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8 th International Scientific Conference on Defensive Technologies OTEH 2018

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The paper provides the basic information about 8th International Scientific Conference on Defensive Technologies OTEH 2018, organized by the Military Technical Institute in Belgrade, on October 11-12, 2018. It also gives a brief overview of the prominent and interesting papers by thematic areas, presented and discussed at this Conference

Key words: **defensive technologies, military industry, international scientific conference, Serbia.**

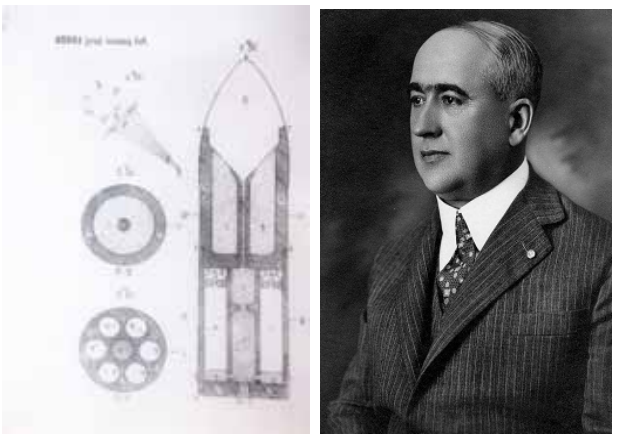
Introduction

OTEHis an International Scientific Conference on Defensive Technologies, traditionally organized by the Military Technical Institute every two years, as a multidisciplinary review of current development trends in the area of military-technical science. The Military Technical Institute is the biggest research and development institution in this area in the Republic of Serbia, and a part of the University of Defense.

8th International Scientific Conference OTEH 2018, held from 11 to12 October at the Military Technical Institute in Belgrade, provided opportunities for scientists and engineers, researchers, designers and universities from many countries to share ideas and technical information regarding defensive technologies, as well as to build new relationships. The Conference was sponsored by the Ministry of Defense. For the fifth time, the OTEH Conference had an international character.

This year's conference was dedicated to one of the greatest Serbian scientists, Milutin Milanković who, besides numerous achievements, made a significant contribution to military technology. On this occasion a lecture "A traveler through distant worlds and times" was held by a guest from the Institute of Meteorology, prof. Lazar Lazić, PhD. Milanković was born in Dalj (May 28, 1879), in the Slavonia region which was the part of Austria-Hungary territory. He started his successful career path as a civil engineer. Particularly interested in the theory of reinforced concrete, he constructed buildings, railroads, airports, bridges, dams, and aqueducts all over Central Europe. Between the two world wars, in 1926, he was engaged in constructing and supervising twelve large hangars for the Kingdom of Yugoslavia Air Force, to be made of reinforced concrete. In 1956 he outlined an ideal mathematical picture of an edifice of the maximal height which could be constructed on the Earth: a rotationally symmetrical building made of reinforced concrete 21.646 kilometers high, with a base diameter of 112.84 kilometers.

During his wealthy research life Milanković had eight patents. Among all of them he had ballistic patent granted by the Kingdom of Yugoslavia where he constructed a very efficient rocket projectile. However this achievement was not implemented in the Yugoslav Army. The performance of this weapon was so advanced that a very similar principle is has been used in the most modern rocket nuclear systems of today.



a) b)

Figure 1. a) Patent certificate No.10929 from Decembar 1st 1933 concerning Milanković's rocket projectile b) The portrait of Milutin Milanković

At the beginning of 20th century (1909) Milanković taught a course in Applied Mathematics which included three seemingly diverse subjects: rational mechanics, celestial mechanics, and theoretical physics. Despite this unconventional circumstances for the European universities of that time, he believed this approach helped him to establish climatology as an integral, holistic cosmic science that could be applied to very specific problems in geophysics, climatology - including the problem of past ice ages, and the temperatures of other planets.

He started working on the astronomical theory of climate in 1912. However, his work was interrupted constantly by turbulent historical events. His masterwork Canon of Insolation and the Ice-Age Problem was written in Germany and published in Belgrade by the Royal Serbian Academy of Science during dramatic political (circumstances).

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KÖNIGLICH SERBISCHE AKADEMIE

KANON DER ERDBESTRAHLUNG
UND
SEINE ANWENDUNG
AUF
DAS EISZEITENPROBLEM

VON
M. MILANKOVITCH

BELGRAD 1941

Figure 2. Milanković's masterpiece from 1941: Canon of Insolation of the Earth and its Application to the Problem of the Ice Age

In the center of his theory Milanković put the Sun, the only source of heat and light in the solar system. The planets orbit the Sun moving along slightly elongated paths that ever change due to the gravitational force (which depends on their masses and distances). The changes in the geometry of an orbit lead to the changes in the insolation (incoming solar radiation) - quantity of heat received by any spot at the surface of a planet. Milanković concluded that the overall sum of such changes must lead to the change of the thermal regime of the whole planet. Moreover, he tried not only to prove his idea, but to calculate the exact value of the thermal change.

Milutin Milanković has created the most accurate calendar so far its deviation from the solar year is only two seconds. Gregorian calendar has a deviation of 26 seconds while the deviation of Julian calendar is even 14 minutes and 14 seconds.

NASA lists the Serbian scientist Milutin Milanković among the most important scientists of all time on the Earth. Two craters, on the Mars and on the Moon, and a minor planet were named after him. Since 1993 the Milutin Milanković medal has been awarded by the European Geophysical Society (now EGU) for contributions in the area of climate.

Milanković died on December 12, 1958 in Belgrade. He wrote a lot about his life and work, especially in "Memories, reminiscences and knowledge". He was rightfully called "a traveler through space and time" and this will be his synonym forever.

Realization of the Conference

The activities regarding the Conference began by opening a website with general information in April 2018. The inaugural meeting of the Organizing Committee was held in May, when the Organizing and Scientific Committee were constituted as well as the Secretariat of the Conference. It was taken into account that the members of the Scientific Committee should be from at least five foreign countries for the Conference to have an international character. Out of the total number of 38 members of the Scientific Committee, 11 members were from abroad: from Belarus, Germany, Czech Republic, New Zealand, Russia, Bulgaria, Serbian Republic, Bosnia and Herzegovina, Romania and Macedonia. The official language of the Conference was English.

The call for papers for the Conference OTEH 2018 attracted over 150 submissions. The Scientific Committee selected 111 papers and (four) plenary lectures. The papers accepted for the final program were grouped in eight topic areas:

1. Aerodynamics and flight dynamics (8 papers),
2. Aircraft (10 papers),
3. Weapon systems and combat vehicles (10 papers),
4. Ammunition and energetic materials (14 papers),
5. Integrated sensor systems and robotic systems (23 papers),
6. Telecommunication and information systems (9 papers),
7. Materials and technologies (28 papers),
8. Quality, standardization, metrology, maintenance and exploitation (9 papers).

Similarly to OTEH 2016 and OTEH 2014, the 8th Scientific Conference OTEH 2018 had an international character since among the accepted papers, 14 of them were from 11 foreign countries: UAE, Czech Republic, Italy, Hungary, Belarus, Finland, Bosnia and Herzegovina, Macedonia, New Zealand, Macedonia and South Korea (Table 1 shows the number of papers and authors from each country). The total number of authors and co-authors was 397, while 28 of them were from abroad.

Table 1. Overview of the number of papers

COUNTRY	Number of papers	Number of authors / co-authors
Serbia	97	365
Turkey	1	2
Italy	1	3
New Zealand	1	1
Czech Republic	1	2
Macedonia	1	5
Finland	1	2
Belarus	2	2
UAE	2	2
Bosnia and Herzegovina	2	6
Hungary	1	4
South Korea	1	1
TOTAL 12	111	397

At the beginning of the opening ceremony, the Director of the Military Technical Institute, col. Bojan Pavković, PhD, gave the introductory speech.

Figure 3. Introductory speech of the Director of the Military Technical Institute, col. Bojan Pavković, PhD

The 8th International Scientific Conference on Defensive Technologies OTEH 2018 was officially opened by the Minister of Defense of the Republic of Serbia, Aleksandar Vulin. On this occasion, he said that OTEH, being a very significant scientific-technical manifestation, represents an opportunity for all those directly and indirectly included in the activities of defensive technologies to meet in one place and exchange their experiences. He also said that the Ministry of Defense will always encourage international military-technical cooperation.

Figure 4. Lecture "A traveler through distant worlds and times" was held by a guest from the Institute of Meteorology prof. Lazar Lazić, PhD

The opening ceremony was attended by over 250 guests, about 50 of whom were from abroad: 22 authors / co-authors of the papers, 13 students of the Military Academy from Algeria, and military attachees from 5 countries (Belarus, Bulgaria, Turkey, Austria and the Czech Republic). It was also attended by numerous accredited representatives from the following media: Army Info Forum, magazine "Odbrana", "Kalibar", Fonet Agency" and the portal "Pozitivne vesti".

Figure 5. The first plenary lecture at the International Conference OTEH 2018, held by prof. Taek Liul Song, was dedicated to one part of the scientific opus of a successful Serbian scientist, prof. Darko Mušicki

Three plenary lectures were held. Lecture by prof. Taek Liul Song at the International Conference on Defense Technologies OTEH 2018, entitled: " Efficient Multiple-DetectionMultitarget Tracking " was dedicated to one part of the scientific opus of a successful Serbian scientist, prof. Darko Mušicki, who in the period from 2009.-2014., lived and worked at Hanjang University, An San, Republic of Korea, in a scientific team led by prof. Song. Darko was born on April 2, 1957 in Belgrade, Serbia. He graduated from the School of Electrical Engineering, University of Belgrade as the best student of his generation as well as the first student in the history of the Department to graduate one year before target date. Furthermore, Mušicki received his PhD degree in 1994 from the University of Newcastle. He became a leading scientist and professor in the field of radar control, particularly in automatic control and systems engineering of signal processing. His highly sophisticated knowledge was applied in the process of automatic tracking of moving targets on the Sky. This is well-known as the Theory of Estimation and Automatic Target Tracking. The greatest recognition for a professional contribution to the development of science he experienced by being selected twice as a president of the International Society of Information Fusion, ISIF. Darko was a Principal Research Fellow at the University of Melbourne, Australia, before he joined Hanyang University in 2010 as a full professor.

The second lecture "Methodological approaches to substantiation of directions of development of the system of armament" was held by col. Tumar V.A (Armed Forces of the Republic of Belarus) who explained that development of the system of armament depends on dialectics of armed struggle.

On the other hand development of new samples of equipment defines necessity of working out of new positions for a theory of art of war. Methodological approaches of substantiation of directions of development of the system of armament should consider absolute as well as relative economic indicators. Development of the system of armament is a set of processes of definition of directions changing its shape, substantiations of carrying out the research and developmental works, purchases or modernization with overhaul of equipment samples during which the system will pass in other more perfect condition. The samples of military equipment are the integral part of the system of armament of armed forces.. According to existing methodology, directions of development for the system of armament are chosen first as a whole, and then for each sample separately. It is specified by the principles of the methodology of substantiation of directions of development of the armament systems.

The main of them are: systemacity, balance, conformity of battle possibilities of the system of armament to perform the tasks of armed forces, conformity quantity-quality indicators of the system of armament to economic possibilities of a country, division of planning of the system of armament on long-term and short-term as well as standardization and unification of weapons and military equipment. Methodology is made of a set of methodological approaches of substantiation of directions of development of the system of armament.

The third one "Variable efficiency of modular battle teams heeled with compatible military equipment" was held by prof. Dr. Momčilo Milinović (Faculty of Mechanical Engineering, University of Belgrade).

The total number of the Conference participants was 397. In two days of work during the Conference, 16 sessions were held in four halls. Finally, the authors presented 115 papers in the context of open discussion. The average number of the participants in the sessions was about 20. Out of the total number of the accepted papers, only 17 papers were not presented due to the absence of the authors.

On the margins of the sessions, on the second day of the Conference, the participants had the opportunity to visit the Laboratory for inertial sensors and systems and the Laboratory for Experimental Aerodynamics. A cocktail reception for the Conference participants and invited guests was organized at the Central Military Club. For the guests from abroad, the Military Technical Institute organized sightseeing of Belgrade from an open bus.

At the closing ceremony, the attendees were addressed by the President of the Scientific Committee, col. Bojan Pavković, PhD. As a summary of two-day work, he was pleased to conclude that OTEH 2018 fulfilled the expectations of the organizers. He expressed his gratitude to all the authors and participants from abroad as well as from Serbia for their contributions and efforts which made this Conference possible and successful, and invited all the participants to the next OTEH conference that will be organized in 2020.

Conclusion

The 8th International Conference on Defensive Technologies (OTEH 2018) was successfully held from 11 to 12 October at the Military Technical Institute in Belgrade. A large number of scientists and researchers gathered on this occasion at the Military Technical Institute to exchange their experiences and ideas in the field of defensive technologies. More than 400 guests attended the Conference, including the authors and coauthors of the papers coming from abroad and from our country, representatives from the Ministry of Defense of the Republic of Serbia, accredited military attachees, students of master and doctoral academic studies from Algeria, and journalists from many media.

Including three plenary lectures, the total number of accepted papers was 115, out of which 14 were from abroad. Among 397 participants, 32 authors and co-authors were from abroad.

At 16 sessions held in 4 halls, 115 papers were presented and discussed, divided in 8 topics. Besides the working part, the participants had an opportunity to visit facilities of the Military Technical Institute as well as to enjoy sightseeing of Belgrade.

Figure 6. VTI Headquarters

The aim of the Conference was to promote a cooperation and establish new contacts that might provide even greater participation of authors and researchers from abroad in the next, 9th scientific conference OTEH 2020. OTEH 2018 has fulfilled the assigned goals. During the two-day Conference, many high-quality and original papers from current research projects were presented, as well as the papers on the research already applied in practice in particular military technology areas.

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8. Međunarodni naučnostručni skup iz oblasti odbrambenih tehnologija OTEH 2018

Ovaj rad nudi opšte informacije o 8. Naučnostručnom skupu OTEH 2018 organizovanom od 11-12 oktobra 2018. godine u Vojnotehničkom institutu u Beogradu. Takođe je dat sažet pregled istaknutih i interesantnih radova po tematskim oblastima, prezentovanim i prodiskutovanim na konferenciji.

Ključne reči: **odbrambena tehnologija, vojna industrija, međunarodni naučni skup, Srbija.**

8 – я Международная научная конференция по оборонным технологиям OTEX 2018

В этой работе содержится общая информация о 8-ой Международной научной конференции экспертов OTEX 2018, организованной 11-12 октября 2018 года в Военно-техническом институте в Белграде. Также был представлен итоговый обзор выдающихся и интересных работ по тематическим направлениям и областям, представленным и обсуждённым на Конференции.

Ключевые слова: **оборонные технологии, военная промышленность, международная научная встреча, Сербия.**

La 8.conférence d'experts scientifique du domaine des technologies de défense OTEH 2018

Ce papier présente les informations générales sur la 8.conférence d'experts scientifiques OTEH 2018 qui a été organisée du 11 au 12 octobre 2018 à l'Institut militaire technique à Belgrade. On a donné aussi un compte-rendu sur les travaux intéressants et remarquables groupés par les domaines thématiques exposés et discutés à la conférence.

Mots clés: **technologie de défense, industrie militaire, conférence scientifique internationale, Serbie.**