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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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Typical Report Citation and Abstract

❶ **19970001126** NASA Langley Research Center, Hampton, VA USA
❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
❹ Mar. 1996; 130p; In English
❺ Contract(s)/Grant(s): RTOP 505-68-70-04
❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10’ to 50’, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65’ swept forebody serrations tended to roll together, while vortices from 40’ swept serrations were more effective in generating additional lift caused by their more independent nature.
❽ Author
❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 483)

JANUARY 25, 1999

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LIFE SCIENCES (GENERAL)

19990008604 NASA Marshall Space Flight Center, Huntsville, AL USA

Media Compositions for Three-Dimensional Mammalian Tissue Growth under Microgravity Culture Conditions

Goodwin, Thomas J., Inventor, NASA Marshall Space Flight Center, USA; Dec. 08, 1998; 14p; In English

Patent Info.: Filed 13 Feb. 1886; NASA-Case-MSC-21984-2; US-Patent-5,846,807; US-Patent-Appl-SN-600793; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Normal mammalian tissue and the culturing process has been developed for the three groups of organ, structural and blood tissue.The cells are grown in vitro under microgravity culture conditions and form three dimensional cells aggregates with normal cell function. The microgravity culture conditions may be microgravity or simulated microgravity created in a horizontal rotating wall culture vessel.

Official Gazette of the U.S. Patent and Trademark Office

Tissues (Biology); Mammals; Microgravity; Procedures

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19990008605 NASA Langley Research Center, Hampton, VA USA

Digital Mammography with a Mosaic of CCD Arrays

Jalink, Antony, Jr., Inventor, NASA Langley Research Center, USA; McAdoo, James A., Inventor, NASA Langley Research Center, USA; Dec. 01, 1998; 11p; In English

Patent Info.: Filed 26 Jan. 1996; NASA-Case-LAR-15059-1; US-Patent-5,844,242; US-Patent-Appl-SN-601143; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A digital mammography device uses a mosaic of electronic digital imaging arrays to scan an x-ray image is discussed. The mosaic of arrays is repositioned several times to expose different portions of the image, until the entire image is scanned. The data generated by the arrays during each exposure is stored in a computer. After the final exposure, the computer combines data of the several partial images to produce a composite of the original x-ray image. An aperture plate is used to reduce scatter and the overall exposure of the patient to x-rays.

Official Gazette of the U.S. Patent and Trademark Office

Medical Equipment; X Ray Imagery; Imaging Techniques; Image Processing; Radiography; Biotechnology

19990008644 Army Research Inst. of Environmental Medicine, Natick, MA USA

Effects of Exercise-Heat Stress While Wearing Five Toxic Agent Protective Systems

Cadarette, B. S., Army Research Inst. of Environmental Medicine, USA; Levine, L., Army Research Inst. of Environmental Medicine, USA; Staab, J. E., Army Research Inst. of Environmental Medicine, USA; Kolka, M. A., Army Research Inst. of Environmental Medicine, USA; Sawka, M. N., Army Research Inst. of Environmental Medicine, USA; Apr. 1998; 73p; In English

Report No.(s): AD-A355167; USARIEM-T98-19; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This study evaluated heat strain in four developmental toxic agent protective systems relative to the standard Toxic Agent Protective (TAP) suit during exercise-heat stress. Eight subjects (6M, 2F) completed five experiments in a 38 deg C, 30% rh climate, wearing: (1) Self Contained Toxic Agent Protective Outfit (STEPO) with rebreather (STEPO-R); (2) STEPO

with tether (STEPO-T); (3) Improved Toxicological Agent Protective (ITAP) suit with Self-Contained Breathing Apparatus (ITAP-SCBA); (4) ITAP with blower (ITAP-B); and (5) TAP. Experiments were treadmill walking at 0.89 m.sec-1, 0% grade, exercise/rest cycles of 20/10 min, for 240 min in STEPO and 120 min in ITAP. Mean metabolic rates were: (1) STEPO-R, 298+/-26 W; (2) STEPO-T, 299+/-34 W; (3) ITAP-SCBA, 275+/-26 W; (4) ITAP-B, 255+/-27 W; and (5) TAP, 222+/-40 W. In STEPO, subjects received whole body cooling at; STEPO-R, 200+/-36 W; and STEPO-T, 186+/-59 W. In ITAP, subjects received shirt only cooling at: ITAP-SCBA 172+34 W; and ITAP-B, 178+/-41 W. TAP had no cooling. Comparisons were not made between STEPO and ITAP systems. Exposure time was longer ($p < 0.03$) in STEPO-R (83+/-22 min) and STEPO-T (106+/-39 min) than in TAP (46+/-10 nun). Exposure time was longer ($p < 0.05$) in ITAP-SCBA (85+/-20 min) and ITAP-B (87+/-25 min) than in TAP(46+/-10 min). Rate of heat storage (S) was less ($p < 0.05$) in STEPO-R (37+/-8 W.m-2) and STEPO-T (38+/-12 W.m-2) than in TAP (77+/-15 W.m-2). S was less ($p < 0.05$) inITAP-SCBA (51+/-16 W.m-2) than in TAP (77+/-15 W.m-2). Microclimate cooling significantly reduced S in three of four systems and increased exposure time in all four systems relative to TAP.
DTIC
Toxicity; Breathing Apparatus; Evaluation; Protection; Physical Exercise; Heat Tolerance; Temperature Effects

19990008872 NASA Langley Research Center, Hampton, VA USA
Aerospace Medicine and Biology: A Continuing Bibliography with Indexes, Supplement 481
Dec. 28, 1998; 28p; In English
Report No.(s): NASA/SP-1998-7011/SUPPL481; NAS 1.21:7011/SUPPL481; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
This report lists reports, articles and other documents recently announced in the NASA STI Database.
Author
Aerospace Medicine; Bibliographies; Data Bases

19990008994 Kyushu Univ., Inst. of Advanced Material Study, Kasuga, Japan
Noncontact Measurement of Internal Temperature Distribution using Ultrasonic Computed Tomography, Report 2, Numerical Simulation and Experimental Measurement
Fujii, Motoo, Kyushu Univ., Japan; Zhang, Xing, Kyushu Univ., Japan; Kumamori, Tooru, Kyushu Univ., Japan; The Reports of Institute of Advanced Material Study, Kyushu University; 1994; ISSN 0914-3793; Volume 8, No. 1, pp. 131-139; In Japanese; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche
A numerical simulation and experiments are carried out for a noncontact method to measure internal temperature distribution of a solid using ultrasonic computed tomography (CT). The method is based on the fact that the sound velocity in a material depends on its temperature. 'Filtered Back Projection' is found to be the most effective algorithm for the reconstruction. to obtain an accurate temperature distribution, it is necessary to measure the sound propagation time with high resolution such as 1 ns. In the experiment, the temperature distributions are measured in a concentric cylinder with 40 mm outer diameter which is made of agar-gel and heated along center line with O.1 mm dia. platinum wire heater. It is confirmed that the method could measure the temperature distribution inside the agar-gel within an error of O.1 C, except for the region very close to the platinum wire.
Author
Temperature Measurement; Ultrasonics; Tomography

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BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

19990008502 Defence Science and Technology Organisation, Electronics and Surveillance Research Lab., Salisbury, Australia
Psychological Approaches to Data Visualisation
Lee, Michael D., Defence Science and Technology Organisation, Australia; Vickers, Douglas, Adelaide Univ., Australia; Jul. 1998; 53p; In English
Report No.(s): DSTO-RR-0135; DODA-AR-010-587; Copyright; Avail: Issuing Activity (DSTO Electronics and Surveillance Research Lab., PO Box 1500, Salisbury, South Australia 5108), Hardcopy, Microfiche
The aim of 'data visualisation' is to display a body of information in a way which allows accurate and effortless human comprehension and analysis. Accordingly, the development of data visualisation techniques should be constrained by an understanding of both human perception and cognition. This report develops and examines a psychological framework for the development

of data visualisation techniques based on the notion of similarity structure modelling. Through a series of case studies, a range of established approaches to data visualisation is reviewed and evaluated within this framework, and a number of suggestions for the development of new techniques is made.
Author
Psychology; Cognition; Scientific Visualization; Information Systems; Information Management

19990008936 Old Dominion Univ., Psychology Dept., Norfolk, VA USA
Automation Technology and Human Performance: Current Research and Trends ***Final Report, 1 Jan. - 31 Aug. 1998***
Scerbo, Mark W., Editor, Old Dominion Univ., USA; Mouloua, Mustapha, Editor, University of Central Florida, USA; Jan. 1998; ISBN 0-8058-3135-5; 351p; In English; 3rd; Automation Technology and Human performance, 25-28 Mar. 1998, Norfolk, VA, USA
Contract(s)/Grant(s): N00014-98-1-0196
Report No.(s): AD-A354935; No Copyright; Avail: CASI; A16, Hardcopy; A03, Microfiche

The implementation of complex, and ”intelligent” automated devices and machines in such domains as aviation, medicine, driving, and nuclear power has brought in its wake significant new-challenges-for those who work in human factors, cognitive science, and systems engineering. Recognizing the need for a better understanding of human interaction with complex and automated systems, The Third Automation Technology and Human Performance Conference was held in Norfolk, VA, in March 1998. The purpose of this meeting was to address both basic and applied research issues regarding automation technology across a variety of domains. The present report constitutes the proceedings from that meeting and includes sections human interaction with automated technology, driving systems and driver performance, air traffic control, adaptive automation, situation awareness, monitoring and vigilance, workload and fatigue, simulation technology, design and interface issues, and several others. It is expected that innovative experimental research and design standards presented in this report will play an important role in the development of future Naval systems.
DTIC
Automatic Control; Human Performance; Human Factors Engineering; Trends; Systems Engineering; Psychophysiology

19990009007 Nagoya Inst. of Tech., Japan
The Stress-Reducing Effect of ”Cooperativeness” as a Personality Trait
Sumi, Katsunori, Nagoya Inst. of Tech., Japan; Matsunaga, Takuma, Nagoya Inst. of Tech., Japan; Bulletin of Nagoya Institute of Technology; 1992; ISSN 0918-595X; Volume 44, pp. 211-216; In Japanese; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

In this study the ”stress reducing effect” of a personality trait on the stress process is investigated. A ”stress-reducing effect” is composed of a ”stress-buffering effect” and a ”stress-suppressing effect”. The former is the effect which focuses interest on the up to now, and which relieve stress as a result of a buffering of the influence of the stressor, the latter is the effect which prevents occurrence the stressor from the environment. On balance, this effect suppresses stress. A questionnaire was conducted with 155 college students as subjects. Life dissatisfaction factors as stressor were measured by five original items, and a scale of depression was used to rate-stress. In a Y-G personality inventory, the ”lack of cooperativeness” scale consisted of ten items, which asserted that the personality trait measured by these items conformed exactly to ”basic interpersonal trust”. As a result, the hypothesized correlation of stressor or ”cooperativeness” with stress, and the stress-suppressing effect of cooperativeness is demonstrated. Contrary to prediction, interaction between stressor and ”cooperativeness”, that is, the stress-buffering effect of ”cooperativeness” was not found. Implications of the results and future research issues are discussed.
Author
Stress Relieving; Personality; Cooperation

19990009018 Nagoya Inst. of Tech., Japan
An Experimental Study on Psychological Time, Report 13, The Effects of Tasks Interposed During the Foreperiod on Reaction Time and Time Estimation
Kohmura, Kazumi, Nagoya Inst. of Tech., Japan; Bulletin of Nagoya Institute of Technology; 1992; ISSN 0918-595X; Volume 44, pp. 11-18; In Japanese; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

Two experiments were conducted to investigate the relation between reaction time (RT) and estimated time (ET), as continued from previous study. RT was measured by pressing a key swiftly for a light spot presented after short interval that was called foreperiod. ET was measured by the method of reproduction in remembering the duration of foreperiod used to measure RT. Correlation coefficients between RT and ET were examined in order to explore the mechanism of time estimation. Experiments were done in the unexpected situation, in which subjects were given no information about the foreperiod, and in the expectant situation, in

which they were given orally information about it by experimenter. In addition to these conditions, the task was interposed in order to delay RT in present study. It was counting in the reverse order a two-or four-digit number which was given orally by experimenter. Main results were as follows: (1) RT obtained in the expectant situation was slightly shorter than that in the unexpected situation. But RT showed little difference in comparing between task conditions interposed during the foreperiod; (2) ET in both situations were longer than the foreperiod duration (standard time). and ET obtained in the expectant situation was longer than that in the unexpected situation. However, it seemed difficult to compare ET obtained in both situations each other, because subjects might have used the different method of time estimation in each situation. The relative values (mu %) of ET for each foreperiod showed little difference between the foreperiod of 12 sec and 16 sec in both situations; and (3) Correlation coefficients between RT and ET in the expectant situation were recognized to be high in comparison with those in the unexpected situation. However, it was difficult to find out the specific relation between RT and ET, because positive and negative correlation coefficients were mixed together in individual data. These findings seem to reflect that the mechanism of time estimation are very complicated because subjects try to use every possible clues obtained from the experimental situation in estimating time.
Author
Experimentation; Reaction Time; Estimating; Tasks; Human Reactions

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19990009064 Defence Science and Technology Organisation, Electronics and Surveillance Lab., Salisbury, Australia
Psychological Approaches to Data Visualisation
Lee, Michael D., Defence Science and Technology Organisation, Australia; Vickers, Douglas, Adelaide Univ., Australia; Jul. 1998; 67p; In English
Report No.(s): AD-A355765; DSTO-RR-0135; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The aim of data visualization is to display a body of information in a way which allows accurate and effortless human comprehension and analysis. Accordingly, the development of data visualization techniques should be constrained by an understanding of both human perception and cognition. This report develops and examines a psychological framework for the development of data visualization techniques based on the notion of similarity structure modelling. Through a series of case studies, a range of established approaches to data visualization is reviewed and evaluated within this framework, and a number of suggestions for the development of new techniques is made.
DTIC
Scientific Visualization; Human Factors Engineering

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