ЕКОНОМІКА ТА УПРАВЛІННЯ НАЦІОНАЛЬНИМ ГОСПОДАРСТВОМ

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APPLICATION OF SITUATIONAL MANAGEMENT METHODOLOGY IN FORENSIC INVESTIGATION OF AIR ACCIDENT CIRCUMSTANCES

Urgency of the research. *The authors solve the following praxeological questions: How do we perceive a dangerous flight situation, a flight incident and an air accident? Which basic stages of the investigation do we use? How to implement a situational management methodology for investigating the circumstances of an air accident?*

Target setting. *The article presents the analysis of the current state of information issues in the investigation of air accident circumstances in the military and civil aviation by using the methodology of situational management of forensic investigation processes.*

Actual scientific researches and issues analysis. *An integral part of this development is also the tackling the concept of development of the Air Force, with an emphasis on the training of personnel and the level of the flight operations and the flight safety.*

Uninvestigated parts of general matters defining. *The forensic investigation of air accidents and incidents is perceived as the specific application area of the Forensic Engineering.*

The research objective. *The core output of article is in the proposal of the investigation of air accident circumstances in the military and civil aviation.*

The statement of basic materials. *We use the tools of analysis and synthesis, the expert method with the inductive method based on the close observations and experimentation/investigation in the terrain, in the aviation practice.*

Conclusions. *It is therefore necessary to subject on the permanent pay attention to the theoretical and practical level.*

Some specific issues addressed in the monograph can be extended with the further proposals and selected issues to address within the scope of research and scientific base of the armed forces.

Keywords: *education; technology; training; military pilots.*

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ЗАСТОСУВАННЯ МЕТОДОЛОГІЇ СИТУАЦІЙНОГО УПРАВЛІННЯ В СУДОВОМУ ДОСЛІДЖЕННІ ОБСТАВИН ПОВІТРЯНОЇ АВАРІЇ

Актуальність теми дослідження. *Автори вирішують наступні праксеологічні питання: Як ми сприймаємо небезпечну ситуацію в польоті, політ і авіаційну аварію? Які основні етапи дослідження ми використовуємо? Як застосувати методологію ситуативного управління для розслідування обставин авіаційної аварії?*

Постановка проблеми. *У статті проаналізовано сучасний стан інформаційних питань при розслідуванні повітряних аварій у військовій та цивільній авіації з використанням методології ситуаційного управління криміналістичними процесами.*

Аналіз останніх досліджень і публікацій. *Невід'ємною частиною цього розвитку є також розробка концепції розвитку ВПС з акцентом на підготовку персоналу та рівень польотних операцій та безпеку польотів.*

Виділення недосліджених частин загальної проблеми. *Судово-медичне розслідування авіаційних подій та інцидентів сприймається як специфічна область застосування судової інженерії.*

Постановка завдання. *Основним результатом статті є пропозиція розслідування обставин авіаційних аварій у військовій та цивільній авіації.*

Виклад основного матеріалу. *Ми використовуємо засоби аналізу та синтезу, експертний метод з індуктивним методом, заснований на тісних спостереженнях і експериментах / дослідженні на місцевості, в авіаційній практиці.*

Висновки. *Тому необхідно підпорядкувати постійній увазі теоретичний і практичний рівень.*

Деякі конкретні питання, що розглядаються в монографії, можуть бути розширені з подальшими пропозиціями та окремими питаннями для розгляду в рамках наукової бази збройних сил.

Ключові слова: *освіта; технології; навчання; військові льотчики.*

Urgency of the research. The present is characterized by the increasingly intense professional discussions and the preparation of the documents prospectively affect and determine the further the development of aviation. An integral part of this development is also the tackling the concept of development of the Air Force, with an emphasis on the training of personnel and the level of the flight operations and the flight safety. What may be an insight into the issues of the flight safety?

The flight safety is an internally integrated system of the elements (subsystems) that respects their own identity (specifications, risks) and the existence of mutual relations as well as their ties with other areas of the human activity, in line with the intention to eliminate the influence of the risk flight factors and ensure the highest level of the security flights as a whole.

The issue of flight safety is constantly in the agenda of airline companies and institutions in the areas of air traffic management, the aeronautical implementation and safety, and the aviation staff training.

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Target setting. The article is the fourth part of a research study on the Knowledge Alliance of Aviation Education, to be completed in the framework of the institutional project "Integrated Aviation Education of Civilian and Military Personnel at the Faculty of Aeronautics, Technical University of Košice, the Slovak Republic", in 2019-2020.

Actual scientific researches and issues analysis.

We have the following praxeological questions: How do we perceive a dangerous flight situation, a flight incident and an air accident? Which basic stages of the investigation do we use? How to implement a situational management methodology for investigating the circumstances of an air accident?

Uninvestigated parts of general matters defining. The proposals to address these specific questions concerning forensic flight safety investigations may be the subject of scientific studies.

Literature review: Research theoretical framework of Air Forensic Investigation

The forensic investigation of air accidents and incidents is perceived as the specific application area of the Forensic Engineering.

The research objective. The main objective of article is the analysis of the current state of information issues in the investigation of air accident circumstances in the military and civil aviation by using the methodology of situational management of forensic investigation processes. The individual issues can be solved separately but must be interconnected.

The statement of basic materials. According to the monograph of Noon, K. Randal (2001) the term „the Forensic Engineering“ is the application of engineering principles, knowledge, skills, and methodologies to answer questions of fact that may have legal ramifications. Fundamentally, the job of a forensic engineer is to answer the question, what caused this to happen? A forensic engineer is not a specialist in any one science or engineering discipline. The solution of “real-world” forensic engineering problems often requires the simultaneous or sequential application of several scientific dis-ciplines. Information gleaned from the application of one discipline may provide the basis for another to be applied, which in turn may provide the basis for still another to be applied. The logical relationships developed among these various lines of investigation usually form the basis for the solution of what caused the event to occur. Because of this, skilled forensic engineers are usually excellent engineering generalists.

The basic core elements of the Air Forensic Investigation as an important part of **the Knowledge Alliance of Aviation Education** and as **the State-Privat education, research and investigation service** are based on:

- the know-how, the past and present Civil and Military aviation maintenance, repair and operation’s experience,
- the results of the theoretical work and the scientific and research activities in the field of : the Applied University Academic subjects, Social and Human Sciences, the Simulation and modelling of Security issues, the Applied Technical Sciences, the Applied Civil and Military / Air Force management, education and training etc. within the Expert Database of Civil and Military Aviation Experience in progess.

Selected theoretical framework of Knowledge Alliance within the Simulation and modelling of Security issues is in the work of Fuchs et al. (2010) focused on the simulation of dangerous substances outflows into the environment because of traffic accidents by dangerous substances transport, in the study of Dvorak et al. (2010) on the enhancing of security on critical accident locations using telematics support, in the work of Balatka et al. (2011) on the exposure of the environment and surface water by dangerous liquid - the slop outflow model, in the study of Kelemen and Blišťanová (2014) on the applied knowledge in the logistic modelling to handle the threat of floods with aviation logistic support, or in the study of Kompis et al. (2011) on the parallel computational models for composites reinforced by CNT-fibres for personal and vehicle protection materials, also in the work of Vágner and Papová 2014) on the comparison of Radar Simulator for Air Traffic Control used also for the education of new Air Traffic Controllers, in the work of Pavolová and Tobisová (2013) on the model of supplier quality management in the transport company applied for the air transport, tin the study of Kuzma et al. (2016) on the use of CAX System as a tool modeling construction element in the aviation industry, or

in the work of Fözö et al. (2009) on the advanced anytime control algorithms and modeling of turbojet engines etc.

Selected theoretical framework of Knowledge Alliance within the Applied Technical Sciences is in the work of Nečas and Kelemen (2009) on the call for more security by the technology revolution wanted, in the work of Bučka and Kelemen (2009) on the analysis of the specific requirements related to the Slovak Air Force, in the book of Hovanec (2016) on the digital factory as a prerequisite for successful application in the area of ergonomics and human factor, in the study of Andoga et al. (2018) on the intelligent situational control of small turbojet engines, in the work of Draganova et al. (2017) on the non-stationary noise analysis of magnetic sensors using allan variance, in the study of Semrad et al. (2014) on the analysis of all composite wing design containing the magnetic microwires etc.

Selected theoretical framework of Knowledge Alliance within the Applied Civil and Military / Air Force management, education and training is in the work of Socha et al. (2016) on the training of pilots using flight simulator and its impact on the piloting precision, in the study of Rozenberg et al. (2016) on the critical elements in piloting techniques in aerobatic teams, in the work of Durco et al. (2017) on the means of CPDLC using with ATC procedures in terminal maneuvering area, in the study of Nečas et al. (2009) on information operations and media: Beyond the Security Scope, in the analysis of Kalavsky et al. (2015) on the conditions for abandonment out of a helicopter using thepersonal rescue parachute, in the work of Sopoci et al. (2009) on the Air Force knowledge within the Military Management in the 21 century and Transformation of Army etc.

The educational and research sources for the study are available at the university library or on-line open access / e-learning modules, in future within the MOOC Massive Open Online Courses. The perspective Expert Database of Civil and Military Aviation Experience is still in progress.

Identification of problem and methodology.

The main problem is the investigation of air accident circumstances in the military and civil aviation by using the methodology of situational management of forensic investigation processes in the conditions of the Slovak Republic.

When analyzing the phenomenon, we used the tools of analysis and synthesis, the expert method with the inductive method based on the close observations and experimentation/investigation in the terrain, in the aviation practice.

The historical analysis of the aviation didactic systems and the air forensic investigation systems was carried out on the data basis of the selected air institutions from 1959 until the present:

- Vojenské letecké účilište Košice;
- Vojenská stredná škola letectva v Košiciach;
- Odborná výcviková škola letectva Košice;
- Vysoká vojenská letecká škola SNP v Košiciach;
- Vojenslá letecká akadémia gen. Milana Rastislava Štefánika v Košiciach (Air Force Academy in Košice, Slovakia);
- Letecká fakulta Technickej univerzity v Košiciach (Fcaulty of Aeronautics, the Tehchnical University of Košice, Slovakia);
- Lotnicza Akademia Wojskowa – "Szkoła Orląt", Air Force Academy in Deblin, Poland,
- Univerzita obrany, Fakulta vojenských technológií, the Czech republic;
- École de l'air, Salon-de-Provence, France (French Air Force Academy).

The lessons learned from the historical analysis were compared with the findings gained by the expert method. The expert group consisted of 5 specialists experienced in the aviation education and training. The data were obtained within the interviews with the experts.

This article represents the area of pedagogical research in the study and scientific field “Transport” in the Air Transport subgroup. Data collection for the study of the issue was carried out during 2018/2019. The origin of the analyzed material is in the database of 60 years of aviation education within the Czechoslovakia and the Slovak Republic. Our national experience, including the personal experience, has been compared and complemented by the successful experience of aeronautical training abroad (Czech Republic, Poland, France). From 2018 the Faculty of Aeronautics of the Tech-

nical University in Košice is a part of this international educational consortium based in Košice. These new findings have affected the results presented in the article.

Results and Discussion. Air Force.

The Air Force accident investigation is a complex process consisting of a mosaic of specific events, the consequences of which, in particular, but the cause of being investigated. Only a thorough and the comprehensive investigation of an accident allows the system to adopt and implement the effective measures under the prevention of the recurrence of similar accidents and incidents, so as much as possible to increase the overall level of the flight safety.

Based on the nature of the performance of tasks during the investigation of an accident investigation process itself can be divided into three phases:

- The first phase - gathering information about the accident and investigation organization.
- The second phase - the immediate work of the Commission in the investigation of an accident and determining its causes.
- The third phase - the case file processing according to the results of the investigation.

In the first phase of the investigation the commander works generally with limited and incomplete information about an accident, the flight crew and the aircraft. Important role to play in this phase has the response of the entire rescue system, the professional rescue team and synergy with other elements of the search and rescue action. At this phase the commander is processing „preliminary report on an accident“, "and the commander will appoint the Commission of investigation.

In the second phase of the investigation the Commision is proceeding in accordance with the methodology of the investigation of aircraft accidents and directives for action, emphasizing the documentation and the course of the accident, examining various options causes of accidents and the very causes of emergency. Depending on the needs analysis are undertaken an expertises in the various fields of the investigation, within groups of the Commission of investigation, or in conjunction with invited specialists (institutions).

In the third phase of the investigation, the Commission shall make a comprehensive processing of the results of the investigation as a "Report on the investigation of an accident" (case file), which will hand over together with the recommendations to the investigating commander.

The chairman of the investigation commission shall adopt the measures to ensure the complex process of a commission of inquiry to clarify the cause of accidents. According to the Ministry of Defence regulation (2001) the aviation accident investigation is in terms of the structure and procedure of the work performed-oriented research and the analysis of events in the following areas: the circumstances of an accident, the flight readiness of the flight crew and flight organization (flying), the state of aviation technology, the medical examination.

Based on the information and documents processed by the individual investigators and invited experts, they are within groups of the Commission of investigation prepared the preliminary conclusions in the areas mentioned in the investigation.

Subsequently, the Commission carried out an analysis of the materials of the investigation and evaluation of the results of expertise in order to identify the cause of an accident and the cause of the emergency during the flight.

The investigation into the circumstances of an accident is the primary source of information to begin the process of clarifying the circumstances and causes of accidents, and is executing the work: the investigation of the impact of the aircraft into the ground, the hearing of the flight crew, the interviewing witnesses of an accident, the use of recordings of the means of connection and radiotechnical equipment.

When examining the impact point, the attention of investigators focused on the search for and identification of each component or wreckage (priority to the register flight data and the cockpit of aircraft), carrying out a detailed plotting of the impact point and the corresponding photographs (using camera and video camera). Simultaneously with the charts of the wreckage it is evaluated the probable flight path of the aircraft and its position on the impact into the ground (the angle of incidence), and the using of lifesaving aircraft. The Commission records in detail the outward signs of the destruction of aircraft.

The interrogation of the crew members of the airplane, the investigators clarify the nature of the flight tasks, flight mode (track, time and the flight altitude ...), the course of the flight, place and time of the emergency. The interest in the work of investigators is focused on the activity of alarm systems of the aircraft, the operation of equipment and aircraft engines, the flight crew activity during an emergency, their radio communication and the using of life-saving equipment of the aircraft. The interrogation of the crew members of the aircraft must take into account the fact that the Commission is working with the subjective meaning of people, usually under heavy psychological stress.

The interrogation of witnesses of the aviation accident the investigators focused on the eyewitnesses from the area of the impact of aircraft, persons involved in the preparation of the crew, the air traffic control personnel and providing flight operations. The questioning is implemented by the investigators who know the methodology of implementation of interrogation and communication technology.

For the objectivity of the investigation shall be used for the recording of radio communications control communications with the crew of the aircraft and the recording of radar air situation at a time before the emergencies until an accident.

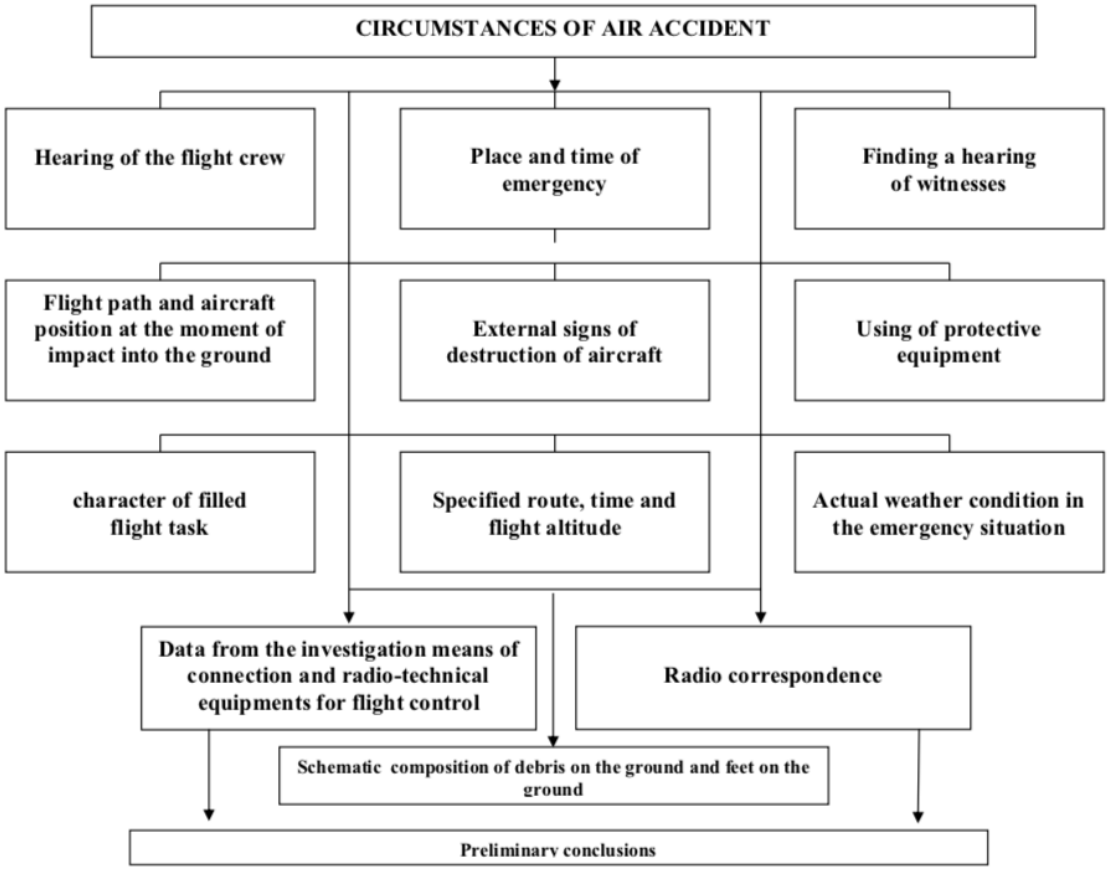

Fig. 1 Circumstances of Air Accident (Source: Authors)

Based on the collected data and the interim analyses of the members of the investigation commission and co-workers, the specialized equipment and the scientific research institutions, they are processed the provisional conclusions on: the circumstances of an accident, the flight readiness of the flight crew and flight organization, the state of aviation technology, the medical examination.

The investigation commission conducted a comprehensive analysis of the materials of the investigation to determine the cause of an accident and cause of emergency. The Commission shall submit to the investigating commander report on the investigation of an accident, containing the following information:

the description of the circumstances of an accident, the causes of accidents and causes of emergency, the responsibility for an accident people (the guilty), the draft of measures to prevent the similar aircraft accidents, the appendix to the report (technical report, technical management, reporting ...). That content respects the requirements of the regulation on the list of documents in the "Investigation Report".

When it was proven during the investigation found that the aviation technology worked without failure and has not been the cause of accidents, it is treated as a brief technical report for a comprehensive assessment of the state of aviation technology. If the causes of the accident was the fault of the aviation technology, it is processing the technical report, which is very detailed analysis of the causes of its failure.

The annex provides all report to the authority in connection with the accident, the photo documentation and video footage from the site of impact of the aircraft chart layout debris and the aggregates aircraft on the ground, the pattern profile and the route of flight termination crew members and other direct and indirect witnesses of an accident, the findings of the medical examination, the expert advice and laboratory examinations, etc. Attachments are also included the copies of documents on the fly, flight certificate or other document authorizing the crew to fly and documents crew members of the aircraft.

Upon presentation of "Investigation Report" from the commission of investigation are processed the commander conclusions on the results of the investigation of aircraft accidents. The investigating commander inform the air staff on the master lists of the circumstances, the conditions and causes of accidents. The commander also lays down the binding measures for the prevention of accidents for the same reasons.

Conclusions. The aircraft accident and incident investigation is the most important source of accident prevention in the field of flight safety. The goal is not to punish the guilty, but the identification of causes and the events formulation of effective prevention measures, on the basis of available and the objective information and the subsequent administrative decisions. It is therefore necessary to subject on the permanent pay attention to the theoretical and practical level.

Some specific issues addressed in the monograph can be extended with the further proposals and selected issues to address within the scope of research and scientific base of the armed forces.

Based on the nature of the performance of tasks during the investigation of an accident, the investigation process itself is divided into three phases:

The first phase – the gathering of information about the accident and investigation organization.

The second phase – the immediate work of the Commission in the investigation of an accident and the determining its causes.

The third phase – the investigation file processing according to the results of the investigation.

In the terms of structure and procedures of work performed the air accident investigation is focused on the exploration and analysis of events in the following areas: the circumstances of an accident, the flight readiness of the air crew and the organization of flight activities at the air unit, the state of aviation technology, the medical examination.

The complexity of the investigation process, the mutual bond of relevant information about the accident and the time-consuming process of professional work and expertise are the main features of the process. The requirement of comprehensiveness, objectivity and adequate time for the investigation and the taking preventive measures are the natural drivers of optimizing the process of investigation of an air accident in all its areas. The way to solve the problems is most likely to be based on application: the exact methods of decision-making, or the heuristic methods of decision making, or the decisions by the degree of informed.

The process optimization will be given by the determining the required criteria of optimization for the decision-making investigation into the circumstances of an air accident, or the deviations from the established plans of the situation management of investigative procedures.

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References

1. Noon, K. R. (2001). *Forensic Engineering Investigation*. Florida, USA: CRC Press LLC [in English].
2. Fuchs, P., Novak, P., Saska, T., Smida, J., Dvorak, Z., Kelemen, M. & Sousek, R. (2010). Simulation of dangerous substances outflows into the environment because of traffic accidents by dangerous substances transport", in Sánchez, M. (ed.), *the 14th world multi-conference on systemics, cybernetics and informatics, WMSCI 2010 proceedings*, volume 1, 204-207 [in English].
3. Dvorak, Z., Cekerevac, Z., Kelemen, M. & Sousek, R. (2010). Enhancing of security on critical accident locations using telematics support", in Sánchez, M. (ed.), *International conference on society and information technologies, ICSIT 2010 proceedings*, April 6th-9th, 414-417 [in English].
4. Balatka, M., Fuchs, P., Kamenicky, J., Sousek, R. & Kelemen, M. (2011). Exposure of the environment and surface water by dangerous liquid - the slop outflow model, in Sánchez, M. (ed.), *15th World Multi-Conference on Systemics, Cybernetics and Informatics, Proceedings*, Volume III, July 19th - July 22nd, 280-284 [in English].
5. Kelemen, M. & Blišťanová, M. (2014). Logistic Modelling to handle the Threat of Floods - The Bodva River example, in Curran Associates, Inc. (eds.), *14th International Multidisciplinary Scientific GeoConference, SGEM 2014 Conference Proceedings*, Volume III, 715-723 [in English].
6. Kompis, V., Qin, QH., Fu, ZJ., Chen, CS., Droppa, P., Kelemen, M. & Chen, W. Parallel computational models for composites renforced by CNT-fibres, *Engineering Analysis with Boundry Elements*. 36, 1/2012, 47-52 [in English].
7. Vágner, J. & Pappová, E. (2014). Comparison of Radar Simulator for Air Traffic Control", *Naše more*, 61(1-2), 31-35 [in English].
8. Pavolová, H., & Tobisová, A. (2013). The Model of Supplier Quality Management in Transport Company, *Naše more*, 60 (5/6), 123-126 [in English].
9. Kuzma, D., Korba, P., Hovanec, M. & Dulina, L. (2016). The Use of CAX System as a Tool Modeling Construction Element in the Aviation Industry", *Naše more*, 63(3) SI, 134-139 [in English].
10. Fözö, L., Andoga, R. & Madarász, L. (2009). Advanced anytime control algorithms and modeling of turbojet engines, in Rudas, I.J., Fodor, J. & Kacprzyk, J. (eds.), *Computational intelligence and informatics, the 10th international symposium of Hungarian researchers, proceedings*, November 12-14, 83-94 [in English].
11. Nečas, P. & Kelemen, M. (2009). Call for more security: Technology revolution wanted", in Vintr, Z. (ed.), *International conference on Military Technologies*, 9, 246-250 [in English].
12. Bučka, P., & Kelemen, M. (2009). Requirements related to the Slovak Republic´s Air Force, in Vintr, Z. (ed.), *International conference on Military Technologies*, *5-9*, 282-289 [in English].
13. Hovanec, M. (2016). Digital factory as a prerequisite for successful application in the area of ergonomics and human factor, *Theoretical Issues in Ergonomics Science*, *18(1),* 35-45 [in English].
14. Andoga, R., Fozo, L., Judicak, J., Breda, R., Szabo, S., Rozenberg, R. & Dzunda, M. (2018). Intelligent Situational Control of Small Turbojet Engines, *INTERNATIONAL JOURNAL OF AEROSPACE ENGINEERING*, 2018, 16 [in English].
15. Draganová, K., Moucha, V., Volcko, T. & Semrád, K., (2017). Non-Stationary Noise Analysis of Magnetic Sensors using Allan Variance, *Acta Physica Polonica*, 131(4), 1126-

Література

1. Noon, K. R. (2001). *Forensic Engineering Investigation*. Florida, USA: CRC Press LLC.
2. Fuchs, P., Novak, P., Saska, T., Smida, J., Dvorak, Z., Kelemen, M. & Sousek, R. (2010). Simulation of dangerous substances outflows into the environment because of traffic accidents by dangerous substances transport", in Sánchez, M. (ed.), *the 14th world multi-conference on systemics, cybernetics and informatics, WMSCI 2010 proceedings*, volume 1, June 29th - July 2nd, 2010, 204-207.
3. Dvorak, Z., Cekerevac, Z., Kelemen, M. & Sousek, R. (2010). Enhancing of security on critical accident locations using telematics support", in Sánchez, M. (ed.), *International conference on society and information technologies, ICSIT 2010 proceedings*, April 6th-9th, 2010, 414-417.
4. Balatka, M., Fuchs, P., Kamenicky, J., Sousek, R. & Kelemen, M. (2011). Exposure of the environment and surface water by dangerous liquid - the slop outflow model, in Sánchez, M. (ed.), *15th World Multi-Conference on Systemics, Cybernetics and Informatics, Proceedings*, Volume III, July 19th - July 22nd, 2011, 280-284.
5. Kelemen, M. & Blišťanová, M. (2014). Logistic Modelling to handle the Threat of Floods - The Bodva River example, in Curran Associates, Inc. (eds.), *14th International Multidisciplinary Scientific GeoConference, SGEM 2014 Conference Proceedings*, Volume III, 17-26 June, 2014, 715-723.
6. Kompis, V., Qin, QH., Fu, ZJ., Chen, CS., Droppa, P., Kelemen, M. & Chen, W. Parallel computational models for composites renforced by CNT-fibres, *Engineering Analysis with Boundry Elements*. 36, 1/2012, 47-52.
7. Vágner, J. & Pappová, E. (2014). Comparison of Radar Simulator for Air Traffic Control", *Naše more*, 61(1-2), 31-35.
8. Pavolová, H., & Tobisová, A. (2013). The Model of Supplier Quality Management in Transport Company, *Naše more*, 60 (5/6), 123-126.
9. Kuzma, D., Korba, P., Hovanec, M. & Dulina, L. (2016). The Use of CAX System as a Tool Modeling Construction Element in the Aviation Industry", *Naše more*, 63(3) SI, 134-139.
10. Fözö, L., Andoga, R. & Madarász, L. (2009). Advanced anytime control algorithms and modeling of turbojet engines, in Rudas, I.J., Fodor, J. & Kacprzyk, J. (eds.), *Computational intelligence and informatics, the 10th international symposium of Hungarian researchers, proceedings*, November 12-14, 2009, 83-94.
11. Nečas, P. & Kelemen, M. (2009). Call for more security: Technology revolution wanted", in Vintr, Z. (ed.), *International conference on Military Technologies*, ICMT ´09 [electronic source], May 5-9, 2009, 246-250.
12. Bučka, P., & Kelemen, M. (2009). Requirements related to the Slovak Republic´s Air Force, in Vintr, Z. (ed.), *International conference on Military Technologies*, ICMT ´09 [electronic source], May 5-9, 2009, 282-289.
13. Hovanec, M. (2016). Digital factory as a prerequisite for successful application in the area of ergonomics and human factor, *Theoretical Issues in Ergonomics Science*, 18 (1), 35-45.
14. Andoga, R., Fozo, L., Judicak, J., Breda, R., Szabo, S., Rozenberg, R. & Dzunda, M. (2018). Intelligent Situational Control of Small Turbojet Engines, *INTERNATIONAL JOURNAL OF AEROSPACE ENGINEERING*, 2018, 16.
15. Draganová, K., Moucha, V., Volcko, T. & Semrád, K., (2017). Non-Stationary Noise Analysis of Magnetic Sensors using Allan Variance, *Acta Physica Polonica*, 131(4), 1126-1128.

ЕКОНОМІКА ТА УПРАВЛІННЯ НАЦІОНАЛЬНИМ ГОСПОДАРСТВОМ

1128 [in English].

16. Semrád, K., Lipovský, P., Cernan, J. & Jurčovič, M. (2014). Analysis of all composite wing design containing magnetic microwires, in Trebuňa, F. (ed.). *Modelling of Mechanical and Mechatronic systems, 6th Conference on Modelling of Mechanical and Mechatronic systems (MMaMS)*, 428-434 [in English].

17. Socha, V., Socha, L., Szabo, S., Hanak, K., Gazda, J., Kimlickova, M., Vajdova, I., Madoran, A., Hanakova, L., Nemec, V., Puskas, T., Schlenker J. & Rozenberg, R. (2016). Training of pilots using flight simulator and its impact on piloting precision, in Ostaševičius, V. (ed.), *Transport Means 2016, Proceedings of the International Conference*, 5-7, 374-379 [in English].

18. R. Rozenberg, V. Socha, L., Socha, S. Szabo & Nemec, V. (2016). Critical elements in piloting techniques in aerobatic teams, in Ostaševičius, V. (ed.), *Transport Means 2016 - Proceedings of the International Conference*, October, 5-7, 444-449 [in English].

19. Ďurčo, S., Sabo, J., Rozenberg, R. & Miženková, Ž. (2017). Means of CPDLC using with ATC procedures in terminal maneuvering area", in Hrubý, M. (eds.), *Distance Learning, Simulation and Communication 2017, proceedings*, May 5-9, 2017, 62-67 [in English].

20. Kelemen, M., Nečas, P., Terem, P. (2010). Advanced aerospace management of integrated education and training towards comprehensive security, *INCAS BULLETIN*, 2 (3/ 2010), 45 – 49 [in English].

21. Nečas, P., Kelemen, M. & Sopóci, M. (2009). Information operations and media: Beyond the Security Scope? in Stanciu, L. (ed.), *15th International Conference the Knowledge-based Organization: Military Sciences. Security and Defence, Conference Proceedings 1*, November 26-28, 2009, 96-103 [in English].

22. Kaľavský, P., Socha, V., Socha, L., Kutílek, P., Gazda, J. & Kimličková, M. (2015). Conditions for Abandonment Out of a Helicopter Using Personal Rescue Parachute, in Stefek, A. & Krivanek, V. (eds.). *International Conference on Military Technologies Location, Book Series: INTERNATIONAL CONFERENCE ON MILITARY TECHNOLOGIES*, MAY 19-21, 467-471[in English].

23. Sopóci, M., Kelemen, M. & Nečas, P. (2009). Military Management in 21 century and Transformation of Army", in Stanciu, L. (ed.), *15th International Conference the Knowledge-based Organization: Military Sciences. Security and Defence, Conference Proceedings 1*, 138-142 [in English].

24. Let-1-5. (2001). *Bezpečnosť letov*. [*Flight Safety].* Bratislava, Slovakia: Ministry of Defence [in English].

16. Semrád, K., Lipovský, P., Cernan, J. & Jurčovič, M. (2014). Analysis of all composite wing design containing magnetic microwires, in Trebuňa, F. (ed.), *Modelling of Mechanical and Mechatronic systems, 6th Conference on Modelling of Mechanical and Mechatronic systems (MMaMS)*, November 25-27, 2014, 428-434.

17. Socha, V., Socha, L., Szabo, S., Hanak, K., Gazda, J., Kimlickova, M., Vajdova, I., Madoran, A., Hanakova, L., Nemec, V., Puskas, T., Schlenker J. & Rozenberg, R. (2016). Training of pilots using flight simulator and its impact on piloting precision, in Ostaševičius, V. (ed.), *Transport Means 2016, Proceedings of the International Conference*, October, 5-7, 2016, 374-379

18. R. Rozenberg, V. Socha, L. Socha, S. Szabo & V. Nemec, Critical elements in piloting techniques in aerobatic teams, in Ostaševičius, V. (ed.), *Transport Means 2016 - Proceedings of the International Conference*, October, 5-7, 2016, 444-449.

19. Ďurčo, S., Sabo, J., Rozenberg, R. & Miženková, Ž. (2017). Means of CPDLC using with ATC procedures in terminal maneuvering area", in Hrubý, M. (eds.), *Distance Learning, Simulation and Communication 2017, proceedings*, May 5-9, 2017, 62-67.

20. Kelemen, M., Nečas, P., Terem, P. (2010). Advanced aerospace management of integrated education and training towards comprehensive security, *INCAS BULLETIN*, 2 (3/ 2010), 45 – 49.

21. Nečas, P., Kelemen, M. & Sopóci, M. (2009). Information operations and media: Beyond the Security Scope? in Stanciu, L. (ed.), *15th International Conference the Knowledge-based Organization: Military Sciences. Security and Defence, Conference Proceedings 1*, November 26-28, 2009, 96-103.

22. Kaľavský, P., Socha, V., Socha, L., Kutílek, P., Gazda, J. & Kimličková, M. (2015). Conditions for Abandonment Out of a Helicopter Using Personal Rescue Parachute, in Stefek, A. & Krivanek, V. (eds.), *International Conference on Military Technologies Location, Book Series: INTERNATIONAL CONFERENCE ON MILITARY TECHNOLOGIES*, MAY 19-21, 2015, 467-471.

23. Sopóci, M., Kelemen, M. & Nečas, P. (2009). Military Management in 21 century and Transformation of Army", in Stanciu, L. (ed.), *15th International Conference the Knowledge-based Organization: Military Sciences. Security and Defence, Conference Proceedings 1*, November 26-28, 2009, 138-142.

24. Let-1-5. (2001). *Bezpečnosť letov*. [Flight Safety]. Bratislava, Slovakia: Ministry of Defence.

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