security component of GMES, the goals identified to support ESDP and CFSP can be summarized as follows:

- For **border surveillance**, it has been set up a working group of representatives of the EC, Frontex, Member States, ESA, EDA and the EU Satellite Centre, to identify potential GMES applications and services that could help the European Border Surveillance System (EUROSUR);
- To support the EU's **external action**, various projects developed under the EC Research (FP7)²⁸ have as a goal to provide information on regional conflicts, to support EU interventions (e.g. G-MOSAIC project);
- Regarding **maritime surveillance**, a structured dialogue has been initiated with EC, EDA, EMSA (European Maritime Safety Agency) in order to develop maritime transport

and border surveillance policies, and to analyze possible GMES contributions. Research and Development projects have also developed within the Space theme, in FP7, aiming at developing technologies to improve the detection of small vessel capability.

GMES applications and services are not limited to the areas mentioned above. Depending on the definition of new requirements from users, new capabilities can be developed. Moreover, it should be evaluated not only the way GMES may cover some security needs, but also the way the dual-use observation infrastructure can contribute to GMES services.

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SPACE – AN AREA OF STRATEGIC IMPORTANCE TO NATO

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Space-based services have become integrated into our daily lives. Civilians, industry, government and military users have become dependent on services such as weather, satellite communication, global navigation and timing. From NATO's perspective, Space Power is strategically important. Current and future crises require a combined and an effective use of Land, Air, Sea and Space capabilities. Space systems are developed because they provide a capability that is only possible from Space or because they are a more cost effective solution to other methods.

Keywords: risks; threats; technology; asymmetric confrontations; space power; space system; military power.

Introduction

The space dimension is influenced by the outer space and is a subject to the laws of celestial mechanics. Within this framework, space forces are developed and they evolve, acting independently, although in a complementary manner and in synergy with the other forces, within a homogenous operational environment.

One should keep in mind that space forces' features place them well above the air forces: whoever owns such capabilities is clearly advantaged due to the increased presence, perspective, persistence, agility and the disruptive potential at global scale¹.

Through what it can offer to the military, the space dimension is exceptional. Today and especially in the future, the whole spectrum of conflicts could be globally led from this dimension, from peace to crisis and war. All areas are closely interconnected, starting with satellite communications, GPS-based high-precision guiding systems for aircraft and

ammunitions, target acquisition, force command and control, effects and casualties assessment, up to inter-service and inter-agency coordination and cooperation. These connections are enabled by the multi-valence of the space dimension, on which basis space command and control capabilities, air, space and information operations are integrated, thus enabling the synergy of action.

The use of outer space has become a day-to-day activity. Today, civil, industrial, governmental and military users are addicted to services such as weather report, global positioning for navigation or satellite communications. For NATO and its member nations, Space Power has a strategic importance, and space systems are being developed to provide a unique and cost-efficient capability, in comparison with other methods, in such a context where present and future crises will impose the efficient, combined use of land, air, naval and space capabilities.

1. The new risks and threats and the space component

The complexity of the current security environment has multiple implications on the space component. The increased number of regional conflicts and security crises (in areas such as terrorism, environment, economy, food and health safety, human beings, arms and drugs trafficking, cyber-threats etc.) is evident, as well as their international dimension. All these demand a multi-polar management, in accordance with the power architecture of the 21st century. In fact, the emergence of new risks and threats award an increased importance to the space power. The security environment at the end of this decade, described by fragmentation and major dangers



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posed by terrorists, armed gangs, criminal syndicates, Mafia-style organisations, extremists, open the way to new types of conflicts, asymmetric in nature, with no clear identified armies, with enemies able to employ chemical, biological or nuclear weapons against the population. In a new war waged under such circumstances, which would be characterized by non-linearity, confusion and by the chaos strategy, the role of the space component becomes crucial. The experts of the space-relevant powers have noted that the space component went through complex developments, at a moment when the environment of conflict has become more and more complex, diffuse and difficult, by comparison to the past.

In a new global and interconnected environment, as they are confronted with foreseeable threats, the states which have developed remarkable space components, such as the USA, Russia, China, France, The United Kingdom, Germany, Spain, Japan and India etc. have speeded up their force transformation, have completed their own defence arsenals with conventional and unconventional, defensive and offensive capabilities, and have developed a wide range of rapidly deployable capabilities, capabilities to deploy their forces to theatres under any circumstances, land and space communications and information capabilities. This is a costly but necessary process to enable the response to the asymmetric threats. It entails the creation of air and space forces trained and equipped to ensure operational superiority in confrontations with terrorists and guerrillas, in fights within the grey area, to protect the land, air and maritime environment.

Space equipments, in association with other land and air elements offer global, immediately-available and independent capabilities for information, communications, navigation and early warning. These equipments are more and more integrated in providing information and command of operations. In the global-extended area of the new missions, the great powers have noted an increase in the demand for strategic transport capacity and a decrease of volume and weight of the cargo, which are specific to the planning and execution of the expeditionary operations.

In a different idea, the space component needs a continuous renewal and improvement, in order to counteract the access of terrorists and states

which, through their structure, internal and regional security and their position can manufacture or acquire equipments or technologies considered as asymmetric. In low intensity conflicts, the high technology air equipments have proved to be vulnerable to low-cost light weapons or portable missiles attacks, performed by individual fighters.

1.1. The connection of the Space Component to the technologies of the new asymmetric confrontations

The space component is certainly the most advanced area of the military technology, and the main flagpole of future weapons, considering that it will add to military aircraft missile and missile defence systems, space platforms, military satellites, laser guided systems, GPS systems, and the unmanned reconnaissance and targeting aircraft systems such as PREDATOR etc.

In the fight against terrorism and against insurgents, the space equipments validate new, radically transformed concepts, such as: power projection, decisive force, strategic flexible force and force insertion. These are fundamentally changing the way we are dealing with some well-known concepts such as mass, movement, harassment, deception and concealment. The idea behind the use of the aero-spatial forces in the asymmetric battle is to keep being focused on maintaining a technological edge, in order to compensate possible tactical disadvantages of own forces versus those of terrorists or insurgents. In this respect, the development of the air equipments has been focused on: increase of speed, altitude and of flying autonomy, increase of the payload, reduction of the aircraft's dependence on the meteorological conditions and on the land-based infrastructure, increase of their firepower and precision of attack, increase of the flight-safety, and also on denying the capability to detect the flight of such equipments, in order to surprise the enemy.

Based on the operations carried out in Afghanistan, the Air Force has augmented its own Arsenal being able to launch precision guided weapon systems and ammunition against fortified targets, to execute direct observation of the objectives and to broadcast video signal for the Forwards Air Traffic Controller of the terminal



Figure 1. The Space System

belonging to the Joint Air Attack System, that will guide towards the laser guided beam base or through the GPS System. It is worth mentioning the role of the aerial airborne platforms in achieving the electronic protection for the Land Forces and of the role in attacking the insurgents communication, also for the neutralization of the electronic systems necessary to launch the Improvised Explosive Devices (IED).

In connection with the constraints imposed by the terrain, by the adversary and by other factors, the Space Forces are affirming themselves as an important component, efficiently combating an adversary that is multi-directionally fighting using a complex set of tactics, techniques, procedures and adaptive equipments. Those are achieving the kinetic effects using the fighter bombers, the bombers, the unmanned intelligence, surveillance targeting and reconnaissance systems that allow the usage of a wide range of space and non-traditional captors, that are forming EW platforms and have the long range transport and airborne capacity that is no longer imposing anymore the separate employment of individual units. Those assets are also capable to articulate themselves in the supporting process of the Land Forces in order to carry out operations independently. Allen G. Peck² has mentioned that the Air Component can provide today the whole spectrum of asymmetric capabilities that can hit the targets, based on the operational needs,

producing different effects such as: the kinetic destruction, the permanent collection/distribution of intelligence and of the information using the Intelligence Surveillance and Targeting Systems, the support of the infiltration/extraction forces, the attack of the computer networks and of the support infrastructure.

1.2. The Conceptual Framework

The „Space Power” is representing more than the physical space means themselves. USA is defining the “SPACE POWER” as representing “the total power of the capabilities of a Nation to lead and influence the activities in, from inside and through the Space in order to reach their own goals³⁷”. The power of the Space can be influenced through different military, environmental and political means. The military influence is focused first of all on the space physical system.

The Space system (figure 1) is comprising from a land part (segment), a space one and one of the users. **The land part (segment)** includes the industrial sites, the production and the storage facilities for the rockets and satellite systems. It also includes the Command and Control Networks (the antennas, the computer networks and other similar facilities), the launching systems and the information analysis and distribution centers. **The Space part (segment)** includes the rocket



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space delivery means, the satellite itself, the mission load (transponders and sensors), etc. The experts can also take into consideration the orbit/location, as part of the space segment. *The users' part (segment)* comprises all the receptors, the information systems, and also different clients that benefit from the space services provided.

This complex and interdependent system of systems has to face and to be consistent against a wide range of risks and vulnerabilities. In order to maintain the Space in a permanent risk status, the enemy has to interfere and disrupt one of those links of this fragile connection.

There have been made significant efforts to understand the military nature of those risks and challenges towards the space systems. At this elementary level, the standard military doctrine and tactics are stipulating: the deception, concealment, disruption, denying, degrading and destructions. The follow on sensors and systems can be deceived and can be negated the access and be destroyed through attacks against the space services and communications, and the proper systems can be destroyed. The Space is representing the contested environment that is confronting with numerous threats and that is subject of serious several vulnerabilities.

The attention of Mass-Media is focused on the anti-satellite capabilities such as direct and co-orbital trajectory, on the high altitude nuclear weapons with an electro-magnetic pulse and also on "exotic" equipments and weapon systems, such as the lasers, with an oriented beam that will make blind the sensors of the satellites, as a main priority of several states.

Many nations have demonstrated already their jamming capabilities of the GPS and of the SATCOM. The technology for those jamming equipments can be easily procured at relative low prices. Even though, the most vulnerable part of the space system is the land part: the launching, C2, production and dislocation location. Those facilities are very few, they have known locations and they can be easily located and targeted using conventional weapon systems. It also considered as being vulnerable the geo-synchronous orbits or those sub-atmospherically ones. It also exists a limited number of important locations and an attack using the anti-satellite weapons systems or ADM can create sufficient space fragments that will make impossible to be used the orbit for

hundreds or thousands of years.

The Space Power can also be influenced by other factors. The main problem is linked to the environment, either the land one or the extra-atmospheric one. The space environment is representing the biggest threat for the satellites, the Sun being the main one. The space systems have to struggle to maintain their orbit, to fight against the solar radiation, with the micro-meteorites and to avoid the collision with different objects that are moving with a higher speed than 7 kms/second. The states owning such a kind of equipments can follow over 18,000 orbital objects, while several other hundreds can not. More than that, the Atmosphere can interrupt the radio signals and block the sensors and also can limit the capacity of terrestrial observation of the land sensors in following the satellites.

The diplomatic activities can also influence the space Power. Being an important actor in the space, come together with the influence on the modeling and framing of the international treaties and regulations. The smaller nations now can easily have a place to the "space table", because the entering cost has substantially decreased. As a consequence, they (individually or as part of a coalition) can declare the diplomatic presence in order to influence any new treaties or agreements⁴. More than this, the nations have not set the space on the debate agenda, and that has as a result the diminished efforts in getting significant progress.

The informational and economical activities can also influence the space Power. The informational activities can influence the orbital positions, frequency management and use of space capabilities for verifying the treaties, such as image delivery regarding violation or wrong use of space. The informational activities can influence the space Power through news campaigns on policies, programs objectives, or financing of some programs or initiatives etc. There are little states and companies able to launch satellites. They can influence the manner in which a launching program can be accessed, which are the commercial facilitators, what services can be sold, to whom and at what prices.

In addition to the "soft" military influences, there are also potential threats stemming from **terrorists and pirates**. Terrorists engage in activities aiming at striking panic and fear in people and to create a large media impact. Attacking a



	2010		2015 (forecast)		2030 (forecast)	
1.	USA	291.2	USA	337.5	USA	375.0
2.	RUSSIA	60	RUSSIA	80	RUSSIA	100
3.	JAPAN	45.6	JAPAN	71	JAPAN	90
4.	CHINA	42	CHINA	50.0	CHINA	70.0
5.	FRANCE	35	FRANCE	43.5	FRANCE	50.8
6.	GREAT BRITAIN	34.6	GREAT BRITAIN	40.4	GREAT BRITAIN	47.3
7.	GERMANY	28.8	GERMANY	38.5	GERMANY	45.5
8.	SAUDI ARABIA	18.7	SAUDI ARABIA	34.5	SAUDI ARABIA	45.5
9.	TAIWAN	17.6	TAIWAN	29	TAIWAN	33
10.	INDIA	14.7	INDIA	21.6	INDIA	26.3

Table no. 1. The projection of the first 10 military budgets (billions \$, equivalent to BY 2010)

space launching installation or a ground based station which could trigger wrong functioning or interruption of the television, internet or power networks, and stand for tempting targets for terrorists. The risk of terrorism spilling over from Earth to Space is real but latent. However, the threat of “Space terrorism”⁵ is, to a large degree, neglected by decision makers. Furthermore, pirates off the Horn of Africa have taken ships for ransom money and been paid millions of Euros. They are in effect, attacking that maritime LOC⁶; it may be just a matter of time before a major Space LOC is held hostage to pirates’ demands (there have already been jamming and piracy attacks on satellites).

As most unmanned aerial systems use commercial SATCOM for command and data links, this could greatly impact military operations in the Middle East. As can be seen with just this short overview, assuring access to the Space domain is quite a daunting task! Assuring the Space domain is a global issue, and NATO is but one stakeholder. There is no simple solution to the challenge and it requires the cooperation of the international community.

NATO must have assured access to Space in order to support decision making and operations. NATO is already dependent on Space, and as the Space domain has become an increasingly contested domain, it must take a more active role to ensure the Space LOC is assured⁷.

1.3. The Future Distribution of the Military Power (including the space power)

This section will analyze, at strategic level, the trends towards the future distribution of the military power. A special caution will be placed on the situation of the armed forces, taking into account the expenditures for defense, conventional capabilities and with mass effects, their posture and organization.

1.3.1. Defense Expenditures

In the future, the level of the states defense expenditures will represent a major factor of the future distribution of the military power (**specialists predicts that 15% out of them will be allocated to the expenditures in the field of space capabilities**). The defense expenditures will be mainly influenced by the absolute value of the state economy and by the political decisions regarding the proportion of governmental resources dedicated to the military capabilities, by comparison with other priorities. It is not possible to clearly forecast the future defense expenditures. Table no. 1 shows an illustrative evaluation of the relative defense expenditures of the first 10 military budgets of the world for 2010 – 2030. The evaluation is based on quantitative projection of economic increase rate, supposing a constant rate for defense expenditures⁸.

This evaluation suggests that, based only on the capacity of projected economic increase and on



<i>Power projection</i>	<i>2010</i>	<i>2015</i>	<i>2030</i>
<i>Global capability</i>	<i>USA</i>	<i>USA</i>	<i>USA, CHINA, EU (FRANCE, UNITED KINGDOM AND GERMANY)</i>
<i>Multi-regional capability</i>	<i>FRANCE, UNITED KINGDOM</i>	<i>EU (FRANCE, UNITED KINGDOM, GERMANY), CHINA, RUSSIA</i>	<i>RUSSIA, INDIA, JAPAN</i>
<i>Regional Capability (local)</i>	<i>RUSSIA, CHINA, ISRAEL, PAKISTAN, INDIA, JAPAN, IRAN, NORD COREEA, TAIWAN, SOUTH COREEA, IRAQ, GERMANY, TURKEY, AUSTRALIA</i>	<i>INDIA, TURKEY, PAKISTAN, ISRAEL, JAPONIA, LIBIA, IRAN, TAIWAN, EGIPT, IRAQ, NORTH COREEA, SOUTH COREEA, AUSTRALIA</i>	<i>TURKEY, LIBIA, PAKISTAN, ISRAEL, TAIWAN, NORTH COREEA, SOUTH COREEA AUSTRALIA</i>

Table no 2. Probable capabilities for projection of space power

the constant proportion of the percentage allocated to defense, USA will remain the dominant power from that point of view, for the analyzed period, with a level of defense expenditures equal to the sum of the next 5 analyzed states. We can notice from the above table, the increase of China expenditures, which will surpass Russia until 2030, becoming the second state in the world regarding the defense expenditures, and the India progress, which will surpass UK until 2030.

1.3.2. Conventional Military Capabilities

Table no. 2 compares the evaluation of potential expenditures with the evolution of possible future geo-strategy of a range of states, in order to outline the possible development of the projection capabilities of space power (power projection being defined here as representing the ordinary ability of projection, sustainment and usability of the military power in space). This doesn't mean that these states will have to exercise this power in that manner, but the projection of the space power increases the potential of a state to use the military

tool in order to reach its own interests. According with our personal evaluation a certain number of states have the ability for power projection at regional level even at the international one, and this will increase simultaneously with economic growing when capabilities for projection of military power will become more accessible and available for spreading technology and geopolitics changes. USA will remain a dominant military power and will remain the unique state able to project its global space power, whilst China and EU states are expected to became member in this Selected Club sometime around 2030. India and Japan could develop their multi-regional capabilities until 2030, when it is estimated to reach the same level with UK and France have in present. A number of states will make a translation from local capabilities to those regional, until 2015.

2. Mitigating the Risk

2.1. Space – a distinct domain

The first step that NATO must take is to clearly understand that Space is a distinct domain



and that it is as important as Air, Land, and Sea Power. Space is already briefly mentioned in some guidance, doctrine and other documents. However, with no focus, no executive oversight and lack of direction from the Military Committee, Allied Command Transformation or Allied Command Operations, it will continue to be near impossible to make significant progress. With this issue aside, is there anything that we can do to mitigate risk?

Space includes as many different missions and systems as Air, but there are very few personnel trained and experienced to service NATO's needs. The Space warrior must be knowledgeable in all Space mission areas, how Space can support each component, the strategic objectives of the mission, which tactics to employ, what commercial and national capabilities exist, and how to employ them. Therefore, Space expertise must be developed. This includes addressing establishing a core of specialists, developing education and training, and providing the necessary command, control and equipment to perform their mission. The domain specialists suggest a people base approach to developing NATO Space Power.

To protect interests, there must be offensive and defensive capabilities, no matter what the domain, and in the Space is no different. The endowment of Space with weapons has been hotly debated for latest years. It is vital to mitigate the creation of Space debris and through transparency and cooperation, to ensure freedom of access to Space for all nations. For the foreseeable future, there is no need for NATO to have access to offensive weapons in Space. However, terrestrial capabilities that can deceive, deny, or degrade adversary Space capabilities are a viable option.

2.2. Space Defense Strategies

NATO could improve its defensive strategy. For the Space segment, satellites could be further hardened against radiation, lasers, jamming etc. However, satellites are limited in size and weight due to constraints by existing launch systems. Robust defensive measures mean additional weight, cost and less room for the mission payload. A more viable solution is improving security of the ground segment and user segment. This includes increasingly robust encryption and network security measures. Another alternative is the use of many small satellites. Small satellites

allow more flexibility, defense in depth, dispersal of assets, and shared risk between the Nations.

Most importantly, political influence should be better focused to set up a Space traffic management or international Space police force. We must maintain order, protect assets, ensure access and enforce treaties, laws and regulations. What should NATO's role be? Can we keep adversaries out of the Space club? Probably not. A better solution for a Space security strategy is to make many more nations interdependent on the same Space systems, thereby making them less likely to attack those systems. Anyway NATO should be prepared to answer how would respond to an attack on its Space capabilities, what national caveats there would be, and define the Rules of Engagement.

Another important aspect of any space security strategy is to deter an attack on Space systems. One of the most vital parts of deterrence is attribution of actions. Space Situational Awareness (SpSA) is needed to characterize actions. This is the ability to determine what actions are taking place, and to provide enough information for decision making. How do you prove hostile intent in space versus damage from a meteorite? Since most satellite activities are classified, what can you share with the public? NATO does not require Space surveillance systems, it requires access to a Space common operating picture for the systems it uses and that are of interest to its member nations.

3. Operational Elements within Space Dimension

As a collateral activities associated with globalization, raised as a violent evolution of a world in a continued crisis, nowadays wars, as well as those from the future – asymmetric, local, regional or international, increased by disintegration of several states or by some consequences of transnational treats, of violent and Islamic extremist, of lack of resources and of new challenges, of low intensity struggle with terrorism or guerilla factions or insurgent movements – have a space component more and more consistent, endowed with latest space technology which confer them spectacular characteristics.

Operational dimension of this component are strongly determinate by asymmetric elements such as: on the side, coalitions and multinational



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forces, having intelligent armament systems with high precision with great level of complexity and intelligence space gathering assets, satellites, systems of informatics networks or space and air strategic forces and aircraft or unmanned air vehicle, new designed structures with modularity, mobility and interoperable, jointly trained for a rapid deployment and for long lasting operations, for classic air forces strikes (combat, surveillance, interdiction operations, advanced alert, refueling ops), but also by strategic transport (personnel, materials, logistics) or in space, for combat on land, air and land, and on the other hand an atypical enemy, terrorist groups, using a great variety of means, often less efficient, improvised, but effective as surprise, innovating in combat tactics, trying to produce as many victims as they can, to create fear and terror, as opposed to the other forces , who try to subscribe to the humanitarian option „zero dead, zero injured “.

3.1. Use of space forces in war

Current conflicts reserve a special place for space forces. The armed forces of great economic powers will include in their structure important strategic space forces: research and long distance warning space platforms, strategic space strikes and transport, space refuelling, strategic medium range missiles, research satellites by photography and radars, electronic research satellites, communication and navigation, space shuttles, and orbit stations with human crews. With such capabilities, an extraordinary progress has been achieved in combat actions, from action within human sight to extremely precise action, almost surgical, conducted long beyond the horizon, against long distance targets beyond the range of AA defence means and in all time and weather conditions.

The moving of military actions gravity centre towards space has produced a real revolution in the way of understanding conflicts, in general, and the air action, in particular⁹. Information warfare has opened a new era for conflicts: cyber war, a new type of war, taking into account the particularities of the cyber space, conducted by specially trained experts. The viability of the space component depends and will depend in the future on the good functioning of information systems at strategic, operational and tactical levels. Mastering space

means having a mandatory strike capacity, first of all, of the adversary's air and space operations nervous system, but in the same time, sound operational structures, able to face the enemy's strikes and to function according to the given situation. Orbital capabilities play an extraordinary role on the operational level because they ensure information, navigation, information transport, meteorology, which are accessible through satellite control centres, or satellites themselves.

The more and more numerous space assets¹⁰ practically amplify and augment air power, transform it in space power, increasing the contribution to military operations, offering this way monitoring and telecommunications data, through detection, namely geo-stationary satellites, and also meteorological data, telephone communications etc. The global future of the air power, in the circumstances of the network warfare is closely linked to space assets. Space transforms air power in a global power, because it ensures a strategic global vision, a global strike and a global power¹¹. Having the advantage of ultra performing sensor systems, laser weapons and satellites but also power projection capacity, supported by surveillance and reconnaissance, interception and communications space assets, airspace power will be able to meet in the future, simultaneously or successively a wider range of missions (anti-satellite, strategic great precision strikes etc.), to intervene at long distance, more rapidly, with flexibility, more efficient, to obtain a more clear victory in war.

For the moment we may speak about an extension of the air/space power parameters, at a global level, given by the engagement of air/space forces of states, in coalition actions on far away territories: Afghanistan, Iraq. Air assets are being reduced, but the global capacity is augmented, by progressively introducing high performance combat aircraft and also strategic transport and reconnaissance aircrafts, UAVs with weapons on board.

3.2. Action milestones in space dimension

Action in space dimension goes nowadays towards a superior, complex operational value, given by new and extended requirements from every service, in a non conventional, asymmetric war, as it was very suggestively described, in



1998, by two ex-Chinese air force high rank officers Qiao Liang and Wang Xiangsui, in their work entitled „Unrestricted Warfare”, as a confrontation „conducted by poor countries with a weak power force and non state warrior entities, against superior powers, using guerrillas (urban guerrillas), terrorist attacks, Jihad, prolonged warfare and network warfare”¹².

The challenges which the space component has to face in the new circumstances, are totally different and the states are seeking to preserve and develop current specific combat assets, ensuring through training, the levels of excellence, required by the specific actions for this kind of warfare, so as to have maximum benefits from air/space superiority, strikes, transport and its connection at global level, by using it widely, in a joint, inter-institution and coalition context.

At operational level, specialists believe that space power has currently a global character, in extension, given by the „global aspect of air campaigns”¹³, which are part of integrated operations that have the characteristic of accession to the enemy territory, of producing a large range of effects and of focusing in time and space, on capabilities, due to the ubiquity of action (simultaneous presence deep in the theatre or at contact).

In order to increase global importance, air power and even more, space power depends essentially on economic power and no doubt, on political decision makers, which allows technological progress necessary to approach long distance operations, that are global, fast, reversible and flexible in use.

Future risks and threats, as well as globalization requirements, are forcing NATO to invest more and more in air assets for operations outside the Euro-Atlantic area for anti-missile defence, combating terrorism, and EU to create project groups for air re-fuelling and UAVs so as to build security in Europe and beyond its territory.

Therefore, the two organizations meet the conditions to become globally important, fact that would confer to the air power of Member States, the attributes of a global air power.

At operational level, much is expected from air space force, taking into account its complex capabilities (especially in EU and NATO states, which are technologically advanced) and the capacity of the non-conventional enemy to adjust

to a permanently changing environment.

The quality of operational efforts in the aerospace branch it depends, in our prospective on the informational control systems. Here, the analysts have in attention the actions of electronic warfare, network operations, blog¹⁴ operations, operational security, information security and kinetic component of informal operations.

One of the most important tracks of the space force belongs to air force and expeditionary space. The concept of expeditionary operations, a traditional one but also a usual one, in the light of strategic interventions and asymmetric confrontations in large zones it takes a focused attention. On this force category on increasing the capacity of deploying of the larger elements in intercontinental spaces, by involving of the new strategic transport capacities, downsize of the material assets, setting up the new military base in the world.

From the view of the mission type for the space force could be emphasized¹⁵: surveillance and reconnaissance, interdiction of the surveillance of the battlefield, communications support, and aerial support. The performing efficacy of these types of mission is due to aerospace forces ‘procurement systems belong to it. It is considered in this sense that the optimized technical systems in order to support closely the land forces, rotary wing and fixed wing strategic transport capable to land on the short and improvised surfaces., JSTAR reactive and less detectable, which can perform information operations, surveillance and reconnaissance and as a weapons: small bombs which can make collateral damage, small ammunition and precisely guided, 105 or 40 mm artillery.

From the elements that cover aerospace dimension, have to be emphasized those which jeopardize space force’s integrity¹⁶. So, in the cosmic space, are known as menacing for aerospace assets: nuclear weapons launched from ballistic rockets, land lasers, electronic actions as GPS’ jamming systems, ABM systems, and the previous ASAT system launched throw SL 11 and having the same orbit, which is probably still operational, but also the US space plane.

Regarding to this, are launched anti-space operations, which are defined as “kinetic and non kinetic operations performed in order to reach and maintain a high level of space superiority, by destroying, degradation or perturbation of



the space potential enemies¹⁷”. Practically, these kinds of operations are offensive, but in case of launching of the offensive operations anti space by the enemy, has to be initiated an anti space and defensive operation, which can preserve the personal space potential, to oppose the enemy’s attack, to reinforce space potential after attack and to reinforce the space forces. We can mention here the satellite operations that have an fundamental importance for space operations.

No doubts that, in space dimension to, the action area is regarded to the new concepts and capacities of the operations based on the effects (EBO), starting from the philosophy that everything counts is what matters and no the way is done. The specialists¹⁸ in this field consider that, throw this kind of slim conceptual process (EBO), the final strategic product or the effect gained over the enemy is the effect of synergetic, multiplied and cumulated actions of military and civilian capacities that belong to this dimension.

Conclusions

As the space assets, together with air, land and maritime assets give a global, rapid and independent capacity for information and communication, navigation and alert, global mobility and others strategic important advantages, like air superiority, transport and planetary level connectivity, and increase the combative capacities by using in unit context inter-institutions and coalitions, the states technologic relevant in the field make efforts to build air and space forces well trained, organized and equipped in order to gain and maintain the operational initiative in the complex and asymmetric battle field.

NATO can certainly use the space capabilities and has a long way in assuring the access at these capabilities. Military capabilities necessity to protect the high level of interests in the Space’s field will increase in the next period of time.

The forbidding of using the space services by civilians, industry, governs or military staff would cause confusion and would have also a negative impact on the global stability and security. We don’t think that NATO could afford to ignore this stressful issue. We consider that is the moment that NATO should take the initiative and to step forward.

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CHANGES IN THE SPACE-TIME DIMENSION OF MILITARY ACTIONS IN A GLOBALIZED SOCIETY

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Military action has undergone and will always undergo ample changes of all its dimensions. However, its space-time dimension is the most dynamic of all. It is significantly influenced not only by military factors but also by the characteristics of the environment. Considering both categories of factors in designing and materializing the military actions is an absolute necessity.

Keywords: military action, determinations, dynamism, dimension, processuality, space, time.

1. The dynamism and complexity of military actions

Military action has been the field with the most numerous changes in the past years, some easily perceived, others profound highlighted only by the results in concrete situations. In fact, by its very nature, military action is characterized by a perpetual dynamism and the rhythm of the latest changes can be explained by a shift in International Relations. Following the adoption of the United Nation Chart in 1949, the world Armed Forces have been structured, equipped and prepared for actions in accordance with Article 51 of the Chart referring to the individual or collective self-defence in the case of an armed attack. At present, although this right has remained fundamental, military actions seek to maintain or restore peace and international security. This tendency will characterize the physiognomy of military actions in the predictable future¹. At the same time, military action will remain the beneficiary of the prospective thinking and open-to-the-future initiatives where past moments are firstly analyzed as a source of Lessons Learned in order to increase the efficiency of future actions.

On the other hand, apart from dynamism, the military action distinguishes itself by complexity. This is highlighted by: the levels at which the military actions exist and manifest themselves;

the military actions structure; the types of military actions; the sides of military actions; the interdependence and interaction between them.

Military action is the coherent ensemble of activities organized and developed by the Armed Forces and/or different military structures during peacetime, crisis and armed conflicts in order to reach strategic, operational and tactic objectives. That is why, the military actions include a large variety of manifestation forms, ranging from those of the armed conflicts to operations others than war. It can be organized and conducted both at strategic level (when its goals have similar levels) and also operational and tactic (when its goals are at operational and tactic levels).

Like all social actions, the military action's structure includes four distinct, interdependent and interactive elements:

1. An actor, individual or collective – who conducts the action. In fact, the main actors of military actions are the military structures belonging to governments or other state authorities, paramilitary structures, armed or terrorist bands. Thus, the actors with transparent doctrines, with known principles and rules, in accordance with the human rights provisions, confront with others apparently without any doctrines but with motives maintained by fanaticism, interested exacerbation of ethic, religious and civilization differences. This situation emphasizes another important actor of the military actions – civilian population. Civilian population may become victim of the violence of the actors without a clearly defined/perceived doctrine and it may be protected by the military structures which theoretically would be their enemy. In the case of protracted armed conflicts, the civilian population becomes a source of regeneration for the forces even with untraditional participants (women, children, elders).

2. A situation – physical, social, political and military conditions of the respective action



providing the actor with the possibility of choosing different alternatives. Thus there are: intra-state armed conflicts (identity, religious or both); inter-state armed conflicts; asymmetrical conflicts; armed conflicts carried by multinational military coalitions under UN mandate and different paramilitary forces; establishing, maintaining and enforcing peace; post-conflict reconstruction.

3. An objective, a goal orientating the action. The military structures will act to achieve some well-defined political and strategic objectives determining the intensity and duration of the action and also the post-conflict responsibility in the theatre, the pacification and reconstruction strategies. The goals aren't always similar to the needs. Generally, they are narrower because they select what can be achieved given the present conditions and means².

4. A strategy (as a means of organizing the resources and methods to reach some objectives, not at a level of military art) used by the actor to achieve the objective. In other words, it's about the action's mechanisms that is the ensemble of available means and goals, values, needs and motives and also all the forms of adequacy between them.

During the process of structuring the military actions, there is an agreement between its means and the end states desired. Thus, there are: a) the conditional side of the military actions – it encompasses its means and conditions; b) the normative side of the action – it encompasses its goals and norms.

Establishing the goal is specific to any military action as a social action. Through goal we understand the objective to be achieved through battle actions and which is required by the political authority³. However, the mere existence of the goal, extremely necessary as it may be, is not enough. It's necessary to transform the general goal into practical final results. In fact, the goal may be considered the destination to reach by the military actions specific to the social, political and military context of the army mandate given by the political factor.

The military literature establishes the following types of military actions: coercive action; civil-military action; humanitarian military action; preventive action⁴.

The coercive action is any type of military action involving the effective use of force in order

to reduce or limit the enemy's sovereignty and freedom of expression.

The civil-military action is the type of action in a theatre regarding the interaction between the forces and their own civilian environment in accordance with the objectives established by the government. There are three types of such military actions: actions for the benefit of the forces (this type of military action seeks to facilitate the conduct of operational missions before, during and after their engagement); actions favoring the civilian environment (in accordance with governmental objectives in order to contribute to the partial or total restoration of a fragile state); humanitarian actions (they encompass humanitarian aid and humanitarian military actions).

The humanitarian military action represents the action through which the armed forces execute direct actions for the benefit of the population and the humanitarian organizations in the theatre. This type of action is often achieved during a peacekeeping operation⁵.

The preventive action is the type of military action focusing on the general prevention of potentially dangerous situations. Its purpose is to keep the crisis outside armed confrontations. It can take the form of a strictly military action seeking to prevent the use of the enemy's military means against national interests.

There are also special military actions. These are military operations others than war and are in fact low-intensity actions, conducted during peacetime, crisis and conflicts in order to achieve strategic goals and objectives regarding the prevention, discouraging, limitation or termination of low-intensity conflicts and also assisting the civilian authorities during internal crisis⁶.

All these prove the dynamism and complexity of military actions at all their levels.

2. Impact factors on the space-time dimension of military actions

2.1. Space and time in military actions

From a sociologic point of view, a military action is a coherent system of dimensions – social, political, psychosocial, economic, normative, space-time and organizational – according to which it is conceived, organized and conducted. The space-time dimension is operationalized



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through two variables – space (it defines the place, real and/or virtual environment) and time (past, present and future) – necessary and sufficient to conceive, organize and conduct military actions. Space and time are in an ongoing interaction and interdependence. It's difficult to separate between them when analyzing the military action in all its complexity and dynamism.

The military actions' space is concrete, real like land, maritime, air and cosmic environment and also virtual. Space is a combination of present and future priorities and realities of land, maritime, air and cosmic environment representing the physical support for the achievement of objectives through armed violence. Each of these environments has influenced the military thinking and practice at the beginning, isolated then by identifying and using the opportunities provided by their combinations. Today, there cannot be any effective military actions without thoroughly analyzing the way all environments favor the synergy of the actions which guarantee victory.

At present, the military action space has two new environments where human violence is present – cosmic space and virtual space. Cosmic space is relatively recent gain but its influence is relatively omnipresent and in the near future it will become decisive. The effect of using the cosmic space is perceived starting with the actions of the isolated fighter to the highest level of joint military actions. The cosmic space creates infinite advantages. "Integrated combat space" and "informational superiority" are concepts on which today's armies are organized and operationalized.

Virtual space⁷ doesn't oppose the real one but the present one. The virtual, contrary to the possible, to the static, is the problematic complex, the node of tendencies or forces accompanying a situation, an event, an object, any entity imposing a solving process: actualization.

Therefore, we can speak about a space of the military actions. This is the one where the operations are conducted and where there are the direct effects of armed violence. The evolutions inside it are influenced by the considerations (laws, principles, doctrines, regulations, human rights provisions) conditioning the armed combat. Achieving the missions and defeating the enemy represent the main objectives in this space in accordance with the political decisions. That is why it is influenced by the manifestations and events

within the political space. Thus, the Desert Storm operation in 1991 against Iraq, under UN mandate, conducted by a large international coalition led by the US, revealed the main landmarks of future operations in the space of military actions:

- multinational expeditionary operations;
- combination of the land, navy and air efforts, the last ones being dominant at least in the first stages;
- large capability maneuvers (between and within theatres);
- the strictly centralized conduct of multinational forces;
- the intense use of electronic warfare means during an operation with anything that can create impulses in this type of military action;
- the direct use of satellites of all types;
- new demands in planning and achieving the synergy in the actions of such diversified components;
- intense logistic conditionings.

In close connection to the military action space is the other variable of the spatial temporal dimension, time. This is a reality present at all stages of conceiving, organizing and conducting the military actions. The time is past, present and future, moments "flowing" one way, from the past to the future. That is why, it cannot be considered as a component or a distinct element of an action, but as a variable of the space-time dimension. It exists as a way of being of military actions in a rigorously defined space. Both space and time play an essential role in military actions.

2.2. The processuality of changing the space-time dimension of military actions

A military action is defined through several dimensions as we have mentioned above. The space-time dimension is the one which has undergone and always will undergo the most dynamic and profound changes in time. We can speak about the change of this dimension as being a process, an ensemble of phenomena, facts and events, of different duration, scale, intensity and frequency and in an ongoing interdependence and interaction.

This processuality of changing the space-time dimension is based on: the determinations and characteristics of military actions; ongoing transformation undergone by the military action



combat space due to the impact on the military domain and the context created by the current globalization phenomenon.

2.2.1. Military action determinations

The military actions have multiple determinations – political, economic, technological, imagological, human.

A. Political determinations. Increasing and diversifying the risks and threats to stability and peace, their dissemination to social communities and on large spaces subject the political decision to hard tests due to the differences in political culture in assuming responsibilities and consequences. The rules of engagement, the courses and intensity of actions and even some strictly technical moments (planning, target selection, choosing the time, use of force) will have a strong political load – even if the operationalization and efficiency reasoning would impose its passing-by.

At the same time, the need of “post-conflict” stabilization will impose certain time limits on military actions. However, the political determinations are visible during the stabilization stage when each moment of the action, each new mission, each success or failure will be analyzed and politically assessed and the military considerations will be taken into account only if they are in accordance with the political goals.

Therefore, the military action planners have to consider elements that were once small or ignored:

- the elimination of exaggerated or apparently useless enemy losses even with the risk of not achieving the goal;
- the protection of own troops;
- the protection of economic, social, cultural enemy objectives;
- the rapid change of the courses of action depending on the domestic and international public opinion;
- the highlighting, monitoring and planning actions in times and places where the enemy could act through challenges affecting the image of own troops, etc.

B. Economic determinations. The military action becomes an organized and planned domain as an economic business, a real investment where, with low costs and resources, can be achieved great results, an enterprise with long time profits.

The commanders and their staff will have to consider the following:

- identifying and analyzing “the enemy economic centers” not only for military reasons but also in order to shape their behavior and intensity of armed violence depending on the strict economic realities;
- identifying and interfering with the enemy financing circuits;
- planning the use in action the equipment and weapons in accordance with the operational demands and also with the expiring degree, the loading degree of warehouses, the liberating the logistical capabilities, the future budgets etc.
- assessing the post-conflict economic development, etc.

C. Technological determinations. The technological revolution, caused by the high tech weapons, intelligent ammunition, powerful explosives, cosmic programs, is completed today with the numerous opportunities in the field of nanotechnologies, communications, collecting and transmitting data and information, science and economy. All human activities have been influenced by these opportunities still insufficiently exploited. Thus there is the possibility of associating the lethal military products, usually forbidden to non-military environment, to high technologies. Not only military structures can benefit from this combination but also terrorists, paramilitary insurgent groups which will possess the capabilities to protect and coordinate actions at global level, to become an enemy capable to strike anywhere and anytime.

For this, the military actions will be progressively influenced by the new realities:

- impact of informational domination on the combat space;
- exercising the command and control and decision-making during the circulation of real-time informational fluxes;
- necessity to achieve the command and control when the informational fluxes are broken etc.

D. Imagological determinations. The military actions with an exaggerated armed violence can lead to the loss of public support in own environments even if the military motives justify that. Also, the human losses of the own troops and the humiliating situations can raise questions on the legitimacy of the action and the war as a whole and also can strengthen the combat spirit of the



enemy's fanaticism. That is why, not always the courses of action leading to the rapid achievement of the military goals can be adopted without risks. The public image forces the military actions to reconsider their efficiency criteria. Here, the media has an essential role, through its narrative of military actions and especially through operational information about the human losses of own troops and civilian population.

The military action is part of the other determinations (social, psychosocial, demographic, geographic). However, we cannot ignore a socio-demographic reality with an impact on military actions: almost half of the world population lives in urban areas and in the future the urban population will be even more numerous. Progressively, the military actions for the control of cities and communications will increase.

The urban agglomerations favor the less maneuver and lightly armed structures such as the terrorist, paramilitary and guerilla forces. The effects of informational warfare of some actions in the urban environment will be disproportionately favorable to them. This is the reason why they will seek such environments.

This reality will impose new demands for planning and conducting actions in towns by the maneuver and well equipped military structures so that their destructive potential will not backfire.

2.2.2. The characteristics of military action

A. Emphasizing the expeditionary character

The strategic changes in Europe, the enlargement of NATO's defence space and assuming "out of area" missions by the Alliance render less probable the armed attacks in Europe. At the same time, there still are areas of instability in some peripheral European regions or other continents but with direct effects on the security of European states.

The issue of national and collective defence has new meanings; the efforts are focused on preventing the destabilizing situations and defending common values. Among numerous political, economic, military measures, there is the necessity of conducting military actions far away from the national territory – expeditionary actions. These actions will be multinational, expeditionary for many states.

In the case of terrorist actions of paramilitary

organizations, it is obvious that they transfer forces, means and resources at great distance in order to achieve some missions. The modern society facilities, especially those created through globalization, allow them to do this.

The support of expeditionary military forces is achieved by **force projection** in theatres which imposes greater demands about:

- forces' elastic and modular structure so that the necessary group can be established as quickly as possible;
- achieving the interoperability so that the multinational modules far away from each other, can rapidly form units under one command in order to accomplish the missions;
- maintaining the unit's combat potential in theatre, similar to that in its permanent location;
- building "bridges" for the force transfer in theatre in accordance with the planning.

Logistics plays an important role in expeditionary military actions. It must achieve permanent and uninterrupted logistical fluxes at great distance from the usual infrastructure. At the same time, the expanded logistical space is a vulnerability factor of own forces' actions with all the protection measures necessary. A credible enemy will be quick to use it. From the logistical point of view, the force projection is a complex measure, with much political economic, financial inter-conditionality which cannot be left out.

The main advantage of the expeditionary actions is that the force's generation and regeneration sources are outside the enemy's classic strikes. However, they remain vulnerable to terrorist actions.

B. The joint character of military actions

This is the result of joining the three components – land, air and naval – to achieve the same missions. The joint character has long been present at the higher echelons of military art (strategic and operational) but starts to become general at the lower level of the tactic echelon. In future, the joint actions may be achieved in team-aircraft combination.

This new tendency imposes special demands to participants regarding:

- the ability to organize joint actions in the tactic field to solve situations which demand rapid solutions, unplanned by higher echelons.;
- achieving the interoperability between elements of the services;



- forming the skills for the lower echelon commanders to act together with elements of other services.

The perspectives provided by higher technologies to joint actions allow not only the considerable reduction of losses and damages but also the increase of the psychological impact through the element of surprise, precision, maneuverability unknown till today, rapid action and reaction, flexibility and a higher degree of scope in exercising the command and control.

C. Fire

This tends to become the dominant component of military actions. Fire planning is a major concern even for strategic echelons. The fire vectors to the target allow for the simultaneous hit of all the enemy strategic objectives regardless of their dispersion and geo-location. The high technology allows for unlimited data gathering and their transformation into information in quasi-real time. This offers the possibility of knowing combat space in detail which creates ideal conditions for timely intervention wherever there are signs that the enemy concentrates weight centers within its dispositions. Diversifying the sensors to collect data in all environments, the higher and higher performances of high-tech weapons and intelligent ammunition, increasing the destructive power of ammunition together with reducing the volume allow for selective fire or “surgical strikes” with profound psychological effects on the adversary.

The predominance of the role of fire creates conditions for achieving the absolute supremacy in the theatres, conducting military actions with unfavorable force rapports, erasing the differences between offensive and defensive, permanent higher rhythms.

The necessity to increase the fire efficiency represents one of the main circumstances which imposed the integration of the land, naval and air components in one action with common objectives, exploiting the own advantages in the action environments. With increasing the precision, the air and naval fire effects increase at the expense of the land environment.

The consequences of this trend will be the creation of reduced heavy land devices, mobility and dispersion thus the aprioristic creation of conditions to reduce losses. These are some of the effects of joint actions.

The essential expression of fire’s determinant

role in the future military actions represents the new network-based warfare. This concept represents the triumph of applying “high-tech” in military actions and creates the conditions for achieving the longtime military desideratum, focusing the action’s effects on the enemy and not the action itself.

2.2.3. Revolution in Military Affairs

The American concept of Revolution in Military Affairs (RMA) has emerged in a context of a double revolution, that of information technology and globalization. The strategic actors multiply both of them as a relay of hegemonic practice (that of the US and of world-system) and also as systematic threats or risks. Thus, the transnational firms, NGO’s and the media can be used in projecting force when the “delinquent” actors (terrorists, proliferators, ethnic purifiers, etc) represent asymmetrical threats. In essence, RMA means the informational integration of the war means.

RMA has three levels⁸:

1) The technological level. This means integrating the new information technologies in the current weapon systems and integrating C4ISR (Command, Control, Communications, Computers and Information gathering, Surveillance, Reconnaissance);

2) The doctrinal and operational level. This means that technology must be experimented to create new forms of combat;

3) The organizational level. This level shows that RMA is not possible without profound institutional changes (joint integration, entrepreneurial revolution of national army management, civil-military integration).

The Revolution in Military Affairs consists in the fact that the information technology allows for networking and integrating all systems (weapons, sensors, command and control). In fact, RMA becomes thus a revolution in warfare if the informational integration implies changing the balance between attack and defence, maneuver fire, space and time.

2.2.4. The digitization of the battle space

Another element with significant impact on the changes in the space-time dimension of military



actions is the digitization of the battlefield. The expression “digitization of the battle space” tends to make us conceive the battle space as a mere digitization of the theatre in its physical meaning through which we perceive different vector geographic strata belonging to the military domain. The digitization of the battlefield means represents⁹:

1) *A deformed, ideal and teleological space.* Each fighter has his own representations on space founded either on cognitive images (in the case of the beginner) or on the operational images of the military actions (in the case of experienced fighter);

2) *An archipelago of concrete spaces connected by multiple tangible or intangible networks.* Space is not continuous. It is rather a network of places connected by an ensemble of axes where the areas are secondary. Thus, space consists of empty places and occupied places. The empty places are sides not yet covered and outside the territory (the word territory has a geographical meaning here). On the other hand, from the subjective point of view, the territory is perceived as a whole, an ensemble with no discontinuities;

3) *A subjective individual space but culturally oriented.* Generally, the represented space is that represented or imagined by an individual in accordance with his life experience, knowledge and imagination and socio-cultural environment;

4) *A space suitable for a weapon system.* Each weapon system is space generator as it exaggerates or neglects the main elements of space. It operates a redistribution of these elements. This space production translates through a space perception and its reconstruction varying gradually depending on the doctrine of a weapon system. The reconstruction of the space perceived as a weapon system generates its own assessment system other than the one induced by other weapon systems. The perception of spaces, restraints and advantages for a certain weapon differ from the spaces perceived by the other weapons;

5) *A dynamic and progressive space.* The flexibility of a linear front is its ability to maintain its continuity by accepting considerable alterations. The plasticity of a linear front is assimilated to the plasticity: the front can lose part of its thickness and the lines stretch to the breaking point, remaining continuous though. The plasticity of an incomplete front is the ability to maintain a coherent device,

capable to fight, accepting any geographical alterations and functional reconfigurations;

6) *A collective representation.* The spatial representation is more connected to collective representations; it belongs to the social representations.

Therefore, the battle space is a representation of a space-time representation mentally shaped by fighters, more or less experienced, having their own weapon system and depending on one or several goals to be achieved. This battle space is the support of an uncertain dynamics of numerous geographical objects, tangible or intangible, in interactions such as front lines, action areas, units, meteorology etc¹⁰.

2.2.5. The effects of globalization on the space-time dimension of military actions

Globalization is a complex and multidimensional process which, through its effects, has a significant impact on the space-time dimension of military actions. In fact, the globalization creates the context where military actions are conceived, organized and conducted. Today, it is no longer considered as a mere geo-economic fact, but a powerful factor of social upset induced by the extension of the capitalist system from the social realm by the development of services, science and culture, on the one hand, and the development of non-state and non-territorial socio-spatial centers of power, freed from the differentiated political jurisdictions, on the other hand. Thus, the globalization moves the strategic field outside the interstate framework.

At the same time, by creating or aggravating the conflicts in the “grey areas”, the globalization (as it erases the systemic borders between public and private, internal and external, civilian and military, war and crime) weakened the poorest states and the collective security systems. The development of cross-border organized crime, massive corruption, the social decay of certain states and the expansion of poverty represent, from now on, the catalyst of cross-border and globalized conflicts.

Also, the globalization allows for the spreading of the new technologies in all fields, it capitalizes the intellectual production, diminishes the costs of transportation, supports the new non-state actors



on the world stage, provides a good manifestation field for the NGOs. All these will influence the space-time dimension of military actions changing it in time.

Conclusion

The military actions are defined through complexity, dynamism, processuality and multidimensionality. One of its dimensions, the space-time one, undergoes the most alert change under the impact of an ensemble of factors – the characteristics and determinations of the military action, the Revolution in Military Affairs and globalization; the digitization of the battle space.

All these factors are in an ongoing interaction and interdependence regardless of the form of the military actions and its level of manifestation.

That is why, today, conceiving, organizing and conducting military actions must consider the factors mentioned above if we wish to achieve all the objectives established.

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SPACE DIMENSION OF SECURITY. THE SPACE POWER BETWEEN PSYCHOSOCIAL REPRESENTATION AND THE INTERNATIONAL RELATIONS AGENDA

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Space has become in recent decades an important element of national power, namely by the capacity to explore and to control it. In turn, space power is influenced and influences all other components of power; there is a close interdependence between them. Unfortunately not all countries of the world benefit from the advantages of both space exploration capability and space power status. Access to space remains an ideal in less developed countries. From this point of view, it is essential to analyze the space power concept as central to the space dimension of security, by considering psychosocial representation that humans have on space and space power in conjunction with state and non-state actors and their interests in the same area.

Keywords: space dimension of security; space power; psychosocial representation; space capabilities

Space dimension of security is not a recent addition on the International Relations agenda, but, in the last years, the understanding of space issues has shifted depending on the changes in the international security environment. The key-moment of space admission on the contemporary IR agenda is the beginning of the informal competition between USA and USSR, the so-called Space Race between 1957 and 1975, even if the preoccupation for space exploration exists since many centuries (for instance, in 1687, Isaac Newton published *Philosophiae Naturalis Principia Mathematica*). The scientific competition was accompanied by a

military one in which both of the two powers has secretly developed recon military satellites programs. Unfortunately, there is no data on the psychosocial representation of the citizens of these countries regarding the issue of space power and implicitly on the space dimension of security. We argue that it is important to analyze the psychosocial representation of security, by analyzing individuals' opinions and attitudes, because the causes of insecurity gradually affect the entire levels of society, produce international reactions, including the use of armed force by a state or group of states and, finally, an armed conflict.

1. Theoretical landmarks regarding the space power as a central element of the space dimension of security

The geopolitical definition of space brings to the forefront the importance of the territory as a strategic advantage in space conquest¹ even if the space power theories define a clear demarcation between the outer space and the terrestrial one. Thus, outer space is the area above Earth's atmosphere that expands infinitely in all directions from approximately 62 miles (100 km) from Earth's surface².

The space power is the ability of a state or non-state actor to achieve its goals and objectives in the presence of other actors on the world stage through control and exploitation of the space environment³.



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One of the most important papers on space issue is the one written by U.S. officer David E. Lipton – On Space Warfare: A Space Power Doctrine⁴ – that defines the main concepts of such a theory: space power, space forces, and space doctrine.

Lipton's definition of space power – the ability of a nation to exploit the space environment in pursuit of national goals and purposes and includes the entire astronautical capabilities of the nation⁵ – removes from the analysis two important elements: the non-state actors and the ability to control this environment. He argues that the space forces, which are able to cause destruction or at least to support the destructive elements, constitute the military component of the space power⁶. Applying these two definitions shows that the U.S. is a space power whether or not deploys military forces or space systems, as they have the ability to explore space and to engage space forces.

The need to develop a doctrine that will provide the basis for all levels of a strategy (from the national level to the battlefield one) is obvious in this context. Lipton argues that the space doctrine is a circumstantial one (chosen from the main three categories of doctrines: fundamental, circumstantial, and organizational) because it must show the best way to employ forces in a specific environment and in specific conditions⁷. Thus, the author identifies the most important “informal” doctrines of the space power that are derived from four schools of strategy: the Sanctuary School, the Survivability School, the High Ground School, and the Control School.

The Sanctuary School argues that the main value of the space forces is their ability to “see” inside the borders of the sovereign states. Thus, the use of space surveillance systems reduces the risk of a nuclear war. However, using space in military purposes other than the one of deterrence might cause a space war. Therefore, space must be a sanctuary free of military systems.

The Survivability School is based on the premises that space systems are inevitably less survivable than the ground ones. The disciples of this School do not believe in the superiority of space forces because they are not survivable during wars even if they efficiently fulfill military functions (communications, weather data gathering, etc.) during peacetime.

The third School Lipton identified, the High Ground School, is based on the classical military principle that domination of the high ground ensures domination of the lower lying areas. Its proponents promote the space-based ballistic missile defense and the idea that the global-presence characteristic of space forces combined with either directed-energy or high-velocity-impact space weapons provide opportunities for new national strategies.

Finally, the Control School argues that there is a close link between the ability to control space and the ability to control the territory. Moreover, the ability to stop a war is enhanced by the ability to dominate the space environment. This means that the space control will be equivalent with the air and maritime control in the future wars.

Given these definitions and schools of thought, and the main elements of national power - natural resources, human resources, economic capacity, military forces and capabilities, culture - we can summarize the main components of space power, as the core of space dimension of security. They are mainly of technological, economic and military nature and are influenced by political and cultural factors⁸.

The technological component is very important in configuration of both relative and absolute power of a state.

The technological ability of a country significantly affects its level of economic and military development and reflects also in the balance of power between world states. This is also valid for the case of space power. Space, alongside the virtual one, is the new manifestation environment of the technological capabilities of major powers. Today, space capabilities have become indispensable tools to achieve individual, national and international security.

Artificial satellites, as a symbol of a nation's technological development, are the main space vectors with civilian, governmental and business applications to improve people's everyday lives (telecommunications, navigation, weather research, scientific research, prevention and response to natural disasters) and military applications to deter and remove potential terrestrial and outer space threats. However, space satellites can also be a threat because they can support: electronic attacks and physical attacks on ground stations; “blindness” of sensors; attacks



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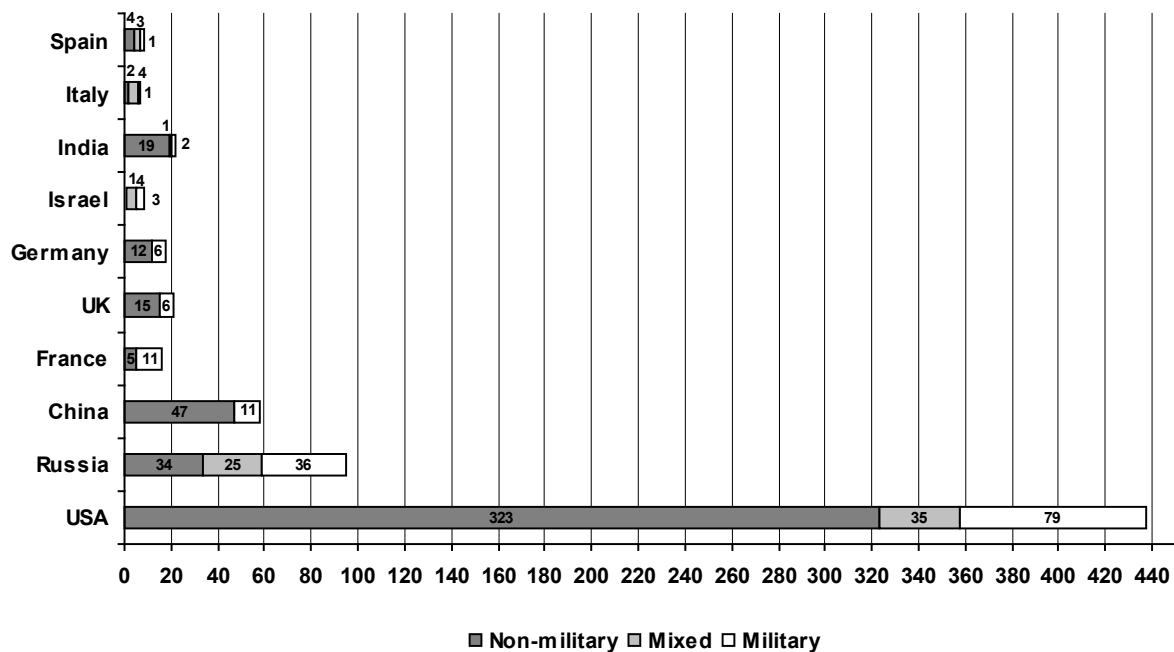


Figure no. 1: Top countries in the number of military, mixed and non-military satellites¹¹

on the low-orbit satellites; microsatellite attacks; anti-satellite weapons destruction; high altitude nuclear detonation, etc.

The economic component is interrelated to the technological one. Not only that technological advance by developing space capabilities is not possible without a robust economy, but also no economy can exist without strong technological and innovative capabilities that are over average. Thus, space power depends on economic development and if this level is sufficiently high as to allow its existence, space power will in turn generate wealth through access to modern communications and information services.

The military component of the space power is about the ability of one actor's military space forces to successfully contribute to the achievement of its national goals and objectives in the presence of other actors on the world stage through control and exploitation of the space environment.

We can argue that the military component is also composed by five subcomponents that might be described in terms of the forces deployed, the ability to deploy them, the ability to employ them, the ability to sustain them, and the ability to deny an adversary control and exploitation of space⁹.

The three components are influenced by both political and cultural factors specific to that country or nation. Political factors not only trace

the framework and the development priorities of the country, leading the choice for development of space power, but might be supported in turn by the space power, increasing the national and international status and role of that country.

At the same time, cultural factors have on the other components of the space power an impact similar to the political ones and are closely linked with the technological component.

Cultural factors also include the distinct characteristics of that society in physical, but mostly spiritual, intellectual or emotional terms.

In this regard, the psychosocial representations of individuals on space and space power, correlated with the issue of state and non-state actors and their interests in this area, are important to the analysis of space power as a central element of the space dimension of security.

The psychosocial representations that the population of potential space power has about these issues are important to analyze the spatial dimension of security, beyond the political debates, intentions and actions.

Its importance derives, in our view, from the fact that security from the national to the international level, cannot be viewed solely in terms of nation states and their interests, but ultimately, it depends on humans and their interests.



2. State and non-state actors and the main components of space power

On April 1st, 2010, the number of operational satellites worldwide reached a total of 928, of which 437 satellites belong to United States, 95 to Russia, 58 to China, 44 to Japan, 22 to India, 16 to European Space Agency and the remaining 338 to other world countries¹⁰. In terms of military applicability, USA had 79 dedicated satellites, Russia - 36, China and France - 11 each, United Kingdom and Germany - 6 each, Israel - 3, India - 2, Italy and Spain - 1 each (Figure no. 1).

In addition to the satellites used exclusively for military purposes, many countries have and operate satellites with dual or triple use, such as:

- Military/Commercial: USA - 33, Russia - 25, Israel - 4, Italy - 3, Brazil - 1, Spain - 1, Australia - 1, South Korea - 1;
- Government/Military: India - 1, Pakistan - 1, Taiwan - 1;
- Civil/Military or Military/Civil: USA - 2, Italy - 1;
- Commercial/Government/Military: Spain - 2.

The end of bipolar confrontation between USA and Russia has brought in the spotlight new players interested in developing space programs and satellite systems. According to the latest data, at least 10 states are able to launch satellites in orbit and over 40 operate such high tech devices¹². Among the actors who are directly involved in space activities and programs we can include: Brazil, Canada, China, South Korea, Europe (France, Germany, Italy, United Kingdom, and Sweden), India, Israel, Japan, Russia and USA. Besides these, South Africa, Australia, North Korea, Iran, and Singapore are the new players in the space arena which develop such technologies and capabilities¹³. USA, Russia, European Union, and China are the most active actors in space and despite the disastrous effects of global financial and economic crisis the arms race in space apparently is about to intensify. In this context, outer space is not only a resource available to all mankind, but also a new “arena” of political, geopolitical, economic or even military struggle.

United States, for example, considers the outer space as the last dimension of the military arena (beside the land, naval, air, and cyberspace ones) where they have to prove their superiority

by modern defensive and offensive military capabilities. Terrorism and nuclear threat justifies to a certain extent the expansion of American power in space and increasing support costs. Moreover, the 2001 Report on defense stresses that “a key objective for transformation, therefore, is not only to ensure the U.S. ability to exploit space for military purposes, but also as required to deny an adversary’s ability to do so”¹⁴. In 2006, President George W. Bush approved a new National Space Policy¹⁵, which states: the preservation of U.S. rights, capabilities, and freedom of action in space; the dissuasion or deterrence of others from either impeding those rights or developing capabilities to do so; the necessary actions to protect its space capabilities; the response to interference; and the deny, if necessary, of the use of space capabilities hostile to U.S. national interests by its adversaries. Therefore, to maintain its supremacy, the USA will continue to conduct space activities and develop specific military capabilities and also will use force if its interests are threatened.

Currently, the Obama administration is working on revision the U.S. Space Policy whose key elements are to increase the protection of government and commercial critical space assets against the full range of hazards, debris and international threats and to strengthen international cooperation in space area. Also, in a speech at the John F. Kennedy Space Center¹⁶, the U.S. president announced: the development of technologies that enable faster space travel for longer periods at lower costs; the building of commercial space launchers; the construction of the Orion crew capsule as rescue vehicle connected to the International Space Station (ISS); the extension of the ISS life at least another five years; the construction of an advanced heavy lift rocket to reach deep space, which will send humans to an asteroid (2030) and then to Mars orbit (2035), etc.

Russia, one of the countries with experience in space activities and leader in orbital launches, has revived its program designed to provide space technologies and services for the benefit of government institutions, regions, businesses and their citizens by improving the use of space efficiency, developing its space potential, strengthening international space cooperation and fulfilling commitments in this area. After a decline of space activities in the '90s, Russian



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authorities have established several objectives by Federal Space Program of the Russian Federation for 2006-2015¹⁷, such as: development, accomplishment, augmentation and maintenance of the orbital spacecraft constellation for the benefits of the socio-economic field, science and security of the country; development, deployment and maintenance of the Russian component of the ISS; providing support for Russian Segment of the Cospas-Sarsat International Search and Rescue System; development of the advanced launch vehicles; sustaining development of rocket and space technologies, etc. Also developing Global Navigation Satellite System (Glonass) is a priority for Moscow in order to sustain economic development and national security.

The military potential of Russia' space power is immense and relies on many space assets, complexes and systems, on its technical, technological, industrial and experimentation capacity, on its system to train specialists or to stimulate science and technology.

European Union adopted in April 2007 the European Space Policy¹⁸, a document which supplements the action of the Member States and other key players such as the European Space Agency (ESA) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). According to the document, the strategic mission is based on the peaceful exploitation of outer space by all states in order to: develop and exploit space applications serving Europe's public policy objectives and the needs of European enterprises and citizens; meet Europe's security and defense needs in terms of space; ensure a strong and competitive space industry; contribute to the knowledge-based society; secure unrestricted access to new and critical technologies, systems and capabilities, in order to ensure independent European space applications.

Europe has succeeded in the recent years to develop an efficient aerospace industry on global level, regarding both building and launching satellites and related services. In defense and security field, EU advocates need for interoperability and multiple use of space capabilities in order to allow to the most civilian programs, such as the European Global Navigation Satellite System (Galileo) and the Global Monitoring for Environment and Security (GMES), to have military application. Therefore,

it requires a coordinated effort from the EU, ESA and the Member States to develop a European monitoring and surveillance capacity of its space infrastructure and debris.

In the light of its economic expansion in recent years, China could compete with USA in the area of space activities and programs in the near future. However, the Chinese space program still lags behind the American one in terms of resources, especially experience and expertise. The objectives of China's space activities aim to secure space for peaceful purposes by: exploring outer space; using outer space for the progress of human civilization; meeting the demands of economic construction, scientific and technological development, national security and social progress; protecting national interests and building up the comprehensive national strength¹⁹. The ambitions of Beijing authorities are to: build up an Earth observation system; set up an independently operated telecommunications system; establish independent satellite navigation and positioning system; and provide improved commercial launching services²⁰, etc. While Chinese authorities reject using outer space for military purposes, it was no problem to destroy an own older generation satellite with a ballistic missile, which shows some less transparent interests and capabilities.

The world powers can not ignore India or Japan's investment in technology and space programs. Moreover, overall spending for space activities have reached 86.17 billion dollars in 2009, up to 16% from a year earlier²¹. USA continues to lead with budgetary allocations of about 63.19 billion dollars in 2009 compared with 57.98 billion dollars in 2008. In addition, last year, the U.S. authorities have boosted space activities with further 1.23 billion dollars, leading to a budget of 64.42 billion dollars, up to 11% compared to 2008. Other countries allocated a total of 19.97 billion dollars in 2009, up to 22% from a year earlier, and other 1.78 billion dollars expenses for international budgets. EU expenses for space applications and activities are about 2.6 billion euros for 2007-2013, of which 1 billion are allocated to Galileo²². In addition, Member States annually invest about 3 billion euros through the European Space Agency and the same amount on different national space programs.

The UN Treaty on Principles Governing the

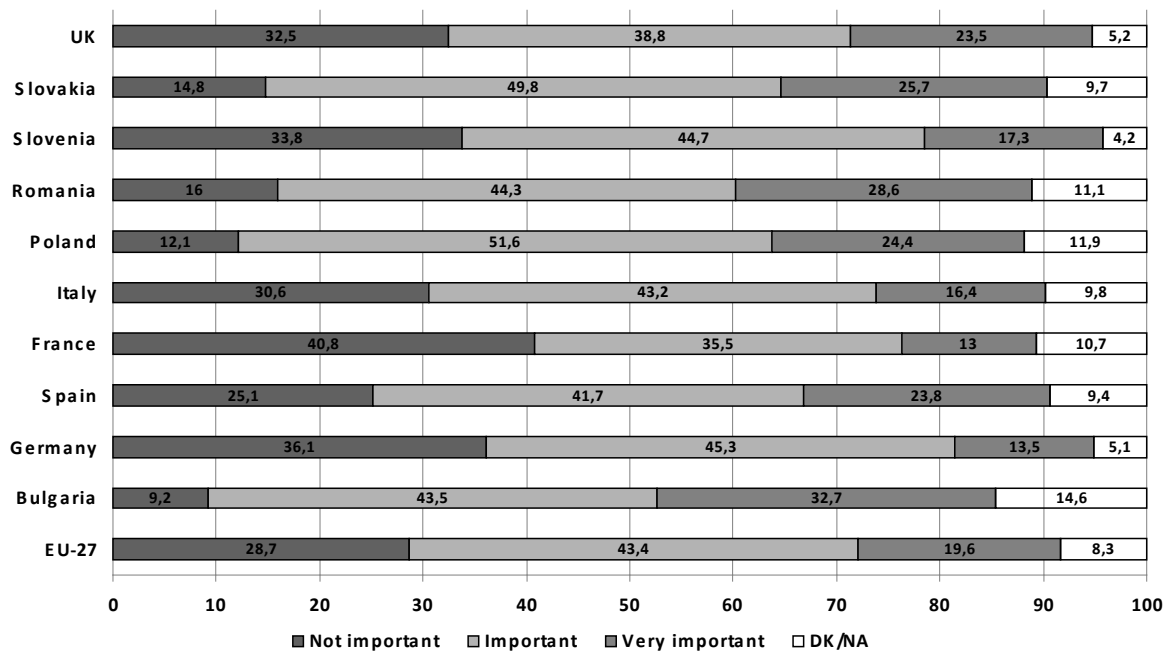


Figure no. 2: The answer to the question "Do you think space exploration and other space activities are important for the future international position of the European Union?" (Percent of the population, 2009)

Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies²³ is the international legal basis of space issues. The document entered into force in October 1967. It calls for a that the peaceful use of outer space, according to the following principles: exploration and use of outer space shall be carried out for the benefit and in the interest of all countries, of all mankind; outer space shall be free for exploitation and use by all states; outer space is not subject to national appropriation; not to place nuclear weapons or any other kinds weapons of mass destruction in outer space; states shall bear responsibility for national activities in outer space; states shall avoid harmful contamination of outer space, etc. Moreover, the UN General Council has adopted since 1981, nearly 26 resolutions on Prevention of an arms race in outer space²⁴. Last resolution on this issue, A/RES/62/20 of December 2007, was rejected by the USA (by voting against) and Israel (in abstention). Despite the opposition of great powers that have significant space capabilities, the UN continues to work towards strengthening international cooperation for the peaceful use of outer space. International Space Station designed for research in biology, physics, astronomy and meteorology, is the most important example of

cooperation in space matters between states of the world.

The international community is trying to reach to a consensus in terms of a treaty banning the placement of weapons in outer space. Also, it would be necessary an agreement to stop anti-satellite weapons tests, so-called ASAT, and using satellites as weapons. Therefore, the world countries must avoid by stable and comprehensive cooperation a possible arms race in outer space that could endanger civilization and its development.

3. Some considerations about psychosocial representation on space power

Psychosocial representation on space dimension of security is formed on the same basis as the classical process of building such images on world and its consequences for social existence are recorded in the same sphere of conventionalizing objects, people and events. On the one hand, the representation is the product of these values, ideas and practices that individuals are using in order to understand the natural and social environment. On the other hand, the representation produces values, ideas and practices.

In our approach on space dimension of security we must take into account a possible

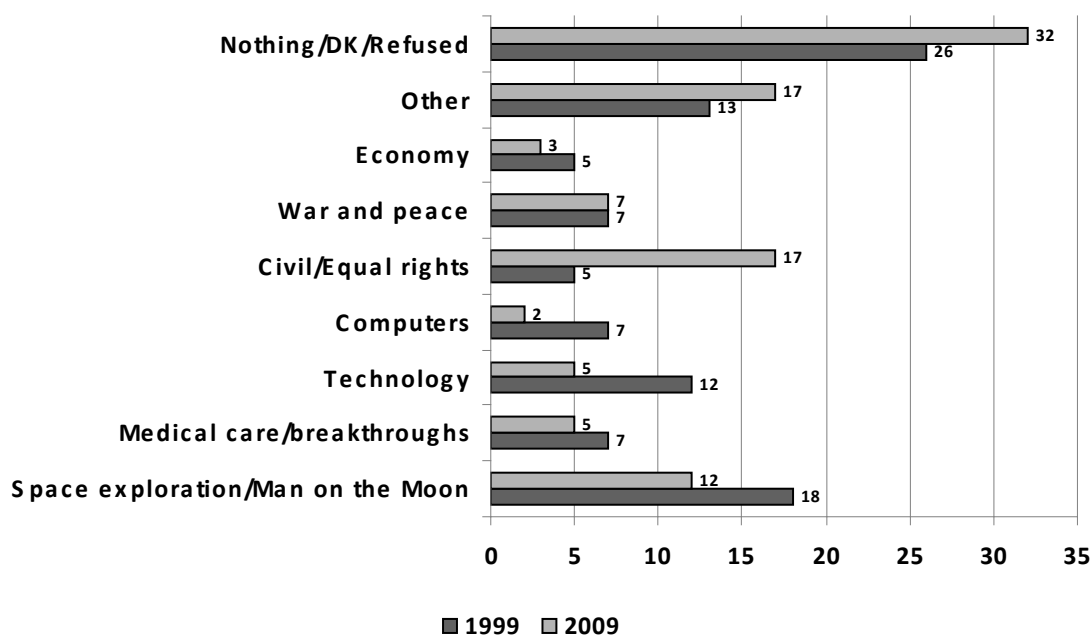


Figure no. 3: The answer to the question “What would you say has been America’s greatest achievement over the past 50 years or so” (Percent of the population)

definition of security as a state that is conditioned by both objective factors – which are caused by the absence/presence/control of risks, dangers and threats to the existence of individuals/groups/states/groups of states etc. – and subjective factors – which are the result of the way of perceiving their existence, values, and interests. In this framework, we can analyze the issue of space as an element of human life against which we relate our personal beliefs and values, theories and the way of understanding the world we are living in. Thus, individuals and groups have a decisive role in the area of security and they can define a certain type of reality, in accordance with their interests by promoting specific perception and psychosocial representation on space.

Unfortunately, there are not many data to support such analyses. Still, we can use the opinion polls published by European Commission²⁵ and the Pew Research Center²⁶.

Regarding the European Union, the analysis shows the opinions on EU space activities of the population from the 27 Member Countries in 2009. If we correlate the answer to the question “Do you think space exploration and other space activities are important for the future international position of the European Union?” with the list of the most important European space actors by the number of owned military, mixed and non-

military satellites, we conclude that the public opinion from the European countries with satellite capabilities (Germany, Spain, France, Italy, United Kingdom) tends to underestimate the importance of such activities. The situation is different in the European countries that have no or reduced space capabilities (such as Bulgaria, Poland, Romania, Slovenia, and Slovakia): the public opinion greatly values the issue of space exploration (Figure no. 2).

If over 50% of respondents in the entire population of the EU answered “important” and “very important” to the question above, the country analysis reveals slightly different results. Thus, over third of the population in the five European space powers believes that space exploration and related activities are irrelevant to the Union’s status in the international arena, while over 80% of the population in countries that do not have access or have limited access to such technologies believes that the EU could strengthen its status by exploring space. Such discrepancies can arise from, on the one hand, the poor information and popularization of “conquest” of countries that already have the space power status in this field and, on the other hand, the existence of “myth” or “mystery” of space exploration as an ideal of those who do not have the capacity to deliver this type of projects, such as countries with lower



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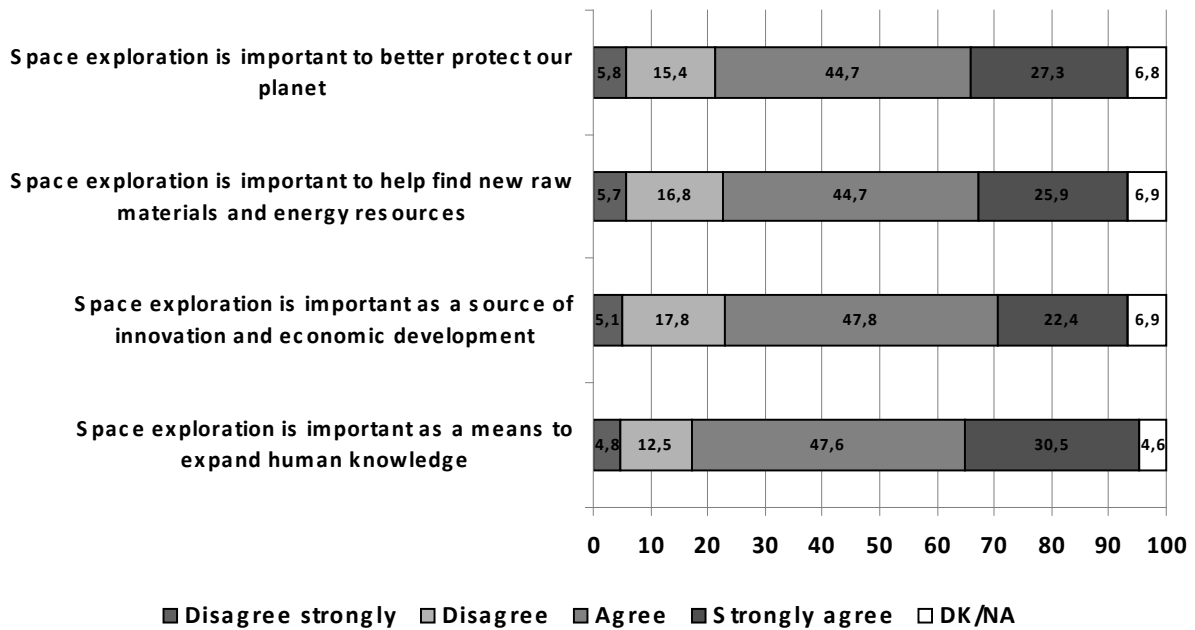


Figure no.4: The answer to the question “Please tell me how much do you agree or disagree with the following statements:...” (Percent of the population, 2009)

economic and technological development.

Regarding the country with the most important and developed space capabilities, the United States, data provided by the Pew Research Center allow a comparative analysis between years 1999 and 2009 on the importance given by the U.S. citizens to the national achievements in space exploration (Figure no.3).

From the above figure is noted that although in the '90s, space exploration and conquest of the Moon by man was seen as one of the most important American achievements. Within 10 years, its value, along with the one of development and innovation in the technological and medical fields, subsided in favor of some items on the current national agenda such as the civil/equal rights.

Also in the U.S. case is possible that, firstly, the main actors in space exploration to not disseminate the results of their work, and, secondly, people to be disinterested in the issues that do not directly influence the living.

Space exploration seems to be, at least for the European citizens, a guarantee for European security because it facilitates the human knowledge, the innovation and economic development, the discovery of new raw materials and energy resources, and the better protection of our planet (Figure no. 4).

One can say that space activities are represented by humans not only as an element of international prestige, as an expression of state power, but also as a means of providing security to all mankind. However, space exploration remains the advantage of economic and technological most developed countries. Other states, especially their population, are more “sensitive” to the prestige that such a capability offers. For them, in most cases, this will remain for many decades an ideal emerged from science fiction literature. Unfortunately, in this case, experts and political class cannot translate psychosocial representations, expressed through population’s beliefs and aspirations, into reality because of lack of funds for the development of space programs.

Conclusions

Over 50 years of space history showed that the use of space and its resources serves to the critical needs and interests of the mankind. The world became much more interconnected, and satellites capabilities can save lives, strengthened the economy and support national security. Without the “space support”, the efficiency of intervention and response forces could be limited, financial transactions could be disrupted, military structures would be less able to defend themselves. On the



other hand, space capabilities can be used to cause damage at terrestrial or outer space level, and they are also vulnerable to specific attacks.

Space power is directly proportional to technological and economic power and, with them, enhances military power. Therefore, the diversification and the importance given to the military space activities in terms of tactical communications, imaging capabilities and intelligence remain a priority for the world's major economic forces. Their advantage is the increased ability to detect and identify threats in a timely manner, to monitor continuously the situation and to design appropriate responses. In less developed countries, independent access to space is still an attraction far beyond their technical and financial capacity. Under these conditions, the population of countries with "space tradition" is less concerned about space issues, unlike public opinion in countries that do not have such capabilities, which considers spatial power essential to increase security and prestige.

The use of space capabilities to meet more pressing needs of development can be achieved only through concerted efforts at national, regional, interregional and global levels and enhanced collaboration between developed and developing countries.

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THE SPACE DIMENSION OF ENVIRONMENTAL SECURITY

Francisc TOBĂ, PhD
Luminița GHIȚĂ

Motto: Man conquered the universe. Now he has to fight with himself.

(Vasile Ghica)

Although we conquered a part of the extraterrestrial space, we are not yet prepared to live outside the Earth. To support further development of actual civilization, we shall reconsider our relationship with the natural environment, we shall secure the resources in order to create the conditions for a durable and sustainable development. The authors propose a definition of national security and environmental security in response to the impact of temporary or irreversible phenomena affecting human society.

Keywords: national security; environmental security; sustainable development; volcanoes, astro-politics.

Premises

The modifications of the international security environment have determined the redefinition of “space” as a variable of utmost relevance for the security of each nation. Among the factors that have changed the role and importance of space in the national security policy one could include:

- Increased risk and competition;
- The changing nature of military conflict (war) in which the advantage of information and the asymmetric have become increasingly important;
- The dynamic technological changes;
- The extent of the attention paid by policy makers, military and intelligence communities to space imagery.

Professor Lester R. Brown from the Earth Policy Institute, Washington D.C, has recently visited Romania, at the invitation of “Club of Bucharest” and presented his latest book, “Plan B 3.0”, which has the subtitle “general mobilization to save civilization”, publisher Engineering, 2010. What is worth mentioning regarding this

book, is the distinguished American scientist urge on humanity to leave its current position of spectator and to become an active factor in the rescue of civilization worldwide. The complexity of the phenomena that endanger the earth require a widespread effort and a proactive activism, especially in the area of environmental security.

We believe that environmental security issues are omnipresent and, unfortunately, omnipotent through their discreet, lengthy and sometimes irreversible character. The fundamental handicap of humanity in relationship with Mother Nature is its existential reporting at various scales of time, reason for which the conceptual device proves to be in most cases inadequate.

1. Concepts of national security and environmental security.

A possible definition of the concept of national security can be the following:

National Security is a state and a process parameter the nation has inherited, accumulated and which can be generated today and tomorrow, as well as all collective national and international capabilities required to identify vulnerabilities and to provide performing management of internal and external vulnerabilities, risks, threats and aggressions of any kind.

Thesis 1 - state institutions, communities and each citizen will take action in the area of national security in accordance with the precautionary principle and the right balance between objectives and resources available, having the purpose of preserving the fundamental issues of identity and national values and creating conditions of **sustainable development**.

Thesis 2 - National Security is no longer the state exclusive monopoly and its effective management is based on public-private partnership and communication tools, relying on modern regulations regarding cooperation with academic



and scientific, business environments and with private companies which provide security and society services as a whole.

Climate change is evolving at a different time scale compared to the consumerist civilization has understood as a time reference system. Economic globalization process engendered the inter-conditionings at the planetary level, but the environment requires more severely rethinking of human relations with nature, the increasingly pressing need to move from a profit civilization to a resource-based civilization.

Mankind must be centered on cost/income ratios in terms of the environment. In this respect, we would point out the need for a new paradigm: environmental security. This concept takes into account the holistic approach to human-nature relations, the global civilization-environment system.

Environmental security enables the awareness of the boundaries of these relations and allows to the appropriate arrangements to reduce the existing imbalances and to guide human activity towards cooperation rather than confrontation with environment. Activities of “therapy”, such as the restoration of natural environments seriously affected or waste recycling, must be accompanied by activities of “prevention, anticipation and mitigation of the adverse consequences of human activities on the environment. Man-nature partnership is the only win-win solution; it is the only valid option if humans want to continue its existence on Earth.

Environmental security refers to the security of bios and the manner in which natural resources sustain the bios on Earth as a result of human activity.

The Development of human civilization must not cause the weakening of the environment and the principles of balance between needs and the available resources, as well as the principle of precaution should govern human existence on Earth.

2. Space Dimension

Space dimension of security, in general, and environmental security, in particular, brings forward two relevant issues as follows:

1. The Military dimension:

- Space Imagery - use of GEOINT products;

- Scientific research;
- Navigation and telecommunications¹;
- Platforms for attack / counterattack from space;

- Internal security management.

2. The Civil (non-military) dimension:

- Scientific research in civil purposes;
- Global telecommunications²;
- Civil emergency management;
- Natural resources management;
- Integrated management of global environmental security.

For specific approach reasons, we considered space dimension as consisting in the atmospheric space and the Outer Space. We shall approach the issues separately as the environmental security is specific to each area.

2.1. The atmospheric space consists in:

- Troposphere – between 0 km and 7 km (at the poles) / 17 km (at the tropics) – it is the area where the weather phenomena take place;
- Stratosphere – between 7 km/17 km and 50 km;
- Mesosphere – between 50 km and 80 km;
- Thermosphere – between 80 km and 640 km;
- Exosphere – 50 km/1,000 to 100,000 km.

The layer in which all the living beings exist is the **Biosphere** and it is comprised between 0 km and 20 km.

2.1.1. Climate Change

The authors of the report entitled “Climate change and Earth observation”³ admit that, until 2010, the civil space policies - and financing – have been solely dictated by political agendas specific to the Cold War and by a relative dose of romance regarding space flights.

Climate Change - the new global imperative - requires a radical shift in paradigm to allow the construction, in a not too distant future, of an appropriate architecture for planetary observation and monitoring. Global warming and its effects are a large topic of speculation, but it is clear that mankind must deal with at advanced level a new set of global priorities. This process requires gathering, processing, storage and dissemination of a critical mass of relevant and opportune information in this area.



Climate change - especially the temperature changes - hasn't been sufficiently documented yet and, implicitly, they are managed as a result of limited atmospheric observation. The way in which human civilization influences climate changes is still insufficiently deciphered since these changes have been often placed on the top of the global political agendas.

Evaluation and management of these planetary mega-processes - unexpected and complex - require a scientific approach and the implementation of the identified solutions. By these two actions, regional and global policy makers will have adequate knowledge for their advanced actions. In this respect, space/satellite imagery plays an important role by providing a holistic understanding of the problem. At present, there are only 19 satellites dedicated to climate observing, many of them with an expired period of operation, therefore, the functional gaps will increasingly weaken global climate monitoring processes. Reality and climate change management requirements impose new types of satellites, more efficient, providing highly accurate information.

Weather satellites provide low resolution images which do not permit taking some advanced decisions. Climate change is a major dilemma in the field of space programs policy and space programs in this area remain under-funded. USA, through NASA, has generously funded space programs, determined by the requirements of the Cold War, programs which provided an international reputation in the global ideological confrontation, but which have also generated an extremely expensive and fragile space transportation system. The current program dedicated to Mars exploring is relevant in this respect.

If strategic decision-makers accept that climate change is the major risk for economic security, national security and stability, then it becomes obvious that the financing of the space programs for civil purposes should be reconsidered.

If classic cosmic flights offer international prestige, planetary observation supports environmental security, and thus national security.

Efficient management of climate change is one of the preconditions of sound national security management, at regional and global level. A system for space monitoring climate change requires sets itself as a condition for the security

of the environment and, consequently, for the national security.

New problems require new institutional architectures and, in this sense, we shall notice that the USA aims to achieve a "National Climate Service" which will gather, process and disseminate information on climate change in order to support strategic decisions in the sphere of national security, business development and communities management.

Data provided by specialized government institutions will also allow the development of weather prediction, water resource management and biodiversity conservation. They also allow more adequate understanding of the nature of climate change. Orbital satellites currently provide 99% of the data on environmental security and provide enhanced support for possible and favorable solution identification.

2.1.2. Regional pollution - activities of the volcanoes

As an effect of economic and information globalization, natural disasters turn into vectors of influence of national or international security. The most serious cases are those that engender functioning problems on the national or regional critical infrastructure components; this is the reason why there were identified and implemented a complex monitoring and early warning systems.

Through the Directive No. 114/2008, the European Commission introduced the obligation of the Member States to identify and designate Critical Infrastructure - at national level - until 12 January 2011. Presently, the Directive focuses on two sectors:

- Energy sector - sources of production, transportation, storage and distribution;
- Transport sector - air, land (road and railway) and water (river or sea).

On the way forward, the EU Commission aims to identify the European Critical Infrastructures in the field of ITS and other sectors.

Events in civil aviation that took place in the past decade, have forced major reconsideration of the impact of volcanic ash on the security of civil transport aircraft.

On June 24, 1982, Captain Eric Moody calmly announced the 247 passengers of the British Airways travel company (747), which flew on



the route from Kuala Lumpur (Malaysia) - Perth (Australia), that all four engines of the aircraft had stopped because of unknown reasons. The plane flew at a cruising altitude of 11.000m. The Flight Manual did not provide enough information to resolve this problem and the captain decided to descend to an altitude of 4,000 m and tried to restart the engines. One after another they began to function normally. The plane landed normally. The investigations carried out by experts of "Flight Safety Foundation" concluded that the simultaneous presence of such factors as the engine off, strangely bright halo⁴ around the aircraft and acrid smoke in the aircraft cabin in flight were the result of a cloud of volcanic ash. This cloud had been generated by the eruption of Mount Galunggung of Indonesia. On December 15, 1989, all-jumbo jet's engines of Airline KLM, which flew from Amsterdam to Anchorage (Alaska), stopped suddenly. The cause of this incident: the plane flew through a cloud of volcanic ash. The engines were restarted and the plane landed safely. These two aviation events, the results and findings of the investigations carried out by experts in the field (including engine manufacturers) have required the development of new procedures and exercises at international level.

"Flight Safety Foundation" stated the absence of relevant information provided to the crew by specialized institutions made it impossible to avoid these possible disastrous routes. Following these conclusions, the United Nations decided through its special structure, International Aviation Organization, to create detailed plans for unpredictable situations which have been also initiated on the latest eruption of the Icelandic volcano that caused a significant ash cloud. The decision to close the European airspace was based on the simulations of the Volcanic Ash Advisory Center of London and came exactly six weeks after the European community specialized authorities carried out the first of the two exercises dedicated to this type of aeronautical incidents. The aim of these exercises, according the principle of precaution promoted by the European Union, was to minimize the consequences of the volcanic ash cloud. The London Center is managed by The British Meteorological Office and it is part of a network of nine similar centers that are located in Toulouse (France), Anchorage and Washington D.C. (USA), Montreal (Canada), Wellington (New Zealand), Tokyo (Ja-

pan) and Buenos Aires (Argentina). This network was created by the International Civil Aviation Organization (ICAO).

This global network offers:

- Estimations - based on volcanic ash simulations performed by national centers, satellites and flying aircraft;
- Early Warning - notices that have been published since 1990 regarding the impact of volcanic ash clouds (identify areas affected and expected geo-spatial evolution of the clouds);
- London Center - is responsible for the UK, Ireland and north-east Atlantic Ocean;
- If the area affected by the ash cloud is relatively small it still has significance in terms of overall traffic.

Impact of volcanic ash cloud

The environment security, as described above, refers to the bios security, the resources security and more and more to the modifications/impact determined by human activities on the balance to be preserved in the man-natural resources relation. The impact of the volcanic ash cloud on human health was described by the United Nations Organization spokesman, David Epstein, who stated that the microscopic volcanic ash was potentially dangerous when it reached the ground as it can cause breath problems. Although the ash reached the ground in Island, Scotland and Norway, British specialists in the field of public health said the risk was insignificant because of the very small amount of ash that reached the ground.

Professor of Toxicology at the University of Edinburgh, Ken Donaldson, says that volcanic ash is less harmful than the cigarette smoke or pollution in the city. According to his estimations, we can speak about significant risks only for those who are in the immediate vicinity of the volcano. After having studied the impact of volcanic eruptions on public health, he concluded that it was insignificant.

Climatology studies have shown that massive volcanic eruptions throughout history have led to periods of planetary cooling. Environmental security specialists estimate that climate change - caused by clouds of volcanic ash - can affect the overall security as an effect of cooling because sunlight can be reflected by microscopic aerosol droplets (sulfuric acid) resulting from the conversion of sulfur dioxide into the atmosphere



from the volcanic eruption. Monitoring the volcanic ash cloud generated by the Icelandic volcano eruption showed that it remained relatively constant at an altitude of 6,000 m.

*The impact on businesses*⁵ was highlighted by the Executive Director of National Business Travel Association Foundation, Michael W. McCormick, who has publicly stated that the losses in terms of additional costs for travel were amazing. He advanced an estimated U.S. \$ 400 million, not including the missed /canceled business opportunities.

European Union leaders, through the voice of José Manuel Barroso, called for an assessment of the economic impact of the volcanic⁶ ash cloud and the European Commission held a technical meeting. A videoconference with European Union transport ministers was held simultaneously.

Three major objectives have been identified following these actions, namely:

- Increasing cooperation at EU level in order to maximize the potential of air transport passengers without depriving the passengers of security;
- Assessing the economic consequences;
- Passenger management situation.

We can conclude that volcanic eruptions may have direct and indirect effects.

Direct, usual effects are those which determine local damage and major operational problems on certain components that belong to critical infrastructures. A relevant example in this regard is the U.S. port of Tacoma which was not operational for two months after the eruption of Mr. Rainer volcano.

During this time, food supply was stopped despite the importance of this port as the 10th largest in the world. In the immediate proximity, the volcano St.Helen demonstrated its devastating potential in the recent past. Ceasing the activity of a port of this scale can engender lack of food for great part of population, causing both social and economic effects, especially for traditional food suppliers.

The most important indirect effect are the so-called “greenhouse gases” that can generate “mini-glaciations”. Unexpectedly, the cause of the green-house effect is not the volcanic ash, but the sulfur acid aerosols together with other chemical substances. A well documented case is the one of the Pinatubo eruption (Indonesia), which resulted in a 2 °C average reduction of the

global temperature for almost three years. The ash released by the eruption traveled around the world for three weeks.

The literature presents perhaps the most serious case of eruption which took place 251 million years ago, when, after several presumed giant eruptions in Kamceatka (Russia), 70% of terrestrial creatures and 90% of water creatures disappeared.

Analyzing the effects of volcanic activity, throughout history, we advance the following views:

- Earth is a “living organism” which evolves according to the fundamental principle of the Universe: the balance. Human activity introduced multiple variables in the balance equation which determined global mega- unbalances at the planetary level and the planet has responded; it activated its immunity system to restore balance. Man needs to reconsider its conquistador position of “conquering nature”, and to search for win-win solutions;

- Natural phenomena can have certain cycles in accordance with the yin-yang theory, which is based on the idea of energy duality;

- Closure of aviation activity - as a result of the Icelandic volcano eruption of spring 2010 - may generate, in our view, enough doubt regarding the appropriateness and scientific arguments. Climatic factors were used as levers in the global economic game and the dramatic reduction of the aviation companies potential is relevant in this regard;

- European principle of precaution was invoked in obvious disproportion with factual arguments. This kind of disproportionate reactions are the basis of many kinds of crises/conflicts specific to the contemporary world;

- Volcanic ash has beneficial facets as well as it is a very good fertilizer; the duality principle of life/death can be easily identified in this situation.

- Within the global evolution – in a theoretical 24 hours interval - human civilization “takes” only a few seconds, this being the reason for which the phenomena which have a planetary impact remain largely obscure.

- If one accepts the premises that, firstly, the Earth is a “mega-body” and, secondly, the universe is an info-energy construction, based on the balance principle, then we consider as feasible the idea of similarity. From this perspective, planetary microcosm - consisting of ecosystems and natural



resources system - determines the evolution (and, implicitly, the reaction) of the entire Earth, and vice versa.

2.2. Outer Space

Outer Space was originally considered as a new El Dorado, a new “Wild West” or a “no man land” which determined the United Nations Organization to impose strict legal regulations for this heritage of all human civilization.

Cosmic Space as security environment - may be considered as consisting in:

- The Earth - including the atmosphere;
- The outer space - the lowest orbit up to geostationary orbit (36,000 km) ;
- The Moon – the moon space from the geostationary orbit up to the lunar orbit ;
- The Moon area – everything that is placed in the solar system, under the influence of solar gravity.

According to “Space Treaty of 1967”⁷, the legal regulations for the use of the outer space includes, among others, the following:

- Art. IX - on carrying out space activities, the countries have the obligation to avoid harmful contamination of outer space and celestial bodies and harmful changes in the terrestrial environment following the introduction of alien substances.
- Art. VII – The country which uses a space object or ensures its launch or the country on whose territory or facilities was launched the object is internationally responsible for the damage caused by that object, or its components on earth, the atmosphere or in space.

2.2.1. Cosmic waste

According to the study “Space Security 2006”⁸, it has been estimated that, there are about 35 million objects known as “cosmic waste” (or “space debris”) in the outer space; about 13,000 of them are orbiting objects of sufficiently large size to damage or destroy a spacecraft or satellite.

In 2005, their volume increased by 2.1% as a result of five incidents of satellite fragmentation and two accidental collisions. Studies conducted in 2005 revealed that global warming and the effect of contraction in the thermosphere have generated an increased lifetime of cosmic waste and a higher frequency of space collisions.

Since 1990, it has been accepted that the issue of cosmic waste is an increasingly significant threat. In response, countries with space potential - China, Japan, Russia and the U.S. - and European Space Agency have developed standards of cosmic waste reduction. In 2001, the UN Commission for the peaceful use of outer space has mandated the Inter-Agency Committee for Waste Coordination to develop a set of principles to guide waste mitigation. In 2005, Waste Mitigation Task Force and Technical Subcommittee of the UN Commission for peaceful uses of outer space have generated an agreement on prohibiting the intentional destruction of any orbital object that can generate long-life cosmic waste.

U.S. Space Surveillance Network uses 31 sensors on a global level to monitor over 9,000 space objects in all orbits. Russian Federation has 14 sensors in the space surveillance system to monitor more than 5,000 objects, the majority on low orbits. The last paper “Space Security 2009”⁹ sustains that cosmic waste (which has a speed of 7, 8 km/s) remains a significant threat to space shuttles and global satellite system. At present, the U.S. Department of Defense, through the Space Surveillance Network, surveys more than 19,000 objects of more than 10 cm. diameters. It is estimated that currently there are over 300,000 objects with diameters exceeding 1 cm and one million objects of smaller dimensions. What would be the possible solutions? On the one hand, we could wait for the law of gravity to bring some of these wastes into the atmosphere and incinerate them naturally and, on the other; we could regulate the obligation of countries with space potential to develop technologies to “green” their space.

2.2.3. Astro-politics

The issue of space management as a reference system in the planetary security field is one of the most actual concerns of the experts in this field.

*Everett C. Dolman*¹⁰ approaches the space geopolitical issue even if the “Outer Space Treaty in 1967” prohibits placing mass destruction weapons on Earth’s orbit. He addresses the space environment as another geographical dimension, even if not included in the classical Earth geography¹¹.

Alongside classical environments - land, sea and air - outer space is increasingly becoming



an area of interest for military and civilian applications¹².

The exercise of “space power” - a new dimension of national security requires as a necessary and sufficient prerequisite, the acceptance and understanding of space as a new field of conflict (even military), which is not essentially different from the traditional geographic areas. Astro-politics can be defined as “major strategy” and Earth, as a whole, is reducible to a single component of a total approach.

Astro-politics principles promote all the efforts of sustainable development and increased general welfare - including the promotion of environmental security as a complementary result of beneficial democratization and of limiting the negative effects outer space militarization.

Astro-politics significant contribution results from the holistic approach of the geopolitical variables in the exploration of the outer space and from the complete and peaceful economic exploration of the cosmos by humanity.

The novelty of maximum generality, advanced by Everett C. Dolman, consists in redefining conventional geopolitics assumptions, as follows: who will control the low orbits will control the space in the immediate vicinity of the planet, who will control the neighborhood, will dominate the Earth and who will dominate the Earth will determine the evolution and destiny of humanity.

Geo-determinism, one of the classical geopolitical thinking trends, is based on the idea that geographical location - influenced by factors such as climate, natural resources endowment potential, topographic features (including landforms, rivers or oceans and seas) - ultimately decide the type of governance and people specificities.

Arnold Toynbee¹³, one of the leading representatives of the geo-determinism, considered the **climate factors** the fundamental pillars of geopolitics, taking into account the climatic vicissitudes determinant in the development of civilizations. From the geo-determinism perspective, outer space is an extremely rough and inhospitable environment. As a consequence, human civilization cannot evolve in this “space environment” which represents a unique combination of the hypothesis of hyper-frontiers and an inhumane environment.

Astro-politics is defined by Everett C. Dolman as the “study of the relations between outer space

and technology and between the development of political and military strategies¹⁴.

Astro-strategy¹⁵ is considered to be the process of “identification of critical sites, on Earth or in space, whose control may allow military or political domination of this area or, at least, provide guarantee against a similar domination of aggressor states”.

Traditional geopolitics and derivative strategies took the forefront of communications pathways and checkpoints, which may be natural or virtual (cyberspace, the financial system etc.). The U.S. navigation system - the Global Positioning System - is clearly a classic example of artificial “Checkpoint” technology, with effects on socio-economic life worldwide.

The Outer space (cosmic space) - similar to sea or air - may be theoretically covered omnidirectionally but supply and maintenance constraints will require in the future, the identification of “cosmic highways” to enable the space “heavy traffic”¹⁶. These “cosmic highways” will have their own critical “checkpoints” and the states controlling them will have their own space domination both in terms of terrestrial economic and political prospects.

Astro-politics proposes giving up nationalist approaches because Earth itself is a unitary concept that includes multiple entities into a single unity. The future approach shall have a holistic nature triggering the update of the traditional geopolitical paradigm which focuses on national and regional rivalries. Control of each Member will be replaced by the avoidance of the state control (or group of States) on vital points in space (locations, highways, checkpoints).

Conclusions

1. Environmental Security is the most general approach as it concerns the **Bios** (everything that is alive), the vital natural resources, particularly the interdependencies between human civilization and the Earth's resources that enable the sustainable development.

2. Environmental Security generates the nation security resources.

3. Environmental Security, through the bios focus, includes what is called and understood as “tacit knowledge”, peculiar to the human being, the only one that be aware of its own evolution.



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NOTES:

1 Such as the US Global Positioning System (GPS), EU's GALILEO System, GLONASS System of the Russian Federation.

2 The most frequently used system nowadays, the US GPS, had initially exclusive military purposes, but it has turned into a vital support for the economic activity. He has cost and continues to cost billions of US dollars paid by the US Department of Defence and seems to become increasingly vulnerable in what concerns its reliability.

3 James A.LEWIS; Sarah O. LADISLAW și Denise E. ZHENG, *Climate Change and Earth Observation*, Center for Strategic & International Studies, www.csis.org, 2010.

4 This is also known as "Saint Elmo's Fire", who was considered the patron of the sailors; it appears when the atmosphere is highly ionized, especially during storms.

5 According to the information provided by www.etravelblackboards.us.

6 On 19th of April 2010, according to www.english.hotnews.ro.

7 On 27th of January 1967, three states – USSR, US and UK – signed "The Treaty on the principles that that govern states' activity in exploring and using cosmic space, inclusively the Moon and other celestial organisms". It entered into force on 10th of October 1967, and since January 2008, other 98 states have become parts of the Treaty; other 27 countries signed the Treaty and the ratification procedures are in process.

8 www.spacesecurity.org.

9 www.spacesecurity.org.

10 Everett C. DOLMAN, **Astropolitk, Classical Geopolitics in the Space Ege**, Frank Cass Publishers, 2005.

11 In our opinion, we shall consider more the virtual dimension, which is the cyberspace.

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16 Before 9/11, during the presidency of Bill Clinton, USA set itself to realize genuine "internet highways". Cyber attacks determined them to reconsider this strategy.

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SPACE TECHNOLOGIES AND THE MILITARIZATION OF SPACE

Gheorghe CALOPĂREANU, PhD

Cold War provided the ideal environment for launching various races in many areas between the world superpowers of those times, often supported by their own satellite-nations. Among all these, the race for space conquest, the race for arming and the result of their combination - space militarization- are certainly the most obvious samples of the fight for the world supremacy.

The essay below is designed to chronologically illustrate the level the two world players – the USA and the Soviet Union/Russian Federation reached towards the militarization of the space and, through technical details, to depict the objectives they reached in this particular area.

Keywords: race; space; anti-satellite; militarization; cosmos; orbital

The Early Days of Outer Space Exploitation for Military Purposes

The outer space conquest race obviously was the 20th century tightest competition in which, since 1957, the US and the Soviet Union competed for more than a decade. Throughout this period, Nikita Khrushchev, the reputed Soviet communist leader, on the one hand, and as many as four American presidents, i.e., Dwight Eisenhower, John Kennedy, Lyndon Johnson and Richard Nixon, debated on this issue and all came to one conclusion: the outer space conquest was the top priority of their epoch.

Each of the two super powers wanted to demonstrate to the other, as well as to the whole world, its military power along with its scientific and technical supremacy. While Khrushchev was trying to display the Soviet technological superiority, his American counterpart, John F. Kennedy, when talking about the project of sending men to the Moon, showed his all-encompassing availability to make it operational before the

Soviets developed their own technologies enabling them to reach the Moon soil first.

“No other project of this time will be more impressive and important for outer space exploring, nor more difficult and expensive to carry out”, stated the US President in 1961.

Under these circumstances, given this kind of statements made by both sides, the competition for the outer space race begun, in 1957, when the Soviet Union launched the first artificial satellite of the Earth, i.e. Sputnik (“the Traveler”). Less than a year later, the USA sets up the National Aeronautical and Space Agency (NASA), the first federal agency dedicated to outer space exploring. Later it became world famous due to the exceptional results its experts - scientists and engineers brain-drained from all over the world - got in the field of outer space research.

In 1959, the Soviet Union launched Luna 2, the first module that reached the Moon, placing the USA on the second position in the recently started race.

1961 brings satisfaction to both competitors, with a slight superiority maintained by the Soviets. The latter managed to send the first man, Yuri Gagarin, on the Earth orbit. In response, the Americans become the first visitors of outer space, within the Mercury Project, by Alan Shepards Jr. The program has a historical importance, despite its short duration and the minimum size of the capsule.

The stated objectives of the project were to send the first man on the orbit of Earth, to study the outer space effect on human body and to bring the astronaut safely back to Earth.

By the end of 1963, when the project was successfully closed, seven astronauts were sent to outer space. Nevertheless, the Soviet Union continued to run first in the outer space conquest race.



THE SPACE DIMENSION OF THE SECURITY ENVIRONMENT

Only 20 days after the 15-minute suborbital flight of Alan Shepard's, President J.F. Kennedy said: "I think our nation should reach the Moon before this decade comes to an end". It was May, 25th, 1961. Eight years later, the astronaut Neil Armstrong was to become the first man to have ever set foot on the Moon.

The next program, called Gemini, was designed as a mid stage between Mercury and Apollo and was aimed at extending to two weeks the time spent on the orbit, meeting and coupling in outer space with another space ship, returning and landing on the Earth as safely as possible. Beyond the technically exceptional achievements, the Gemini program triggered off a new beginning for the outer space conquest race, placing the USA first, before the Soviets.

The Apollo project, commenced immediately after the end of Gemini in 1966, is, beyond any doubt, the greatest achievement that far of the humanity. By the end of 1972, 24 people had traveled from the Earth to the Moon (three astronauts had made the trip three times), and 12 of them had even set foot on the surface of the Earth's natural satellite.

Thousands of photos could be collected during the flights comprised in the Apollo program; recordings worth several hours were made and 380 kilos of lunar soil were brought to Earth. In addition, several scientific experiments were made, a laser-based reflector included; it was designed to measure the distance between the Earth and the Moon, and was left on the latter for further use.

The Apollo program was not focused exclusively on the conquest of the Moon. In 1973, the Skylab space station was launched by a "Saturn V" – type rocket, and two years later the USA and the USSR coupled in space their Apollo and Soyuz ships.

The objectives of the project, fully met, were to have one man land on the Moon and return on Earth safely, as well as to have some lunar soil samples brought to our planet.

By being the first to reach the Moon, the USA won the outer space conquest race. The event was highly described by the media, the whole world watching with interest the huge progress made by each of the two competing states.

A series of events which occurred in the mid-20th century heralded the Soviet Union's intention to use outer space for military purposes.

In 1955, the Baykonur cosmodrome was set up, in the former Socialist Soviet Republic of Kazakhstan, used for some time for purely military purposes. Today it is used exclusively for civil-related activities.

Two years later, the ex-USSR inaugurated the Plesetsk cosmodrome, still operational today but used for military purposes solely. The cosmodrome infrastructure was so developed to be able to launch Angora 1.2 – type rockets, produced by the research scientists of the Krunichev Space Research Center in Moscow, in order to replace the Soyuz series ones and able to launch military satellites of the new generation.

In March 1961, only five weeks before the famous astronaut's Yuri Gagarin flight in space, in today's Kazakhstan – close to Lake Balkhash – the first successful interception of an outer space target was made, a performance which the USA was to equal only 23 years later.

Step by step, important progress was made in the development of missile defense systems, while setting up space troops, which culminated in the achievement of the first missile defense system, in Moscow in 1978. From this moment on, the USSR initiated a series of programs and scenarios for the offensive type space war, including the well-known 85-ton combat laser orbital station Polyus Skif – DM, achieved in the 80s.

In the post-Soviet era, the space forces, currently called the Russian Space Forces (VKS), although officially created by presidential Decree in 2001, were set up in 1959 when training the experts in early warning and missile defense and space monitoring.

At present, the Russian Space Forces are led from Moscow and carry out the following spectrum of missions: early warning, ballistic missile defense, development, launch and control of Russian orbital satellites, as well as permanent surveillance of the United States of America.

The forces are made up of approximately 15,000 people, out of which almost 50% are civil experts and currently work in the Plesetsk and Baykonur cosmodromes (the latter being hired from Kazakhstan); starting from 2011, they are due to move to a new cosmodrome which will become operational in Eastern Russia.

Since they came into being, the Russian Space Forces have been deployed in out-of-area installations, e.g. the Beregovo-Mukachevo station



in western Ukraine, close to Poland-Slovakia-Hungary border (now de-commissioned), the Mikolayv-Ukraine radars, used in support of the Black Sea Russian Force (whose presence in the Black Sea area has caused endless controversies in Kyev), the Balkos-Kazakhstan installations and, last but not least, the Volga radar station in Ganchevich-Baranovich, Belarus, operating for the Russian Federation and Belarus altogether, according to the integrated missile defense structure both countries agreed upon.

Other controversies are caused by the radar located in Gabala, Azerbaidjan, whose inhabitants have repeatedly complained about certain diseases consequent to chemical and electromagnetic radiation exposure due to the installation.

Despite all this, it is the Russian Federation's intention to include this radar, along with the Armavir one, in Northern Caucasus, in a missile defense system jointly produced with NATO.

The Early Anti-Satellite (ASAT) Programs

In the field of space militarization, in the last 50 years, the US and Russia have adopted parallel approaches, often complementary. Initially, the military use of outer space was for reconnaissance purposes exclusively. The competition between the US and the USSR - subsequently the Russian Federation - with respect to reconnaissance missions in outer space, has shifted from the hostile age of the 1960s, when an American U2 spy-plane was destroyed by air-defense missiles above the USSR, to the mutual acceptance of imaging satellites used for monitoring the accomplishment of agreements on arms control, as an essential component of these states' national security. The transition was not at all a smooth one. Periodically, both the US and Russia have invested a lot in anti-satellite technologies (ASAT), but some of the measures of ensuring transparency and recognition of the fact that anti-satellite weapons did not serve the interests of either state have slowed down the process of development of such weapons. This resulted especially in the ban documents issued by the U.S. Congress and the voluntary Russian moratoriums regarding anti-satellite testing. The report made in January 2001 by *the US Commission to Assess the National Security Space Management and Organization*, chaired by Donald Rumsfeld

for a short time before becoming Secretary of Defense in the Bush administration, makes explicit reference to the anti-satellite technology, stating that "the US will need means to deter and defend against satellite threats, be they temporary and reversible or physically destructive."¹

At present, outer space has acquired a higher military value, as satellites can perform not only reconnaissance and surveillance missions, but also essential communication and navigation functions. However, the US seems to have regained interest in anti-satellite weapons.

Ever since 1963, the Soviet, then Russian, armed forces have had anti-ballistic missiles (ABM) and programs for outer space defense in response to the threat posed by the American reconnaissance satellites, which were developed in turn when it became clear that the USSR was eventually going to be able to prevent the surveillance of American U2 spy-planes.²

The Soviet Union initiated diplomatic action against the recognition of US satellites by submitting a project proposal to the International Law Commission, in June 1962, stipulating that "the use of artificial satellites to gather intelligence on the territory of foreign states is incompatible with the objectives of mankind in conquering outer space". Anti-satellite capabilities were mainly developed as part of this program, although there have been various residual capacities used for other purposes.

In its turn, the US aimed at developing anti-ballistic and anti-satellite systems, especially because of the threat perceived in the Soviet "systems of orbital bombardment". In a speech made in the presidential electoral campaign, in 1964, Lyndon Johnson announced that "*in order to make sure that no nation will be tempted to use outer space as a platform for weapons of mass destruction, in 1962 and 1963 we started to develop systems able to destroy satellites which carry bombs*".³ The limitations imposed by the technological means of the 1960's on the guiding systems determined the manufacturing of the first interceptors from hard alloy, still allowing successful attacks against anti-ballistic and anti-satellite missiles.

In 1960, the USSR set the limited missile defense of Moscow, using nuclear interceptors made of hard alloy, whose components are still in use. As a response, in 1975 the US also developed



a system using nuclear interceptor missiles in Grand Forks, but shut it down on reasons of high costs and lack of efficiency.

Although both systems would be easier to use against satellites, they were for a long time a limited anti-satellite option, mainly because it is impossible to differentiate among nuclear explosions in outer space and - in case they happened - they would destroy all the satellites in the area and disturb the activity of many others. At the same time, using them would mean breaking the Partial Test Ban Treaty from 1963, which forbids testing any nuclear weapon "or any other nuclear explosions" in the atmosphere, in outer space, and under water.⁴

The expressed desire of the United States of America was to confer legitimacy to that reconnaissance mission in outer space while protecting the latter against Soviet weapons. In turn, the Soviets considered the control of weapons in outer space as serving their purpose and reacted positively to the possibility of signing an agreement on this issue. Although the US had changed its position ever since the end of the 1950's, when their diplomatic initiatives concentrated on issuing a flight interdiction for the overall military activity *in and through* outer space regarded by the Soviets as a scheme meant to slow down their superior, long-range missiles program, the circumstances of preparing such a treaty became favorable as late as 1967. Thus, despite both superpowers expressed concerns - difficult to check out - in 1967 they signed the Outer Space Treaty, which forbids stationing weapons of mass destruction in outer space or on the celestial bodies and proposes the development of co-operation within this type of space already considered to be at risk. The Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of the Outer Space, endorsed by over 90 countries, the US included, regarding the interdiction of weapons of mass destruction in outer space, stipulates that "*the exploration and use of outer space should be carried on for the betterment of mankind and for the benefit of States irrespective of their degree of economic or scientific development, for the benefit and in the best interests of all mankind... [and] must be guided by the principle of co-operation and mutual assistance.*"⁵

The USSR and the Co-orbital Anti-Satellite System

The only anti-satellite weapon system Russia possesses is the co-orbital anti-satellite one, able to launch conventional missiles when the target satellite's ramp is lifted from the launch spot, a moment when the anti-satellite system is placed on an orbit close to the target satellites. On the course of one or two orbits (approximately 90-200 minutes), the 1,400 kg anti-satellite interceptor gets close to the satellite, guided by the on-board radar, then "dives into" the target satellite, blowing off when the distance to it is less than 1 km. The aim is to destroy the target satellite by means of fragments (shrapnel) resulting from the explosion.

The initial trial phase of the system lasted from 1963 to 1972 and comprised approximately 20 launches, including target and interception satellite launching, about seven interceptions and five detonations. The initial trials confirmed the system might operate at orbital altitudes ranging between 230-1,000 km and the system was declared operational.⁶

After the Anti-Ballistic Missile Treaty was signed in 1972, the Soviets ended the trials. The treaty not only stipulated "each party's commitment not to develop, test or deploy anti-ballistic missile systems", but also banned the parties from using "national technical means of monitoring the Treaty"⁷ (primarily the research satellites). The acceptance by the Soviets of these terms was regarded as a tacit approval of the legitimacy of this type of satellites.

For some time, the Soviets were suspected of having developed electromagnetic weapons, especially lasers, to be used for anti-satellite purposes. In October 1975, five cases of abnormal "blindness" of the IR sensors on the American satellites were generated by sources in Western USSR. Although the officials explained the IR source was a fire along the Trans-Siberian pipeline, some observers stuck to the conviction the Soviets had developed a laser-based anti-satellite system.⁸

The following year, the Soviets resumed the co-orbital system trial, in response to the development, by the USA, of the space shuttle, which the Soviet military perceived as a means of transport for weapons into outer space. The



distance was successfully extended to a range of minimum 160 and maximum 1,600 km, and the attack time shortened, to allow the interceptor to maneuver to target on one single orbit. The platforms using optical systems and with IR sensors instead of on-board radar are thought to have faced certain problems. At those times, the system was considered fully operational.

Since the signing of the treaty in 1978 until 1982, the Soviets continued the trials on anti-satellite co-orbital weapons, at the approximate pace of one interception per year. The system is currently considered operational, although it has not been tested again for several years.

At that time, while pursuing the anti-satellite technology development, both the USA and the USSR seemed to hide their intentions by continuing talks on anti-satellite weapon control, though at a low level.

American and Russian Anti-satellite Systems of 2nd and 3rd Generation

In June 1982, the USA stated the intention to try a cutting edge anti-satellite weapon, i.e., *the air-launched miniature vehicle*. This supposed high altitude launching of a missile from the F-15 aircraft. The latter would subsequently go straight up to a target satellite on a low orbit and try to annihilate or disturb it by the impact force. This annihilation mechanism is also called “kinetic annihilation”, because the satellite is destroyed by the high kinetic energy of the high-speed collision. The competition responded by developing a similar anti-satellite weapon, launched from a MiG-31 aircraft. Such a system helped improve the anti-satellite co-orbital system, by removing the need to wait for the best launch time and by significantly reducing the lapse between the anti-satellite launch and the target annihilation.

In the spring of 1983, in his “Star Wars” speech, President Reagan stated his intention to channel US resources onto the large-scale development of a missile defense system. Such systems were to contain several interceptor missiles stationed in outer space. The USSR responded to this announcement by resuming research on its own missile defense systems, followed by undertaking diplomatic measures, proposing the ban of space weapons and declaring a moratorium on anti-satellite system trials. Russian President Yuri

Andropov stated Moscow would impose “a moratorium on such launches throughout the period when other states, the US included, would withdraw all kind of anti-satellite system from outer space”.⁹

The American *air-launched miniature vehicle* system was tested twice in 1984, launching interceptors without aiming at specific targets. The first and only anti-satellite trial was made on October 13th, 1985, when an old Solwind satellite was destroyed on a 555-km orbit. The US Air Force kept on developing this program, scheduling a series of trials for the following year. Despite this, in December 1985, the Democrat-controlled House of Representatives and the Republican-led Senate included in the budget approval note a ban on the *air-launched miniature vehicle* trial on an outer space target. This decision was made only one day after the Air Force had launched two target satellites on orbit for their second trial round.

The Air Force continued tests on the anti-satellite system in 1986, while complying to the ban on engaging an outer space target.

The ban on anti-satellite system trial was renewed in 1986. The Russians continued simultaneously to comply to a voluntary moratorium on anti-satellite tests. In November 1987, both the White House and the Congress compromised on arms control regulations in the bill extending the anti-satellite test ban, but which allowed to raise this interdiction in case the Soviets resumed their anti-satellite tests. The political opposition to the continuation of the anti-satellite system was seemingly strong and the Air Force quitted developing *the air-launched miniature vehicle*, due to the impossibility to perform the final tests.

While complying to the moratorium, the Soviets continued to develop missile defense technologies. There were some allegations on the development, by the Soviets, of a MiG-launched anti-satellite weapon, similar in purpose to the air-launched miniature vehicle. In 1987, a Soviet mission, possibly a trial-platform for the “space combat station” to-be, failed when the air vehicle could not reach the orbit and eventually crashed into the Pacific waters.

In 1988, the two Houses of the Congress voted against the extension of the anti-satellite ban, while rejecting the Department of Defense’s request to allocate 100 million USD in order to develop a



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ground-based anti-satellite system. The Air Force initiated plans for other anti-satellite programs, especially for a ground-based laser system. Both the kinetic annihilation system and the laser one have relative advantages and disadvantages. While the kinetic annihilation systems offer an easily verifiable satellite “strike” and can be used in any weather conditions, the ground-based lasers, quite sensitive to bad weather conditions, produce less space debris and allow for the “concealed” strike against the satellite.

The US Army started to speed up planning for their own ground-based anti-satellite weapons: a ground-launched kinetic annihilation vehicle (i.e., the anti-satellite kinetic energy KE ASAT system) and a laser ground-based system. Projects on the latter meant both for the US Army and Air Force, converged into the Army MIRACL laser, a megawatt-class chemical laser, located in White Sands Missile Range, New Mexico.

The reports of the US intelligence services of that time revealed the Soviets had developed an operational anti-satellite laser system, perceived as a real threat to satellites and ballistic missiles likewise. The Soviet success was a genuine incentive for the anti-satellite development. The American MIRACL laser-centered anti-satellite system was largely developed in 1989-1990.

In July 1989, the Council for Natural Resources Defense and the Soviet Academy of Sciences organized a visit of a US delegation to Sary Shagan Laser-Ranging Facility in Kazakhstan, during which, following observation and discussion, it became obvious that the Soviet anti-satellite laser project was not a major threat, and was certainly far from being ready to send into space as an anti-satellite weapon. Later on, the Congress included in the defense budgets for 1991-1995 bans on using the MIRACL laser *against an outer space target*.

Although the Department of Defense officially shut down the Army ground-based KE-ASAT program in 1993 and, from that moment on, has not requested additional budgeting to continue it, the Congress revived the program in 1996, adding 30 million USD to its budget. The Congress continued to support the program, by allocating 50 million USD in 1997 (to which President Clinton used his right of veto to reject) and another 37.5 million USD in 1998. Despite government statements, which warned the program was not in order,

support continued for much lower budget levels. Moreover, although the Department of Defense had not requested budgeting for this program, the Congress authorized 7.5 million USD in 2000 and 3 million USD in 2001. No budgeting had been provisioned for 2003, and the strongest supporter for this program, Senator Robert Smith, was not re-elected in 2002. Excepting the armed forces’ officials, there seems to be little interest in this program. The Air Force representatives were very critical to it, stating the risks related to striking own space assets by using the KE-ASAT outnumber the advantages the system might have.

The ban on using the MIRACL laser against outer space targets was raised in 1996, when the newly elected Republican Congress decided not to reinforce it.

In October 1997, the US Air Force ordered the trial of a new anti-satellite, MIRACL laser-based system, oriented to a satellite orbiting the Earth 420 km high. The MIRACL laser apparently faced some technical issues, but the trial results were amazing.

Within the trial, a lower power (30 W) laser, meant to help align the system and keep track of the satellite, was the main laser source used throughout the test. Although it could not destroy the sensor, this lower power laser seems to have been powerful enough to blind the satellite temporarily. The fact that a commercial laser and a 1.5 m mirror might prove an efficient anti-satellite system pointed to a vulnerability of the US which the Americans obviously disliked to a high degree. Although the Pentagon described the trial as defensive in nature and performed solely to identify the degree of vulnerability of American satellites to laser weapon attack, there were many other voices, especially Russian, who expressed their concern as to the offensive capabilities of this system, and asked officially for negotiations on banning anti-satellite systems.

Current US Anti-Satellite Capabilities

Following the already traditional American-Russian race, both the armed forces and the defense agencies in the US were directed to concentrate their efforts on achieving control over the outer space. This led to a series of alterations of bureaucratic nature but, despite this, no new initiative of anti-satellite systems has been



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launched on a large scale. Nevertheless, there are still chances that a residual capability from the previous generation of systems may still be operational at present.

Therefore, the level of current capabilities, including the systems of miniature vehicles launched in the air by the air forces, has not been tested yet, since their trial has never been finalized. Air Force officials expressed their disagreement with respect to the use of ASAT, which they considered destructive systems, able to produce space debris. Even the councilors within the Department of Defense who are in favor of developing anti-satellite capacities, consider non-reversible anti-satellite systems as a last resort¹⁰. A report of the Scientific Council of Defense mentions that “the task force considers the authority to use systems for the “physical” destruction of an enemy satellite not appropriate when there are other “reversible” means of reaching this objective. The US would destroy a space system only if the permanent denial of the enemy’s capacity to accomplish missions in outer space is a matter of national interest and only when they receive orders to this effect from the National Command Authority. Although it has traditionally been the service with the greatest involvement and interest in anti-satellite technology, the Air Force has not shown any interest in resuming this special program.

The assessment made in December 2000 by the *General Accounting Office* regarding the anti-satellite system based on kinetic energy (KE-ASAT) of the Land Forces concluded it would take considerable amount of work and adequate financing in order to make the system ready for in-flight testing. Following recommendations made by the Department of Defense, the Land Forces, together with Boeing, their contractor, continued their integration efforts and the tests of environmental protection on three vector-vehicles, which were to be subsequently stored.

The officials of the program believed that the Bush administration and the Republican Congress could offer greater support for the program, at the same time admitting the flight tests of KE-ASAT may encounter considerable political opposition.¹¹ They stated that, provided they receive necessary support, including the financial one, the system could develop an emergency implementation capability in three year’s time, although two out

of the three vector-vehicles already built were dismantled in order to be used in other projects¹². No funds were allocated from the budget at the President’s or Congress’s request starting 2001, and no other financing was included afterwards in the budget request for the 2004 financial year.

For these reasons, the anti-satellite laser system MIRACL has not been tested again and, although the US Land Forces occasionally use the laser in routine testing, the program has come up against financial difficulties and its managers are trying to identify other uses for the laser.

Basic EW anti-satellite technology, such as data transmission jamming to and from satellite is not particularly difficult to acquire technically speaking and is therefore probably possessed on a large-scale. Such anti-satellite attacks also have the advantage of being somewhat under cover and do not leave space debris. Nevertheless, the success of such attacks is difficult to confirm. More difficult to achieve are the exclusive jamming of specific users and permanent denial. The exact level of specific capabilities of the US and the Russian Federation is not known, but it is very likely that both countries have these EW techniques which are also useful outside the geostationary orbit, especially against non-military targets relatively unprotected against such attacks.

Although the US has initiated no new anti-satellite program, the George W. Bush administration increased the financing for, and expansion of, the research and development field for relevant space technologies, including some meant to survey space objects, new launching and propulsion technologies, and light sensors and vector-vehicles. High energy laser technology was also supported by increased financing, while adjacent projects include developing the required techniques for propagating laser radiation in the atmosphere, special importance being given to decreasing the weight of the laser system in order to make it more practical and easier to carry by plane or launched in space. The traditional satellite components are also in course of improvement, in the sense of reducing their size and weight. This can eventually lead to the possibility to launch “parasite”¹³ micro satellites, i.e., small objects which spot and chase other satellites. This technology could prove useful for ASAT missions in case the micro satellites were able to maneuver in the immediate proximity of the target-satellite,



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in order to jam or destroy it. At the same time, micro satellites might provide satellite defense functions.

The development of such breakthrough technologies both for offensive or defensive deployable systems will be a long-term process. Even so, some of the systems the US is currently developing for ballistic missiles interception could prove extremely appropriate to use as ASAT systems, and could therefore significantly increase the US ASAT capability. It is obviously clear that, as long as the technologies developed for long-range missiles defense cannot prove efficient enough for ballistic missiles defense, some of them could prove their efficiency against satellites as, in many respects, attacks against satellites are easier to mount.¹⁴ The trajectory of satellites lies on predictable orbits, which can be determined accurately by ground monitoring, allowing thus to anticipate the next position of the satellite. The US would have time to plan an attack, could choose the moment, and would have enough time to strike it as many times as necessary to destroy it. On the other hand, in an attack with ballistic missiles, the attacker would have the advantage of taking the other by surprise and the defense would have less than 30 minutes to respond. In addition, an interceptor attacking a satellite would not have to encounter difficult counter-measure problems the way an anti-missile system would. Today's state-of-the-art satellites are not properly equipped for defense purposes. While the satellites of the future could include measures conferring a certain level of protection, the upper hand of the attacker will be difficult to overcome.

Conclusions

The Russian Federation has clearly set, from the very beginning, its objectives aiming at the militarization of outer space, on the one hand by defining the doctrines and tactics for military operations in space and, on the other, by avoiding the repetition of the space arms race of the 80s, considered to have triggered off the events which led to the dismantling of the Soviet Union.

In 2009, President Dimitri Medvedev stated that the Russian Federation's response to any deployment of American armaments on the orbit would be asymmetrical and should be carried out agilely, innovatively and very accurately,

the Russian official making it very clear that his country would not exclude the use of nuclear weapons if any threat to the security of the Russian Federation were posed.

Despite this, the Russian authorities consider it is mandatory to avoid any strategic competition with the USA insofar as the space armaments are concerned.

The Russian Federation's technological deficit in the competition against the United States of America increases the interest of the former in banning all space arms as well as the surface-to-space platforms ones. The same deficit urges Russia to include nuclear arms and missile defense in the new START treaty, signed in Prague, on April, 8th, 2010 by presidents Obama and Medvedev, following over one year of negotiations.

The new treaty, which replaces the document signed in 1991, highlights the nuclear arms for orbital purposes as a reason for serious concern, the latter including, beside nuclear technologies, lasers, electromagnetic and energy-guided weapons, munitions launched from outer space against ground targets, with devastating kinetic effects such as the so-called "anti-satellite weapons", able to launch "nuclear mines", projectiles or particles against ballistic and orbit targets.

The Russian federation's intentions as regards the space weapons development and use are nevertheless unclear. A secretary of state from the Russian Federation's Ministry of Defense, General Vladimir Popovkin, suggested his country intends to develop this kind of armaments in case its adversaries design their own weapons for outer space-related purposes. Several months later, the Russian Space Forces Commander denied the mere existence of such Russian plans.

The current goal of the Russian Space Forces is to launch about 60 observation-reconnaissance, communications and command and control satellites, meant to cover constantly the whole surface of the Earth. On April 16th, 2010, the second satellite of the program, a reconnaissance platform of the Kobalt-M type, was launched from Plesetsk at low altitude, close to the polar orbit, rotating around the Earth every 90 minutes. Immediately after its launch, one of the deputies to the Russian Space Forces Commander admitted the latter had run a launch program of a space vehicle, without stating if the program under



discussion was part of the current satellite launch plan, initiated in 2009.

Despite the impressive heritage of the USSR, the present day's Russian leaders, civilians and military alike, tend to admit the Russian Federation is not able to keep the pace with the USA and China in the competition regarding deploying the space weapons on the orbit.

The ex-Soviet republics are still involved in outer space issues, although the number of launches for military purposes has decreased, whereas the commercially related ones have increased in number. The existence of the American reconnaissance satellites – which for many years was the underlying cause for the development of the Soviet anti-satellite capability – is no longer perceived as a major threat, as the Russians view cooperation with the US in the missile defense area as an option for the future. The moratorium for testing the anti-satellite weapons, initiated in 1983, is still in force.

NOTES:

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TECHNICAL AND TECHNOLOGICAL DIMENSION OF SECURITY AND DEFENCE

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This paper brings into the readers' attention the importance of the technical and technological dimension of the security and defence. The first part of the paper refers to the dynamic of the international security environment, bringing into discussion the dilemma of national vs. multinational in countering the current risks and threats. No matter if solid arguments can be brought in order to support any of the ways currently looked upon as adverse, national or multinational, it is certain that regardless the development of one state requires cooperation in the technical and technological field. There are numerous and ambitious plans of developing military capabilities for combating current risks and threats, but the aim of this paper is to illustrate the way in which present technology may come in support of the identified needs. This paper is pointing at a certain technique's capacity of adjustment to the needs, the adaptive character of the initiatives, their final aim and their efficiency. The secret of a good further development of international security and defence environment consists in increased inter-agencies cooperation (NATO-EU). Moreover, countering terrorism is looked upon with increased precaution by most of the international or regional security organizations. In this field, two elements can be identified as essential: cooperation (exchange of data and information and joint actions) and technological dimension.

Keywords: security environment; countering terrorism; technical and technological cooperation; missile defence; cyber defence; AGS; EDA.

1. Assessment of the international security environment. National vs. multinational in countering current risks and threats

The dynamic of the international security environment, as well as the continuous decay of the so –far known components of the reality ask for a constant re-assessment and re-thinking of the changed status of any subject interested in or affected by the surrounding world. Therefore, the inexorable emergence of a new disposal of the reality's components, the immanent transformation of the traits perceived as risks or threats (currently all being seen as „challenges”), the expansion of the meanings of the „security” concept so much that, at present moment, defence is just one of the constituents, along with, for example, energy security or environmental security, claim for paying an increased attention towards quotidian and enhancing our own capacity of foretasting the „unforeseeable developments”¹.

As 9/11 events or the racing of the globalization process have led, in the recent years, to a need of over-theorizing the reality, of „putting into words” or of „conceptualizing” all the elements on which each organization, nation or even individual have a personal perception – e.g. „terrorism or „asymmetric”, we now feel that there is a new drift, that of concretion of all the scholastic debates. A summary of the European Security and Defence Workshop held at Chatham House on 10 June 2009, „Changing Concepts of Security and Defence”, mentions the statement of the US professor Joseph Nye Jr., according to which Obama's Administration has only few academics precisely because they have become „out-of-touch



with reality”². In consequence, we can argue that there is a new risk, that of compartmentalization of the opinion, following the divergent interests of all the subjects involved and, consequently, of not reaching a consensus at the level of international community, with regard to actions, steps to be taken, means or objectives. The same trends, that can generate lack of action or reduced capacity of reaction, can also be met at the level of an international or regional security organizations, as it proves pretty difficult (at times impossible) for the member states to share the same priorities in this field³.

„The nature of security environment is such that there are no wins, losses or tangible defeats”⁴. Even so, the proven willingness of all the components of the international environment in preserving, by all means, the values and ways of conducting their lives inevitably lead to common actions. The most relevant through their palpable components, as well as those that have constantly been looked upon with enough openness by all the states, are those that deal with actions or developments in the technical field. In other words, we may argue that where political dialogue and analysis have been confronted with restraint, common investments and proven willingness in reaching the necessary level of interoperability have triumphed. So, no matter if, in theory, solid arguments can be brought in order to support any of the two ways currently looked upon as adverse, national or multinational (be it organizational or coalition-type), it is certain that, physical incapacity, of any of the states, no matter their level of development, to deploy and sustain, for long periods of time, military actions or operations taking into consideration all aspects involved by such steps, require cooperation in the technical field.

2. The usage of modern technical and technology in support of enhancing international security

There are numerous and ambitious plans of developing military capacities, technical means of combating current risks and threats. The aim of this study is not that of making an exhaustive presentation of all of these plans (this approach, besides its self implied complexity, might not lead to our study’s expected academic utility), but that of illustrating the way in which present

technology may come in support of identified needs. Therewith, the present study will point at, among others, the following: a certain technique’s capacity of adjustment to the identified needs, the adaptive character of the initiatives, their final aim and their efficiency.

For a greater coherence of the current paper, a short definition of terms is required. So, the Romanian Explanatory Dictionary⁵ mentions that the word „technical” refers to, among other, the following: „the aggregate of tools and production practices developed along the history, that allow the mankind to research and transform the surrounding environment with the aim of getting material goods; the aggregate of the procedures used for practicing a certain job, a science and so on”. In the military sense, through „fighting technique” is understood „the aggregate of fighting and auxiliary means that are used for the armed forces’ capableness”. On the other side, the word „technology” signifies: „the science of the ways and means of the elaboration of the materials; the aggregate of the processes, methods, jobs and so on used for getting a certain product.”

Latest NATO Summit’s Communiqués prove an increased interest paid by Allied states towards developing and launching of common initiatives in the technical field.

Among the most spectacular, that also receive good media coverage, are as follows: missile defence, cyber defence and Allied Ground Surveillance System.

Missile Defence

US President Barack Obama and US Defence Secretary Robert Gates announced, this September, the alteration of the already known US plans regarding the enforcement of a missile defence system.

As the US explained it, this change was meant to „enhance our ability to respond to the most immediate threats to the continent, as well as future threats”⁶. This statement also brings back into the public opinion’s attention all the steps taken in this respects, starting with former president George W. Bush announced intention, in December 2006, of installing components of the US missile defence system on the European continent, in Czech Republic and Poland⁷. Allied intentions with regard to developing a missile defence system was initially announced at the 2002 NATO Prague Summit, when the



drafting of a study concerning the feasibility of such an initiative was launched. This study, publicly assumed by NATO Heads of State and Government during the 2006 Summit envisaged that Allied missile defence is manageable. It is worth mentioning that the negotiations among member states were conducted at various levels: political/military, technical, military and financial, thus involving all allied structures that have responsibilities in this field. In fact, North Atlantic Treaty Organization considers the developing of the two missile defence programmes, one of these referring to the protection of member states' populations and territories, and this is to be complementary to the efforts of US and Russian Federation in the field, while the other one will be responsible for the protection of the Allied armed forces deployed in a theatre of operations. The latest, known as Active Layered Ballistic Theatre Missile Defence (ALTBMD), is supposed to reach its final operational capability in 2010, when it „will be able to protect Allied deployed troops from short and medium range ballistic missiles, by intercepting them in the boost, mid/course and final phases”⁸. As for the protection of the European continent, Allied plans are conceived as complementing the already existing American ones, so that, before their the above mentioned already announced alteration, there would have been a real risk of covering, at least for an initial faze, just a limited area of the continent. Three distinct courses of action were presented during the NATO Strasbourg – Kehl Summit that took place in April 2009⁹:

a) “Bearing in mind the principle of the indivisibility of Allied security as well as NATO solidarity, we task the Council in Permanent Session, taking into account the Bucharest Summit tasking, to present recommendations comprising architecture alternatives, drawing from the architectural elements already studied, for consideration at our next Summit;

b) To inform any future political decision on missile defence, we also task the Council in Permanent Session to identify and undertake the policy, military and technical work related to a possible expanded role of the Active Layered Theatre Ballistic Missile Defence (ALTBMD) programme beyond the protection of NATO deployed forces to include territorial missile defence;

c) We support increased missile defence cooperation between Russia and NATO, including maximum transparency and reciprocal confidence-building measures to allay any concerns. We reaffirm our readiness to explore the potential for linking United States, NATO and Russian missile defence systems at an appropriate time and we encourage the Russian Federation to take advantage of United States' missile defence cooperation proposals”.

Coming back to the above mentioned US missile defence system, announced at 17 September 2009, it is important to mention that it is aimed at covering the entire European continent in four phases that are to be finalized in 2020. Mainly, this system will be initially based on maritime interceptors, that are to be later on complemented with improved sensor technologies stationed in Southeastern Europe, following that, in the final two phases, the system would take benefit of a mobile sensor system.

Among other advantages that are brought in by this newly launched US missile defence system, the following could be mentioned¹⁰:

- The new system is based on current or soon available technologies and consequently will be operational six to seven years sooner than the previous program, and at less expense;

- It is also a more survivable system and offers a high degree of flexibility in terms of geographical deployment and adaptability to growing threats;

- It offers the flexibility to adjust and technologically upgrade the architecture.

The first phase of the newly launched plan, that is to be finalized in 2011, „envisions a sea-based missile defence with the much smaller standard SM-3 missiles available today, which are designed to intercept shorter-range missiles typically flying slower and closer to the ground than intercontinental ballistic missiles. Improved sensor technologies stationed in Southeastern Europe will complement the system, offering a variety of options to detect and track enemy missiles.

By 2015, a more advanced version of the system would be deployed, including defence missiles that could be launched from both sea and land, while in phase three and four, further improved SM-3 missiles would, after extensive testing, address the potential Iranian ICBM threat to the US by 2020”.



Cyber defence (CyD)

Allied interest in this field, as proven even since 2002¹¹, has grown in intensity following the cyber attacks in Estonia in spring 2007. Up till that date, Allied efforts were mainly focused on protecting Allied infrastructure (basically protecting informatics systems and codified communication ones, that ensure the transfer of classified information within the Alliance), without taking into consideration the protection of member states' infrastructure¹².

Cyber attacks in Estonia, developed through internet against public websites, did not involve any risk towards Allied codified system, but have underlined the necessity of protecting the entire information network. Suleyman Anil, head of NATO Computer Incident Response Capability Co-ordination Centre, stated that cyber defence "stands together with air missile defence and the global fight against terrorism"¹³.

Lines of action were presented by allied leaders on the occasion of the NATO Summit in Prague in 2002 in order to implement NATO's Program in the field of Cyber Defence in the following three steps:

1. "The first phase covered the creation of the currently functioning NATO Computer Incident Response Capability (NCIRC) and establishing its interim operating capability;
2. The second phase involved bringing the NCIRC up to full operational capability;
3. The third phase consists of incorporating lessons learned from phase one and two, as well as using the latest cyber defence measures to enhance NATO's cyber defence posture".

NATO's policy in the field of cyber defence was adopted in January 2008, being publicly assumed with the occasion of the Bucharest NATO Summit. During April 2009 Strasbourg-Kehl Summit, allied heads of state and government have presented the latest steps taken in the field of cyber defence: "in line with our agreed Policy on Cyber Defence, we have established a NATO Cyber Defence Management Authority, improved the existing Computer Incident Response Capability, and activated the Cooperative Cyber Defence Centre of Excellence in Estonia.

We will accelerate our cyber defence capabilities in order to achieve full readiness. Cyber defence is being made an integral part of NATO exercises"¹⁴.

Cyber security was identified by the European Union as a security issue in the report on the implementation of the European Security Strategy (ESS) submitted by SG/HR Javier Solana to the European Council in December 2008¹⁵.

Certain developments in the field of cyber defence have taken place at the level of Allied member states or partners, as well as the EU level, as mentioned above. It is worth being mentioned, in this respect, US President Barack Obama's strategy launched in May 2009, after a thorough analysis¹⁶ of all the vulnerabilities existing in the public or private systems. According to the released papers, computer networks are to be considered "a national asset of strategic importance" for whose protection a White House office will be created. Even more, the creation of a cyber command was announced, that would allow American land forces to launch offensive and defensive military operations in the network centric warfare¹⁷.

According to the adopted American policy, "cyberspace" refers to "the interdependent network of information technology infrastructures, and includes the Internet, telecommunications networks, computer systems, and embedded processors and controllers in critical industries. Common usage of the term also refers to the virtual environment of information and interactions between people"¹⁸. The above referred to document also includes an action plan in ten points that is to be fulfilled in the near-term:

- a) Appoint a cyber security policy official responsible for coordinating the Nation's cyber security policies and activities;
- b) Prepare for the President's approval an updated national strategy to secure the information and communications infrastructure;
- c) Designate cyber security as one of the President's key management priorities and establish performance metrics;
- d) Designate a privacy and civil liberties official to the NSC cyber security directorate;
- e) Convene appropriate interagency mechanisms to conduct interagency-cleared legal analyses of priority cyber security related issues identified during the policy development process and formulate coherent unified policy guidance that clarifies roles, responsibilities, and the application of agency authorities for cyber security-related activities across the Federal government;
- f) Initiate a national public awareness and



education campaign to promote cyber security;

g) Develop U.S. Government positions for an international cyber security policy framework and strengthen our international partnerships to create initiatives that address the full range of activities, policies, and opportunities associated with cyber security.

h) Prepare a cyber security incident response plan; initiate a dialog to enhance public-private partnerships with an eye toward streamlining, aligning, and providing resources to optimize their contribution and engagement;

i) In collaboration with other EOP entities, develop a framework for research and development strategies that focus on game-changing technologies that have the potential to enhance the security, reliability, resilience, and trustworthiness of digital infrastructure; provide the research community access to event data to facilitate developing tools, testing theories, and identifying workable solutions.

j) Build a cyber security-based identity management vision and strategy that addresses privacy and civil liberties interests, leveraging privacy-enhancing technologies for the Nation.

US's initiatives in this field are to be promoted in the UK also, that launches similar programs¹⁹. UK's steps are to be included in the National Security Strategy, which has been last modified in March 2008.

Allied Ground Surveillance System (AGS)

Part of the Allied assumed commitments at the Istanbul Summit²⁰, Allied Ground Surveillance System is to provide a permanent flow of information regarding the field situation of own and adversary's land forces during a military operation, meaning settling those „eyes in the sky” (as NATO Handbook figuratively names it).

Its initial operational capability ought to be reached in 2012, while the final operational capability in 2015.

According to current plans²¹, the AGS core will consist in an integrated system that will include an air segment and a ground one. „The air segment will be based on the Block 40 version of the US RQ-4B Global Hawk high-altitude, long-endurance unmanned aerial vehicle (UAV). The UAV will be equipped with the state-of-the-art multi-platform radar technology insertion program (MP-RTIP) ground surveillance radar sensor, and also with an extensive suite of line-of-sight and beyond-

line-of sight long-range, wideband data links. The ground segment will provide an interface between the AGS Core system and a wide range of Command, Control, Intelligence, Surveillance and Reconnaissance (C2ISR) systems to interconnect with and provide data to multiple deployed and non-deployed operational users, including reach-back facilities, remote from the surveillance area.

The primary ground segment component will consist of a number of ground stations in different configurations, such as mobile and transportable configurations, which will provide data link connectivity, data processing and exploitation capabilities, and interfaces for interoperability with C2ISR systems. The AGS Core ground segment will also include dedicated mission support facilities at the AGS Main Operating Bases (MOB), and ground stations for flight control of the UAVs. The Main Operating Base will be located at Sigonella Air Base, Italy.

The composition of the AGS Core system will provide NATO with considerable flexibility in employing its surveillance capabilities in a manner that can be tailored to the needs of any emerging situation²². At the beginning of September 2009²³, the Program Memorandum of Understanding was signed by 15 Allied states, when also the AGS Charter and the NATO AGS Management Agency were launched to take charge of the program.

European Defence Agency (EDA)

„At the European level, there is enough potential in the field of research, development and launching of an entire technological aggregate for security. In front of the entire variety of the new threats, Europe must overcome the existing functional and structural deficiencies through the limitation of compartmentalization and duplication of efforts, and also through the increase of cooperation and achievement of standardization and interoperability²⁴.

At present, science and technology are looked upon as requisite elements for protecting and promoting European continent's security and defence. Despite some initial hesitations characteristic for the launching phase of a security pillar within the European architecture, the need for such a dimension, invariably recognized by all member states, determined the EU member states to make the decision regarding the enforcement of the European Defence Agency, in July 2004. Its main missions basically refer to the drafting



of and the implementation of a „global approach of the development process of the defence capabilities and of the streamlining of the support provided by member states with regard to defence acquisitions. In this respect, EDA provides the long term framework for a coherent long-term European policy in the field of enriching defence capabilities, research and armaments, with a view to ensure a convergent approach of national and multinational policies that respond to European Security and Defence Policy's needs. [...] In the field of research and technology, the Agency's activity is focused on ad-hoc cooperation formula, on the establishment of a European long-term strategy and priorities, on financial aspects, on a new legal framework for ad-hoc cooperation, including third parties and for the framing of defence financing models”²⁵.

The European Defence Agency will stimulate initiatives or manage ad-hoc projects in the following fields of activity:

- UAVs/ISTAR (Unmanned Air Vehicles/Intelligence, Surveillance Target Acquisition and Reconnaissance);
- Advanced training of pilots;
- Command, Control and Communications;
- Rationalization of testing data-basis and assessment of military equipments;
- Armored fighting vehicles;
- COTS / MOTS products (Commercial / Military Off-the-Shelf).

The Agency asked for Coordination Council's approval of incorporating other fields of activity, as follows:

- Technological and industrial basis in the naval sector;
- Air-to-air refueling;
- Chemical, biological, radiological and nuclear (CBRN) defence;
- Maritime surveillance²⁶.

3. Technological dimension of countering terrorism

Terrorism, hard to define or isolate from other means of action specific to international actors or non-actors (with regard to purpose, action, connotation, costs, modus operandi and so on), is, for certain, one of the main threats to the international security environment. The lack of a legal framework in this field, a direct consequence

of the lack of a common vision, constitutes the premises for allowing the expansion of terrorist cells on European and American continent.

A current debate on terrorism touches upon numerous elements raised by the 9/11 events, such as: terrorist organizations' proven ability of self-financing²⁷, planning and executing their activities, their capacity of using weapons of mass destruction.

Certain authors²⁸ consider that we no longer deal with “terrorism” as we knew it (a phenomenon that is as old as mankind and has evolved accordingly), but that, at present, we are facing a new terrorism, characterized by “the media impact that it is capable to provide, through the intimidation and terror-inducing potential it holds”²⁹.

The altering of the “global war against terrorism” concept, launched by former US President George W. Bush, into “the long war”³⁰ marks the assumed never-ending commitments in countering the extreme phenomena. The problems come also from the lack of identification of precise objectives. With the exception of the launched lists by the American administration with regard to terrorist organizations that operate in the entire world, as well as up-to-date data-basis with the number and places of terrorist attacks, no final end-state of this “long war” has been established.

Countering terrorism is looked upon with increased precaution by most of the international or regional security organizations, lines of duty covering all levels being assigned by national or multinational authorities. Two elements can be identified as essential in the effort of bounding or countering terrorism: cooperation, extremely important for the exchange of data and information and for the launching of joint actions and technological dimension. While communication mainly refers to expanding and deepening of the permanent contacts between all countries (be them members or non-members of NATO and EU), emphasizing on the better understanding and thus preventing the terrorist actions, the second pillar, that of technological dimension, deals with completely other elements.

One can argue that the technological approach of the terrorist phenomenon mainly consists in the deepening of the already existing relations (in sense that, technology, by its nature, requires a rather “limited” access to programs, projects or cooperation initiatives), its actions rather looking



towards the discouragement of a terrorist event, focusing its projects on countering the effects of a potential attack or the post-reconstruction. At the Allied level, a Working Program for the Defence against Terrorism has been assessed, aiming at the development of nine different programs. "Mainly, this initiative will offer allied armed forces better methods for stopping the functioning of explosive devices - like car bomb and improvised explosive devices - and to contribute to the finding of bombs and the identification of their fabricators, will improve pyrotechnics' capacity of acting against the explosives and managing the effects of bomb attacks, will ensure the protection of air vehicles against man pad missiles and of helicopters against RPGs, will protect harbors and ships against plungers and high-speed vessels filled with explosives, will increase the protection against chemical, biological, radiological and nuclear weapons and will allow the precise air-launching of special forces with all their necessary equipment, the fulfilling of information operations, reconnaissance, surveillance and searching of the terrorists, as well as countering mortar attacks. For the better coordination of this effort, NATO has appointed a Coordinator for Terrorism Combating Technologies that is subordinated to the CNAD chairman and supervises the activity of a team of specialists coming from several NATO member countries. The main groups of CNAD - Military Aviation, Military Marine, Armament Groups of Land Forces, the Organization for Research and Technology, as well as the Industrial Consultative Body of NATO - are the driving force of this program"³¹.

4. Conclusions

In the opening remarks of the current article we have touched upon the idea of lack of concrete evidence, in modern conflict, of clear evidence with regard to „winners and losers”. Cyber security, network centric warfare or the usage of UAVs in sophisticated program that will contribute to the identification of data needed for fueling the conflict, elements mentioned within the present study, support the idea according to which in the nearest future the human factor would be substantially reduced in the military conflicts. This aspect, no matter how well received it may be from a cost-reduction perspective (in terms

of human or material losses) may also lead to an entire debate regarding the human rights.

Even more, it might trigger a real revolution of the international affairs, or even of inter-agency cooperation at a state's level. Inside all this mix of information and data that we are learning to report our current existences to, one single item might be taken as a fact: ongoing technological evolutions or revolutions might generate a significant altering of the international security environment. We may argue that the secret of a good further development of the international security and defence environment consists in an increased inter-agency cooperation. In this respect, the creation of the framework of cooperation needed for facilitating NATO-EU cooperation in the technological field is required. Concepts of joint capabilities and requirements, complementarily, sharing of costs and risks are increasingly used, leading to a new trend, at the European or Allied level of regrouping around common objectives, as identified within various forums interagency initiatives organized by EU or CNAD.

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relationship with organized crime, drug trafficking or any other way of violent manifestation, all of these representing the matrix of low-intensity conflicts that has been inveterate at its substantial core, as currently is the case of Columbia, Libya, Rwanda, Sri Lanka or Balkan countries where the mix between ethnic conflicts, anarchy, religious movements, criminality and narco-terrorism destroy everything”– Gheorghe ARĂDĂVOAICE, Gabriel NAGHI, Dan NIȚĂ, **The End of Terrorism**, Bucharest, Antet Publishing House, 2002.

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SCIENTIFIC RESEARCH AND MILITARY TECHNOLOGY – ROMANIAN’S SECURITY AND DEFENSE FACTORS IN THE CONTEXT OF THE NEW POWER STRUCTURE OF THE WORLD

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The present paper sets itself to describe and analyze the main evolutions and trends that took place and are taking place in the international security environment in the post-bipolar era, phenomena that influence Romania’s approach to security and defence; this article also refers to the role of scientific research and military technologies as security and defence factors in Romania.. In this view, we have chosen to analyze the main evolutions and trends in the power distribution at international level, the role of military power in International Relations and the impact of globalization on the world’s power order.

Keywords: power; EU; NATO; military power; globalization; research.

Introduction

We are witnessing the rising of a new world, where the international scene is continuous changed by powerful economic interests and the nations are confronted with the major problem of identity. Nobody doubts that the age we are living is one of big changes

No doubts, the European and worldwide system are profoundly transforming, simultaneous with the internal transformation of their actors. Therefore, the last decade marked two structural transformation of the international system initiated by the Cold War and the 2001 September 11 terrorist attack.

The power levels rebuilt from the “after Cold War period”, was quickly fallowed, after the attacks on American territory objectives, by

the beginning of a new age in the global system history, witch can be named “after Cold War period”. Those policy transformations happened and are happening leded by the global mass-media informational technologies acceleration. Beside that, recently, have appeared analyses of interconnection between internal and foreign policy, precisely about the projection of the internal policy in the foreign space. This is determined by the continuous intensifying of the international interconnections, by the globalization, and in the same time by internal group’s interest projection on foreign plan. Beside that, the fact that the connection between internal and foreign became stronger is pushing us to a new worldwide order, who, starting from de interdependence between the system and his components, is proposing itself to interfere in the internal politics of the system actors each time their situation can put in danger the whole assembly security system.

This will require a rethinking of some fundamentals values like suzerainty and independence, who should be promoted inside an environment, who apparently, will try to deny them more and more, in the classic meaning. The international life is the analytic domain of the international relations fields. It appeared on a specific level of system integrations, and reflects with fidelity, its evolution through succession of different schools of thought which have dominated. Academic study of international relations and, equally, work practice decision-makers and industry experts is constantly confronted with three major challenges: levels of analysis problem,



defiance of theoretical, and, respectively, the ability to explain the main character evolution in the international system.

1. Developments and trends of global power distribution

Complexity of reality is evident in many areas radically transformed query; they increase or even disappear during the study. Theories of international relations differ significantly depending on the scope of the phenomena analyzed. In simplest terms, levels of analysis dilemma involve a choice between studying the worldwide system (world politics), a particular geographic area, a set of specific issues, or political or social groups to individual. Difficulty formulating general laws of human behavior is accentuated in international relations theory by the very limited possibility of prediction of change in the worldwide system and economic prosperity.

European Union needs a coherent Common Security and Foreign Policy (PESC). Fight for resources dominate international politics, each force tending to act unilaterally. Only the European Union promotes a multilateral approach becoming the true lighthouse at a worldwide level. United States were champion of the rule of law until they became the only supreme power. Their political power tends to decline even when their military power dominate. But is useless to criticize America, we need to seek concrete ways to balance its power through EU. Unipolarity and multipolarity are terms used conceptual: for example, unilaterality as theory or fact. Consider that United States is resuming to a unilateral approach, counterproductive, it acting unilaterally (as with Iraq); in fact, they acted multilateral (as a coalition). The four terms defining can be separated into two pairs: unilateralism and plurilateralism, when is about strategies and attitudes; Unipolarity and multipolarity, who are describing the distribution of power. During the Cold War the opposition between East and West created a new concept: bipolarity (the existence of two competitors). This world disappeared in 1990, but the question who persist is "how power is distributed today?". United States possess certain hegemony, but there are other centers of power. Is hard to appreciate if is about a multilateral or unilateral world. Usually, unilaterality is very

rare that even a superpower can not act alone and it needs help. This attitude is translated by the Clinton's saying "together when is possible, alone when is needed".

It should distinguish between unilateralism and plurilateralism. George W. Bush operated in a multilateral plan, and decided in a unilateral way. In plurilateralism, the decision is made by more than one character, if is possible with the vote of majority. Unilateralism is produced by a hierarchical structure between states, in top with a powerful state, and the rest of them are following it decision. Plurilateralism is defined by the fact that more than one state participate taking a decision. Opposition is similar with the one between monarchy and democracy.

In symmetric alliance decision is taken from top. In coalition decision is the result of common intention of members. Certainly, these types are ideal and can not be found in reality. Within NATO decisions are taken at Washington, though formally there are consultations between all members. In UN decisions are taken with the majority of votes. But there are disputes between major forces, members of Security Council, leading, but do not dominate, and small states, dominating, but do not lead. Therefore, difference between the two types of systems is that, first is domination on obedient, and secondly is leadership exercised by partners.

With the coming to power of George W. Bush, unilateralism became the main strategy, as attested the interventions in Afghanistan and Iraq. Bush administration preferred a voluntary coalition in Iraq not to be constrained by European allies from NATO. Nobody knows how long will last this wave of unilateralism. '90 marked deterioration of international security, as the intervention of Bosnia, Kosovo, Afghanistan and Iraq showed. Power distribution should be analyzed in two perspectives: (a) between states and (b) inside states. Between states, in military terms, USA is the dominating power (a force equal to the following nine countries taken together), being only world power. Bush administration intends to maintain that supremacy by any means as shown in so-called "Bush doctrine".

Interventions in Afghanistan and Iraq are not only effect of September 11, but also policy outcome of Withe House administration. Regardless of how history will eventually reflect Bush mandate, one thing can be a highlight in last eight years:



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America alone can not solve all world problems, and the United States president he is a strong man, but this does not mean it and omnipotent.

True, world today is in extremely bad condition and the new president of USA, Barack Obama, will face problems, some of which seem insurmountable: world economic crisis, Wars in Afghanistan and Iraq, Islamism terrorism, Iranian and North Korean nuclear program and the perpetual threat that is Pakistan failed policies, but in possession of nuclear weapons, eternal conflict in the Middle East, Russia's aggressive ascent, China's less aggressive ascent, withdrawal of Europe from history in its postmodern paradise, poverty and AIDS in Africa, the eternal threat that is the destabilization of South America, Global Warming (if there is something), view of global energy crisis (it is very real), growing attraction that authoritarian regimes are, as Moscow, together with less prestige that enjoyed democracy in the world.

Obama has a clear electoral mandate and is supported by a Congress dominated by Democrats, so has all strengths for promoting his agenda. The question is if he knows how to take good decisions. Instance, with regard to economic crisis, in America and worldwide is exist a seemingly irresistible power, who demands creation of institutions overregulation of the markets, Obama must resist this call.

Achievement of the Missile Shield (NMD) reflects a desire to maintain the military supremacy without precedent of USA and his unilateral way of action. Yet, in Iraq and Afghanistan, USA proved that can not destroy the terrorism organizations, only the states. Attacks are useless in some countries (Somalia), that puts to question the effectiveness of this strategy.

Critical humanitarian situation, created in Gaza by the Israeli military offensive intensified resentment against Israeli actions, reason for, in the name of alleviating suffering civilians, Arab countries, but also EU demanded Israel immediate stop to violence.

Given that the news provided are mostly from sources supporting Palestinian cause, is necessary an effort to restore moral clarity in this cacophony. Hamas is, by European standards, a terrorist organization with both the period before the Israeli offensive, and now continue to launch missiles from Gaza on Israeli town from south.

After all international regulations, these launches are an aggression and the Israel have the right to defend. European diplomacy, long as there, when is about Middle East situation, is playing a counterproductive role of ethical relativism.

Ending violence so much of Europe requested would be tantamount to a shameful defeat for Israel, even more shameful compared with the 2006, a campaign against Hezbollah was stopped before reaching their targets, under the European and America influences. This time, Israel is sentenced to win, which means in strategic terms, more or less, de destruction of Hamas.

The summer of 2006 failure had the effect of considerable strengthening Iranian influence, who came more aggressively both in relations with Gulf countries, and the West. If, as promised, American president, Barack Obama, wants to convince Ayatollahilor's Iran to to abandon the nuclear program, then you should ask Israel to win the war against Hamas in the shortest time and with as few civilian casualties.

Geopolitical, China is the main competitor for USA. Japan replaced the Pacific area in military terms, what constitutes a very interesting trend. In Africa, the South Africa republic becomes the most important player. In South America, Brazil and Argentina make games.

In Europe, EU is the most important player next to a weakened Russia. Old Europe begin to move its position, in competition with USA, the evidence is the processing by the EU of NATO headquarters peacekeeping tasks (Bosnia). European Union is about to become more than a regional power, meaning tends to be a single powerful state, first with a post national identity. Therefore, EU is a very attractive alternative for small European states because is providing the chance to have a word to say in international politics. EU is a multilateral organization, but tends to become an "multilateral state". It will not try to compete with USA; it will try to cooperate using NATO, as a redistribution of power inside a symmetric organization.

United States can not benefit fully from their military strength to become a hegemonic. Worldwide there are several power poles, we have a regionalized world. United States is the is the greatest military power, , but political is using the support of the regional powers. In the field of mass destruction weapons, USA promotes cooperation,



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but also preventive attack (in the case of Iraq and maybe Iran). The war between India and Pakistan is a dangerous example in this context. When Korea decided there was a refusal to cooperate because it feared that the U.S. could invade the country. Brazil has made important steps toward producing nuclear weapons. End of cooperation in limiting nuclear weapons could lead to a new period of nuclear proliferation. Chemical and biological weapons represent a bigger threat for the industrialized countries, if the state loses the control.

Disarmament issue can not be solved only through multilateral cooperation. Is not ruled out military intervention, but ultimately only be used. Security Council must be expanded and reformed, for unified representation to the EU and other major players (Mercosur, ASEAN, etc). A multilateral world is preferable to a unilateral one. From the economic point of view, U.S. does not dominate the world, there are other significant factors: Japan, EU, and China. Presently, economic dominance became even more important than military domination. It is important to help develop a nation weigh choosing against attack and defeat. Use of force is a simplistic solution with temporary results. Is true, however, that some governments are more interested in providing weapons rather than food. Internally, the nation state himself has changed. New situation is characterized by the empowerment of the population under the authority of governments who no longer have complete control over society and the international system.

Organized crime and terrorism have become major players in the new international system political solutions are needed to these problems. International organizations are needed allowing participation of all international players. Development of unilateral U.S. power would lead to the reappearance of old geopolitical divisions of the past because the other actors will feel threatened. What will happen to Russia and China depends on what happens in the West. Today's world is interdependence and every aspect has influence on the entire system. With their aggressive policy USA lead the arming of North Korea to co-opt China in the process of resolving the Korean crisis. By NATO expansion, Russia has been excluded from the cooperation with the rest of Europe.

When creating a national democratic system there are more chances for an international system without violence, by the prevalence of "soft power" upon "hard power". Therefore, the future of democracy in Russia is crucial for Russia's relationship with the world transatlantic crisis is the result of a lack of coherent international political organizations to solve problems in a symmetrical manner. Starting with the Franco-German agreement of 1962, in EU is a tendency to step out from under U.S. domination. This does not mean a complete separation, but a complementary development. Actually, Europeans have learned from American multilateralism and now must restore U.S. to this approach. War against terrorism must not be worn by military means, using means to achieve its sources (Israeli-Palestinian conflict, Western presence in the Middle-East-perceived as colonial domination, world income distribution- north-south conflict). Terrorism is not a religious issue but a purely political issue. Transatlantic crisis led to the division of Western standards both in the field of standards and the types of capitalism. Yet today, there is no official European Union position about separation from NATO. In the today's world unilateralism is not a negative phenomenon. He brings order and even opportunities (in economics) for other players (China, Russia).

United States is a country where the law is dominating. But, in recent years, they have dropped the traditional approach which is a negative tendency that will not bring the desired results. Value of "hard power" is less than the value "soft power", and the U.S. do not have leadership in the last field.

Due to the impact of the 1.3 billion people entering suddenly in the world capitalist system, China is becoming one of the leading participants in the global distribution of power. Few data and logistics are sufficient: growth of the new colossus is 10% per year, so it doubling the domestic product gross every 7 years. At this rate, by 2010 China will become the first world economic power, surpassing USA.

Currently, China is the second consumer in the world, although the annual consumption per capita is one and a half barrel, for example, far less than ten barrels consumed by each Spanish man. On the other hand, the number of cars will increase tenfold over the next fifteen years, involving an



unprecedented rise in oil imports. Foregoing, plus the accelerated industrialization is taking place in China, creates the possibility that in a few years it will become first crude oil importing country, what worries Western countries, because, according to current calculations, there will be enough oil to meet future needs of the colossus. China's coal needs are also considerable until now, lack of electricity was the main obstacle on development of the country, but this situation began to change with the opening of hundreds of nuclear and thermal plants. China is the main importer of steel, nickel and aluminum. Another aspect that we should not overlook is that China consumes more cereals, meat, fertilizers and steel than United States.

This exaggerated consumption arise the problem that there are no sufficient ships for transporting all raw materials that China requests. Spectacular information which offers us a vision on the importance of Chinese imports is the fact that their growth was estimated at 60% from total world imports.

2. Military power – component of international security

The evolution of international situation has known essential mutations, with deep consequences at both continental and worldwide level. After the violence manifested in the first half of the past century, Europe has known an unprecedented peaceful and stability period, where a particular influence had the creation of EU. European countries have resolved disputes in a peaceful manner, collaborating through common institutions. Successive adoptions at EU make the dream of united and peaceful continent come true.

United States played an important role in European security and integration process, especially through NATO. The end of Cold War conferred United States a dominant position in military domain, but a single country cannot resolve increasingly complex problems which appear today. The global role of EU is also determined by the increasing European interest convergence for strengthening membership mutual solidarity. Europe must be ready to participate at maintaining global security and continuing creation of a better world.

As a result of worldwide changes, the necessity of embodying global judgment and action appears. In this new context the future depends by the EU actions. For security preserving and promoting values EU has three strategic objectives:

- main threats identification
- contribution at EU border neighborhood security increasing;
- creation of a international order based on an actual versatile system.

The probability of producing a major conflict in this security conditions is appreciated to be reduced. All over the world there is local and regional latent, frozen or in progress conflicts which can get out of hand and extend to large regions or even to whole world. The most recent and striking example supporting this assessment is the conflict in Georgia, which has opposed government forces in the breakaway region of South Ossetia, supported by the Russian Federation (7 to 18 August 2008). The fact that the calls for aid to NATO of the Georgian president were followed by strong political support, but not military one, as was requested, minimized the risk of escalating conflict.

Risks and threats with military precedence to international security are manifold, but the security environment is influenced mainly by: frequent use of armed force in interstate relations, undeclared arms race, some states attempts to take possession of weapons of mass destruction, in particular the nuclear weapon, ethnic conflicts, religious conflicts and terrorism.

Use armed force in interstate relations is, according to analysts, a result of human nature which is essentially warrior (*homo homini lupus* - says ancient Plautus). This mentality, very briefly described by the ancient dictum “*si vis pacem, para bellum*” or “be prepared for war is one of the best ways to keep the peace”, constituted and will constitute a difficult barrier to overcome in building a world based on cooperation and not confrontation.

The current situation of the international security environment, according to Professor's Barry Buzan conception, presented in “Peoples, states and fear”, is generated by states of the world that “seem unable to coexist harmoniously” and therefore continue to fight among themselves.

Animated by interests (to impose terms or assist) and fear (not to be challenged, not to



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lose the independence, sovereignty, freedom, dominance and influence in international relations, etc.), human communities have developed a security concept based on military power and resolve disputes by force. To justify use of force without the UN Security Council accord, states call for right to self-defense, enshrined by the UN Charter, but interpreted to suit their interests and objectives.

In this way, doctrine of preventive action outlined, understood as a form of active defense, i.e. hitting the enemy before it can materialize their intentions on all fronts, using all means. This interpretation of the right to self-defense led to the establishment of the Multinational Coalition attack Iraq in 2003, triggering the second Gulf War. The idea of using preventative actions as a defense was included in the contents of their security strategies by all major powers and the states aspiring to great power status or, at least at the regional leader. Depending on the interests and capabilities, those states had provided the use of military power to deter potential enemies, to defend and expand spheres of influence, to impose their views in disputes with other states, to ensure their access to resources, etc. Preventive action involves surprise hitting to those who are preparing to launch an attack (armed assault) before he must have completed the preparation of action (aggression). In this way, potential attacker becomes the target and potential target is the attacker. The dispute between supporters and opponents of preventive actions, and thus the use of force in international relations is a political and a moral dimension.

From politically point of view, it must be asked: Is the UN Charter applies to unconventional warfare? Where are sufficient arguments to demonstrate the need to improve the UN Charter, then it must be followed by negotiations way, to adapt it to new realities.

From morally point of view appears the question of usability appropriateness of force against someone accused of intending to use force. In other words, both sides have similar intentions but one reflects its intention before the other.

Therefore, the question arises: Who is right? So far the answer was: "He who is stronger is always right". It is considered that a fair solution is negotiation – not to get the use of force – and harmonize positions by identifying those

commonalities to allow building "bridges between the parties", because true prevention "requires removal proceedings". The transition from a world where there is still the law of force the one in which justice will prevail force can not simply made without people committed, competent and without assigning their efforts to achieve this objective.

Proliferation of weapons of mass destruction was, is and will be an issue that can not be solved in a short time. The temptation to obtain nuclear weapons is because they confer status on their possession in the competition for regional and global power, and the existence of nuclear technology transfer networks - as one of the Pakistani AQ Khan - lead us to appreciate that history could repeat.

The call to the proliferation history tells us that "three states that have not signed the Nuclear Nonproliferation Treaty – India, Pakistan and Israel – have come to possess nuclear status accepted ... process that can occur with other countries ... because beside states possessing nuclear weapons is estimated that another 40 could obtain it if wanted ...".

After Libya renounced the ambition to become a nuclear power and Iran and North Korea agreed to inspections conducted by the International Atomic Energy Agency, seemed that the process of nonproliferation of weapons of mass destruction will come to normality. But North Korea's vacillations and bellicose attitude of the Iranian leadership have led to increased international tensions in the Middle East and Far East. The sanctions adopted by the UN Security Council had not expected efficiency, and the new proposed are unlikely to be adopted due to different positions of the permanent members of the Council.

Although most attention is directed towards nuclear weapons, chemical and bacteriological weapons are – in terms of lethality – comparable to nuclear ones, but are more difficult to control and easier to obtain and use, even by laymen. Therefore, there is the risk of obtaining and use by terrorists. Ethnic conflicts, religious conflicts and terrorism have many common points and their integrated approach is more beneficial than treating them separately. In analyzing the situation in this area, we drew the conclusion that almost all ethnic conflicts, as the religious conflicts, are generated by dissatisfaction of minority communities of



their status in relation to mainstream community.

Also, almost all ethnic conflicts have a religious component, and in many cases, insurgents engaged in conflicts works by terrorist methods.

Ethnic and religious conflicts are a paradox of our times, dominated by globalization and democratization of international relations. The causes of the ethnic and religious conflicts are largely similar and most important are:

- identity crisis and need for status recognition;
- nation (re)build;
- colonialism effects which do not take into account the ethnic and religious boundaries;
- resurgence of “tribalism” and the power desire of local leaders;
- weak legitimacy of the leaders of some states (regimes);
- increasing number of states and ethnic groups who claim their right to self-determination;

In most cases, ethnic conflicts have a religious component, because most times, conflicting ethnic groups have different religions (Indian Buddhists against Muslims in Pakistani Kashmir; Orthodox Greek Cypriots against Turkish Muslims from the island of Cyprus; Albanian Muslim Kosovars against Serbian Orthodox; Muslim Palestinians against Israelis followers of the Jewish faith etc.). Another cause of religious association to ethnic conflicts is the attitude and outlook of many political leaders from ethnic minorities, who use religion to promote their own desires to have more power, because “there is no purely religious phenomenon ... Religion is a human phenomenon ..., social ..., linguistic and ... economic, because man can not be conceived outside of language and collective life”.

Religion is a very strong glue for human communities and therefore association with ethnicity and desire of self-determination is a force multiplier, particularly in underdeveloped and poor states, where the manipulation of people by political leaders is easier if in this action are co-opted religious leaders too. In some cases, religious leaders took the banner of struggle “against infidels and laic state”, setting up to establish Islamic republics where the Basic Law is the Koran.

Undeclared arms race can be demonstrated by increased size of annual military budgets of most countries of the world, particularly those located

in areas of frozen conflicts, in areas with ongoing conflicts and in areas where some states are trying to obtain weapons of mass destruction, especially nuclear weapons and their carrier vectors. Another fact that demonstrates unequivocally that there is an undeclared arms race is the annual volume of transactions in arms, fighting technique and military material. In official statements of most countries leaders indicated that increased military budgets is required to maintain sufficient capacity to defend national interests and for covering increasingly large costs of more sophisticated weapons. It must be admitted that the achievement of credible military capabilities is possible within a large amount of time, so investment in defense must be carefully planned for periods of at least 15-20 years. Otherwise, the surprise factor may occur because the in crisis is not enough time to purchase and to train staff to employ modern weapons systems with maximum efficiency. With all these considerations, even a cursory analysis of military spending in the “hot spots” of the world and those with “dark fire” (Near East, Middle East, Southeast Asia, Far East, Caucasus, etc.) will reveal a continuous increase in expenditure on armaments of states that are in open or latent conflict and those who aspire to the status of regional leader.

Analysis of the international security environment, by the military coordinates, lead us to consider that:

- increased extremism – with ethnic and religion origin – led to the resurgence of terrorism and the increase in the number of local, regional and low intensity conflicts;
- despite the end of cold war and the diminution of threat of high intensity war, eith the use of classic armament and/or weapons of mass destruction, “... the world remains a dangerous place ...”, reason why maintaining military capabilities is still necessary.
- The evolution of security environment impose the transformation of the military security’s component form the conceptual, structural, action and endowment point of view to confront all the threats;
- In the future, soldiers most be trained so that “to be efficient in fighting during peace time like in war time”.

In these days, in most of the allied countries, the security insurance requires a different radical



approach which must be different from the static territorial defense and the discouragement during Cold War. Territorial defense remains a basic function, but the internal security can no longer be insured without risk and potential threat assessment which occur far from the NATO border. In consequence, the new NATO missions most aim security challenges from functional perspective not only geographical. Allied countries understood that the new missions must have capacities and adequate procedures which can be generated according to the requirements of the future. According to this transformation concept of NATO, the Romanian Army will be ready to intervene wherever is necessary. The priorities regarding endowment with technique of the land, air and navy force are known: to make operational the two frigates, the acquisition, with an international bid, of a multirole airplane and the acquisition of transporting technique.

Inside the Alliance, for the evaluation of present challenges and opportunities and to have a common orientation regarding future activities, a new NATO strategy for the research and technology field was necessary. During the last years, technology contributed momentously to the increase in efficiency in the military field by developing capabilities like guided munitions and network enabled capabilities. Nanotechnology, communication, biotechnology, laser and sensor systems, robotics and automatics and also human-machine interface are evolving in directions that are not easy to be anticipated, and from these arise opportunities and capacities unimagined before.

The NATO strategic objectives have in mind to lay-out directions for the NATO research and technology community level and also for the institutions and national authorities from the nations member of NATO. There are five main strategic objectives:

- To align the research and development to the NATO priorities regarding the transformation and the security environment;
- Instauration of efficient coordination of research and technology activities through a clear and efficient management;
- To ensure an efficient conciliation in the process of defining present and future needs;
- The development of practical application and information dissemination in the field of research and technology;

- To develop the most efficient and prosperous collaboration environment in the field of research and technology.

The NATO strategic objectives can lead to a better integration of our national society in this process of research and technology and, also, to an improvement to the field coordination at Ministry of National Defense, both with benefic effects in development and new capabilities implementation. The endowment of our forces is based on an elaborate future risk assessment and missions inside NATO, but mostly from the data furnished from the conflicts from western Balkans, Afghanistan and Iraq, and from the experience gained during the peace keeping missions all around the world.

In this way, the main mission of the scientific research and technology development in the defense field consist in ensuring conditions that developed armament systems and military technique bought for the Romanian Army endowment have the most recent developments from the scientific, technique and technology field and to respond as well as possible to the requirements imposed by the military actions in the existing conditions in the modern battle field. The main objective scientific research activities in defense field consist in developing those military capabilities that allows implementation of general concept of Romanian Army endowment strategy, insisting on increasing the participation of Romania to multinational operation developed in different geographical areas.

The increased efficiency of military operations is provided in terms of scientific research and technological development by some basic capabilities, among which stands out:

- the ability to gather and receive, process and understand information relating to the operations area and take effective decisions based on the understanding that information. The ability to develop a theater surveillance, over a wide area with high precision, using communication systems, control, command, reconnaissance and information allow own forces to control situations of conflict at any level. Interoperability and the ability to identify potential targets as allied, enemy or neutral are particularly important in this area.
- ability to deploy its forces, where and when is needed and determination and deployment of enemy forces. Weapons systems must be carried



out as planned, precisely in order to reduce collateral damage and effectively combating enemy targets. Electronic warfare systems must be able to reduce the enemy's ability to use its own systems and to allow own forces to conduct its operations in security. The electronic war has an increasingly importance seeking to protect their systems and networks for collecting and processing information while reducing the enemy's ability to his own capabilities.

- capability to protect own troops and technology. Action areas include: anti-aircraft and missile defense technology (ability to detect, track and destroy enemy missiles and surveillance capability to detect missile launches). Other critical capabilities that have to be developed concerns: to detect, destroy or neutralize mines; precise and rapid remote sensing of chemical and biological threats; denying access to enemy troops to own systems and technologies, caution that some of them are captured by the enemy, and also the capacity to interdict the use of technologies and systems in the possession of enemy.

- flexibly and quickly operating capacity, in different environments and different levels of conflict. In this respect, a priority role is ensuring interoperability. To carry out operations in urban environment, special communication capabilities, surveillance and target identification are needed. Capacity to transport forces rapidly and conduct operational in different geographic locations is very important and also the capacity to provide adequate logistical support for these units.

- the ability to use technical equipment as efficiently as possible and prevent the enemy to use their own equipment. This capability refers to: technologies to extend the life cycle of equipment systems, through which is provide an effective usage of older systems; interoperability of systems from the allied armies; simulation and training systems. A major role is to achieve capacities which allows to takeover and use the civilian technologies, especially those in computer and space technology.

Scientific research and technological development for defense should not manifest hermetically, only military. Significant and rapid changes that occur in high-tech civilian industry fundamentally affect the defense capabilities. Scientific research and technological development for defense must constantly monitor civilian

technologies and to determine opportunities and also the threats they can bring the national defense system. Should be identified and developed those mechanisms that allows that progress in civilian industry and newly developed technologies to be understood and used by the military research community.

To translate into practice the tasks put before scientific research is defined and operates six categories of scientific research and technological development: oriented basic research; applied research (composed of pre-competitive research and competitive research); technology demonstrations; technological development; development testing and evaluation; development of operational systems.

Military Equipment and Technology Research Agency ensure scientific and technological competence of the Ministry of National Defense through applied research, pre-competitive and competitive, including the development of technical specifications, concept studies, testing and evaluation of weapon systems. The achievements and involvement of METRA in many programs and projects shows the orientation and opening to military requirements, willingness to cooperate with national industry and leading international companies, active participation in national and international scientific manifestations, flexibility and openness to future.

Management and technical research for military technology should lead to new products and technologies development, to promote multisectorial and multidisciplinary research with a large potential of dissemination of civilian application in defense and reversely, to national and international scientific cooperation development.

Since actual socio-economic conditions in the country not allow a massive replacement of combat technique with last generation weapons or weapons systems, through decisions and measures staggered in time, with the allocation of special financial and material resources it started to achieve a modernization process of equipping the army, aiming mainly, interoperability and after, compatibility to equip the Romanian army units with similar units from allied countries armies composition. METRA participate in the programs of modernization and equipment of the Romanian army with new technique, conducted on the basis of international cooperation agreements. Keeping



pace, capability and competence of the Romanian military research and will be a vital condition to ensure the combat potential of the army under current conditions.

3. Effects of globalization on the world power structure

Globalization is a process of transition that includes all formulas of social organization as finality both post-communist transition and of the capitalist, exactly what would make sense both processes, global transition. To understand and describe globalization is not enough to concentrate on delivery and economic consequences it produces, but should be considered in conjunction with political changes. Globalization must be seen from the perspective that traditional duties of the state are fulfilled to a lesser extent. This is due partly to the fact that states, acting in accordance with neoliberal ideology and adapting to globalization have transformed from “guardian of the national public good” in “neoliberal guardian of international private capital”, in a global free market system.

On the other hand, because the globalization has become its own force, states become, objectively, weaker, less able to perform social traditional duties, such as redistribution of wealth and environmental protection. Moreover, they become less able to perform duties required of international capital: ensuring property rights, ensuring public order, fight crime, peace, etc. With the cessation of existence of confrontation between the superpowers, new types of conflicts have arisen and future strategies redefine Western security interests.

Popular sovereignty was and is still guaranteed in several ways:

- first, head of state is chosen by the people, be only a symbolic function;
- second, government power is controlled, though divided, with a representative parliament or in some cases, people's democracy throughout. To ensure equal representation in parliament and enable people to assess and influence government policies, has been developed a multiparty system characterized by political pluralism. For this system to function, a society must have access to information of interest, guaranteed by transparency, free press and the right to freedom of expression;

- thirdly, government power is divided between three institutions, dependent power between them, but autonomous: the legislature (parliament) and administration (government). These three powers are coordinated by the Constitution, by laws and institutions to defend the law. To those rights, duties and mechanisms more or less formal can be added the general principles that should form the basis for all democratic institutions.

The principles are: transparency, legality and honesty. Generally speaking, the institutions must assume and justify their actions to foreign/national partners.

At the same time, institutions must be incorruptible and must show integrity in all their actions. Integrity means that institution's employees must not accept personal favors or benefices from other parts.

The socio-political definitions define power from the socio-global system point of view: power is a relation between those who govern and those who are governed, taking no account on the climate they are working in. At any time and space, in all societies there are people who govern and people who are governed. Power is defined as the relation that objectively structures them, more or less considering their will and conscience. J. W. Lapierre stated that power is a relation between communication and execution of decisions: “to communicate a decision to be fulfilled means to lead. To fulfill that, means to obey”.

A minimal definition of power is referring to one's ability to obtain what is needed. Generally, it is a distinction between “power on someone” an “power to achieve something”. The function of power is to ensure both cohesion and functionality to different structures and organisms that activates in human society, and strictly related to power is decision embracement at all levels of society. The political power is born and takes its tools from economical power, being a subsystem of social power as state, political entities (directly those who govern and indirectly the opposition), public opinion, influence power, tolerance facing power.

Boulding stated that power can have three different shapes:

1. force threat – associated to army and police; the sanctions are applied to the citizens when they don't obey the imposed rules;
2. bargain – associated to economical institutions; citizens are rewarded when they obey;



3. making commitments – refers to the ability to inspire loyalty, respect and engagement (for instance nationalism and religion).

The political power implies all three shapes of power. Political power is the ability of the government to make citizens fulfill collective aims. Thereby, the government uses all three forms of power to obtain citizens support.

To have citizens aside any state will use all possessed means: force, to ensure rule obeying, bargain to obtain instrumental support and commitments to achieve affective support. And all these with one single aim: survival of the political regime. Each interaction type between individuals forces the use of a specific shape of power. As a consequence of the important role of the politic in a society, the political power, as a form of social power, has major importance.

The power concept, including social power is extremely vague, general and without precise boundaries. The most intense wishes of a man, among all wishes, are power and glory. These are not identical even if they are closely related: the prime minister has more power than glory and the king has more glory than power. Anyway, the easiest way to obtain glory is by obtaining power. Glory wish conducts to similar actions as power wish, and these two motivations categories can be seen, from practical reasons, as one. The wish of wealth, when considered apart from wish of power and glory, is finite and can be fulfilled in a normal way. The most expensive wishes are not dictated by the need of material comfort. When a medium level of comfort is achieved, both individuals and societies will focus on power more than on wealth: it's also possible to want fortune just to gain power, but in both situations the fundamental motivation is not a economical one.

Following J. W. Lapierre, "in every human community can be observed relations of leading/obeying or domination/subordination between individuals and their activity groups. In the most immediate forms, any political power combines rightful authority, in front of which obeying is fulfilled and the power which constraints to obedience through either threatening or use of legal violence".

Conclusions

The nowadays international security climate is characterized by terrorist actions, failure of governments, mass destruction weapons proliferation, actions of multi national entities, peace keeping operations and information security enhancement actions. Every paper contains the following collocation: "New world order".

The economical crisis is the background for statements of various important political personalities: Timothy Geithner, the president of Federal Bank from New York, asks for a unique organism to control every bank worldwide. Jeffrey Garten, member of Council of Foreign Relations, demands the foundation of Money Global Authority, a sort of global financial dictatorship and the France president, Nicolas Sarkozy, asks for a "World financial government".

The internet offers hundreds of thousands of information pages strictly related to elite plans, masonry and the New world order. The New world order is not a fantastic, speculative, prophetic story but a reality of the living world.

The mechanisms and tools of history have been modified and, here we have a large scale Monopoly game played: with real money, real properties exchanges and real winners and losers.

"The world needs a New world order and I warn you that strong worldwide disorder will follow. A unique world government will be created until 2020" said Ray Kurywell at the Economical Forum from Davos.

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VIRTUAL SPACE AS A VARIABLE OF THE SPACE DIMENSION OF THE SECURITY ENVIRONMENT

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The security environment is multidimensional. Space dimension is the most dynamic and complex of all the dimensions of security. In essence, from a sociological point of view, it has two interdependent variables – real space and virtual space.

On the other hand, the security environment is subjected to a set of challenges (security menaces, risks and threats). Among these, a central place is occupied by the international terrorism, the proliferation of weapons of mass destruction, frozen conflicts, organized crime. Also, security is faced to another set of challenges emerging from the virtual space via Internet. In this respect, one should mention cyber-terrorism, cyber-crime and hackers' acts. As a consequence, nowadays, the security environment includes not only the real space, but also the virtual one.

Keywords: real space; virtual space; security environment; Internet; opportunities; challenges.

1. Conceptual specifications

Specialized literature and everyday speech have been enriched in the recent years with a series of words such as: virtual, virtualization, update, virtual reality, virtual space, real space, security environment. For a proper understanding of these terms and of the relationship between them, we will attempt to elaborate a brief presentation of them.

Virtual. The word “virtual” derives from the Latin *virtualis*, which emerged from the word *virtus*, which means strength, power. According to scholastic philosophy, it is virtual something that exists in power and not in act. The virtual tends to become real, without being effectively or formally concretized¹. As an instance, the tree is virtually present in the seed. In conformity with the

philosophical rigor, the virtual is not the opposite for the real but for the actual, as the virtuality and actuality are just two different manners of being. Here, it is necessary to be introduced a capital distinction between possible and virtual². The possible implies the fact that it may be realized without any change in its determination or nature. This is a phantom, latent reality. The possible is similar to the real: it only lacks the existence.

In 1985, a computer scientist, Jaron Lanier³ used for the first time the term “virtual” – a word which carries a long history and deep philosophical implications – in order to describe the field of new technologies. More specifically, Lanier used this term to describe a reality which was present in the complete sensorial experiences – the experiences in which all the senses are involved – by means of an electronic environment. This reality – because it is about a reality within which the experience is produced – is obviously different from the one to which it is retrospect usually. This is the reason why there was a need to use an adjective to characterize it: it is a “quasi-reality”, a “virtual reality”. Maybe Jaron Lanier didn't reckon that this word – which probably he used as a synonym for “fictive” or “imaginary” – had complex philosophical significations and characterized, in an unexpected way, the words he referred to. Indeed, the concept of “virtual” has a wider and more precise signification than the one of almost-reality or pseudo-reality.

However, since 1985, the term has enjoyed a lot of success. Perhaps that is why everything in the new computing and communications technologies is inevitably accompanied by the adjective “virtual”. Thus, one could speak about virtual reality, virtual communication, virtual commerce, virtual society, virtual conferences, virtual community and beyond. The impressive



development of Internet has played a catalytic role in the use of the term “virtual”. The almost constant presence of this environment in our everyday lives determines us to speak often about “virtuality”. However, the more the term of “virtuality” gains a place in our everyday lives, the more its meaning seems to escape us. Therefore, a careful analysis of this term appears more than necessary. Nevertheless, it appears that the constant use of “virtual”, in new technologies, had a double consequence: on the one hand, the original philosophical meaning of the word has changed and enriched with new meanings and, on the other hand, what Virtual initially stand for in relation to new technologies has changed as it has imposed its semantic value. An analysis of the “virtual” concept shall begin by studying the term epistemology and deepening its philosophical meaning. In other words, it is appropriate to ask whether new technologies are really virtual or, more precisely, it is appropriate to question the virtual contents of new technologies. Due to the lack of space and to the purpose of this study, we will limit our analysis to the Internet, as the embodiment of new technologies, because it has the most explicit presence in our lives. At the same time, there are two references that shall be made about the virtual, namely: “... the virtual is always thought as a force that determines the production of an actual different from the virtual from which it emerges”⁴; the virtual is external to the one from which it is a virtuality and remains virtual after its actualization: the actual is never a crystallization of the virtual; thus, the latter is the force that allows its production, but is always there as a force, even after passing into the act. Its primary feature is the proliferation of what, within the actual, has a unique function as the virtual element has multiple functions that can not be reduced to unity. This is the idea that appears to Deleuze, with strictly philosophical implications, but which can be easily adapted to new media’s virtual, as shown in Levy’s definition and in Ventimiglia’s idea of interactivity and of the plurality of media⁵.

After becoming an act, the virtual preserves its multiplicity: the virtual is not exhausted in an actualization. For instance, architect’s capacity of building houses is always present as a force of multiple productions after having built an edifice. Hereby, the openness implied by virtualization remains the same when an actual is produced.

Virtualization may be defined as the opposite movement of actualization. It consists of a shift from the actual to the virtual, in an increase of the considered entity’s power. But virtualization is not a de-realization (the conversion of reality into a set of possible items), but a change of identity, a shift of the considered subject’s center of the ontological gravity: instead of being defined firstly by its actuality (a solution), the entity finds from now on its consistency in a problematic field. To virtualize a certain entity is to find a general question which it relates to, to get this entity to move towards this query and to redefine the initial actuality as a response to a particular issue.

A relevant example in this sense is the virtualization of a business. The classical organization used to rejoin its employees in the same building or within a complex of pavilions. Each employee had a precisely defined place of work and used the time accordingly to the work schedule. But a virtual company makes a massive appeal to the work from a distance. It tends to replace the physical presence of the employees in the same place by participating in a network of electronic communication and using soft resources that facilitate cooperation. Hereby, business virtualization consists firstly in making space and time dispatching of the work performed by the employees. As a consequence, the company’s center of gravity is not a complex of pavilions, of work places and time using, but a process of coordination that redistributes always differently the space and time coordinates of the work team and of each one of its members depending on various constraints.

Actualization appears as a solution of a certain problem, a solution that was not contained before in the statement. It is creation, invention of a form, based on a dynamic configuration of forces and finalities. In this case, there is nothing but the endowment of the reality with a possibility or with a choice from a predetermined set: a production of new features, a transformation of ideas, a genuine becoming which fuel the virtual in return. For example, if the running of a computer program, purely logical, point out the couple possible/ real, the interaction between people and computer systems reveals the dialectic of virtual and actual. Upstream, software elaboration, as instance, approaches a certain problem in an original manner. Each team of programmers redefines and



solves different issues that they are confronted to. Downstream, software's actualization in the utilization situation, for example, within an work team, disqualify some competencies and favors the emergence of new functions, triggers conflicts, releases situations, introduces a new dynamic of cooperation. The software carries a virtuality of change that is actualized more or less creatively by the group which is also matured by a dynamic configuration of tropisms and constraints. The real resembles to the possible. But the actual doesn't resemble at all to the virtual – the actual replies to the virtual.

The actualization goes from the problem to the solution, but the virtualization goes from a given solution to another problem. It transforms the initial actuality in a particular case of a more general problematic, on which, from now on, it is placed the ontological accent. Thus, the virtualization cuts back the instituted distinctions and raise the levels of liberty. If virtualization were just the transformation of a certain reality into a set of possibilities, it would deconstruct what exists in reality. But it implies, on the one hand, irreversibility in its effects, indetermination in its process and invention in its effort and, on the other, the very actualization. Virtualization is one of the main drivers of the reality creation.

The virtual reality represents, from a lexical point of view, an oxymoron, a figure of speech consisting in the formation of an expression which puts together two terms having opposed a priori significances. From an applicative perspective, the virtual reality forms within a simulation process, in which a computer reproduces a real, physical model in real time and in the most precise way possible. Thus, one may situate within the framework of virtual reality the plane piloting learning systems or the more common video games that are trying to render a maximum realism.

Virtual reality allows to human beings to enter an artificial world that is able to simulate the conditions of a real world or to create the conditions of a new one. Humanity and virtual world interact, meaning that the human being is able to apply almost all his cognitive faculties – perception, action, memory, emotion, motivation. These are natural skills, but they are used in new contexts, through the need of being combined with the virtual world. Relying on our virtual reality

applications, we proceed to a study of the cognitive faculties involved and of their adaptation.

Regarding the duality real/ reality, we consider that reality is what we perceive as real. Furthermore, the term “virtual” does not cover the virtual in its generality. It is limited to virtual reality context. Moreover, within the IT field, it is maintained confusion between qualifiers such as virtual, electronic, digital, artificial, synthetic, all describing an artifact produced by the machine (as opposed to humanity, natural, physical, real).

Virtual space is the equivalent of cyberspace, a term whose paternity is bestowed to the American writer William Gibson. In his novel, *Neuromancer*, he describes the virtual space as “a hallucinatory consensual experienced daily by billions of legitimate operators in every nation; by children learning mathematical concepts ... a graphic representation of data taken from the local base of each computer from the human system; an unthinkable complexity; rays of light arranged in the non-space of the spirit; fragments and constellations of data; like fading away city lights...”⁶.

The term “cyber”, derived from the Greek “Kubernao” or “Kybernetes”, has as original meaning the verb “to lead” and constitutes, at the same time, the root of the term “to govern”⁷. The semantic connotation evokes, on the one hand, the idea of navigating through electronic data and, on the other hand, the possibility to lead due to the control of these data.

Cyberspace, in William Gibson view, is not a universe of passive data similar to a library. On the contrary, this space provides communication channels between this world of data and the one known as “real”. Indeed, until now, Internet user went on a site, selected the information that interested him and then he downloaded it on his computer. This is called the pull method. The new generation of browsers makes it possible to select sites that will send automatically, at regular intervals, information to the PC⁸; in this case we speak about the push method. Thus, it is possible for Internet users to receive their daily newspaper, their television programs or the electronic courier without being necessary any more to search them every time they need it.

As far as the word “space” is concerned, one could assert for good reason that it evokes many ideas simultaneously. In the first place, it is about



the idea of scope, which corresponds exactly to the nature of network unifying an unlimited number of other networks. Secondly, space allows the freedom of movement between different places, which is the very essence of the protocol TCP/IP⁹, which permits information to go to and from various computers, no matter what their physical place might be. In the next place, space implies geometric concepts such as distance, direction and dimension. This idea is reflected in virtual reality techniques that imply the creation by the PC of some three-dimensional spaces, which interact following users' movements and manipulation¹⁰.

The relation between the real space and the virtual space is based on the premise that these two different types of space exist. The real space is physical, tangible and material, in which people live their lives in the multitude of their dimensions and complexity and run their professional, cultural, military, political, social, diplomatic, economic activities. This space has different and diverse representations given by the human beings, as individuals, and by the local and national human communities. The second type of space is a completion of the first one and a result of technological progress, especially in IT and communication area. Apparently, it is immaterial and difficult to locate precisely. For example, an e-mail message, addressed to an individual who has an electronic mail address, may be accessed by any PC, anywhere in the world, only if connected to the Internet network. Nonetheless, this space is "real" enough to permit action within its framework, but, of course, an electronic action. It seems that everything "happening" in the virtual world has, at a certain extent and in a certain sense, a connection to the real space. First and foremost, every action taken in the virtual space is performed, at least initially, from the real, tangible space. Then, all the changes, transformations and/or mutations realized in the virtual world reflect somehow in the real world. That is to say that they lay their mark upon the facts, the way of being, the mentality and the proceeding of the individual that performs the action in the virtual space.

In our view, inclusively the video games with different themes have a reflection in real life. Hereby, if a child, young or adult spends most of his time on various PC activities their life will be, at a certain extent, affected. It is possible for that person to nourish a strong feeling of satisfaction

or fulfillment from an individual point of view, but, from a social perspective, he may be isolated or he may have even broken any contact with reality. Moreover, virtual space allows every person who accesses it to create its own world, a world that may be sometimes completely different from the real one. From here to a genuine alienation remains only a step to be taken.

Besides, virtual space is "full" of information provided by both the human society, who uses it to achieve different and divers goals and objectives, and the ones who create their own virtual world. Nobody can guarantee on the veracity of this information. The source of the virtual world data may often be missing or hidden. At the same time, almost any individual in the world has the liberty to access the virtual space. Each Internet user lays its own mark upon the virtual world. In his turn, the virtual space has the ability to influence its users' opinions, attitudes and behaviors. As a consequence, one can notice that there is a interdependency and inter-conditionality between the virtual and the tangible, physical space.

The security environment refers to a reality represented by a set of domestic and international, ecological, social, economic, military, diplomatic, political, informational and cultural favorable conditions, within which exists all the human communities. It represents the space (the place) where the security/ insecurity state is manifested, at individual, group, regional and global level. The security environment has a complex structure and its evolution depends on a many national, regional and international factors.¹¹ If we take into account the existence and the manifestation of virtual space and its significant relation to the real space, then we can assert that the security environment has to "contain" both of them. In other words, when referring to the security environment, one shall take into consideration simultaneously both real and virtual spaces, which are in a continuous and constant interdependency and interaction. As a consequence, the space dimension of security must include not only the real space, but also the virtual one, as a variable of the former.

2. Internet as place of manifestation and expression of the *virtual*

The term "Internet" refers to World Wide Web, the unique global computer network, interconnected



by the communication protocols Transmission Control Protocol and Internet Protocol, known as TCP/IP. Internet pioneer is dating from 1965, when Defence Advanced Research Projects Agency (DARPA), from the Department of Defence, USA, created the first network of interconnected computers, called Arpanet. The super-network from nowadays resulted from the development of Arpanet network. **Internet** concept means, in most cases, the same network, but seen as a medium of mass communication, with information and services offered to users through this medium. Technically, the term can refer to a network that interconnects two or more autonomous networks, which are far away from each other. Examples of large networks, for which this name is justified, are SIPRNet and FidoNet.

The word "Internet" is derived from artificial and partial agglutination of two English words: interconnected and network¹².

In a certain way and to a certain extent, Internet can be considered as expression and place of manifestation of the virtual. To demonstrate this assertion, we shall proceed from the fact that Internet, by way of constitution, is a place (indeed, a virtual one) in which, through information, people "meet", communicate and more.

In our opinion, Internet, as expression of the virtual, comes into prominence mainly through the concept of *virtual community*. This¹³ refers to the individuals who are reunited via the Internet, by common interests or values (e.g., hobby, profession or leisure time). Community's objective is to create value, based on exchanges between members, exchanges which may consist of counseling or discussion topics. The creation of the virtual community can be beneficial for a website, because it creates a sense of belonging to a group and allows the site to evolve into a participatory approach. In addition, a community of users of considerable size may improve the website value because it procures a strong sympathy capital and creates a feeling of confidence to Internet users. However, if the perimeter of the community is not properly defined, there may be divisions and frustrations may crystallize. In this case, the community risks to create the opposite effect of its intention, namely to circulate a negative image.

In time, Internet has greatly expanded the range of the activities it facilitates. If at the beginning, electronic games were those that occupied much

time and space, today, a series of public services solve many of their tasks over the Internet. More broadly, the virtual community will include all those who use Internet facilities, from electronic gaming to the very wide range of information, from railway time books to bibliographies and texts for almost all professions. Hence the need to introduce within the areas regulated from a juridical point of view the "virtual community", namely the virtual space occupied by the Internet. However, the large number of communities does not constitute a major obstacle to the existence of a unifying community: virtual community. One of the most obvious evidence of the existence of such communities is the creation of a discussion group on Usenet¹⁴. The system was created within a U.S. university, in 1979, and can be considered the precursor of today's discussion forums, making it the oldest communication system, still in operation. Seemingly clear evidences of virtual communities' existence are represented by various discussion forums that bring together individuals who have common interests or concerns. This feature of Internet was considered, at the beginning of its development, as having the potential of becoming a promoter and facilitator of security in the world that could turn the world into a "well-connected big global village"¹⁵. In 1994, a Magna Carta for the Knowledge Era¹⁶ was elaborated, expressing the belief that Internet will foster the development of "electronic neighborhoods" whose common bond is the interest and not the geographical factor. Cyberspace is considered, by the authors of this manifesto, a centripetal force, which will foster the cohesion of a society increasingly free and diverse. However, considering how the World Wide Web has evolved over 20 years of existence and the uses that have been assigned to it, one may conclude for good reason that, although Internet is indeed a specific feature of the age we live in, differentiating it with respect to other ages, its implications for security environment have not been exclusively positive. Western civilization model did not spread throughout the world, yet we can not talk about a single virtual community, but about several such communities built around common interests, which are often very different. Moreover, they can bring their contribution to the increase of national and regional levels of insecurity. In this regard, we consider relevant the examples given by E. Morozov¹⁷; they show that



transnational networks supported by Internet may worsen our world. This happens because Internet allows homophobic organization activists in Serbia to fight against sexual minorities' rights and the creation of an online equivalent of the Committee for Virtue Promotion and Vice Prevention by social conservatives in Saudi Arabia and even the recruitment of new followers by terrorist networks.

It is becoming increasingly clear that the real world and virtual world will merge. "The exponential growth of information, the accelerated development of social networks and the increasing traffic will go gradually to the creation of an interconnection between the virtual world and real world"¹⁸. They have implications for both humanity and the Internet's relevance.

In parallel with the Internet, global society is, with each passing year, increasingly complex and interdependent. Governments, multilateral organizations, private sector and civil society now recognize that they are often powerless when acting alone; global issues, threats, opportunities and challenges, which they must face, are often beyond individual capability, regardless of their power.

We notice more and more the influence and potential of the Internet in various spheres of human activity at local, national, regional and global level. Science and innovation, whose development is encouraged by the opportunities presented by the World Wide Web, also has to cope with the challenges of the Internet when the universal arteries determine developments and stimulate economies.

3. Security challenges via Internet

Analyzed from the perspective of its connection to the security environment, cyberspace can be considered both a substantial opportunity to increase security status and a facilitator for enhancing proliferation and amplification of new types of security threats and risks. As demonstrated above, the primary element of the virtual world is information. World Wide Web is actually a worldwide network of information, facilitating the access of individuals to it, representing, at the same time, a binder of people. Thus, a real virtual society arose, a society whose members are united in this unique bonding – the information. Its

relevance for those who manage security issues is obvious – a large source of documentation allows them to prepare consequently. Furthermore, information often means power, which, in conjunction with high-technology development, can be a real advantage to the one who has the information and a disadvantage of the one who doesn't have the proper information. Perhaps the most obvious practical reflection of this philosophy is represented by the development of the concept of Network-Based War (NBW), which refers to a "system to ensure informational dominance not only in the battle space but also in the whole space and the achievement of the necessary means for its real and quasi-real time transmission"¹⁹. NBW concept involves the use of sophisticated technology, complex and integrated actions, but its main feature, which distinguishes it from traditional types of war, refers to the flow of information in real time and to its capitalization in the theaters of operations. NBW is grounded on Internet benefits only partially; it represents an evolution in the military area that shows the growing importance given to technology, information and networks in this area of interest.

However, cyberspace has the clear tendency to become the space in which new types of security threats are developing. In the first place, this is due to the unprecedented development of technology and, secondly, to the phenomenon of globalization, which has allowed the expansion of these technologies at such an extent that people have cultivated a high degree of dependence on them. Technologies requiring action in the virtual space represent the very basis of more and more people's business activity, of the systems of protection, of ensuring security, of supplying vital resources, of communication and transport. The other side of the picture consists in the fact that the existence of virtual space could be exploited not only for the augmentation of security level, but also to increase insecurity. In other words, Internet is associated with the globalization process, which tends to remove the old certainties and realities and to replace them with new ones, with new challenges and opportunities. Security is no exception to this trend.

As the Internet tends to be ubiquitous in all areas of human activity and is accessible to all those who have the necessary technology, there is a possibility that certain individuals or groups



to take advantage of the anonymity offered by cyberspace to threaten citizens of different communities and countries because of their ethnic affiliation, of their religious or political beliefs. They can do this without assuming the risk of being captured, wounded or killed, as it would happen if they executed a similar act in the real world. As the Internet evolves, expanding more and more both nationally and worldwide, cyber-terrorism acts could multiply. Computer systems, cyber-terrorists' favorite target, will continue to be affected by sabotage or terrorism via cyberspace. Besides, both independent individuals and organized groups are able to commit unlawful acts on Internet. They are the authors of what is called cyber-crime. Cyber-crime or computer crime describes a new type of security threat, which hasn't yet had a clear and universally accepted definition; usually, its definitions vary with the nature of the discussion (political, legal, public, academic etc.). However, overall, cyber-crime concerns information and communication network operations, without any geographical constraint, and the movement of data in order to commit unlawful acts. Cyber-crime is considered a transposition in virtual space of crimes (acts clearly prohibited by law, therefore, illegal) or deviances (acts that are inconsistent with social norms, socially undesirable²⁰). Cyber criminals' actions are, however, less harmful than those committed by offenders who operate in a traditional manner, which makes many deviant behaviors on Internet not to be sanctioned in many states. Still the need for legal regulation of cyberspace activities at both national and international level is undeniable. Even the nature of Internet involves an effort to secure the network beyond traditional state boundaries.

All these acts, which fall into the category of computer crime, affect human, national and international security. Therefore, judicial vocabulary shall digest these new security challenges. They affect the intellectual property, privacy, databases through the inappropriate use (i.e. illegal) of information about individuals, institutions, businesses and beyond. Thus, Internet can allow not only to steal or alter data and data processing systems but also to lend an identity or authorization as its use in illicit operations performed remotely and anonymously.

Today, it is noticeable that information may be

used offensively in three ways²¹, which actually represent negative offsets of the advantages it brings. These three offensive ways of using information consists in:

□ An inappropriate adaptation of information, reverse of its sustainability. Information, whether it refers to things (techniques allowing certain performances, knowledge that determines strategies) or to individuals (location, register, monitoring and record), generates power. The offensive use is affined to the risk of the protecting privacy loss, covering a range of events from the theft of a patent to the invasion of privacy. Basically, the information may threaten privacy.

□ The harmful penetration of information in certain environments, reverse of its transmissibility. Thus, the information may create objects or relations and may also destroy them. It produces order and disorder. In particular, false, deconstructed information that hides the truth affects the ability to act appropriately, destroys the memory or annihilates the processing capacity. From political misinformation to viruses, from lying to sabotage, the information may threaten the information.

□ Unacceptable propagation, reverse of its responsibility. The monopoly on its dissemination or the control over its reception, through manipulation or propaganda, threatens critical thinking and the possibility of response and causes significant damage to any free human relation. In this way, information may threaten communication.

Basically, Internet uses information as raw material of all its activities. This is the reason why the information has not only a social, economic, political and cultural importance but also a vulnerability to the different and diverse challenges. Among them, an important place is occupied by hackers' activity. They are usually gifted young persons, highly trained in computer science, who succeed in accessing illicitly the computers of institutions or companies. Perhaps, today, there are several thousands of hackers, of which several hundred are able to break through the most sophisticated computer systems²².

The relation between hackers, on the one hand, and the notion of secrecy, on the other, can be characterized as ambivalent. Because their work is unlawful, it involves anonymity, but the need to be recognized within the community of hackers



determines the cyber-crime actions' notoriety. According to a study of Computer Security Institute, more than 40% of businesses have faced at least one attempt of invasion in 2000²³. Pirated services, stolen credit cards numbers, disfigured websites – Internet pirates gain an increasing notoriety. But the objectives and details of their actions remain unknown to the public. Most hackers say that their actions are justified by their passion for computers and not by other causes. It seems that pirates attacking servers to earn money or to access financial data are not too many. However, any attack by hackers may affect data in the system they entered. This is why there is a need to protect computer systems against hackers.

Along with cyber-crime and hackers' activities, cyber-terrorism represents an equally important and contemporary security challenge. Moreover, after September 11th 2001, countries which achieved a high degree of computer development and dependency have begun to approach very seriously cyber-terrorism risks to their business and society in general.

Cyber-terrorism is placed at the meeting point between traditional terrorism and information networks, such like the Internet, representing actually the link between globalization, terrorism and information. As a consequence, cyber-terrorism can be defined as the deliberate action of destruction, degradation or modification of data, information flows and vital systems of states or companies having a strategic value in the proper functioning of a country, in order to cause damage and/or to slow up at a maximum degree their activities, being politically, religiously or ideologically motivated. These may be economic, social, environmental damages, and even threats to individuals' lives in certain cases. However, for such an activity to be considered an act of cyber-terrorism, it has to be an act of violence against a person or a property or to be harmful enough to cause fear²⁴. Cyber-terrorism is a mutation of the form of a terrorist act without a change in motivation. Intelligence systems, procedures and equipment that were created to protect people and countries are now vulnerable to these new and profound threats. In this case, we don't face anymore an enemy that attacks using bombs, trucks loaded with explosives or Sarin gas, bags with dynamite tied around the bodies of fanatical

followers, he attacks using, merely, "0" and "1", and their target is the place where nowadays individuals and states prove themselves to be most vulnerable – at the intersection of the real, physical world with the virtual, symbolic one²⁵.

One shall clearly distinguish between the simple cyber-crime and cyber-terrorism, as the former consists in using a system using an illicit purpose. Similarly, cyber-terrorism should not be mistaken with hackers' activity, which is sometimes motivated by ideological elements; and they usually seek, first of all, to disturb the functioning of public institutions and other similar organizations.

Cyber-terrorism is successful in at least from one of the following reasons²⁶: 1) the cost of access is very low: a laptop is less expensive than a shattering explosive or a war weapon; 2) our societies have become increasingly dependent on information networks and their disappearance may cause considerable economic, logistical and emotional effects. In addition, the public and journalists are fascinated by all types of computer attacks, leading to a broad coverage in the media; 3) the paralysis of developed countries when they are abridged of their computer networks. This represents one of the goals pursued by the international terrorist groups.

Cyber-attacks' targets are represented by: telecommunications management facilities (telephone, GSM access points, filar and non-filar networks, satellite and hertz relays), energy generation and distribution sites (nuclear plants, thermal, EDF control sites), transport coordination facilities (airports, ports, maritime and air traffic control, road and rail stations, highways, intersections regulating systems in large conurbations), petroleum products distribution facilities (refineries, storage networks of service stations), postal business management centers, water distribution sites (treatment plants, analysis centers, treatment plants), financial and banking institutions (national grants, ticket distribution network); emergency services, health and public security (police, fire departments, hospitals, the systems of intervention in case of emergency), government services (social security, medical insurance and institutional sites), media (television chains, pressure groups, different content providers), symbolic elements of society and lifestyles (large distribution industry representatives).



Therefore, an attack on multiple targets simultaneously may trigger devastating effects on a country unprepared to face such an act. However, one shall take into account the fact that although computers and Internet have become real weapons to carry out terrorist attacks, they can be equally used for our defense.

Conclusions

The development of information and communication technologies has enabled the emergence and widespread manifestation of virtual space. Internet is one of the most significant uses of virtual space.

From a sociological perspective, "virtual" is a variable of the space dimension of security environment. This happens at least because of the following reasons: by its characteristics, virtual reality is still a continuance of the real dimension; very diverse and concrete human activities are performed in virtual space; the existence and manifestation of security challenges in virtual environment may affect security; from the perspective of human activities, there is a continuity between the real space and the virtual one.

Real and virtual spaces interact and intertwine. Between them, there is a constant communication. Internet, by its multiple roles, realizes this communication. In addition to social, cultural, economic facilities, Internet may also "host" unlawful activities. Thus, a number of security challenges – menaces, risks and threats – come from the Internet, namely from cyberspace, to the real space. Basically, it is about cyber-crime, cyber-terrorism and hackers' activity

There is a necessity of legal regulation of Internet activity both nationally and globally. This shall be taken into consideration because of the conjugation of activities to prevent and combat the security challenges arising in cyberspace and electronically "sent" to the real space where their damaging effects are noticeable.

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THE FINANCIAL CHALLENGE – TIMELY AND AFFORDABLE CRITICAL COMMUNICATIONS SOLUTIONS FOR GOVERNMENTS AND MILITARY

Gerard DONELAN

The paper examines the growing need and requirements for space access. It offers possible solutions to the increasingly complex issues that we are facing today in the changing field of security. It underlines the urgency for nations to have access to modern and effective governmental and military communications and, as a consequence, to satellite and space assets.

Keywords: space access, critical communications solutions, satellites, hosted payloads

First, we shall make a brief introduction to SES ASTRA. It is (Figure no. 1) a wholly-owned SES company headquartered in Luxembourg. SES ASTRA is a satellite operator and operates a large fleet of spacecraft and provides a wide array of satellite services, including ground infrastructure. Although mainly renowned for its core business which is in television, direct-to-home, ASTRA provides many other satellite based applications, especially for Governments and Institutional customers. With regard to the direct-to-home business, over 122 million people watch TV via the ASTRA satellite fleet. But SES ASTRA as a company addresses multiple business verticals:

1. Media;
2. Enterprise;
3. Governments and Institutions.

With this paper, we examine the growing requirements for space access. The starting point is the changes in the military operations (Figure no. 2).

In the “Good Old Days” of the Cold War, everyone knew exactly who and where the enemy was located. There was always a well-defined

single mission theatre of operation which today has changed to multiple-theatre operations. The emphasis primarily was on conventional and heavy military means, such as tank divisions and heavy artillery regiments. We now see the change to highly mobile special operations forces which are quickly deployable.

There used to be autonomous units working independently within a branch of the Armed Forces. Now, we have an increased need for coordination and cooperation both within National Forces and with Allies (e.g. Coalition partners and Allies such as in Afghanistan, Iraq and Somalia).

Previously, military operations would be conducted within or close to the national homeland. Often, the issue would be border disputes with neighbors. Today, operations are often global and consist of simultaneous operations with very different flavors. For example, relief efforts like Haiti will be ongoing simultaneously with military efforts in Afghanistan.

This means that in today’s military operations, we have reached a point where the only real constant is change itself, driven by the demands of an increasingly heterogeneous threat, which, in turn, is driving governments to develop more agile and professional defence forces. The transformation of defence forces is intrinsically linked with the use of new and modern technology, giving a distinctive advantage and creating the decisive winning edge necessary in the face of ever changing operational requirements.

Most importantly, modern defence forces require mission critical information and up to date intelligence for a complete operational picture. This Information Superiority can only be achieved



Who are we



- A wholly-owned SES company
- Operator of the leading DTH broadcast satellite system in Europe
- 15 ASTRA group (ASTRA + SIRIUS) satellites over Europe
 - new satellites continually in the procurement pipeline
- More than 2,500 TV, radio and interactive channels available
- 800+ employees from 25 countries
- In total, 122 million homes are connected to the ASTRA group satellites
- Headquarters in Luxembourg, 9 affiliate offices in Europe and Africa

Figure no. 1

by the use of a modern and robust communications network.

The concept is aptly illustrated in the U.S. Global Information Grid (GIG) figure where satellite communications, both military and commercial, is vitally incorporated (Figure no.3).

Information superiority through the application of network centric doctrine acts as a force multiplier, reducing the number of overall forces required to carry out the required operation. Modern defence forces are adopting the tenets of network centric operations and NATO Network

Enabled Capability and they are using technically advanced, robust, resilient networks with satellite operations at its core. This makes them both cost effective and efficient. So, why is satellite technology of particular importance in this context? Mainly because satellite communications at its core can offer features other infrastructure can not, including the global coverage required for these networks.

Why is the demand for satellite communications increasing (Figure no. 4)?

Satellite encompasses the elements involved in

Military operations: What has changed



From:

- Well defined single mission theatre of operation
- Emphasis on conventional and heavy military means
- Autonomous units
- Operations conducted within/close to homeland



To:

- Multiple-theatre operations
- Emphasis on highly mobile special operations forces quickly deployable
- Increased need for coordination (eg. Coalition)
- More data-intensive weapon systems requiring ad-hoc infrastructure (eg. UAVs)
- Remote medical support and welfare communication: a Must Have

Figure no.2

The GIG concept



- The **Global Information Grid (GIG)** is central to network-centric, C4ISR strategy
- Commercial **SATCOM** is an essential, complementary component within the infrastructure and services layers

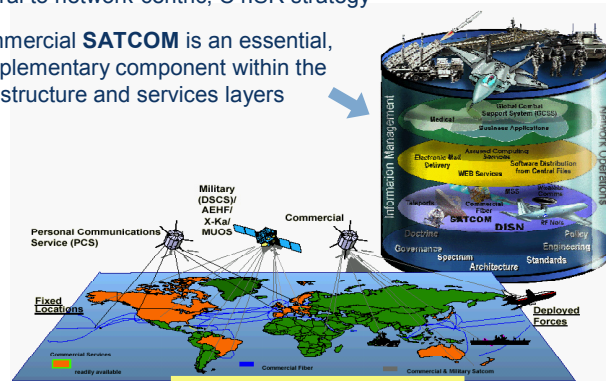


Figure no. 3

linking collectors, effectors and decision makers together to provide the desired information superiority. Effective communications translate information superiority into superior combat power with interoperability across the battlespace and with Allies.

This greatly reduces cost in manpower and equipment, effectively putting “boots on the ground” in the right quantity at the right time and using all elements of C4ISR to achieve the objective efficiently.

How is the overall bandwidth demand growing (Figure no. 5)?

The U.S. government remains the single largest user of satellite capacity in the world. However, contrary to popular belief, it is not all on exclusive military satellites or systems. Military satellite systems are comparatively expensive and capacity demand is ever increasing. The U.S. DoD has developed processes to use commercial capacity to mitigate the critical lack of appropriate military satellite systems and existing military program

Why is the demand for satellite communications increasing?



- Satellites encompass the elements involved in linking collectors with effectors and decision-makers
- Satellites enhance and support joint development, employment and sustainment of forces
- Satellites enable decision making agility, initiative, precision and coherence of operations across the battlespace
- Satellite communications provide the simultaneous link from the theatre of operations back to the government
- Satellites are a true force multiplier

→ Satellites provide for interoperability

Figure no. 4

How is overall bandwidth demand growing?



- The U.S. government remains the single largest user of satellite capacity in the world
- US DoD forced to use commercial capacity due to critical lack of appropriate military satellite systems and program delays to new military capacity
- Other governments use satellite capacity too – although at far lower level in pure bandwidth terms

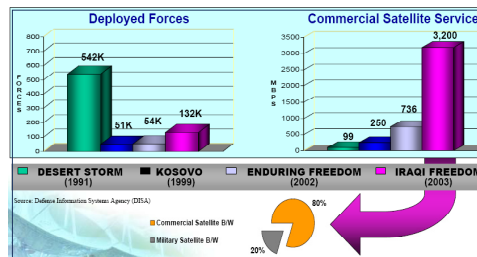


Figure no. 5

delays or cancellations. At present, the U.S. DoD leases 80% of its total satellite communications from commercial companies.

Other governments use commercial satellite capacity too – although at far lower level in pure bandwidth terms. The UK for example, even though it has its own military satellite network, is the nation whose MoD leases the most commercial satellite bandwidth in Europe with over 60% of its total usage coming from commercial satellite companies. Several commercial companies provide satellite capacity for C4ISR use, to NATO and other nations, including SES ASTRA.

What is driving these demands for increased satellite capacity?

Let's more closely examine the demand drivers in the world today (Figure no. 6):

- We mentioned net-centric programs and, in particular, this refers to ongoing NCW, NNEC initiatives.
- We also mentioned conflicts in Iraq and Afghanistan, Somalia and relief efforts in Haiti, Chile and China; in other words, the global communications need.
- The shifts in mindset of commanders today are a demand driver. Commanders now want and, more importantly, are beginning to expect constant information even while on the move. Communications on the move is becoming the norm.

- UAVs are a technology driver - there is an increased usage of UAVs and their data requirements can only be satisfied using satellite.

- Mobile Maritime and land-mobile requirements are demand drivers associated both with new technology and the mindset of communications on the move as mentioned.

- Enhanced network usage and applications – like computers, people increasingly want applications which demand more memory but also more bandwidth. Larger data transfers (enhanced imagery) from UAV's highlight this area.

- And, last but not least, welfare communications – email, VoIP and social media access for troops – is dramatically on the increase. These services are more and more perceived as basic rights and so the pressure on nations to provide them is increasing correspondingly.

More about UAV's. After many years exploring options for a NATO owned and operated airborne ground surveillance capability, NATO decided on the Alliance Ground Surveillance Program consisting of a fleet of Global Hawk UAVs. Mr. Peter C. W. Flory, NATO's Assistant Secretary General for Defence Investment, said: "NATO AGS is an essential asset to increase our situational awareness in support of our Alliance forces across the full range of NATO operations in the future" (Sep 2009).

Within the NATO Alliance Ground Surveillance (AGS) Program, SES ASTRA is responsible for

Demand drivers

Demand has surged driven by:

- Net-centric programmes. (NCW, NNEC)
- Conflicts in Iraq and Afghanistan
- Communications on the move (COTM)
- UAVs
- Mobile Maritime and land-mobile
- Enhanced network usage and applications
- Larger data transfers (enhanced imagery)
- Welfare communications

Figure no. 6

satellite engineering services and provision of required satellite test capacity and is the only satellite operator in the program. Here is a view of the NATO Global Hawk - subject to confirmation of specification of course (Figure no. 8). These are big craft about the size of a small passenger jet. The satellite link at the moment is in Ku Band, the same as used by the U.S. The Global Hawk can stay airborne for up to 36 hours and they can provide advanced imagery and provide up to the minute information back to the commanders.

The Global Hawk is not the only UAV being

used by nations. There are over 40 various types and sizes being used in Afghanistan alone. The use of UAVs as such has increased dramatically over the past 10 years. They are already a vital tool in the C4ISR theatre which means they are used more and more. This explains the associated increased rise in demand for satellite capacity.

The communications requirements of a UAV are really quite large: up to 48Mbits per UAV. At that point you may likely also need the information to be aggregated and backhauled out of theatre to Homeland HQ's or NATO HQ's. This requires

NATO AGS

NATO AGS Core Revised UAV-Only Configuration

- NATO is acquiring a UAV based AGS capability
- Based on the Block 40 version of the RQ-4B Global Hawk UAV
- Wide-area GMTI/SAR radar sensor
- Integrated Ground Segment

Figure no. 7

NATO Global Hawk

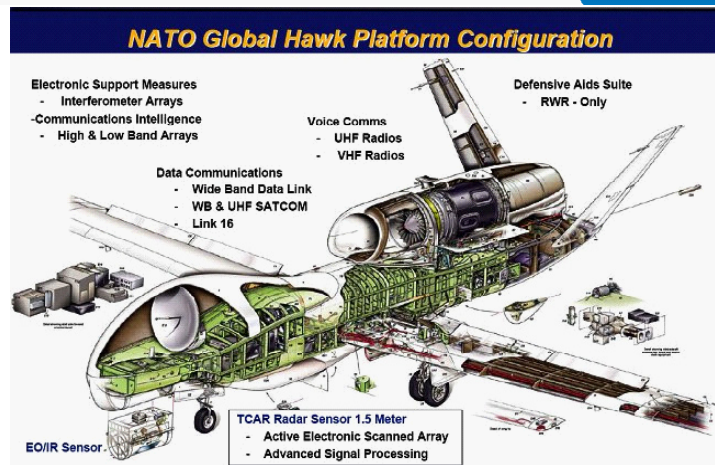


Figure no. 8

even more satellite bandwidth. But the advantages are obvious as it provides and increases an overall operational capability to commanders in the theatre. The need for an increase in total satellite bandwidth compared to overall cost saving in manpower and equipment, not to mention lives saved, easily justifies costs.

Taking into account the demand drivers, we can all see where the advantages are, but how we gain access to space to do this? How do we implement these new communication devices and sensors required to save on manpower? And more

importantly how do we save lives and, at the same time, be more effective and cost efficient in these financially constraining times? We now examine some of the associated problems governments face and some possible solutions.

We have seen that nations are increasingly dependent on satellite communications and therefore the requirement for a “national” or independent satellite is also on the rise. This gives national space asset independence. Examples of nations with their own satellites are: U.S.A., U.K., France, Italy, Spain and Russia.

Military space systems



- Nations are increasingly dependent on satellite communications
- The requirement for a “National” or independent satellite or space capacity is on the rise
- Nations with their own national satellites include: USA, UK, France, Italy, Spain, Russia, Turkey, etc.

But other nations also want access to space



Figure no. 9

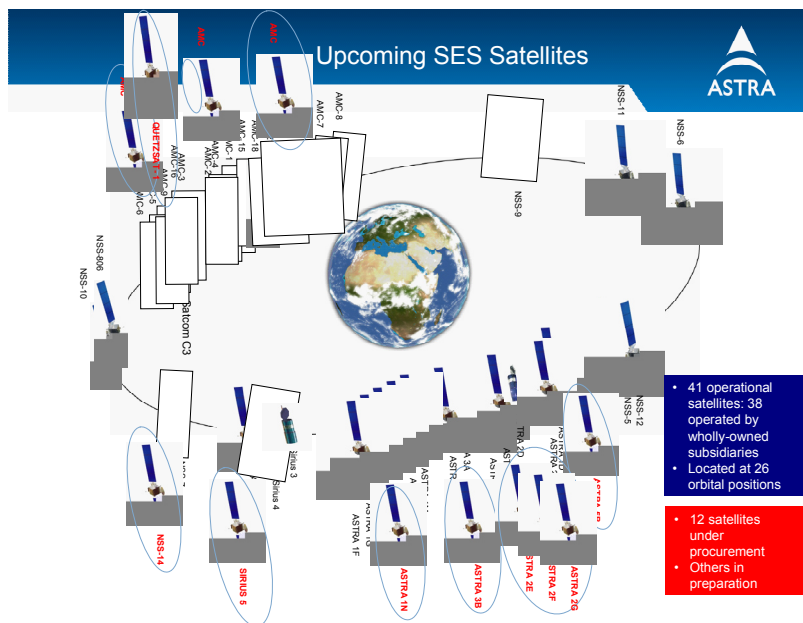


Figure no. 10

Everyone wants access to space; however, it is not that straight forward. Satellite programs are long – 3-5 years even for an experienced commercial company. However, that time scale at least doubles for a military program. In addition, government approval and a political process can significantly add to this through changes in government and policies.

Satellite programs are also complex due to the expertise required – which may not be available in the nation itself. They are inherently risky, it

is the nature of the business and, if there is an inexperienced team, risk will inevitably increase, which leads to even more budget and timescale over run.

And, finally, satellite programs are very expensive – 150 million to over a billion dollars, depending on whether it's a small communications satellite or imagery satellite or a complex military constellation with multiple ground stations.

So, is there an alternative, timely and cost effective way to get access to space? Let's examine

What is a Hosted Payload ?

Governments can benefit from the “conveyor belt” of planned launches

Governments place a primary or secondary communications or other sensor payloads onboard commercial fleet spacecraft.

Such devices are known as hosted payloads.

Hosted Payloads can fulfil several types of missions:

- Raw transponders -bandwidth
- Earth observation missions
- Sensors
- Other communications payloads

Each mission is unique, however experience matters

Figure no. 11

European Commission – EGNOS

March 2009 - ASTRA contracts a hosted payload with the European Commission for the EGNOS (European Geostationary Navigation Overlay Service)

- ASTRA's new commercial satellite will host a 100kg L-band tailor-made payload
- EGNOS provides more detailed information to navigation devices with Safety-of-Life (SOL) quality for all modes of transport, including civil-aviation
- EGNOS allows users in Europe and beyond to determine their position within 2m, compared with about 20m for GPS and GLONASS alone
- EGNOS provides a crucial 'integrity message', informing users in the event of problems with satellite navigation systems

January 2010 SES ASTRA Awarded Second Contract For EGNOS

- Europe's leading satellite operator will provide hosted payload services for European Geostationary Navigation Overlay Service

Figure no. 12

now the concept of hosted payloads. To take the SES global fleet as an example, it has 44 satellites and another 12 satellites under procurement. This means a conveyor belt of spacecraft are planned for launch over the next years (Figure no. 10).

Governments can benefit from this “conveyor belt” of planned launches from a commercial satellite operator by placing a primary or secondary communications or other sensor payloads onboard a commercial fleet spacecraft. Such devices are known as hosted payloads (Figure no. 11).

There are missions that are particularly suited

for hosted payloads:

- Raw Transponders – Capacity such as a steerable beam;
- Specialized Transponders – Some hosted payloads provide communications capabilities, just like the rest of the satellite, but with customized features such as specific radio frequencies (e.g., L-band or UHF). These specialized transponders can either be operated commercially and leased back to the user or operated directly by the user. Either way, it reduces the financial impact of a dedicated satellite,

EGNOS On-Board

Spacecraft features:

- Standard SS/L 1300 bus
- ~12 kW solar array power at end of life
- 15 year service life

EGNOS payload features:

- Uplink uses same C-band antenna as for FSS/BSS service
- Heritage antennas built by MDA (Montreal) for Anik 1R
- High-stability local oscillator required to meet EC requirements

SES SIRIUS SPACE SYSTEMS LORAL

21 *Use or disclosure of the data contained on this sheet is subject to the restrictions on the life page.*

Figure no. 13

U.S. Air Force
CHIRP, Commercially Hosted Infrared Payload



- July 2008 - AMERICOM Government Services (AGS) signs a contract with the US Air Force for a hosted payload



- An experimental passive infrared sensor is put on an SES satellite operating over the United States
- The project, known as the Commercially Hosted Infrared Payload flight demonstration programme (CHIRP), will test a new type of infrared sensor from geosynchronous orbit
- The sensor is integrated into the commercial satellite and the data it receives will be transmitted to a ground station for analysis
- AGS will also provide the services to determine the utility of the sensor in terms of data, performance validation and interoperability

Figure no. 14

- Environmental Sensors – Certain scientific instruments that observe the Earth, its atmosphere and its space environment do not always need to fly on government satellites. Some may be able to accomplish their missions as hosted payloads. Such missions include hyper-spectral sounding, ocean color analysis, and ozone mapping. Due to cost saving and ease of access to space for example; the U.S. DoD is looking into the possibility of flying sensors on a large number of commercial satellites. Such sensors would augment the Air Force's ability to track spacecraft and orbital debris, monitor space weather, and detect other threats in space;

- Technology Testbeds – Hosted payloads provide an efficient means of testing, demonstrating and validating new space technologies prior to their operational deployment. Because hosted payloads offer regular, reliable and rapid access to space, it is a way to use them to reduce the technical risk of developmental flight hardware and the associated costs of launching a spacecraft just to do it.

An example a hosted payload project is the payload contracted by the European Commission for the EGNOS (European Geostationary Navigation Overlay Service). In this case SES ASTRA's new commercial satellite will host a 100kg L-band tailor-made payload.

EGNOS (Figure no. 13) is a satellite-based augmentation system (SBAS) that is intended to supplement the GPS, GLONASS and Galileo systems by reporting on the reliability and

accuracy of satellite navigation signals over Europe. The entire system consists in a network of ground stations and control centres that will relay EGNOS information to users via geostationary transponders. While EGNOS covers the European states area, the hosting satellite has the built-in capability to extend coverage to other regions, including Africa and neighbouring countries of the EU. SES ASTRA recently won a second hosted payload contract for EGNOS 2.

Another example is the experimental passive infrared sensor on a commercial satellite operating over the United States. The project, known as the Commercially Hosted Infrared Payload flight demonstration program (CHIRP), will test a new type of infrared sensor from geosynchronous orbit (Figure no. 14). The sensor is integrated into the commercial satellite and the data it receives will be transmitted to a ground station for analysis. The host in this case will also provide the services to determine the utility of the sensor in terms of data, performance validation and interoperability thus a massive saving in simply testing a sensor in space without having to have a purpose built and expensive spacecraft.

Some conclusions

The need for satellite capabilities in nations is growing more quickly than ever, and becoming more and more acute. Conversely, access to space is not becoming easier. It remains a complex,



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high-stakes, time-consuming task.

One way forward to achieve affordable access to space in financially restrictive times is the use of hosted payloads. The technology risk mitigation allows Governments and institutions to benefit by using advanced technology proven and operated

in commercial systems. Secondly, operating risk mitigation can allow for national surge capacity to be available to respond rapidly and cost effectively to global events. Finally, the cost risk mitigation through a hosted payload provides for an accelerated access to space programs versus the associated costs of a stand-alone space project.

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EUROPEAN SECURITY AND DEFENCE IN A GEOPOLITICAL AND GEO- CULTURAL CONTEXT

Ilias ILIOPOULOS, PhD

During the Cold War era, policymakers and strategic thinkers had it relatively easy since the holistic and apparently ever lasting bipolar confrontation shaped the framework within which the main strategic choices were defined. With the end of that epoch and the eclipse of the Soviet empire, what was a given gave way. European as well as international security has become too multi-faceted to characterize by way of a single analytical model. Though military power remains crucial, the importance of economic power has clearly increased. Additionally, non state actors have also emerged to an extent unknown in the old times of classical diplomacy. Therefore, a distinction could be made between formal and applied geopolitics. Geopolitical dynamics include not only geostrategic but also geo-economical (read: geo-energetic) and geo-cultural changes of a strategic actors' position. Three major international strategic actors are involved in framing the European geopolitical and geo-cultural context: the United States of America, the European Union and Russia – clearly forming a kind of power configuration by interacting though to a different extent each one of them, in the European region, and beyond: in the broader “Eurasian” and “euro-Atlantic” supra-region.

Keywords: European Security & Defence; Geopolitics; Geo-Culture; Strategic Actors.

During the Cold War, policymakers and strategic thinkers had it relatively easy: “From 1945 to 1989 – Immanuel Wallerstein asserted in a recent paperwork –, the main chess game was played between USA and the Soviet Union. This was called the Cold War and the basic rules were metaphori-

cally called “Yalta”. The important rule is the one sharing Europe in two areas of influence. It was called by Winston Churchill “The Iron Curtain” and laid from Stettin to Trieste. This was the rule and very little counted the agitations from the European territory caused by pawns’ instigations and either the problem of bursting a war between USA and the Soviet Union. After another series of turbulences, the pawns had to be placed again in their first places (as in the chess game)...”¹

Most strategic choices were defined by a central, apparently enduring cleavage. Led by the Soviet Union and the United States, two camps – East and West – were locked into what was thought to be a perpetual confrontation. This bipolar relationship provided the framework that informed analysis and strategy. International politics and national strategies revolved around this bipolar juxtaposition. What mattered and what did not was largely defined by it. Regardless of issue area, it was the United States vs. the Soviet Union; NATO vs. the Warsaw Treaty, West vs. East, liberal democracy vs. communism; free markets vs. central planning. Even the international economic order was largely defined by the Cold War divide.

With the Cold War’s end and the Soviet Union’s eclipse, what was a given gave way.

The profound changes during the last 20 years started with the collapse of the Soviet Union and the concomitant fall of the Soviet empire in Central and Eastern Europe. This was followed by the deepening and enlargement of the co-operation between the states of Western Europe, in what was the European Communities and became the EU in 1993.



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Next came the process leading to the enlargement of NATO. Then, there was NATO's reluctant intervention in the Balkans, at least indirectly forcing the EU to develop its own military capacity. After that, Islamist Jihadists carried out their unprecedented attacks against the US on 11 September 2001. Since then, the US and its NATO allies have been involved in the Global War on Terror. The seemingly futile search for a new European, euro-Atlantic and Eurasian security and defence architecture to meet the geopolitical process, while replacing the bipolar framework of the previous constructs, continues.

The geopolitical² process is growth, or decline, both of power and territory, or space. It has been well said that "re-dimensioning the areas of influence is a major objective for the big powers, within the evolution of their power cycle".³ For example, the creation of the Warsaw Pact established strategic control of the Soviet Kontinental-Macht, of the largely land-bounded and un-maritime Soviet power over a "shatter-belt"⁴ of Central and Eastern Europe, of Mitteleuropa and Ost-Mitteleuropa, to put it in classical terms. Analogously, NATO enlargement means expansion of strength and influence of maritime powers over almost all parts of the European Rimland, the European discontinental geostrategic zone.

Of course, international politics are today too multi-faceted to characterize by way of a single analytical model. Undoubtedly, military power is still crucial. The role and functioning of military science(s) "as a coherent ensemble of scientific knowledge under the form of theories, concepts, methods, techniques and means of investigating the military domain"⁵ thus remaining significant since it provide "the scientific base of conceiving, establishing, organizing, conducting any military action, including those called asymmetrical actions".⁶

On the other, hand though "the conflicts' physiognomy has changed significantly, its factors including: new political, economic and strategic situations of insecurity; new political and strategic goals; new objectives, specific forces and means..." and so on.⁷ Further, the importance of economic power has clearly increased. It has been reasonably said that "the fact that security has an economic-financial dimension is already a truism".⁸ Economic ties, particularly trade relations, play an increasingly crucial role for

modern security frameworks. Further, European security and defence is situated in an international environment, where diplomatic processes, typically undertaken within international governmental organizations, appear to be more important than they were some decades ago, though, in essence, this is not necessarily the case. In addition, in some policy areas, non state actors (Non-Governmental Organizations) have also emerged to an extent unknown in the old times of classical diplomacy.

Hence, we could make a distinction between formal geopolitics, on the one hand, which analyses spatial configurations of power – the world's geographical power structure (regions, sub-regions, supra-regions) and its dynamics – and applied geopolitics, on the other hand, which projects the concentration of all sorts of power in space to achieve political objectives, thus "modifying the geopolitical spectrum of the area of interest".⁹

Therefore, geopolitical dynamics include geo-economical (and geo-energetic), geostrategic and geo-cultural changes of a state's position. Geo-economical change could be understood as the transition from one geo-economical zone to another (core/centre – semi-periphery – periphery). Geo-energetic change means a change of a state's position in the energy resources supply chain: stock suppliers – transit and processing countries – states-consumers. For example, the Baltic States, pretty much like several South-East European States, turned from energy consumers into energy resource transit countries during the last years. Geo-cultural¹⁰ change means change of a state's production functions in the area of "production" of knowledge and cultural innovations – from supplier of stock and supportive services to producer of final products of culture. To put an example, towards the end of 19th century and the beginning of the 20th century, the USA turned from a semi-periphery (in terms of geo-economy and culture) state into one of the major geo-economical and geo-cultural centers.

The term "geo-culture" describes a concentration of cultural-civilisational power and the projection of it into space to achieve political objectives. Similarly to geo-economics, geo-culture is about the uneven distribution of cultural-civilisational resources in space. This uneven distribution generates communicational barriers; influence the geo-economical and geopolitical



power of a state. Geo-culture analyses cores of civilizations, normative codes, relations between semi-peripheries and peripheries, processes of cultural innovation, application, adaptation and the spread of these innovations.

An international geopolitical system, similarly to any other system, consists of elements and relations between the elements. The elements of a geopolitical system are geopolitical subjects and geopolitical formations – sub-regions, regions, supra-regions. Interaction between geopolitical subjects results in the creation of higher level geopolitical formations. Intensity of relations is measured by their regularity and volume. The concept of geopolitical region signifies that the relations (economic ties, communication channels, transport corridors, energy supply resources) between the geopolitical subjects within a group are more intense and concentrated than those relations with other geopolitical subjects (not belonging to the group). Geopolitical subjects are attributed to the same geopolitical region when tight economic, political, social and cultural ties bind them.¹¹

In essence, a geopolitical region consists of subjects, which have a high concentration of communication between them and a high intensity of communication content. The dynamic objective state of such relations could be called geopolitical gravitation; the dynamic subjective state of relations could be termed geopolitical orientation. In other words, a geopolitical region is a group of political subjects bound by geopolitical gravitation and orientation.

Geopolitical gravitation includes both cultural ties of several states and belonging caused by material ties. Physical material gravitation reflects the more vivid communication infrastructure of some states, energetic and economic interdependency etc. Cultural-civilisational gravitation means the easier exchange of communication content (information) with inhabitants of some states. This involves standards, rules and stereotypes of social behavior; standards of political ethics and economic activity. It can be described using qualitative methods, but hardly defined; still, it is always possible to identify whether it exists or not.

Among the eleven geopolitical regions identified by scholars in nowadays there are Western Eurasia (Europe), Central Eurasia, North-

America and so on. A geopolitical supra-region consists of two or more geopolitical regions, bound by functional ties (geostrategic, geo-economical or geo-cultural). As such geopolitical supra-regions could be considered, per instance:

1. The euro-Atlantic supra-region linking maritime Western and Mid-West Europe as well as maritime Northern and Southern Europe with North America;
2. The Eurasian supra-region linking Russia, and Central Eurasia, with Eastern Europe (in terms of Ostmitteleuropa);
3. The Pacific supra-region linking Australia, Oceania and Southeast Asia.

States, which have global and/or regional geopolitical codes, are geopolitical actors, because they have, firstly, possibilities, and secondly, the will to influence processes outside their own territory. Regarding the European region – whether in narrow (Europe) or in broader (euro-Atlantic supra-region, Eurasian supra-region) terms – European security and defence are, as it is the rule in such cases, about power relations among important international strategic actors. To identify a “strategic actor” one clearly needs to define both “strategy”/ “strategic” and “actor”. Following Bretherton and Vogler,¹² “actor-ness” is constituted by three elements, that is:

- opportunity (meaning the external context);
- presence (meaning the ability to influence processes outside its borders);
- capability (meaning the ability to exploit opportunity and use presence).

Three major international strategic actors are involved in framing the European geopolitical and geo-cultural context: the United States, the European Union and Russia. These three actors clearly form a kind of power constellation by interacting not only in the European region in narrow sense, but also in what we would term the “Eurasian supra-region” and the “euro-Atlantic (or transatlantic) supra-region”. The criterion justifying the necessity to involve the aforementioned major actors in the study of European security and defence is essentially a very simple one: do all three actors, in formulating their policies in a given European issue area, take each other into consideration - or not? Arguably, the United States, the EU and Russia are the three most important actors in the greater Eurasian and euro-Atlantic region, though to a different extent each one of them.



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Sure, relations between the aforementioned actors are asymmetrical, in particular due to the colossal military and economic power of the US. Nevertheless, the asymmetry of the crucial dimensions of power does not invalidate the notion of an existing context or framework, even if it makes the three actors enter the game in distinctive ways – the crucial point here being that the three actors, for all their differences, tend to take the policies and relations of the other two actors into account when formulating their own policies, at least in this part of the world that we focus upon here. Although the US is clearly the supreme power, it is hard, even for the superpower, the “hyper-puissance” (to put it in French terms) to entirely ignore the others in issues of European security and defence. Hence, one could term the relationship between all actors of this region almost unavoidable.

At least two of them are major global economic actors: the US and the EU. The asymmetry becomes even more obvious when it comes to military strength; only two are major military powers in the sense that they control arsenals of strategic nuclear weapons: the US and Russia. It could be of interest that two of the actors have a choice as to how they approach the third, the EU: Washington and Moscow can choose either to approach Brussels or the national capitals.

The United States. The United States, to begin with, must be included in any analysis of European geopolitical and geo-cultural context; the reasons are more than obvious: it is the only global superpower (or “planetary power” / “Planetarmacht”, to put it in Panajotis Kondylis’ terms)¹³ dominates international politics, including most particularly the greater European region. Being by far the strongest of the three actors, the US determines, to a very large extent, under what circumstances, and on what issues, any notion of European security and defence really exists.

At least since the end of the Second World War, the United States has been, de facto, a European power, though it is still contested among scholars whether this happened by choice or by necessity. In any case, Washington has such a choice, at least in theory, whether or not it wants to remain a European strategic actor. The mere fact is that, being once a continental power which then succeeded in transforming itself into a naval power, the United States has acted three times

during the 20th century to restore or sustain the balance of power in Western Eurasia and deter the supremacy of a continental power in the Eurasian Heartland – to put it in Sir Halford J. Mackinder’s terms – when British sea power and balancing seemed, for the same purpose, inadequate: 1917, 1941, 1947. It is said, subsequently, that even NATO’s eastwards expansion after the end of the Cold War as well as the build-up of American military presence in post-communist Balkans would have been perceived and being followed by the policy makers as a strategy of preventive balancing targeting post-Soviet Russia, though this would never be officially declared.¹⁴

It seems that sea power, maritime supremacy (including air and space supremacy) and strategic control of both the oceans and the Rimland (the Earth’s Ring according to Sir Halford Mackinder and Nicholas Spykman) always remain the key of success for the occidental, Anglo-Saxon naval powers;¹⁵ airpower and nuclear weapons are just added to the stew. Sure, the last observation may sound embarrassing since the strategic significance of particular features of geography has greatly varied through out history due to endless social, political, cultural and, most particularly, technological development of any kind. Yet, in fact, a lesson learned from history and geopolitics, if any, is that, much to our own surprise, some factors were as relevant for occidental, Anglo-Saxon maritime powers and nations of the Rimland dealing with Eurasian continental powers in the 20th century AD (and they still remain in the 21st century) as they were for Athenian sea power facing Spartan land power in the 5th century BC. Albeit all impressive changes having occurred during the last twenty-five centuries regarding military, transportations and other technologies, the practical continuities in geopolitics, strategy and statecraft are undoubtedly impressive: notably the theme of a balance-of-power policy towards Eurasian continental hegemonic aspirants entirely dominates the Anglo-Saxon geopolitical and strategic experience.

On the other hand, one should not underestimate the fact that, instead of a broad political consensus on America’s proper role in the world, what we have been witnessing during the last years is rather an ongoing debate among American politicians and scholars featuring a number of contending grand strategy visions. Four alternative visions have been



identified so far: neo-isolationism,¹⁶ conservative realists' concept of selective engagement,¹⁷ liberal internationalism¹⁸ and the concept of primacy – or even empire¹⁹ – advocated by so called aggressive realists. Yet, no matter the outcome of the debate, whether the United States is perceived as a “Reluctant Leader”, an “Emperor” or a “primus inter pares” – or not –, for the time being, it is the most likely leader of any coalition dealing with rogue states and failed or failing states – thus being, in the internet phrase, a kind of “systems administrator” for the global trading system. As a maritime power, the United States considers it as its function to defend the system against local disorders and wars, as threats to the common interest of all. It is noteworthy that the origin of such ideas goes back to Theodore Roosevelt (who, by the way, had met the famous naval strategist, then Captain Alfred Thayer Mahan as a fellow scholar during his time as a Visiting Speaker at the Naval War College in Newport, long before he was elected a President of the United States).

To what extent is the US conception of its role in global and European, politics today congruent with the notion of a European security and defence context involving all major strategic actors? Will the world's only “remaining super-power” conduct significant aspects of its security policy in Europe in a way that takes the relationships with the EU and Russia into consideration, or will what was characterized as “unilateralism” continue to shape US foreign and security policy in global politics, including in particular the European region and the euro-Atlantic and Eurasian supra-regions?

The European Union. It goes without saying that the concept “actor” is more problematic when it comes to the EU. It is fundamentally unclear whether the EU may be regarded as an actor in the same sense as the other two. To use one of the most trivial examples, in the case of the Iraq War in 2003, the Union proved to be absolutely unable to act as a unified actor, and it was, instead, the national capitals that each pursued its own policy regarding the issue - and the US. Still, in our analysis we have to examine what we call the “actorness” of the EU. Under what circumstances can the EU act as one, unified actor in a given policy area? Does it have internal legitimacy? And is the EU accepted as an actor by other actors in this policy area? Does it have external legitimacy?

Arguably it could be said that the “actorness” of the EU is not vital to the existence of a European security and defence context since there is NATO. Certainly, we should not fail to appreciate the significance of the North-Atlantic Alliance. It has been reasonably said that “NATO is a dynamic political and military organization in an ongoing development, which means adapting to the reality of the 21st century.”²⁰ On the other hand, some scholars believe that it will play a less important role over time than it has for the past half century. Yet, one should not forget that the military strength that characterized NATO, to a large extent, made possible the construction of the EU as a so called “civilian power”.²¹ Sure, since 1999, the EU, relying on its considerable economic resources, has also been in process of building at least some military capacity. Whether NATO's role will be overtaken by the EU, at least to some extent, remains to be seen. The Alliance is undergoing a significant transformation,²² in the end of which it could emerge as a field for interaction among all major and minor strategic actors in the greater European region – and beyond. “Practically, NATO wants to transform itself from a European-American military organization into an organization of global collective security.”²³ In any case, NATO will remain the pivot of European and Euro-Atlantic security and defence.

Nevertheless, the EU is such an important emerging international actor that it should be included in our framework. There is a tendency to emphasize the economic aspects of European integration and to dismiss the geopolitical significance of the EU because it is still very weak militarily. A united Europe, however, should be taken seriously as a new political entity in the European security environment, even if the integration process has yet not been accomplished.

Sure, the EU is very different from the other actors - the US and Russia. The latter are nation-states. When it comes to the EU, the situation is very different. The EU is more difficult to understand because it is an amorphous entity (Hans Morgenthau²⁴ would have said “gestaltlos”), thus defying standard analytical categories. Moreover, it is contested in the academic literature as well as in practical politics, whether or not the EU is indeed an international actor of any significance in its own right, outside the trade sphere where



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its role is widely acknowledged. It has been reasonably said that “politically speaking, the formation of the economic and monetary Union means the sovereignty and control giving up upon the decisions regarding the economic policy of the member states.”²⁵ Moreover, “the introduction and the use of the unique currency suppose a single economic management that demands the transfer of the responsibilities and even the functioning of the unique policy leading.”²⁶ Such a management is still absent though, as clearly shown, among else, by EU’s reaction to the recent financial crisis.

Yet, the EU could be regarded not only as the most problematic, but, at the same time, as the most challenging actor. Undoubtedly, it is noteworthy that “for the first time, since the fall of the Roman Empire, most of the Europeans have the same currency.”²⁷ We are talking about an emerging international actor, now containing 27 member states, which is undergoing important changes, not least in the sphere of foreign, security and defence policy. This actor has an immense potential strength, provided, of course, that all assets that the 27 states bring to the table could be utilized in international affairs.

Whether the EU is an actor or not, remains a matter of contention among practitioners as well as scholars. From its part, the EU is seeking to define its identity by aspiring to greater self-reliance in matters of international security, especially in the event that the US is reluctant to become involved in crisis management or peace enforcement via NATO. Certainly, whether the EU will counterbalance the US on the world stage is a different question lacking immediate relevance.

The geo-cultural context, where the dissemination of the more tacit norms of democratic life is found, is probably the most evasive of all strategic fields. In addition, the advance of democracy is probably the most difficult of all issues to measure with any degree of certainty. In spite of these practical and analytical challenges, precisely this geo-cultural field and the issue of democracy are employed by the EU at the core of its relations with neighboring countries outside its own immediate orbit of jurisdiction and responsibility, since the very “ideology” of the EU links economic integration to democratic rule, which, in turn, is linked to peace, stability and prosperity.

There is probably no better area for experimentation with novel strategic objectives than the Central Eurasian region, partly because of its geographical closeness to Europe, and partly because of the multitude of new states with an expressed ambition to be or become democratic states to be found there. It was Joseph Nye who provided us with the term “soft power”.²⁸ Analogously, the basic matter here is the extent to which the EU has “normative power” based on ideational foundation or an ability to shape conceptions of “normal”.²⁹ Five core values of the EU have been identified by scholars – peace, liberty, democracy, rule of law and human rights – as instruments of “presence” of the EU. By projecting these values on to its surroundings, we may deduce that the EU has “actor-ness” in the execution of normative power.³⁰

In this context, we should recall in mind that, if the Cold War ended peacefully with the fall of the USSR, one of the major factors for this outcome had been the diffusion of human rights norms in the communist world. Scholars have reasonably argued that, while accepting the Helsinki Accords in 1975, the inherent force of human rights norms placed in the so called “fourth basket” was not properly understood by the USSR leadership. Instead, the general notion in the ruling soviet elite was that the signing of the accords was a tolerable price in return for recognized borders. In this sense, it should be fairly said that, at least indirectly, the Conference on Security and Co-operation in Europe (today’s Organization for Security and Co-operation in Europe – OSCE) turned out to be a major catalyst in questioning the legitimacy of the totalitarian systems in Central, Eastern and Southeastern Europe.

To put an analogy, does the EU – on its own or in alliance with other European institutions (Council of Europe, OSCE) and the US – seem to have a plan for how to “democratize” Eurasia and a set of instruments with which to forward that purpose? It has been suggested that the EU is stronger when faced with its geographical “near abroad”, primarily by virtue of its economic attractiveness.³¹ Additionally, the EU has been said to conduct itself as “a normative, civilizing or ethical power”³² in the international context. With the European Neighborhood Policy (ENP), the EU is exploring a delicate approach keeping countries of Ostmitteleuropa (Moldova, Ukraine,



Belarus) and Caucasus (Armenia, Georgia, and so on) within its own “norm sphere”. By the way, it should be underlined that the ENP was explicitly designed not to create new dividing lines – or even a “buffer zone” between Russia and the EU.

Russia. The inclusion of Russia might appear less self-evident. Yet, though Russia is much less important in global politics than the Soviet Union was before its collapse, we have to recognize that Russia is still a major regional power (whose role seems to have been downplayed in research and policy analysis of European security and defence issues) and that, subsequently, a framework covering the greater European region and the Eurasian and even euro-Atlantic supra-region should encompass Russia. To put it in laconic words: “Russia is a great power and pertains to this reality”.³³

Russia also is undergoing changes in its approaches to international relations. After a truly traumatic experience of national decline, Russian leaders are in the process of formulating their country’s role in the world. The collapse of the Soviet Union was, of course, a major geopolitical shock, from which the much weaker successor state, the Russian Federation, has been trying to recover. Characteristically, then President Putin in April 2005 called it “the biggest geopolitical catastrophe of the century”. While seeking to rebuild Russia as a great power, though not a superpower, during the last decade, the Russian leaders have decided to co-operate with the United States in combating international terrorism. In this context, it was of high essential and symbolic significance that then President Putin reportedly was the first foreign leader to contact then US President Bush directly after the terrorist attacks of 11 Sept 2001 offering his full support.

The relationship seemed to remain close despite the fact that strains have been put on relations between Russia and the US by the Iraq War, Russia’s nuclear co-operation with Iran and Kremlin’s domestic political actions which were understood in Western capitals as aiming at limiting political freedom.

The crucial question seems to be here: What is the role that Russia under Vladimir Putin – and Dmitri Medvedev – wants to play within the European geopolitical context, during the next years? Clearly, Russia cannot afford deteriorate relations with either the US or the EU. In Russian

view, the US, aiming at securing and preserving its global primacy, appears to apply a strategy of encirclement towards post-Soviet Russia. The Russian answer here seems to be a new “Russia’s grand strategy”,³⁴ “by which it intends to block NATO’s expansion in the South-East of Europe and to increase its influence in the Balkans and in the whole continent”,³⁵ mainly by making smart exploitation of the geo-energetic card. In fact, Russia uses its ability to create linkages across issue areas. One example is the fact that Moscow supplies a leading EU country, read Germany, with large amounts of natural gas. Germany already imports 35 per cent of its oil and 40 per cent of its gas from Russia. No doubt, one may intimate that Russia uses its energy assets to put the Western European countries into a state of dependency. Yet, on the other side, one could also arguably question the reasoning for possible European geo-energetic dependency on Islamic countries (such as Saudi-Arabia, Turkey etc).

As a matter of fact, “nowadays, it’s more than necessary to harmonize the interests of the great actors – USA, NATO, EU, Russia – regarding the problem of managing the energy resources of the Caucasus and Central Asia”.³⁶ Besides, America’s Global War on Terror correlates well with Moscow’s fierce battle against Islamic terrorism and separatism. The EU is important to Moscow for partly other reasons. Cooperation between the EU and Russia is decisive since in the energy security sphere the two parties are mutually dependent. “Russia will remain the key-energetic provider of EU and EU will remain the most important market for Russia’s export (...). This creates a strong basis for interdependence and a situation that may be beneficial for both parties”, according to European leaders’ statements.³⁷ A range of motivating forces favor co-operation, most importantly interdependence both in the geo-economic and geo-energetic sphere and as regards “soft threats” in Europe. Hence, Russian interaction with the Occident “must be read from the logical perspective of a great power being in search of its last recognition”.³⁸

To raise another issue, whether and to which extent, there is a possibility of influencing and changing traditionally non-democratic and authoritarian societies into more democratic ones, this question has already been and will continue to be the object of most serious consideration by



scholars. The strength of occidental Europe lay in the norms themselves and in the legitimacy claims that such norms contain. The overall notion is that of “diffusion”³⁹ of norms across national borders. Still, here, it would be useful to remember that, as Samuel Huntington once put it, the 1989-1991 revolutions in East and Central Europe constituted only the first phase of a broader democratic wave or revolution; after all, “democratization” is a long and complicated process that observers ought to approach “humbly”.⁴⁰

Will all former Soviet republics succeed in transforming themselves to electoral democracies? Or will some of them remain “managed democracies”? The argument sounds reasonable that they should not be expected to become Western-style democracies overnight. After all, in Europe and the US, electoral democracy was born and bred after revolutions that took place more than two centuries ago; again, this was the final outcome of a long historical and geo-cultural evolution which in some cases goes back to the 13th century. To put one of the most prominent examples, one should recall the transformation of England and Britain into parliamentary democracy since Magna Charta Libertatum through Habeas Corpus Act and Bill of Rights to the Glorious Revolution and so on. By contrast, autocratic societies of Central Eurasia, per instance, are unaccustomed to such processes. Another question is how democracy norms are invested into clan-layered societies or worse, weak state structures, when societies in which they are embedded are deeply fragmented.

European security and defence, understood in a broader geopolitical and geo-cultural context, would mean that such questions should be altogether examined – along with the attempt of all strategic actors involved to find a way in a world that has been fundamentally changed through several events and processes during the last 20 years. In promoting or adjusting to the monumental changes, all actors have had reason to redefine their geopolitical roles and ambitions. Their search for new security identities is a major theme in the years to come. Further, it would also mean covering parameters of domestic nature within each actor, primarily to the extent that such aspects exercise influence upon the relations among all actors.

It must be assumed as a plain fact that

the international system will continue to be characterized by what Hans J. Morgenthau once called *Machttrieb* (power instinct). Conflicts are to be expected – conflicts of interests with emerging continental powers and conflicts of values and identities, particularly in view of ongoing Islamic fascism. Hence, for the foreseeable future, it will be an imperative necessity to try to lay a solid geopolitical and geo-cultural foundation for European security and defence while, at the same time, maintaining an efficient coalition of maritime nations and nations of the Rimland defending international order and the core values of the occidental, Greek-Roman, Judeo-Christian, Aristotelian-Jeffersonian heritage.

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THE ACTIVITIES OF THE CENTRE FOR DEFENCE AND SECURITY STRATEGIC STUDIES

APRIL-JUNE 2010

Being already a tradition, the Annual International Scientific Session STRATEGIES XXI, organised by "Carol I" National Defence University (April, 14-16) was about "European security and defence in the context of the economic and financial crisis" and was organised in 13 sections. There participated decision makers and representatives from the Government, the Ministry of National Defence, the Ministry of Education, Research and Innovation, Ministry of Administration and Interiors, rectors from military and civilian higher education institutions, other important figures from the Romanian and international scientific community. There were also invited guests from Luxemburg, the Czech Republic, Spain, Republic of Moldavia and Ukraine, as well as military diplomats accredited to Bucharest and mass-media representatives. CDSSS was responsible for organizing and managing the section on "Security and defence".

The proposed topic allowed some debates on some problems of the actual security environment. There were presented analysis, opinions and evaluations on the future security environment, the evolutions of risks and threats, the projection of challenges in the conditions of increasing the complexity of exigencies towards the security and defence architecture in the context of the economic and financial crisis.

On May, 27th, at "Carol I" National Defence University's premises there was organised the international seminar on "The space dimension of the security environment", organised by The Centre for Defence and Security Strategic Studies, an event which was honoured by the participation of numerous civilian and military experts. There were debated major issues on the space dimension of the security environment in a globalized society, on the space dimension of the environment security, on the european space, on the strategic importance of space for NATO and EU, but also issues related to the relevance of the military technologies as security factors.

Within this period of time, there were published the following studies: "The role of the international actors in shaping the international security environment" and "Globalization versus political separatism".

The Centre's most important scientific activity, within this year, is the Annual International Scientific Session, organised in November, 19 – 20, on "The impact of the international relations' evolution on the security environment". More information about the enrolment will be posted on the Centre's website, <http://cssas.unap.ro>.



INSTRUCTIONS FOR AUTHORS

On selecting the articles there are taken into consideration: the area of the subjects presented in the magazine, the actuality of the topic, its novelty and originality, its scientific content and the adequacy to the editorial norms adopted by the magazine. The article should not contain any party political connotations.

The papers' scientific evaluation is done by two scientific experts that are either professors or senior fellow researchers.

The article, written in a foreign language (English, French) may have maximum 10-12 pages (6.000 – 7.000 words) and has to be sent both in print and paper, using Times New Roman font, size 12, one line, and the tables and schemes have to be printed separately. The translation into Romanian will be provided by the editor.

The text has to be preceded by an abstract which is not to exceed 250 words, both in Romanian and English and not more than 10-12 keywords. The papers have to be signed adding the authors's scientific degree, name, first name, the institution he comes from and have to end with a curriculum vitae, which should include the following elements: a short bio, a list of personal papers, birthyear, birthplace, address, city, postal code, country, telephone, fax, e-mail address, photo in jpeg format.

The footnotes are to be included by the end of the article and have to respect the international regulations. Authors can publish only one article by issue.

The text has to present an easy structure, using titles (subtitles). The abbreviations will be marked on the text only at their first mention on the text. It is likely to end the papers with some important conclusions regarding the importance of the research.

The articles will not use classified information.

As the magazine does not have a profitable purpose, the articles cannot be paid.

Our address is: National Defence University "Carol I", the Centre for Defence and Security Strategic Studies, 68-72 Panduri Street, sector 5, Bucharest, Romania, telephone: (021) 319.56.49; Fax: (021) 319.55.93, e-mail: cssas@unap.ro, web address: <http://cssas.unap.ro>, <http://impactstrategic.unap.ro>



After nine years since its first edition, STRATEGIC IMPACT magazine, edited by the Centre for Defence and Security Strategic Studies from the National Defence University “Carol I” is a quarterly scientific magazine acknowledged locally and internationally for the wide area of topics - the political-military present, security strategy and military security, NATO and EU actions, informational society, strategic synthesis and evaluations, a special column “Strategic Event” that studies the strategic impact of the dynamics of the actions undertaken nationally, regionally and globally.

STRATEGIC IMPACT has as collaborators important researchers and personalities within the scientific research area and from the civilian and military university system, both national and international, from the Ministry of National Defence, General Staff, services’ staffs, the Ministry of Administration and Interior, Ministry of Foreign Affairs, military units and other state’s organizations, NGOs, companies, etc.

The international acknowledgement of the magazine’s quality is confirmed by its editions presented on sites belonging to prestigious foreign institutions (The International Relations and Security Network of the Swiss Federal Institute of Technology Zürich; Defence Guide, in collaboration with the Hellenic Institute of Strategic Studies – HEL. I.S.S.), The Institute for Development and Social Initiatives – IDIS from the Republic of Moldova – the virtual library for political and security studies. Also, the magazine is included in international databases: CEEOL - Central and Eastern European Online Library, Germany, IndexCopernicus International, Poland.

The magazine is accredited by the National University Research Council and acknowledged as a B+ magazine that demonstrates the potential to become an international acknowledged magazine.

STRATEGIC IMPACT is a representative forum for reflection and debates on topics related to strategy and security for the scientific, academic, national and international community.

At present, STRATEGIC IMPACT magazine is issued separately in two editions, Romanian and English, and disseminated in the domestic and international scientific environment and also to the main institutions involved in security and defence.

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