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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

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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 442)

JUNE 30, 1997

51
LIFE SCIENCES (GENERAL)

19970017359 NASA Marshall Space Flight Center, Huntsville, AL USA

Crystals of Serum Albumin for Use in Genetic Engineering and Rational Drug Design

Carter, Daniel C., Inventor, NASA Marshall Space Flight Center, USA; Dec. 17, 1996; 9p; In English

Patent Info.: Filed 6 Dec. 1994; NASA-Case-MFS-28834; US-Patent-5,585,466; US-Patent-Appl-SN-351861; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Serum albumin crystal forms have been produced which exhibit superior x-ray diffraction quality. The crystals are produced from both recombinant and wild-type human serum albumin, canine, and baboon serum albumin and allow the performance of drug-binding studies as well as genetic engineering studies. The crystals are grown from solutions of polyethylene glycol or ammonium sulphate within prescribed limits during growth times from one to several weeks and include the following space groups: P2(sub 1), C2, P1.

Official Gazzette of the U.S. Patent and Trademark

Albumins; Serums; Genetic Engineering; Drugs; Crystal Growth; Pharmacology; X Ray Diffraction

19970017536 NASA Johnson Space Center, Houston, TX USA

Constructing a High Density Cell Culture System

Spaulding, Glenn F., Inventor, NASA Johnson Space Center, USA; Dec. 31, 1996; 7p; In English; Division of US-Patent-Appl-SN-996263, filed 23 Dec. 1992

Patent Info.: Filed 13 Apr. 1994; NASA-Case-MSC-22060-2; US-Patent-5,589,112; US-Patent-Appl-SN-227827; US-Patent-Appl-SN-996263; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An annular culture vessel for growing mammalian cells is constructed in a one piece integral and annular configuration with an open end which is closed by an endcap. The culture vessel is rotatable about a horizontal axis by use of conventional roller systems commonly used in culture laboratories. The end wall of the endcap has tapered access ports to frictionally and sealingly receive the ends of hypodermic syringes. The syringes permit the introduction of fresh nutrient and withdrawal of spent nutrients. The walls are made of conventional polymeric cell culture material and are subjected to neutron bombardment to form minute gas permeable perforations in the walls.

Official Gazzette of the U.S. Patent and Trademark

Cells (Biology); Culture Techniques; Tissues (Biology); Bioreactors; Rotating Cylinders; Neutron Beams

19970017545 Bionetics Corp., Cocoa Beach, FL USA

Comparison of Gavage, Water Bottle, and a High-Moisture Diet Bolus as Dosing Methods for Quantitative D-xylose Administration to B6D2F1 (Mus musculus) Mice

Zimmer, J. Paul, Cornell Univ., USA; Lewis, Sherry M., National Center for Toxicological Research, USA; Moyer, Jerry L., Bionetics Corp., USA; Laboratory Animals; 1993; Volume 27, pp. 164-170; In English

Report No.(s): NASA-CR-203744; NAS 1.26:203744; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Gavage, water bottle, and diet incorporation are 3 dosing methods used orally to administer test compounds to rodents. These 3 methods were compared in mice to determine which represented the most quantitative delivery system. For dietary incorporation, a high-moisture bolus form of NIH-31 rodent meal was developed using hydroxypropyl methylcellulose as an autoclave-stable binding agent. A high-moisture bolus were selected to increase the acceptability of the dosed diet and to promote quantitative consumption through reduced wastage. The test compound used was D-xylose, a pentose sugar that may be quantitatively detected, colorimetrically, in urine following oral dosing. Six male and 6 female B6D2FI mice were placed in metabolism

cages and dosed with a known quantity of D-xylose by each of the 3 methods. Urine was collected before and after each method of administration and analysed for total D-xylose; the per cent recovery was based upon the amount of D-xylose consumed. Quantitative consumption was apparently greatest for water bottle dosing with an average recovery of 56.0% of the original D-xylose dose. High-moisture bolus incorporation ranked second with 50.0% D-xylose recovery, and gavage was third with 41.0% D-xylose recovery.
Author
Metabolism; Dosage; Xylose; Diets; Mice; Rodents; Moisture Content; Water; Physiological Tests

19970017600 European Nuclear Energy Agency, Frascati, Italy
Induced modifications on algae photosynthetic activity monitored by pump-and-probe technique
Barbini, Roberto, European Nuclear Energy Agency, Italy; Colao, F., European Nuclear Energy Agency, Italy; Fantoni, Roberta, European Nuclear Energy Agency, Italy; Palucci, Antonio, European Nuclear Energy Agency, Italy; Ribezzo, Sergio, European Nuclear Energy Agency, Italy; Torzillo, Giussepe, Consiglio Nazionale delle Ricerche, Italy; Carlozzi, Pietro, Consiglio Nazionale delle Ricerche, Italy; Pelosi, Elio, Consiglio Nazionale delle Ricerche, Italy; Dec. 1995; ISSN 1120-5571; 27p; In English
Report No.(s): ENEA-RT-INN-95-19; RT/INN-95-19; DE97-713423; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

The lidar fluorosensor system available at ENEA Frascati has been used for a series of laboratory measurements on brackish-water and marine phytoplankton grown in laboratory with the proper saline solution. The system, already used to measure the laser induced fluorescence spectra of different algae species and their detection limits, has been upgraded with a short pulse Nd:YAG laser and rearranged to test a new technique based on laser pump and probe excitation. Results of this new technique for remote monitoring of the in-vivo photosynthetic activity will be presented, as measured during a field campaign carried out in Florence during the Autumn 1993, where the effects of an actinic saturating light and different chemicals have also been checked.
DOE
Algae; YAG Lasers; Laser Pumping; Photosynthesis

19970017602 Georgetown Univ., Medical Center, Washington, DC USA
The Molecular Biological Basis for the Response of Poly(ADP-RIB) Polymerase and NAD Metabolism to DNA Damage Caused by Mustard Alkylating Agents
Smulson, Mark E., Georgetown Univ., USA; Jul. 1996; 34p; In English
Contract(s)/Grant(s): DAMD17-95-C-5001
Report No.(s): AD-A319494; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

During the course of this contract, we have performed a variety of experiments to provide a strategy to modulate the nuclear enzyme poly(ADP-ribose) polymerase (PARP), in cultured keratinocytes. This enzyme modifies a variety of nuclear proteins utilizing NAD. DNA is required for the catalytic activity of the enzyme and the activity is dependent upon the presence of strand breaks in this DNA. It has been hypothesized that human skin exposed to mustards may develop blisters due to a generalized lowering of NAD in exposed skin cells. During the contract period, we have established a stably transfected human keratinocyte cell line which expresses antisense transcripts to PARP mRNA when these keratinocyte were grafted onto nude mice they formed histologically normal human skin. Accordingly, a model system has been developed in which the levels of PARP can be selectively manipulated in human keratinocytes in reconstituted epidermis as well. We also showed that PARP was proteolytically cleaved at the onset of spontaneous apoptosis following proteolytic conversion of CPP32b to its active form, termed 'apopain'. Having characterized the even ts associated with apoptosis, we determined, during the last period, whether any or all of these features could be observed following exposure of keratinocytes to SM.
DTIC
Deoxyribonucleic Acid; Skin (Anatomy); Ribs (Supports); Metabolism; Enzyme Activity; Cells (Biology)

19970017739 Prins Maurits Lab. TNO, Rijswijk, Netherlands
Intratracheal Aerosolization of Endotoxin (LPS) in the Rat: A Comprehensive Animal Model to Study Adult Respiratory Distress Syndrome (ARDS) ***Final Report***
vanHelden, H. P., Prins Maurits Lab. TNO, Netherlands; Kuijpers, W. C., Prins Maurits Lab. TNO, Netherlands; Steenvoorden, D., Prins Maurits Lab. TNO, Netherlands; Go, C., Prins Maurits Lab. TNO, Netherlands; Bruijnzeel, P. L., Prins Maurits Lab. TNO, Netherlands; Aug. 1996; 34p; In English
Report No.(s): AD-A315633; PML-1996-B63; TDCK-TD-96-0040; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Adult Respiratory Distress Syndrome (ARDS) is characterized by high- permeability pulmonary oedema containing plasma-derived proteins, decreased lung volumes, decreased compliance, and arterial hypoxaemia. ARDS results from a number of different causes, of which Gram-negative sepsis and endotoxin (LiPolySaccharide, LPS) from bacteria and aspiration are thought to be major causes to the development of this life-threatening syndrome. Although insight into the clinical course of ARDS patients is increasing, the sequence of pathophysiological events remains poorly understood. Currently, it is becoming widely accepted that an inflammatory reaction occurs in the lungs, in which numerous cellular and humoral mechanisms are involved, including macrophages, neutrophils, platelets, coagulation and fibrinolytic systems. Activated alveolar macrophages (AM) may contribute to this inflammatory reaction by the in vivo production of Reactive Oxygen Intermediates (ROl) and chemotactic cytokines, of which TNFct seems to be the major one. Some of the damage done by ROl in vivo is assumed to be due to hydroxyl radicals (OH) that emerge from the conversion of O2 and H2O2. Not only in vivo experiments were in favour of a potential role for TNFct in pulmonary damage, but also in vitro experiments supported these findings. In vitro TNFct was capable of 'priming' PMNs for secondary stimuli. In addition to the central role of ROl and TNFct, there is clear support for the involvement of a multimediator network that leads to lung tissue injury. During the development of ARDS, the generation of various mediators contribute to the development of severe lung damage. For example, damage to the surfactant system significantly contributes to the lung dysfunction associated with ARDS.
DTIC
Respiratory System; Activation Analysis; Permeability; Trachea

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AEROSPACE MEDICINE

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

19970017288 Czech and Slovak Society of Environmental Mutagenesis, Prague, Czechoslovakia
The 2nd International Conference on Environmental Mutagens in Human Populations
Aug. 1996; 218p; In English; 2nd; Environmental Mutagens In Human Populations, 20-25 Aug. 1995, Prague, Czech Republic
Report No.(s): INIS-mf-14900; CONF-950879; DE97-605124; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche; US Sales Only; US Sales Only

The proceedings contain 190 contributions, out of which 21 have been inputted in INIS. These deal with genetic effects of ionizing radiation, some describe the examination of children affected by the Chernobyl accident. (P.A.).
DOE
Radiation Effects; Ionizing Radiation; Mutagens; Genetics

19970017475 Kentucky Univ., Research Foundation, Lexington, KY USA
Perimetric Mapping of Hyperacuity: Effects of Retinal Laser Scars, *25 May 1995 - 24 May 1996*
Schmeisser, Elmar T., Kentucky Univ., USA; Jun. 1996; 42p; In English; Sponsored in part by an unrestricted departmental grant from Research to Prevent Blindness, Inc.
Contract(s)/Grant(s): DAMD17-95-C-5038
Report No.(s): AD-A310716; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The effects of specific graded retinal laser lesions on both hyperacuity and local luminance perimetry were measured by electrophysiological means. Animals were used that previously received minimal spot laser exposures from a pulsed neodymium-YAG laser at energies up to and including contained subretinal hemorrhages in both the parafovea and the fovea. In these experiments, a 95% contrast vernier acuity targets were presented at high luminance levels to anesthetized primates. Visual evoked potentials were recorded by conventional means. An additional map of each retina was produced by flickering small patches on the stimulus display and recording the retinal signal. Vernier recording have proven relatively successful in those animals with less than contained retinal hemmorage lesions in the fovea. Animals with such lesions have grossly degraded resolution acuity and no recordable vernier acuity. Retinal and cortical topographic function mapping has to date proven unsuccessful.
DTIC
YAG Lasers; Visual Acuity; Retina; Pulsed Lasers; Neodymium Lasers; Surgical Instruments; Fovea

19970017590 Bowling Green State Univ., OH USA
The Effects of Refrigeration and Freezing (With Glycerolization) of Packed Red Blood Cells on the Recovery and Viability of Orientia Tsutsugamushi
Casleton, Brian G., Bowling Green State Univ., USA; Aug. 1996; 68p; In English

Report No.(s): AD-A318713; AFIT-96-060; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Scrub typhus, caused by infection with Orientia tsutsugamushi, accounts for up to 23% of all fevers in endemic areas of the Asia-Pacific region. Patients often become rickettsemic approximately 1 to 3 days before symptoms of the disease are evident. Infection is common in rural areas and the clinical syndrome can vary from asymptomatic to a fatal illness. In an effort to determine if 0. tsutsugamushi could survive in units of stored blood and present a potential threat to the blood supply, we infected human mononuclear cells isolated from whole blood by density gradient centrifugation and subsequently inoculated them with 0. tsutsugamushi, Karp strain. Infection of the mononuclear cells was determined by Oiemsa stain, direct fluorescent antibody (DFA) staining, and polymerase chain reaction (PCR).

DTIC

Antibodies; Infectious Diseases; Typhus; Freezing; Refrigerating; Erythrocytes

19970017597 Armstrong Lab., Brooks AFB, TX USA

Human Pulmonary Tolerance to Dynamic Over-Pressure ***Final Report, Jan. 1994 - Dec. 1995***

Krebs, Matthew B., School of Aerospace Medicine, USA; Pilmanis, Andrew A., Armstrong Lab., USA; Nov. 1996; 64p; In English

Contract(s)/Grant(s): AF Proj. 7184

Report No.(s): AD-A318718; AL/CF-TR-1996-0058; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The literature was reviewed for animal and human data defining the limits of dynamic pulmonary overpressure. The physiology and basic theory of decompression are discussed. The current understanding of static pressure limits is discussed, and its basis in the literature identified. The maximum pressure that can be safely tolerated by the human pulmonary system in a dynamic over-pressure situation is unknown. This measurement, in general, has not been performed. Evidence is presented which suggests that the unsupported chest wall of the human population can safely support 80 mm Hg static and dynamic over-pressure of the lungs. Safe static pressure in the human population wearing chest and abdomen support devices is at least 190 mm Hg. It is probable that a pilot without pulmonary pathology, wearing well designed life support equipment, could support higher pressures without permanent injury. The problem lies in the lack of human data, partly due to the fact that humans have never expected to be exposed to decompression in excess of the data presented in this summary.

DTIC

Overpressure; Human Tolerances; Lungs; Physiological Responses; Pressure Gradients; High Altitude

19970017619 Ohio State Univ., Graduate School, Columbus, OH USA

Low Level Laser Irradiation of Nerve Cells In Vitro

Jonathan, James, Ohio State Univ., USA; 1996; 71p; In English

Report No.(s): AD-A318712; AFIT-96-066; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Low energy laser treatment of patients with nerve injuries has been reported to achieve enhanced return of sensation in treated patients. Animal studies have shown reduction in scar formation and improved function following laser treatment of crushed sciatic nerves. However, these results remain controversial. Other clinical and animal studies fail to find any laser effect, and the biological basis for an effect has not been established. Studies of cultured fibroblasts have produced conflicting results, and there is little in vitro data regarding laser effects on nerve tissue. The purpose of this study was to determine the effects of GaAlAs low energy laser irradiation of rat cerebral cortical cells, and human nerve cells in vitro.

DTIC

Cells (Biology); Nerves; Cerebrum; Laser Beams; Radiation Effects; Biological Effects

19970017620 Bowling Green State Univ., OH USA

The Effect of Room Temperature Storage on the in Vitro Storage Characteristics of CPDA-1 Packed Red Blood Cells

Ruddell, Jean P., Bowling Green State Univ., USA; Aug. 1996; 91p; In English

Report No.(s): AD-A318714; AFIT-96-059; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Packed red blood cells (PRBC) which reach temperatures exceeding 10 deg C are generally discarded. Little data exist on the degree of accelerated metabolism and increased hemolysis of PRBC allowed to warm for more than a few minutes. Twenty four CPDA-1 PRBC units were pooled in eight groups of three. Each pool was divided into two test units and a control unit. Test units were warmed to 250 C for 24 hours either at day 6 or day 20; controls were maintained at 1-60 C. In-vitro storage characteristics were evaluated weekly and prior to warming. Sterility was evaluated at day 35. Data were analyzed by ANOVA. Control units had higher ATP and glucose, less hemolysis, and equivalent morphology to the warmed test units at day 35. Warmed units had adequate ATP and glucose, equivalent hemolysis, and better morphology at day 28 than adequate ATP and glucose, equivalent hemolysis, and better morphology at day 28 than day 35 control units. With the exception of ATP, test units at day 28 were equiva-

lent to or better than controls at day 35. In the day 28 warmed units, ATP exceeded 1.5% mole/g hemoglobin (Hgb). No bacterial growth was detected despite repeated sampling. It appeared that a day of 250C storage of CPDA-l PRBC accelerated aging equivalent to a week of conventional storage at l-60 C. It did not appear to matter whether the PRBC were warmed at day 6 or day 20. Medical directors may find this information useful in logistically difficult circumstances.
DTIC
Hemoglobin; Hemolysis; Room Temperature; Temperature Effects; Erythrocytes

19970017623 Kentucky Univ., Lexington, KY USA
A Study of H-Reflexes in Subjects with Acute Ankle Inversion Injuries
Hall, Robert C., Kentucky Univ., USA; Dec. 09, 1996; 196p; In English
Report No.(s): AD-A318727; AFIT-96-077; No Copyright; Avail: CASI; A09, Hardcopy; A03, Microfiche

This study examined the H-reflex responses of the ankle invertor and evertor muscles in healthy individuals (N = 20) and in individuals with an acute (less than 10 days) ankle inversion injury (N = 20). The purposes of this study were: (1) to determine whether or not a relationship exists between the H-reflex response and the amount of ankle swelling, and (2) to determine whether or not a relationship exists between the H-reflex response and the functional level of individuals with an acute ankle inversion injury. All subjects underwent identical testing procedures. Subjects were evaluated for their level of function, and assigned a rating (0-10). The ankle girth of both ankles were then measured using the figure-of-eight method. The H-reflex responses of the flexor digitorum longus and the peroneus longus muscles were elicited by electrical stimulation of either the tibial or common peroneal nerve just above the popliteal fossa and recorded from each limb. Based on the findings, the following conclusions were drawn: (1) acute ankle swelling is related to the reflex inhibition of the ipsilateral flexor digitorum longus muscle, (2) a relationship between the H-reflex response and the functional level of individuals with an acute ankle inversion injury was not established, (3) individuals with either a grade 1 or grade 2 acute ankle inversion injury may also have a bilateral injury to the peroneal nerve, and (4) the figure-of-eight girth measurement technique is clinically useful in quantifying side-to-side differences in ankle girth.
DTIC
Reflexes; Leg (Anatomy); Injuries; Physiological Responses; Physiological Tests

19970017731 Colorado Univ., Dept. of Preventative Medicine, Boulder, CO USA
Methodology to Determine Homology and Clustering as Applied to Intronic Regions of Regulatory Cancer Genes and Non-Regulatory Genes
Hall, Deborah L., Colorado Univ., USA; May 31, 1996; 171p; In English
Report No.(s): AD-A318731; AFIT-96-023D; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This thesis considers the problem of statistically evaluating the closeness of multiple genes based on their DNA intronic regions. The purpose of intronic regions in a gene is unknown. Recent research suggests that, in cancer related genes, intronic regions may play a role in regulating disease susceptibility. to investigate whether the intronic features of cancer related genes differ from non-regulatory genes, a collection of oncogenes, tumor suppressor genes, and non- regulatory genes involved in enzyme metabolism are analyzed. A statistical methodology is employed to determine whether features of these genes' intronic regions will result in clustering by regulatory group. This is the first comparison of intronic attributes for 33 homo sapien genes. Affributes analyzed include mean of intronic log lengths, standard deviations of intronic log lengths and number of intronic regions in a gene. The analysis also includes the available ordered DNA data from these intronic regions. The process begins with creation of first-order Markov transition counts for all intronic regions in each gene. A hypothesis testing approach employs these counts to determine whether the order of the nucleotides in each intronic region is random or whether this order shows statistical evidence of a first-order Markov chain.
DTIC
Homology; Cancer; Genes; Accuracy; Evaluation

19970017749 Defence and Civil Inst. of Environmental Medicine, North York, Ontario Canada
Design and Evaluation of a Three-Zone Thermal Manikin Head
Osczevski, Randall J., Defence and Civil Inst. of Environmental Medicine, Canada; Oct. 1996; 20p; In English
Report No.(s): AD-A318743; DCIEM-96-R-60; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A thermal model of a human head was constructed that has three zones: the scalp, face and a small forehead/ears zone. The surface temperature and heat loss from each zone are individually controlled and monitored by a computer. Because it has independent zones, the three-zone thermal manikin head can provide more accurate measurements of the thermal insulation of hats, helmets and face masks. Single-zone thermal manikin heads measure the effective thermal resistance of the whole head, which usually includes large areas not covered by the item in question. Heat transfer from the entire manikin head was measured in a

wind tunnel at wind speeds up to 7.3 m/s (26 km/h). The results compared favourably with whole head heat transfer from the head segment of other thermal manikins and from the human head. An equation was derived to describe the e ffect of wind on heat loss. The radiative heat transfer coefficient was also determined.
DTIC
Thermodynamic Properties; Thermal Insulation; Thermal Resistance; Head (Anatomy); Forehead; Models

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BEHAVIORAL SCIENCES

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

19970016965 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA
Comparison of the Control Anticipation Parameter and the Bandwidth Criterion During the Landing Task
Kivioja, David A., Air Force Inst. of Tech., USA; Mar. 1996; 167p; In English
Report No.(s): AD-A319509; AFIT/GAE/ENY/96M-2; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Many handling qualities criteria have been developed which predict pilot opinion of landing aircraft. 'Flying Qualities of Piloted Aircraft' lists six different criteria. However, applying all six criteria to one aircraft can lead to conflicting results. The Air Force Institute of Technology (AFIT) along with the Flight Dynamics Laboratory have conducted research to evaluate differences among the handling qualities criteria. The overall objective of this thesis was to determine similarities and discrepancies between the Control Anticipation Parameter (CAP) and bandwidth criteria, and to evaluate the advantage of including a dropback criterion with the bandwidth criterion. Results of this research will be used to derive a more clear-cut, generally acceptable, comprehensive flying qualities criteria predicting pilot opinion for the next revision. Research was conducted in two phases. Phase 1 was conducted at AFIT. There the CAP domain was mapped onto the bandwidth and bandwidth with dropback criteria revealing where the criteria agreed and disagreed. Phase 2 was conducted at the USAF Test Pilot School. The test team used the Variable-Stability In-Flight Simulator Test Aircraft (VISTA) to simulate aircraft and obtain actual pilot opinion in the areas of agreement and conflict found in Phase 1.
DTIC
Flight Characteristics; Aerodynamics; Test Pilots

19970016966 Naval Postgraduate School, Monterey, CA USA
The Effect of Gender on Attrition At the Defense Language Institute Foreign Language Center
Arthur, George T., Naval Postgraduate School, USA; Sep. 1996; 58p; In English
Report No.(s): AD-A319502; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The Defense Language Institute Foreign Language Center (DLIFLC) , located at the Presidio of Monterey, California, provides language training for Department of Defense military and civilian personnel. The Institute trains approximately 2,500 students annually, of which approximately 26 percent are female. Student attrition is a costly feature of this training program. Females experience roughly a 7 percent higher rate of attrition than males at DLIFLC. The Institute is interested in knowing whether this difference indicates a gender bias, or whether it can be explained by other factors. This study investigates this question. Specifically, data on FY-95 DLIFLC stu dents are examined to determine factors with a significant impact on attrition, with particular emphasis on gender. Such information is potentially useful to the Institute for internal quality assurance efforts as well as part of potential cost saving measures.
DTIC
Personnel; Females; Males; Education; Bias

54
MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

19970017479 Texas Univ., Dept. of Neurobiology and Anatomy, Houston, TX USA
Analysis and Synthesis of Adaptive Neural Elements and Assemblies ***Final Report, 30 Sep. 1993 - 29 Sep 1996***
Byrne, John H., Texas Univ., USA; Sep. 30, 1996; 13p; In English
Contract(s)/Grant(s): F49620-93-1-0272; AF Proj. 2312

Report No.(s): AD-A316713; AF-AFOSR-TR-0534-96; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Several general principles are emerging from these studies. First, the functional organization of neural circuits is dynamic, and a single circuit, such as a CPG, can produce several distinct outputs, which in turn, can mediate different behaviors. Second, modulatory transmitters can regulate the functional organization of circuits as well as their responsiveness to inputs. Third, motivational systems can influence behaviors, in part, by acting on motor systems, such as CPGs. Fourth, motor systems possess cellular mechanisms capable of supporting complex forms of neuronal plasticity, which in turn, may contribute to learning and memory. These general principles illustrate that motor behaviors are governed by highly adaptive neural networks and help to explain how systems of nerve cells function to produce and modulate behavior.

DTIC

Neural Nets; Nervous System; Evaluation

19970017727 Army Research Inst., Behavioral and Social Sciences, Alexandria, VA USA

Air Warrior Baseline Evaluation, Volume 1, Summary ***Final Report, Jun. 1995 - Jul. 1996***

Wright, Robert H., Army Research Inst., USA; Hanson, Rande R., Army Research Inst., USA; Couch, Michael E., Anacapa Sciences, Inc., USA; Oct. 1996; 18p; In English

Contract(s)/Grant(s): DA Proj. 2O2-62785-A-791

Report No.(s): AD-A320909; ARI-RP-97-01-Vol-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Air Warrior is a U.S. Army program that has been initiated to improve the fighting capabilities of helicopter crews in contaminated combat environments. The Air Warrior baseline simulations were conducted to identify and quantify the effects on aircrew mission and task performance of wearing the current MOPP 4 protective and survival ensemble. Differences in performance and workload between the MOPP 4 ensemble and normal flying gear were obtained for AH-64 crews flying night missions and performing a set of daylight maneuvers and tasks. The MOPP 4 ensemble was found to cause major increases in workload and reduce performance on numerous aircrew tasks. Specific effects of the MOPP 4 ensemble on aircrew discomfort, pain, and task performance were obtained through detailed debriefings.

DTIC

AH-64 Helicopter; Combat; Flight Crews; Helicopters

19970017834 Biodynamic Research Corp., San Antonio, TX USA

Feasibility Study for a Personal-Computer Based Head-Spine Model ***Final Report, May - Dec. 1995***

Bomer, John B., Biodynamic Research Corp., USA; Pancratz, David J., Biodynamic Research Corp., USA; Rogers, Linda J., Biodynamic Research Corp., USA; Dec. 1995; 198p; In English

Contract(s)/Grant(s): F41624-95-C-6003; AF Proj. 3005

Report No.(s): AD-A316720; AL/CF-TR-1996-0014; No Copyright; Avail: CASI; A09, Hardcopy; A03, Microfiche

Biodynamic Research Corporation (BRC) of San Antonio, TX, completed an SBIR Phase 1 project to port the Air Force Head-Spine Model (HSM) to a PC-DOS environment and provide a recommended roadmap for the future of the HSM. The impetus for this project was the Air Forces desire to have a software tool capable of modeling the internal forces and motions of the human head and spine during impulsive acceleration events. The program, originally designed to run on a mainframe computer, had been ported to a UNIX workstation. BRC was able to successfully port the code to an MS-DOS compatible PC computer. The DOS and UNIX versions code transfer was successful, BRC discovered several 'problems' with the HSM which made creating a general purpose HSM code impossible. The cost and effort required to understand the current version, debug coding and algorithm errors, and document the code is far greater than simply extracting the useful data and starting over. Therefore, BRC recommended that the HSM be rewritten for the PC environment and that the development program be conducted under a rigorous protocol designed to ensure documentation of the model's domain of applicability.

DTIC

Spine; Head (Anatomy); Human-Computer Interface; Models; Computer Programs; Feasibility

19970017839 Los Alamos National Lab., NM USA

Case study for the evaluation and selection of man-machine interface (MMI) software

Nekimken, Howard, Los Alamos National Lab., USA; Pope, Noah, Los Alamos National Lab., USA; MacDonald, John, Los Alamos National Lab., USA; Bibeau, Roland, Los Alamos National Lab., USA; Gomez, Ben, Los Alamos National Lab., USA; Sellon, Dustin,, Los Alamos National Lab., USA; 1996; 22p; In English; Industrial Computing Society Technical Conference In Conjunction with the International Conference and Exhibit of the Instrument Society of America, 6-11 Oct. 1996, Chicago, IL, USA

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The authors evaluated three of the top man-machine interface (MMI) software systems. The main categories upon which they based their evaluation on were the following: operator interface; network and data distribution; input/output (I/O) interface; application development; alarms; real-time and historical trending; support, documentation, and training; processing tools (batch, recipe, logic); reports; custom interfacing; start-up/recovery; external database; and multimedia. They also present their MMI requirements and guidelines for the selection and evaluation of these MMI systems.

DOE

Man Machine Systems; Software Engineering; Multimedia

Subject Term Index

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Personal Author Index

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