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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*

## Key

1. Document ID Number; Corporate Source
2. Title
3. Author(s) and Affiliation(s)
4. Publication Date
5. Contract/Grant Number(s)
6. Report Number(s); Availability and Price Codes
7. Abstract
8. Abstract Author
9. Subject Terms

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# AEROSPACE MEDICINE AND BIOLOGY

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*A Continuing Bibliography (Suppl. 454)*

DECEMBER 15, 1997

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## LIFE SCIENCES (GENERAL)

**19970037745** ROW Sciences, Inc., Gaithersburg, MD USA

**Final Report on the Reproductive Toxicity of Tamoxifen Citrate (CAS No. 54965-24-1) Administered by Gavage to Sprague-Dawley Rats** *Final Report*

Aug. 08, 1997; 325p; In English

Report No.(s): PB97-199723; ROW SCIENCES-8989-40; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

The purpose of this study was to assess the effect of exposure to tamoxifen citrate prior to and including the first trimester of pregnancy in female Sprague-Dawley rats on: the ability of exposed F0 dams to reproduce successfully; the incidence of reproductive tract abnormalities in the male and female F1 offspring exposed to tamoxifen in utero; the ability of F1 offspring to reproduce successfully; the incidence of reproductive tract abnormalities in the F2 offspring. This time window of exposure was selected to mimic human exposures during prophylactic therapy.

NTIS

*Toxicity; Reproduction (Biology)*

**19970038918**

**FT-IR study of water desorption from collagen films**

Shibata, Tomoko, Hokkaido Univ, Japan; Tonan, Kenji; Yasuda, Toshio; Ikawa, Shun-Ichi; Applied Spectroscopy; March 1997; ISSN 0003-7028; vol. 51, no. 3, pp. 337-339; In English; Copyright; Avail: Issuing Activity

FT-IR spectra of collagen films set in a vacuum chamber have been measured as a function of time for evacuation at 35 and 75 C. From the difference in the spectra before and after evacuation, three distinct peaks were found at 3080, 3240, and 3480 cm(sup - 1). The latter two peaks have been assigned to two types of water molecules bound in the collagen films from comparison with frequencies of solid and liquid water. The intensity change of these peaks with the evacuation time, therefore, indicates progress of the desorption of water from the collagen film. The first peak, its frequency being too low to be assigned to water, may be assigned to some functional groups of collagen which bind tightly to the water molecules. This suggestion is supported by the fact that the rate of intensity change during evacuation is approximately the same for the 3080- and 3240-cm(sup - 1) peaks. On the other hand, the intensity of the 3480-cm(sup - 1) peak changes faster, which means that the water molecules assigned to this peak are more loosely bound in the collagen film than are those assigned to the 3240-cm(sup - 1) peak. It has been found that the rate coefficients of water desorption decrease with the evacuation time. This result is probably due to the effect of the diffusion of water through the collagen film.

Author (EI)

*Collagens; Desorption; Fourier Transformation; Infrared Spectroscopy; Water*

**19970038927**

**Effect of temperature on the stability of association of pyrimidine bases with serum albumin: Proton NMR study**

Sulkowska, Anna, Medical Univ, Poland; Applied Spectroscopy; March 1997; ISSN 0003-7028; vol. 51, no. 3, pp. 428-432; In English; Copyright; Avail: Issuing Activity

In a study of the effect of temperature on the interaction of 5-methylcytosine, 1,3-dimethyluracil, thymine, and 2' -deoxythymidine with bovine serum albumin (BSA) in aqueous solution, the proton magnetic resonance technique has been applied. An important broadening of proton resonances is observed in complexes that is due to a restricted mobility of the bonded molecule. A particular effect of BSA concentration on the pyrimidine ring signals or on the C-5 methyl protons of ligands shows the pyrimidine ring of 1,3-dimethyluracil and the methyl groups of 5-methylcytosine, thymine, and 2' -deoxythymidine as primary binding

sites in the complex with albumin. The results reflect the existence of hydrophobic interactions between C-5 methyl groups of the ligand and hydrophobic domains of the serum albumin. It seems that in the complex of 1,3-dimethyluracil with BSA the pyrimidine ring plays a primary role in the binding. No strong chemical bonds are present. The temperature effect is characterized by a decrease of interaction at temperatures higher than 300 K and by the release of ligands from their binding sites on the unfolding albumin. The possible importance of direct interactions between pyrimidine bases and albumin has been discussed with respect to the problem of specific interactions between proteins and nucleic acids.

Author (EI)

*Deoxyribonucleic Acid; Nuclear Magnetic Resonance; Protons; Solutions; Temperature Effects*

**19970039164**

**Spectroscopic characterization and tissue imaging using site-selective polyazacyclic terbium(III) chelates**

Houlne, Michael P., Texas Tech Univ, USA; Agent, Tony S.; Kiefer, Garry E.; Mcmillan, Kenneth; Bornhop, Darryl J.; Applied Spectroscopy; October 1996; ISSN 0003-7028; vol. 50, no. 10, pp. 1221-1228; In English; Copyright; Avail: Issuing Activity

Polyazamacrocyclic chelates of terbium are shown to be useful in diagnostic medical imaging as tissue site-selective markers. Spectroscopic properties and biodistribution are studied for three terbium(III) species: 3,6,9-tris(methylene phosphonic acid n-butyl ester)-3,6,9,15-tetraaza-bicyclo (left bracket) 9.3.1(right bracket) pentadeca-1 (15),11,13-triene (abbreviated as PCTMB); 3,6,9-tris(methylene phosphonic acid)-3,6,9,15-tetraazabicyclo (left bracket) 9.3.1(right bracket) penta-deca-1(13),11,13-triene (abbreviated as PCTMP); and N,N' -bis(methylene phosphonic acid)-2,11-diaza (left bracket) 3.3(right bracket) -(2,6)pyridinophane (abbreviated as BP2P). The respective aqueous molar absorptivities are found to be 3424, 2513, and 3281/2210 L mole(sup - 1) cm(sup - 1). Fluorescence quantum efficiency is determined against rhodamine 19 in basic ethanol and rhodamine 6G in ethanol. These values are 0.48, 0.21, and 0.40 for Tb-PCTMB, Tb-PCTMP, and Tb-BP2P, respectively. Bio-distribution studies performed in Sprague-Dawley rats indicate tissue site-selectivity. Fluorescence images of bone tissues are presented and demonstrate the potential for using the lanthanide chelates to perform site-directed in vivo imaging for the early identification of abnormal tissue.

Author (EI)

*Imaging Techniques; Medical Equipment; Organometallic Polymers; Spectroscopic Analysis; Terbium Compounds*

**19970039638**

**3-D anisotropic electrical impedance imaging**

Gong, Lian, Erlangen-Nuernberg Univ, Germany; Zhang, Keqian; Unbehauen, Rolf; IEEE Transactions on Magnetics; March 1997; ISSN 0018-9464; vol. 33, no. 2, pt. 2, pp. 2120-2122; In English; Copyright; Avail: Issuing Activity

A 3-D algorithm of anisotropic electrical impedance imaging is presented. The image reconstruction is based on the theory of the generalized incremental linear function with global sensitivity. The inverse calculation only deals with the conductivity-varying finite elements. The forward problem is solved by 3-D FEM and 1-D storage is utilized to save memory. The inverse of the stiffness matrix can also be stored in a one-dimensional way. A successful computer simulation shows that this algorithm can detect conductivity variations from 1% to 100% of the original conductivity with global sensitivity and the convergence is fast, so it is efficient and flexible.

Author (EI)

*Algorithms; Computer Storage Devices; Computerized Simulation; Finite Element Method; Imaging Techniques; Medical Equip-ment*

**19970040214** Kansas Univ., Dept. of Molecular and Integrative Physiology, Kansas City, KS USA

**A Method for Preparation, Storage and Activation of Large Populations of Immotile Sea Urchin Sperm**

Bracho, Geracimo E., Kansas Univ., USA; Fritch, Jennifer J., Kansas Univ., USA; Tash, Joseph S., Kansas Univ., USA; 1997; 20p; In English

Contract(s)/Grant(s): NAG2-1016; NIH-HD-33994

Report No.(s): NASA/CR-97-206150; NAS 1.26:206150; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Reversible protein phosphorylation is associated with initiation and modulation of sperm flagellar motility. Many studies aimed at examining the signal transduction mechanisms underlying the expression of motility have relied on detergent-permeabilized sperm reactivated with exogenous 32 P-ATP. However, the reactivation conditions allow variable levels of motility to be expressed and phosphorylation of many proteins that appear to be unrelated to sperm motility. Thus, identification of the few relevant proteins is difficult. We have developed a method to collect and keep sperm immotile until reactivated for analysis to normal motility levels. Artificial sea water (ASW) buffered with 5 mM 2-[N-morpholino]ethanesulfonic acid at pH 6.0 and containing 50 mM KCl, allows collection and storage of immotile sea urchin sperm for up to 96 h at 4-5 C. Motility under these conditions

is essentially zero, but sperm is rapidly reactivated to normal motility by diluting with ASW to standard pH (8.0) and KCl concentration (10 mM).

Author

*Proteins; Phosphorylation; Genetics; Modulation; Spermatozoa; Sea Urchins*

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### AEROSPACE MEDICINE

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

**19970037280** Federal Communications Commission, Allocations and Standards Div., Washington, DC USA  
**Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Additional Information for Radio and Television Broadcast Stations, Supplement A**

Cleveland, Robert F., Jr., Federal Communications Commission, USA; Sylvar, David M., Federal Communications Commission, USA; Ulcek, Jerry L., Federal Communications Commission, USA; Aug. 1997; 45p; In English

Report No.(s): PB97-199640; OET/BULL-65-SUP-A; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This supplement is designed to be used in connection with the FCC's OET Bulletin 65, Version 97-01. The information in this supplement provides additional detailed information that can be used for evaluating compliance of radio and television broadcast stations with FCC guidelines for exposure to radiofrequency electromagnetic fields. However, users of this supplement should also consult Bulletin 65 for complete information on FCC policies, guidelines, compliance-related issues and methods for achieving compliance.

NTIS

*Electromagnetic Fields; Broadcasting; Television Systems; Exposure; Electromagnetic Radiation; Radio Frequencies*

**19970037293** Federal Communications Commission, Office of Engineering and Technology, Washington, DC USA  
**Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Edition 97-01**

Cleveland, Robert F., Federal Communications Commission, USA; Sylvar, David M., Federal Communications Commission, USA; Ulcek, Jerry L., Federal Communications Commission, USA; Aug. 1997; 86p; In English

Report No.(s): PB97-199632; OET/BULL-65; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This revised OET Bulletin 65 has been prepared to provide assistance in determining whether proposed or existing transmitting facilities, operations or devices comply with limits for human exposure to radiofrequency (RF) fields adopted by the Federal Communications Commission (FCC). The bulletin offers guidelines and suggestions for evaluating compliance. The bulletin is organized into the following sections: Introduction, Definitions and Glossary, Background Information, Prediction Methods, Measuring RF Fields, Controlling Exposure to RF Fields, References and Appendices. Appendix A provides a summary of the new FCC guidelines and the requirements for routine evaluation.

NTIS

*Exposure; Radio Frequencies; Electromagnetic Radiation; Electromagnetic Fields*

**19970037329** Defence Science and Technology Organisation, Aeronautical and Maritime Research lab., Melbourne, Australia  
**Review of Methods of Improving the Intake and Absorption of Water into the Body by the Use of Alternative Supply Methods and/or Additives**

Thomson, G. F., Defence Science and Technology Organisation, Australia; Walker, G. J., Defence Science and Technology Organisation, Australia; Forbes-Ewan, C. H., Defence Science and Technology Organisation, Australia; May 1997; 22p; In English

Report No.(s): DSTO-TR-0483; AR-010-119; Copyright; Avail: Issuing Activity (DSTO Aeronautical and Maritime Research Lab., PO Box 4331, Melbourne, Victoria 3001, Australia), Hardcopy, Microfiche

Defence personnel working in the heat run the risk of heat illnesses and decreased performance due to hypohydration. Physiological, psychological and mechanical methods for improving the intake and absorption of water into the body are discussed. Recommendations include evaluation of the effectiveness and service suitability of 'bladder' style delivery systems, and water bottles with push/pull tops such as those used on some sports bottles, consideration of the inclusion of 'sports drinks' into ration packs, and studies on hyperhydration.

Author

*Heat; Dehydration; Water; Personnel; Risk; Rations; Additives; Sickesses*

**19970037476** Vanderbilt Univ., Center for Microgravity Research and Applications, Nashville, TN USA

**New Technologies for Bioartificial Organs Final Report**

Wang, T. G., Vanderbilt Univ., USA; [1997]; 25p; In English; Sponsored in part by the Vanderbilt Diabetes Research and Training Center

Contract(s)/Grant(s): NIH-DK-20593; NAGw-1707

Report No.(s): NASA/CR-97-112566; NAS 1.26:112566; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Each year several hundred thousand Americans die because of organ failure. Organ transplantations have achieved remarkable success, but the source of human organs is limited. Only a small portion of patients can benefit annually from this method of treatment. Immunoisolation of living cells as bioartificial organs can be transplanted into human without the need for immunosuppression and its accompanying side effects; it allows cells from nonhuman species to be used thereby overcoming a limited supply of human cells available for encapsulation; and, the capsule can serve as an ideal cage to keep animal viruses from contacting the human host. To achieve this promise, we have incorporated the pore size distribution into a new design of capsule for immunoisolation of living cells. In this model, the capsule wall is thicker and the pores are bigger than in the current systems. The larger pores will allow the immune system to enter the membrane, and the smaller pores inside the membrane will act as the traps to prevent or delay most of the immune system from passing all the way through to the inner volume of the capsule where the living cells reside. Limited animal studies have supported the advantages of this new entrapment model over the current model. Systematic studies to determine optimal capsule design for human transplantation are now feasible.

Author

*Organs; Cells (Biology); Transplantation; Patients; Encapsulating; Immune Systems*

**19970037734** Armstrong Lab., Brooks AFB, TX USA

**Gender Role Stress, Mental Health Risk Factors and Mental Health Sequela in Deployed Versus Non-Deployed and Pilot-Rated Versus Non-Rated Active Duty Women Versus Men Final Report, 22 Dec. 1995 - 30 Sep. 1996**

Lombard, David, Armstrong Lab., USA; Dec. 1996; 94p; In English

Contract(s)/Grant(s): MIPR-96MM6639

Report No.(s): AD-A328804; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

In an era of cost containment, the changeover to manage health care and ever-increasing rates of rapid short and long-term deployments, the mental health of our troops is paramount in their being mission ready and physically capable. Recent reviews of the DoD inpatient database indicated that women's rates of admission for various mental health disorders (e.g., adjustment disorder, affective psychosis and neurotic disorders) were much higher than those of male active duty members, and appear to be higher than one would expect in a military population. This study examined the intra- and inter-personal and environmental aspects of being a woman in the military and their impacts on female mental health. The Mental Health Inventory assessed mental health symptoms, the Schedule of Recent Experiences assessed for recent negative events, the Ways of Coping Checklist. Assessed how subjects dealt with recent negative life events, and the Gender Role Stress Scale determined how different environments impacted gender role stress and how this impact altered mental health symptoms. All these tools are self-report surveys that were combined into one survey and mailed to identified subjects groups.

DTIC

*Mental Health; Males; Human Beings; Females*

**19970039436**

**Comparison of different transfer matrices for the calculation of an inverse problem using BEM**

Yun, Z. Q., Southeast Univ, China; Tan, B. D.; Huang, J.; IEEE Transactions on Magnetics; March 1997; ISSN 0018-9464; vol. 33, no. 2, pt. 2, pp. 1189-1191; In English; Copyright; Avail: Issuing Activity

This paper presents two new transfer matrices for an inverse potential problem using boundary element methods. The condition numbers of the new transfer matrices are compared with that of the conventional transfer matrix through numerical examples. It is shown that the condition number of the new transfer matrices may be several orders of magnitude smaller than that of the conventional one. The regularized solutions achieved by using the new transfer matrices are also shown to be better than the usual one.

Author (EI)

*Bioelectric Potential; Current Distribution; Electric Current; Electrocardiography; Matrices (Mathematics)*

19970039732

**Use of shift reagents to determine enantiomers by near-infrared analysis**

Macdonald, Stacy A., Indiana Univ, USA; Hieftje, Gary M.; Applied Spectroscopy; September 1996; ISSN 0003-7028; vol. 50, no. 9, pp. 1161-1164; In English; Copyright; Avail: Issuing Activity

A method is described that utilizes beta -cyclodextrin and silica gel as shift reagents to distinguish between enantiomers by means of near-infrared transmission spectroscopy. The premise is that the spectrum of the (+)-enantiomer bound to the shift reagent will be different from that of the (-)-enantiomer bound to the same reagent. With the use of principal component analysis, the difference between the enantiomers can be distinguished. The resulting method is fast, simple, and of potential application in pharmaceutical process control.

Author (EI)

*Drugs; Glucose; Near Infrared Radiation; Principal Components Analysis; Silica Gel*

19970040171 Institute for Human Factors TNO, Soesterberg, Netherlands

**Recent Progress in Colour Vision**

Walraven, J., Institute for Human Factors TNO, Netherlands; Jul. 17, 1997; 16p; In English; Original contains color illustrations Contract(s)/Grant(s): A96/KLu/324

Report No.(s): TD97-0229; TM-97-A051; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 ZG Soesterberg, The Netherlands), Hardcopy, Microfiche

This literature study on recent advances in colour vision was prepared as part of a document on the operational use of colour in aviation (to be prepared by the working group AGARD, WG 24). It focuses on the spectral filtering and trichromatic processing of the visual stimulus, still the most relevant issue for practical purposes, such as testing for colour deficiencies and the definition of the so-called "CIE standard observer". The following topics are discussed: (1) new data on the spectral sensitivity functions of the L(ong-wave), M(iddle-wave) and S(hort-wave) photo receptors; (2) the integration of revised data on spectral filtering in the eye media (lens and macula pigment), taking in consideration modifying factors like age, stimulus size and pupil diameter; (3) recent developments in molecular genetics on the variability of the absorption spectra of the L and M pigments, indicating that the photo pigment of normal and deficient colour derive from the same two sets of genetic L/M combinations; (3) a simulator, incorporating the new data on the standard observer, that allows the visualization of any form of deficient colour vision (a TNO development); (4) a new computational approach and its questionable validity-for the explanation of colour constancy; (5) a cursory reference to colour processing beyond the retina. Although there has been significant progress in the field of colour vision, it turns out that the off-spin for applied vision is far from impressive. As for the application in aviation, it is to be expected that the new insights in defective colour vision may be profitably used for more refined test methods and better selection criteria.

Author

*Color; Color Vision; Absorption Spectra; Visual Stimuli; Spectral Sensitivity; S Waves; Eye (Anatomy); Pigments*

19970040511 Istituto Superiore di Sanita, Rome, Italy

**Satellite Meeting of the 7th International Conference on Environmental Mutagens (ICEM). Workshop: Quantitative Modeling Approaches for Understanding and Predicting Mutagenicity and Carcinogenicity *Convegno Satellite della 7a Conferenza Internazionale sui Mutageni Ambientali (ICEM). Seminario: Modelli Quantitativi per Capire e Predire la Mutagenesi e Cancerogenesi***

1997; ISSN 0393-5620; 67p; In English; Satellite Meeting of the 7th International Conference on Environmental Mutagens (ICEM), 3-5 Sep. 1997, Rome, Italy; Sponsored by Joint Research Centre of the European Communities, Italy; Meeting Sponsored in part by European Centre for the Validation of Alternative Methods and Istituto Nazionale per la Ricerca sul Cancro.; Copyright; Avail: Issuing Activity (Istituto Superiore di Sanita, Viale Regina Elena, 299-00161 Roma, Italy); Abstract Only, Hardcopy, Microfiche

The workshop is divided into four sessions: structure-activity relationships, evaluation of molecular markers of carcinogen exposure, risk assessment, regulatory perspectives. The main theme of the first session is the assessment of the applicability of quantitative structure-activity models, routinely applied in pharmacological research, to toxicological problems. The second session focuses on the relevance of molecular markers of carcinogen exposure, both in terms of biological significance and of statistical association and risk association. The aim of the third session is the evaluation of the applicability of biological markers to risk assessment. The last session deals with the practical use of "state-of-the-art" knowledge on carcinogen risk assessment to draw up guidelines and regulations. The final round table is devoted to the search for a common language that can productively link molecular biology and quantitative modeling research: this effort of unification is the underlying theme and goal of the meeting. Derived from text

*Carcinogens; Mutagens; Molecular Biology; Mathematical Models; Predictions; Pharmacology; Conferences*

## BEHAVIORAL SCIENCES

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

**19970036396** Princeton Univ., NJ USA

**Central Postsynaptic Actions of Monoamine Neurotransmitters in Behaving Animals *Final Report, 1 Mar. 1994 - 28 Feb. 1997***

Jacobs, Barry L., Princeton Univ., USA; Mar. 01, 1997; 4p; In English

Contract(s)/Grant(s): F49620-94-1-0128; AF Proj. 2312; 61102F

Report No.(s): AD-A325701; AFOSR-TR-97-0167; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This research program focusses on the brain serotonergic system and its function in relation to integrative physiology and behavior. The primary experimental approaches have employed recording the electrophysiological activity (extracellularly recorded action potentials) of serotonergic neurons and measuring changes in extracellular levels of brain serotonin by means of in vivo brain microdialysis. Somewhat surprisingly and not expected on the basis of the existing literature, the major variable associated with activation of the brain serotonergic system is tonic and repetitive gross motor activity. Additional studies have explored the connectivity of the brain serotonergic system with other brain systems and the possibility that functional activity in this system induces morphological changes.

DTIC

*Neuromuscular Transmission; Synapses; Brain; Serotonin*

**19970040264** Tisk a vazba Moravske tiskarny a.s., Olomouc, Czech Republic

**Neural Computing and Neural Science. A Theory of Information Processing in the Human Brain**

Grmela, Ales, Tisk a vazba Moravske tiskarny a.s., Czech Republic; 1997; 175p; In English; ISBN 80-902329-0-6; Copyright; Avail: Issuing Activity (AGCES, Levskeho 3221, Praha 4, PSC 143 00, Czech Republic), Hardcopy, Microfiche

The brain memory is the very basic function of the brain. The brain memory is not separated from other brain functions. The memory and the other brain functions are placed at the same brain structures. The memory records are not similar to the memory records in the computer memory. The brain memory is to be imagined as a change of the brain structure. The main problem of the neural sciences is to find mechanism that allows to decode information stored in the brain.

Author

*Brain; Data Processing; Memory (Computers)*

**19970040401** Institute for Human Factors TNO, Soesterberg, Netherlands

**Team Training vs Team Building and Cooperative Learning: Defining the Field of Research *Interim Report Team training vs team building en coöperatief leren: Afbakening van het onderzoeksterrein***

vanBerlo, M. P. W., Institute for Human Factors TNO, Netherlands; Sep. 19, 1997; 17p; In Dutch

Contract(s)/Grant(s): B96-036

Report No.(s): TD97-0240; TM-97-B019; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 DE Soesterberg, The Netherlands), Hardcopy, Microfiche

Training is one of the factors influencing the effectiveness of teams. The concept of team training, however, is often confused with the concept of team building. Although the ultimate goal of both team training and team building is the same, there are considerable differences between the two. Also, team training is wrongly conceived of as cooperative learning. Again, there are similarities, but distinctions as well. In this report the differences and similarities between team training on the one hand, and team building and cooperative learning on the other hand, are discussed, with the purpose to define as clearly as possible the research on team training design. The implications of this comparison, and the experiences acquired in the fields of team building and cooperative learning, for the research on a methodology for developing team training systems, are discussed.

Author

*Education; Teams; Comparison; Cooperation; Communication; Analogies*

**19970040513** Institute for Human Factors TNO, Soesterberg, Netherlands

**Crosstraining and Team Performance: A Further Investigation *Interim Report Crosstraining en teamprestatie: Een nadere verkenning***

Schaafstal, A. M., Institute for Human Factors TNO, Netherlands; Bots, M. J., Institute for Human Factors TNO, Netherlands; Sep. 26, 1997; 43p; In Dutch

Contract(s)/Grant(s): B96-036

Report No.(s): TD97-0244; TM-97-B020; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 DE Soesterberg, The Netherlands), Hardcopy, Microfiche

An experiment is described in which the effects of three different methods for crosstraining on team performance and communication within teams are examined. The methods for crosstraining differ in information contents about the tasks, activities and informational needs of the other team members. They were developed with the aim of answering the following questions: (a) Will practice in the tasks of other team members lead to better communication strategies and to an enhanced team performance? (b) Will an explicit training of the shared aspects of the task among different team members result in better performance than cross-training in which the various team members are trained in each others' total task. Apart from this, the effect of time pressure on the various cross training methods was examined. Finally, recommendations of Schaafstal en Bots with respect to the design of the experiment are implemented in the current experiment. The results show that the communication between team members is of utmost importance for a good performance of the team. An analysis of the differences between the various methods for cross-training shows that explicit training of the shared aspects of the tasks among various team members results in better performance and more efficient communication strategies. However, the TANDEM-task as it was designed for this experiment was such that just reading about the tasks of other team members leads to just as good performance as explicit instruction. There is no differential effect of method for crosstraining in relation to time pressure. In all conditions, the performance decreases equally. The recommendations of Schaafstal en Bots for an improvement of the design of the experiment resulted in more readily interpretable results. Finally, recommendations for future research are given.

Author

*Experiment Design; Teams; Communication; Education; Human Performance*

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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.*

**19970037455** NERAC, Inc., Tolland, CT USA

**Head Up Displays. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)**

May 1997; In English; Page count unavailable; Supersedes PB96-860408

Report No.(s): PB97-859722; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the design and use of head-up display systems and associated apparatus. Applications in aircraft cockpits, including sighting systems and attitude control, are discussed. Projection systems include holographic devices and subsystems, such as lenses, mirrors, and mountings. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

*Head-Up Displays; Bibliographies*

**19970039090**

**Driver's seat with active suspension of electro-pneumatic type**

Stein, G. J., Slovak Acad of Sciences, Czechoslovakia; Journal of Vibration and Acoustics, Transactions of the ASME; April 1997; ISSN 1048-9002; vol. 119, no. 2, pp. 230-235; In English; Copyright; Avail: Issuing Activity

The aim of this article is to summarize some of the results of a study of a driver's seat with an electro-pneumatic active suspension utilizing a pneumatic spring and a proportional electro-pneumatic transducer. Discussion of the system's simplified mathematical description is followed by a short explanation of the full scale dummy driver's seat with active pneumatic suspension and discussion of some experimental results.

Author (EI)

*Automobiles; Pneumatic Equipment; Seats; Transducers; Vibration Damping*

**19970040118** Lockheed Martin Engineering and Sciences Co., Houston, TX USA

**X-38 Cabin Condensation Study**

Eckhardt, Bradley D., Lockheed Martin Engineering and Sciences Co., USA; Proceedings of the Eighth Annual Thermal and Fluids Analysis Workshop: Spacecraft Analysis and Design; Sep. 1997, pp. 7.1-7.4; In English; Also announced as 19970040111; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

The International Space Station's (ISS) X-38 Crew Return Vehicle is being developed to provide emergency crew escape capabilities for the ISS. The X-38, a lifting-body vehicle, will be attached to the ISS while in orbit with a Soyuz-style docking ring allowing air exchange between the X-38 cabin and the ISS. During certain ISS orbital positions, diabatic external surface temperatures on the X-38 can reach as low as -129 C. Although the X-38 is constructed with a Thermal Protection System (TPS) which includes insulation in the vehicle structure, an analysis of various proposed Environmental Control and Life Support System (ECLSS) designs is required to determine if condensation can occur in the cabin during these "cold case" conditions. An analysis was performed using PHOENICS, a infinite code to model fluid flow and heat transfer characteristics within the cabin using a simplified model of the cabin geometry. Boundary conditions at the cabin wall were provided as heat fluxes by a NASA/JSC aeroshell heat peak study of the X-38 TPS using Thermal Synthesizer System (TSS). Development of the TSS and PHOENICS X-38 models continues, however preliminary results indicates local inside cabin wall temperatures can fall below cabin dew points, thereby providing conditions conducive to condensation.

Author

*International Space Station; Spacecraft Docking; Thermal Protection; Environmental Control; Air Flow; Flow Characteristics; Insulation; X-38 Crew Return Vehicle*

**19970040119** Lockheed Martin Corp., EVA Systems Analysis Group, Houston, TX USA

**Orbital Thermal Environment Measurements and Comparisons to Analysis**

Lepore, Joseph, Lockheed Martin Corp., USA; Iovine, John V., Lockheed Martin Corp., USA; Proceedings of the Eighth Annual Thermal and Fluids Analysis Workshop: Spacecraft Analysis and Design; Sep. 1997, pp. 8.1-8.7; In English; Also announced as 19970040111; No Copyright; Avail: CASI; A02, Hardcopy; A02, Microfiche

Thermal environment data collected during Space Shuttle missions is compared to predicted results using two analysis methods. A Thermal Cube Assembly (TCA) was flown aboard three Space Shuttle missions to determine incident heat fluxes at a particular attitude, vehicle orientation, and TCA location. This information was used to support on-orbit verification of Extra-Vehicular Activity (EVA) space suit modifications. The flight data are also being used to obtain on-orbit transients to verify thermal environment model predictions for future missions. Radiometers were used to measure the environment sink temperature in six directions. The TCA contains twelve radiometers, six of which measure total incident radiation and six to measure radiation in the infrared (IR) wavelengths only. Each face of the TCA contains one total and one IR radiometer. Each radiometer was calibrated using a thermal vacuum chamber and an environmental simulator. Flight data were converted to environment sink temperatures using calibration equations. Analysis predictions were made using both the Thermal Synthesizer System (TSS) and the Thermal Radiation Analyzer System (TRASYS) for environmental calculations and the Systems Improved Numerical Differencing Analyzer (SINDA) for temperature calculations. In general, TSS sink temperature predictions showed better agreement with flight data than TRASYS. In several instances, both analysis methods had significant discrepancies when compared to flight data. Sources of error for analysis results using both calculation methods are discussed.

Author

*Thermal Environments; Thermal Analysis; Aerospace Environments; Extravehicular Activity; Heat Flux; Space Shuttle Missions; Error Analysis; Finite Difference Theory*

**19970040400** Institute for Human Factors TNO, Soesterberg, Netherlands

**Research Study on the Crash Safety and Ergonomic Position of the Mobile Data Terminal of the KMAR *Final Report Onderzoek naar botsveiligheid en ergonomische plaatsing van de Mobiele Data Terminal voor de KMAR***

Punte, P. A. J., Institute for Human Factors TNO, Netherlands; Oudenhuijzen, A. J. K., Institute for Human Factors TNO, Netherlands; Huijskens, C., Institute for Human Factors TNO, Netherlands; Sep. 23, 1997; 31p; In Dutch; Original contains color illustrations

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Report No.(s): TD97-0242; TM-97-A060; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 DE Soesterberg, The Netherlands), Hardcopy, Microfiche

By order of the Royal Military Police, TNO Human Factors Research Institute investigated the crash safety and ergonomic position of the Mobile Data Terminal (MDT), in cooperation with TNO Road-Vehicles Research Institute. The MDT will be positioned at the relief driver position of KMAR vehicles (for example the Volkswagen Transporter) and will be used during standstill and slow driving. The MDT will be controlled using a keyboard and a monitor (LCD). The monitor of the MDT is positioned at the sun visor of the vehicles. A literature survey has been made of existing and forthcoming European regulations and rules in the field of passive safety. Using a digital analysis, requirements have been generated for an ergonomically justified position of the keyboard of the MDT at the Volkswagen Transporter. The digital analysis was carried out by using the 3D human modelling tool MDHMS (McDonnell Douglas Human Modelling System). The present user population and the population in the year 2015

are taken as a base for this digital analysis. Attention was paid to the sitting postures including the postures of the arms. The main results of this study are as follows. According to the European regulations and rules, serious head contact always has to be avoided during frontal collision of the vehicle. For this purpose, the use of seatbelts is the most important protection. As a result of the digital analysis, a proper position of the keyboard of the MDT has been defined for the Volkswagen Transporter. For proper arm and wrist postures, it is advised to use a revolving keyboard and to provide support for the palm or hand.

Author

*Crashes; Safety; Data Processing Terminals; Human Factors Engineering; Regulations; Research*

**19970040520** Institute for Human Factors TNO, Soesterberg, Netherlands

**Comparative Evaluation of a Bridge Design Based on the UNIMACS 3000 Concept** *Final Report Vergelijkende beoordeling brugontwerp op basis van het UNIMACS 3000 concept*

Post, W. M., Institute for Human Factors TNO, Netherlands; Punte, P. A. J., Institute for Human Factors TNO, Netherlands; Oct. 03, 1997; 25p; In Dutch

Contract(s)/Grant(s): A97/KM/352

Report No.(s): TD97-0246; TM-97-A063; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 DE Soesterberg, The Netherlands), Hardcopy, Microfiche

As part of the procurement of a navigation bridge of the Air Defence and Command Frigate of the Royal Netherlands Navy, TNO Human Factors Research Institute advised about a bridge design based on the UNIMACS 3000 concept proposed by Van Rietschoten en Houwens Systems (R&HS). The aim of this study was to determine whether the UNIMACS design fulfilled the ergonomic requirements and principles as described in two studies carried out in the context of a study about the lay-out of four operations rooms on board of the LCF: a conceptual study and a detailed design of the navigation bridge. It was found that at a general level the UNIMACS design was in accordance with the detailed design. However, on several other points the UNIMACS design was not in accordance with the principles set forth in the detailed design. First, the maneuvering panel did not fulfill the wish of the Royal Netherlands Navy to seat the helmsman, and its operation was ergonomically unacceptable. Second, the UNIMACS design did not provide an acceptable solution for the multi-functional bridge console. Third, the standard modules that make up the consoles are, from an ergonomical point of view, unacceptable.

Author

*Human Factors Engineering; Navigation; Air Defense; Modules; Bridges; Computer Programs; Systems Engineering*

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