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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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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

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 435)

MARCH 21, 1997

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LIFE SCIENCES (GENERAL)

19970009628 Rice Univ., Inst. of Biosciences and Bioengineering, Houston, TX USA

NASA Specialized Center of Research and Training (NSCORT) In Gravitational Biology ***Interim Report, 1 Mar. 1996 - 31 Dec. 1996***

Mclntire, Larry V., Rice Univ., USA; Rudolph, Frederick B., Rice Univ., USA; Dec. 31, 1996; 73p; In English; Original contains color illustrations

Contract(s)/Grant(s): NAGw-5007

Report No.(s): NASA-CR-203106; NAS 1.26:203106; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The mission of our NSCORT is to investigate the effects of gravity and other environmental factors on biological function at the cellular and molecular level. The research efforts, training opportunities, and scientific exchange will promote the expansion of a scientific peer group well-educated in space-related biological issues. This will stimulate the interest of the larger scientific community and insure the continuing development of rigorous flight investigations in Gravitational Biology.

Author

Gravitational Physiology; Gravitational Effects; Biology

19970010014 Woods Hole Oceanographic Inst., MA USA

Microbial Diversity (A Summer Course at the Marine Biological Laboratory, Woods Hole, Massachusetts) ***Final Report, 11 Jun. - 27 Aug. 1995***

Leadbetter, E. R., Woods Hole Oceanographic Inst., USA; Feb. 1996; 267p; In English

Contract(s)/Grant(s): N00014-95-1-0463

Report No.(s): AD-A311002; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

The objectives of the course were to provide participants with both a perspective of, and experience in, isolating, identifying, and assessing the potential activities of the diverse bacterial populations that are present in a variety of natural habitats and the roles these organisms play in determining and maintaining those habitats. The applied (industrial, biotechnological) potential of (often) poorly studied and characterized members of natural populations was noted as was also the utility of modern molecular biological approaches for identifying non-cultured microbiota in different habitats.

DTIC

Marine Biology; Microbiology; Microorganisms; Bacteria

19970010159 Houston Univ., Dept. Human Development, TX USA

Calcium Balance in Mature Rats Exposed to a Space Flight Model ***Final Report***

Wolinsky, Ira, Houston Univ., USA; Oct. 1996; 4p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

Negative calcium balances are seen in humans during spaceflight and bed rest, an analog of space flight. Due to the infrequency and costliness of space flight and the difficulties, cost, and restraints in using invasive procedures in bed rest studies, several ground based animal models of space flight have been employed. The most useful and well developed of these models is hind limb unloading in the rat. In this model the hind limbs are non-weight bearing (unloaded) but still mobile; there is a cephalad fluid shift similar to that seen in astronauts in flight; the animals are able to feed, groom and locomote using their front limbs; the procedure is reversible; and, importantly, the model has been validated by comparison to space flight. Several laboratories have studied calcium balance using rats in hind limb unweighting. Roer and Dillaman used young male rats to study calcium balance in this model for 25 days. They found no differences in dietary calcium intake, percent calcium absorption, urinary and fecal excretion,

hence indicating no differences in calcium balance between control and unloaded rats. In another study, employing 120 day old females, rats' hind limbs were unloaded for 28 days. While negative calcium balances were observed during a 25 day recovery period no balance measurements were possible during unweighting since the researchers did not employ appropriate metabolic cages. In a recent study from this laboratory, using 200 g rats in the space flight model for two weeks, we found depressed intestinal calcium absorption and increased fecal calcium excretion (indicating less positive calcium balances) and lower circulating 1,25-dihydroxyvitamin D. The above studies indicate that there remains a dearth of information on calcium balance during the hind limb unloading rat space flight model, especially in mature rats, whose use is a better model for planned manned space flight than juvenile or growing animals. With the aid of a newly designed metabolic cage developed in our laboratory it is now possible to accurately measure urinary and fecal calcium excretions in this space flight model. The purpose of this study, then, was to extend and enlarge our previous findings viz: to measure calcium balances in mature rats exposed to a space flight model.
Author
Calcium; Space Flight; Flight Simulation; Physiological Effects; Rats

19970010169 NASA Ames Research Center, Moffett Field, CA USA
Collagen Gel Contraction by Fibroblasts: The Role of Myosin 2 and Gravity Effects ***Final Report***
Johnson-Wint, Barbara P., University of Northern Illinois, USA; Malouvier, Alexandre, NASA Ames Research Center, USA; Holton, Emily, NASA Ames Research Center, USA; Oct. 1996; 3p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

Several lines of evidence suggest that collagen organization by connective tissue cells is sensitive to force. For instance, in flight experiments on rats the collagen fibrils which were produced under weightlessness and which were immediately next to the tendon fibroblasts were shown to be oriented randomly around the cells while the older fibrils right next to these and which were produced under 1 G, were highly organized.
Derived from text
Collagens; Fibroblasts; Weightlessness

19970010269 NASA Ames Research Center, Moffett Field, CA USA
Amphibian Development in the Virtual Absence of Gravity
Souza, Kenneth A., NASA Ames Research Center, USA; Black, Steven D., Reed Coll., USA; Wassersug, Richard J., Dalhousie Univ., Canada; Proc. Natl. Acad. Sci.; Mar. 1995; Volume 92, pp. 1975-1978; In English
Report No.(s): NASA-TM-111839; NAS 1.15:111839; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

To test whether gravity is required for normal amphibian development, Xenopus laevis females were induced to ovulate aboard the orbiting Space Shuttle. Eggs were fertilized in vitro, and although early embryonic stages showed some abnormalities, the embryos were able to regulate and produce nearly normal larvae. These results demonstrate that a vertebrate can ovulate in the virtual absence of gravity and that the eggs can develop to a free-living stage.
Author
Embryos; Gravitational Effects; Physiological Effects; Eggs

19970010289 Colorado School of Mines, Golden, CO USA
Identification of Biomarkers in Bacteria by Pyrolysis-Tandem Mass Spectrometry ***Final Report, 10 Jul. 1992 - 28 Feb. 1995***
Voorhees, Kent J., Colorado School of Mines, USA; Oct. 18, 1995; 22p; In English
Contract(s)/Grant(s): DAAL03-92-G-0285
Report No.(s): AD-A309220; ARO-30533.1-LS; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A new turbomolecular pump and vacuum manifold were added to a chemical and biological mass spectrometer (CBMS). Detection limit measurements on pyridine, toluene, and methyl salicylate are reported for both the unmodified and modified versions of the CBMS. Comparison of pyrolysis-mass spectra of egg albumin showed that the modified instrument spectrum did not match those from unmodified CBMS instruments. The changes in instrument operating parameters and hardware of the modified instrument are described. Four oral presentations have been made on data generated from this contract.
DTIC
Mass Spectrometers; Pyrolysis; Ion Traps (Instrumentation); Portable Equipment; Mass Spectroscopy; Albumins

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AEROSPACE MEDICINE

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

19970009408 Institute for Human Factors TNO, Soesterberg, Netherlands
Audiological Selection Criteria ***Audiologische Keuringseisen***
Bronkhorst, A. W., Institute for Human Factors TNO, Netherlands; Dec. 17, 1996; 39p; In Dutch
Contract(s)/Grant(s): A94/KM/341; Proj No. 786.3
Report No.(s): TD-96-0504; TM-96-A062; Copyright; Avail: Issuing Activity (Human Factors Research inst., TNO, Soesterberg, Netherlands), Hardcopy, Microfiche

In a study performed on behalf of the Royal Netherlands Navy, it was investigated whether the present tone audiometric test criteria used for selection of personnel are still suitable in the light of scientific developments, or whether it is necessary to modify the criteria or add other tests. Several tone-audiometric criteria used for military selection in the Netherlands and abroad were evaluated using model predictions, base on the statistical distribution of hearing losses in the Netherlands and taking into account the inaccuracy of measured pure-tone hearing thresholds. In the calculations, a criterium for (moderate) auditory handicap was used, based on high-frequency tone-audiometric loss. The results show that the tone-audiometric criteria used in the Netherlands, especially those applied by the Royal Navy, are relatively stringent, and that a further lowering will result in a steep increase of the rejection percentage. The long-term effect of stringent criteria is, however, limited because persons with a (somewhat) better hearing will not necessarily develop less age-related and/or noise-induced hearing loss. This means that there is some room for relaxation of th criteria, if necessary. There are two main reasons for including other hearing test than the tone audiogram i the selection procedure. The first is that such tests can be used to assess auditory capabilities that ar poorly correlated with pure-tone hearing loss. Though many auditory test are, in principle, available fo evaluating capabilities like speech perception, directional hearing and signal detection and discrimination only speech audiometry, in particular sentence perception in noise, seems suitable for selection purposes. It is therefore recommended to consider inclusion of this test in the selection procedure. The second reason is that there is a need for tests that are either related to the (individual) susceptibility for noise-induced hearing loss, or that can be used for early detection of such a hearing loss. Several test that may be used for these purposes are mentioned in the literature. Examples are acoustic reflex measurements, high frequency audiometry and oto-acoustic emissions. It is recommended to perform a longitudinal study, over a period of several years to evaluate the effectiveness of these and other tests.
Author
Audiometry; Auditory Defects; Auditory Perception; Signal Detection; High Frequencies; Hearing; Acoustic Measurement

19970009601 Maryland Univ., Dept. of Zoology, College Park, MD USA
Evolution of Gravity Receptors in the Ear ***Final Report***
Popper, Arthur N., Principal Investigator, Maryland Univ., USA; 1996; 5p; In English
Contract(s)/Grant(s): NAG2-787
Report No.(s): NASA-CR-202653; NAS 1.26:202653; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The general status of a grant to investigate the origins and evolution of two hair cell types in the ears of a teleost fish, Astronotus ocellatus (the oscar), is presented. First, it was demonstrated that the cells in the rostral end of the saccule of the , Carassius auratus, are type 1-like, while those at the caudal end are type 2 cells. It was demonstrated that the dichotomy of hair cell types found in the utricle of the oscar is also found in the goldfish. Second, the lateral line system of the oscar was examined using gentamicin sulphate, an ototocix drug that destroys type 1- like hair cells but does not appear to damage type 2 hair cells. It was demonstrated that the hair cells found in neuromasts of lateral line canal organs were totally destroyed within 1 day of treatment, while the hair cells in free neuromasts were undamaged after 12 days of treatment. Third, it was demonstrated that the calyx, the specialized nerve ending, is not unique to amniotes and that it is present at least in the cristae of semicirular canals in goldfish. These results have demonstrated that: (1) there are multiple hair cell types in the vestibular endorgans of the ear of fishes, (2) these hair cell types are very similar to those found in the mammalian vestibular endorgans, (3) the nerve calyx is also present in fishes, and (4) multiple hair cell types and the calyx have evolved far earlier in the course of vertebrate evolution than heretofore thought. Understanding the structure of the vestibular endorgans has important implications for being able to understand how these organs respond to gravistatic, acceleration and acoustic input. The vestibular endorgans of fishes may provide an ideal system in which to analyze functional differences in hair cells. Not only are the two hair cell types similar to those found in mammals, they are located in very discrete regions in each endorgan. Thus, it is relatively easy to gain access to cells of one or the other type. The presence of two cell types in the lateral line have equally significant implications for studies of the vestibular system.
Derived from text
Ear; Vestibules; Fishes; Biological Evolution; Cells (Biology); Gravireceptors

19970010147 Illinois Univ., College of Medicine, Rockford, IL USA

Mechanisms of Bone Mineralization and Effects of Mechanical Loading ***Final Report***

Babich, Michael, Illinois Univ., USA; Oct. 1996; 3p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

The data suggest that PTH and PKC inhibit nodule formation, and that alternative energy sources are utilized by osteoblasts in the process of mineralization. The conditions and techniques to grow, fix, photograph, and measure bone mineralization in vitro were defined. The results are presently in preliminary form and require further assessment as follows; quantitate the surface area of nodules + treatments via computer-aided image analysis; use PTH + inhibitors of signaling pathways to determine the mechanism of nodule formation; determine how protein kinase C is involved as a promotor of nodule formation; cell proliferation vs. cell death affected by modulation of signal transduction (i.e., PTH, enzyme inhibitors and activators); identify mRNA induced or decreased in response to PTH and signaling modulators that encode proteins that regulate cell morphology, proliferation, and nodule formation. Therefore, several follow-up studies between the laboratories at NASA-Ames Research Center and my laboratory at the University of Illinois have been initiated.

Derived from text

Bone Mineral Content; Weightlessness; Flight Stress (Biology); Regeneration (Physiology); Gravitational Effects; Aerospace Medicine

19970010152 North Dakota State Univ., Dept. of Electrical Engineering, Fargo, ND USA

Development of Minimally-Invasive Aortic Pressure and Flow Instrumentation ***Final Report***

Ewert, Dan, North Dakota State Univ., USA; Oct. 1996; 3p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

To better understand the mechanisms underlying the effects of microgravity on the cardiovascular system, cardiovascular models have been developed. These computational models estimate changes in cardiovascular parameters such as total peripheral resistance and systemic arterial compliance, and require high quality aortic pressure and flow measurements as their input. Many of these measurements are obtained in experimental animals and therefore the invasiveness of the instrumentation must be as kept to a minimum. These considerations are the primary motivation behind this work.

Derived from text

Microgravity; Cardiovascular System; Aorta; Arteries; Flow Measurement

19970010153 Rochester Inst. of Tech., Dept. of Mechanical Engineering, NY USA

Development of a Driver Code for the WICS Project ***Final Report***

Ghosh, Amitabha, Rochester Inst. of Tech., USA; Oct. 1996; 3p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

Wall Interference Correction System (WICS) is a computational technique to evaluate the wind tunnel wall interference corrections for blockage, Mach number, dynamic pressure and angle of attack. The objective is to predict the effects of the bounding walls on wind tunnel measurements [1]. The procedure attempts to compute these corrections in real time so that the test engineer can implement these by adjusting wind tunnel controls for angle of attack and dynamic pressure while the test is in progress in the 12 ft. pressure wind tunnel at the Ames Research Center. The technique utilizes an ideal flow solver PMARC (Panel Method developed at the Ames Research Center) to compute influence coefficients in an internal flow mode by representing a paneled model of the tunnel for fullspan and semispan tests.

Derived from text

Wind Tunnel Walls; Wind Tunnel Tests; Wall Flow; Panel Method (Fluid Dynamics); Dynamic Pressure; Aerodynamic Interference; Angle of Attack

19970010162 Stanford Univ., Dept. of Aeronautics and Astronautics, Palo Alto, CA USA

Welcome to Webpress ***Final Report***

Oct. 1996; 2p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

A World Wide Web page, Webpress, designed for K-12 teachers is described. The primary emphasis of Webpress is the science of aeronautics, and the page includes many links to various NASA facilities as well as many other scientific organizations.

Derived from text

Aeronautics; Internets; World Wide Web

19970010163 NASA Ames Research Center, Moffett Field, CA USA

A Comparison of the Physiology and Mechanics of Exercise in LBNP and Upright Gait ***Final Report***

Boda, W. L., NASA Ames Research Center, USA; Watenpaugh, D. E., NASA Ames Research Center, USA; Ballard, R. E., NASA Ames Research Center, USA; Chang, D., NASA Ames Research Center, USA; Looft-Wilson, R., NASA Ames Research Center, USA; Hargens, A. R., NASA Ames Research Center, USA; Oct. 1996; 3p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

Bone, muscular strength, aerobic capacity, and normal fluid pressure gradients within the body are lost during bed rest and spaceflight. Lower Body Negative Pressure (LBNP) exercise may create musculoskeletal and cardiovascular strains equal to a greater than those experienced on Earth and elucidate some of the mechanisms for maintaining bone integrity. LBNP exercise simulates gravity during supine posture by using negative pressure to pull subjects inward against a treadmill generating footward forces and increasing transmural pressures. Footward forces are generated which equal the product of the pressure differential and the cross-sectional area of the LBNP waist seal. Subjects lie supine within the chamber with their legs suspended from one another via cuffs, bungee cords, and pulleys, such that each leg acts as a counterweight to the other leg during the gait cycle. The subjects then walk or run on a treadmill which is positioned vertically within the chamber. Supine orientation allows only footward force production due to the negative pressure within the chamber. The purpose of this study was to determine if the kinematics, kinetics, and metabolic rate during supine walking and slow running on a vertical treadmill within LBNP are similar to those on a treadmill in 1-g environment in an upright posture.

Author

Lower Body Negative Pressure; Posture; Physiological Effects; Physiological Tests; Kinematics; Kinetics; Physical Exercise; Cardiovascular System

19970010168 University of Northern Colorado, Greeley, CO USA

Effect of +Gz Acceleration on the Oxygen Uptake-Excercise Load Relationship during Lower Extremity Ergometer Excercise ***Final Report***

Jackson, Catherine G. R., University of Northern Colorado, USA; Oct. 1996; 3p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

Long term spaceflight and habitation of a space station and/or the moon require that astronauts be provided with sufficient environmental and physiological support so that they can not only function in microgravity but be returned to earth safely. As the duration of habitation in microgravity increase the effects of the concomitant deconditioning of body systems becomes a concern for added exercise in space and for reentry to Earth gravity. Many countermeasures have been proposed to maintain proper functioning of the body, but none have proved sufficient, especially when the cost of crew time spent in these activities is considered. The issue of appropriate countermeasures remains unresolved. Spaceflight deconditioning decreases tolerance to +Gz acceleration, head to foot, the direction which is experienced during reentry; the result is that the crew member is more prone to becoming pre-syncopal or syncopal, thus exacerbating the orthostatic intolerance. All ground-based research using microgravity analogues has produced this same lowered G tolerance. When intermittent exposure to +1 to +4 Gz acceleration training was used, some alleviation of orthosatic intolerance and negative physiological effects of deconditioning occurred. Exercise alone was not as effective; but the added G force was. The physiological responses to acceleration added to exercise training have not been clearly shown. We will test the hypothesis that there will be no difference in the exercise oxygen uptake-exercise load relationship with added +Gz acceleration. We wi also compare oxygen uptake during graded exercise-acceleration loads in the human-powered short arm centrifuge with those from normal supine exercise loads. The human-powered short arm centrifuge was built by NASA engineers at Ames Research Center.

Derived from text

Acceleration (Physics); Oxygen; Ergometers; Long Duration Space Flight; Physical Exercise

19970010306 Kings Coll., Dept. of Physics, London, UK

Compilation of the Dielectric Properties of Body Tissues at RF and Microwave Frequencies ***Final Report, 15 Dec. 1994 - 14 Dec. 1995***

Gabriel, Camelia, Kings Coll., UK; Jun. 1996; 273p; In English

Contract(s)/Grant(s): AFOSR-91-0122; AF Proj. 7757

Report No.(s): AD-A309764; AL/OE-TR-1996-0037; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

Recent developments in the field of electromagnetic dosimetry have produced high resolution anatomically correct man and animal models from medical imaging data for use in numerical simulation exercises. The level of details is such that over 30 tissue types can be identified. The application of such models require that dielectric properties be allocated to the various tissues at all

the frequencies to which the model is exposed. There is, as yet, no consensus on the dielectric data. This project is geared towards this objective.
DTIC
Dielectric Properties; Imaging Techniques; High Resolution

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BEHAVIORAL SCIENCES

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

19970009472 Naval Postgraduate School, Monterey, CA USA
Fundamental Applied Skills Training (FAST) Program Measures of Effectiveness
Thomlison, Cynthia Ann, Naval Postgraduate School, USA; Mar. 1996; 68p; In English
Report No.(s): AD-A310386; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This thesis attempts to measure the effectiveness of Fundamental Applied Skills Training (FAST), a program designed to help selected Navy recruits succeed in Basic Military Training (BMT) by improving their literacy skills. The study first analyzes whether completion of FAST is related to the subsequent completion of BMT for recruits who entered the Navy in Fiscal Years 1992 and 1993. FAST participants and other recruits with relatively low literacy skills from these two recruit cohorts are then compared on the basis of additional success indicators: completion of the first term of service and advancement toward higher rank (EA). Study results suggest that participation in FAST is related to an increased probability of completing BMT and generally higher success chances in the Navy during the first term of service. Limitations in the data are addressed along with recommendations for further study.
DTIC
Education; Navy; Abilities; Maximum Likelihood Estimates

19970009860 NASA Ames Research Center, Moffett Field, CA USA
Effects of Optical Pitch on Oculomotor Control and the Perception of Target Elevation
Cohen, Malcom M., NASA Ames Research Center, USA; Ebenholtz, Sheldon M., New York Univ., USA; Linder, Barry J., Permanente Medical Group, USA; Perception & Psychophysics; 1995; Volume 57, No. 4, pp. 433-440; In English
Contract(s)/Grant(s): UPN-199-16-12
Report No.(s): NASA-CR-2203217; NAS 1.26:2203217; Copyright Waived (NASA); Avail: CASI; A02, Hardcopy; A01, Microfiche

In two experiments, we used an ISCAN infrared video system to examine the influence of a pitched visual array on gaze elevation and on judgments of visually perceived eye level. In Experiment 1, subjects attempted to direct their gaze to a relaxed or to a horizontal orientation while they were seated in a room whose walls were pitched at various angles with respect to gravity. Gaze elevation was biased in the direction in which the room was pitched. In Experiment 2, subjects looked into a small box that was pitched at various angles while they attempted simply to direct their gaze alone, or to direct their gaze and place a visual target at their apparent horizon. Both gaze elevation and target settings varied systematically with the pitch orientation of the box. Our results suggest that under these conditions, an optostatic response, of which the subject is unaware, is responsible for the changes in both gaze elevation and judgments of target elevation.
Author
Pitch (Inclination); Visual Perception; Visual Fields; Eye Movements; Optical Illusion

19970009955 University of Central Florida, Dept. of Industrial Engineering and Management Systems, Orlando, FL USA
The Use of Computer-Based Planning to Enhance the Effectiveness and Efficiency of Simulation-Based Team Training
Stone, George F., III, University of Central Florida, USA; Jan. 1996; 239p; In English
Report No.(s): AD-A308091; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

To ensure user acceptance and success of technology-enhanced training in an era of declining budgets and scarce resources, civilian and military organizations must exploit effective and efficient planning and evaluation tools as part of simulation-based training. The purpose of this research is to validate the hypothesis that computer-based (automated) planning tools will improve training planning effectiveness and efficiency for simulation-based team training exercises. A modified pretest-posttest control group experimental design was used to determine the effectiveness and efficiency of a computer-based training planning model. Performance measures, as well as, cognitive mapping and clustering techniques aided the assessment of the automated training planning tool. The treatment group of 27 two-person teams used a computer-based planning tool to develop a plan for conducting

simulation-based training, while a control group of 25 two-person teams used current manual planning methods. Both groups then executed their respective training plans in a constructive simulation program called Janus. Results indicate that the group which used the computer-based planning tool had a significantly better mental model of the training planning process than the control group. Based on statistical tests comparing relevant performance measures, the study concludes that a computer-based planning tool has the potential to enhance the effectiveness and efficiency of simulation-based team training.
DTIC
Computer Techniques; Planning; Education; Statistical Tests; Simulation

19970010104 Odyssey Research Associates, Inc., Ithaca, NY USA
Netbook - A Toolset in Support of a Collaborative and Cooperative Learning Environment ***Quarterly Report***
Stillman, Maureen, Principal Investigator, Odyssey Research Associates, Inc., USA; Pienkowski, Nathan, Odyssey Research Associates, Inc., USA; Apr. 26, 1996; 7p; In English
Contract(s)/Grant(s): MDA972-96-C-0004
Report No.(s): AD-A307911; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Netbook is a software development/research project being conducted for the DARPA computer aided training initiative (CEATI). As a part of the SNAIR division of CEATI, Netbook concerns itself with the management of Internet resources. More specifically, Netbook is a toolset that allows students, teachers, and administrators to navigate the World Wide Web, collect resources found there, index and annotate those resources, and then organize them in a meaningful way. In addition Netbook provides the capacity for communication with peers and teachers, enabling students to collaborate while engaged in the aforementioned activities. For the first quarter of 1996, the functional specifications for Netbook were defined. This process involved developing a real-world scenario and then defining the components needed for its realization. The major issue that arose in the development of the functional specification surrounded deciding whether Netbook's tool suite would be integrated and structured, or separated and flexible. Because of the particular needs of the audience and an attempt to reduce the learning curve, among other issues, it was decided that an integrated and structured Netbook would add greater value to the research process, and that greater flexibility could always be built in should the Netbook project be extended for future development. In the following quarter Netbook's system architecture will be defined, various components will be coded, and early formative evaluations will begin.
DTIC
Internet Resources; Education; Information Management; Applications Programs (Computers)

19970010181 Ohio State Univ., Columbus, OH USA
Loss of Situation Awareness in Pilots: Analysis of Incident Reports ***Final Report***
Villeda, Eric B., Ohio State Univ., USA; Oct. 1996; 3p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

Introduction Approximately 75% of all aviation accidents and incidents are attributable to human failures in monitoring, managing, and operating system. Tactical decision errors were found to be a factor in 25 of 37 major US air transport accidents between 1978 and 1990. These two facts demonstrate the inability of some pilots to maintain situation awareness. Situation awareness (SA) is defined as 'the perception of elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future". Thus, when a pilot loses SA, he or she is unable to ether perceive, comprehend, or project the status of the aircraft. In pilots terms, he or she has 'fallen behind the airplane'. Our study this summer involved an analysis of 190 NASA Aviation Safety Reporting System (ASRS) reports.
Derived from text
Aircraft Accidents; Aircraft Safety; Flight Safety

19970010274 Georgia Inst. of Tech., School of Management, Atlanta, GA USA
The Effects of Performance, Individual Differences, and AroUSAl on Feedback-Seeking Behavior in a Novel Computer Based Task ***Final Report, Jun. 1992 - Oct. 1994***
Rensvold, Roger B., Georgia Inst. of Tech., USA; Apr. 1996; 91p; In English
Contract(s)/Grant(s): MDA903-92-K-0107
Report No.(s): AD-A313216; ARI-RN-96-59; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This report focuses on how situational characteristics affect feedback seeking. It also examines how individual differences in feedback propensities affect feedback seeking. Proposed antecedents of feedback eliciting (overt feedback seeking) were examined utilizing a computer-based technique that permitted objective measurement of the behavior. A 2 X 2 research design was used, with two levels of social presence (an observer present or absent) and two different task rationales (evaluating the task, evalu-

ating the participant). Feedback eliciting was operationalized in two complementary ways-as the number of times the participant elicited f eedback, and as the number of seconds he or she spent examining feedback information. Two types of feedback were examined: (1) outcome feedback, or information about level of performance, and (2) process feedback, or information about how to improve performance. Separate hypotheses were formulated for each. In addition, to social presence and task rationale, the following variables were hypothesized to affect feedback eliciting: performance, aroUSAl (measured as state anxiety), external feedback propensity, task-specific internal feedback ability, task familiarity, internal feedback propensity, self-esteem, locus of control, tolerance for ambiguity, and need for achievement.
DTIC
Computer Techniques; Feedback; Hypotheses

19970010318 Navy Personnel Research and Development Center, San Diego, CA USA
The Effects of Quality of Life Factors on Turnover and Performance in the Private Sector: A Literature Review ***Final Report, Feb. - Oct. 1993***
Glaser, Dale N., Navy Personnel Research and Development Center, USA; Mar. 1996; 35p; In English
Contract(s)/Grant(s): R1772
Report No.(s): AD-A307956; NPRDC-TN-96-38; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
A literature review was conducted assessing the effects of Quality of Life (QOL) and related factors that affect turnover and performance in the private sector. Support was found for the spillover model (attitudes from one sector of life, such as work, carry over into another sphere, such as home). However, determining the caUSAl direction of the work-nonwork relationship is still speculative. Some evidence has been found for the effects of family responsibilities on work (e.g., tardiness). Possible variables that influence turnover include pay/salary, health, and shiftwork. The QOL/performance relationship is suggestive at best given the lack of research.
DTIC
Personnel Management; Human Behavior

19970010369 Army Aeromedical Research Lab., Fort Rucker, AL USA
Perception of an Illusory Form Under Conditions of Limited Visibility ***Final Report***
Rabin, Jeff C., Army Aeromedical Research Lab., USA; May 1996; 11p; In English
Report No.(s): AD-A309202; USAARL-96-25; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Ambiguous figures and visual illusions are difficult to perceive when presented in terms of color contrast rather than luminance contrast. This finding has prompted the notion that the perception of these forms depends primarily on processing along an achromatic, luminance pathway. Others contend that the perception of such figures depends on the visibility of the stimulus rather than on the particular pathway traversed from eye to brain. If visibility is a limiting factor on perception, then it would be useful to determine how certain perceptual ambiguities are resolved under various conditions of limited visibility. In the present study, visual perception of a complex, ambiguous form was evaluated under several conditions of limited visibility including equiluminant color contrast (S and LM) and a range of luminance contrasts, also were evaluated. The results confirm and extend previous findings in showing that the perception of a complex, illusory form depends more on the visibility of the stimulus than on the particular pathway accessed. The expectations and prior experience of the observer also were found to be crucial determinants of complex object recognition.
DTIC
Color Vision; Luminance; Illusions; Visual Perception

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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.

19970009457 United Technologies Corp., Windsor Locks, CT USA
SPE OBOGS: On-board Oxygen Generating System
Smith, William F., United Technologies Corp., USA; McElroy, James F., United Technologies Corp., USA; Space Electrochemical Research and Technology; Dec. 1996, pp. 133-146; In English; Also announced as 19970009446; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Regulations require oxygen USAge by commercial airliners during check out and during certain aircraft configurations. This oxygen is drawn from a high pressure on-board cylinder storage system. In a typical aircraft, oxygen cylinder removal for oxygen ground servicing is conducted every 4 to 6 weeks. In the early 1990's, it was recognized that an on-board oxygen generating system (OBOGS) could provide an economic advantage for the airlines. An in-flight service evaluation (ISE) of the SPE-OBOGS by United Technologies Corporate is in the planning stage.
Derived from text
Airline Operations; Commercial Aircraft; Oxygen Supply Equipment; Cost Effectiveness; Electrolysis; Certification

19970010154 Stanford Univ., Industrial and Management Systems Engineering, Palo Alto, CA USA
Effects of Gloves, Temperature and Their Interaction on Finger, Hand, and Arm Blood Flow and Skin Temperature: A Pilot Study ***Final Report***
Hallbech, M. SUSAn, Stanford Univ., USA; Oct. 1996; 3p; In English; Also announced as 19970010146; No Copyright; Avail: CASI; A01, Hardcopy; A02, Microfiche

The objective of this study is to investigate the effects of cold only, commercially available gloves only, and the combination of gloves and cold on the blood flow and surface (skin) temperature of the medial and proximal phalanxes of digit 3, the metacarpal region of the hand, and the forearm.
Derived from text
Gloves; Blood Flow; Fingers

19970010293 Logicon Technical Services, Inc., Dayton, OH USA
Developing Virtual Interfaces for Use in Future Fighter Aircraft Cockpits ***Interim Report, 1 Jul. 1993 - 1 Jul 1994***
Hass, Michael W., Armstrong Lab., USA; Nelson, W. Todd, Logicon Technical Services, Inc., USA; Hettinger, Lawrence J., Logicon Technical Services, Inc., USA; Jul. 1995; 110p; In English
Contract(s)/Grant(s): F41624-94-D-6000; AF Proj. 7184
Report No.(s): AD-A307887; AL/CF-TR-1995-0154; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The current research was conducted to evaluate the effect of employing multi-sensory displays for fighter aircraft cockpit on the performance of a simulated air combat task. Each of four experienced U.S. Air Force F-16 pilots flew twelve simulated missions which required them to locate and destroy four enemy bombers whose flight path was pre-programmed. Simultaneously, two other pilots were assigned to auxiliary cockpits in the laboratory and flew enemy fighter aircraft in an attempt to intercept and shoot down the primary pilot. Each pilot flew six trials using a cockpit comprised of conventional F-15 flight instruments and six trials using a modified, multi-sensory cockpit. The latter configuration included three-dimensional sound cueing information specifying the location of enemy aircraft, a head-slaved head-up display, a schematic representation of the terrain that provided pictorial information about self-motion an altitude, a spatial representation of the location of enemy and friendly aircraft in the vicinity, a pictorial representation of the status of aircraft weapons systems, and a multi-sensory Ground Collision Avoidance System. The results indicate tha pilot performance and situational awareness were enhanced with the multi-sensory cockpit as opposed to the conventional cockpit. This report also contains a summary of the effects of changes in tactics and new control and display technology on the development of multi-sensory crewstations.
DTIC
Cockpits; Crew Workstations; Display Devices; F-15 Aircraft; F-16 Aircraft; Flight Instruments; Head-Up Displays; Pilot Performance

19970010352 Defence Science and Technology Organisation, Ship Structures and Materials Div., Melbourne, Australia
An Electrostatic Hazards Evaluation of RAAF Flightline Clothing
Bajinskis, G., Defence Science and Technology Organisation, Australia; Billon, H., Defence Science and Technology Organisation, Australia; Quinn, J., Defence Science and Technology Organisation, Australia; Jul. 1996; 31p; In English; Original contains color illustrations
Report No.(s): DSTO-TR-0372; AR-009-758; Copyright; Avail: Issuing Activity (DSTO Aeronautical and Maritime Research Lab., PO Box 4331, Melbourne, Victoria 3001, Australia), Hardcopy, Microfiche

An electrostatic hazards assessment of procedures and service clothing used during flightline operations that involve electro-explosive devices (EED's) has been completed. The assessment includes measurements of the body-to-ground resistance, capacitance and body potential for personnel in service clothing. Activities involved in the loading of 20 mm ammunition into an F/A-18 aircraft provide a focus for the investigation.
Author
Hazards; Initiators (Explosives); Electrostatic Charge; Ammunition; Flight Clothing

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S

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W

Personal Author Index

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