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20030077846 Research and Technology Organization, Neuilly-sur-Seine, France

Reconsideration of the Effects of Impulse Noise

April 2003; 114 pp.; In English; Original contains color and black and white illustrations

Report No.(s): RTO-TR-017; AC/323(HFM-022)TP/17; Copyright; Avail: CASI; [C01](#), CD-ROM; [A06](#), Hardcopy

This report contains the main outcome of the work constituted by NATO Research Study Group RSG.29 Reconsideration of the effects of impulse noise. The main objective of the work of RSG.29 was to assess the risk of hearing loss from exposure to impulse sounds, by identifying occurrences which are hazardous and by developing measures which will protect hearing. This final report is not a consensus report of the entire RSG. It focuses on the risk of auditory damage from impulse noise (rifles and blasts) and gives recommendations for good and safe criteria for the exposure to impulse noise generated by weapons. It contains a chapter on a model to predict the risk of hearing damage (AHAH model) and a chapter on hearing protection, primarily based on data from large caliber impulses. Furthermore, attention is given to hearing conservation programs and to the treatment of acute noise trauma.

Author

Auditory Defects; Algorithms; Acoustics; Noise (Sound); Human Factors Engineering

20030082116 Research and Technology Organization, Neuilly-sur-Seine, France

Multilingual Speech and Language Processing

April 2003; 84 pp.; In English; Multilingual Speech and Language Processing, 8 Sep. 2001, Aalborg, Denmark; See also 20030082117 - 20030082128

Report No.(s): RTO-MP-066; AC/323(IST-025)TP/21; Copyright; Avail: CASI; [A05](#), Hardcopy

This volume contains the 12 papers, presented in 4 sessions at the Information Systems Technology Panel Workshop held in Aalborg, Denmark on 8th September 2001. The papers presented covered the following headings: N4 Corpus and Speaker Identification; Non-Native Speech; Language Identification and Multilingual Applications; and Speech Recognition.

Author

Speech Recognition; Languages; Pattern Recognition; Conferences; Voice Communication

20030082129 Research and Technology Organization, Neuilly-sur-Seine, France

Cost Structure and Life Cycle Cost (LCC) for Military Systems

June 2003; 196 pp.; In English; In French; Cost Structure and Life Cycle Cost (LCC) for Military Systems, 24-25 Oct. 2001, Paris, France; See also 20030082130 - 20030082140

Report No.(s): RTO-MP-096; AC/323(SAS-036)TP/27; Copyright; Avail: CASI; [C01](#), CD-ROM; [A09](#), Hardcopy

Cost, not limited to acquisition costs but all costs involved in the use and disposal of systems, has become a major issue in military systems analysis. In order to harmonize the most important aspects of Life Cycle Cost (LCC) a study

was carried out by Technical Team SAS-028 covering three concurrent aspects: the cost breakdown structure that defines and organizes all cost elements to be considered, the boundaries of those cost elements defined by LCC, TOC, COO and WLC and the uses of those concepts (economic or financial analysis, optimisation, etc.) by decision makers. Following this study, a symposium entitled Cost Structure and Life Cycle Cost (LCC) for Military Systems was held in Paris from 24 to 25 October 2001. Twenty-two papers, focusing on concepts such as Life Cycle Cost (LCC), Whole Life Cost (WLC), Cost of Ownership (COO) or Total Ownership Cost (TOC), were presented.

Author

Conferences; Life Cycle Costs; Systems Analysis; Military Technology; Logistics; Value Engineering

20030097962 Research and Technology Organization, Neuilly-sur-Seine, France

Low Cost Composite Structures and Cost Effective Application of Titanium Alloys in Military Platforms

March 2003; 612 pp.; In English; In French; Low Cost Composite Structures, 7-11 May 2001, Loen, Norway; See also 20030097963 - 20030098008

Report No.(s): RTO-MP-069(II); AC/323(AVT-076/077)TP/47; Copyright; Avail: CASI; C01, CD-ROM; A99, Hardcopy

The development of military systems that utilise composite materials for their structures has continued to increase, but one of the factors which still limits their applicability is their cost, compared to metallic systems. Composites have demonstrated in both the land, sea and air environments that their use can substantially reduce the weight and consequently increase the performance of military equipment. Composite may also offer maintenance cost reduction due to their better corrosion and fatigue properties. But, as defence budgets continue to decline in real terms, the cost of new equipment is becoming increasingly important, to the detriment of potentially increased capability. The objective of this Specialists Meeting was to explore the recent advances in the design and manufacture composite structures for military systems to identify both common themes and unique differences between the services and how each in addressing the requirement for reduced cost. The drawing together of representatives from all three environments (air, sea and land) was a rather unique feature of the meeting, which contributed to both the high levels of interest of the papers and exchange of ideas during the discussions. A total of 21 papers were presented with authors representing 11 member countries. It was felt by many of attendees of the meeting that the meeting's emphasis on products and lessons learnt from producing hardware, rather than pure scientific research, was one of the key factors that contributed to the success of the meeting.

Author

Titanium Alloys; Composite Materials; Composite Structures

20030105742 Research and Technology Organization, Neuilly-sur-Seine, France

Intelligent Systems for Aeronautics

June 2003; 272 pp.; In English; Intelligent Systems for Aeronautics, 13-17 May 2002, Rhode-Saint-Genese, Belgium; See also 20030105743 - 20030105757; Original contains color and black and white illustrations

Report No.(s): RTO-EN-022; AC/323(AVT-095)TP/69; Copyright; Avail: CASI; C01, CD-ROM; A12, Hardcopy

Intelligent Systems (IS) are nature-inspired problem solving tools and methodologies that have recently become important in information technology applications. Artificially intelligent systems use computers to emulate various faculties of human intelligence, and biological metaphors. They use a combination of symbolic and sub-symbolic systems capable of developing human-like cognitive skills and intelligence, not just systems capable of doing things humans do not do well. Intelligent systems are ideally suited for tasks such as search and optimization, pattern recognition and matching, planning, uncertainty management, control and adaptation. These lecture notes approach IS from two perspectives: techniques and applications. The emphasis is on aeronautical and space applications of IS, rather than basic research or tool development.expertise. For this purpose, the following techniques commonly used in IS were reviewed: decision strategy tools based on game theory (Dr. J. P eriaux, MDBA, France), neural network techniques for fault identification (Prof. M. Innocenti, U. Pisa, Italy), genetic algorithms (Dr. M. Anderson, Sverdrup Technology, USA; Dr. D. Quagliarella, CIRA, Italy) and multi-agent theory (Dr. I. Degirmenciyan, MDBA, France) These techniques were illustrated by numerous applications: optimal air combat tactics (Dr. K. Krishnakumar, NASA Ames), control of unmanned air vehicles (Dr. M. Ricard, Draper Lab, USA), air combat simulation (Dr. I. Degirmenciyan, MDBA, France), space exploration (Dr. R. Doyle, JPL, USA), unmanned aircraft navigation and formation control (Prof. M. Innocenti, U. Pisa, Italy), missile design (Dr. M. Anderson, Sverdrup Technology, USA), airfoil design (Dr. D. Quagliarella, CIRA, Italy) and finally analysis of rocket plume data for condition monitoring (Prof. K. Whitaker, U. Alabama, USA). Most of these applications have a clear military aspect, whether at the system design level (missile design, control of unmanned

air vehicles) or at operational level (optimal air combat tactics, unmanned aircraft formation control, air combat simulation), hence highlighting the relevance and importance of Intelligent Systems for military issues.

Author

Automatic Control; Aeronautics; Artificial Intelligence; Machine Learning

20030106269 Research and Technology Organization, Neuilly-sur-Seine, France

Reduction of Military Vehicle Acquisition Time and Cost through Advanced Modelling and Virtual Simulation

March 2003; 730 pp.; In English; In French; Reduction of Military Vehicle Acquisition Time and Cost through Advanced Modelling and Virtual Simulation, 22-25 Apr. 2002, Paris, France; See also 20030106270 - 20030106328

Report No.(s): RTO-MP-089; AC/323(AVT-090)TP/64; Copyright; Avail: CASI; [A99](#), Hardcopy

Integrated weapon systems modelling and simulation from concept to operation were treated as essential tool for achieving cost and time reductions which are needed to field new systems. Such tools are being applied to lower the cost and design cycle times from both a design/development and recurring manufacturing perspective. Early identification of problems dramatically reduces costs and improves procurement as well as operations, increasing performance as well as cost effectiveness. The maturing of virtual manufacturing tools led to the review of the various approaches in the NATO framework. Advanced simulation in design, manufacture, and support were treated in four sessions on: 1) Virtual Prototyping and Simulation; 2) Tool Integration; 3) Qualification by Analysis; 4) Design Synthesis. Avoiding cost overruns and schedule delays connected to aerodynamic or hydrodynamic performance was treated in three sessions: 1) Cfd Modelling Of Non-Linear Phenomena; 2) Cfd Validation Procedures And Error Evaluation; and 3) Dynamically Coupled Cfd.

Author

Systems Simulation; Weapon Systems; Virtual Reality; Systems Integration; Mathematical Models; Computational Fluid Dynamics

20030106329 Research and Technology Organization, Neuilly-sur-Seine, France

Technology for Evolutionary Software Development

June 2003; 242 pp.; In English; In French; Technology for Evolutionary Software Development, 23-24 Sep. 2002, Bonn, Germany; See also 20030106330 - 20030106332

Report No.(s): RTO-MP-102; AC/323(IST-034)TP/19; Copyright; Avail: CASI; [A11](#), Hardcopy

This Symposium was an opportunity for taking stock of experience in applying Evolutionary Software Development to real, primarily military, systems. Successes were recorded, and complications were noted, leading to a need for future refinement of the process. Although there are open questions in how best to apply the process, these were not addressed by the submitted papers. As with many other conferences affected by the downturn in the economy this year, attendance unfortunately was down, only 69 attendees. A novel aspect of the Symposium was that it was preceded by a free tutorial to acquaint newcomers to the history of Evolutionary Software Development. The Symposium consisted of two keynote speeches, and 21 submitted papers. The keynote speeches represented North American and European views, covering industrial, academic and military perspectives. The submitted papers, which represented experience from 9 nations, were divided among six sessions: Software process; Strategies and approaches; Software and system architectures; Components and user interfaces; Techniques; Lifecycle issues.

Author

Conferences; Software Engineering; Military Technology

20030106510 Research and Technology Organization, Neuilly-sur-Seine, France

Alternatives to Anti-Personnel Landmines

Wong, K. T.; Carbone, E. R.; May 2003; 172 pp.; In English; Original contains color and black and white illustrations Report No.(s): RTO-TR-040(1); AC/323(SAS-023)TP/20; Copyright; Avail: CASI; [C01](#), CD-ROM; [A08](#), Hardcopy

Since its inception in December 1997, seventeen of the nineteen NATO nations have signed the Ottawa Convention. The Convention entered into force in March 1999. Consequently, most of the NATO nations are actively considering alternative means of providing the capabilities that APMs give to the warfighter. SHAPE requested assistance from the Research and Technology Board (RTB) with assessing the impact on NATO operations of losing the APM capability. The RTB, in turn, asked the Studies, Analysis and Simulations (SAS) Panel to perform a Military Applications Study on

Alternatives to Anti-Personnel Mines. The study was actually conducted over seven sessions between September 1999 and May 2001. The panel examined summary descriptions of 15 national studies related to the impact of APMs and alternatives. Results indicate that NATO forces fighting without APMs provide the enemy with significant military advantages in most operations. Study results also demonstrated it is possible to compensate for some of the lost APM capabilities by employing different mixes of weapons at the small unit level but such alternatives come with heavy logistical increases and operational risks to NATO forces. In addition, qualitative assessments by all study group members indicate that at least one of five key tactical situations would be severely impacted due to the loss of APMs. Therefore, from both the quantitative and qualitative analyses and at both the tactical and operational levels of conflict, the removal of APMs from the NATO fighting forces inventories were viewed as presenting increased mission risk to the allies. The risks were measured in increased casualties, increased loss of military equipment, increased probability of loss of key battlefield terrain, and increased time to regain the initiative and accomplish mission objectives.

Derived from text

Mines (Ordnance); Risk; Qualitative Analysis; Quantitative Analysis

20030106521 Research and Technology Organization, Neuilly-sur-Seine, France

Real Time Intrusion Detection

June 2003; 236 pp.; In English; In French; Real Time Intrusion Detection, 27-28 May 2002, Estoril, Portugal; See also 20030106522 - 20030106539

Report No.(s): RTO-MP-101; AC/323(IST-033)TP/18; Copyright; Avail: CASI; C01, CD-ROM; A11, Hardcopy

Within NATO member nations and coalition partners there will be an increasing dependence on communication and information systems (CIS) to ensure the success of military operations, including mission critical operations. Also the interconnection of coalition CIS and the growing use of commercial off-the-shelf software increases the risk of intrusions from external and internal sources. To minimize losses and ensure the continuous operation of CIS, there is a recognised need for a real-time, automated response to intrusions. One of the important prerequisites for an appropriate response is the timely detection of intrusions, and this forms the background for the symposium. The symposium includes two keynote addresses and seventeen papers discussing several aspects of the theme. The papers are presented in six technical sessions. The first keynote address, entitled Networked Systems Survivability Program, is about the possibility of building survivable systems instead of continuing to correct the inadequacies of the systems being built today. The second keynote address, entitled Building Secure Software, is about taking security into account during all phases of development and ensuring that software developers get proper security training. The first technical session, entitled Real-time Intrusion Detection, Overview and Practical Experience has 3 papers. They give an overview of the topics of the theme and point out some of the challenges of intrusion detection for the R&D community. In particular, practical experience illustrates the gap between actual needs and the state of intrusion detection systems. The second technical session, entitled Correlation and Fusion, has 3 papers. They discuss technology for the correlation and fusion of intrusion detection information. The technology aims at faster and more reliable detection. One paper discusses fusion at the alert level. The third technical session, entitled Insider Threat Detection, has 2 papers. The insider threat is a big challenge, because intrusion by authorized users may imply more severe consequences. Although several papers in the symposium deal with this aspect, the two papers selected for this session reflect the topic in specific environments. The fourth technical session, entitled Real-time Data Analysis and Processing has 3 papers. It is obvious that a real time analysis of intrusion detection data is a very convenient way for real-time detection. The papers discuss anomaly detection techniques, clustering techniques, and data reduction techniques to increase speed of the analysis. The fifth technical session entitled Real Time Decision Support and Visualisation, has 3 papers. The topics of this session are related to the fact that incident response will often include human decisions, thus intrusion detection systems must provide reliable information for decision making, e.g. appropriate visualisations of intrusions. The sixth technical session, entitled Intrusion Detection for Real Time and Time Service Dependent Applications, has 3 papers. For real time applications, such as multimedia traffic and IP telephony, the detection of attacks on time dependency require special methods and technologies. Examples of real time applications are multimedia traffic and IP telephony. There is also a paper about a time-dependent service thus attacks on time synchronisation can lead to unreliable service. Future intrusion detection systems must deal with this too.

Author

Real Time Operation; Computer Information Security; Conferences

20030106542 Research and Technology Organization, Neuilly-sur-Seine, France

Electronic Information Management for PFP Nations

April 2003; 168 pp.; In English; Electronic Information Management for PFP Nations, 24-26 Sep. 2002, Vilnius, Lithuania; See also 20030106543 - 20030106552; Original contains color and black and white illustrations

Report No.(s): RTO-EN-026; AC/323(IMC-001)TP/4; Copyright; Avail: CASI; [C01](#), CD-ROM; [A08](#), Hardcopy

The internet and intranet are becoming dominant factors in much of what we do with networked information sources and services proving to be an indispensable part of our every day lives. This series of lectures reviews current developments in electronic information management, exploring the difficulties in searching, finding, gathering, organising and retrieving internet and intra/extra-net based information. Access to networked information sources such as the wide variety of on-line bibliographic, full-text and multimedia databases requires well-designed electronic information management systems to better manage the plethora of information available. Understanding the features and capabilities of search engines and the use of metatags to describe contents of electronic documents is of great importance as is the need for customization and personalization of electronic information services. The Series examines state of the art models of electronic information provision, along with a description of some of the strategies, processes, infrastructure, information technology and access management requirements. Finally, initiatives to create a global network of archives of digital research materials and digital preservation and archiving projects are discussed.

Derived from text

Information Management; Information Systems; Information Retrieval; Data Management; Conferences

20030106555 Research and Technology Organization, Neuilly-sur-Seine, France

Military Application of Space-Time Adaptive Processing

April 2003; 184 pp.; In English; Military Application of Space-Time Adaptive Processing, 16-17 Sep. 2002, Istanbul, Turkey; See also 20030106556 - 20030106563; Original contains color and black and white illustrations

Report No.(s): RTO-EN-027; AC/323(SET-057)TP/41; Copyright; Avail: CASI; [C01](#), CD-ROM; [A09](#), Hardcopy

Space-time adaptive processing (STAP) is a signal processing technique for detection of moving targets buried in ground clutter by means of a moving (air- or spaceborne) radar. No future military air- or spaceborne radar will be designed without this feature. This Lecture Series gives a comprehensive overview of the broad field of STAP, starting with fundamentals, clutter characteristics, application to synthetic aperture radar (SAR), and issues in over-the-horizon radar (OTH). Beside the principles and underlying fundamentals special aspect are covered, such as economic STAP architectures, limiting effects, algorithms for real-time processing, and special applications such as bistatic radar configurations and terrain scattered jamming.

Author

Space-Time Adaptive Processing; Military Technology; Airborne Radar; Satellite-Borne Radar

20030106737 Research and Technology Organization, Neuilly-sur-Seine, France

Recommendations on the Establishment of a NATO Simulation Resource Library

April 2003; 76 pp.; In English; Original contains color illustrations

Report No.(s): RTO-TR-051; AC/323(MSG-012)TP/04; Copyright; Avail: CASI; [C01](#), CD-ROM; [A05](#), Hardcopy

In 1998, the North Atlantic Council (NAC) approved the creation of a new organisation tasked with coordinating the modelling and simulation (M&S) activities of the Alliance. This Organisation, known as the NATO Modelling and Simulation Group (NMSG), was integrated into the Research and Technology Organisation (RTO). The activities of NMSG are set out in an M&S action plan (MSAP) which was approved by the RTO Board. This document stresses that the rapid establishment of a Simulation Resources Library (SRL) is an important objective as a key enabler for the NMSG. Thus, to comply with this action plan, NMSG decided to form a working group tasked with comparing various possible implementations of a NATO SRL and specifying the best solution. The Task Group (MSG-012, TG-009) met 5 times (in December 2001 and in February, April, October and December 2002) and produced this resultant report.

Author

Libraries; North Atlantic Treaty Organization (NATO); Data Bases

20030107361 NASA Ames Research Center, Moffett Field, CA, USA

The Polar Regions and the Search for Evidence of Life on Mars

McKay, Christopher P.; [2003]; 2 pp.; In English; 3rd International Conference on Mars Polar Science and Exploration, 13-17 Oct. 2003, Alberta, Canada

Report No.(s): RTOP 624-06-96; No Copyright; Avail: CASI; [A01](#), Hardcopy

This paper discusses the search for evidence of Life on Mars in Polar Regions and Permafrost locations on Earth.
CASI

Extraterrestrial Life; Mars Surface; Polar Regions; Geochronology

20030107492 NASA Ames Research Center, Moffett Field, CA, USA

Unstructured Adaptive Meshes: Bad for your Memory?

Biswas, Rupak; Feng, Hui-Yu; VanderWijngaart, Rob; September 1, 2003; 6 pp.; In English; ADAPT03: Conference on Adaptive Methods for PDEs and Large-Scale Computation, 11-12 Oct. 2003, Troy, NY, USA

Contract(s)/Grant(s): NAG2-1456; NCC2-1323

Report No.(s): RTOP 704-44-54; No Copyright; Avail: CASI; [A02](#), Hardcopy

This viewgraph presentation explores the need for a NASA Advanced Supercomputing (NAS) parallel benchmark for problems with irregular dynamical memory access. This benchmark is important and necessary because: 1) Problems with localized error source benefit from adaptive nonuniform meshes; 2) Certain machines perform poorly on such problems; 3) Parallel implementation may provide further performance improvement but is difficult. Some examples of problems which use irregular dynamical memory access include: 1) Heat transfer problem; 2) Heat source term; 3) Spectral element method; 4) Base functions; 5) Elemental discrete equations; 6) Global discrete equations. Nonconforming Mesh and Mortar Element Method are covered in greater detail in this presentation.

CASI

Supercomputers; Memory (Computers); Parallel Processing (Computers)

20030108087 Research and Technology Organization, Neuilly-sur-Seine, France

Cost Structure and Life Cycle Costs for Military Systems

September 2003; In English; Original contains color illustrations

Report No.(s): RTO-TR-058; AC/323(SAS-028)TP/37; Copyright; Avail: CASI; [C01](#), CD-ROM

In system analysis, a Cost Breakdown Structure may be considered as a tool that enables analysts to define and compute with Life Cycle Costs and decision makers to take decisions. The way analysts and decision makers use Life Cycle Costs has necessarily an impact on its definition and thus on Cost Breakdown Structure. That is why this aspect has been taken into account in the study. This aspect includes the classification of costs into several categories (direct, indirect, variable, etc.), the definition of Life Cycle Costs variants and the use of each one. The main results of the study consists of: 1. a Generic Cost Breakdown Structure and associated definitions that can be used by any military programme to construct its own Cost Breakdown Structure, 2. an analysis of the way to use Life Cycle Costs in the decision making process.

Author

Systems Analysis; Costs

20030112114 NASA Ames Research Center, Moffett Field, CA, USA

A Voice and Mouse Input Interface for 3D Virtual Environments

Kao, David L.; Bryson, Steve T.; September 10, 2003; 2 pp.; In English; 13th International Conference on Artificial Reality and Telexistence, 3-5 Dec. 2003, Tokyo, Japan

Report No.(s): RTOP 704-40-42; No Copyright; Avail: CASI; [A01](#), Hardcopy

There have been many successful stories on how 3D input devices can be fully integrated into an immersive virtual environment. Electromagnetic trackers, optical trackers, gloves, and flying mice are just some of these input devices. Though we can use existing 3D input devices that are commonly used for VR applications, there are several factors that prevent us from choosing these input devices for our applications. One main factor is that most of these tracking devices are not suitable for prolonged use due to human fatigue associated with using them. A second factor is that many of them would occupy additional office space. Another factor is that many of the 3D input devices are expensive due to the unusual

hardware that are required. For our VR applications, we want a user interface that would work naturally with standard equipment. In this paper, we demonstrate applications of our proposed multimodal interface using a 3D dome display. We also show that effective data analysis can be achieved while the scientists view their data rendered inside the dome display and perform user interactions simply using the mouse and voice input. Though the sphere coordinate grid seems to be ideal for interaction using a 3D dome display, we can also use other non-spherical grids as well.

Author

Virtual Reality; Scientific Visualization; Voice Communication; Mice; Input; Three Dimensional Models