

## MODELLING OF THE SURFACE MOVEMENTS IN GIS IN THE KOŠICE DEPRESSION FOR A PURPOSE OF HUMANS AND PROPERTY PROTECTION

Vladimír SEDLÁK, Pavel NEČAS, Václav MIKULENKA

**Abstract:** It is necessary to understand the geo-tectonic recent movements and landslides and mining subsidence of the earth surface and the earth crust movements as a natural continuation of dynamic tectonic processes. Determined movements by means of using the geodetic terrestrial or satellite navigation technologies give information about displacements in concrete time information on the base of repeated geodetic measurements in the concrete time intervals. 3D deformation investigation of the point of the monitoring station stabled in Košice-city and the Košice Depression territory in East Slovakia is the main task of the presented paper. The obtained results are transformed into GIS (Geographical Information Systems) in a frame of the environmental and humans and property protection.

**Keywords:** GIS, ground movements, environmental and humans and property protection.

## DETECTOR TUBE WITH PICRIC ACID USED TO DETECT IRRITATING CN AND CS AGENTS IN THE AIR

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**Abstract:** Description of methods used for the detection of irritating CS and CN agents in the air by the detection tube containing silica gel with immobilized picric acid in the presence of dimethyl sulfoxide and glass ampoule with 20% solution of sodium hydroxide. The presence and concentrations of CN and CS agents can be determined from the intensity of the indicator layer color. The method is sensitive enough (detection limit of 0.1 to 0.3 mg.m<sup>-3</sup>) even for the use in the field conditions. The work also describes the possibility of detecting CN and CS agents in organic solvents (limit of detection 10 µg.ml<sup>-1</sup>).

**Keywords:** CN agent, CS agent, detector tube, picric acid.

## THEORETICAL AND METHODOLOGICAL ADVANCES TOWARDS AN EPISTEMIC COMPETENCY OF DECISION-MAKERS

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**Abstract:** The study proposes a paradigmatic approach of a social necessity that emerges in the process of managing organizations: the formation of a decision-maker's epistemic competence. The project implies that managers at any level of organizational hierarchy would be able to update their information processing capacity by assimilating a set of basic, but relevant metacognitive and epistemological principles. Starting from Lucian Culda's processual-organic theory of social existence, the author provides a transdisciplinary theoretical framework and some basic methodological guidance for managers willing to participate in such an undertaking.

**Keywords:** Paradigmatic science, processual-organic theory, epistemic competence.

## ENHANCED TIRE MODEL FOR VIBRATION ANALYSIS OF VEHICLE

Mário ŠTIAVNICKÝ

**Abstract:** The simplified vehicle models for vibration analysis consisting of rigid bodies connected with springs and dampers are well known in car community. These models are efficient for simplified simulations of vehicle springing with minimal requirement for computation power yet they are in certain cases sufficiently accurate. The main problem for these models are tires which are modeled as a set of springs parallelly connected with dampers with the ends in contact with passing terrain. This way the fore-aft forces parallel with ground acting on the tire are completely neglected resulting in discrepancies compared to real tires. Also for terrain with discontinuities the results are poor. In this paper a Finite Element Method (FEM) model of tires is presented which can be directly used with existing simplified vehicle models thus eliminating the need for new modeling and simultaneously providing better contact handling and vibration response.

**Keywords:** Finite – elements, vehicle model, tire model, contact handling, dynamic simulation.

## **SOCIAL RELATIONS AND ACTIVITIES –PART OF THE CULTURE OF A MILITARY ORGANIZATION**

Jozef MATIS, Eva ZÁVODNÁ

**Abstract:** The content of this article is theoretic analysis of the environment of social relations and social activities in military organization as main social components, which form the content of culture of military organization. Theoretic analysis is performed from the sociologic aspect. The emphasis is on defining social relations and social activities as two inseparable parts of each social bond in general and steadiness of culture of military organization in particular.

**Keywords:** Social bond, social relations and activities, culture of organization, military organization, culture of military organization.

## **THE ROLE OF INFORMATIVE ENVIRONMENT IN ECONOMICEL SECURITY OF ENTERPRISES**

Valentina NOVAK, Tatiana MOSTENSKA, Oksana ILIENKO

**Abstract:** Some aspects of the informative process management of enterprises' economic security related to structuring of the informative environment on the basis of the balanced system of indicators and employment of this methodology in the construction of the complex system of the economic security of an enterprise are considered in the article.

**Keywords:** Economic security, management.

## **LOGISTIC APPLICATIONS IN RECEPTION, STAGING, ONWARD MOVEMENT ACCOMPLISHMENT**

Nataša POMAZALOVÁ, Zbyšek KORECKI, Tomáš DVOŘÁK

**Abstract:** The Strategic deployment & Reception, Staging, Onward Movement and Integration functionality includes full spectrum of military operations going through all levels of military structure – strategic, operational and tactical. Strategic deployment is considered as a fully strategic mission level due to current capabilities of countries involved. Reception, as a most comprehensive period, constitutes an interfacing between the strategic and the operational level. The process is aimed at combat power generation, which means not only accomplished transport of soldiers, equipment and into-theatre movement, but soldiers' integration process as accomplishment of military command „end state“ status. In this research is analyzed current RSOM process planned by Czech and Slovak European Union Battle Group (CZ/SVK EU BG) in 2009. Results show the logistic infrastructure as a critical factor for a successful operation execution and the applications of the operational research approaches to logistic assessment.

**Keywords:** Deployment, operation, research, critical path, lessons learned, life support.

## **PARADIGMS OF PEDAGOGY**

Ildikó SZELEI

**Abstracts:** The education is a strongly controversial issue; I believe it cannot be determined easily and clearly, only ideas and philosophies can be created but these are necessary if we want to deal with people. However education influences our life in many aspects regardless of position, rank. Therefore it is important to develop and extend our pedagogical culture and knowledge. Through this study I would like to designate the borders at the field of philosophy of pedagogy and education methodology and determine what we mean under education.

**Keywords:** Pedagogy, Inheritance, socialization, inclination, genetics.

## LIFELONG EDUCATION AS THE BASE OF CARRIER OF MILITARY PROFESSIONAL

Lenka KURHAJCOVÁ, Lubomír BELAN

**Abstract:** In these days the main idea of education is whole – life education. Every organization needs to have a conception of learning organization. The necessary assume of carrier development not only of military professionals but each other is lifelong education. The aim of this article is to show like convenient chosen methods have better influence of further education, and have better satisfaction with education.

**Keywords:** Lifelong education, military professional, courses, key competence of manager development.

## ASPECTS REGARDING THE USE OF INNOVATIVE DECISION SUPPORT SYSTEMS IN MILITARY APPLICATIONS

Alexandru GĂLUȘCĂ, Traian ANASTASIE, Gabriela PRELIPCEAN, Ionică CÎRCIU , Mircea BOSCOIANU

**Abstract:** The sustained progress in ICT represents an opportunity to develop new models for military decision making, more accurate, more robust. The interest is to build a flexible framework capable to support decision makers in military applications.

The complexity of force planning and operations planning is influenced by the high uncertainty and the new dynamics that affects an extended set of factors (political, military, economic, social, information, infrastructure). The response based on different type of instruments (diplomatic, information, military, economic) should be supported by a new framework, capable to offer the power of selection is given by the limitation of resources. The use of modeling and simulation offer a better understanding of the concepts and solutions for commander's decision making.

The new paradigm to adopt a flexible, adaptive, and robust solution is totally different from the classic planning and is focused on the exploitation of the strengths elements of the human creativity and knowledge. New analytical framework will offer also effective instruments in real time, capable to support the optimal decision making.

**Keywords:** MDMP (military decision making process), DSS (decision support systems), modeling and simulation (M&S), military applications.

## HIGHER EDUCATION IN AIR FORCE: CHALLENGES AND PERSPECTIVES

Florin MOISESCU, Mircea BOSCOIANU, Vlad VÂGA

**Abstract:** Training of civil aviation and military personnel is based on higher education often by, Air Force Academy, but also the courses Romanian Aviation Academy, and sport aviation. The Romanian aeronautics research set off while the great academies of the world believed that "the problem of flight with a device that weighs more than air can not be resolved and there is only a dream and he did successfully. In terms of aviation higher educational institutions, education is based more on teaching and learning and less or not at all on the research.

There weren't made any investments in research, not even in the present days and no support for young aviation enthusiasts is offered. Prospects are, as before, very good. We have, however, the same old dilemma: how to fund research and aviation industry? Does it follow another period of decline? Do we continue the series of missed opportunities? Or accept what the European papers say, that we should try a new road at the long-term sustainable development, the recovery of existing capacity and develop new science and technological progress, the elimination of the standard of living gap with the West, the which supports and accepts resignation of hundreds of years? Europe says that there where is the aviation industry, there is sustainable development.

**Keywords:** Air Force (AF), aviation industry, R&D research and development, global economic crisis.

## VISUALIZATION SERVICES FOR JOINT TRAINING FACILITY

Jan HODICKÝ, Petr FRANTIS

**Abstract:** 3D visualization services of Common Operational Picture can play a key role in achieving better understating of battlefield situation by providing spatial unit positions in 3D terrain data. This fact is valid in M&S world as well as in command and control systems. Appropriate mixing of two dimensions (2D) and three dimensions (3D) battlefield visualization can significantly increase the shared awareness not only at the tactical level but also at the operational level. For the operational level using aggregation filters to decrease amount of visualized information is essential.

This paper deals with an original solution that integrates the possibility of hybrid training system for air defense units together with constructive simulation and a new presentation layer of command and control system of Czech Ground Forces in three dimensions. It creates complete joint training environment with connection to real time ground forces situation. It can be used as an offline training tool or if deployed as support tool (train as you fight).

First, the joint training architecture solution is mentioned. It is based on 2D desktop solution based on constructive simulation and 2D/3D visualization services implemented in Czech command and control system. The Service Oriented Architecture is used in design and implementation of interface layers.

Second, issue of merging the air and ground forces visualization is analyzed. The information fusion and mainly aggregation functions must be implemented to join these two totally different areas (air force tactical time is much faster than ground forces tactical time).

Finally paper reports on the current state and benefits of this joint training facility.

**Keywords:** Visualization, common operational picture, battlefield, command and control, three dimensions.

## RESEARCH SCALAR FILTERING ALGORITHM WITH SELFORGANIZATION METHOD FOR MODELLING CONTROL SYSTEM

Andrey PROLETARSKY, Konstantin NEUSIPIN

**Abstract:** The scalar filtering method with selforganization method is discussed in this paper. This complex method is one of the key points in building compact algorithm of control systems for dynamic objects. The selforganization algorithm can synthesize target, produce decision-making and bring out control action to realize target under effects of series of uncertainties.

**Keywords:** Scalar filtering, selforganization method.

## ENVIRONMENTAL CAPACITY OF AN AIRPORT AS AN ELEMENT OF BALANCED APPROACH TO AIRCRAFT NOISE CONTROL

Elena KONOVALOVA

**Abstract:** The paper presents analysis of Environmental Capacity of an Airport as an Element of Balanced Approach to Aircraft Noise Control. The main aim of the article is to use the concept of airport environmental capacity as according to ICAO Balanced Approach to aircraft noise control and emissions control. The interrelations of environmental, economic and operational capacities are discussed.

**Keywords:** Airport capacity, airport environmental performances, noise and emissions control.

## **INTERPOLATING SOLID ORIENTATIONS WITH QUATERNION CURVES BASED ON ATOMIC FUNCTIONS AND CARDINAL SERIES**

Mikhail A. BASARAB

**Abstract:** New classes of unit quaternion curves to smooth interpolation of a given sequence of solid orientations are proposed. The first technique uses the compactly supported atomic functions for forming the so-called cumulative bases in the way similar to the procedure for constructing the B-spline quaternion curves. The resulting quaternion curves are infinitely differentiable and their curvature can be regulated by an appropriate choice of atomic function's parameters. Another approach is based on the cardinal interpolation series (the Whittaker–Kotelnikov–Shannon series) and its generalized version which uses the Fourier transforms of some atomic functions. It is shown that cardinal cumulative bases result undesirable oscillatory behavior of quaternion curves while their atomic generalization allows one to eliminate these unnatural oscillations.

**Keywords:** Quaternion, rotations, interpolation, atomic function.

## **DEVELOPMENT OF MOTORIC ABILITIES AND PHYSICAL FITNESS OF MILITARY PROFESSIONAL DURING THEIR STUDIES AT THE ACADEMY OF THE ARMED FORCES IN LIPTOVSKÝ MIKULÁŠ**

Dušan LITVA

**Abstract:** We deal with the level of motor abilities and skills of male and female students of the first up to the fourth year of the Armed Forces Academy in Liptovsky Mikuláš in respective semesters of study. Two generation of four year study students were involved in the research. There are observable changes in almost all motor abilities in comparison with the beginning of study. The interesting differences are in swimming skills performance. The highest increase was recorded in endurance tests (Cooper test, 4 km, 5km run). Gradual increase of performance from the first up to the fourth year was recorded in female sample. On the contrary, male reached the top level of conditioning abilities in the second year and they did not improve noticeably further. The most noticeable changes in the level of conditioning abilities appeared in the tests during the last semester of study.

**Key words:** Motoric abilities of military professionals, fitness performance tests.