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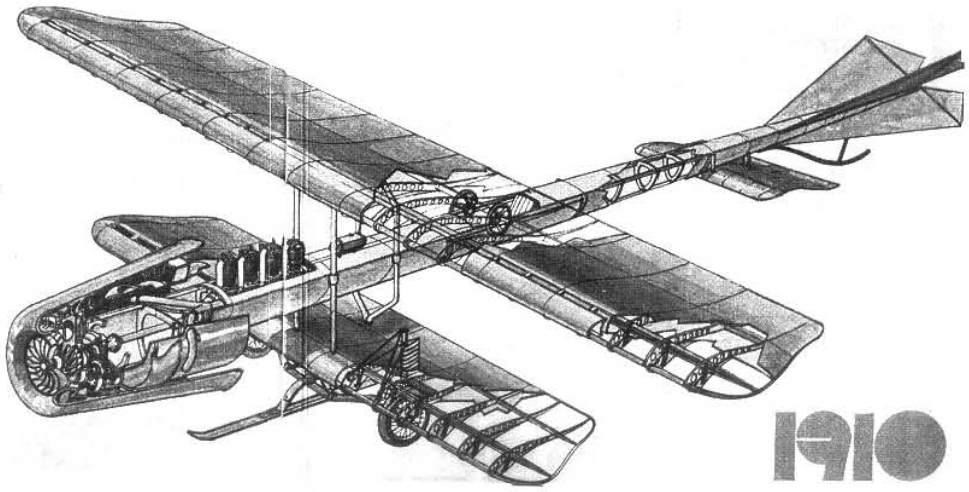

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C O N T E N T S

MILITARY SCIENCES

TECHNICAL SCIENCES

MANAGEMENT AND SOCIO-HUMANITIES

BOOK REVIEW

CHARACTERISTICS OF THE MILITARY LEADER OF THE FUTURE OF THE ROMANIAN AIR FORCE

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Abstract: *The next generation of air force leaders will need to be aware of the possible career paths to follow in order to build a successful career. For this, they will have to know where to go and which path to take to that goal, given that the starting point is already known. A challenge is that the two variables will have to be identified at the very beginning of an officer's career, as an effect of the fact that the two are strongly interrelated.*

Keywords: *leadership, leader development, the conflictual environment of the future, abilities, character traits, values, leader profile.*

1. INTRODUCTION

For decades, military and intelligence organizations have demonstrated that setting long-term strategic goals can be a powerful, deliberate way to lead themselves smartly into the future with finite resources [1], The phenomenon of civil disturbances, humanitarian crises, the impact of instant communication technologies and network-based warfare methods will combine to create unpredictable and volatile circumstances. Information decentralization undercuts traditional power structures, enabling non-state actors to play a disproportionate role in areas where states formerly held absolute sovereignty [2]. Leaders of air forces using "shelf" solutions will have difficulty in succeeding in this challenging action environment.

In order to create a favorable framework for getting future leaders able to cope with the challenges of the new operational environment by fulfilling the tasks with the most judicious use of resources, increasingly rare, it takes a few adjustments to the process current development of leaders. The air forces must make these changes, now or in the shortest possible time, so that current low-level officers have the chance to develop the necessary features of tomorrow's top leaders.

2. THE CONFLICTUAL ENVIRONMENT OF THE FUTURE

Leadership is the key ingredient for successful military efforts, and air force leaders at all levels need to prepare themselves to meet current and future requirements. The security environment is changing at an accelerated pace, increasing the extent and depth of the challenges for which they need to be trained.

Reality confirms that the world has its main features complexity and fluidity, which is why the need for adaptive responses derives. Current and emerging changes in the operational categories of the force categories suggest the need for new prototypes of leadership as well as different, if not more sophisticated, methods for the development of military leaders [4].

Recent technological developments have led to an exponential change in the nature of the war. The amount and availability of data has increased dramatically while communication technologies provide real-time information to decision-makers.

The multitude of changes over the past two decades has considerably expanded the role of the leader, which has made the performance indicators of a complex leadership more numerous. Leaders at all levels are currently facing challenges and pressures that are not specifically addressed in training programs. Consequently, studies on the operational environment (for example, the "*US Air Force Strategy 2020-2030*" conducted under the auspices of the Air Force Research Institute - AFRI) predict that officers will require skill sets that include the ability to drive efficient subunits, problem solving, increased adaptability and wider decision-making autonomy.

The first step in determining these sets of skills needed by strategic level leaders to ensure success in a chaotic and unpredictable operating environment is to recognize the challenges faced by future air force leaders.

The challenges faced by fighters in the 21st century will make the primacy of initiative and flexibility in the decision-making process for lower-level officers. The categories of forces put a great emphasis on the subunits that will have to achieve the success of the mission with increased autonomy and relying to a great extent on individual creativity.

To face this challenge, today's air forces must focus on the deliberate development of their tomorrow's leaders. Developing a group of leaders able to adapt to changing conditions and emerging challenges provide flexibility as the response to enemies, situations and unconventional missions.

In a future where volatility, uncertainty, complexity and ambiguity (VUCA) will remain prominent features of the strategic operational environment, the leaders of tomorrow's air forces will face challenges that will certainly be tested for the best in this category of forces.

Demographic, economic, ecological (climate change) and technological crises suggest that the future strategic operational environment will prove even more chaotic than today, more unstable than experienced by previous generations. For future air force leaders to succeed, they need to develop a personalized strategic decision making process that can incorporate the rapid, unpredictable (volatility) changes, unknown circumstances (uncertainty), complicated decision makers (complexity), ambiguity of the situation and potential outcomes (ambiguity). Volatile, uncertain, complex and ambiguous operational environment will persist and will most likely continue to grow in size over the next few decades.

3. CHARACTERISTICS OF THE LEADER IN THE FUTURE OF THE AIR FORCE

The challenge for the air forces in terms of leadership development will be to determine precisely what are the attributes and characteristics they will need to be able to face the conflicting environment of the future.

Through a memorandum addressed to AFRI, US Chief of Staff, General Norton A. Schwartz, called for a study and identification of viable solutions to improve several areas of interest within this category of forces. One of these areas of interest was the development process of the leaders of the Air Force. The team of reunited researchers analyzed and categorized the characteristics identified by high-ranking leaders through the interview method and consultation with literature, and assessed which of these would be appropriate to help the air force leader face the challenges of the future.

AFRI researchers, as part of their work, have used a study previously conducted by RAND Corporation. The RAND team interviewed a group of leaders actively engaged in mission-level missions with extensive experience in asymmetric conflicts and hybrid warfare to determine what are the essential characteristics for pursuing strategic leadership in such an environment operational. The main attributes and characteristics identified included humor, mentoring, communication skills, cognitive abilities, the ability to harmonize actions at all three levels of the armed conflict, the level of integration into society, relationship mode, intercultural and linguistic capabilities, and deep knowledge of organizational theory.

AFRI has changed the categories used to describe the characteristics of the future leaders as follows: cognitive (Visionary thinker and Polymath), interpersonal (Team-Building and Networking, Politically Savvy, Culturally Astute, Skilled Negotiator and Facilitator, Emotionally Resilient) and personal style (Ethically Grounded, Strategic Communicator Mentor and Resource Steward).

Thus, a portrait of the leader can be described as one who thinks in a critical, strategic and creative way to the same extent, in order to be able to respond to current and future challenges to the same extent. The psychological profile of each leader must include the desire for lifelong learning and continuous self-refinement. Through the profession of officer, implicitly a commitment must be made to what life means to study strategy, politics, economics and history.

The leader of the future is the one who proves a good understanding of the political phenomenon. It will need to be able to work successfully in a variety of different organizations or management structures, including by accepting facilitator and negotiator roles. It also has developed those working skills with partners from other services, non-governmental organizations or other countries. In view of the fact that leaders in the position of regional commanders are often in the situation that, in order to achieve the mission's success, to work with people over whom they have no direct authority, the ability to solve problems through persuasion and influence is the key element in obtaining a complete set of negociation skills.

Adaptive capacity will be the result of the challenges and rhythms at which events occur, the enormous amount of data that sometimes turns out to be contradictory and their rapid dynamics. Leaders of the future also have a solid ethic, on the basis of which altruism and modesty become very visible. They devote a whole life to reading, listening, practicing and providing information, being able to use their specific interrelation skills to advise subordinates and colleagues and to develop effective working teams.

Having an outline of a strategic leader image, made by combining the characteristics provided by the experienced leaders we have seen, it was interesting to find out what the image of the leader of the future of the Romanian Air Force is, from the point of view of the young officers of this category of forces, participants in career courses at the Air Force Training School "Aurel Vlaicu".

Thus, we proceeded from a logical premise, namely that the leadership competence of the young officer, a fresh graduate of the “Henry Coandă” Air Force Academy, is different from that of leaders at the top of the military organization. This difference is highlighted by the level of perfection that a leader accomplishes through three pillars, on which personal leadership skills can improve and become successful: instruction, experience and education. In this way, as a general objective, we intend to find out whether there is a shared vision of what it means to be at the level of the lower-level group of students participating in the career courses. The common vision, an essential element of leadership, must be shared, on the one hand, with this category of forces, and on the other hand by the young officers at the beginning of the military career.

For this, as specific objectives in our approach, we proposed identifying the characteristics that an air force leader should display in the context of the challenges created by the evolution of this category of forces, from the perspective of low-level officers present in as a student at the Air Force Application School, identifying the factors that pose challenges for young air force leaders and comparing the results obtained with the elements described in the theoretical framework presented earlier.

The numerical breakdown by grade of trainee officers was as follows: 47 second lieutenants - the entire "Henry Coandă" Air Force Academy 2017, 36 first lieutenants and 15 captains from either the Air Force Staff, or from various combat units in territory. Graphically, the batch structure can be presented as follows:

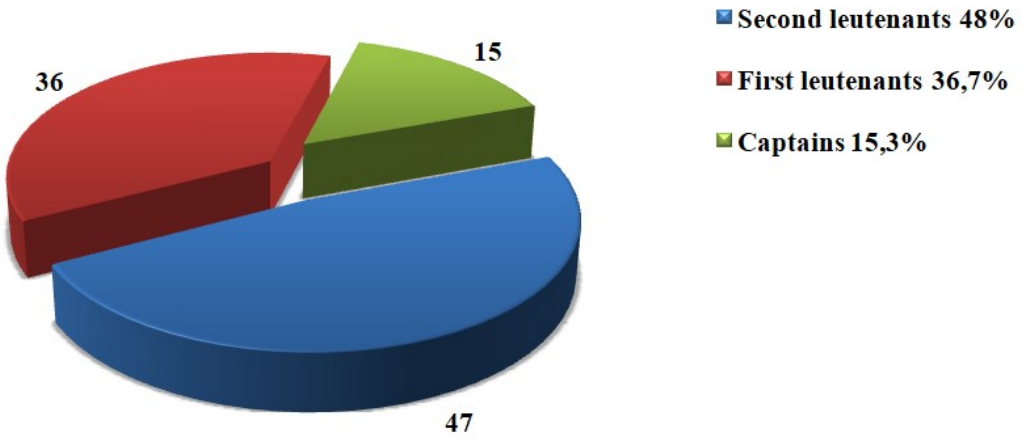

FIG.1 Graphic Representation of the Structure of the Responsible Lot

In view of the experience gained in the military career, the captains present at the course fall within a range of 8-10 years, the first lieutenants 3-5 years old and the second lieutenants with an almost nonexistent experience.

The investigative method we used was the one based on the questionnaire. For this purpose, we used a questionnaire built around two common questions, regardless of the specialty or course level. Open-ended questions were formulated to provide the opportunity for respondents to be able, on the basis of experience, where appropriate, of training and their own preparation, to be able to formulate opinions, analyze and issue points of view, supported by arguments, on the issues addressed.

The questionnaire was directly applied to trainee officers, in an organized form, at the completion of the *Leadership* discipline, specific to each course. The application of this instrument reflected the willingness of the young military cadres to communicate, as well as the quality and quantity of information provided (some exhibiting complex problems, others having a higher affective burden).

The data were collected by identifying, within the respondents' answers, the elements included in the disciplines studied and statistically interpreted, and the degree of consensus or number of repetitions in case of identifying the same characteristic in several subjects.

The questions that were analyzed for this study were as follows:

1. What do you think are the characteristics that the leader of the Romanian Air Force should possess?

2. What do you think are the challenges that await the leader of the Romanian Air Force, in terms of the uncertainty, complexity and vulnerability of the conflicting environment?

The characteristics extracted from the consultation of the three groups led to a total of 105 elements, consisting of abilities, character traits and values which, in the respondents' sense, can be described as descriptive parts of the air force leader portrait.

Thus, all three groups used features with a similar degree of consensus that led to the creation of similar leader portraits. We can state in this regard that the leading portrait, resulting from the interpretation of the elements described by the whole respondent group, represents a small variation of the three portraits taken separately. The elements that make these differences possible are: courage, creativity, competence, patriotism, intelligence, ambition, or emotional intelligence. From the point of view of the experience gained throughout the career and its possible influence on the portrayal of the air force leader, we did not find any significant issues.

The resulting portraits were the result of the combination of a large number of features, with a relatively low consensus rate compared to the one predicted. Therefore, from the comparison of the graphs of the obtained characteristics, we can see that the share of characteristics with a high consensus level is small, being in the margin of maximum 45 percent. Out of the total of 105 recognized characteristics, 23 of them were identified as common to the three groups of respondents, with a consensus rate of up to 41 percent.

The portrayal of the summaries highlights the military leader as a military, empathic specialist who proves adaptability and courage; is a good communicator in expressing his / her own vision, innovative, offering original methods of solving situations, and personal example for highlighting the integrity that characterizes it; devoted, intelligent, inspire confidence and respect through proven effectiveness in decision-making.

From the point of view of the basic values of the Romanian Air Force that should be found in every military leader within this organization, only two of them have been identified at the level of the whole group: integrity, with a consensus of 26 percent and devotion, at a level of 12 percent. This is due to the lack, in the economy of characteristics collected at the level of the state level, of the third value - tenacity.

As in the case of the characteristics relevant to an overall picture of the challenges associated with the conflict environment of the future, in the sense of the whole group of responding officers, we considered to be only those found at least once in all groups as separate entities. A total of 39 aspects related to the possible challenges of leaders in the future of the air force were collected from the questionnaires applied to the learners as a whole group. These were extracted from respondents' answers and related to those presented in the theoretical framework presented earlier.

The analysis of the results revealed that separately, in groups, but also as a whole, the main concern of the young officers regarding the future is to work with people, namely to motivate them. The other concerns of the subjects are related to technological progress, namely the rapidity with which technology is developing and is being used by all the actors worldwide.

Resources are another challenge, especially human ones, due to the lack of staff and specialists. At the same time, financial constraints and procurement policies are reflected in worrying about the outdated infrastructure situation and not exactly clear prospects for change.

An important aspect is one's own, in terms of the need for continuous improvement, fear being related to the inability, in time, to achieve this desideratum. The quality of the subordinates, namely their level of training and preparation, is another concern for the leaders of the future. On the whole, the image of the challenges ahead of the leader in the future of the air forces is similar.

4. CONCLUSIONS

The leadership of military actions remains, in our opinion, the most challenging element of military leadership, and that is why, from this point of view, we are able to strengthen the assertion that leadership is defined as "the art of leading ".

Identifying a common leadership portrait highlights the fact that the views of young officers are similar and the training received within the academy has been channeled in the same direction for everyone, regardless of the military specialty. The image of the leader is found in the general framework of skills needed to be a good leader.

However, indecisiveness in the choice of air force specific values denotes a total separation of the group of personal values from that of organizational values, which is undesirable, especially among young officers at the beginning of the military career. For this purpose, it is necessary to intervene in the way the character training program is implemented and the methods used in it are improved, in order to achieve the goal of leadership character, with a starting point in the military academy.

One of the core competencies of leaders is that of working with people. Fear about the inability to work with subordinates and motivate them is justified by the lack of experience, but not acceptable, and for this reason it is desirable to focus more on the practical part of the training, by enhancing those experiences that will contribute to substantiating this competence.

The image of resources, procurement policies, inappropriate future infrastructure is the result of an inappropriate campaign, in the face of the non-involvement of these aspects in the process of building the characteristic foundation, and must be changed into one that has the ultimate goal of increasing self-confidence.

There is currently no concrete formula specifying the way a successful leader can form. Defining a profile for such a leader proves to be a great challenge in terms of selecting those characteristics or cognitive, aptitude and behavioral features that are considered to be indispensable for ensuring success in leadership.

However, the organizational specificity of the Romanian Air Forces, through the missions entrusted to them, can provide the decision-makers with the desired elements, traits and qualities necessary to form a vision of what is to be the leader in the future of this category of forces.

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SECURITY CHALLENGES IN 2019 - PRESENT AND FUTURE APPROACHES IN THE WESTERN BALKAN ROUT OF MIGRATION

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Abstract: *The last years have been seen as a turmoil in the Balkans in regard to immigration routes. Smugglers guide immigrants across the border of the Balkan states such as Greece, Albania, Montenegro, Serbia, Bosnia and Herzegovina, into the European Union. The migration patterns are new or old; what "works" is unchanged what "don't work" is to be changed before the law enforcement institutions adapt as illegal is every day faster than legal. 2019 is to be seen as a difficult year for the European Union but also for the non-EU member states in the Balkans in both terms of unity and common trust facing security challenges that could undermine the fragile stability and prosperity context. The environment and the geopolitical context seems to be a constant challenge for the states that require adaptability in order to maintain peace and calm in the region. The security challenges require diplomacy, fast action, financial and human resources, strong regional and international partnerships, confidence and mutual trust to deal with. Organised crime, illegal migration, are just the tip of the "security iceberg" EU and non - EU states have to manage now and in the near future. The aim of the paper is to provide a diagnosis in terms of immigration dynamics and state decisions regarding the flow management of migrants at the beginning of 2019 regional security context in the Balkan Peninsula. Also, through a SWOT analyses, the article offers the most probable solutions Balkan States will have to follow in order to manage the immigration security issues identified as priorities for the near future. Finally, the main trends for the future of the European Union concerning immigration management are not to be neglected in the provided analysis.*

Keywords*: Regional security; European Union; Romania's national security; immigration; security challenges*

1. INTRODUCTION

Immigration opinions and attitudes encompass a variety of favorability judgments. Sentiment analysis of informal immigration discourse is often considered a binary approach of "thumbs up" vs "thumbs down" classification. The possible goals, aside from binary judgments could want to: classify according to some more general taxonomy, e.g. secured immigration vs illegal immigration, evaluate the degree of confidence with which the writer of the social media post is entitled, evaluate the degree of agreeability/argumentativeness with which the writer expresses views, identify particular issues regarding immigration of special importance to the audience and the writer.

The exponential growth of social media in the last years has brought new patterns of the way people interact and form perceptions and opinions related to important issues of the society they live in. Individuals produce digital data at an unprecedented rate by interacting, sharing, and consuming content through social media.

Knowledge operates at different levels, and when undertaking to examine the images different peoples have of one another, it would be a mistake to imply that such pictures are either evenly composed or uniformly imagined by all members of a particular people (FranciS, 2013:233).

The power of the state to define the legal status of aliens in the country is the decisive factor in the construction of "illegal aliens". The construction of immigrant illegality is a long-term process that is generated by the immigration regulations. These regulations are of course influenced by various factors such as political and economic developments, public debate on immigration and border control. It is precisely this process of deliber-intervention, differentiation and exclusion that is interesting when trying to understand illegality (Schover *et al*., 2008:41).

Thus, territorial borders are, in spite of huge investments, still permeable borders. This has been seen as flows of migrants passed through the Greek-Macedonian border, the Serbian-Hungarian border and so on…

One reason for this is that borders have a double function. The smooth functioning of the modern economy requires an easy passage for some people and goods. Businessmen and cargo should pass the border with minimum delay. On the flipside, the border is meant to filter out contraband, terrorists and irregular migrants (Schover *et al*., 2008:42).

The "toughening" of immigration rules is often associated as being a part of national antiterrorism legislation that stemmed from a new perception that terrorists or potential terrorists were exploiting national immigration and asylum rules. After all, not only had many known terrorists lived in Europe as legal immigrants (most notably the Hamburg cell of Mohammad Atta), but (much more troubling to the European press, public, and governments) many Al-Qaeda members and/or sympathizers were living in Europe as genuine refugees. Given the rather brutal tactics of some Middle Eastern governments towards fundamentalist clerics and their sympathizers, many suspected Al-Qaeda members faced genuine Geneva Convention-recognized persecution in their home countries, and thus were (apparently) legally entitled to shelter in the West (Givens *et al.*, 2009:134).

The informal economy is emerging worldwide as an antipode to the formal economy. Although only partially visible and parallel to the formal economic system, it is manifested in social and cultural activities in European cities in the tourist trade, in the form of vendors in the streets and squares or those selling flowers in restaurants. It has links to drug trafficking and prostitution, but also provides economic opportunities for immigrants, young people, and students. It has links with the formal economy, contributes to the forces of formal and informal social control, and is an important factor in the economies of European countries (Gottschalk & Gunnesdal, 2018:90).

2. INTEGRATION POLICIES IN THE WESTERN BALKANS

Integration policies in the Western Balkans are barely halfway favorable for societal integration, scoring below the European average and alongside other 'new' immigration countries in MIPEX, such as Bulgaria, Hungary, Poland, Romania and the Czech Republic. Newcomers in these countries will face slightly more obstacles than opportunities to participate in society. These countries are at different stages of their EU accession, with Croatia as the newest Member State. Interestingly, the policies that could contribute the most to integration are EU law-driven. Despite these improvements, the conditions in law are undermined by authorities' rather discretionary procedures in all Western Balkan countries, a problem across Central and Eastern Europe. In addition to the negative impact of this uncertainty on integration, newcomers critically lack many basic citizenship, education and political opportunities that are becoming best practice across Europe (Huddleston, 2016:2) (FIG. 1).

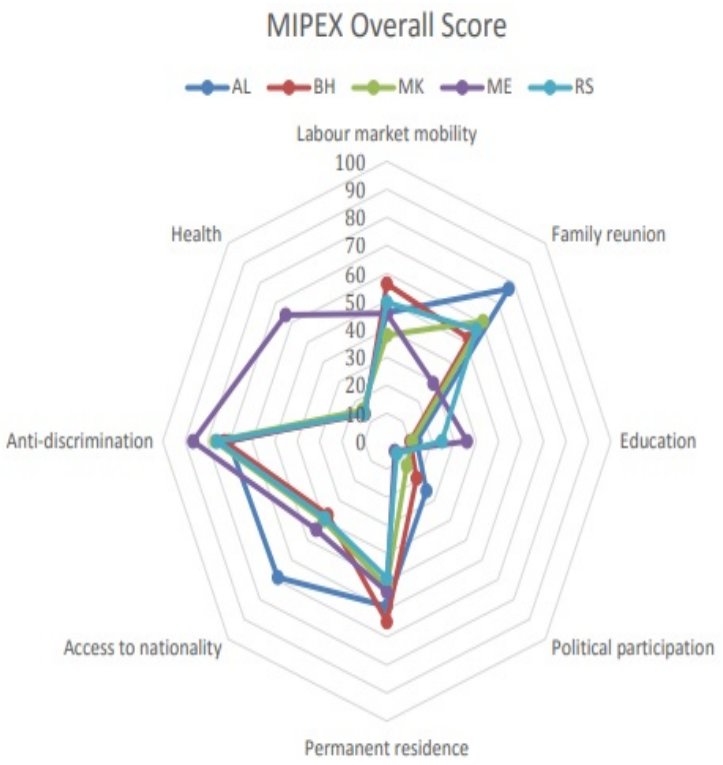

FIG.1 Diagram of MIPEX Overall Score for AL, BiH,MK,ME,RS (Source MIPEX.eu)

3. LONG RESIDENCE IN WESTERN BALKANS

Do the immigrants stay or do they do towards the Western Europe?

This question is hard to respond to due to the lack of data and information about the flows that pass through the Western Balkans. Some of the immigrants tend to go in Germany, France or other countries that are seen by the migrants themselves more favorable for long term residence.

Based on the provided MIPEX data, the long term residence in the Western Balkans is more than different than in the European Union countries. Thus, EU Member States agreed and implemented the EC long-term residence directive (2003/109/EC), with the common objective that the integration of long-term residents will promote economic and social cohesion. Most legal immigrants should be eligible to apply after 5 years for equal opportunities to integrate in economic and social life. This is not the case in the Western Balkans, where several categories of temporary permits are not considered for the 5-year residence requirement. As in the case of family reunion procedures, applicants who meet the legal conditions in these countries can still be rejected and can lose their residence permit on several grounds due to state discretion that is common in the region. They also have few protections against expulsion. Therefore, migrants in most of the Western Balkan countries do not enjoy the security of status that is afforded by the Directive. The conditions are especially unclear in Albania. Applicants in Bosnia and Herzegovina need to meet a vague language requirement. The 2009 CZ language test for long-term residence is an example for a good practice in terms of integration requirements, aimed to ensure equal and reasonable conditions. With an attainable level (A1), free support and professional examiners, this model creates conditions for applicants to succeed, rather than creating more bureaucratic obstacles (Huddleston, 2016:7).

All the Balkan states have claimed that they have closed their borders as Austria has already long time told that has do so… In fact the immigrants find always a way to pass the borders unnoticed by paying a lot of money to smugglers using some of the most unconventional routes with big success.

The message the internet, the social media and also the television wants to send to those that have not yet flew their countries of origins is that it's impossible to get into the European Union.

One of the intermediate points of arrival in the Western Balkan route is Bihac (Bosnia and Herzegovina) close to the Croatian border (practically the border of the European Union).

Many people were not granted the possibility of applying for asylum. Europe is failing to deal with big numbers of arrivals but is failing to deal also with small numbers on income immigrants. As migrants seek help in smugglers they improvise rafts made from plastic bottles to cross the Drina River. Bosnia, as other countries on the Western Balkan route, is trying to give to immigrants a human welcome but is a country with the necessary resources to cope with this new trend. Most of the immigrants come from Serbia as the news of closed borders with Hungary spreads mainly on social media and also due to the free visa regime for the Iranian citizens. The immigrant come by plane to Belgrade as there are flights weekly from Iran.

According to data from Bosnia's Foreigner's Affairs Service, 16 Iranians have requested asylum in the country last year. But only until September this year, this number stands at 1,647 already.

After 27 years, the first Iran Air airplane has landed in Belgrade in March this year. Two more followed suit the same month - Qeshm Air and Mahan Air. More than 20,000 passengers have arrived in Serbia from Iran since then.

According to Serbia's Statistics Agency, nearly 16,000 Iranian tourists have stayed in Serbia within the first seven months of the year.

According to the director of Serbia's Info Park, a refugee centre in Belgrade, part of the Iranian tourists coming to Belgrade continue their path illegally toward Western Europe (N1 Sarajevo: 2018).

The free regime visa is for now suspended.

For years, the global migrant crisis was a remote concern for Bosnia. Migrants traveling along the Balkan corridor first arrived in Greece by sea from Turkey and then moved toward Macedonia and Serbia in order to enter Croatia and Hungary, both EU member states. As in 2015 and 2016, countries along the route have closed their borders, sending migrants fanning out across the Balkans.

Now, migrants leaving Greece go through jagged mountains and dense woodland to reach Albania, then Montenegro, only to find themselves stuck in Bosnia. This small, ethnically divided country with a dearth of economic opportunities has found itself at the epicenter of the crisis, as more people make their way in and can no longer find a way out (Kalan, 2019).

3.1 The numbers.

The number of refugees and migrants arriving to Bosnia and Herzegovina (BiH) saw a noticeable increase late in 2017. In contrast to an average of 32 arrivals per month recorded in the period January-November, in December (2017) the number of arrivals reached 198. The trend continued into 2018 and the number of recorded arrivals has more or less doubled each month this year, increasing from 237 in January to 666 in March. Between 1 January and 31 March 2018, the authorities registered 1,314 new arrivals.

The most common countries of declared origin were Syria, Libya, Palestine, Afghanistan, Iran, Algeria, and Iraq.

Over the same period, 741 attestations of intention to seek asylum were issued by the Service for Foreigners' Affairs (SFA). Nineteen percent of these arrivals had registered an asylum claim by the end of March. As of 31 March, 253 people had lodged their asylum claim in BiH. Of these, 30 percent were from the Syrian Arab Republic, 19 percent were from Pakistan, 11 percent were from Afghanistan, 9 percent were from Libya, and 8 percent were from Palestine.

Many of the refugees and migrants cross the border in an irregular manner (i.e. at non-official border crossing points) and the majority arrive from Montenegro and Serbia. Currently, a large proportion reside in Sarajevo and its vicinity. At the same time, there is an ongoing accumulation of refugees and migrants at various potential exit points along the border with Croatia. This accumulation is particularly visible in Velika Kladuša and Bihać; further short-stay accumulations are visible at entrance points in Trebinje and Goražde (arriving from entry points in Rudo and Čajniče). National and regional media, with memories of increased refugee and migrant arrivals in the neighboring countries in 2015-2016, have taken keen interest. Although the number of recorded arrivals has not yet reached humanitarian crisis levels, the current trend calls for increased support, engagement, and coordination from a range of actors, as well as increased funding. It should be noted that capacities to respond are already being tested and strained. A prime example of this is the available accommodation, or lack thereof: the Asylum Centre, managed by the Ministry of Security (MoS), is now regularly at or close to capacity and limited sustainable alternatives exist (United Nations, May 2018:11).

3.2 The successful route – Bosnia and Herzegovina.

From the migrants perspective the successful route passes through Bosnia, 3 out of 4 migrants have successfully passed into the EU and continue onwards towards Croatia, Slovenia, Italy and so on. For the resident people themselves in Bihac and Velika Kladusa the perception of insecurity in face of the growing numbers of migrants was clearly an issue. Bosnia and Herzegovina is a decentralized state. So, for an issue like the fast growing of immigrants flow the response should come from the state government, the authorities of the Federation, the cantonal authorities and the local municipality which in term of cost-time efficiency the response comes always late. Another issue is the cost of dealing with migrants that fairly for Bosnia Herzegovina is something that the economy can't support as is the situation in Greece where the EU has a better implication with financial support and where the administration is more centralized.

The "ongoing rush" towards the Croatian border on the Western Balkan route of migration was also fueled by rumors (especially on the social media – Facebook, Twitter) that the Croatian Border Police will open the border for the flows of migrants. This rumors, even if hard to prove, were generally spread across the social media by the smugglers themselves that saw in the "migration stall" a threat to their business. Another issue is that immigrants have leaders in the groups that promote action when "the time comes". Usually the leaders in the groups know themselves and act as a whole when critical mass is gained. This model of action could explain why the migrant flows suddenly moved towards the borders of the EU (Croatia) from Bosnia Herzegovina at once.

It opens the space for smugglers, both internationals and locals. There are human traffickers who offer Bosnia's route to migrants in Greece, Bulgaria, even in the countries of origin, and there are ones who drive them from Bosnia to Croatia, there is another that drives them to Slovenia, said Peter Van der Auweraert, IOM Coordinator for the Western Balkans (Panic, 2019).

3.3 The strength – the European Union.

The European Union itself is the true strength in the immigration crises and in managing the Western Balkan route. The EU - through the financial support it offers to Western Balkans states for dealing with the migration related issues should be seen as the equation S (strength) now and in the future.

It's clear that without cooperation and financial support many transit states in the Balkan Peninsula cannot cope with the migration phenomena.

3.4 The question of smuggling immigrants – the week point.

The process of smuggling immigrants into the Western Balkans is far from easy to manage. Some of the criminals exploit the migrants as they go forward while some of them deliver them to the points of border crossing as promised. In both cases huge amounts of money are being pulled away from the immigrants. The transit states cannot face this issue alone as there has to be close cooperation and coordination from the EU countries in terms of police and intelligence data sharing to deter and stop the criminal actions. The joint investigations teams may be an option but the actions remain basically tributary to the financial resources allocated.

Another issue that EU has to respond to is the irregular immigrants working in some economic sectors (agriculture, housekeeping) where is a big demand of labor force. If this demand is kept informal not to say it is on the mercy of the black market, the growth of immigrants that fuel this domains is going onwards as for now. So, the systematic analyses of the pull factors (that attract immigrants into the EU) has to be done internally in the EU and decisions have to be taken into account as soon as possible, as most of the immigrants themselves are willing to work in order to support their life.

3.5 The opportunity: **increased political collaboration between the European Union and the Western Balkan states.**

To this extent the Western Balkan route should be more and more a plan of the European Union in dealing with migration.

Another opportunity that has to be seen in managing migration flows is a common set of European values that are inner to the people living in the Western Balkans that many researchers have neglected in their papers. The fact that people are different in the Western Balkans proved that humanitarian support was coming from the simple social actors that actually live in the Western Balkans. Where states have failed simple humans have not failed. To underscore my point of view I just want to give a short example for when my car engine has failed back in December 2017 near Sarajevo and in just a couple of minutes local people stopped their cars to help me with good advices or recommendations for auto services that made my Christmas holydays a little better.

3.6 The threat: the "where to go issue".

f people do opt for asylum and they stay but they have a negative decision over their asylum claim there is no political ant technical capacity to return the immigrants to their countries of origin.

Examples come from Germany or Finland that have huge problems when they decide to return immigrants (that have not the right for refugee status) from Pakistan or Irak into their home countries. This is even more obvious for countries like Serbia, Albania, Bosnia, Montenegro that have not so much political influence in the origin countries of migrants in order to accept their return back home. The solution is cross-political collaboration between the countries of origin, countries of settlement and countries of transit. The solution may be simple but in reality it's complicated.

4. CONCLUSIONS

In the eyes of many European Union countries the Balkan Peninsula is still seen as a place of tensions and unrest. The rise of nationalism and delicate issues of interethnic relationships continue to impale the common trust in the way of good inter-state relationship.

The promotion of the European Union in the benefit of all the citizens in the Western Balkans is to be seen as a strategic objective in the years to come. The Balkan states need to support each other and cooperate with the common goals in mind: to help the states that are not yet members of the European Union and to prepare themselves with the cooperation with the European Union.

As far as they can be seen, the Western Balkans represent, in my opinion, the European Union iceberg tip to the common security and welfare perspective for the years to come. Needless to say that for Romania's regional and common European interests, the security issues in the Western Balkans have a great impact, in both terms of national security and common regional/European security. Thus, Romania is supporting the European Union enlargement in the Western Balkans and is continually upgrading the comprehensive action programs is part of, as stability, security and economic development in the region is a must for the future to come.

At a closer look the European Union should be aware that basically, the Western Balkan route used by the immigrants is just a way from the EU to the EU. It's a corridor from Greece to Croatia, Slovenia, Austria, Italy and onwards and the issue of the Western Balkans is by that an European Union issue more than a single state issue.

In terms of immigration flows the "lessons learned" in the years that have passed need to be the central key in dealing with the new flows of migrants that might arrive in the Balkan Peninsula.

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TOWARD A BOUNDED RATIONALITY APPROACH OF CYBERWARFARE

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Abstract: *Research seeks a cognitive alternative to current rationalist studies on cyberwarfare. The purpose of this study is to present the cultural and intentional boundaries in the rationality of an actor's decision in cyberwarfare as a process, as well as the ways of investigating and processing empirical data.*

Keywords: *foreign policy, operational code analysis, image indicators based on verbs in the context system.*

1. INTRODUCTION

The concept of cyberwarfare was launched in the international debate after 2000 with its political, economic, military or diplomatic implications. The concept of cyberwarfare's role is to give today a series of interpretations regarding relations between state and non-state actors involving cyber-power projection activities of a state or non-state actor. Starting from Clausewitz's [1] cyberwarfare idea, we can regard it as a cyberwar-based offensive policy that is based on a state or non-state actor (even if non-state actors are not characterized by foreign policy). In this research through critical cyber infrastructure we understand the assembly of computer-servers, computer-clients and physical antenna systems (cables, fiber optics, radio antennas) [2]. This set of computing systems and physical information transport systems can be used for destruction by a state or non-state actor against the other international actors. The concept of cyberwarfare is seen as part of the informational warfare, comprising three components: radio-electronic warfare, cyberwarfare and psychological propaganda operations [3]. In this research, we will only focus on shaping cyberwarfare specific purposes and means. Thus, the cyber critical infrastructure of a state actor has as components computer-servers, computer-clients and physical systems for the transfer of information specific to a state or non-state actor. We believe that in cyberwarfare an actor's goals are to decommission as many of the specific cybernetic critical elements of an opponent. In order to model the projection forms of power (and hence the means used in cyberwarfare) using the critical national cyber infrastructure, we consider the most appropriate in the specialized literature the typology proposed by Craig B. Greathouse [1]:

1. Action of Cyber Espionage and Cyber Crime - is the bottom line of online confrontation that combines cybercrime organized with the collection of information of any kind that is specific to state or non-state actors oriented toward target cyber critical infrastructure;

2. Action of Denial of Service - encompasses all those types of cyber attacks that determine the denial of service effect between a particular computer-server and its computer-clients in the target cloud computing infrastructure;

3. Action of Focused Cyber Attack - refers to the attack on target critical cyber infrastructure but without causing great damage and its ability to recover soon (data recovery can be done);

4. Action of Massive Cyber Assault - refers to the attack on cyber critical target infrastructure causing great damage and its inability to recover shortly (data recovery can not be achieved). *Because all of the cyberwarfare elements are taking place in the field of security studies of international relations, we will further detail the elements that help us to integrate this concept into this discipline.*

In the study of international relations there are two main areas of research. The first is the study of the international political system and the second is the foreign policy analysis. The first area of research aims to study the interactions between the most important states at one time and the outcome of their interactions. The second area of research aims to study for a particular state its foreign policy and the motivations behind this policy with the directions of its evolution in the international arena. Between the two areas of research [4] consider that there are similarities "first of all, both theories are built on the discovery or recognition of models; second, theories are causal relationships explained on empirical models. "

Explanations of the two areas of international relations research have also been developed by Kenneth Waltz [5] and Fareed Zakaria [6], which emphasizes the same traits defined by the two Chinese researchers quoted above. [4] considers that the field of research of the international political system is part of what is called the "great theory" or "general theory" specific to issues such as "the continuous appearance of the war, the constant emergence of the balance of power or the replacement hegemony ". Foreign policy analysis is a "medium-level" or "local theory" theory that focuses on explaining the motivations and the particular behaviors of states.

Thus, in the theory of the international political system there are three great schools of thought generating great theories: realism/neo-realism, neo-liberalism, constructivism [7]. Among the medium-level theories of foreign policy analysis we can mention the following schools of thought: rational or bounded rational paradigm, cyber paradigm, prospect paradigm, paradigm of the organizational model, political bureaucracy paradigm, polycentric paradigm [8].

This research aims to go beyond the purely rationalist approach based only on the analysis of capabilities that define the outcome of an interaction and are already outlined in the cyberwarfare study [9]. A bounded rationalist approach is proposed which includes, besides the analysis of capabilities and elements of cultural specificity, national intentionality and image that define the motivation of an actor and which can construct for the decider the premises that restrict the totally rational logical thinking. In this research we consider that national cultural features and state intentions are characterized by imaginative-cognitive processes that limit the rationality of a political decision-maker. Therefore, according to [10]: "Cognitive mechanisms can thus be useful for explaining foreign policy outcomes, though not necessarily for predicting them. Accepting this premise would encourage cognitively oriented FPA scholars to treat their research as well as historical sciences, such as geology and evolutionary biology, where the goal of research is to develop the process by which different mechanisms of contingent interactions produced a specific result".

So, using imaginative-cognitive processes, we can interpret the past results and we can estimate how the decision-maker could behave through the imitation mechanism of behaviors (generated by image-based motivation) that want to replicate these behaviors that they find satisfactory and give it comfort in foreign policy and cyberwarfare.

The motivation and bounded rationality of a state actor based on cognitive-imaginative processes has been studied by a large suite of authors in International Image Theory [11], remarkably distinguished by Martha Cottam.

Cottam proposed a typology of political actors based on the analysis of capabilities, culture and intentions that will be presented in the methodologies section.

This explains to the decision-maker whether the image of the environment in which he is acting presents opportunities or threats to the foreign policy that he wishes to adopt. The basis of Cottam's research was a questionnaire of the image that the state actor had to deal with in the environment in which he acted. In this paper we will fine-tune this questionnaire by adapting it to the cyberwarfare actions defined by Craig B. Greathouse and the results of the analysis of the operational code and the additional method of Verbs In Context System (VICS). Analysis of the Operational Code is a foreign policy research approach to which several authors have contributed [12, 13, 14]. The main merit of this method is that it is applicable to document analysis and allows the extraction of psychological profiles and the estimation of the results sought by the decision makers. The two approaches will briefly be presented in the methodology section providing a way to link the results of the analysis of the operational code to the images the decision-maker has towards the environment in which it operates. So in this way emerge both apporaches of international relations theory. Outcomes of the grand theory are borrowed from operational code analysis, the middle level theory of behavior is adopted by Craig B. Greathouse typology and motivation inspired by Martha Cottam studies.

2. METHDOLOGY

First, we will exemplify how to use the analysis of the operational code defined by Schafer [12, 13, 14] using transitive verbs statistics (VICS). The motivation to use this kind of statistics is to quantify the number of actions and implicitly the projection of power. This is explained by the number of transitive verbs that the decider presented by the subject develops on his/her present environment by direct complement. As an example, we will analyze using the verb contextual method applied to a quote from a speech by President Jimmy Carter about the Soviet invasion of Afghanistan in December 1979.

The sentence in President Carter's speech on January 4, 1980 is as follows: „“Massive Soviet military forces have invaded the small, nonaligned, sovereign nation of Afghanistan…” method is the following [12]:

- Subject - which refers to the subject of the sentence ("Massive Soviet military forces") which is coded by Self or Other, depending on the state to which the author refers. In this case, Self refers to the US or a state allied with it. Other to the Soviet Union or its allied states.
- That time category refers to the verb of the sentence "have invaded" has the connotation of a negative action encoded as a punishment.
- Domain can be two types of internal political system or international political system as the interaction between actors.
- *Target and context* are expressed by Afghanistan-targeted action in the context of the Soviet-Afghan conflict between 1979-1988.

In our research we will relate to the context and we will consider it synonymous with the image of the external environment of the deciding actor and is the imaginative-cognitive process underlying the motivation of this deciding actor. Consequently, the context will be the analysis through the imaginative questionnaire treated with transitive verbs in context proposed in the results section.

Returning to the analysis of the operational code, it is characterized by ten indicators, of which the first five are called *philosophical beliefs* and refer to how the political actor perceives the environment around him. The second group of five indicators is called *instrumental beliefs* and represents the behavior the actor can adopt in relation to the environment around him. The actor will be called Ego, and the environment around him will be called Alter.

The *philosophical beliefs* of the Operational Code are [12, 13, 14]: P-1. NATURE OF THE POLITICAL UNIVERSE; P-2. REALIZATION OF POLITICAL VALUES; P-3 POLITICAL FUTURE; P-4. HISTORICAL DEVELOPMENT; P-5. ROLE OF CHANCE. And the *instrumental beliefs* of political actor are [Schafer, 2006] [Malici, 2009]: I-1. APPROACH TO GOALS; I-2. PURSUIT OF GOALS; I-3. RISK ORIENTATION; I-4. TIMING OF ACTION; I-5. UTILITY OF MEANS.

In his research, Schafer [12] considers the following three indicators to define actor's behaviors in the foreign policy analysis:

- P-1. NATURE OF THE POLITICAL UNIVERSE - defines the characteristic of the political environment if it is a harmonious or conflictual one and what characterizes the behavior of the actors in that political environment. The value range is from +1 for friendly to -1 for hostile

$$P_{-1} = \frac{NVTP(Other) - NVTN(Other)}{NTVT} \quad (1)$$

$NVTP(Other)$ - number of positive transitive verbs with Other subject; $NVTN(Other)$ - number of negative transitive verbs with Other subject; $NTVT$ - total number of transitive verbs.

- P-4. HISTORICAL DEVELOPMENT - characterize the actor's ability to control a certain development/evolution/political trajectory/projection of power in the desired direction. It gives an imaginative-cognitive measure of the application by the actor of cyberwar actions of Cyber Crime, Action of Focused Cyber Attack by Craig B. Greathouse. Value range is +1 for high policy control over low policy control

Error! Objects cannot be created from editing field codes. (2)

$NTVT(Self)$ - total number of transitive verbs with cu Self subject; $NTVT(Other)$ - total number of transitive verbs with cu Other subject.

- I-1. APPROACH TO GOALS - Expresses the choice of the roadmap for selecting a policy objective. The value range is +1 for high cooperation or

-1 specific to the high conflict

$$I_{-1} = \frac{NVTP(Self) - NVTN(Self)}{NTVT} \quad (3)$$

$NVTP(Self)$ - number of positive transitive verbs with Self subject; $NVTN(Self)$ - number of negative transitive verbs with Self subject; $NTVT$ - total number of transitive verbs with Self and Other subject.

As a conclusion of the Operational Code Analysis, there are six behavioral models based on Brams' theory of motion [12, 13, 14]. These are the following according to the I-1 and P-4a statistical indicators presented in the table 1 below for the foreign policy decision-maker named in the Ego's Operational Code:

Table 1. Table 1 - Organizing behaviors according to power values

	Low Power	*Medium Power*	*High Power*
	Error! Objects cannot be created from editing field codes.	**Error! Objects cannot be created from editing field codes.**	**Error! Objects cannot be created from editing field codes.**
$I_{-1} < 0$	Bluff	Compel-Punish	Bully
$I_{-1} > 0$	Appease	Reward-Deter	Exploit

The external environment of the Ego will be called Alter. Analogous to the external environment of the foreign policy actor is defined a typology with the same behavioral patterns but which are defined by the statistical indicators P-1 and P-4a and represent the Ego's perception of the Alter.

Thus, for the six behavioral patterns Schafer [12] defined the following results-specific patterns of interaction of an actor with its international environment with the meanings: Dominate and Submit are specific to a zero-sum, Dominate for winner and Submit for looser; Settle and Deadlock values are specific to a non-zero sum game in which Settle is characteristic of mutual co-operation, and Deadlock is typical of a mutual conflict [14]. These four results are hierarchically organized according to the following six sentences proposed by Schafer [12]. Each of the six sentences is associated with one of the behaviors: Appease, Reward-Deter, Exploit, Bluff, Compel-Punish, Bully (see Table 1 - Organizing behaviors according to power values).

For the six patterns of behavior we have the first three sentences that govern the Ego's perception of cooperation with Alter. These cooperative relationships can be coalitions, alliances, social contracts, etc. They are named by Schafer "Power Politics Propositions Re: Secondary Interests" [12]. The following three sentences are: Prop 1 the behavior of the Ego called Appease with the following hierarchy of results: Settle> Deadlock> Submit> Dominate; Prop 2 the Ego behavior called Reward-Deter with the following hierarchy of results: Settle> Deadlock> Dominate> Submit; Prop 3 the behavior of the Ego called Exploit with the following hierarchy of results: Settle> Dominate> Deadlock> Submit.

Also, the Ego's perception of the conflict with Alter is given by the following three sentences called Schafer "Power Politics Propositions: Vital National Interests" [12]: Prop 4 the Behavior of the Ego called Bluff with the following hierarchy of results: Dominate> Settle> Submit> Deadlock; Prop 5 Ego's behavior called Compel-Punish with the following hierarchy of results: Dominate> Settle> Deadlock> Submit; Prop 6 the Behavior of the Ego called Bully with the following hierarchy of results: Dominate> Deadlock> Settle> Submit.

All six sentences express the choices of the deciding foreign policy actor from the most desired/favorable result that is Settle for sentences 1, 2, 3 and Dominate in sentences 4, 5, 6 to the least desired/unfavorable outcome of the four, for example, Submit for sentence 1. This choice of an actor is dictated by the appreciation it gives to the result

based on its experience expressed through its culture and intentions built over time as a consequence of this experience.

Thus, the image of the environment (Alter) in which the Ego is located is its motivation in foreign policy or cyberwarfare. *The Ego motivated will choose one of the four results for which his behavior is known.*

Alter image in terms of Martha Cottam's studies is a variable dependent on the following three independent variables: "(1) perceptions of a country's ability, culture, and intention; (2) event scripts, reflecting lessons from history that policy makers use to understand the behavior of a country or to predict its behavior; and (3) response alternatives that have been consistently considered appropriate for use vis-à-vis a country. The attributes of capability, culture, and intention could not be operationalized at those levels of abstraction and were therefore broken down into smaller components "[11]. Next, we will treat items specific to the element (1): perceptions of Alter's ability, perceptions of Alter's culture, and perceptions of Alter's intention using the image indicator proposed by the author [11]. We will attempt to treat elements (2) and (3) by analyzing the operational code in the results section. Following Martha Cottam's [15] research for Alter's image, we propose the following types of images (see table 2):

- Colonial - is that image of the Alter in which it is inferior to the Ego in terms of its capabilities and culture but benign as its intention.
- Degenerated - is that image of the Alter in which it is superior or equal to the capabilities of the Ego, but cultural is poorly motivated (Equal/Inferior) and harmful as intent.
- Enemy and Ally - is that image of the Alter in which it is the Equal of Ego from the point of view of capabilities and culture. The difference between Enemy and Ally is the date of intent. This is harmful to Enemy and good for Ally.
- Rogue - is the image of the Alter in which its capabilities and culture are inferior to the Ego. His intention is harmful to Ego.
- Imperialist and Barbarian - the image of the Alter contains higher capabilities than the Ego and has the intention of harming it. From a cultural point of view, the Imperialist is superior to the Ego and Barbarian is inferior.

Table 2. Classification of Alter's images based on its capacity, culture and intent

Alter Image	Capability	Culture	Intention	
Colonial	Inferior	Inferior	Benign	High Opportunity
Degenerate	Superior/Equal	Equal/Inferior	Harmful	Low Opportunity
Enemy	Equal	Equal	Harmful	Low Threat
Rogue	Inferior	Inferior	Harmful	
Ally	Equal	Equal	Good	
Imperialist	Superior	Superior	Harmful	High Threat
Barbarian	Superior	Inferior	Harmful	

For the seven types of images of the Alter described above, Martha Cottam believes that the image of the Colonial or Degenerate Alter gives opportunities to the Ego [15]. Also the other five images of Alter are threats to Ego [15]. Because in international relations theory capabilities and culture are important independent variables that determine the behavior of foreign policy, they determine the magnitude of the opportunity or threat according to the above table. In the table below are presented for each of six propositions proposed by Schafer with the four most wanted results types associated with the High Opportunity image, the desired result associated with the Low Opportunity image, the unlikely result associated with the Enemy/Rogue/Ally (Low Threat) image, or

the least wanted result associated with the image of the Imperialist/Barbarian Alter (High Threat). (see table 3)

Table 3. Prop-opportunity-threat

		High Opportunity	Low Opportunity	Low Threat	High Threat
Alter Image		Colonial	Degenerate	Enemy/ Rogue/Ally	Imperialist /Barbarian
Appease	Prop 1	Settle	Deadlock	Submit	Dominate
Reward-Deterrence	Prop 2	Settle	Deadlock	Dominate	Submit
Exploit	Prop 3	Settle	Dominate	Deadlock	Submit
Bluff	Prop 4	Dominate	Settle	Submit	Deadlock
Compel-Punish	Prop 5	Dominate	Settle	Deadlock	Submit
Bully	Prop 6	Dominate	Deadlock	Settle	Submit

3. RESULTS

We state in the methodological section that the motivation of the Ego that is directly influenced by the image of the Alter and the image is composed of (1) perceptions, (2) event scripts, (3) response alternatives. So we can conclude that the context in which the Ego executes its decisions contributes to the cognitive-imaginative process, being a constituent part of the image of the Alter. Because the variables that construct the perceptual dependent variable are those that explicitly model the image in Tables 2 and 3, we will only use perception for the analysis of operational code with transitive verbs.

The context will be considered as a qualitative variable, dependent on "response alternatives" and "event scripts".

The cognitive-imaginative process determines the Ego decision-maker to take action on cyberwarfare on the environment. The initial questioner proposed by Cottam will be modified in the subsection "response alternatives" and "event scripts" to allow the analysis of the operational code and the verbs system in the context. For the "response alternatives" variable, the spectrum of classical actions is: "includes military threat or actual force, economic incentives to economic sanctions, diplomatic protests, bilateral and multilateral negotiations, or simply doing nothing; those perceived as weaker are dealt with in a more coercive fashion "[11]. It also takes into account the actor's willingness to study "bargaining" [11]. In the case of our analysis, cyberwarfare's actions will take the form of Action of Cyber Crime, Action of Denial of Service, Action of Massive Cyber Assault. For the second variables of the "event scripts" context [11]: "Event scripts were derived from statements about lessons from history: a. Historical incident used as an analogy to explain current conflict; c. Predictions about country's behavior or the outcome of "conflicts/co-operations based on table 3. The Alter's image was investigated on the basis of the analysis of the operational code applied to Ego's documents by further processing by categories of positive and negative transitive verbs [12, 13, 14]. The new questionnaire model will be called "image indicators based on verbs in the context system".

3.1. The collection of positive and negative transitive verbs related to the perception of capabilities that have as subject the Ego or the Alter $NVTP_{11}^{Capability}$, $NVTN_{12}^{Capability}$, $NVTP_{12}^{Capability}$, $NVTN_{22}^{Capability}$ on the basis of the items of the questionnaire below from item 1 to item 3c. "*The capability attribute was derived from statements about the following:* 1. Military strength and capability: 1a. The country's offensive and defensive military potential; 1b. The government's control over the military; 1c. The likelihood that

the country would resort to the use of military force to achieve its goals; 1d. Whether the country's military force was superior, equal, or inferior to the Alter military force; 1e.

The country's capability of using, and willingness to use, military force. 2. Domestic policy: 2a. The country's government structure (open or closed); 2b. The government's effectiveness and efficiency in implementing policy; 2c. The organization, size, and strength of the government's opposition; 2d. The government's ability to carry out a policy, achieve a goal, or abide by an agreement; 2e. Whether the decision structure was multi-tiered or monolithic (monolithic countries are assumed to be more capable since they do not have to please their publics, interest groups, or bureaucratic interests). 3. Economic characteristics: 3a. The capacity and stability of the country's economy (industrial potential, agricultural self-sufficiency, growth rate, potential for growth and development); 3b. The interaction between the Alter's economy and the other country's economy (permeability of other economy; threat to or opportunity for the Alter); 3c. The country as recipient or provider of international aid." [11]

3.2. The collection of the positive and negative transitive verbs related to the cultural perception that have as subject the Ego or the Alter $NVTP_{11}^{Culture}, NVTN_{12}^{Culture}, NVTP_{12}^{Culture}, NVTN_{22}^{Culture}$ based on the items in the questionnaire below under item 4 and item 5. "*The culture attribute was derived from statements about the following:* 4. Comparison of culture to Alter's culture (perception of similarity implies a positive affect with low or no threat); 5. Cultural sophistication (includes social norms, literacy, religion, standard of living, scientific and technological capabilities, racial composition, nationalism and the public mindedness of citizens)." [11]

3.3. Collecting the number of positive and negative transitive verbs related to intentional perception that have as subject the respective Ego respective Alter with $NVTP_{11}^{Intention}, NVTN_{12}^{Intention}, NVTP_{12}^{Intention}, NVTN_{22}^{Intention}$ based on the items in the questionnaire below from item 6 to item 10.c. "*The intention attribute was derived from statements about the following:* 6. Goals and motives: 6a. Leaders pursuance of their goals; 6b. Leaders' and citizens' motives; 6c. Comparability of goals with Alter goals.
7. Flexibility: 7a. Leader's willingness to bargain, change tactics, and shift policy in response to Alter initiatives; 7b. The Ego's country flexibility; 7c. The linking of flexibility with cause (nationalism, imperialism, etc.). 8. Supportiveness of Alter goals and policies. 9. Whether decision structure is multi-tiered or monolithic (those seen as multi-tiered are seen as less threatening)." [11]

3.4. Global determine the behavioral model of the six in all three dimensions of perception by calculating the I-1 and P-4a for a given typology of Craig B. Greathouse [1] (Action of Cyber Espionage and Cyber Crime, Action of Denial of Service, Action of Focused Cyber Attack, Action of Massive Cyber Assault).

Table 4. Chi-square test to check the three influence of the capability, culture and intent of the image

X = Capability/Culture/Intention			
	NVTP	NVTN	TOTAL
Self/Ego	$NVTP_{11}^{X}$	$NVTN_{12}^{X}$	NVT_{1}^{X}
Other/Alter	$NVTP_{12}^{X}$	$NVTN_{22}^{X}$	NVT_{2}^{X}
TOTAL	$NVTP_{1}^{X}$	$NVTN_{2}^{X}$	$NTVT^{X}$

The relationship between the cognitive-imaginative-motivational process and the three independent variables is verified by the hi-square test (chi-square table 4).

Then the image model of the four groups with the types of opportunities and threats based on Table 5 below determines the perceived type of capability, culture and intent of Alter as in Table 2 for a given cyberwarfare action and the given context.

Table 5. Determining the Alter's images based on the frequency of positive and negative transitive verbs

X = Capability or Culture		X = Intention	
Superior	$NVT_1^X > NVT_2^X$	Good	$NVTP_1^X > NVTN_2^X$
Equal	$NVT_1^X \cong NVT_2^X$	Benign	$NVTP_1^X \cong NVTN_2^X$
Inferior	$NVT_1^X < NVT_2^X$	Harmful	$NVTP_1^X < NVTN_2^X$

4. CONCLUSIONS AND FUTURE WORKS

Research is not an exhaustive one in the field of cyberwarfare research. As a novelty, it shows how the cognitive-imaginative motivational process limits the rationality of an actor. According to the rationalist paradigm widely used in cyberwarfare research, estimates are based on quantitative assessments of utility functions specific to critical cyber infrastructure capabilities. This study presented a way in which rationality is limited by the image (related by capabilities, culture and intentions) of the external environment of the decision maker and how to evaluate his/her cognitive decision. Future research is about integrating image indicators based on verbs into the context system with quantitative methods such as game theory, agent-based modeling, and qualitative predictive methods such as Lockwood Analytical Method for Prediction.

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CONSIDERATIONS ABOUT THE FUTURE FIGHTER PILOTS DEVELOPMENT

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Abstract: *The present training aircraft used for fighter pilots development is not able to offer to the students the possibility to acclimate to maneuvers performed at high G overloads, to provide the training needed to perform the air to air refueling missions or to provide the tactical training with the new survival systems. So it is mandatory to develop a new training system, that it will be able to meet those new requirements.*

Keywords: *skills, formal training, operations, training programs*

1. INTRODUCTION

The purpose of this analysis is to identify the performance requirements, training tasks and standards that pilots have to meet to be admitted to the initial qualification programs for fifth fighter aircraft generation.

The entry into operation of the fifth fighter aircraft has produced a major change in institutionalized training and has prompted Air Forces from NATO members to reassess its current training system and adapt it to new requirements. In this context, the United States Air Force (USAF), the NATO's most important air force and, at the same time, the first entity to have felt the effects of launching the F-22 Raptor, asked the RAND Research Institute to assess the capability of the own current training system, consisting of the binomial aircraft and training programs, to ensure if the training pilots is in line with the new requirements. The study was finalized after two years of research, and its findings in the final report highlighted the fact that future air operations will lead to a change in the combat pilots training system, but without specifying what performance and capabilities are expected from the school aircraft to support new training requirements. The study proved to be extremely necessary and helped the responsible entity in making well-documented decisions about keeping or replacing institutionalized training programs or current school aircraft. In response to RAND Corporation's research, the Air Education and Training Command (AETC) has begun its own research study on the functionality of the institutionalized training system, a study later supplemented by an analysis of the present and future requirements it has to meet.

2. CONSIDERATIONS RELATING TO THE COMPETENCES REQUIRED FOR FUTURE PILOTS OF FIGHTER AIRCRAFT

Taking in account the experience of NATO partners about the impact of the new combat aircraft over their training systems, the Romanian Air Force needs to adapt its own institutionalized training system in time so that, with the purchase of fifth generation fighter aircraft, expected from 2030, to be capable of providing pilots with training appropriate to the actual training requirements and to facilitate their passing on aircraft to upper generation combat aircraft.

In this spirit, I believe that addressing this issue is a necessity for both the present and the future Air Force, and finding viable solutions prior to the acquisition of new combat aircraft would allow timely distribution of budget effort, thus avoiding financial pressure greatly exerted on the system in a short period of time. Also, an early approach to the subject provides the time to identify dysfunctions and to regulate the system effectively.

To assess the capacity of the current training system to provide training needs of pilots generated by modern aircraft, a comparative analysis of the skills that the current system develops to pilots in Advanced Flight Training (AFT) and Introduction to Fighting Fundamentals (IFF), with those required for admission to the qualification program on modern combat aircraft has been carried out. Lower Teaching Stages, Selection and Initial Flight Training (Screening and Initial Flight Training-IFT) and Basic Flight Training (BFT) are not relevant to this analysis because they are addressed by all pilots and are not influenced by the requirements of combat aircraft. Therefore, the minimum set of skills required to be accumulated during the lower stages of training will remain the same for all pilots, and for those who will be oriented to multilevel aircraft, the competencies accumulated in the higher stages of training are relevant.

Starting with 2030, the Romanian Air Force intends to acquire the first multi-fighter F-35 combat aircraft and, implicitly, to begin the training of the first series of students who, immediately after completing the introductory phase of the basic tactics (IFF), under the institutionalized training, they will access the initial qualification on the F-35A. This first class will be the beginning of the training of Romanian pilots for the fifth fighter aircraft`s generation, and from then on a constant annual increase in the number of pilots will have to be expected on the F-35. These pilots will need some skills to exploit this aircraft, skills that will somehow differ from the skills required today's combat pilots. At the same time, the Air Force inventory will move from the fourth generation to the fifth generation of combat aircraft, and budget efforts will be considerable.

Therefore, the current pilots training system, from the selection phase through the institutionalized training stages and finalizing the IQT initial qualification stage, may need to adapt to the new student preparation requirements for the future air operations. To this end, it is necessary to have a documented analysis of the training requirements specific to the new aircraft, identifying the type of competencies required for future students to exploit future combat aircraft, and an assessment of how the current system prepares and develops the necessary skills.

As the F-35 specific training program may be subject to changes according with future aircraft development programs, we started research from the existing *F-35 Aircraft Training Program* and we tried to cover potential future changes and in support of this we formulated some hypothesis like the number of flight training missions and their duration will be similar to those for the F-16 aircraft. Based on this hypothesis, there will be a finite number of skills and competencies that a student will have to achieve within the Initial Qualification Course on the multilevel aircraft. Following this, identifying the minimum set of skills required to complete the course must be done through "inductive logical reasoning", starting from the minimum skills and competences required to enter the training course, from the number of flight training mission, from the number of exercises performed at simulator and their time allocated, and last but not least, by combining new skills necessary for pilots to operate and efficiently use new equipment and systems introduced on the multirole aircraft.

In order to determine possible deficiencies in the training system, we compared the minimum set of competencies identified to be required by pilots to be admitted to the Initial Qualification Training course and the set of competencies accumulated and certified today, with the completion of the Introduction to Fighting Fundamentals course (IFF).

To determine how these discrepancies can be eliminated, the present study identified flight safety as the main element of analysis and the effectiveness in conducting combat action as the secondary one. Flight safety has as its primary objective the reduction or avoidance of unacceptable risks as well as the exposure of the pilot student to situations where inherent errors may occur which may have undesirable major effects.

If a deficiency can be identified as a result of the analysis that could create a flight safety issue, then the way to be solved will be translated into the necessary competence to be acquired before the initial qualification course on the aircraft.

Since the field of development and training of combat pilots is complex and implies a lot of variables, and research work requires good organization, the basic skills necesary for a pilot to successfully complete the training can be distributed in four major categories, depending on the field addressing them as follows:

• category of skills required for piloting and controlling the aircraft;

• competence category for knowledge, understanding and application of flight principles and regulations;

• the category of competencies required to manage the information on board and make the right decisions;

• competence category specific to combat aircraft pilots.

This systematization of the database is absolutely necessary, taking into account that the F-35A aircraft Training Development Team has identified over 3500 individual tasks required to be executed by a pilot along the training program for obtaining the mission qualification, starting from take-off to the use of night-time weaponry. After simplifying the management of this large amount of data from these four categories of competencies, it is necessary to identify the shortcomings that the current system has in relation to the new training needs.

Knowing the exact number of skills required to obtain each basic skill and the number of repetitions according to the training program needed to develop a certain skill is not so important, but identifying a certain type of skills and the level of performance required is essential. Therefore, the grouping of competences in the four categories based on performance standards, corresponding to the areas mentioned above, has proven to be extremely useful and necessary. To determine pilots' level of training, the Air Force has standardized the assessment of their performance in techniques of flying, instrument flight, flight performance as an instructor or as an assessor. In all cases, through examinations planned or decided by commanders, the performance of the pilots in the performance of missions for which they are qualified is assessed. Also, according to the RAND Corporation study, an important feature of future operations will be the ability of pilots to handle a large amount of information received on board aircraft as well as the ability to interpret them. Competencies in the category dedicated to piloting and controlling the aircraft are the basic skills necessary for any pilot to progress in training. For each aircraft, a certain level of training is required for the pilot to exercise control, but the foundation in flight technique is provided by the stages of training on classical school aircraft. In the advanced training phase, the student continues their training, but training focuses on the development of other competencies, specific to the combat pilot. Within the IFF, training is polarized on the development of competencies in the "Competence specific to combat aircraft pilots" category, as the pilot is already wings awarded and has the competency specific to the category dedicated to piloting and controlling the aircraft, but only to be maintained by training. Finally, we can conclude that the current training system provides the student at the end of the IFF stage with the level of performance needed to address the IQT program for the fourth-and-fifth-generation multirole combat aircraft.

Competencies in the category of knowledge, understanding and application of flight principles and regulations, as well as those in the category dedicated to piloting and controlling the aircraft, are also well developed by the current training system. The assessment of skills in the knowledge, understanding and enforcement of flight and regulatory principles starts from the first day of the first training phase and continues until the end of the career. Air Force polarizes the training provided in each stage or phase on the development of this category of competencies, and aims to the student responsibility in preparing and executing missions as their flight experience will increase. These expectations are much more evident in the case of combat aircraft pilots in solo flight, where the accurate flight execution and situational awareness is the responsibility for only one person, its mission becoming more complex and requiring a high level of performance. To successfully accomplish this, instructors should permanently evaluate and correct pilots' performance during training, regardless of the phase or stage, thus assuring students the development of basic skills in this category. In conclusion, we can state that, from the point of view of this category of competencies, there is no deficiency of the current training system in relation to the specific requirements of the fourth-and-fifth generation of multirole combat aircraft.

The category of skills required for *Cockpit Resources Management (CRM)* and *Decision Making (DM)* is one of the those two categories for which students are poorly trained during institutionalized training stages and the assumption of a required level of their performance after completing basic tactical training and before approaching the initial qualification course on the combat aircraft is little unrealistic in this respect.

Regardless of the aircraft analyzed, the pilot, during the flight, is required to receive information and data, process them to make the right decision and to execute the actions accurately. Moreover, the amount of information received on the board of the modern aircraft will be much higher than any other aircraft in the past, and assessing pilots' ability to manage this information is very important in training them. CRM includes many more tasks to be performed onboard of combat aircraft and it is not limited to information and sensor management, but thanks to the advanced data exchange technology implemented on multi-aircraft aircraft, this study focuses on these latest aspects of CRM , in order to highlight the need to develop pilots' capacity to handle a large amount of information and data onboard during the flight. All these resources provide a wealth of information, and it is imperative that the pilot is able to manage, interpret and identify their source. Thus, in the case of fourth and fifth aircraft generation, the pilot will receive both on-board sensors and data links from terrestrial and/or other aircraft in the air. Processing all this information, maintaining aircraft control and monitoring the action environment is a complex and difficult task that requires dedicated training before aircraft qualifications course begins.

A key component of the management of information and sensors is the prioritization. Prioritization includes knowing the exact moment of use of a sensor, weapon, or information which are received at a moment in time. Therefore, this study focuses on the type and amount of information received by a pilot at each stage of training and how well the current training system for modern combat aircraft is prepared from this point of view.

However, the most important deficiency of the training system prior to commencing training in the combat field, is the level of those specific skills developed for the combat aircraft pilots. First of all, developing these skills before approaching training on an airplane only with a simple, constructive design is, ultimately, a safety issue. Without an intermediate training program on a dual command aircraft, students will have to go directly from the school aircraft to a state-of-the-art combat aircraft.

The school aircraft has very good flight characteristics for the aviation category it belongs to, but the performance and systems on board are far from modern combat aircraft. Obviously, the training system is not able to offer to the students the possibility of acclimating to maneuvers performed at high overloads, to provide the training needed to perform refueling missions in the air or tactical training with new hostile survival systems such as Distributed Aperture System, as well as missions for recognition and suppression of enemy ground defense (SEAD).

The new fighter aircraft`s development programs are in a still going on and the new technologies used onboard combat aircraft bring new missions for which students must be trained, leading to a high density of training events to be performed in a time-frame well defined and unmodified in accordance with the new requirements. The consequence of this development is the need to resize the number of events in the training categories already existing in the IQT training program and to overburden the students by increasing the number of skills that need to be accumulated in a short time. That is why the existence of a training system able to provide the necessary preparation for the students from all stages would provide a relaxation of the IQT program and, implicitly, a resource saving, given the high cost of operating the multirole aircraft.

3. CONCLUSIONS

As technology advances and its impact on pilots development and training is becoming more and more enhanced and with immediate effects, I believe that future research studies in this area are absolutely necessary. Taking into account that new combat aircraft benefit from flight control equipment and systems which allow for network flight performance beyond the old aircraft and which requires a much less effort from pilots to maintain aircraft control, analysis of the possibility of eliminating training events in the category of competencies dedicated to maintenance of aircraft control and allocation of appropriate resources and time to the categories of competencies for which the deficiencies of the current training system were found.

Another solution to mitigate the differences between the institutionalized and the operational training stage is to allocate more solo flight missions as the student gains more confidence in his / her possibilities and manages emotionally better the contact with the fighter aircraft.

Also, training in the execution of certain tasks, intended to be performed in flight, must be transferred from the aircraft to the simulator. The student must safely execute all maneuvers in flight, but the introduction of specific CRM elements must be done much earlier in the flight simulator. Simulator training involves a much lower consumption of resources, and the instructor can concentrate on training only on items that are found to be deficient.

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THE PLACE AND THE ROLE OF STABILITY AND SUPPORT OPERATIONS IN THE PREVENTION AND STOPPING CONFLICTS IN THE EX-YUGOSLAV SPACE

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Abstract: *Stability and support operations are military operations carried out to achieve national interests and goals, to deter or prevent war, to promote or establish peace, to reduce tensions between the states, to solve international crises, or to assist local civilian authorities in solving internal crises. In accordance with the defense law (national and international) regarding the use of the armed forces, as well as with the obligations assumed by our country within NATO or within the framework of the democratic international structures, the national armed forces will participate in peace-building and peacekeeping operations, as well in operations for maintaining constitutional order, in emergency situations interventions and in supporting public authorities. In this article we will detail some aspects related to the environment of the stability and support operations, to crisis prevention measures, focusing on the specifics of stability and support operations in the former ex-Yugoslav area.*

Keywords: *stability and support operations; conflicts in the former ex-Yugoslav area; preventing and stopping conflicts; international democratic organizations; diplomatic steps …*

1. INTRODUCTION

In the Doctrine of Land Forces Operations (2017) it is emphasized that operations specific to the war represent "the violent engagement of forces, using military equipment and weapons, for imposing their own will upon the enemy by producing human and material losses, its destruction or capture" [1]. At first sight of the contemporary operational environment, compared to the traditional war, no spectacular changes occurred, fact justified by the presence of the continuation of the two operations, the offensive and the defense, respectively, as basic forms of the war. However, the integration into the NATO system has given the opportunity for Romanian military specialists to adapt to new requirements of the contemporary security environment, dominated by new risks, threats and vulnerabilities, as well as global phenomena of international terrorism, organized crime and corruption, dangers that seriously threaten the international democratic world.

The need to combat these dangers has highlighted new types of operations, such as: intermediate operations, stability and support or stabilization and reconstruction operations, etc.

"*intermediate operations are precursor or consecutive military actions and activities by which the forces are prepared or brought to the state from which they can carry out the next operation or cease the mission*" [2];

" *stability and support or stabilization and reconstruction operations are actions and missions which are aimed at discouraging, preventing conflicts, restoring, maintaining, imposing and building peace, preserving / restoring constitutional order, granting humanitarian aid and reconstruction*" [3].

They are executed according to other rules and means than the specific operations of the armed conflict, with the possibility that, within the same conflict, to shift from one operation to another, from those specific to the armed conflict to the stability and the support and vice versa. These types of operations are usually nonlinear and isolated and are carried out according to specific principles, respecting, depending on the situation, the principles of the armed conflict.

We believe that studying and understanding the place and role of stability and support operations has a particular role in the development and adoption of policies, doctrines and plans to achieve new military capabilities specific to operations carried out in the joint, international and inter-institutional environment. Basically, by applying the specific features of stability and support operations to these capabilities, they will need to be deployable in several operating areas and to have the possibility of collaboration, interconnection and integration of all systems and devices of military, non governmental and governmental organizations participating in the operation. Due to the numerous stability and support operations carried out in the ex-Yugoslav space, studying how to prevent and stop these conflicts is a valuable source of lessons learned, that can be harnessed by identifying and designing the best solutions for the development of these policies, doctrines and capabilities.

Commanders at all echelons adapt the application of the elements of operative art and of the MEFL-TC factors (Mission, Enemy, Own Forces, Land-Time and Civilians) to the concrete situation of the operational environment specific to the operation.. Operative art designates "*the application of creative imagination of commanders and staff, based on their skills, knowledge and experience, to plan, organize and engage military structures in major campaigns or operations. The operative art integrates the final state, the ways and the means by which it is attained*". By applying its principles, the commanders establish decisive operations, the modeling of the operational environment or the support necessary for the success of the mission.

The activities carried out to identify the centers of gravity, the decisive points and even the desired final state may be more complex and more demanding / non-routine than in armed conflict operations. When viewing such an operation, the commander must take into account that the enemy must be defined as such, taking into account its specifics and peculiarities. For example, the opponents can be: human groups that are illegally constituted - according to certain criteria and for certain purposes, disease, hunger or the consequences of a disaster, etc. Moreover, the purpose of these types of operations is to meet, for a limited time, the immediate needs of certain groups, until the civil authorities can manage the situation without military assistance. In extreme or exceptional situations, military force can help ease the situation or can provide the direct assistance of those in need. Normally, however, it assists civil authorities or non-governmental organizations to provide specific and necessary assistance until the situation is normalized.

2. THE SPECIFIC OPERATING ENVIRONMENT OF STABILITY AND SUPPORT OPERATIONS

In order to make an objective analysis of the specific environment for the conduct of stability and support operations, we consider it necessary to identify and analyze, first of all, the general conditions that lead to the occurrence of crises generating such situations.

We believe that the most exposed structural organizations to the emergence of crises and which can therefore be the subject of a stabilization and reconstruction operation are the ' *fragile* ' states or so-called ' *failed* ' states.

In the contemporary era, some natural shocks (in the form of disasters, and the example of Haiti and Japan we consider to be the closest) or man-made, can be so strong and with such profound consequences that they have the opportunity to push not only fragile nations or shaky regimes, but also modern, organized and stable states, in a spiral of self-destruction, accentuated by multiple elements, of a governmental and social nature.

If a government is weak, corrupt, incompetent or unable to exercise its authority, a trigger-shock event leads to an escalation of an already existing difficult situation, generating the spread of suffering, increasing popular claims, and sometimes popular movements, all can be intensified by several interrelated factors, consisting of [5]: the absence of an adequate internal security environment; essential public services and other key government functions ineffective, sometimes corrupt; inability of the Government to exercise its authority; spreading crime in an atmosphere of anarchy or conflict between ethnic, tribal or religious groups or between government forces and violent opposition; very poor economic performance due to internal disorder, outdated infrastructure and the destruction of key economic assets; massive unemployment and increased economic disparities between social groups, that create general dissatisfaction and fuel the recruitment pool for opposition groups.

Once these conditions are met, the directions of instability and conflict tend to amplify, developing a heightened degenerative cycle, in which the sense of insecurity of the population increases. Without the intervention of a force, often external, intervening to interrupt this cycle and counterbalance the situation, the elements of the crisis may increase, further destabilizing the system. This is, in our view, the fundamental element that can lead to the emergence of the operational environment for stabilization and support operations.

From the perspective of the foregoing, we consider that the evolution towards a specific operational environment is characterized by the existence of a favorable environment, constituted by fragile or failed states, and by the emergence of the specific favorable conditions that shape it: ethnic and religious rivalry, accentuated urbanization, global media networks, relative technological development and the multitude of actors involved in resolving the crisis.

Failed States can reach such a situation as a result of the effects of globalization, economic collapse, and competition for resources, corrupt governance or the failure of efficient management of social infrastructure. The conditions created like this can be a conducive environment for the development of dictatorial regimes, organized crime, tribal leaders or fundamentalist religious authorities, which can lead to the emergence of groups that substantiate their actions on people's grievances and the need to help those in distress, by appealing to popular support for supporting the causes they represent and can provide shelter and refuge for criminals and insurgents. Moreover, in the situation of power takeover, terrorists, drug dealers and criminal elements can use government areas as bases for operations that spread their influence among domestic and foreign populations.

The example of the Taliban regime in Afghanistan is well known in this regard.

Stabilization and reconstruction operations in the Balkans, Afghanistan and Iraq have been triggered, in some cases, or, in other cases, have been heavily influenced by *significant ethnic and religious differences.* That is why we believe that from the point of view of stabilization and support operations, inter-ethnic and religious conflicts can create a serious challenge for local civil authorities and the involved forces in these operations. Moreover, the conflicting states of ethnic and religious nature that have long been smoldering, rarely can be solved only by the intervention of external forces, their resolution can only be found in political and social reconciliation.

Inter-ethnic conflicts tend to occur when identities are caused by major social changes, accompanied by modernization and globalization. While ethnic divisions are currently geographically centered, in the future, ethnic dynamics can have a major impact on regional power balance. The recognition and the understanding of the ethnic dimension of the operational environment remains a critical condition in most crisis situations to intervene in stabilization and support operations.

Religious ideology can be, under certain circumstances, power-bearing, by leading political and social forces. Groups aiming at achieving national, regional or global dominance can promote religious engagement, in some cases in its extreme form, as a means of motivating the dissatisformed population. Religious fundamentalism is attractive to those who feel threatened or victims of the cultural and economic impact of globalization and social interconnectivity. Additionally, it creates the opportunity to win followers, speculatively empowered by religiously grounded political movements, when secular civic institutions or political authorities are unable to successfully manage social challenges, whether local or global.

Urban centers can provide a continuous influx of youth, disappointed and without prospects of social self-realization, to be recruited and transformed into insurgents or terrorists. In addition, the complexity of urban space offers asymmetric advantages to terrorists and insurgents, including more advantageous targets and a stronger impact of the undertaken actions.

In many of the crowded urban areas, the inability of governments to provide basic public services increases the potential for chaos and dissatisfaction among the population. Infrastructure in these situations is austere/ severe (poor water supply and sanitation, limited or non-functioning power supply services, inadequate education opportunities and medical services).

Some cities may be ungovernable by favoring the emergence of criminal networks or criminal interest groups, often supported by corrupt politicians or malicious people in the local or central government. The existence in the same urban area of several divergent ethnic or religious groups may fuel the present tensions for a long time, endangering the fragile existing balance.

3. THE UE/NATO GLOBAL STRATEGY ON CRISIS PREVENTION MEASURES AND OBJECTIVES

Crisis prevention measures are those measures taken either when it is possible to avoid aggravation of problems in dispute and incompatibilities of interest, or after their outbreak. This includes peace building and peacekeeping. Achieving peace means seeking a negotiated solution to situations perceived as conflicts of interest between the parties and comprises as ways of achieving: imposing a solution by coercion (by violence or by force); legal settlement of the crisis; the political-diplomatic resolution.

In a world that is defaced by old and new challenges, it is increasingly difficult to design a crisis response standard, close to what it would be wanted globally. Under such circumstances, it is normal that the concerns caused by the evolution of the security environment should be increased, as long as organizations such as the U.N., whose stated purpose is "*to maintain international peace and security...*", and the OSCE, *whose destination is evident even in the name*, are in many cases inefficient. The spectrum of a crisis, in the NATO concept includes the following stages: peace, escalation (including disagreement, confrontation, armed conflict), and detente (including reconstruction and achievement of new stability).

Equally important in this conceptual debate is NATO's definition of crisis management: "*coordinated actions initiated to avoid a crisis, prevent its escalation into armed conflict, and stop hostilities, if they arise"* [6] Thus, in the crisis management process, NATO identified five phases: the observation of indicators and the warning of a potential or current crisis; assessing the crisis situation in terms of its development and potential, and establishing implications for alliance security; the development of recommended response options to guide the NAC/DPC decision-making process; the planning and execution of the NAC/DPC decisions and directives and the return to stability.

The alliance's crisis management objectives are the following [7]: contributing to reducing tensions and preventing their transformation into crises; managing the crisis that manifests itself in order to prevent it from escalating into a conflict; ensuring, in advance, civil and military training for crises of varying degrees; in the event of an outbreak of hostilities, controlling the response, preventing escalation, and deterring any aggressor from starting the attack and withdrawing from the territory of the alliance. Obviously, this goal is not applicable to technological, humanitarian and natural crises. The detente activities are important, with the aim of restoring normality, after the escalation or hostilities have been stopped or are under control, as well as the application of the "lessons learnt" from other similar experiences.

After the Cold War, NATO focused its attention on preventing and managing crisis with roots in: ethnic tensions and antagonisms, extremist nationalism, internal political struggle, inadequate political change, domestic economic problems, etc. Since 11 September 2001, interest has been focused on terrorism and weapons of mass destruction, as sources of crises, but also on inter-institutional cooperation, in particular with the European Union.

An important aspect in the EU's foreign and defence policy is crisis management, considered a key factor in ensuring peace and security both in the region and around the world. In this respect, in the year 2016, the Union adopted the *EU's Global Strategy for Foreign and Security Policy*, which aims to strengthen its role as a leading actor in the European security environment and to increase its contribution to global peace and security.

4. STABILITY AND SUPPORT OPERATIONS IN THE FORMER YUGOSLAV AREA

Peace Building is a method of post-conflict intervention that runs on the basis of Chapter VI of the UN Charter and involves assistance in controlling the withdrawal of forces on the demarcation line, returning to recognized borders, the control of the exchange of prisoners, the restoration of civilian infrastructure, the realization of new political structures, the deployment and demobilization of forces (example-operation in Cambodia).

All these actions can be performed at the same time in ways of intervention, which can be performed as types of stand-alone operations or as stages of the same operation in support of Peace therefore they can be part of "special operations, Other than war" and, at the same time, constitutes ways of intervening in modest military conflicts, representing an important operational element of the UN (OSCE) for conflict prevention and crisis surveillance, in the context of physiognomy of the political process of/ in resolving disputes within or between states, thus contributing to the preservation of peace and stability in the world [8].

The participation of the states in multinational peace support operations is determined by the current scale of conflictual situations, by the mutations produced in contemporary conflicts, and will certainly remain, in the future, a major and effective way to manage crises. For a good while, peace-support operations as a means of intervening in military conflicts will remain a first-rate mission of international organizations, governments and armed forces in all states. [9]

Methods and mechanisms for conflict prevention have taken different forms. In some disputes, the UN acted through peacekeeping forces, situation assessment teams (sent by the Security Council or the General Assembly), election surveillance, relations improvement missions, mediation teams and special representatives. In other issues, plenary debates and a channel for peaceful diplomacy were ensured.

According to the UN Charter, conflict control measures known as peacekeeping operations have been authorized by the Security Council (or, in exceptional cases, by the General Assembly), normally with the consent of the parties, to enable the UN to restrain hostilities, to prevent their resumption and to normalize the situation. There were two such types of operations: UN observer missions; UN peacekeeping forces.

Military observer missions were composed of unarmed officers made available to the UN at the request of the Secretary-General by the Member States. The mission's function was to observe and report to the Secretary-General (who in turn informed the Security Council) on maintaining a cease-fire and to do everything possible to improve the situation [10]

Peacekeeping forces are comprised of contingents of armed troops made available by Member States. These forces usually support preventing the resumption of battles, restoring and maintaining order and promoting return to normal conditions, as follows:

* UN Interim Administration Mission of Kosovo (UNMIK, 1999), with full authority over the population and territory (legislative, executive, administrative and judicial);

* OSCE Observation Mission in Macedonia (2001) with a mandate for: compliance with the ceasefire agreement; respect for human rights;

* OSCE Kosovo Verification Mission (KMV, 1999), with a mandate for: assistance to local authorities; supervising compliance with the ceasefire agreement; compliance with the agreements.

* United Nations Protection Force mission in Yugoslavia (UNPROFOR, 1992-1995), with a mandate for: the demilitarization of the conflicting factions; monitoring security zones; protection of humanitarian convoys; border control;

* NATO Peace Implementation Force mission in Bosnia and Herzegovina (IFOR, 1995-1996), with a mandate for: monitoring the implementation of the Dayton

Agreement; surveillance of separation zones; ensuring freedom of movement; supervising demining operations;

* NATO Stabilization Force mission in Bosnia and Herzegovina (SFOR, 1996-2004), mandated for: ensure safety conditions for humanitarian and genital assistance; support for the restoration of infrastructure; ensuring human rights; election observation and normalization of economic and social life;

* NATO Kosovo Force Mission (KFOR, 1999), with a mandate for: compliance with the ceasefire agreement; assistance in transition; observing the conduct of elections; humanitarian aid.

The participation of states in multinational peace support operations is determined by the current magnitude of conflict situations, by the mutations produced in contemporary conflicts, and will remain, in the future, a major and effective way to manage crises.

CONCLUSIONS

The conflicting situations of ethnic and religious nature that have long been smoldering, rarely can be solved only by the intervention of external forces, and their solution can only be found in political and social reconciliation.

The religious dimension of a conflict remains an important indicator in the security analysis of power relations, as it refers to a factor that dynamizes conflicts according to the level of discrimination accused or the nature of the claims formulated.

The link between ethnicity and religion, based on the fundamental principle of assumed or practiced religion, was not once an alibi or pretext for post-Cold War conflicts, a kind of curtain behind which geopolitical, geo-strategic or geo-economic interests were hidden, conflicts in which muslims and christians (albanian-serbian, macedonian-albanian) or christians among them (orthodox serbs and catholic croats) faced.

Neither the belief nor the confession was the basis for confrontations in the former Yugoslav area, but rather the claim of legitimacy in the act of government, the struggle for power addressing for its own benefit a certain political-religious turn, that affected or influenced social coexistence, government policies and local security.

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NEW MEDIA USED IN THE CONTEXT OF THE SYRIAN CONFLICT

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Abstract: *This paper is meant to provide insight into the usage of new media in the context of the conflict in Syria, tracing back to transformations previously entailed by the anti-authoritarian social movements generally known as "the Arab Spring". It also explores how media usage transformations in times of civil war turned simple users into media activists, and ultimately into war combatants.*

Keywords: *new media, media activists, Syrian conflict, Arab Spring*

1. INTRODUCTION

The new media and the emergence of social networks have definitively transformed and continue to shape the communication process. They enable, more than traditional mass media, an increasing communication range and a new participation structure. Hereby a transition takes place: the sender-receiver model of the previously unilateral information transfer through a medium is replaced by a multilateral, network-like communication structure. The recipients and transmitters have now an almost equal opportunity to use the medium and thus actively contribute to the construction of the message. The new participatory structure, the extended communication range, and the acceleration of the communication process, apart from the lack of supervisory mechanisms and the emergence of fake news, are just a few changes that have occurred with the new media.

Shaping the political communication, the new media and the social networks lead also to a shift in the power relations. Just as the development of the modern mass media at the beginning of the 20th century and the concomitant transformation of communication structures have favored, yet not determined the emergence of totalitarian systems, the power relations have been changed with the emergence of the new media in an opposite direction, towards a democratization of media usage and of the political sphere. However, this growing public participation does not remain without any response from political actors. Authoritarian regimes, in particular, reacted to this by improving their own appearance in the new media, but also by restricting communication options through nationalization and polarization of the traditional mass media. Nonetheless, by changing the participation structure of the (political) communication process, protest cultures and social movements can evolve more easily.

Going a step further to the civil war-like conflicts, one can assume that media is being used as a weapon by all sides. This is not a novelty considering that in the 19th and especially in the 20th century, media – be it newspapers, war painting or war photography, and then newsreels or cinematography – had been used in fact more as an instrument in order to legitimize the war.

The important change occurring in the present is the network-like, interactive participation in the construction of media messages as well as the widespread access of civilians to social networks. What is also new, are the social movements that use media as mobilization and combat tools.

Considering these media transformations, the present paper deals with the changing nature of conflicts, focusing on the Syrian conflict region. Without paying particular attention to the use of media by the state apparatus or political rulers, who continue to adapt to the new conditions and instrumentalize new and old media in order to achieve their own interests, special attention is paid rather to the participation of the civilian population in the war, which actually represents the novelty of the conflict unfolding. This raises the question: what role do the new media play in the Syrian conflict and how do civil media users become war combatants?

In order to provide a better understanding of the civilian war involvement through media, the first section of the paper emphasizes the importance of media already for the emergence and proliferation of social movements during the Arab Spring. The second section of the paper thus focuses on various media usage practices in Syria including those of the activists group called "Raqqa is Being Slaughtered Silently", whose origins and impact have been made more visible to the Western or international public by the acclaimed American documentary "City of Ghosts" (Matthew Heineman, 2017) [11]. Based on this, the paper finally explores the changes and challenges of new media usage by civil journalists during the wartime in Syria.

2. THE NEW MEDIA AND THE PROLIFERATION OF THE ARAB SPRING

The term "Arab Spring" represents mainly the Western perspective upon the anti-authoritarian uprisings in the Middle East, as this social movement which started 2011 in several countries such as Tunisia, Egypt, Bahrain, Libya and Syria was attributed a touch of hope for a possible democratization. Promising in this context were also the new media which changed political communication towards a critical public. Despite or even because the repressive political systems, this critical public sphere slowly developed and culminated in street demonstrations. Considering the limited freedom of expression, the restrictive media policies and the systematic persecution of dissident media activists prior to the revolutionary movement in these countries [7], the upheavals represented a turning point in which new media have been extensively used as instruments of disagreement with the own political regimes. Nevertheless, transformation toward a critical public occurred earlier.

The scientific landscape is also divided over the importance of social media during the Arab Spring. While some scholars extrapolate the role of the new media for anti-authoritarian movements [2, 3, 7, 10], others try to take a more nuanced view, discouraging media determinism [1, 5, 8]. These uprisings neither have occurred due to increasing media consumption, nor have been influenced primarily by social media, but emerged mainly because of the enduring unfavorable social and economic conditions and the serious violations of human rights. However, there is agreement that social media has been used rather to inform the international community about the course of the movement. Individual studies draw attention to the role of new media during the Arab Spring, which should be considered in terms of temporal and spatial progress of social movements, in relation to other, traditional media and also in the cultural context of the Arab society [8].

The studies of Rinke and Röder [8] and Sean Aday [1] are particularly noteworthy firstly, because it provides a broaden communication analysis model of social movements, and secondly, because special emphasis is placed rather on consuming than producing media messages.

Both studies relativize, however, the role of social networks during the Arab Spring, pointing to their interaction with traditional media, mainly with the regional television broadcaster Al Jazeera.

Addressing the use of various media during the events in Egypt, while also considering the cultural context of the Arab region, Rinke and Röder conclude that new media, despite of being generally accessed by younger population segments, were used, in particular, after journalists were barred from accessing Tahrir Square [8]. The only way to continue the movement was to keep public attention to the street demonstrations by sending videos to the regional traditional media. But the most important reason why the movement has not stopped even after the continuing interdiction measures of the Egyptian authorities was, according to the authors, due to the oral Arabic culture, which still relied on rather personal contacts and more direct information practices than media-based communication. This ultimately allowed the movement to be maintained even with lesser support from social media [8).

A slightly different approach, which also emphasizes the intermedial convergence, has been provided by Sean Aday [1]. Comparing more countries such as Tunisia, Egypt, Libya and Bahrain, the study examines the links accessed on Twitter during the first months of the social movement. It has been shown that not only the number of clicks have varied considerably from one country to another, but also that the majority of clicks originated from non-Arab regions. Moreover, much of the links posted on Twitter were related to traditional media articles [1].

Therefore, it can be seen that media convergence was much deeper than expected, and that the sole extrapolation of social media during the Arab Spring would somewhat distort the reality. Because it was not just the rebroadcast of social network messages in the classical, mostly regional or Western media in order to impart unreachable information, but rather the reverse was also the case, and that social media networks had circulated links referring to reports in the classical media in order to create credibility or make transnational events tangible.

Social media were consequently not a trigger, but an instrument of anti-authoritarian demonstrations. They have been used in the uprising along with traditional media and other social practices. Nonetheless, one could conclude that new media did not represented a singular tool for mass mobilization, but they were rather a singular option for the smaller circle of active dissidents or civil journalists both before and during the uprisings. It was the only relative free communication space in which regime criticism could be practiced nationally, distributed regionally and, in particular, could be communicated transnationally to the Western or international community.

3. THE SYRIAN CONFLICT AS A MEDIATIC BATTLEFIELD

The consequences of this social and medial development during the Arab Spring proved to be crucial for the conflict unfolding in Syria. The anti-authoritarian protests in Syria followed the movements during the Arab Spring. Already in March 2011, street demonstrations of the Syrian population against the Bashar al Assad regime were recorded. As in the other countries before, new media has been used for mobilization on the ground but also for informing the general public [2, 9, 10]. Unlike in Tunisia and Egypt, the political demonstrations in Syria proved unsuccessful. Instead, there has been a radicalization of political conditions especially after parts of the country have been occupied by rebel groups and by the expanding Islamic State. The repression of the civilian population by both the Assad regime and the Islamic State has plunged the country into a protracted civil war in which the social media usage for the purpose of political protest has acquired a completely clandestine role.

Consequently, one can now speak less of media as a mobilization tool, but in fact – as Mareike Meis [6] rightly noticed – as a weapon in the struggle for interpretation of the violent events in Syria. In this struggle, each part has adapted and perfected its communication methods and techniques, exposing media usage to an ongoing change.

Since journalists were forbidden access in this region due to the war conditions, the only actors in this media conflict remained the Assad regime having control over the traditional media and the different dissident or anti-regime factions using primarily social media. Lorenzo Trombetta [10] investigates this cyber warfare in the first months of the Syrian revolt, hinting at perfecting "fighting methods" from both sides, which were resorting to combined media usage. While at the beginning of the movement the Syrian authorities blocked access to the online media, a paradigm shift took place in February 2011: all media were admitted, new platforms were created, people were mobilized for street demonstrations and finally the revolt broke out in several cities, which was again brutally crushed by the police. In addition to the propagandistic content in the state-dominated traditional media, Syrian authorities also opened an Internet platform on which the "false reporting" of media activists has been denounced [10]. Trombetta points out that the Assad regime has adapted its methods to the extent that media activists themselves have been counteracted by cyberattacks [10], while the activists in turn sent videos to foreign traditional media, distributed newspapers and pamphlets, so they finally resorted to classical communication methods [10].

Another study carried out later by field research on Syrian border areas and narrative interviews with activists and refugees shows a more grim picture of the conflict and media landscape in Syria. The authors Rohde *et al.* [9] critically address the assumption that social media have played a primary role in Syria, stressing the importance of a deeper contextualization of war conditions in which the media landscape is constantly changing. They also emphasize a turning point in the Syrian media usage: while the initial demonstrations could still be organized on Facebook, social networks such as Facebook, Twitter or even Skype have been completely banned, especially in the rebel controlled regions, or they were used for the persecution of the political opponents [9, p. 529].

"While in case of the shorter Arab uprisings single users were banned from using Internet sources and social media, during the longer-lasting wartime in Syria government, secret services and telecom providers cut off Internet infrastructure for whole cities and regions." [9].

The restriction of Internet access and telephone lines had a significant impact on the unfolding events, as it not only affected and disabled media activists, but also isolated large parts of the Syrian society. Also the Internet cafes, which are very popular in Syria due to the already low Internet penetration, have been put under increased scrutiny, making the dissemination of dissident messages on social networks almost impossible. Facebook was still considered important, but remained for the least an option. While some activists developed different strategies such as using multiple user profiles, including pro-regime profiles, in order to confuse possible controls, others shared a single account or even shared the tasks of video recording, editing, and uploading on Internet platforms [9]. The authors conclude that from all media, the amateur video footage – taken by both perpetrators and witnesses of the atrocities, and distributed among themselves or uploaded to Youtube - was the most widespread instrument of struggle for "documentation, mobilization, and propaganda" in Syria [9].

Therefore, an important aspect of media use as a weapon in the Syrian conflict is that, because of war conditions and limited access to online media, the importance of professional media activists has grown. Another improvement in their work, which in turn points to the continuing shift in media usage during conflict situations, relies on transnational cooperation not only between activists working within Syria and regional or international traditional media, but also between media activists operating inside and outside Syria.

War narratives are thus not only visually created through amateur video footage on Youtube, - to which Mareike Meis [6] already points out -, but also through narrations transmitted to media activists outside Syria and spread further by them.

In this regard, "Raqqa is Being Slaughtered Silently" is probably the most notorious media activist group from Syria, precisely due to its transnational reach, but also because of its appearances in the Western traditional media. Moreover, it has become even more famous with the documentary "City of Ghosts" (2017) produced by the American director Matthew Heineman, considering that the film has been awarded several times and it is still being distributed online by amazon. The film appearance of the activist group can once again be seen as an act of media conflict and a change in the media usage at the same time. Tracing the origins and the activity of this group, one can draw conclusions about media usage practices before and during the Syrian civil war, comparing them with the results of other studies.

During the later stage of the uprising against the Assad regime in March 2012, "Raqqa is Being Slaughtered Silently" (RBSS) initially formed as a small group of activists, led primarily by politically inexperienced students. Professionalization of their media campaigns as a result of internal journalism training and a tightening of their political activities on social networks such as Facebook and Twitter, as well as the transmission of video footage to Arab media, emerged only in summer 2014, after the city of Raqqa has been occupied by the Islamic State. Persecutions, torture and street executions of possible opponents, training of child soldiers, or the abolition of any communication possibilities with the outside world became part of everyday life in Raqqa and made further political activity of the group impossible. Consequently, the political activity has been transnationalized: whereas some group members moved at the Turkish-Syrian border, and others in Germany, a few of these activists remained in Raqqa. A periodic relocation helped these groups not being identified.

Moreover, technical professionalization increased on both sides. While the IS published professionally filmed recruitment campaigns and other threatening video footages on Internet platforms, the RBSS media activists decided to gain more international public attention both online and offline by participating to street demonstrations or information campaigns (in Germany).

Comparing the activities and the media usage of the RBSS activist group with civilian journalists described in previous studies, it can be stated that during the conflict in Syria, the media use has changed several times, and also that the media war, at least in case of RBSS, has been finally transnationalized.

Regarding these transformations, one could draw the following conclusions: firstly, the changes in the social media usage, as well as the alternation of new and old media eventually excludes the widespread assumption that anti-authoritarian movements in the Middle East have been guided primarily by social media. Secondly, the technical improvement permitted the circulation not only of amateur video footages on Internet platforms, but also of professional filmed videos and information campaigns, which finally shaped visual representations and perceptions of the Syrian war. Furthermore, the change of social practices related to the activists´ media usage in conflict periods included among others the distribution of tasks, different online dissimulation strategies as well as periodic relocations.

The fragmentation and transnationalization of media activist groups turned out to be another changing strategy, considering the restricted action on the ground under worsening war conditions. Last but not least, one should also consider the psychological implications of those civilians becoming civil journalists and ultimately war combatants.

4. CONCLUSIONS

The present paper attempted to address the role of new media in the Syrian conflict, raising the question of how simple civilian media users become war combatants.

War and media have always been interrelated, old or new media being primarily used by state actors for propagandistic purposes. The new media introduces a turning point in which the changing communication structure allows each user to create and disseminate messages in the public sphere.

This has profound consequences when it comes to the question of political communication, considering also the increasing potential involvement of civilians.

Taking this media change into account, the paper has shown that new media, far from being similarly used in the Arab countries, have permitted the emergence of a critical public and have had a mobilization and information function during the Arab Spring. However, it has been also emphasized that it was not just the new media that facilitated the emergence of these social movements, but rather a convergence of new and old media.

With the Syrian conflict, the new media reached a new dimension. Under war conditions, restrictive measures prevented widespread Internet usage by civilians and the new media have thus lost their potential mobilization function on the ground. The importance of professional media activists has instead increased, leading eventually to an internationalization of the political struggle. The accelerated transformation of media usage in times of conflict has turned these activists into war combatants, as they have been involved in a "new war" [4] which still continues to prove its chameleonic features.

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MODEL PREDICTIVE CONTROL APPLIED IN UAV FLIGHT PATH TRACKING MISSIONS

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Abstract: *The UAV flight path design often represents the biggest problem ~~of~~ when it comes to the optimization of common meaning, like the minimum energy problem, maneuvers executed the fastest way. The problem of flight path optimization requires some predictions to eliminate or to minimize the probability of collisions in all possible situations, such as the collision of two or more UAVs, a UAV and a manned aircraft, UAVs and static objects, UAVs and flying birds etc. The Model Predictive Control (MPC) is one of the best methods to control selected UAV paths. The goal of the author is to highlight the mathematical backgrounds concerning the MPC problem formulation, based on the receding horizon problem (RHP), and on the Laguerre functions method.*

Keywords: *UAV flight path design, UAV optimal trajectory, receding horizon problem, Laguerre functions.*

1. INTRODUCTION

Unmanned aerial vehicles (UAV) are going to be used in wide variety. The recent history of UAV applications is awash in informative articles describing brand-new UAV applications like urban drone taxis, drones used for sightseeing, rideable by man (hover bike) drones used by police forces and military squads. UAV applications in urban areas are generating a set of new challenges designers must answer and solve.

As a first challenge, if the UAV is integrated into national airspace management, is to be able to design a flight path ensuring flight safety at the same (or higher) level as compared to manned aviation. Due to the limited amount of electrical energy stored into the batteries, the flight path of the UAV must be optimized in a few ways; for instance, the flight time must be maximized whilst the energy required for a given maneuver has to be minimized and the entire flight must be planned.

The model predictive control may provide solutions for these problems related to UAV flight path design famous for optimization with constraints. The optimal control law being constrained will steer UAV from the initial equilibrium set point to the next equilibrium flight regime minimizing a pre-chosen integral performance index, say, the closed loop cost function.

Basic idea of the MPC can be formulated using receding horizon problem, which is a common and widely used formulation in control theory. The competing method to the receding horizon problem is the optimal control formulation, which has many advantages to those problems solved using RHP.

2. RELEVANT REFERENCES AND PRELIMINARIES

The pioneering work of Löfberg deals with MPC design problem formulation and with its solution for constrained systems using LMI method [1].

The early works of Seeborg et al. formulates basic idea of the receding horizon problem, and many applications are available to highlight importance of the topic of MPC control system design [2, 13]. In [3] preliminary design of the UAV longitudinal controller was introduced, in [5] the important topic of the redundancy of the UAV is investigated. The UAV spatial motion automation based upon model predictive control in different flight scenarios is thoroughly examined in [4]. The evolution of the UAVs is deeply analyzed in [7], and its military application in integrated air defense systems is examined in [6]. In [8] the MPC is introduced for vehicle control, for traction control, for power systems, and for product planning as well. This paper will demonstrate a numerical example based on [9], and [10]. The UAV continuous dynamic system MPC design will be conducted with pre-chosen design parameters [11, 12]. UAV and UAS innovative solutions are deeply examined in [17], and UAV launch system is discussed in [18].

3. FUNDAMENTALS OF THE MODEL PREDICTIVE CONTROL

The general idea of the MPC and its main objectives have been formulated by Seeborg et al. as follows [2]:

– prevent violations of control input and predicted output constraints;

– drive process output to their optimal set points maintaining remaining process outputs within specified ranges;

– prevent aggressive changes of the input variables;

– control maximum number of the process variables when the sensor or the actuator are not available in the closed loop control systems.

The MPC system is very suitable for solution of the constrained MIMO control problems, which is typical for many UAV types. The MPC system block diagram can be seen in Fig. 1. [4].

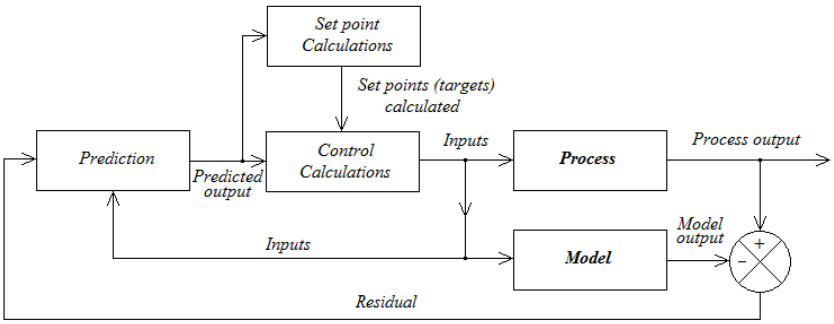


FIG. 1. Block Diagram of the MPC.

The process model is used to predict the current values of the output variables. The differences called residuals measured between process outputs and model outputs used as feedback signal to the prediction block, which is also subjected to the input signals. At every sampling time, two types of calculations, namely the set-point calculations and control calculations are performed. During either calculation inequality constraints like lower and/or upper limits are set upon output variables.

Control calculations lead to inputs subjected to both process and model paths. The set-points (targets) are calculated leaning on well-known optimization criteria of the cost minimization. Worth to mention, that in industrial applications targets (set-points) are calculated using economic optimization procedures of the production rate maximization, or, as a rule of the profit maximization.

The optimum values of the targets will change due to varying process conditions (e.g. noises, parameter variations, system uncertainties, changes in inequality bounds, etc.). The constraints of the output variables change due to varying process conditions, equipment and instrumentation. In MPC systems set-points (targets) are re-calculated each time when the control calculations are performed. All two types of the calculations are based upon current measurements and the predicted (future) value of the process outputs.

The main goal of the MPC control calculations is to determine the control inputs required to drive predicted process outputs to its optimal targets.

4. MATHEMATICAL FORMULATION OF THE RECEDING HORIZON CONCEPT

Behind the basic concept of the MPC is the idea of the receding horizon [1, 2, 4, 8, 11, 12, 13], which is illustrated in Fig. 2.

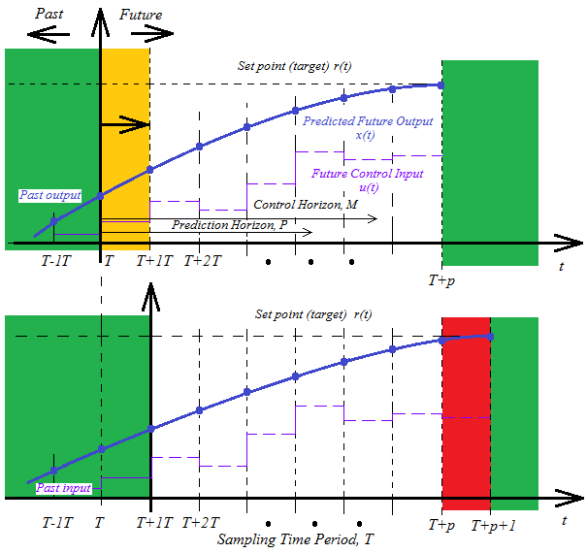


FIG. 2. Basic Concept of the MPC.

The MPC problem is mostly formulated for discrete time systems. At any initial discrete time of the sampling, say, $t=T$, the predicted *process* output is calculated using the internal *model* response. This calculation is performed for the entire range of the of the prediction horizon of p. Leaning on process predicted outputs and model outputs at time '$t=T+p$' control effort needed to minimize system error (residuals) is calculated to drive process to follow the optimal reference trajectory. First step in this concept is: at time '$t=T+1T$' the calculated control input is executed. At the same time, the process output is measured, and compared with the internal model outputs. Based upon the residuals (errors) the new predicted future output is calculated for the new horizon of '$t=T+2T$', till the discrete time of '$t=T+p+1$' on the horizon, p.

This means that prediction horizon keeps to be shifted, at every time, p seconds ahead of the current time, t.

In spite of being interested in discrete time models, continuous time MPC models using orthonormal functions are also interested due to their reduced required computer power needed for calculations [4].

This article will lean upon continuous time models used to calculate process outputs and desired optimal control trajectory.

However, execution of the algorithm proposed will use discrete time settings that for a pre-defined time step the control effort is executed before the next optimization step is made [2, 4, 8, 11, 12, 13].

5. MPC OPTIMAL CONTROL PROBLEM FORMULATION

The MPC problem is formulated for the multivariable dynamic system. The process (plant) behavior is described by the following nonlinear equation [2, 4]:

$$\dot{\boldsymbol{x}} = \boldsymbol{f}(\boldsymbol{x}, \boldsymbol{u}, t) \tag{1}$$

The model outputs are calculated up to the horizon time $t=p$, which represents a terminal point of the calculations. Let us set the control objective as: minimize a cost function of the form as given below:

$$\boldsymbol{V}(\boldsymbol{x}, \boldsymbol{u}, t) = \int_o^p \boldsymbol{l}(\boldsymbol{x}(t), \boldsymbol{u}(t), t)dt + \boldsymbol{F}\big(\boldsymbol{x}(p)\big), \tag{2}$$

where $\boldsymbol{l}(\boldsymbol{x}(t), \boldsymbol{u}(t), t) \geq 0$, and $\boldsymbol{F}\big(\boldsymbol{x}(p)\big)$ is the terminal state weighting at $t=T+p$, and, control input $u(t)$ is subjected to some constraint of $\boldsymbol{u}(t) \in \boldsymbol{U}$. The formulation of the control problem based upon Eqs (1) and (2) is a very general one, and, proper choice of functions $\boldsymbol{f}$, $\boldsymbol{F}$ and $\boldsymbol{l}$ can lead to very common representations of sensible problems.

Solution of the (2) cost function minimization problem requires solution of the partial differential equation formulated below:

$$\frac{\partial}{\partial t}\boldsymbol{V}^0(\boldsymbol{x}, t) = min_{u \in U}\boldsymbol{H}(\boldsymbol{x}, \boldsymbol{u}, \frac{\partial}{\partial t}\boldsymbol{V}^0(\boldsymbol{x}, t)) \tag{3}$$

In Eq (3): $\boldsymbol{H}(\boldsymbol{x}, \boldsymbol{u}, \lambda) = \boldsymbol{l}(\boldsymbol{x}, \boldsymbol{u}) + \lambda \boldsymbol{f}(\boldsymbol{x}, \boldsymbol{u})$ is the Hamiltonian function with the boundary condition of $\boldsymbol{V}(\boldsymbol{x}, \boldsymbol{p}) = \boldsymbol{F}(\boldsymbol{x}(p))$, and, λ is the Lagrange multiplier. Eq (3) represents the well-known Hamilton-Bellman-Jacobi equation. So as to be able to solve Eq (3) some assumptions needed and must be introduced. Further we will assume that the plant (process) is a linear one so that function $\boldsymbol{f(x(t),u(t),t)}$ will gain special form of:

$$\dot{\boldsymbol{x}} = \boldsymbol{A}(t)\boldsymbol{x}(t) + \boldsymbol{B}(t)\boldsymbol{u}(t), \tag{4}$$

which represents the MIMO time varying system state equation [2, 4]. Functions $\boldsymbol{l}$ and $\boldsymbol{F}$ will have quadratic form as follows below [2, 4, 13]:

$$\left.\begin{aligned} \boldsymbol{l}(\boldsymbol{x}(t), \boldsymbol{u}(t), t) &= \boldsymbol{x}^T(t)\boldsymbol{Q}(t)\boldsymbol{x}(t) + \boldsymbol{u}^T(t)\boldsymbol{R}(t)\boldsymbol{u}(t) \\ \boldsymbol{F}\big(\boldsymbol{x}(p)\big) &= \boldsymbol{x}^T(p)\boldsymbol{S}(t)\boldsymbol{x}(p) \end{aligned}\right\} \tag{5}$$

In eq (5): $\boldsymbol{Q}(t) \geq 0$, $\boldsymbol{S}(t) \geq 0$, $\boldsymbol{R}(t) > 0$ are square weighting matrices. These conditions will drive to a special case when the Hamilton-Bellman-Jacobi equation simplifies to the ordinary differential equation (ODE) of Ricatti.

The Hamilton-Bellman-Jacobi equation also can be solved if to introduce:

$$V^0(x, t) = x^T(t)P(t)x(\mathrm{t}), \ \ \boldsymbol{where} \ \ P(t) = P^T(t) - \text{cost matrix.} \tag{6}$$

Then, the Hamilton-Bellman-Jacobi equation may be rewritten as given below:

$$\left.\begin{aligned} -\dot{\boldsymbol{P}}(t) &= \boldsymbol{P}(t)\boldsymbol{A}(t) + \boldsymbol{A}^T(t)\boldsymbol{P}(t) + \boldsymbol{Q}(t) - \boldsymbol{P}(t)\boldsymbol{B}(t)\boldsymbol{R}^{-1}(t)\boldsymbol{B}^T(t)\boldsymbol{P}(t) \\ \boldsymbol{P}(p) &= \boldsymbol{S} \end{aligned}\right\} \tag{7}$$

Eq (7) can be solved and it leads to a linear time-varying feedback control law:

$$\boldsymbol{u}(t) = \boldsymbol{F}(t)\boldsymbol{x}(t), \tag{8}$$

where $\boldsymbol{F}(t)$ stands for the state feedback gain matrix, depending on $\boldsymbol{P}(t)$, which is the solution of the Ricatti equation (7):

$$\boldsymbol{F}(t) = \boldsymbol{R}^{-1}(t)\boldsymbol{B}^{T}(t)\boldsymbol{P}(t) \tag{9}$$

Difficulties related to solution of Eq (7) can be eliminated using candidate method of using orthonormal functions for continuous time MPC design.

6. CONTINUOUS TIME MPC DESIGN BASED ON ORTHONORMAL FUNCTIONS

The design technique based on orthonormal functions and presented by [2, 4] can be used as an alternative one to the classical receding horizon control solution requiring solution of the Ricatti ODE. Future prediction is calculated in an analytical form, the required control trajectory is calculated using a pre-chosen set of orthonormal basis functions. This technique basically has been developed for the continuous time systems, however, it can be extended to the discrete time systems, and, expected to be extended to nonlinear systems, too. In [4] Laguerre orthonormal functions are used and proposed to reduce complexity of the performance specification process. The uniqueness of this procedure is that problem of finding optimal control signals required is turned into the finding a set of coefficients for the Laguerre model. This technique reduces the number of required parameters in the calculations, and, has important advantage when it is used in on-line environment.

6.1 Defining control trajectory. It is well-known that any arbitrary function *f(t)* can be expanded into formal expansion analogue to that of the Fourier expansion. Any arbitrary function *f(t)* can be expressed in the following series expansion:

$$f(t) = \sum_{i=1}^{\infty} \xi_i \, l_i(t) \text{ , } i=1,2,3 \ldots \tag{10}$$

where ξ_i are coefficients of the orthonormal functions $l_i(t)$ satisfying following conditions:

$$\int_0^{\infty} l_i^2(t)\, dt = 1; \; \int_0^{\infty} l_i(t)\, l_j(t) dt = 0; \quad \forall i \neq j \tag{11}$$

Secondly, assuming that *f(t)* represents a piece-wise continuous function satisfying

$$\int_0^{\infty} f^2(t)\, dt < \infty, \tag{12}$$

then for any $\varepsilon > 0$ over the time range of $0 \leq t \leq \infty$ there is an existing finite integer of *N* such that for all $k \geq N$

$$\int_0^{\infty} (f(t) - \sum_{i=1}^{k} \xi_i \, l_i(t))^2 \, dt < \varepsilon \tag{13}$$

In other words, the truncated expansion of $\sum_{i=1}^{N} \xi_i \, l_i(t)$ is used to closely approximate any arbitrary function *f(t)*. One famous set of the orthonormal functions used frequently is a set of the Laguerre functions important to engineers because of simple Laplace transforms of the $l_i(t)$, i.e.:

$$\int_0^{\infty} \, l_i(t) e^{-st} \, dt = \sqrt{2p} \, \frac{(s-p)^{i-1}}{(s+p)^{i}}, \tag{14}$$

In Eq (14) $p > 0$ and called scaling factor. From Eq (14) a differential equation satisfying Laguerre functions can be derived. Let:

$$\left.\begin{aligned}\boldsymbol{L}(t) &= [l_1(t) \quad l_2(t) \quad \cdots \quad l_N(t)]^T \\ \boldsymbol{L}(0) &= \sqrt{2p}[1 \quad 1 \quad \cdots \quad 1]^T\end{aligned}\right\} \tag{15}$$

The Laguerre functions will satisfy the differential equation given below:

$$\dot{\boldsymbol{L}}(t) = \boldsymbol{A}_p \boldsymbol{L}(t);\ \boldsymbol{A}_p = \begin{bmatrix} -p & 0 & \cdots & 0 \\ -2p & -p & \cdots & 0 \\ \vdots & \cdots & \ddots & \vdots \\ -2p & \cdots & -2p & -p \end{bmatrix} \tag{16}$$

The solution of the differential equation (16) represents the Laguerre functions in the following matrix exponential function:

$$\boldsymbol{L}(t) = e^{\boldsymbol{A}_p t}\boldsymbol{L}(0) \tag{17}$$

For LTI systems when the closed loop control system is the stable one, after the transient response period the control signal calculated for the given set-point will exponentially converge to a given constant. Leaning on this, in the receding horizon control design problem solution the future control input signal calculated for each moving window will be invariant one, in other words, $\dot{\boldsymbol{u}}(t) = 0$ for each horizon window of $T_i \le t \le T_i + p$. Easy to see that:

$$\int_{T_i}^{T_i+p} \dot{\boldsymbol{u}}^2(t)dt < \infty \tag{18}$$

The derivative of the future control input signal can be determined using following Laguerre function representing series expansion as given below:

$$\dot{\boldsymbol{u}}(t) = \sum_{i=1}^{\infty} \xi_i\, l_i(t) = \boldsymbol{L}^T(t)\boldsymbol{\eta} \tag{19}$$

In Eq (19): $\boldsymbol{\eta} = [\xi_1 \quad \xi_2 \quad \cdots \quad \xi_N]^T$ column vector of the coefficients of the orthonormal functions $l_i(t)$ used to express expansion of $\dot{\boldsymbol{u}}(t)$.

6.2 Predicted process (plant) output. The dynamic plant to be controlled is assumed to be a MIMO system with control inputs ***u(t)*** of dimension *r*, and outputs ***y(t)*** of the dimension of *q*.

To gain realistic environment in which MPC control problem is being solved, the plant is subjected to external disturbances ***w(t)*** (e.g. atmospheric turbulences, air temperature changes, air density changes, air pressure changes etc.), and measurement process is a noisy one, outputs are disturbed with sensor noises ***n(t)***.

It is supposed that $\dot{\boldsymbol{w}}(t)$ and $\dot{\boldsymbol{n}}(t)$ are continuous time uncorrelated white noise processes with zero means, thus we have [4]:

$$\begin{aligned} &E\left\{\frac{d\boldsymbol{w}(t)}{dt}\right\} = 0\ ;\ E\left\{\frac{d\boldsymbol{n}(t)}{dt}\right\} = 0; \\ &E\left\{\frac{d\boldsymbol{w}(t)}{dt}\frac{d\boldsymbol{w}^T(\tau)}{d\tau}\right\} = W_w\delta(t-\tau);\ E\left\{\frac{d\boldsymbol{n}(t)}{dt}\frac{d\boldsymbol{n}^T(\tau)}{d\tau}\right\} = R_n\delta(t-\tau)\end{aligned} \tag{20}$$

In Eq (20): $E\{\ \ \}$ stands for expected value, $\delta(\ \ )$ is the Dirac function, W_w and R_n are disturbance and noise intensities, respectively.

So we have the LTI MIMO system model in the following standard matrix form [2, 4]:

$$\left.\begin{aligned}\dot{\boldsymbol{x}}(t) &= \boldsymbol{A}\boldsymbol{x}(t) + \boldsymbol{B}\boldsymbol{u}(t) + \boldsymbol{w}(t) \\ \boldsymbol{y}(t) &= \boldsymbol{C}\boldsymbol{x}(t) + \boldsymbol{D}\boldsymbol{u}(t) + \boldsymbol{n}(t)\end{aligned}\right\} \tag{21}$$

Let us introduce a new variable of the form: $\boldsymbol{z}(t) = \dot{\boldsymbol{x}}(t)$. We have now:

$$\dot{\boldsymbol{z}}(t) = \ddot{\boldsymbol{x}}(t) = \frac{d}{dt}\{\boldsymbol{A}\boldsymbol{x}(t) + \boldsymbol{B}\boldsymbol{u}(t) + \boldsymbol{w}(t)\} \tag{22}$$

Using Eq (22) the dynamic system state equation (21) can be re-formulated in the following augmented form:

$$\left.\begin{aligned}\dot{\boldsymbol{z}}(t) = \ddot{\boldsymbol{x}}(t) = \boldsymbol{A}_a\boldsymbol{X}(t) + \boldsymbol{B}_a\dot{\boldsymbol{u}}(t) + \begin{bmatrix}\dot{\boldsymbol{w}}(t)\\ \dot{\boldsymbol{n}}(t)\end{bmatrix}\\ \boldsymbol{y}(t) = \boldsymbol{C}_a\boldsymbol{X}(t)\end{aligned}\right\} \tag{23}$$

In Eq (23):

$$\boldsymbol{X}(t) = \begin{bmatrix}\boldsymbol{z}(t)\\ \boldsymbol{y}(t)\end{bmatrix};\ \boldsymbol{A}_a = \begin{bmatrix}\boldsymbol{A} & 0\\ \boldsymbol{C} & 0\end{bmatrix};\ \boldsymbol{B}_a = \begin{bmatrix}\boldsymbol{B}\\ \boldsymbol{D}\end{bmatrix};\ \boldsymbol{C}_a = [0 \quad \boldsymbol{I}]; \tag{24}$$

In Eq (24): $\boldsymbol{I}$ is an identity matrix of dimensions of $q \times q$. Worth to mention that in the augmented MIMO system state equation (23) the control input is the first derivative $\dot{\boldsymbol{u}}(t)$ taken by time from control input ***u(t)***, while the system output $\boldsymbol{y}(t)$ remains the same vector, and, the augmented dynamic system represented by Eq (23) is observable and controllable.

Due to special features of the random external and internal disturbances described above the expected effects from them in the future predictions are assumed to be zero. It is supposed that an observer is used to determine plant disturbance ***w(t)*** and measurement noise ***n(t)***, and their amplitudes are not magnified due to explicit derivations in Eq (23). Regarding this property further considerations of disturbance ***w(t)*** and measurement noise ***n(t)*** are neglected.

It is assumed that any current time of sampling $t = T_i$ the state variable of the augmented system $\boldsymbol{X}(T_i)$ is available. At any future time $t = T_i + T$ the predicted augmented state variable $\boldsymbol{X}(T_i + T)$, with no expected effects from plant disturbance ***w(t)*** and measurement noise ***n(t)*** in the future predictions, can be described with following equation [2, 4]:

$$\begin{aligned}&\boldsymbol{X}(T_i + T) = e^{\boldsymbol{A}T_i}\boldsymbol{X}(T_i) + \int_{T_i}^{T_i+T} e^{\boldsymbol{A}(T_i+T-\beta)}\,\boldsymbol{B}\dot{\boldsymbol{u}}(\beta)d\beta =\\ &= e^{\boldsymbol{A}T_i}\boldsymbol{X}(T_i) + \int_{0}^{T_i} e^{\boldsymbol{A}(T_i-\gamma)}\,\boldsymbol{B}\dot{\boldsymbol{u}}(T_i+\gamma)d\gamma\end{aligned} \tag{25}$$

The projected future control trajectory of $\dot{\boldsymbol{u}}(t)$ can be expressed in the form given below:

$$\dot{\boldsymbol{u}}(t) = [\dot{u}_1(t) \quad \dot{u}_2(t) \quad \dots \quad \dot{u}_r(t)]^T \tag{26}$$

The input matrix of the dynamic MIMO system (21) is as follows:

$$\boldsymbol{B} = [B_1 \quad B_2 \quad \dots \quad B_r] \tag{27}$$

In Eq (27): B_i is the *i*-th column of the input matrix $\boldsymbol{B}$. The *i*-th control signal of Eq (26) $\dot{u}_i(t)$ $(i = 1, 2, 3, \dots, r)$ can be represented using following formula:

$$\dot{u}_i(t) \cong \boldsymbol{L}_i^T(t)\boldsymbol{\eta}_i \tag{28}$$

In Eq (28):

$\boldsymbol{L}_i^T(t) = \left[l_1^i(t) \quad l_2^i(t) \quad \dots \quad l_{N_i}^i(t)\right]$; $\boldsymbol{\eta}_i^T(t) = \left[\eta_1^i(t) \quad \eta_2^i(t) \quad \dots \quad \eta_{N_i}^i(t)\right]$, and N_i is pre-chosen. The predicted augmented state $\boldsymbol{X}(T_i + T)$ at $t = T_i + T$ is as follows:

$$\boldsymbol{X}(T_i+T)=e^{\boldsymbol{A}T_i}\boldsymbol{X}(T_i)+\int_0^{T_i}e^{\boldsymbol{A}(T_i-\gamma)}[B_1L_1^T(\gamma)\quad B_2L_2^T(\gamma)\quad\ldots\quad B_rL_r^T(\gamma)]\,\boldsymbol{\eta}\,d\gamma \tag{29}$$

In Eq (29) coefficient vector $\boldsymbol{\eta}^T=[\eta_1\quad\eta_2\quad\cdots\quad\eta_r]$ has dimension of $\sum_{i=1}^{r}N_i$. The predicted output of the plant can be determined as:

$$\boldsymbol{y}(T_i+T)=\boldsymbol{C}\boldsymbol{X}(T_i+T) \tag{30}$$

Solution of Eq (29) represents the convolution operation requiring solution of $(n+q)\times\sum_{i=1}^{r}N_i$ integral equation, which means a huge computation load needed for calculations. To minimize that load integral equations can be solved numerically using their finite sum approximations. An analytical solution can be found to the convolution integral corresponding to the *i*-th input [4]:

$$\boldsymbol{I_{int}}(T_i)^i=\int_0^{T_i}e^{\boldsymbol{A}(T_i-\gamma)}B_iL_i^T(\gamma)\,d\gamma \tag{31}$$

In Eq (31) $\boldsymbol{I_{int}}(T_i)^i$ represents a matrix with dimensions of $(n+q)\times N_i$. Substituting eq (31) into Eq (29) shows that the future prediction of the plant output trajectory can be expressed in terms of convolution integral of (31), if to suppose that $1\le i\le r$. In this case matrix $\boldsymbol{I_{int}}(T_i)^i$ can be derived as follows:

$$\boldsymbol{A}\boldsymbol{I_{int}}(T_i)-\boldsymbol{I_{int}}(T_i)\boldsymbol{A}_p^T=-\boldsymbol{B}\boldsymbol{L}^T(T_i)+e^{\boldsymbol{A}T_i}\boldsymbol{B}\boldsymbol{L}^T(0) \tag{32}$$

Obtaining matrices of $\boldsymbol{I_{int}}(T_i)^i$ for $i=1,2,3,\ldots,r$ the future prediction of $\boldsymbol{X}(T_i+T)$ can be determined. Finally, leaning on Eq (30) the predicted plant output also can be calculated.

6.3 Dynamic optimal control of MPC Systems. In MPC of UAVs the cost function is applied for optimization (minimization). Supposing that future set-points $\boldsymbol{r}(T_i+T)=[r_1(T_i+T)\quad r_2(T_i+T)\quad\ldots\quad r_q(T_i+T)]$ are available for prediction horizon of $0\le T_i\le T+p$. The common goal of the MPC is to find optimal control input vector driving the predicted plant output $\boldsymbol{x}(T_i+T)$ as close as possible (in the least square meaning) to the future set point of the $\boldsymbol{r}(T_i+T)$, i.e. error $\boldsymbol{e}(T_i+T)=\boldsymbol{r}(T_i+T)-\boldsymbol{y}(T_i+T)$ measured between predicted output and set point must be minimized. In this case, the integral performance index used for optimal control law synthesis can be derived as follows [2, 4]:

$$J=\int_0^{T_p}\{[r(T_i+T)-y(T_i+T)]^T\boldsymbol{Q}[r(T_i+T)-y(T_i+T)]+\dot{u}^T(T)\boldsymbol{R}u(T)\}\rightarrow Min \tag{33}$$

In Eq (33) $\boldsymbol{Q}$ and $\boldsymbol{R}$ are symmetric weighting matrices with $\boldsymbol{Q}>0$ and $\boldsymbol{R}\ge 0$ selected proper way, i.e. Bryson's Rule, or principle of unit weighting, or finally, heuristic setting of the weighting matrices can be used.

In some cases, so as to simplify and minimize workload on the selection of the weighting matrices $\boldsymbol{Q}$ is set to the identity matrix $\boldsymbol{I}$, and $\boldsymbol{R}$ is set to zero. Regarding [4] the MPC performance dominantly depends of p (poles of the Laguerre functions) and N (number of orthonormal functions). In other words, selection of weights of $\boldsymbol{Q}$ and $\boldsymbol{R}$ is not necessary to archive.

It is well-known that cost function can be re-written as function of η instead of $y(T_i+T)$. With the assumption that UAV reference trajectory $r(t)$ would not change within the prediction horizon of $T+p$ the quadratic integral performance index (cost function) can be expressed as:

$$J = \boldsymbol{\eta}^T \prod \boldsymbol{\eta} - 2\boldsymbol{\eta}^T\{\boldsymbol{\Psi}_1 \boldsymbol{r}(T) - \boldsymbol{\Psi}_2 \boldsymbol{X}(T)\} + \int_0^{T_p} \boldsymbol{w}^T(T_i + T)\boldsymbol{Q}\boldsymbol{w}(T_i + T)dT \rightarrow Min \tag{34}$$

In Eq(34):

$$\prod \quad = \int_0^{T_p} \boldsymbol{\phi}(T_i)\boldsymbol{Q}\boldsymbol{\phi}^T(T_i)dT + \bar{\boldsymbol{R}} \tag{35}$$

$$\boldsymbol{\Psi}_1 = \int_0^{T_p} \boldsymbol{\phi}(T_i)\boldsymbol{Q}dT \tag{36}$$

$$\boldsymbol{\Psi}_2 = \int_0^{T_p} \boldsymbol{\phi}(T_i)\boldsymbol{Q}\boldsymbol{C}\boldsymbol{e}^{\boldsymbol{A}T}dT \tag{37}$$

$$\bar{\mathbf{R}} = diag(\lambda_i \boldsymbol{I}_{N_i \times N_i}) \tag{38}$$

In Eq(38): λ_i are eigenvalues of the extended system matrix $\boldsymbol{A}$, and $\boldsymbol{I}_{N_i \times N_i}$ is an identity matrix of the dimensions of $N_i \times N_i$.

The minimum of the cost function (34) with no hard constraints on any variables can be determined using the least squares technique [4]:

$$\boldsymbol{\eta} = \prod^{-1}\{\boldsymbol{\Psi}_1 \boldsymbol{r}(T) - \boldsymbol{\Psi}_2 \boldsymbol{X}(T)\} \tag{39}$$

The derivative of the control input can be determined as:

$$\dot{\boldsymbol{u}}(T) = \begin{bmatrix} L_1^T(0) & 0 & \dots & 0 \\ 0 & L_2^T(0) & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & L_r^T(0) \end{bmatrix} \prod^{-1}\{\boldsymbol{\Psi}_1 \boldsymbol{r}(T) - \boldsymbol{\Psi}_2 \boldsymbol{X}(T)\} \tag{40}$$

Integrating Eq(40) yields to:

$$\boldsymbol{u}(t) = \int_0^t \dot{\boldsymbol{u}}(T)dT \tag{41}$$

The continuous time MPC systems closed loop stability might be ensured by adding some weighting to the system terminal state in cost function of (35). The integral performance index (cost function) is a quadratic function, and hard constraints can be put easily to the system predicted output $\boldsymbol{x}(t)$, to the first derivative of the control input $\dot{\boldsymbol{u}}(T)$, and, finally to the control input $\boldsymbol{u}(t)$ required.

To form a set of inequality constraints needed to solve quadratic optimization problem of the cost function (35) requires discretization of the trajectories. Let us set bounds on derivative of the control input as follows:

$$\dot{\boldsymbol{u}}_{low}(T_i + T) \leq \begin{bmatrix} L_1^T(T_i) & 0 & \dots & 0 \\ 0 & L_2^T(T_i) & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & L_r^T(T_i) \end{bmatrix} \eta \leq \dot{\boldsymbol{u}}_{high}(T_i + T) \tag{42}$$

Eq (42) denotes the set of linear inequality equations. In Eq (42) $T_i, i = 1,2,3, \dots$ denotes future time instants at which limits on $\dot{\boldsymbol{u}}(T)$ are imposed. Since $\boldsymbol{L}_k(T); k = 1,2,3, \dots, r$ are exponential functions guaranteeing exponential decay of $\dot{\boldsymbol{u}}(T_i + T)$, it is necessary to set constraints only on the initial stage of the prediction horizon *p*, which can reduce number of the constraints required.

Constraints set on the control signal, the system predicted output variables and system states can be determined as follows below [1, 2, 4]:

$$u_{low}(T_i+T) \le \begin{bmatrix} \int_0^{T_i} L_1^T(\gamma)\,d\gamma & 0 & \dots & 0 \\ 0 & \int_0^{T_i} L_2^T(\gamma)\,d\gamma & \dots & 0 \\ & & \ddots & \vdots \\ \vdots & \vdots & & \int_0^{T_i} L_r^T(\gamma)\,d\gamma \\ 0 & 0 & \dots & \end{bmatrix} \boldsymbol{\eta} + \boldsymbol{u}(T_i - T) \le u_{high}(T_i+T) \tag{43}$$

where $\boldsymbol{u}(T_i - T)$ is the previous control signal. Regarding experiences gained from computer simulations with pre-chosen *p* and *N* we have:

$$\int_0^{T_i} L_k(\gamma)\,d\gamma = \left[\boldsymbol{A}_p^{-1}\left(e^{\boldsymbol{A}_p T_i} - \boldsymbol{I}\right)\boldsymbol{L}(0)\right]^T \tag{44}$$

where $\boldsymbol{A}_p$ is defined by Eq (16). For a given set of time instants of T_i equation (43) yield to the set of linear inequality constraints on control input signal, say:

$$\begin{aligned} u_{low}(T_i+T) \le e^{\boldsymbol{A}_p T_i} + [\boldsymbol{I}_{int}^1(T_i) \quad \boldsymbol{I}_{int}^2(T_i) \quad \dots \quad \boldsymbol{I}_{int}^r(T_i)]\eta \\ \le u_{high}(T_i+T) \end{aligned} \tag{45}$$

And so we have predicted output of:

$$\begin{aligned} x_{low}(T_i+T) \le e^{\boldsymbol{A}_p T_i} + [\boldsymbol{I}_{int}^1(T_i) \quad \boldsymbol{I}_{int}^2(T_i) \quad \dots \quad \boldsymbol{I}_{int}^r(T_i)]\eta \\ \le x_{high}(T_i+T) \end{aligned} \tag{46}$$

The procedure described above assumed that all the states at any sampling time of T_i are known. Many cases, due to any reasons, it is impossible to measure all the states of the plant to be controlled, i.e. the state estimation is required to estimate state variables of $x(T_i)$. In this case, the continuous time MPC control system will have following estimator equation [1, 2, 4]:

$$\dot{\hat{\boldsymbol{x}}}(t) = \boldsymbol{A}\hat{\boldsymbol{x}}(t) + \boldsymbol{B}\dot{\boldsymbol{u}}(t) + \boldsymbol{J}_{\boldsymbol{obs}}[\boldsymbol{y}(t) - \boldsymbol{C}\hat{\boldsymbol{x}}(t)] \tag{47}$$

In Eq (47) $\hat{\boldsymbol{x}}(t)$ is estimated value of $\boldsymbol{x}(t)$, and, $\boldsymbol{J}_{\boldsymbol{obs}}$ is the observer gain matrix calculated recursively, and off-line, i.e. no direct need of solution of Ricatti equation. Derivative of the control input $\dot{\boldsymbol{u}}(t)$ can be determined from the optimal solution of the MPC strategy.

The observer can be designed using the static Kalman-filter standard technique. Supposing that the UAV spatial motion model (**A**,**B**,**C**,**D**) is completely controllable and observable, gain matrix of $\boldsymbol{J}_{\boldsymbol{obs}}$ can be chosen such that the error of the estimation of $\boldsymbol{e}(t) = \boldsymbol{x}(t) - \hat{\boldsymbol{x}}(t)$ will decay exponentially at any desired rate and at any desired time. Worth to mention that the observer static gain matrix of $\boldsymbol{J}_{\boldsymbol{obs}}$ is often limited due to existence of such measurement noises [1, 2, 4, 11, 12].

7. CONTROL LAW SYNTHESIS FOR UAV SISO MPC SYSTEM

In general, small UAV dynamics is considered for rigid body, linear model expressed either in MIMO (state space model), or in SISO (transfer function) forms. For further discussion of MPC control of small UAVs, the aerodynamic model of the lateral motion of the fixed-winged Trainer-60 SUAV was used is as follows [9]:

$$\dot{\boldsymbol{x}} = \boldsymbol{Ax} + \boldsymbol{Bu} = \begin{bmatrix} \dot{v} \\ \dot{p} \\ \dot{r} \\ \dot{\phi} \end{bmatrix} = \begin{bmatrix} -0{,}7724 & 0 & -18{,}9671 & 9{,}0867 \\ 1{,}9247 & -19{,}9149 & 7{,}7565 & 0 \\ 69{,}1314 & -23{,}8689 & -2{,}5966 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} v \\ p \\ r \\ \phi \end{bmatrix} + \\ + \begin{bmatrix} 0 & 2{,}2582 \\ -23{,}8289 & 1{,}5015 \\ -11{,}7532 & -15{,}2855 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} \delta_a \\ \delta_r \end{bmatrix}. \tag{48}$$

In Eq (48): v is the lateral translational speed, p is the roll rate, r is the yaw rate, ϕ is the roll angle position, δ_a is the angular deflection of the ailerons, and, finally, δ_r is the change in rudder angular position.

In [9] the UAV lateral motion dynamic model was reduced to that of the short period motion dynamic model, i.e.:

$$\dot{\boldsymbol{x}} = \boldsymbol{Ax} + \boldsymbol{Bu} = \begin{bmatrix} \dot{p} \\ \dot{\phi} \end{bmatrix} = \begin{bmatrix} -19,9149 & 0 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} p \\ \phi \end{bmatrix} + \begin{bmatrix} -23{,}8289 \\ 0 \end{bmatrix} \delta_a \tag{49}$$

The UAV spatial motion represented by Eq (49) is often subjected to some plant disturbance. Leaning on these conditions, the control free UAV can be represented as follows:

$$\dot{\boldsymbol{x}} = \boldsymbol{Ax} + \boldsymbol{Bu} = \begin{bmatrix} \dot{p} \\ \dot{\phi} \end{bmatrix} = \begin{bmatrix} -19,9149 & 0 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} p \\ \phi \end{bmatrix} + \begin{bmatrix} -23{,}8289 \\ 0 \end{bmatrix} \delta_a + Y_d d \tag{50}$$

The control free UAV model given by Eq (50) can represented with its Laplacian model, and the block diagram was constructed and it is depicted in Fig. 3.

From Fig. 3. it is easily can be seen that the UAV lateral short period motion model is the SISO one. The plant disturbance filter transfer function is as follows below:

$$Y_d(s) = \frac{0{,}1}{0{,}01s+1} \tag{51}$$

From Fig. 3. the UAV roll rate dynamic model subjected to the plant disturbance (default) can be derived as it is given below:

$$p_n(s) = \frac{A}{1+sT}\delta_a(s) + Y_d(s)D(s) = \frac{1{,}1965}{0{,}0502s+1}\delta_a(s) + \frac{0{,}1}{0{,}01s+1_d} D(s) \tag{52}$$

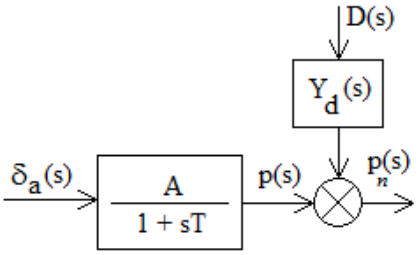


FIG. 3. Block diagram of the SISO UAV model.

The MPC system design problem can be formulated as follows: for the dynamic system illustrated in Fig. 3. design the controller ensuring closed loop control system dynamic performances as they derived by [10].

Design parameters of the MPC system has chosen using [2, 11, 12] as follows below:

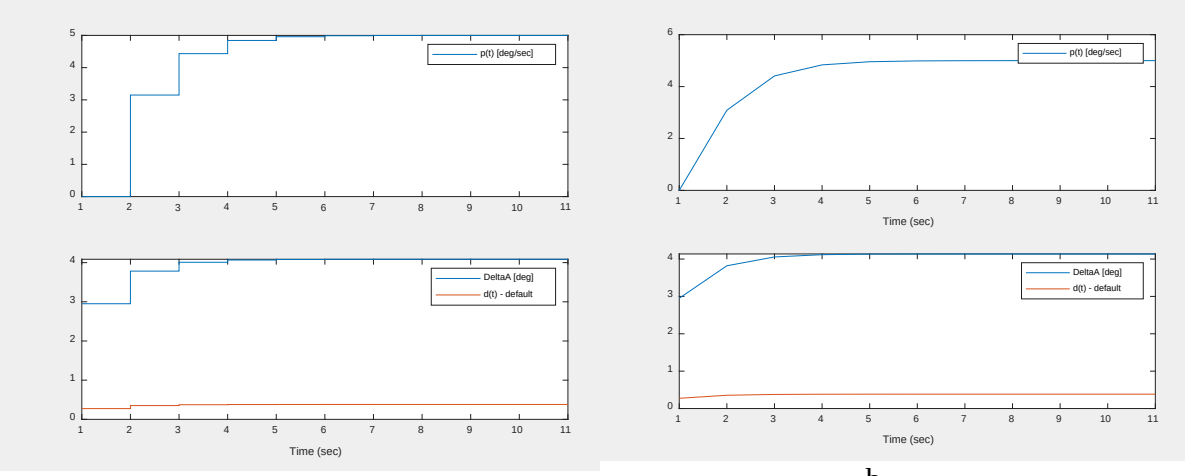
1) Roll rate reference: 5 deg/s;
2) Sampling period: $\Delta t = 0{,}1\ sec$;
3) Settling time:$t_s = 6\ sec$;
4) Model horizon N: $N\Delta t = t_s$; N=60;
5) Control horizon: M=5;
6) Prediction horizon: P=50;
7) $\boldsymbol{Q}$=1;
8) $\boldsymbol{R}$=[1 1].

Let us consider a UAV flight scenario of the collision avoidance, whilst UAV is forced to change directional angle suddenly to avoid hitting any object being either natural or artificial. For that mission, to have fast responses from the UAV, control of the roll angle is required, to maintain roll angle position required. This method is widely used in automatic flight control of both manned and unmanned aerial vehicles.

The reference model of the small UAV roll rate behavior to be followed by the closed loop control system has been chosen to be:

$$p_m(t) = 5 * 1(t) \text{ deg/s} \tag{53}$$

Using data defined above, the UAV roll rate closed loop control system has been designed and tested in time domain using `cmpc.m` built-in function of the MATLAB Model Predictive Control Toolbox [14, 15, 16]. Results of the computer simulation are depicted in Fig. 4.a. using stairs plotting option, and in Fig. 5.b. using conventional plotting option offered by MATLAB®.



a. b.

FIG. 4. Small UAV rolling motion MPC - closed loop control system step response.

Fig. 4 demonstrates that the roll rate reference given by Eq (53) is followed, and for the settling time range of t_s it is reaching final value of the roll rate of 5 deg/s. For further scheduling and augmentation of the UAV closed loop control system dynamic performances one can change control horizon M, prediction horizon P, and weighting matrices $\boldsymbol{Q}$ and $\boldsymbol{R}$ of the integral performance index given by Eq (33).

8. CONCLUSIONS AND FUTURE WORK

The motive behind this research work was to summarize mathematical backgrounds serving for solution of the MPC design problems. The approach of predictive thinking about UAV flight path planning can ensure that future control input required to minimize error between the set point (reference path to be followed) and predicted output in least square means will be an optimal solution to a standard cost function minimization problem. Leaning on this technique UAV flight path design and flight via path designed can be optimized. However, the parameter setting of M and P, and parameter selection of $\boldsymbol{Q}$ and $\boldsymbol{R}$, is requiring a complex set of dynamic performances of the UAV closed loop automatic flight control system, such as time domain performance indices (peak time, settling time, percent overshoot), and frequency domain performance indices (damping ratio, gain margin, phase margin), which are often unknown or, not defined ones, and validation of the results of the computer simulation requires some preliminaries serving to define set of performance indices of the UAV closed loop control system.

The problem introduced for the MPC system design will be extended firstly for more sophisticated reference input signals like exponentials of the flare flight phase of the UAV landing. Moreover, the test input signals of the UAV closed loop automatic flight control system will be chosen for typical flight phases of the UAV collision avoidance maneuvers in any relationships, like UAV vs UAV, or UAV vs non-UAV.

The competing UAV dynamic model available is the state space model to that of the applied transfer function models, and, for further preliminary computer aided design the multivariable model will be used to design closed loop MPC control systems.

Finally, the default external disturbance model provided for use by `cmpc.m` built-in function of MATLAB will be substituted with random turbulence models ensuring more realistic representation of the stochastic atmospheric turbulences.

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UAV FLYING WING WITH A PHOTOVOLTAIC SYSTEM

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Abstract: *Unmanned aircraft have numerous operational advantages that they recommend, and flight autonomy is important in conditions of use in hostile operating environments. A method of maximizing autonomy is the use of correlated photovoltaic energy with an optimized design depending on the type of mission.*

The article presents both theoretically and numerically a technical solution for the FW-UAV using a photovoltaic system.

Keywords: *flexible solar cells, flying wing, equivalent circuit, software simulation.*

1. ACTUAL STAGE OF THE PHOTOVOLTAIC CONCEPT ON FLEXIBLE SUPPORT

Mechanically flexible solar cells could change how electricity is generated in the future. Some of the applications include the use of integrated cells in high-altitude and telecommunication space such as unmanned aerial UAVs. Photovoltaic powered flight is not a new concept, dating from 1974, the crewed aircraft - Solar Impulse, see FIG. 1 [1, 2].

FIG. 1. Solar Impulse

These flights were important due to the demonstration of night-time energy storage and flying capacity as well as increased confidence in photovoltaic technologies.

According to specialty studies [3, 4, 5], the use of photovoltaic panels in UAVs confirms the maturity of the technical solution to increase flight autonomy, here we can recall a number of projects, such as: NASA Pathfinder in 1983 (Figure 2a); and Sunseeker in 1990 (FIG. 2b).

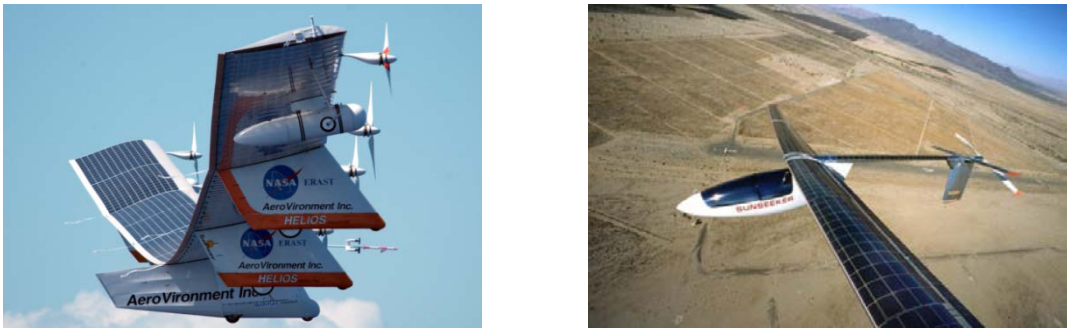


FIG. 2 Projects, a. Helios, b. Sunseeker

Developers in Australia (Parxis Aeronautics) have built a cSi-type flying wing UAV in the low-cost concept that has led to a six-year increase in performance, see FIG. 3 and 4.

FIG. 3. Flying wing –Parxis Aeronautics

FIG. 4. Flying wing Aquila – Facebook

Facebook has attempted to use the solar powered Aquila (2026) to provide Internet connectivity (relay relays) to areas of the world with no internet access [3].

2. PROPOSAL OF THE PHOTOVOLTAIC SYSTEM FROM THE UAV

The manufacturing of the flexible solar cell contains a compromise between efficiency, thickness, mechanical resilience and durability. The use of cells on lifting surfaces (wings, empennage) involves aerodynamics, elasticity and structure vibrations during flight, the main purpose of which is to ensure a safe battery loading on board.

The VTOL Flying Wing Concept contains three vectorized electric motors powered by a rechargeable electric source from a series of 20 interconnected photovoltaic cells placed on the load bearing surface, see Figure 5, [10, 11, and 12].

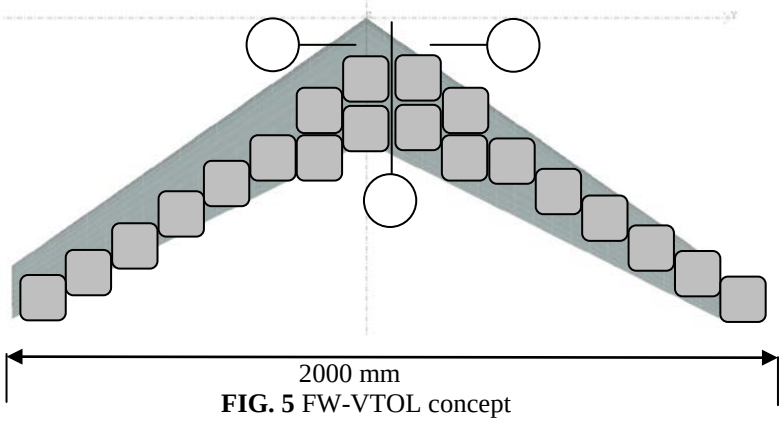


FIG. 5 FW-VTOL concept

The matrix of 20 photovoltaic cells will be mounted on a flying wing as in Figure 5. The system has been simulated software to demonstrate the efficiency of photovoltaic cell matrix. The circuit is complemented by a LiPo battery reassembly to make battery-to-battery shifting on charging versus charging.

The energy efficiency of the cell is given by the ratio between the maximum output power and the incidence of incidence radiation (E_v) on the cell, multiplied by the area A of the useful cell surface.

$$\eta = \frac{P_{max}}{E_v \cdot A} \cdot 100 \quad (1)$$

The efficiency of photovoltaic panels is the ratio of power to the panel and power contained in total incident light.

$$\eta = \frac{P_{max}}{A \cdot G_a} \quad (2)$$

Where:

P_{max} *–Max power estimated*

A- Illuminated surface

G_a *– Solar irradiation*

Although the wing has a total surface area of 0.5m2, it was initially desired to mount 30 flexible photovoltaic cells on the wing (figure 6), finally, the calculation of the surfaces allowed the installation of only 20 cells [13], so we have:

20 cells x 10 g= 200g (3)

The UAV's photovoltaic system provides the electrical power required for the operation of the propulsion system and radio-electronic equipment.

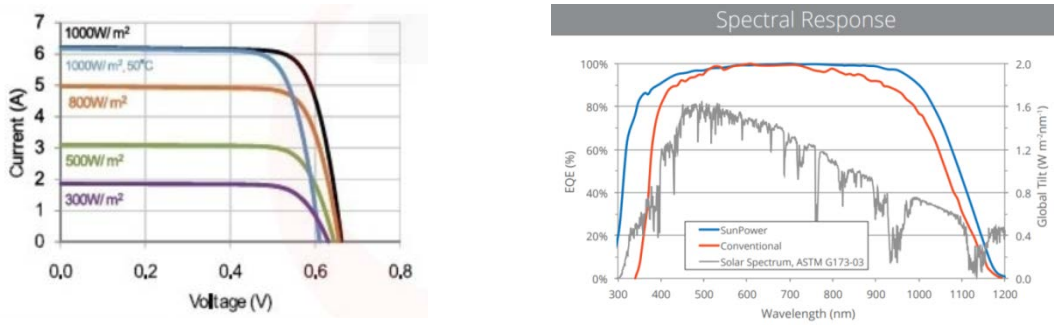
FIG. 6 Photovoltaic cell

The operating characteristics of photovoltaic cells are highlighted in Table 1 and FIG. 7.

Table 1 Characteristics of photovoltaic cells

Characteristics	**Value**	**Characteristics**	**Value**
Type	Si monocristalin	Efficiency	15%
Dimensions	125 x 125 mm	Mass	10 g
Thickness	165±40 µm	Max power P_{max}	3,46 W
Theoretical diameter	160 mm	Nominal power P_{nom}	3,45 W
Current	5,8 A	Voltage	0,57 V

FIG. 7a shows the characteristic I-U and FIG. 7.b shows the efficiency of the SunPower cell compared to the conventional photovoltaic cell and Solar Spectrum.



a b

FIG. 7 Characteristics of photovoltaic cells, a. Current-Voltage, b. Efficiency versus wavelength

Configuration of photovoltaic system

In order to highlight the possibility of supplying a photovoltaic UAV, it was attempted to build an unmanned aerial platform, having on board this type of energy source, FIG. 8.

The proposed connections are highlighted in Figure 9 with only 20 photovoltaic cells. Starting from the requirements imposed by the radio-electronic installation and taking into account the extra mass that is added to the flywheel, it was decided to install a number of photovoltaic cells that would be able to supply the electric current required for the operation of the radio-electronic equipment, see Table 2.

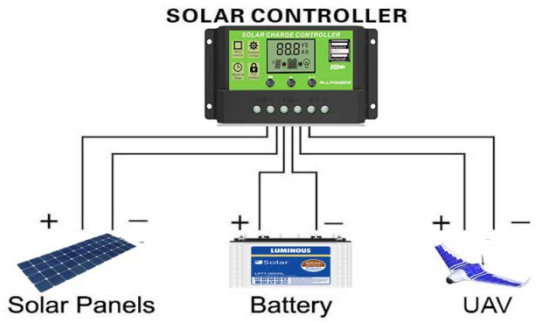


FIG. 8 The concept of FW-VTOL photovoltaic cell power supply

Table 2 FW-VTOL operating characteristics

Characteristics	Value	Characteristics	Value
Autopilot voltage/current	5,37 V / 2,25A	Voltage servo	4,8-6V
Controller electric motor, ESC	max 20A	Acc LiPo	11,1V, 2000mA
Battery eliminator circuit, BEC	5V		

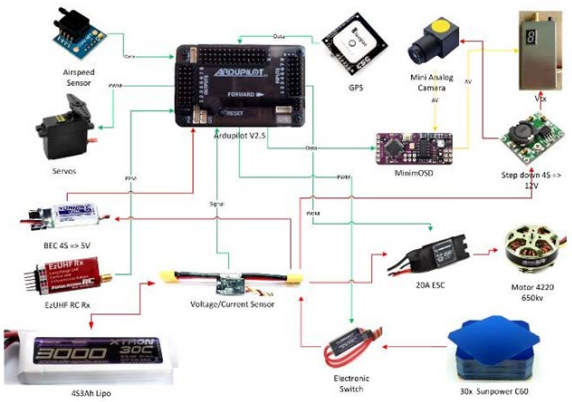


FIG. 9 System Connections

3. MEASUREMENTS AND SIMULATIONS ON THE PHOTOVOLTAIC SYSTEM

Measurements of the photovoltaic cell parameters

By successive measurements under various conditions and configurations we have found that the optimal solar cell coupling is in series providing an average output current of about 11V and 5.5A. I have verified the technical specifications of photovoltaic cells by exposing an office lamp with a 100-watt incandescent bulb. The results obtained are shown in Table 3.

Table 3 Measurement results

Cells number	Voltage (V)	Current (A)
1	0,55	5,3
10	5,4	5,4
20	10,6	5,4

To check the charge rate of the battery after unloading, I loaded it by exposing the photovoltaic cells to the 100W incandescent bulb lamp light, and using the Meter to monitor the charge rate (voltage differences) and the results are noted in Table 4.

Table 4 Results of measurements for loading times

Time (min)	Voltage (V)	Time (min)	Voltage (V)
10	2,85	49	3,38
23	2,99	68	3,57
37	3,09	79	3,60

Solar diagram simulation.

For 48^{o} parallel we have the solar diagram in Figures 10 and 11 [15].

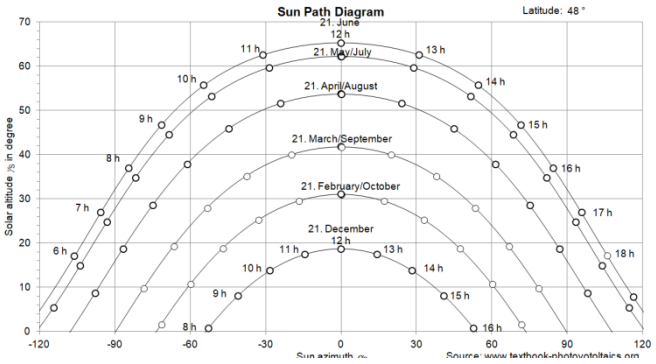


FIG. 10. Solar diagram for Romania

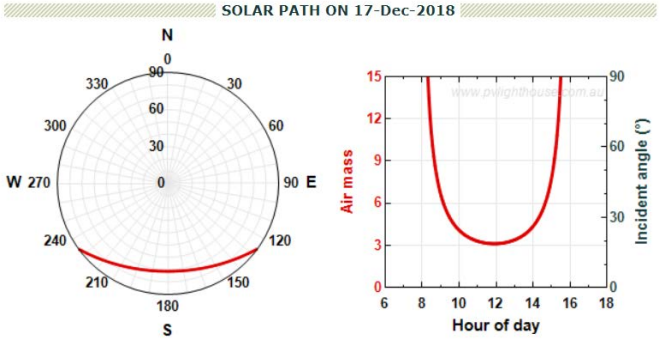


FIG. 11 The solar trajectory

FIG. 11 shows the value of the incidence of sun rays over a day, which influences the amount of battery charge depending on the time of flight. Simulation of the solar spectrum generates the numerical data in figure 12.

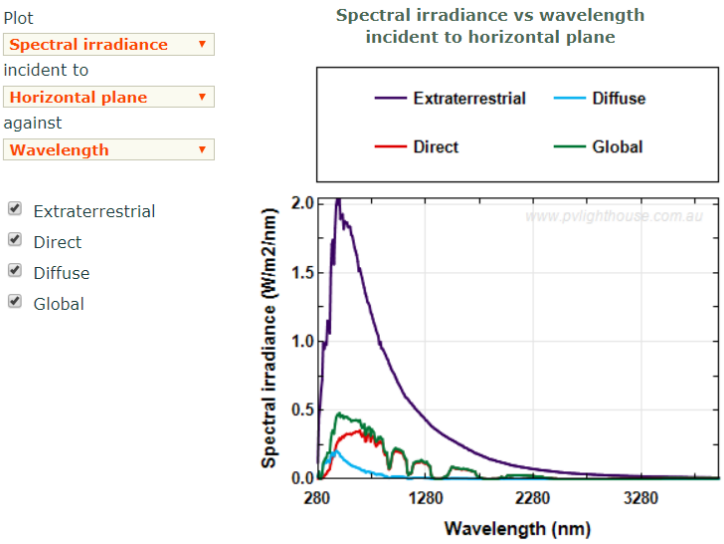


FIG. 12 Solar Spectrum

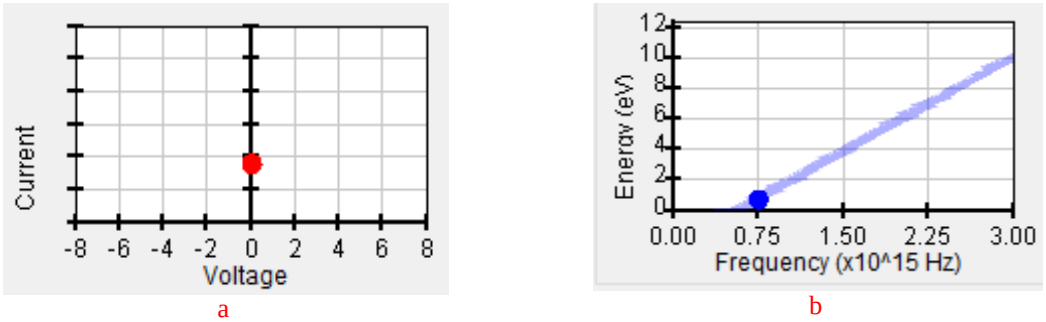
FIG. 12 shows the wavelength values (in a horizontal plane) depending on the radiant spectrum, we are mainly interested in the direct value (red curve) with a maximum at approx. 400 nm.

Simulation of photoelectric effect

A freeware Photoelectric Effect 1.01 was used, the results are Table 5 and FIG.13 [16].

Table 5 Light intensity

Nr. crt.	Light intensity (nm)	Voltage (V)	Nr. crt.	Light intensity (nm)	Voltage (V)
1	100	7,5	5	298	1,62
2	149	7,5	6	350	0,72
3	202	6,9	7	403	0,28
4	248	3,41	8	502	0



a b

FIG. 13 Photoelectric effect for 403 nm, a. Current-Voltage, b. Energy-frequency

The simulation considered a discharged LiPo battery and a 100% photon emission (unobstructed source).

Simulation of the equivalent circuit

Using the manufacturer's operating characteristics (Figure 14) for the equivalent circuit we generated the graphs in Figure 15 [15].

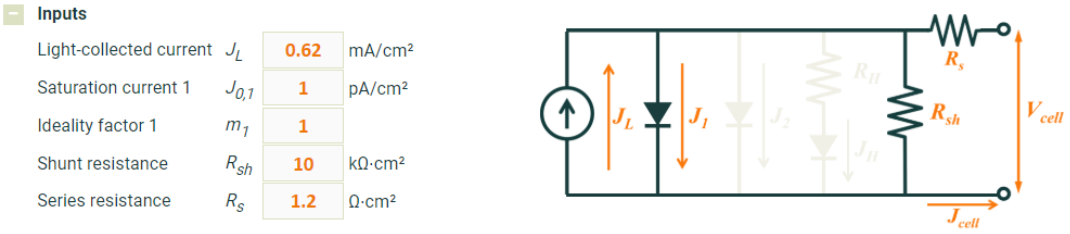


FIG. 14 Input data for the equivalent circuit

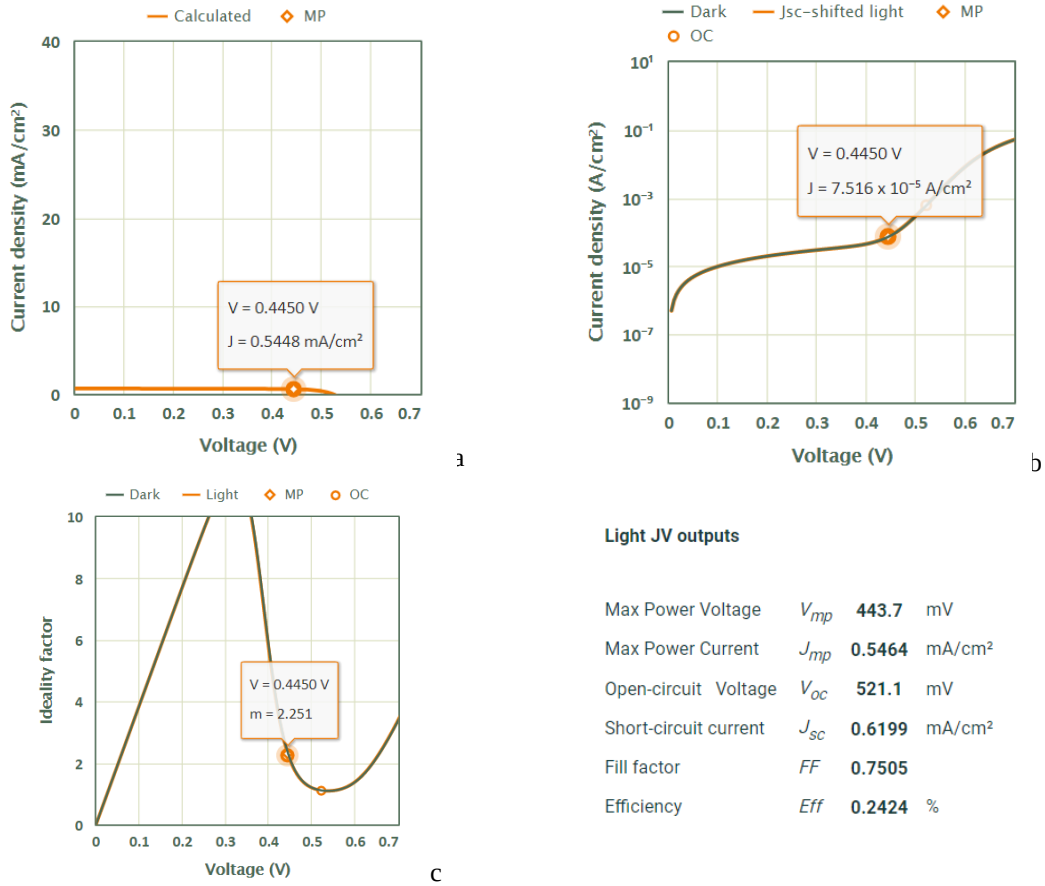


FIG. 15 Output data for the equivalent circuit

It can be seen from the simulation that the unit values of the cell voltage are lower compared to the values given by the manufacturer (0.57V vs. 0.44V) and the current 5.4A vs 5.8A.

CONCLUSIONS AND FUTURE RESEARCH

The global performances of UAV depend directly on the aerodynamic concept approached, the onboard equipment and the mode of operation by the human operator on the ground. The technical and tactical performances of UAV can directly affect mission quality with major influences on the acquisition, dissemination and decision-making capacity of data in the area of interest. Stability in the case of flying wing is achieved by selecting an optimal self-stabilizing profile, negative wing geometric torsion, or centring of the center of gravity below the center of gravity of the lifting surface.

The proposed photovoltaic system is an initial stage of study that can be put into practice with great success on FW-VTOL type UAVs over 3m span.

The article attempted to quantities the parts concerning: the pre-design of the photovoltaic system FW-VTOL and the characterization of the cell and solar module functioning characteristics by theoretical references and numerical simulations.

Future research should focus on the following main issues: building a complete 1:1 full scale benchmark (propulsion system, radio electronic system, retractable landing gear, photovoltaic system); making a demonstration model required for flight tests, scale 1:1 of 4m span; observing the aerodynamic behaviour of the FW-VTOL during the actual flight to create an optimized model; optimized model of the mass vs. the bearing surface and repetition of test processes under the conditions of using a optimized functional photovoltaic energy system.

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MOBILE ACCESSIBLE RICH INTERNET WEB APPLICATION ENHANCED WITH AMP PUBLISHING TECHNOLOGY

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Abstract: *Web applications are becoming more and more complex in an continuously growing Internet and Intranet networks. Nowadays accessibility should not be considered as a barrier to innovation and the possibility of developing optimized accessible solutions in order to favor the reduction or elimination of the gap between those who can independently access web resources and those who can not (in particular people with visual impairment) is a requirement that is indispensable for the modern society. This paper presents a concept and proposes a solution to develop a mobile accessible rich internet web application, presenting its architecture, development environment, as well as the adaptive and responsive capabilities using the AMP (Accelerated Mobile Pages) publishing technology and its advantages.*

Keywords: *accessible rich internet application, accelerated mobile pages, cross-platform development, semantic web, web accessibility, user interface plasticity.*

1. INTRODUCTION

The Internet and Intranets are growing continuously, the web applications are becoming more and more complex, and the semantic web [1] is an ongoing step in the evolution on modern web architectures [2]. Developers and designers often use new self-built controls in applications that can not be represented using the traditional markup language tools. These include drop-down menus, tabs, hierarchical tree structures, sliders, fields that allow an input and at the same time dynamically offer input suggestions in a drop-down menu etc., and all used together are building the modern Rich Internet Applications [3]. These user-side controls and dynamic content updates can generate an increased code density and excessive requests that can slow down the application and decrease the Quality of Service (QoS) and Quality of Experience (QoE) [4], especially when accessed via a mobile device. In addition the Rich Internet Application [5] are often not accessible to users with disabilities, especially for those who use screen readers and users who can not use the mouse or other pointing devices.

Accessibility is the characteristic of a device, a service, a resource or an environment that can be easily accessed by any type of user. The term is commonly associated with the possibility also for people with reduced or impeded sensory, motor, or psychic capacity (that is affected by both temporary and stable disability), to access and move independently in physical environments, to autonomously access and use cultural contents or to benefit from the IT systems and resources available typically through the use of assistive technologies or through compliance with product accessibility requirements.

In this context, accessibility solutions [6] are developed in order to favor the reduction or elimination of the gap between those who can independently access web resources and those who can not (in particular people with visual impairment).

In this paper, we present a solution to develop a cross-platform web and mobile accessible Rich Internet Application using the WAI-ARIA (Web Accessibility Initiative - Accessible Rich Internet Applications) [7] standardized technical specification for users with visual impairment who use screen readers or expandable and refreshable Braille displays. In order to access and use the application, there is no need to install third-party modules or plug-ins because the standard technologies used are natively embedded in the browsers of the modern mobile and desktop devices. Furthermore the solution is developed in accordance and using the new AMP (Accelerated Mobile Pages) publishing technology [8], to ensure improved performance of content and mobile compatibility as well as top indexing in search engine page results.

2. ACCESSIBLE RICH INTERNET APPLICATION

Emerging technology are pushing the development of the Internet as much as possible. But there are also a small number of people with disabilities who are still struggling with these new techniques. Content type as *role*, *state*, and *properties* of widgets and content, which are updated in real-time are often unavailable to assistive technology users. Assistive technologies typically expect the content of the web page to change in response to a navigational event, such as clicking a link or submitting a form [9]. Web applications use techniques such as AJAX (Asynchronous JavaScript And XML) to "hide" content [10], which is sometimes not recognized by assistive technologies, and while they may be affected by content changes, the user may not be aware of it or may not know where it is to locate this updated content.

In order to achieve accessibility for users with visual impairment we extended the HTML5 markup with WAI-ARIA semantic metadata as shown in Fig.1 and Fig.2.

```
<div class="tabs">
 <div role="tablist"
      aria-label="Research">
   <button
      role="tab" aria-selected="true" aria-controls="wai-aria-tab" id="wai-aria">
     Accessible Rich Internet Application
   </button>
   <button
      role="tab" aria-selected="false" aria-controls="amp-tab" id="amp" tabindex="-1">
     Accelerated Mobile Pages
   </button>
   <button
     role="tab" aria-selected="false" aria-controls="semantic-web-tab" id="semantic-web"
     tabindex="-1" data-deletable="">
     Semantic Web &amp;amp; Web Accessibility
   </button>
</div>
```

FIG. 1. WAI-ARIA semantic metadata extending the HTML5 markup for control buttons

```
    <div tabindex="0" role="tabpanel" id="wai-aria-tab" aria-labelledby="wai-aria">
      <p>
        In this paper, we present a solution to develop a cross-platform web and ...
      </p>
    </div>
    <div tabindex="0" role="tabpanel" id="amp-tab" aria-labelledby="amp" hidden="">
      <p>
        Another benefit of AMP is that it makes your content more visible ...
      </p>
    </div>
    <div tabindex="0" role="tabpanel" id="semantic-web-tab" aria-labelledby="semantic-web"
hidden="">
      <p>
      The Internet and intranets are growing continuously, the web applications are ...
      </p>
    </div>
  </div>
```

FIG. 2. WAI-ARIA semantic metadata extending the HTML5 markup for displaying the content

WAI-ARIA (Web Accessibility Initiative - Accessible Rich Internet Applications) is a specification that provides help to describe the characteristics of the self-developed widgets, making them identifiable and usable by assistive technology users. In our solution using the custom WAI-ARIA metadata [11] we provided mechanisms to alert these users to updates of the applications content.

One of the most important features of this semantic accessible marking is the flexibility that WAI-ARIA markers are independent of one another and encapsulated in HTML elements to describe the entity of an element. The tags can be easily processed by a program that knows these conventions such as a screen reader [12] or a Braille display [13].

The tags were formatted using CSS (Cascading Style Sheets) methods, shown in Fig.3, without being influenced by attributes and attribute values that specify the metadata, because they are just naming conventions.

```
<style type="text/css">
    *, *:before, *:after {margin: 0; padding: 0; box-sizing: border-box;}
    html, body {height: 100vh;}
    div.tabs {
        min-width: 320px; max-width: 800px; padding: 50px;
        margin: 0 auto; background: #fff;       }
    button#wai-aria, button#amp, button#semantic-web  {
        display: inline-block; margin: 0 0 -1px; padding: 15px 25px;
        font-weight: 600; text-align: center; color: #bbb;
        border: 1px solid transparent;}
    button#wai-aria:hover, button#amp:hover, button#semantic-web:hover{
        color: #888; cursor: pointer;}
    div#wai-aria-tab > p, div#amp-tab > p, div#semantic-web-tab > p {
        margin: 0 0 20px; line-height: 1.5;}
    @media screen and (max-width: 650px) {
    button#wai-aria:before, button#amp:before, button#semantic-web:before{
        margin: 0; font-size: 18px;}}
    @media screen and (max-width: 400px) {
    button#wai-aria, button#amp, button#semantic-web { padding: 15px;} }
</style>
```

FIG. 3. CSS3 rules used to format WAI-ARIA & HTML5 markup

WAI-ARIA is a purely semantic extension for HTML, which does not change the layout of a web page. The accessibility of dynamic pages such as Web 2.0 with its Rich Internet Applications and the general user-friendliness can be improved. Using WAI-ARIA we allowed the web page to be labeled as an application rather than as a static page.

HTML does not provide the ability to create dynamic content or advanced controls for the user interface, but allows the inclusion of applets (Flash, Java) and client-side scripts (typically JavaScript). These user-side controls and dynamic content updates are often not accessible to users with disabilities, especially for those who can not use the mouse or other pointing devices.

When creating desktop components for web applications, such as *menus*, *tree views*, *rich text fields* or *tab panels* it is usually used JavaScript. The components generally consist of <*div*> and <*span*> elements, which do not inherit the same functionality as real desktop components. Using WAI-ARIA we were able to easily re-propose the same web content on different platforms without loss of accessibility support [14]. In order for the keyboard to be used to activate elements, all handlers associated with the mouse events were also linked to keyboard events.

The discoverability of updated content is one of the biggest hurdles for assistive technology users, to ensure that the controls are fully keyboard usable in the application, the behavior of the self-made controls in JavaScript was implemented, as shown in Fig. 4.

```
function toggleTabs(bool) {
  var tabItem = formItems[formItems.length-1];
  if(bool) {
    tabItem.input.disabled = false;
    tabItem.label.style.color = '#1a9dd3';
    tabItem.input.setAttribute('aria-disabled', 'false');
    hiddenAlert.textContent = 'Tab section is now enabled.';
  } else {
    tabItem.input.disabled = true;
    tabItem.label.style.color = '#e5e5e5';
    tabItem.input.setAttribute('aria-disabled', 'true');
    tabItem.input.removeAttribute('aria-label');
    hiddenAlert.textContent = 'Tab section is now disabled.';
  }
}
```

FIG. 4. JavaScript implementation of keyboard usable self-made controls

For visually impaired people, user guidance and orientation improves immensely, since they can browse sections such as navigation, search or main content at any time. In addition, they immediately understand the area of the page they are currently in.

A screen reader, also called a read-aloud application, is a software that provides the blind and visually impaired with an alternative user interface instead of the text mode or a graphical user interface [15]. A screen reader communicates the information that is usually displayed on screen using non-visual output devices.

The controls and texts are acoustically reproduced mostly via a sound card or tactile via a Braille display by means of speech synthesis. Figure 5 presents the front-end view of the HTML5 block items, extended with WAI-ARIA markup, which is displayed in the web browser using the ChromeVox Screen Reader plugin, when a user visualizes and interacts with the application in order to access the information and interface with it, even modifying it, transforming its values into text; in this way users can find all the features that the applications make available to them.

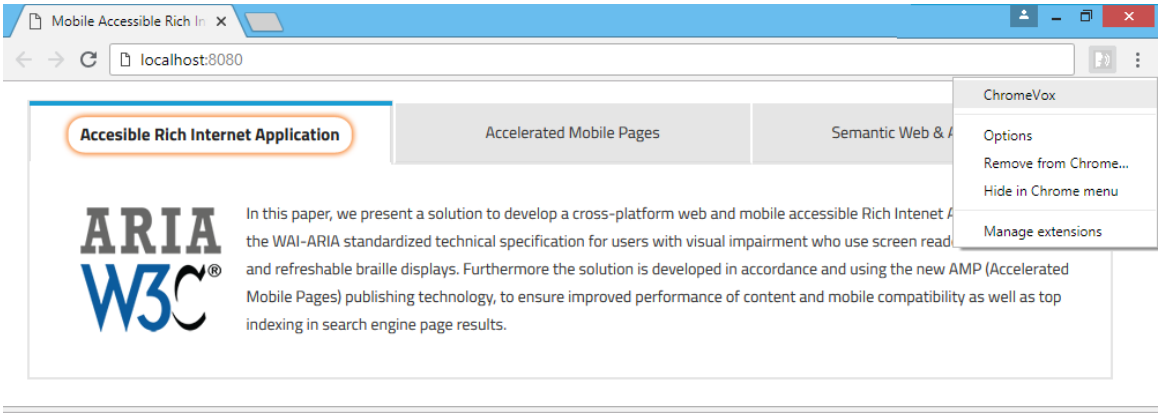

FIG. 5. Front-end view displayed in the browser using CromeVox Screen Reader

3. ACCELERATED MOBILE PAGES

Accelerated Mobile Pages (AMP) is an open source, cross-platform framework that can significantly increase the speed of loading mobile websites. AMP is based on the reduction of CSS and JavaScript, a Content Delivery Network and custom HTML [16]. The Accelerated Mobile Pages Project is supported by Google and compared to mobile-optimized or responsive-designed applications, AMP documents are loaded much faster even over low-bandwidth connections, and are rendered faster in HTML browser-based popular web browsers in less time [17].

This is achieved by consistent streamlining the code of the pages. Technical standards include "AMP HTML", "AMP JS" and "Google AMP Cache". AMP HTML is an HTML5 markup that is enhanced with some special AMP tags. AMP-JS is a JavaScript framework that causes all resources to load asynchronously. Above all, the visible elements of a page are first loaded, and only afterwards the "invisible" elements loaded. In addition, it was used the Google proxy-based content delivery network "AMP Cache", as shown in Fig. 6.

Optional, the proposed AMP solution can cache it's pages and their performance optimized to deliver faster. This also allows for a snapshot of the AMP page on Google search results pages. Images were scaled to the required size on the server side and content that can not be immediately displayed on the screen is not requested until the user starts to scroll.

```
<!doctype html>
<html>
 <head>
   <meta charset="utf-8">
   <link rel="canonical" href="index.html">
   <meta name="viewport" content="width=device-width,minimum-scale=1,initial-scale=1">
   <style amp-boilerplate>body{-webkit-animation:-amp-start 8s steps(1,end) 0s 1 normal
both;-moz-animation:-amp-start 8s steps(1,end) 0s 1 normal both;-ms-animation:-amp-start 8s
steps(1,end) 0s 1 normal both;animation:-amp-start 8s steps(1,end) 0s 1 normal both}@-
webkit-keyframes -amp-start{from{visibility:hidden}to{visibility:visible}}@-moz-keyframes -
amp-start{from{visibility:hidden}to{visibility:visible}}@-ms-keyframes -amp-
start{from{visibility:hidden}to{visibility:visible}}@-o-keyframes -amp-
start{from{visibility:hidden}to{visibility:visible}}@keyframes -amp-
start{from{visibility:hidden}to{visibility:visible}}</style><noscript><style amp-
boilerplate>body{-webkit-animation:none;-moz-animation:none;-ms-
animation:none;animation:none}</style></noscript>
   <script async src="https://cdn.ampproject.org/v0.js"></script>
 </head>
```

FIG. 6. Accelerate Mobile Pages integration

In Fig. 6, above, is presented the integration of the 3 Accelerate Mobile Pages components in the proposed solution:

- **AMP HTML** - It is a markup language with some restrictions to adapt to the objectives sought with the AMP project. In practice, the code reports many of the classic HTML tags, while some are replaced by AMP tags. These elements make some of the common patterns that affect mobile load speed lighter and better performing;
- **AMP Java Script** - The library of the AMP JS is responsible for making operational the features of the AMP, manages the loading of resources and provides the custom tags, the sandboxing of all the iframes and the loading of each resource only after having calculated the overall layout of the page;
- **Google AMP Cache** - This is a proxy-based content delivery network that loads HTML AMP pages and automatically speeds up deployment operations. When the Google AMP Cache is in use, the documents, JavaScript files and images are loaded from the same source, using the HTTP 2.0 protocol.

In Fig.7. is shown the front-end view user interface plasticity of the responsive accelerated mobile web application in a mobile browser:

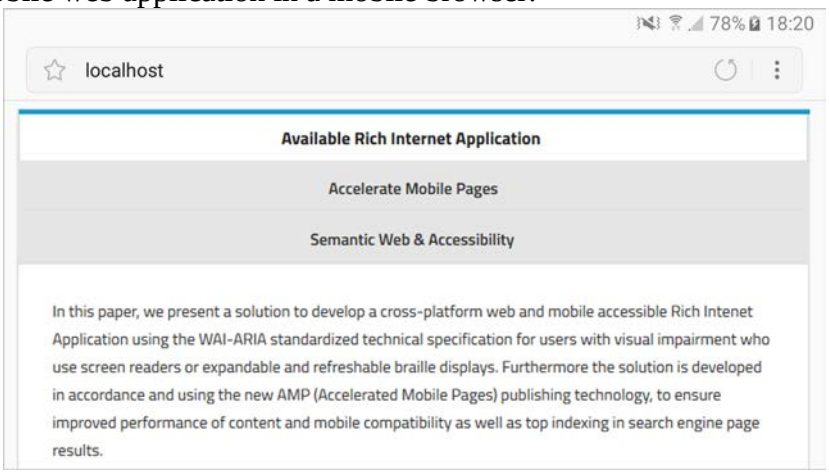

FIG. 7. Front-end view of the applications interface in a mobile browser

4. CONCLUSIONS

Accessibility means no obstacles. Accessibility is available in buildings, on the street and even in product design. Supporting computer technologies allow people with and without disabilities, regardless of age, equal support in school, education, work and leisure, so they can participate as fully as possible in the real and digital world.

Computer accessibility includes both people with technical or age-related limitations (visual deficiencies), as well as web crawlers, with which search engines capture the content of a page, correlating the web accessibility for humans and accessibility for robots. Dynamically prepared and interactively accessible information represents an innovation in information sociology to a similar extent as the Internet itself.

Nowadays, with the evolution of technology, operating systems are considered “barrier-free”. However, there are big differences of accessibility from one operating system to another. In this paper we presented and proposed a solution using standardized and cross-platform compatible technology that works independently of the operating system and the devices used, extending the “border-free” limits to web and mobile users.

The required strict separation of the structure of a document (Document Object Model) and its presentation (layout) was achieved using standard HTML5, CSS3, JavaScript and WAI-ARIA producing a "barrier-free user interface", without compromising on the applications design and scalability making it perceptible and tangible for all users.

Moreover because we used open web standards, a visually impaired user is not limited to a typical form of assistive technology, and can choose what type of software (e.g. screen reader) or hardware (e.g. Braille terminal reader) would like to use. The presented application using WAI-ARIA semantic markup is compatible with all of modern browsers and screen readers, without the necessity to install additional plugins or third party modules, that can cause security breaches, can generate unnecessary resources consumption and can make the QoE problematic and troublesome due to additional dependencies. Even if an old browser or assistive technology, that does not understand the used semantic markup, are used, the information will be ignored because WAI-ARIA comes as an extension to enhance HTML markup language and increase its informational value without altering it (visually as well as acoustically nothing will change).

One of the most important thing of the proposed application is that all the components are focusable and can be operated, continuous updates to the accessibility tree are transmitted to screen readers and Braille displays, making the information accessible to the user without having to re-read the entire page. Integrating AMP technology in the presented solution, full compatibility to mobile devices was achieved, making the application accessible and optimized to smartphone and tablet users. Because only standardized open source technologies were used, the application's graphical user interface is called by simple browser access and without the need to install third-party modules and plugins that can produce security breaches, can generate unnecessary resource consumption and may cause user difficulties and complications due to additional dependencies.

Furthermore optimizing the application for web and mobile devices and using valid and standardized technology and markup languages, made the code more viable, supporting search engines to evaluate semantically correct and accurate the content, in order to generate better search result.

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AWARENESS METHODS THAT ARE USEFUL IN CHANGE OF THE ORGANIZATION/INDIVIDUAL IN A GLOBALIZED WORLD

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Abstract: *A present-day problem is that of the modern man's need to be himself. More specifically, man's refusal to be treated as an object others use to attain their own goals emerges as an issue. Thus, the individual rejection of discipline may come as a consequence of the fact that, in the capitalist economy, the principle of selling and buying without restrictions presupposes the freedom to act without any moral principles, except for those which are explicitly coded by the law and represent a minimum ethical standards.*

Keywords: *economy, consumer-harmful products, concentration, self-analysis, real self*

1. INTRODUCTION. ANTI-AUTHORITARIANISM AS THE RESULT OF THE DESIRE FOR FREEDOM

The reason why concentration is such a rare phenomenon is the weaker and weaker self of human beings, their will that has been diverted from a unique purpose (the lack of passion in pursuing their goals), the fear that they might lose themselves if they let themselves absorbed or distracted by another person/idea/event, or living emotions. The weaker the self, the greated the individual's ego and all to the extent of their fear of losing themselves if they focused on the non-self, thus getting tired of such a strenuous/painful activity.

The individual who perceives him/herself as the owner/holder/possessor of any assets/titles/statuses and who lives in the "having" mode will reject the idea of change and forcefully imposed discipline and will long for the total freedom to decide (Jean-Paul Sartre is the author of philosophical rationalization). His anti-authoritarianism has two causes. The first is the fact that modern man satisfies his own need to be himself by projecting in what he perceives to be the authority the fact of him being treated as an object that the others use to attain their goals. The second cause arises from the specificity of the capitalist economy, which relies on the principle of the freedom to sell or buy without any restrictions, based on the freedom to act without any restrictive moral/political principles, excepting those that are explicitly coded by the law, which aim to prevent the damages caused to the others intentionally.

Currently, this existential desire for freedom has turned into pure ideology, one that is repressed by the modern man in the desire to defend what he thinks he has. In this context, the authoritarian attitude has weakened considerably, beginning in the western democracies and, paradoxically, with it, so did the factual freedom of the individual. The reason for this was that it wasn't the fact of the dependence that changed, but it was its form that did.

If during the 19th century the representatives of the authority (parents, teachers, preachers, leaders, governments) exerted their power in an overt and direct manner, with the change of the methods of production (mechanization, followed by automation and cybernation) the idea appeared of working and saving, as did the ideal of consuming as a way of pursuing happiness, and the direct subordination to the representative of the authority was replaced by the subordination to an organization. Governments attempt to convince the individuals that everything is done to their best interest and that they are free, i.e. they are their own superiors. The replacement of the real superiors with some impersonal bureaucracies turns modern man into an even more powerless individual than before, but one that is conscious of his/her powerlessness. The person who lives in the "having" mode of living defends him/herself from such awareness by constructing an ideal of absolute and unrestricted freedom manifested through the establishment of the sexual freedom that has proclaimed the freedom of lust instead of the freedom of will. The difference is that lust is any eagerness that occurs spontaneously, without any connection with personality and its purpose. The postponement of lust is perceived as a breach of individual freedom and individuals do things only because there is no reason not to do them, and the satisfaction of a lust becomes a manner of avoiding boredom mixed with a profound inner passiveness, whereas will is activity-based. The psychological law that is essential in the "having" mode is that the more intense the feeling of powerlessness and the greater the lack of authentic will are, the more disobedience or the obsessive eagerness to satisfy one's lust by insisting on what is arbitrarily restrictive and on anti-authoritarianism grows. Nowadays, anti-authoritarianism has become a rationale for narcissist self-satisfaction, for hedonistic life. Finally, the fear of authoritarianism serves to rationalize the will to escape reality and its laws, which otherwise can only be escaped in dreams/states of trance/madness.

To live in the "being" mode presupposes a course of action that is determined by the individual's will and dedication to a purpose to which he/she will direct all his/her energies. There still are certain professions that allow the development of excellence (teacher, priest, doctor, artist), i.e. those occupations in which mechanization hasn't been introduced and the routine of work hasn't increased as much as in other occupations, in which the individuals act upon their own lives, living through the creation of their own level of interest/skill that is specific of a continuous adaptation/change of their work methods, while keeping the interest/perseverance in what they do, including their involvement in the improvement of the performance of the rational organization of management and the quality of human relations.

The optimal organization of the society as a whole requires changes that should give the possibility to contribute to the extent to which its political representative, i.e. the state, becomes the product of the citizen's work, renouncing to oppose and to supervise the citizen. At the current state of alienation, this is impossible.

The most important thing in the "being" mode is that it makes the change of the individual/organization/economy possible, because it leads to the increase/ improvement of the capacity of awareness, of critical thinking and curiousity, without any connection with intelligence/education/age. In essence, it is a matter of character, i.e. it has to do with the degree of independence from the irrational authorities and all the types of idols that society, which is defined by the „having" mode, has created. This independence may be obtained:

-By understanding the reason that justifies submission, thus becoming aware of the crucial importance of disobedience;

-Through the attitude of profound mistrust as a healthy option that is preferable to the opposite premise of believing that people say the truth, until proven wrong.

As a matter of fact, most of the people who lie are convinced that they tell the truth or they convince themselves of that while telling untrue things.

In the "having" mode, the cybernetic human being does everything to avoid concentration, preferring to do several things at a time, such as to eat, read, talk to friends, listen to music, watch TV etc., the lack of concentration upon of topic or the interlocutor in conversation being an element of the "having" mode, up to the point where people prefer social media to direct relations with their fellows and, being alone, they avoid to really focus on certain issues and prefer, most often, the easy reading of a newspaper/magazine or article.

The entire contemporary production and consumption system is responsible for the modern man's difficulties in concentrating. Modern man is less and less involved in his bland/monotonous work (that mainly consists of maintaining/operating machines) that no longer requires true concentration. In what consumption is concerned, the market offers countless more compensations in the possibilities of entertainment and this variety makes man's concentration on a single thing impossible.

2. ANALYSIS OF THE FIELD OF FORCES IN THE CHANGE THAT OCCURS IN THE ORGANIZATION AND IN THE INDIVIDUAL

The analysis of the field of forces considers the organizational change in the context of certain forces that act in favour and against the change. It regards these forces as being in a dynamic balance. The balance can either incline in favour of or in opposition to the change. When the managers are blocked by certain forces that oppose the change, they should fight a fiercer battle for the change, which might prove to be unproductive and harmful. The forces that oppose the change may, in their turn, intensify their battle and thus a deadlock is reached between the supporters and the opponents of change.

The dilemma is whether the forces that fight for the change should be increased to obtain the above-mentioned reverse effect, by reducing the forces that oppose the change, which is hard to accomplish, but very much needed. This entails many negotiations with groups that have very well defined interests.

Each of the forces that support the change is antagonized by another force, as shown herein below:

-The requirements of system-based organization is antagonized by the behaviour/thinking of the pioneering stage;

-The champions of change are opposed by stubborn conservatives;

-The flexibility requirements of the market are opposed by the traditional inflexibility ;

-The employees' need to make a contribution to improvement is antagonized by the traditional autocratic management;

-The need to solve the problems rather than just cope with them is opposed by hypocrisy;

-The need to manage the change is countered by the misunderstanding of the proper manner of managing the change.

This antagonism of forces occurs for well-grounded reasons, some of which might have a connection with the specific content of the change, which might need to be adapted to the individual needs, whereas others might be pathological in nature. Whatever these needs, they must be regarded in tight connection with the great variety of groups of special interests that have to be forced into the regular pattern, starting from the acknowledgement of the existing differences.

The individuals who live in the consumer society fight the change. An individual oppose a change for rational reasons that either have to do with the proposed change, or for psychological reasons. In the first case, it's a negotiation process. In the second case, it has to do with personal culture, the identity of the individual, his/her inner being.

The best approach of the change should not be threatening for the individual and it entails the need to focus on information that explains the fact that neither the individual's attitude, nor his/her personality are targeted, but rather his/her behaviour, thus giving him/her the proper help in a framework of scrupulosity where the individual is not blamed in any way. The paradox is that the behavioural change will eventually have effects upon the individual's attitude, but under circumstances that are imposed by him/herself and not by the others, without his/her survival and psychological identity being threatened in any way.

3. CONCLUSION: AWARENESS METHODS THAT ARE USEFUL IN CHANGE AND ARE APPLICABLE TO THE INDIVIDUAL

Modern man, a follower of the "being" mode, can learn how to focus. The inevitable discouragement that might appear in the process of learning can be overcome just as it can be in the case of any important achievement. There are easily available methods that aim at changing the behaviour towards learning focused attention, such as:

The practise of immovableness (not to think of anything while remaining steady for 5-10 minutes and being aware of what is happening to oneself, i.e. the fact that the disruptive thoughts will slowly disappear and one will no longer have the tendency to drowse).

- The practise of focused reading (to go to the essence of the writer's thinking when reading for hours and remaining relaxed, without skipping pages, re-reading certain pages that one didn't clearly understand during the first lecture, thinking about the author's arguments, formulating answers to some new questions, without criticizing one aspect or another, without rejecting the author's opinions, only wanting to learn something new or getting the direct/indirect confirmation of one's own opinions).
- The practise of focusing upon another person (to judge what one says and how one behaves, dresses, the opinions one expresses, going from the surface of that person's personality and assessing the character of the human being behind the mask, reacting with compassion, care or even with fear.
- The practise of certain sports (tennis, climbing, chess, athletics)
- The practise of certain artist activities (playing an instrument, painting, sculpting)
- The practise of meditation (to focus on the present, to be attentive to what one does at that very moment: prayer, gardening, brooming, dishwashing, cycling, eating, listening to music. The result of meditation is the lack of attachment/greed/illusion and even the cessation of hatred/ignorance by reaching a high level of being and even the maximum awareness of our own bodily/mental processes).

Focused attention needs to be practised daily, not just in meditation, but also in the full concentration upon the things we do: walking, eating, thinking, watching. The person who has reached the focused attention state is aware of the reality in its depth/concreteness. An example of focused attention is the observation of breath as a simple and restful act of contemplation of its natural flow, without any effort or rigidity, only by observing the length of the breath without trying to regulate it deliberately. This practise would result into a calming, an equalization and deepening of the breath, while taming down the rhythm of the entire life.

Being aware of the social conflicts within ourselves starts by correctly valorising the significances behind our double entendre discourse, the reality behind our illusions, by renouncing to be aware of ourselves as we are supposed to be, to exist, aware of ourselves just the way we are. The self that we know is largely false and, under such conditions, we lie without knowing it, perverting the meaning of the words:

- "defence" means "war",
- "duty" means "disproof",
- "virtue" means "disobedience",
- "sin" means "obedience",
- the idea that "parents love their children instinctively" is a myth,
- "fame" does not mean or entail any admirable human qualities and real "accomplishments",
- "modesty" is in fact "vanity",
- "love" is "pleasure and greed".

The borderline between awareness of the feelings and their expression into word is very fluid. The word can separate from the feeling, respectively from the speaker and, at that point, the word has lost its substance and it remains a mere combination of sounds. Verbalization becomes a word juggling and the rationalization of the feelings replaces the awareness of the inner reality. If one is no longer preoccupied by the place where they want to go, but only by the fact of going the right way and facing the difficulties, one may become able to attain their own inner state of wellness. Man is a unique individual and his needs, which result from the "human condition", and the answers to these needs pertain to his affective experience. The more his individuality evanesces, the more it is glorified in word. Industry, television, consumption patterns,… all pay homage to the people's individuality, actually manipulating them by stressing the individuality of the presupposedly different products they sell (dozens of varieties of toothpaste, coffee, salami, perfume), but which, in essence, are the same, deluding the consumers that they are making free choices. In reality, both the persons and the products have lost all trace of individuality. Adverts promote individuality through insignificant differences of the consumer goods (packaging, label, shape, arrangement on specially designed shelves, advantageous prices) based on some rigorous psychological studies that are, in fact, used as an instrument of manipulation of the self, thus stimulating the alienation of the individual. This fraudulent practise of psychology leads to the adaptation/adjustment of the modern man's self to the extent of the pursued goal: the increase of the economic productivity and the proliferation of the comforting ideology of happiness stemming from wealth and well-being.

The world is attempting to rationalize evil intentions and to make them look noble and beneficial and it pursues "success" by systematically persecuting truth, justice and love. Being successful means simply having/consuming more consumer products than the other fellow beings and disrespecting life. In fact, what does the respect of live mean anymore? Certainly, we must start from finding out who we really are by adopting the behaviour of one who wants to find out.

Knowing who we really are starts with our capacity of self-analysis practised in our own rhythm, regularly, as a liberating process (walking, breathing exercises, focused attention) filled with a mixture of joy and suffering, anxiety and disappointment. The process of self-analysis is painful and it can cause anxiety, because it is entails making us aware of various aspects, such as:

- Our dependence, when we think we love and we are loyal;
- Our vanity, narcissism when we think we are kind and thoughtful;
- Our sadism when we think we do for others what is right for them against their will;

- Our destructiveness when we think we are just when we punish;
- Our cowardice when we think we are cautious and realistic;
- Our arrogance when we think we are humble;
- Our fear of freedom when we think we are only driven by our wish to be equidistant/neutral;
- Our insincerity when we struggle no to be impolite;
- Our betrayal of others when we think we are just objective.

Going over the shock of discovering that we haven't been kind, we can grasp the fact that what shocks us is due to our narcissistic expectations and that our acknowledged negative impulses are not the only driving forces existing within us. The self-analysis process shall last until we give in to resistance, relying on the newly identified driving forces.

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THE LANGUAGE IN THE PROCESSES OF GLOBALIZATION

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Abstract: *We live in a globalized world. For some decades now there has been economic, cultural and social integration throughout our planet, although the impact is, on each area, of different scope. Unification of markets, free movement of people, goods and ideas are just some of the consequences deriving from this phenomenon that, like it or not, has invested the world towards the end of the 1900s and is constantly growing, unstoppable. The debate is open and today more heated than ever: rivers of words and ink are poured to criticize the economic inequalities and cultural homologation caused by globalization; likewise the easier international integration, the economic and social freedoms that it inevitably brings with it are praised. The weakening of local cultures creates the conditions for homogenization without integration, characterized by strong socio-economic and cultural differences, which leads to mass migrations towards "valuable citizenships" (Bauman, 1998). The processes of political and economic integration, the formation of multicultural and multilingual societies and the emergence of a new global awareness determine important changes in culture and thought in a world in which distances and differences tend to be less and less perceptible.*

Keywords*: globalization; languages; extinction*

1. GLOBALIZATION AND LINGUISTIC APPROVAL

An aspect that is less frequently considered when we speak of globalization is the impact that this phenomenon has on language; on those languages, in particular, "weaker", known and spoken only by small or very small groups of individuals who, giving way to the great giants of the global market, risk, generation after generation, to disappear forever. These are unfortunately not only groundless fears: a recent study by the University of Cambridge revealed that there is indeed a relationship between the economic development of an area and the disappearance of so-called minority languages within that specific territory.

There are three risk factors identified as the most dangerous: the small size of the reference population (a small number of 'speakers'), the small size of the geographical area in which the language is (or was) widespread, the change within the population (change, of course, in linguistic use, to the detriment of the minority idiom).

Starting from these considerations, a correlation between the levels of Gross Domestic Product, GDP (Domestic Wholesale Products) and the probability of losing the linguistic identity was identified: the faster the economic development, the faster the disappearance of the variety will also be native linguistics. This is mainly due to pragmatic factors: the languages related to finance and commerce (English, Arabic, Mandarin Chinese), tend to spread widely in countries with developing economies whose populations are enticed and - at the same time - forced to learn them and talk to them so as not to be excluded from the working world. But in reality the question is even more complex than that. The economic factor, in fact, could only be part of the problem: the disappearance of minority languages is also linked to cultural factors.

Another study, conducted this time by the linguists of the University of Chicago, revealed that the economically most powerful regions, those that contribute to "driving" global trade and production, tend to impose their hegemony also on the culture of the most important countries weak that slowly homologate to a model imposed on them from above, losing their cultural and linguistic identity.

According to UNESCO (2017), languages are threatened by external forces such as military, economic, religious, cultural or educational subjugation, or by internal forces such as the negative attitude of the community towards their own language.

This phenomenon is perfectly reflected in the concept of 'soft power' introduced by the American political scientist Joseph Nye already in the 1980s: he defines it as the capacity of a country to push others to do what it wants without the use of force or coercion, shaping, over the years, their habits, preferences, their tastes (Nye jr, 1990:153-171).

It is appropriate to provide some more detailed data to understand the actual extent and severity of this phenomenon. Currently there are at least 7,102 languages spoken all over the world, divided unevenly between the different continents: in the first places there are Asia and Africa, with more than 2,000 idioms each, followed by Oceania and the Americas, with about 1,000 languages each. Europe closes the rankings, where "just" 286 different languages are spoken. Out of the 7.2 billion people that populate our planet, 2/3 speak only 12 (Chinese, Hindi and English are on the podium) of over 7,000 existing languages.

The data, collected during a fortnightly study conducted by Ulrich Ammon (2015), a linguist professor at the University of Düsseldorf, refer to native speakers of a certain language, and also include bilingual individuals. The research continues, showing that English is the "most popular", most spoken and most studied (from 1.5 billion people) idiom in foreign countries, as it is more often used as a language for official international communication. Although the numbers are impressive, so far no surprise: the fundamental role that the English language plays at world level is well known.

Instead, the most shocking information emerges when we look at other minority languages, excluded from the global stage: about 3% of the population of our planet preserves the knowledge of 96% of the languages still existing. About 2,000 languages have less than 1,000 native speakers. It is easy to imagine how, soon, these languages are destined to disappear. The current rhythm is 25 idioms per year which, as they die, take away the culture, traditions and literature of the populations that generated them: at this rate by 2100 the world will have lost 3500 of the idioms that currently they talk.

The areas considered most at risk of others are northern Australia, central South America, the North American coastal zone of the northern Pacific, eastern Siberia, the southwestern part of the United States, in addition to the tropics, the regions of the Himalayas, Brazil and Nepal, which are rapidly growing economically. Among the most incredible examples we find, for example, Quechua, spoken in the Andean region, which has been slowly supplanted by Spanish and Portuguese, the official languages, which are spoken at school, in offices, are used in newspapers, magazines, road signs. There are very few, perhaps less than ten, (this number dates back to 2014, today it could be drastically decreased) the people in Arizona who speak chemehuevi, the language of the Indian tribe to which they belong.

Italy is also at risk. Considered by scholars and linguists as one of the countries with the greatest variety and linguistic richness, in the coming decades it could lose this primacy: the Cimbrian, the Sardinian, the Friulian, the Ladin, are just some of the dozen minority languages in our country, speak, currently by 4 million people.

Finally, among the causes of the disappearance of minor linguistic truths it is inevitable to also include the Internet, a world that, although on the one hand favors the inclusion and contact between languages, cultures, the most disparate, distant and radically different people among them, on the other hand, it uses, in fact, few hegemonic idioms (first of all English), excluding a priori who is not able to master them and thus forcing the populations to abandon their mother tongue to avoid being cut off from these communication circuits.

This phenomenon takes the name of digital divide, and is very vast, much more dangerous than we could imagine. To be at risk of extinction are not, as we might think, the dialects of small communities, but of the real national languages of European countries.

A Meta-Net research (Multilingual Europe Technology Alliance), a European network involving about sixty linguistic research centers in 34 European countries, has reported that, due to the poor representation at digital level, languages such as Icelandic, the Latvian, Lithuanian and Maltese but also Hungarian, Polish, Greek and Bulgarian are gradually weakening and are destined to disappear. Natural languages undergo profound mutations under the impact of telecommunications: languages mix, words and expressions are exchanged, but at the same time more powerful languages tend to impose themselves on weaker ones.

Historically there have already been great linguistic empires: from the Latin of the Roman Empire, survived in religion and culture for many centuries, to Arabic or colonial English. The same applies to writing systems: think of the spread of the Latin alphabet which on the other hand has adopted the numbering system from the Arabs, but also to the success of Chinese ideographic writing, capable of overcoming linguistic differences.

Recently in Germany a drastic simplification of German spelling has been introduced to facilitate its use and dissemination. A fact like this must make us think of those who consider language as an immutable heritage to be protected.

Some believe that the extinction of languages is part of the progress of humanity, that it is a natural and inevitable phenomenon, and that any attempt to stop it would be impossible and useless. But, says Mark Turin, an anthropologist from Yale University

[...] we spend huge amounts of money to protect animal species and biodiversity, so why shouldn't the one thing that really makes us human be nourished and protected in the same way? (apud Nuwer, 2014)

Languages are part of the heritage of humanity and contain within them real fragments of culture (songs, poems, stories) that, not always kept in written form, are lost forever with the disappearance of the language.

Some languages also represent precious gems in themselves, due to the unique meanings that only they contain. The Cherokee, an idiom spoken by a native North American people, has a word ("oo-kah-huh-sdee") to express the feeling of tenderness and sweetness that pervades us when we see a small, adorable kitten. Moreover, the Cherokee does not have a word to say ‘goodbye’, but only ‘goodbye’.

Each language is a different filter through which we can analyze human behavior, feelings and emotions. Each word contains different shades of meaning that allows us to interpret the world differently than we have always imagined. For this reason, although the weakening of minority languages is indeed an inevitable process, it is advisable to move as far as possible in order to slow it down and somehow prevent it.

2. IT IS POSSIBLE TO SAVE A LANGUAGE FROM EXTINCTION?

Unfortunately no. A language cannot be saved: once the last native speakers have died and the others are absorbed by the dominant languages, idioms are destined to disappear. However, the operation that can be done is that of preserving the linguistic, lexical and cultural heritage of a population or tribe. Linguists from around the world are starting to search through documents, archives, stories of extinct languages in an attempt to find out as much as possible and collect it, report it, make it usable also for the future by creating dictionaries, the report of stories, traditions and the transcription and translation of tales handed down orally.

For this purpose a project of the University of Cambridge has existed for some years, called the World Oral Literature Project which has been gathering for 9 years hours of audio recordings of songs, national poems, stories of tradition with the aim of creating a huge archive of languages in way of extinction, marking the grammatical and syntactic rules. This is the only way to allow traces of a language to remain, an extinct fly, thus preserving cultures that would otherwise fall into oblivion. Similar is the initiative proposed by the National Science Foundation in collaboration with Eastern Michigan University active since 2009: the creation of an online database that not only has the function of collecting data on languages in danger of extinction (cataloging of idioms at risk, count of the number of speakers still alive, grammar and syntax conservation) but also a financial purpose. Once idioms in danger have been identified, resources, including economic ones, will be used to prevent their final disappearance.

There is perhaps no better way to conclude this article than with the words of Anthony Aristar, linguist of Eastern Michigan University, one of the United States promoters of the workshop and the online database, with the hope that they can help us to acquire a greater awareness compared to what we are losing (ELP, 2009):

A language is not made only of words and grammar is a network of stories that connect all the people who once used that language, has in it all the things that those people did together and all the knowledge that the linguistic community left to his descendants. The death of a language is like the death of a species, with it you lose a link in the chain and all that that part meant for the whole.

Can we therefore say that linguistic diversity is destined to end? This judgment makes sense only if relatively to a time so far as to render any forecast useless. It would therefore be very dangerous to attribute any regulatory role to linguistic globalization: if politics assumed this scenario as regulative for its preferences (for example, distinguishing between favorable and contrary to the formation of a world language) would risk not noticing one of the major challenges of the contemporary, constituted by the communication between great linguistic-cultural universes that are profoundly different from each other.

Globalization is not a process that takes place somewhere far away, in some exotic space. Globalization is taking place in Leeds as well as in Warsaw, in New York and in any small town in Poland. It is just outside our windows, but inside as well.

Thus said Zygmund Bauman in one of the most famous interviews (Galecki, 2006).

Studying, understanding, interpreting and governing the process of globalization, intercepting phenomena, interpreting processes and not being overwhelmed by them; because

The globalization of the economy transforms all authentically or theoretically sovereign territories into “communicating vessels” in which the liquid, as is known, continues to flow until it reaches a stable level.

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THE RIGHT TO BE INFORMED – THE RIGHT OF PERSONALITY

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Abstract: *Should the society's goal be the release of constructive energies of each individual's personality, then it is mandatory for the Law to have as its final target the defense of its subjective rights. The rights of personality are subjective rights that follow the availability principle, the law presuming only the interest and not the will - as is the case of human rights. By the right to be informed the human personality has enriched. Having the information weighing it and sharing it one can decide with full responsibility whether to assume an idea, a principle, a value or not, having the obligation of not breaking the rights or fame of others and of not harming the national security, morality and public order.*

Keywords: *person, personality, rights, rights of personality, human rights, freedoms, information, right to be informed, liberty to speak freely, restricting rights.*

1. INTRODUCTION

The social history of individuals is, from a certain perspective, the history of their social roles, socially formed within the assembly of social relations. The individual changes together with his businesses and reformations – from a simple human being into a social person, inside the environment that he considers his own. The degree of amplification and enrichment of relations shows the degree of freedom, information and expression of what people potentially detain.

Being able to act freely and consciously, a person bears unsuspected psychic and physical resources so as to make his being known to the world, by converting the self into cultural goods, that is – values. This phenomenon is yet limited since it occurs within a normative net of interdictions and moral-judicial obligations, which determine *how-how much* of it has to come true but also *how-where* it has to fulfill.

Man as a bio-psycho-social being, endowed with reason, is aware of his existence in society and nature, and is able to make valuable judgments. Individual life and social life, in general, is a series of decisions that are based on more or less real or effective information. His experience is a sum of verified information, more or less memorized, and which is an important factor in communication.

Information in communication does not always contain the truth one hundred percent. There is no objectivity in information. It is natural for each individual, depending on his own personality or subjectivism, to have his own impression on the event he has witnessed [1]. Thus, any information implies the existence of three variables:

a) the informer may know the deformed fact, the object of the information;
b) the means of communication distorts the information;
c) the informed receives the information with a certain area of subjectivism.

Inherent in the three elements, the information shows a certain percentage of distortion.

Objectiveness cannot exist - even more so than in scientific information, where the same experiment conducted by different researchers always leads to the same results (although here, too, relativity intervenes). Sometimes there is the temptation of intentional distortion of information for some, more or less noble purposes [2]. All of these lead to good reasons for those working in intelligence services, in the military, security and public order system to distinguish between raw information collected and information that is passed through a selection of at least three factors: source evaluation, evaluation of information and corroboration of information [3].

The notions *person* and *personality* refer to the same human being, although under various aspects. Nevertheless, it is not the person able to create values but the personality, that is the individual taken as a whole, able to create epistemologically, pragmatically and axiologically. The individual rejoices over his possessions: rights and moral, judicial and economic obligations, while his personality lies in a cognitive-affective and actionable world.

One of the rights of personality is the right to be informed. The human being needs to know and to establish a spiritual community with various implications over his material life, through information which he can apply while he gets to know it. People are interested in the natural reality, while personalities are interested in the social reality, because there will be commitments within a world governed by the moral-juridical and political aspects. Therefore, the need for information – a hunger of the human social spirit – completely, correctly, and authentically satisfied leads to a complete, correct and authentic directing of behaviour and this behaviour will meet the society's expectations. The data processing by the society before it is sent to its members, so as to satisfy its own interests and which would lead to a distortion of the information, to its truncating and unilateralism, represents a form of manipulation of the society's members and it generates their alienation while inspiring fear and lack of trust.

On the other hand, we equally benefit from information and produce it, we co-inform, inter- inform, we evaluate and co-evaluate. The role of information, as source of knowledge, selection and affinity with others, is amplified or diminished by the right to speak freely. For the juridical body, the easy finding and opting for information, which would be able to meet his landed dignity, means an extra possibility of designing a new appropriate model of adaptation to the world, as well as the possibility of producing as many bridges to understanding. The human personality is enriched by its right to be informed, which better explains the meaning of life, so that it can decide with full responsibility to assume an idea, a principle or value if he/she detains the data that he/she can afterwards judge, endorse, distribute, stock and select.

The right to information is a fundamental human right, without which an individual cannot exist as a social being. As a result, the right to information has been preserved in international conventions, constitutions of states, and laws based on them, in a more or less good manner.

Today's global society relies on increasing the importance of human rights as a priority issue on the world agenda. The fact that, often against the will of the state, human rights are legitimate everywhere in the world, has materialized in recent decades into a global consciousness and an international human rights law (at judicial level) that penetrates the national law of states, uniforming national societies, making them function on the ideal of "good governance" [4].

The universality and primacy of human rights cannot fail to influence the work of the armed forces. Representing an important pillar of society, the armed forces are geared to the protection of human rights through the missions they perform, having the obligation, in turn, to respect them in all aspects of their work, according to the conditions and limitations given by law.

2. THE PERSONALITY NOTION AND THE RIGHTS OF PERSONALITY

The defense of the person by the Law equals the defense of the "mask" which the Law itself obliges the individual to wear within the society organized by it. By doing this, one can say that the concern is about only the individual with his given mask, thus, the public order, the security of the state and good manners remain in place. It is visible then that within the social relations regulated by Law the public bodies are modeled as personalities that are not each defended because the Law defends the generic personality, in other words, those epistemic- pragmatic-axiological features through which the individual manifest. Therefore, the law does not define all the features through which a person can be differentiated from others, but only those features bearing judicial relevance, namely, those features able to embody social values sufficiently important to be defended by Law, all the others being left inside the prescriptive sphere of different types of norms, less strict than the judicial system.

The judicial definition of the rights of personality is, if not impossible, certainly very difficult. In the specialty literature, it is regulated that the rights of personality are subjective rights. They consist of the prerogative attributed to a person to ask all the other persons to respect his/her personality (rights of personality), or his/her exclusive power over one thing (real rights), or to oblige another person to give back a thing or to execute some business for him/her (personal rights).

Accordingly, based on the two constitutive elements – interest and volition – subjective rights may be grouped into:

a) subjective rights where there is no prior presumption over the interest or volition of the holder; the interest is to be approved and the volition has to be expressed judicially. These are pecuniary rights;

b) subjective rights where both the interest and the volition are presumed by the legal representative in favour of the holder. These are the person's attributes: name, address, social status;

c) subjective rights in which the interest is presumed and the manifestation of volition is at the potential holder's will. These are the rights of personality.

Consequently, the subjective rights in which the interest is presumed and the manifestation of volition is at the potential holder's will are rights of personality which, technically speaking constitute what may be called "civil liberties". Yet, not all subjective rights may be seen as a "liberty" by visible analogy with the "public liberties". One needs to understand that a subjective right without material expression expresses a civil liberty. Therefore, the defended judicial value is sufficiently important for the legal representative to consider necessary to presuppose that the holder is interested in manifesting that right. Finally, the specific particularities of this prerogative have to make it necessary that its concrete exercise to be left at the free manifestation of will of the potential holder, or to be generated by the principle of "availability" [5].

Resulting from here is the fact that the rights of personality in which the right to a private life, image, honor, dignity and prestige, the un- pecuniary right of authorship, the right to move freely, the right to be educated, informed and to have an opinion – all belong to the category of subjective rights without material expression since honor, dignity, prestige, private life and others are not values that can be evaluated in money. Due to this reason, the rights of personality will have common characteristics with those of the category of civil subjective without material expression known as *attributes of the person* and in which the right to a name(nomination), residence (home) and certain social status are included. Both the former and the latter are, undoubtedly, absolute rights, inalienable, exempt from seizure and strictly personal.

Nonetheless, the rights of personality cannot be considered a prolongation of the attributes of the person, the latter being attributed by definition, while the rights of personality are assumed, by excellence. Generally, a person can choose a name or another, a residence or another, a certain social status or another, but throughout his/her life as a person, he/she has to hold a name, a residence and a social status, no matter which they are. Thus, it results that the attributes of the person are dual: they are not only rights to the holder, but also obligations. As a result, the distribution of these elements is beyond the individual interest and is relative to the juridical society's interest. Judicially, this status is similar with presuming by the law representative of both the interest and the volition of the prerogative holder. From this perspective, the situation of rights of personality differs from the situation of the attributes of the person because, in their case, the law presumes only the interest but not the volition, which is left at the potential holder's will.

In the view of the Romanian legislation, a feature of rights, which can be categorized as being of personality, is that they are legal, in the sense that they should essentially have legislative recognition, involving regulation, either express and detailed, or only at the level of principles. In this way, they cease to be simple civil liberties, becoming civil subjective rights. Seen as control rights, personality rights allow the person to exercise control over various aspects of his personality. This dominion may embrace several forms of expression, for example in an passivity, in a disclosure or in a clarification or rectification.

Although mentioned in bills and international agreements, in general formulations, the rights of personality do not apply *ad literam, omni eo soli* in the same manner, because they come to life through the mediation of various national legislations. Concepts such as 'juridical body', 'juridical value', 'subjective rights' without material expression, or 'availability' – are abstract notions which, in fact, can be rendered definitions, yet the main difficulty with regard to the contents of these Bills and International Agreements is that the practices meant to adjust them differ from one society to another.

3. LIMITATIONS OF THE RIGHT TO INFORMATION

The notion of information has a very wide meaning and represents, according to art.15 of the Law no. 182 from 2002, on the protection of classified information, "any documents, data, objects or activities, regardless of their type, form, mode of expression or manner of circulation. Government Decision no. 353 of 2002 approving the NATO Standard on the Protection of Classified Information defines information as "that notion that can be communicated in any form".

The limitations of access to classified information can be found even in Law no. 544 of 2001, regarding free access to public information.

Although it is prior to the emergence of other laws classifying some documents, in the legal environment it is considered a framework law because it distinguishes information as follows:

- Public or private information - if their source is a public or private person;
- Publicly and non-publicly available information - that is, information is or not intended to be made available to the public (in the category of non-publicly available personal data);
- Information of public or private interest - if the information is intended for the service or good administration of either public affairs or personal interests.

Transparency means meaningful and transparent governance for everyone. The need to provide control over the actions of public authorities, to streamline the decision-making process by increasing public confidence in it and to ensure the active participation of citizens in decision-making has led to the legal regulation of the concept of transparency.

When information dissemination would jeopardize the public interest, authorities may restrict access to certain information. Recommendation Rec (2002) of the Committee of Ministers of the European Union to the Member States with regard to the access to public documents is the normative act governing decisional transparency, allowing the Union citizens to access documents of the European institutions.

The UN organization has reached one of its major objectives, which had been aimed at when two juridical international agreements came into effect for the signing states: defending and promoting the fundamental human rights and liberties. These agreements, together with the Universal Declaration of the Human Rights and the facultative Protocol, offering the solving mechanism for individual complaints about breaking the rights, constitute the main source of training, at international level, of the civil and subjective rights, without material expression of personality.

In accordance with Resolution 59 (I) of the General Meeting of UN, in 1945, *"The liberty to be informed is a fundamental human right and the landmark of all liberties for which defense the United Nations are devoted (…). The liberty to be informed urges that all beneficiaries of these privileges have the will and strength not to take advantage of them. The moral obligation to look for facts without prejudices and to spread the information without malevolent intentions constitutes one of features of the essential liberty to be informed"*.

In the International Agreement of Civil and Political Rights of 1969, Art. 19 stipulates that any individual has the right to the liberty to speak freely, and this rights consists of *"the liberty to search, receive and share information and ideas of any type, disregarding national borders, orally, written, printed or artistically or by any other means at his choice"*. At the same time, the agreement mentions that exercising this liberty involves certain duties and responsibilities and it can be subdued tosome limitations, which need to be established by Law and which are necessary for respecting the rights and reputation of others, for defending the national security, the public order, health or public morality. Simultaneously, similar contents is mentioned within the European Convention for defending human rights and fundamental liberties, in 1950, where there is reference to the liberty to receive or to communicate information or ideas, without being impeded by public authorities and without considering national borders.

At the national level, the right to be informed is stipulated both in the Constitution, where in Art. 31 it is mentioned that *"the right of the person to have access to public information cannot be limited"* and that the right to be informed does not have to harm *"the steps taken for protecting the youth or the national security"*, as well as it is mentioned in other various laws. Such is Law no. 554/2001, regarding the free access to public information, where Art. 12 says that information pertaining to the national defense, security and public order is exempted from free access, if it is included in the classified category. According to Law 182/2002, with regard to classified information, the access to this type of information is granted only in such legal cases, conditions and provisions, without interpreting these provisions as limitations of access to information, or ignoring the Constitution, The Universal Declaration of the Human Rights, agreements and other treaties to which Romania adheres.

Adopting, after the WWII, the international instruments for the human rights, highlights that every human being rejoices certain inalienable rights, without any discrimination with regard to his profession or juridical status, which means that they apply to the members of the armed forces, as well [4]. It is true that these rights may know some limitations, necessary for the benefit of the entire society, but such limitations can only be imposed, according to the Constitution, by Law and only if they strictly necessary to the democratic society.

The liberties to hold an opinion, to speak freely and to be informed are now universally recognized as being part of the fundamental human rights, representing an essential factor of the individual human existence and of the strengthening of peace and international understanding, in a world that is more and more globalized, where the material support of these liberties is provided by the global proliferation of technical possibilities of presenting the information through mass media. However, the very expression of the liberty to speak freely and to be informed may be the object for some juridical limitations, necessary for respecting the rights and reputation of others, for defending the national security, the public order, health or public morality.

We live in an information-based society where production and consumption of information are two of the most important activities. Information is recognized as an essential resource. The level of protection of information is determined by the degree of its usefulness. There may be situations when the uncontrolled dissemination of information will damage the security interests of the state, an organization or a physical person.

One of the areas in which the liberty to speak freely and to be informed has always been restricted is that of the national defense. In this case, on the one hand, there cannot be a total right of the public to be informed, because the efficiency of military actions would be endangered, and, on the other hand, because there are reasons that involve orders and military discipline and they limit the military personnel right to peak freely, the only modality for them to speak publicly being an authorized permission. In turn, citizens must understand that they cannot access data belonging to the ministry of defense unlimitedly, since part of this information, according to the law, belongs to the category of classified information.

The liberty to speak freely and to receive or communicate data or ideas without the involvement of public authorities and without considering the national borders has, as far as military personnel are regarded special connotations relative to the military press. Usually, it is a departmental pres, still, it is also a press appeared due to private initiative of the military personnel, and it is equally controlled and authorized by hierarchically superior military structures, to ensure the correct information of the public opinion.

Since the rights of personality do not belong to the "core" of the human rights, the right to be informed is susceptible to be denied in case of war or in case of a different public danger, which mat threaten the life of the nation. In Romania, the regime of the siege status and the regime of emergency, in accordance with the Government' emergency decision no. 1/ 1999, prescribe, for the civil and military authorities, certain duties and responsibilities, among which there are restrictions regarding the right to be informed by protecting the data with military character that are destined to be communicated via mass media. In this case, the information concerning the exceptional status (excepting that referring to disasters) is made public only with the approval of military authorities, and the mass media (no matter their nature and form of ownership) are obliged to transmit the messages to the military authorities at their request. Equally, the temporary suspension in issuing or broadcasting certain programs of radio stations or television channels is possible.

All of these steps may be taken by the Romanian authorities, respecting Art. no. 53 of the Constitution, in which it is mentioned that diminishing the exercise of certain rights or liberties may be done, only if there is proportionality with the situation that cause it, on condition of its application in an indiscriminating manner and without harming the right or liberty.

CONCLUSIONS

The rights of personality are therefore based on the protection of the individual in what constitutes his individuality and which distinguishes him from any other person. This person presented here does not appear in an abstract manner, but in his uniqueness. In essence, by rights of personality are meant those civil subjective rights, recognized by law, constituting powers with a determined content, having as intrinsic values inherent to the human being, taking into account its physical, mental, moral and social dimension exercised by a autonomous will and protected by legal action.

The right to be informed correlates with the right to hold an opinion from the perspective that only under the conditions of an enlarged possibility of obtaining the data correctly and unchanged may the individual hold an opinion; only under the conditions of a great amount of information can he select, weight and decide with full responsibility.

Both from the international and national documents result that there is evident concern for the affirming and defending the right of personality for its access to information, under the obligation to respect the rights and reputation of others, to defend the national security, the public order, health or public morality.

The right to be informed also correlates with the right of personality as an author to publish his work, to make it known to the collectivity he lives in. A literary, scientific or artistic work [6] represent the development of certain topics, the proposal of some solutions from a personal perspective, both profound and vast, and the absence of information or the lack of information or possession of unilateral, distorted data leads to creating dissatisfactory works.

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EULOGY FOR THE UNNECESSARY LANGUAGE. HOW TO BE USEFUL WRITING ABOUT A USELESS LANGUAGE?

Review of the volume *Viva il latino. Storie e belleza di una lingua inutile* by Nicola Gardini, Milano, Garzanti, 2018

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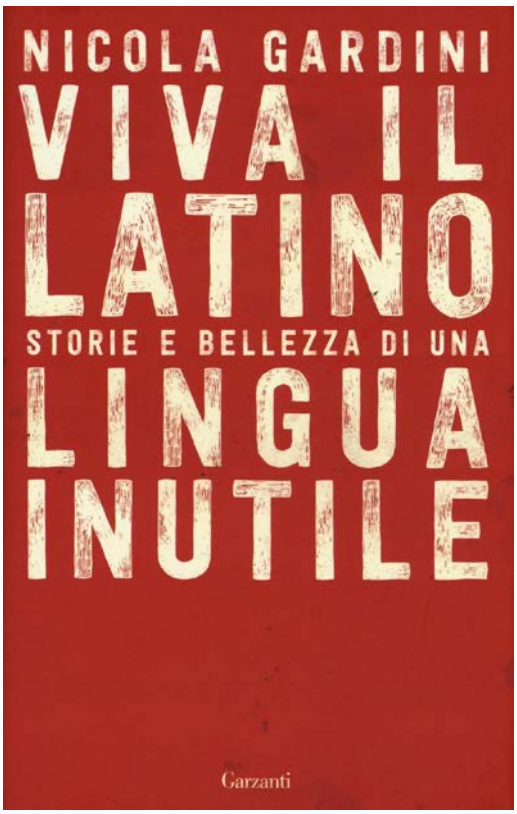

FIG.1 Nicola Gardini, *Viva il latino. Storie e belleza di una lingua inutile.* Front cover.

1. INTRODUCTION

Viva il latino. Storie e belleza di una lingua inutile [*Long Live Latin. The History and Beauty of an Unnecessary Language*], written by the well-known Italian philologist, is a bestseller in Italy. The first edition of the book was reprinted eleven times to meet the demand of the Italian book market, and the second edition also has remarkable success.

Latin language opens the gate, in the mind of the passionate philologists, towards balanced and rational discourse, selection of pertinent meanings, discursive harmonization with the context and verbal expression of the interiority.

Latin language opens the paths to linguistic pragmatics. Latin language is also, for the *connoisseurs*, the language of discourse by excellence, and the language of civilization.

Cruelly and inadvertently considered a dead language, Latin remains, for Gardini, a living language by what it has changed in the world:

> È pratica annosa associare al latino (e al greco antico) la brutta e imprecisa metafora di lingua morta; al contrario, il latino è vivo perché ci parla, perché esistono testi di straordinaria forza espressiva scritti in quella lingua, già influentissimi nel corso di molti secoli, che continuano a dirci cose importanti sul senso della vita e della società. Il latino è vivo perché senza tanto latino non sarei chi sono. Il latino ha formato la società e i sentimenti in cui tutti viviamo. Senza latino il nostro mondo non sarebbe quello che è (pp.25-26).

2. LANGUAGE TRANSFORMATIONS

Nicola Gardini analyzes Latin of Cicero, Ennius, Julius Caesar, Lucretius, Catullus, Virgilius, Tacitus, Ovidius, Titus Livius, Seneca, Petronius, Lucius Apuleius, Horace, Propertius and St. Augustine, surprising it in the dynamics of resettling, from the simplicity of the discursive pragmatics of the Roman administration to the self-awareness of the language in the Augustinian work. The Ciceronian Revolution, as Gardini named it, is the result of applying a thorough language program. This program consisted of the double transfer, from the administrative pragmatics o a language based on the aridity of signification, and from the linguistic artificiality without signification specific to pre-Cicero Roman orators, to the linguistic excellence, understood as spiritual excellence. Ciceronian Latin – language of truth and justice – has developed on vocabulary enrichment, on borrowings from Greek language (meaning from Greek linguistic and democratic experience, namely from linguistic semantics and pragmatics), becoming the classical Latin: standard Latin studied in Italian and Romanian schools, for example. It is true that the beauty of this language, in the Ciceronian 'synchronous section', is actually the beauty of its salvation and preservation.

In the long list of transformations exemplified by Nicola Gardini, Latin of the Roman Emperor Julius Caesar from *De bello gallico* is beautiful grace to its discursive organization and to its impeccable and functional syntax, "misurando i conquistando tutti i territori dei dicibile" (p.65). From this linguistic demonstration made by static instances of Latin language section named in honor of those who really modeled Latin, the birth of metaphor in Lucretius' work cannot be omitted. In *De rerum natura*, Latin language, recording the observation, develops its ability to encompass and surprise. Understanding the power of Latin words, Lucretius extended their significations through 'semantic saturation' and 'metaphorization' (p.76). He proposed understanding life and nature as a functional organization, in accordance with language organization. The world's image in the text and the exposure of entirety via language (at a small scale) are the transformations proposed by the Latin poet and philosopher.

In the picture of the significant Latin language development, Catullus' sexual vocabulary is very important: *mentula, cunnus, culus, futuo, pedico* etc., in its use for the demonstration of force, for position superiority. Therefore, the social-political valences of sexual language: "L'oscenità in Catullo serve principalmente da strumento di protesta sociale" (p.82), the carnival character of the diction, and the suggestion (that is a satirical reflection of justice, human dignity and good practices) are the cornerstones of the Catullian reform. The enjambment of Virgilius is added to the previous analyzed enrichments and variations of the Latin language.

Virgilius' texts (especially *Eneida*) are characterized by the expression of the profound structure of the author's mind, by the semantic and expressive richness of language, as an extension of Lucretius' order at the level of understanding history: "Virgilio è daverro un maestro dell'*ordo verborum*" (p.90). The appeal to social memory in remodelling Latin – due to the one who took advantage of the posthumous glory conferred by Dante's work, *La Divina Comedia*, is completed by the personal memory of Ovidius, whose work is characterized by descriptive capacity. This, different from the Lucretian one, implies rhythm and richness of details in a succession of photograms in *Metamorphoses*, for example.

Neither in the poet's posture of a decayed and exiled individual in the Pontic Tomis (let's not forget that modern exile is identified and claimed from the Ovidian one), Ovidiu is not content with what his language offers. He introduces, in *Tristia and the Epistulae ex Ponto*, the repetition to give validity to content, to emphasize the passage and violence of transformation, to highlight injustice, and to relate to a universal order above any human order, "Luqubere nobis / luqebisque alias" or "amat et not sentit amorem" or "deceptaque decipit omnes" and so on.

And after the incursion at the (space) periphery of the expansion of the tongue, in the need of expressing the implacability of the Pontic sadness in waves, we return to Gardini's attempt to express Seneca's lucidity and inclination towards synthesis, but especially to the language self-conscious of the Augustinian discourse. St. Augustine, in the years of the decline of the Empire, witness to the fall of Rome, he moves the emphasis from syntax on the lexicon and its ability to expand meaning, store metaphorical images, symbolize, transform the figurative into diffuse scenes, hyperbolize , exploit the paradox, resort to analogies and parables. With St. Augustine, as Gardini underlines, the view of the scholar of Hipona, not the word-cup (signifier), the conceptual hole of the language bears the fault of misunderstanding, but the meaning, born from the interaction of the interpreter's mind with the reality, the wine filling the signified's cup: "at colpa non è delle parole, che sono i bicchieri; to the colpa è e del vino che ci and versa dentro "(p.164).

Latin suddenly faces itself with itself, stripped of signifiers, appealing to what Roman Jakobson would later call the poetic function of communication.

3. CONCLUSIONS

Stressing the effects of the society unable to contemplate its past, in a hurry to transpose immediately, to reduce the language (s) to a simple administrative exercise before Cicero, Gardini notes:

> Il latino per molti è *inutile.* (...) Mi limito qui, accingendomi a congedare i lettori, a considerare che quei „molti" – gente comune, politici, profesionisti di ambiti vari – hanno un'idea tristemente (e pericolosamente) limitata dell'instruzion e della formazione: credono, infatti, che la conoscenza si riduca alla traduzione immediata del sapere in qualque servizion pratico (p.207).

The effects of immediate pragmatism and misunderstood hedonism that substitute memory (especially the collective memory), imagination, creativity, depth, complexity gradually make room in the contemporary society. In our case the perception is more acute than compared to others.

As far as the judgment related to the dead language is concerned, its living character is given precisely by the huge legacy of Latin, and especially due to what Latin nurtures in the languages that are still spoken: Italian, Romanian, Spanish, Catalan, Portuguese, French and their dialects, through textual/ discursive organization that extended beyond the area of Romanic languages, through the knowledge that it spread.

The lively character of the language is given by the Latin literature and the literatures to which it gave birth in the languages that originate in it. Without Virgilius' Latin, Dante would not have existed, without Titus Livius's there would not have been Machiavelli, Nicola Gardini points out. Without the Latin of the ancient authors, there would have been no Transylvanian School and the natural settlement of the Romanian writing with Latin letters, and more, probably, the Romanian language would not have afforded (if it had survived) to claim that it originates in Rome. Latin is still alive through the church, through reading, and through history, so much denigrated in the past. Latin gives itself away, to the gain of the human being through science and religious knowledge, and, fortunately, it is not completely abandoned.

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