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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES



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This issue of *Aerospace Medicine and Biology, A Continuing Bibliography with Indexes* (NASA SP-7011) lists reports, articles, and other documents recently announced in the NASA STI Database. In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

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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
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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 436)

APRIL 7, 1997

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LIFE SCIENCES (GENERAL)

19970010395 North Carolina State Univ., Raleigh, NC USA

Small-Scale Physical Processes Related to the Dynamic Photosynthetic Response of Phytoplankton Entrained in the Euphotic Zone of the Ocean *Final Report*

Kamykowski, Daniel, North Carolina State Univ., USA; Jun. 30, 1995; 13p; In English

Contract(s)/Grant(s): N00014-92-J-1428

Report No.(s): AD-A313762; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Phytoplankton directly influence many optical and acoustic characteristics of the oceanic water column. Under nutrient sufficient conditions (Falkowski et al., 1992), phytoplankton activity is regulated both by the varying photosynthetically active photon fluence density (PPFD) exposure and by the photosynthetic potential of the individual cells throughout the water column (Marra, 1978a; 1978b). PPFD at the sea surface varies over a range of time scales due to clouds, and day/night and seasonal cycles (Kirk, 1983). Subsurface PPFD exhibits spectral changes with depth due to wavelength-dependent exponential attenuation (Kirk, 1983). Additional temporal variation in subsurface PPFD results from dissolved organic matter (DOM) and particulate organic matter (POM) patchiness (Parsons et al., 1984a). Near surface water motion, the net effect of turbulent mixing, surface and internal gravity waves, wind drift, Langmuir circulation and larger scale flow (Denman and Gargett, 1983), transports algal cells through the fluctuating PPFD field. Some cells act like neutral Lagrangian particles, but most possess an inherent motility due to buoyancy (Smayda, 1970; Walsby and Reynolds, 1980) or swimming (Roberts, 1981; Kamykowski et al. 1988). The physical and biological motion vectors combine to determine phytoplankton trajectories. Since the emphasis here is PPFD exposure of individual phytoplankton cells, vertical displacement is of primary concern (Kamykowski, 1990; Yamazaki and Kamykowski, 1990). One aspect of the work in his report dealt with the development of the Physical Motion instrument (PMI) to monitor water motion in over biologically significant time scales.

DTIC

Atmospheric Circulation; Phytoplankton; Photosynthesis; Turbulent Mixing; Temporal Distribution; Surface Water; Organic Materials

19970010410 Massachusetts Univ., Dept. of Polymer Science and Engineering, Amherst, MA USA

Genetic Engineering of Polymers Containing Non-Natural Amino Acids *Final Report, 10 May 1993 - 9 May 1996*

Tirrell, David A., Massachusetts Univ., USA; Jun. 1996; 6p; In English

Contract(s)/Grant(s): DAAH04-93-G-0217

Report No.(s): AD-A313717; ARO-31087.1-LS; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The goal of this research program has been to establish strategies for producing protein-based materials that contain amino acids not normally found in natural proteins. Efforts have been focused on amino acids with fluorinated, electroactive or conformationally constrained side chains, and have allowed us to prepare protein-based polymers with unique properties, including low surface energies and sensitivity to electrochemical signals. These developments have expanded in a substantial way the range of materials properties accessible via chemical or biological synthesis of polypeptides and artificial proteins.

DTIC

Amino Acids; Polypeptides; Genetic Engineering; Polymers; Proteins

19970010949 Pachiappa's Coll., P.G. and Research Dept. of Botany, Madras, India

Foetotoxic Effect of Potassium Chromate (K₂CrO₄) in Swiss Albino Mice

Gowrishankar, B., Pachiappa's Coll., India; Vivekanadan, O. S., Pachiappa's Coll., India; Srinath, B. R., Indian Inst. of Science, India; Shiva Kumar, K. R., Indian Inst. of Science, India; Rama Rao, K. R., Indian Inst. of Science, India; Journal of the Indian Institute of Science; May 1996; Volume 76, No. 3, pp. 389-394; In English; Also announced as 19970010945; Copyright; Avail: Issuing Activity (Journal of the Indian Inst. of Science, c/o IISc Library, Bangalore 560 012, India), Hardcopy, Microfiche

The teratological analysis of the Swiss albino mice fetus is used to evaluate the embryotoxic and teratogenic potential of potassium chromate. Skeletal and morphological malformations suggest that the potassium chromate might be fetus-toxic.

Derived from text

Fetuses; Potassium Chromates; Embryology; Toxicology; Carcinogens; Biological Effects

19970011171 NASA Ames Research Center, Moffett Field, CA USA

Cycle-Powered Short Radius (1.9 m) Centrifuge: Effect of Exercise Versus Passive Acceleration on Heart Rate in Humans

Greenleaf, J. E., NASA Ames Research Center, USA; Gundo, D. P., NASA Ames Research Center, USA; Watenpaugh, D. E., NASA Ames Research Center, USA; Mulenburg, G. M., NASA Ames Research Center, USA; Mckenzie, M. A., NASA Ames Research Center, USA; Looft-Wilson, R., NASA Ames Research Center, USA; Hargens, A. R., NASA Ames Research Center, USA; Feb. 01, 1997; 14p; In English

Contract(s)/Grant(s): RTOP 199-21-12-07

Report No.(s): NASA-TM-110433; NAS 1.15:110433; A-975618; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In addition to extensive use of lower extremity physical exercise training as a countermeasure for the work capacity component of spaceflight deconditioning, some form of additional head-to-foot (+Gz) gravitational (orthostatic) stress may be required to further attenuate or prevent the signs and symptoms (nausea, vertigo, instability, fatigue) of the general reentry syndrome (GRS) that can reduce astronaut performance during landing. Orthostatic (head-to-foot) stress can be induced by standing, by lower body negative pressure, and by +Gz acceleration. One important question is whether acceleration training alone or with concurrent leg exercise would provide sufficient additive stimulation to attenuate the GRS. Use of a new human-powered centrifuge may be the answer. Thus, the purpose for this study was to compare heart rate (HR), i.e., a stress response during human-powered acceleration, in four men (35-62 yr) and two women (30-31 yr) during exercise acceleration versus passive acceleration (by an off-board operator) at 100% (maximal acceleration = A(max)), and at 25%, 50%, and 75% of A(max). Mean (+/-SE) A(max) was 43.7 +/- 1.3 rpm (+3.9 +/- 0.2Gz). Mean HR at exercise A(max) was 189 +/- 13 b/min (50-70 sec run time), and 142 +/- 22 b/min at passive A(max) (40-70 sec run time). Regression of mean HR on the various +Gz levels indicated explained variance (correlations squared) of $r(\text{exp } 2) = 0.88$ (exercise) and $r(\text{exp } 2) = 0.96$ (passive): exercise HR of 107 +/- 4 (25%) to 189 +/- 13 (100%) b/min were 43-50 b/min higher (p less than 0.05) than comparable passive HR of 64 +/- 2 to 142 +/- 22 b/min. Thus, exercise adds significant physiological stress during +Gz acceleration. Inflight use of this combined exercise and acceleration countermeasure may maintain work capacity as well as normalize acceleration and orthostatic tolerances which could attenuate or perhaps eliminate the GRS.

Author

Gravitational Fields; Heart Rate; Astronaut Performance; Centrifuges; Lower Body Negative Pressure; Nausea; Orthostatic Tolerance; Physical Exercise; Signs and Symptoms; Space Flight; Vertigo

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AEROSPACE MEDICINE

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

19970010398 Yale Univ., New Haven, CT USA

Self-Organization of Hebbian Synapses on Hippocampal Neurons Final Report

Brown, Thomas H., Yale Univ., USA; Jan. 19, 1996; 7p; In English; Limited Reproducibility: More than 20% of this Document may be affected by Microfiche Quality

Contract(s)/Grant(s): N00014-90-J-4136

Report No.(s): AD-A309810; No Copyright; Avail: Issuing Activity (Yale University, New Haven, CT.), Microfiche

The near-term goal of the project was to create models of cortical neurons and to implement these on a relatively fast platform. This was done. These models have been used to create insights into the computational differences between neurons and the proc-

essing elements typically used in connectionistic studies. The longer-term goal was to abstract these computations into a more efficient form, implement them into learning circuits, and ultimately figure out how to imbed these into low-power, reliable circuit-level VLSI. We have succeeded in the abstractions, and have begun to implement these into circuits that learn and encode time. We are exploring VLSI options.

DTIC

Very Large Scale Integration; Circuits; Neural Nets

19970010441 Naval Research Lab., Washington, DC USA

Dose-Response Correlation of Methadone and its Metabolite EDDP in Human Hair. Start of the Third Series and Analysis of the Samples of the Second Test Series, Start of the Third Series and Analysis of the Samples of the Second Test Series, 1 Jan. - 31 Mar. 1996

Mar. 31, 1996; 3p; In English

Contract(s)/Grant(s): 61-0022-95; N00014-95-K-2000

Report No.(s): AD-A309800; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

We were able to arrange for the patients of two further Methadon practices, that of Dr. Sachtleben in Pirmasens and Dr. Lueg in Kaiserslautern, to take part in our study. They were treated in the same manner as described in our previous Technical Reports. In this new series, the applied sweat patches were generally well accepted. Up until now only one patient (L2) has complained about irritations from the last patch. Blood was drawn by the personnel of the two practices. Hair strands were cut and bleached in the same manner as described previously. One patient from Kaiserslautern agreed only to give sweat and blood samples, another quit the program after collection of sweat patches and bleaching and cutting of the first hair strand. Nevertheless, this subject could be convinced to give blood and a small hair sample from the bleached strand to evaluate her individual hair growth window.

DTIC

Metabolites; Hair; Sweat; Hormones; Physiological Tests

19970010478 Naval Health Research Center, San Diego, CA USA

Circadian Rhythms: Importance for Models of Cognitive Performance Interim Report, 1 Oct. 1994 - 1 Sep. 1995

Kelly, Tamsin Lisa, Naval Health Research Center, USA; Feb. 05, 1996; 28p; In English

Report No.(s): AD-A310265; NHRC-96-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The objective of this paper is to provide information about circadian rhythms and their relevance to the development of models of human cognitive performance. Circadian rhythms are well-established characteristics of human performance. However, to date, models of human performance generally have not taken them into account. The general effects of circadian rhythms will be reviewed, followed by a discussion of the interaction of sustained operations (SUSOPS) and jet lag with these rhythms. Individual differences in circadian rhythms will be addressed, and some published circadian rhythm models will be discussed. While physiological aspects of performance also show circadian rhythms, fluctuations in cognitive performance are more pronounced and will be the focus of this report.

DTIC

Circadian Rhythms; Human Performance; Jet Lag; Mental Performance; Cognition

19970010623 Beijing Inst. of Radiation Medicine, China

Injury Effects of Lasers on Eyes

Guidao, Xu, Beijing Inst. of Radiation Medicine, China; Jiemin, Xu, Beijing Inst. of Radiation Medicine, China; Jiguang Jishu (Laser Technology); Apr. 1996; Volume 12, No. 6, pp. 49-53; Transl. into ENGLISH of Jiguang Jishu (Laser Technology) (China) v12 n6 p49-53 Dec 88; In English; Translated by Leo Kanner Associates

Report No.(s): AD-A309798; NAIC-ID(RS)T-0151-96; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The injurious effects of different wavelength laser with various operating mode and exposure doses on eyes were reported. Comparison of laser damage effects on eyes was conducted between rabbits with different extent of pigment. The ratio of laser damage threshold for eyes of rabbit, monkey to the yellow race was also discussed. The eye is an imaging system sensitive to light. An incident laser beam can form an image in a very small retinal area so that the dosage (irradiance or illumination) increases by four to five orders of magnitude; very little incidence can cause serious injuries. Therefore, the emergence of the laser brings about a new topic on medical research into eye effects from exposure to lasers.

DTIC

Laser Damage; Eye (Anatomy); Retina; Medical Science; Dosage; Exposure

19970010701 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

Guided Bone Regeneration Around Commercially Pure Titanium and Hydroxyapatite-Coated Dental Implants

Stentz, William C., Jr, Air Force Inst. of Tech., USA; Mar. 25, 1996; 189p; In English

Report No.(s): AD-A309227; AFIT/CI-96-009; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

In a split-mouth design, 6 implants were placed in edentulous mandibular ridges of 10 mongrel dogs after preparation of 6 cylindrical mid-crestal defects, 5 mm in depth and 10 mm in diameter. An implant site was then prepared in the center of each defect to a depth of 5 mm beyond the apical extent of the defect. One mandibular quadrant received three commercially pure titanium screw implants (3.75 x 10 mm), while the contralateral side received three titanium double plasma sprayed hydroxyapatite-coated root-form implants (3.3 x 10 mm). Consequently, the coronal 5 mm of each implant was surrounded by a circumferential surgically created defect approximately 3 mm wide and 5 mm deep. The three dental implants in each quadrant received either canine demineralized freeze-dried bone (DFDBA) and an expanded polytetrafluoroethylene membrane (e- PTFE), membrane alone, or no treatment which served as the control. Standardized radiographs were taken at one week and 4 months post-implant placement. Computer-Assisted Densitometric Image Analysis (CADIA) was performed for each of the implants. After 4 months of healing, v block sections of the mandibles were harvested for light microscopy and histomorphometric analysis.

DTIC

Polytetrafluoroethylene; Bones; Defects; Demineralizing; Radiography; Image Analysis; Healing

19970010862 Colorado Univ., Dept. of Pharmaceutical Sciences, Denver, CO USA

Effects of Lyophilization on Metabolic Integrity of Red Blood *Final Report, 1 Mar. 1994 - 29 Feb. 1996*

Carpenter, John F., Colorado Univ., USA; Jun. 07, 1996; 4p; In English

Contract(s)/Grant(s): N00014-94-1-0402

Report No.(s): AD-A309740; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The objective was to investigate the integrity of energy metabolism in human red blood cells that had been lyophilized and rehydrated. This work was in collaboration with Dr. Barry Spargo (NRL), who prepared the lyophilized red cells. Retention of adequate energy metabolism (i.e., glycolysis) is essential for the survival and oxygen delivery function of red blood cells.

DTIC

Blood; Erythrocytes

19970011093 NASA Langley Research Center, Hampton, VA USA

Differential Measurement Periodontal Structures Mapping System

Companion, John A., Inventor, Lockheed Martin Corp., USA; Sep. 09, 1996; 37p; In English

Patent Info.: Filed 9 SEP 1996; NASA-CASE-LAR 15282-1; US-Patent-Appl-SN-712984

Report No.(s): NAS 1.71:LAR-15282-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A diagnostic mapping system for making and recording differential measurements of periodontal structures of a dental patient is disclosed. Periodontal disease results from bacteria growth in the gum area of a patient, and is the leading cause of tooth loss in adults over 35 years of age. The bacteria growth causes erosion of the periodontal ligament, which holds each tooth into its socket, and then erosion of the actual bone of the socket so that the tooth gradually loses its supporting structure. The present invention employs first and second ultrasonic sensors controlled by a dental handpiece to make measurements of the cemento-enamel-junction (CEJ) of each tooth and the depth of the periodontal pocket or cavity of the tooth relative its CEJ. These measurements are visually displayed, recorded (or mapped), and compared with previous and/or subsequent measurements as an indication of the presence or progress of periodontal disease. An alternate embodiment employs a fiber optic sensor as the CEJ finder. Novelty of the present invention resides in the entire system and in particularly, the use of a water filled frusto-conical extension of the depth measuring ultrasonic transducer to converge the ultrasonic beam from the transducer diameter size to a thin beam essentially the same size as the width of the periodontal cavity.

NASA

Dentistry; Tooth Diseases; Ultrasonic Tests; Transducers; Diagnosis

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

19970010459 Naval Air Warfare Center, Human Performance Technology Center, Warminster, PA USA

Female Upper Body Dynamic Strength Requirements in High Performance Aircraft: A Selected Bibliography *Final Report, 1 Sep. 1994 - 31 May 1995*

Shender, Barry S., Naval Air Warfare Center, USA; Jun. 1995; 51p; In English

Report No.(s): AD-A309802; NAWCADWAR-95041-4.6; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The Presidential Commission on the Assignment of Women in the Armed Forces has expanded the role of women in the military with its new 'gender-neutral' assignment policy. NAWCADWAR is conducting a series of tests to determine 'gender neutral' dynamic strength requirements for small stature females performing operationally relevant tasks in a high performance cockpit. This report contains a bibliography of the results of a literature review conducted prior to drafting a human use test plan. It is not intended to be an extensive review of all areas in which male and female strength capabilities differ. Instead it highlights information pertinent to strength assessments in general, measurement modalities and interpretation, published male and female strength data as well as extrapolated female strength capabilities under normal and in acceleration environments and specific strength requirements associated with high performance flight under normal and emergency conditions. It also contains a list of other bibliographies which compile gender related differences in human factors and performance.

DTIC

Human Factors Engineering; Females; Psychophysiology; Electromyography; Pilot Performance; Bibliographies

19970010501 Wright Lab., Avionics Directorate, Wright-Patterson AFB, OH USA

Multi-Agent Residual Advantage Learning with General Function Approximation *Final Report*

Harmon, Mance E., Wright Lab., USA; Baird, Leemon C., III, Air Force Academy, USA; Apr. 03, 1996; 16p; In English

Contract(s)/Grant(s): AF Proj. 2312

Report No.(s): AD-A309171; WL-TR-96-1065; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A new algorithm, advantage learning, is presented that improves on advantage updating by requiring that a single function be learned rather than two. Furthermore, advantage learning requires only a single type of update, the learning, while advantage updating requires two different types of updates, a learning update and a normalization update. The reinforcement learning system uses the residual form of advantage learning. An application of reinforcement learning to a Markov game is presented. The test-bed has continuous states and nonlinear dynamics. The advantage function is stored in a single-hidden-layer sigmoidal network. Speed of learning is increased by a new algorithm, Incremental Delta-Delta (IDD), which extends Jacob's (1988) Delta-Delta for use in incremental training, and differs from Sutton's Incremental Delta-Bar-Delta (1992) in that it does not require the use of a trace and is amenable for use with general function approximation systems. To our knowledge, this is the first time an approximate second order method has been used with residual algorithms. Empirical results are presented comparing convergence rates with and without the use of IDD for the reinforcement learning test-bed and for a supervised learning test-bed.

DTIC

Algorithms; Machine Learning; Markov Chains; Game Theory

19970010700 Colorado Univ., Denver, CO USA

Self-Determination and Moral Character: Elements of a Theory of Identification

Rhodes, William H., Colorado Univ., USA; Jan. 1996; 212p; In English

Report No.(s): AD-A309217; AFIT/CI-96-007D; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

Fostering the self-determination of good moral character is a practical problem in need of theoretical insight. The notion of psychic identification, developed in the work of Harry Frankfurt and Gerald Dworkin, holds promise for improving our understanding of self-determination, but the notion has so far been characterized only thinly. I offer some elements of a theory of identification and some practical recommendations for fostering the self-determination of good moral character in that theoretical light. I critically review Frankfurt's philosophical anthropology and propose some enhancements to it. I discuss Dworkin's notion of procedural independence, and recommend an alternative understanding of the privileged nature of the self that identifies. I conceive of the identifying self, at the phenomenological level, as a psychic referee which enjoys an epistemologically privileged position, not an ontologically privileged one. I offer a partial analysis of identification under such a conception as the authoritative, purposive commitment of the self to a particular way of being. Though many views of identification seem to presuppose that it is an explicit process, I maintain that it is often implicit, though it is nevertheless a sort of psychic activity. Identification is shown to ground self-regarding moral emotions. After examining a model of moral education inspired by Daniel Callahan, I suggest that

such an approach should be supplemented with experiential learning because such experiential learning can foster morally worthy identification.

DTIC

Human Performance; Ethics; Cognition; Personality Tests

19970010754 Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA USA

Environmental Intensity, Stress, and Training Final Report, Jan. 1994 - Dec. 1995

Teague, Ross C., Army Research Inst. for the Behavioral and Social Sciences, USA; Park, Ok-Choon, Army Research Inst. for the Behavioral and Social Sciences, USA; Feb. 1996; 24p; In English

Report No.(s): AD-A310297; ARI-TR-1039; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Stress and its effects on task performance and on human physical and mental well-being have received a great amount of attention. The majority of the efforts directed at reducing the negative effects of stress have either been after-the-fact treatments of individuals exposed to stress or 'time out' methods that include relaxation and communication techniques. While these have been shown to be useful techniques, their effectiveness is limited. Certain tasks do not allow for 'time out' exercises, and only treating individuals after the fact does not remove the negative effects of stress on performance. There is a need, then, for preparing individuals to perform in environments in which stress and its effects can negatively influence performance and the task that does not allow for 'time out' exercises. This paper discusses methods for training individuals for performance in an intense environment. Phased-intensity and graduated-intensity training are discussed in detail. Phased-intensity training allows the trainees to practice the basic skills without any level of intensity present and then to experience the intensity level that the trainee will encounter in the actual task performance situation. Graduated-intensity training presents intensity throughout training with a gradual increase as training continues. This review points out the flexibility and ease with which intensity of the training environment can be presented using simulators.

DTIC

Environment Effects; Human Performance; Stresses; Education; Flexibility

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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.

19970010856 Army Aeromedical Research Lab., Aircrew Health and Performance Div., Fort Rucker, AL USA

Image Contrast and Visual Acuity Through Night Vision Goggles Final Report

Rabin, Jeff C., Army Aeromedical Research Lab., USA; May 1996; 13p; In English

Contract(s)/Grant(s): DA Proj. 3M1-62787-A8-79

Report No.(s): AD-A309176; USAARL-96-26; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Night vision goggles (NVGs) intensify ambient illumination making it possible to see in the dark despite insufficient light for normal vision. NVGs are used for military and civilian operations, and as visual aids for night blindness. The quality and quantity of vision achieved through NVGs depends on several factors including the intensity of ambient radiation, the integrity of NVG electro-optical components, and the luminance, contrast and resolution of the NVG display. The purpose of this study was to investigate effects of display contrast and luminance on visual resolution through NVGs. Computer-generated letter charts were used to measure visual acuity across the range of luminances and contrasts one can encounter when viewing an NVG display. The results indicate that display luminance cannot, in itself, account for the level of acuity achieved through NVGs. An attenuation of contrast through NVGs better explains the level of resolution obtained. Understanding the contrast and luminance transfer of NVGs is important for predicting human visual performance, and for developing improved night vision devices.

DTIC

Night Vision; Visual Aids; Electro-Optics; Goggles; Human Performance; Military Operations

19970010861 Army Aeromedical Research Lab., Aircrew Protection Div., Fort Rucker, AL USA

Aviation Life Support Equipment Retrieval Program: Report of Aircraft Mishap 95-4, Involving the HGU-56/P Army Aviation Helmet *Final Report*

Voisine, Joel J., Army Aeromedical Research Lab., USA; Licina, Joseph R., Army Aeromedical Research Lab., USA; McEntire, B. J., Army Aeromedical Research Lab., USA; Albano, John P., Army Aeromedical Research Lab., USA; Mar. 1996; 12p; In English

Contract(s)/Grant(s): DA Proj. 3O1-62787-A8-78

Report No.(s): AD-A309175; USAARL-96-22; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In 1972, the U.S. Army Aeromedical Research Laboratory (USAARL) established the Aviation Life Support Equipment Retrieval Program (ALSERP). The purpose of this program is to evaluate the effectiveness of aviation protective equipment in an aircraft accident environment and to contribute to the improvement of this equipment through modification or development of new design criteria. Department of the Army Pamphlet 385-40, Army Accident Investigation and Reporting, requires all life support equipment which is in any way implicated in the cause or prevention of injury be shipped to USAARL for analysis. This report analyzes the first impact damaged HGU-56/P recovered from a recent Army aviation mishap involving an AH-6J helicopter.

DTIC

Life Support Systems; Aerospace Medicine; Aircraft Accidents; Helicopters; Helmets; Injuries

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