NASA SP-7011 (195)

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Aerospace Medicine and Biology

A Continuing Bibliography with Indexes

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July 1979

National Aeronautics and Space Administration

Aerospace Medicine & Biology & Biology Aerospace Medicine

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NASA SP-7011(195)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 195)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in June 1979 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 148 reports, articles and other documents announced during June 1979 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)* The first issue of the bibliography was published in July 1964, since that time, monthly supplements have been issued

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space References describing similar effects of 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 In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections *IAA Entries* and *STAR Entries*, in that order The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances

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An annual index will be prepared at the end of the calendar year covering all documents listed in the 1979 Supplements.

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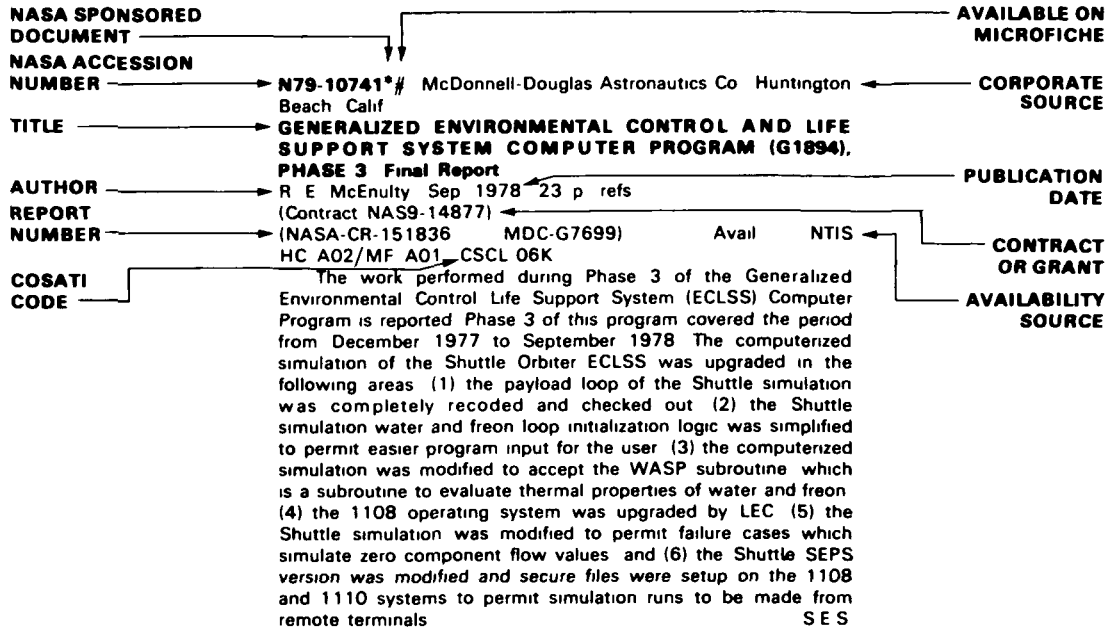

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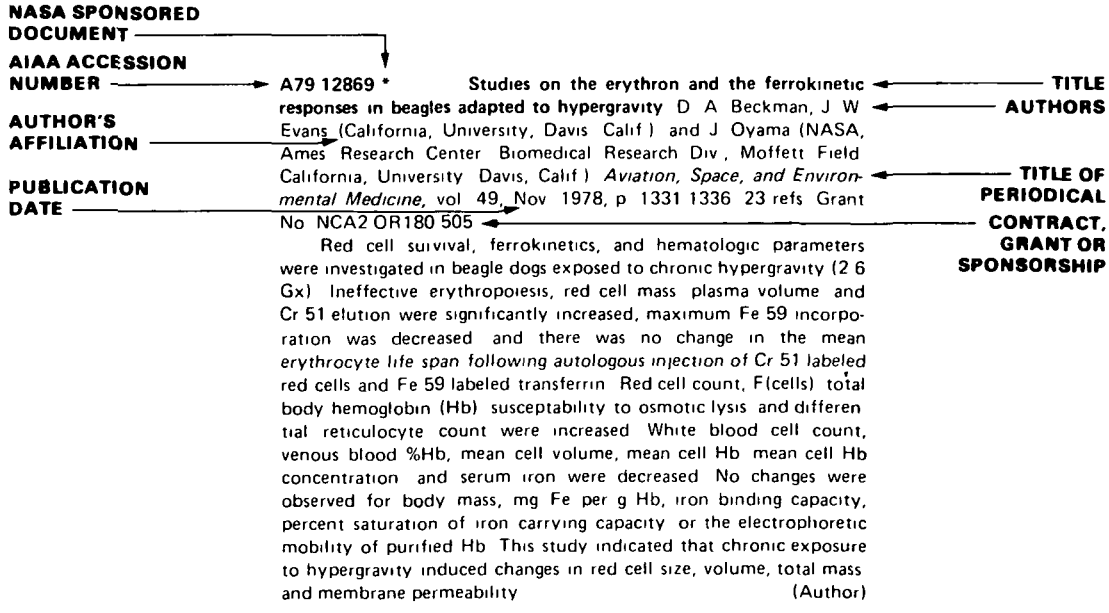

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 195)

JULY 1979

IAA ENTRIES

A79-28565 # **Nonparametric model for the detection of signals observed by a human operator on a CRT screen on a noise background (Neparametricheskaia model' obnaruzheniia signalov, nabliudaemykh chelovekom-operatorom na ekrane ELT na fone shumov)** V N Budko, F M Klement'ev, and N M Novikova *Radiotekhnika i Elektronika,* vol 23, Nov 1978, p 2439-2442 In Russian

A method is devised for taking into account the psychological factor during the operator observation of signals on a TV screen on a noise background The method is based on the determination of the so-called 'working characteristic' which is defined as the dependence of the probability of signal detection on the intensity of the signal as the latter is observed on a noise background The use of nonparametric criteria for such detection processes is discussed, a special feature of such detection is the fact that false-alarm probability is independent of the form of the noise distribution function B J

A79-28735 # **Bilateral and interhemispheric asymmetry of acoustic evoked potentials during monoaural acoustic stimulation (Bilateral'naia i mezhpolusharnaia asimmetriia slukhovykh vyzvannykh potentsialov pri monaural'noi zvukovoi stimuliatsii)** Z Sh Kevanishvili, E David, R A Khvoles, and O Z Davitashvili (Tbilisskii Gosudarstvennyi Institut Usovershenstvovaniia Vrachei, Tiflis, Georgian SSR, Erlangen-Nurnberg, Universitat, Erlangen, West Germany) *Fiziologiia Cheloveka,* vol 5, Jan -Feb 1979, p 44-54 23 refs In Russian

A comprehensive experimental study is conducted on eight subjects (5 M + 3 F), aged 20-40 yr, with normal hearing, to evaluate the bilateral asymmetry of acoustic evoked potentials (AEPs) of different types Short-latency AEP (SAEP), medium-latency AEP (MAEP), and long-latency AEP (LAEP) are examined It is shown that SAEPs, recorded in response to stimulation of ipsilateral and contralateral ear, differ from each other not only in number and configuration but also in the parameters of separate waves MAEPs recorded under ipsilateral and contralateral stimulation contain the same number of waves and the same configuration, with greater amplitude in contralateral stimulation of the ear Relatively early and late components of LAEP are characterized by different degrees of bilateral and interhemispheric asymmetry S D

A79-28736 # **Comparative evaluation of the effectiveness of visual and aural tracking of a sinusoidal signal (Sravnitel'naia otsenka effektivnosti zritel'nogo i slukhovogo slezheniia za sinusoidal'nym signalom)** V I Romashkin-Timanov and E K Berezhnaia (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 5, Jan -Feb 1979, p 88-92 7 refs In Russian

Experiments were carried out on seven male subjects (25-35 yr) to compare the effectiveness of tracking visual and acoustic signals that vary continuously by a sinusoidal law at a frequency of 0 4 Hz It is shown that the resulting error of aural tracking substantially exceeds that of visual tracking No one of these two tracking systems is advantageous over the other in terms of attention span for performing an additional sensorimotor task S D

A79-28737 # **The inhibitory trace effect as a manifestation of the integrative activity of the human brain in performing voluntary motor acts (Tormoznyi sledovoi effekt kak proiavlenie integrativnoi deiatel'nosti mozga pri osushchestvlenii proizvol'nykh dvigatel'nykh aktov)** N P Lokalova (Akademiia Pedagogicheskikh Nauk SSSR, Moscow, USSR) *Fiziologiia Cheloveka,* vol 5, Jan Feb 1979, p 93-101 19 refs In Russian

The study examines the characteristics of integrative activity of the human brain An experiment is described that can be considered as a tool for modeling those life conditions where orientation and adequate response are possible only in the presence of coordinated activity of excitation and inhibition processes It is shown that in terms of underlying mechanism, the observed inhibitory trace effect is the result of the special suppression of elevated trace excitability of inadequate neural structures, i e , a vital mechanism necessary for the integrative activity of the human brain S D

A79-28738 # **Individual differences in hypoxic responses at high altitudes (Individual'nye razlichiia gipoksicheskikh reaktsii v usloviiakh vysokogor'ia)** V A Berezovskii and T L Zhigailo (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologiia Cheloveka,* vol 5, Jan -Feb 1979, p 116-121 16 refs In Russian

Results are presented of an experimental study designed to compare the changes in external respiration and hemodynamics in practically normal subjects (25-40 yr) transferred to different high altitudes (2100-5600 m above sea level) with their capacity to high-altitude hypoxic adaptation Relevant parameters are measured for three situations rest, post inhalation breath holding, and physical exercise (20 knee-bends/min) The results point to the possibility of predicting the nature of response to the reduction of oxygen tension in inspired air S D

A79-28739 # **Model of human heat exchange and identification of its parameters - Physiological studies and mathematical modeling (Model' teploobmena cheloveka i identifikatsiia ee parametrov - Fiziologicheskie issledovaniia i matematicheskoe modelirovanie)** T A Tsivina and A N Azhaev *Fiziologiia Cheloveka,* vol 5, Jan Feb 1979, p 159-166 12 refs In Russian

A mathematical model is proposed for the heat-exchange processes in the human thermoregulatory system The model considers the human body divided in physically definite parts, viz head, trunk, hands and legs Attention is given to the development of methods for successive identification of internal parameters from experimental characteristics of the thermal state in man There is enough experimental evidence to suggest the use of the trunk as the basic element of the model for identification of the desired

parameters Results of combined static and dynamic identification of human heat-exchange parameters are presented S D

A79-28993 * A fast-reacting and versatile optokinetic stimulus pattern by computer graphics with application examples S Yasui (Texas, University, Galveston, Tex), J R Tole, and L R Young (MIT, Cambridge, Mass) *IEEE Transactions on Biomedical Engineering,* vol BME 26, Mar 1979, p 164-166 14 refs Grants No NGR-22 009-025, No NsG-2032

A computer graphics method for the generation of horizontally moving vertical stripes which serve as stimuli for optokinetic nystagmus is presented The pattern is generated by the successive addition of a constant in a digital register, leading to its periodic overflow Digital to analog conversion of the register contents results in a staircase waveform, which is converted into a pattern of vertical lines on a CRT The addition of any number to the reference buffer shifts all lines uniformly, so that the group velocity of the pattern is easily controlled The computer controlled display allows an accurate realization of a commanded velocity profile with practically no time delay and facilitates study under conditions of variable feedback The display software can be easily modified to limit stimulation to a selected area of the moving retina, and the method has been used to simulate central scotomata It is pointed out that the technique, while more accurate, versatile and responsive than a rotating drum device, may be less useful in experiments requiring a wide field display A L W

A79-29248 # Piecewise Fourier analysis of images and the role of occipital, temporal and parietal cortex in visual perception (Kusochnyi Fur'e-analiz izobrazhenii i rol' zatylochnoi, visochnoi i temennoi kory v zritel'nom vospriiatii) V D Glezer (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR,* vol 64, Dec 1978, p 1719 1730 30 refs In Russian

A model to organize visual perception in the cerebral cortex is proposed based on available published data The concept of neuronal module is introduced, consisting of a cylinder of cortical neurons whose receptive fields are directed toward the same area of the visual field and respond to different spatial frequencies and orientations A system of overlapping modules permit piecewise Fourier description of image parts The modules of the Clare-Bishop area consist of receptive fields of different sizes, so that they permit a Fourier description of subimages The lower part of the temporal cortex performs a rough identification of subimages and images through the use of learning-neuron systems The parietal cortex operates in conjunction with the occipital cortex to provide image-to-picture conversion S D

A79-29249 # Experimental investigation of the visual system using one-dimensional Walsh gratings (Eksperimental'noe issledovanie zritel'noi sistemy s pomoshch'iu odnomernykh reshetok Volsha) A M Kuperman and N B Kostelianets (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR,* vol 64, Dec 1978, p 1740-1744 8 refs In Russian

An experimental study is conducted to evaluate the threshold characteristics of the visual system before and after adaptation for an ordered set of aperiodic Walsh gratings Narrow-band Walsh channels with a bandwidth of about 1 octave are established from the Walsh scale for the orders of Walsh functions The summation model expressed in terms of the power of sinusoidal spectral components is capable of describing the data on the detection of aperiodic Walsh gratings S D

A79-29250 # Training of visual recognition (O trenirovke zritel'nogo opoznaniia) N V Turkina and L I Leushina (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR,* vol 64, Dec 1978, p 1745-1752 18 refs In Russian

The paper examines the characteristics of training the human visual recognition of three alphabetical letters, arbitrary geometric signs, and various positions of an object in the field of vision Alternation of the mechanisms responsible for the visual recognition of letters and signs is established A relationship is revealed between the magnitude of temporal shift in pattern recognition and the presence or absence of the mechanism for information processing, so that mechanism alternation appears to be the principal factor of the training process S D

A79-29258 # Mechanics of the regulation of the respiratory system in man (Mekhanika regulirovaniia dykhatel'noi sistemy cheloveka) I M Bykhovskaia (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Mekhanika Polimerov,* no 6, 1978, p 1091 1096 In Russian

A mathematical model of the regulatory system in man is proposed in the case of an applied physical load An analysis of the model equations lead to an explanation of the phenomenon of reregulation of the alveolar CO2 curve during the first 1 to 1 5 minutes after application of the load V P

A79-29270 # Functional changes in the cardiovascular system of machine-tool operators under physical and neurologically stressful loads (Funktsional'nye izmeneniia serdechno-sosudistoi sistemy rabochikh-stanochnikov pri fizicheskom i nervno-napriazhennom trude) I A Ivaniura, G E Zhilina, B F Oleinik, and A I Sudakov (Melitopol'skii Pedagogicheskii Institut, Melitopol, Ukrainian SSR) *Fiziologicheskii Zhurnal,* vol 25, Jan -Feb 1979, p 53-61 14 refs In Russian

Experiments are conducted on 80 healthy machine-tool operators (20-35 yr) engaged in metal-cutting processes with a view to evaluate the influence of physical loads on their physiological state and the adaptation of their cardiovascular system Functional changes in the cardiovascular system are observed relative to the dynamics of work day and work week under combined physical and neurologically stressful loads The most pronounced changes concern the instability of the arterial blood pressure and variation of stroke volume and cardiac output Also observed are bradycardia and arrhythmia, with impaired atrioventricular and intraventricular conduction The largest changes are observed after the third and sometimes after the first hour of work, especially by the end of the work week S D

A79-29271 # Devices for synchronizing a digital measuring apparatus with biological signals (Ustroistva dlia sinkhronizatsii tsifrovoi izmeritel'noi apparatury biologicheskimi signalami) A M Sokoliuk (Kievskii Institut Ortopedii, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal,* vol 25, Jan -Feb 1979, p 93-95 5 refs In Russian

Various circuit diagrams of practical synchronizers using biological signals are described The discussion covers a cardiosynchronizer, a synchronizer with selection of the synchronizing period, a synchronizer for generating a single impulse from a complex-form signal, and a synchronizer for the control of a set of digital measuring instruments designed for semiautomatic measurement of amplitude and time parameters of rheograms These synchronizers are free of a number of defects such as hysteresis, small input resistance, low sensitivity, insufficient noise protection, and other adverse factors S D

A79-29275 # Mechanisms of the effect of oxygen toxicity on the energy metabolism (Pro mekhanizm toksichnoi dii kisniu na energetichni protsesi v organizmi) V V Matsinin (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Akademiia Nauk Ukrains'koi RSR, Dopovidi, Seriia B - Geologichni, Khimichni ta Biologichni Nauki,* Dec 1978, p 1115-1118 15 refs In Ukrainian

The aim of the present study is to generalize and systematize experimental data on mechanisms of disruption of energy metabolism under the effect of hyperoxia A scheme is presented for the development of oxygen poisoning and compensatory reactions of the organism Consideration is given to differences in reaction to pretoxic and toxic hyperoxia B J

A79-29300 # **Paroxysmal disorders of consciousness due to flight factors (Paroksizmal'nye rasstroistva soznaniia, obuslovlennye faktorami poleta)** G A Akimov, O A Stykan, and M G Papkov *Voenno-Meditsinskii Zhurnal*, no 12, 1978, p 51-53 In Russian

The paper summarizes he results of long-term studies on healthy flight personnel members (about 25 years of age) who experience loss of consciousness during flight This syncopic state may be due to insufficient training of the human organism to withstand adverse flight factors such as overload and hypoxia The causes of loss of consciousness are identified as overload in 46% of the cases considered and hypoxia in 10% For the remaining 44% the occurrence of the paroxysmal state is due to the combined effect of some flight factors S D

A79-29336 * **Plasma volume and electrolyte shifts with heavy exercise in sitting and supine positions** J E Greenleaf, W Van Beaumont, P J Brock, J T Morse, and G R Mangseth (NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif) *American Journal of Physiology*, vol 236, Mar 1979, p R206-R214 24 refs

An experimental study was carried out to compare fluid and electrolyte shifts after heavy exercise performed by four voluntary male subjects (26-45 yr) in sitting and supine positions Plasma volume and electrolyte shifts were measured during the 6-min control period and for 60 min after a continuous peak oxygen uptake test The results indicate that the most likely driving force for the restitution of plasma volume after peak exercise is provided by a change in hydrostatic and/or systemic blood pressures when exercise ceases S D

A79-29540 **A fluid-mechanical study of the closure of heart valves** C S F Lee and L Talbot (California, University, Berkeley, Calif) *Journal of Fluid Mechanics*, vol 91, Mar 9, 1979, p 41-63 11 refs NSF Grant No ENG-73-03970

The fluid mechanics of heart valve motion is investigated experimentally and theoretically From the experiments, it is found that the principal mechanism ensuring optimal mitral-valve closure is the pressure field induced by a strong flow deceleration through the valve A complete theory, evolved from the Bellhouse and Talbot analytical model, is developed for both the mitral and the aortic valve to provide a relationship between valve motion and valve flow Results predicted by this theory agree consistently well with those obtained from experiments (Author)

A79-29589 **Can man be calculated - Biological models in aeronautical medicine and engineering (Lasst sich der Mensch berechnen - Biologische Modelle in der Luftfahrtmedizin und -technik)** H von Gierke (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio) *DFVLR-Nachrichten*, Feb 1979, p 5-12 In German

Models are proposed that make possible a quantified evaluation of human reaction and performance Spacecraft instruments, such as the experimental four-legged walking machine and the mechanical device for augmenting human work capacity, are presented as paradigms for such models The structure of a man-machine system is given A A

A79-29715 **Conjoint effect of physical stress and noise stress on information processing performance and cardiac response** J M Finkelman, L R Zeitlin, R A Romoff, M A Friend, and L S Brown (Baruch College, New York, N Y) *Human Factors*, vol 21, Feb 1979, p 1-6 26 refs Research supported by the City University of New York

The conjoint effect of physical stress, induced by requiring subjects to run a treadmill, and 90 dB white noise stress was evaluated on information processing performance using a delayed digit recall subsidiary task measure and cardiac response As anticipated, physical stress significantly raised heart rate, and noise stress significantly degraded information processing ability The experiment failed to demonstrate a linearly additive relationship between noise and physical stress on either cardiac response or information processing performance (Author)

A79-29716 **The effects of carbon monoxide on dual-task performance** V R Putz (U S Public Health Service, National Institute for Occupational Safety and Health, Cincinnati, Ohio) *Human Factors*, vol 21, Feb 1979, p 13-24 27 refs

Thirty normal nonsmoking subjects (18 26 yr) were randomly exposed to one of three levels of CO, forming three exposure groups of 10 subjects each One of the three groups served as a control, exposed only to the ambient CO present in the laboratory For four continuous hours throughout the exposure, performance measurements were obtained Each hour consisted of two periods, half of each period involved a high-frequency and half a low-frequency forcing function of the tracking task, and this was combined factorially with bright and dim intensities of peripheral lights The results show that CO at a concentration sufficient to produce 5% COHb interacts with task difficulty and exposure duration to increase peripheral-stimuli response times, and adversely affects the performance efficiency of visual manual tracking S D

A79-29717 **The evaluation of a complex computer-based flight procedures trainer** S R Trollip (Illinois, University, Urbana, Ill) *Human Factors*, vol 21, Feb 1979, p 47 54 6 refs Contract No F44620-76-C-0009

Skills such as flying holding patterns are taught in planes or simulators An alternative method is to use computer-assisted instruction (CAI) which emphasizes training requirements rather than physical fidelity Such a program was written and evaluated Traditional ground school methods were compared with the CAI method All subjects completed a training sequence in a ground trainer Those taught by computer performed better and attained criterion quicker with significantly fewer critical errors Results indicate that CAI offers an effective alternate to the costly trainers currently in use (Author)

A79-29718 **Discrimination, temperature, and time of day** A Craig (Sussex, University, Brighton, England) *Human Factors*, vol 21, Feb 1979, p 61-68 18 refs

Performance measures on a binary discrimination task and oral temperature readings were obtained at two times of day, morning (0800) and evening (2000), from each of 18 subjects On the task, subjects reported not only the presence of signal A or B, but also the confidence of their judgment A signal detection theory approach was applied to derive separate measures of perceptual efficiency and of the decision-making aspects The results indicate that whereas efficiency did not alter significantly between testing times, both response-bias and report confidence did change significantly, the latter showing an increase between morning and evening A parallel rise in oral temperature was also found, and significant correlations between temperature and confidence were obtained Neither efficiency nor response-bias was significantly related to temperature The results are discussed in relation to previous reports that perceptual efficiency and body temperature are related and change in parallel during the normal waking day (Author)

A79-29719 **Nonparametric measures of sensory efficiency for sustained monitoring tasks** A Craig (Sussex, University, Brighton, England) *Human Factors*, vol 21, Feb 1979, p 69-77 15 refs

The validity of d-prime, the signal detection theory measure of sensory efficiency, seems suspect in applications to vigilance and inspection, and it is suggested that the investigator should use an alternative, distribution free measure instead Three nonparametric measures of efficiency which seem particularly well suited to vigilance applications are considered The measures, A(G) (Green and Swets, 1966), A-prime (Pollack and Norman, 1964) and E (McCornack, 1961) are defined and illustrated, and an example is provided demonstrating their use and suitability and analyzing data from a

sustained monitoring task Norman's (1964) nonmetric procedure for comparing performance efficiency is also applied to the data and is shown to provide a useful means for distinguishing between *measure-dependent and measure-independent inferences about* changes in efficiency The relative merits of the three nonparametric measures are discussed (Author)

A79-29720 * A comparison of kinesthetic-tactual and visual displays via a critical tracking task R J Jagacinski, D P Miller, and R D Gilson (Ohio State University, Columbus, Ohio) *Human Factors,* vol 21, Feb 1979, p 79-86 Army-sponsored research, Grant No NsG-2179

The feasibility of using the critical tracking task to evaluate kinesthetic-tactual displays was examined The test subjects were asked to control a first-order unstable system with a continuously decreasing time constant by using either visual or tactual unidimensional displays *The results indicate that the critical tracking task is* both a feasible and a reliable methodology for assessing tactual tracking Further, that the critical tracking methodology is as sensitive and valid a measure of tactual tracking as visual tracking is demonstrated by the approximately equal effects of quickening for the tactual and visual displays S D

A79-29726 Human skin wettedness and evaporative efficiency of sweating V Candas, J P Libert, and J J Vogt (CNRS, Centre d'Etudes Bioclimatiques, Strasbourg, France) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology,* vol 46, Mar 1979, p 522 528 22 refs

A79-29727 * Early cardiovascular adaptation to simulated zero gravity J V Nixon, R G Murray, C Bryant, R L Johnson, Jr, J H Mitchell, O B Holland, C Gomez-Sanchez, P Vergne-Marini, and C G Blomqvist (Texas, University, Health Science Center, Southwestern Medical School, Dallas, Tex) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology,* vol 46, Mar 1979, p 541-548 41 refs Research supported by the Harry S Moss Heart Fund, Grants No NsG-9026, No NIH-HL-06296, No 5-MO1-II-00633, No NIH-HL-05812

A study was conducted on five normal male volunteers (23-29 yr), under controlled conditions, to evaluate early adaptive responses to zero gravity Specific objectives are (1) to characterize the hemodynamic, renal and hormonal responses to a central fluid shift, and (2) to compare data obtained during and after head-down tilt with corresponding data from actual space flight to validate tilt as a physiological model for simulation of zero gravity Zero gravity is simulated by a 24-hr period of head-down tilt at 5 deg The results suggest that hemodynamic adaptation occurs rapidly and is essentially accomplished by 6 hr, and that adaptation includes diuresis and reduction in blood volume The validity of head-down tilt at 5 deg as an experimental model is established by comparing the results obtained with data from Apollo and Skylab astronauts on body fluid distributions and postflight responses to orthostatic and exercise stress S D

A79-29728 Cardiac responses of dogs to nonsynchronous and heart synchronous whole-body vibration A Bhattacharya, C F Knapp, E P McCutcheon, and J M Evans (Kentucky, University, Lexington, Ky) *Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology,* vol 46, Mar 1979, p 549-555 19 refs Grant No NIH-N01 HT 3 2928

A79-29763 Aircraft noise and its effect on man Methods and results of research, consequences for environmental protection (Fluglarm und seine Wirkung auf den Menschen Methoden und Ergebnisse der Forschung Konsequenzen fur den Umweltschutz) B Rohrmann, H-O Finke, R Guski, R Schumer, and A Schumer-Kohrs Berne, Verlag Hans Huber, 1978 285 p 351 refs In German $28 50

An introduction to the area of research which is concerned with aircraft noise is provided and problems regarding the description and the evaluation of aircraft noise effects are examined Problems concerning the study and the generalization of aircraft noise effects are considered along with the acoustic characterization of aircraft noise and the results of physiological and psychological aircraft noise research Relations between aircraft noise and health are discussed and attention is given to the significance of aircraft noise as a problem of environmental protection efforts G R

A79-29925 * Effect of electroconvulsive shock on monoaminergic receptor binding sites in rat brain D A Bergstrom and K J Kellar (Georgetown University, Washington, D C) *Nature,* vol 278, Mar 29, 1979, p 464-466 30 refs Grants No PHS 12566, No NCA2-0R258-701

A79-29938 * Prebiotic nucleotide oligomerization in a fluctuating environment - Effects of kaolinite and cyanamide D G Odom, N Lahav, and S Chang (NASA, Ames Research Center, Extraterrestrial Research Div , Moffett Field, Calif) *Journal of Molecular Evolution,* vol 12, Mar 15, 1979, p 259-264 15 refs

The clay kaolinite was tested for its ability to promote nucleotide oligomerization in model prebiotic systems Heterogeneous mixtures of clay, water and nucleotide were repeatedly evaporated to dryness at 60 C and redissolved in water in cyclic fashion in the presence or absence of cyanamide and/or ammonium chloride With or without cycling, kaolinite alone did not promote the oligomerization of nucleotides at detectable levels Cycling of clay in combination with cyanamide, however, promoted high levels of condensation to a mixture of oligonucleotides and dinucleotide pyrophosphate without requiring ammonium chloride Although cycling with clay favored synthesis of dinucleotide pyrophosphate, cycling without clay enhanced formation of oligonucleotides These results support the hypothesis that the presence of clays in fluctuating environments would have influenced the course of prebiotic condensation reactions (Author)

A79-29971 # Role of the visual system in the compensation of vestibular dysfunction (Rol' zritel'nogo apparata v kompensatsii vestibuliarnoi disfunktsii) G I Gorgiladze (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) *Akademiia Nauk SSSR, Doklady,* vol 244, Jan 1, 1979, p 245-249 15 refs In Russian

Results are presented of an experimental study designed to assess the role of the visual system in compensation of vestibular dysfunction using the model of single labyrinthectomy in animals Experiments are conducted on 57 male and female adult guinea pigs under conditions of temporary or permanent dark (artificial blindness and enucleation of eyeballs) Nystagmatic reactions as well as head and body postures are recorded to evaluate vestibular compensation The results obtained indicate that the visual system of guinea pigs is involved in the compensation of aftereffects induced by unilateral depression of the vestibular function Blindness is accompanied by a well pronounced inhibition of compensation S D

A79-30019 # Studies on thermoregulation in the rat M T Lin, Y-F Chern, G-G Liu, and T-C Chang (Ministry of National Defense, Medical Center, Taipei, Nationalist China) *National Science Council, Proceedings,* vol 3, Jan 1, 1979, p 46-52 17 refs Research supported by the J Aron Charitable Foundation, National Science Council of Nationalist China Grant No 67B-0412-06(15)

A79-30125 * Effects of aeration on formation and localization of the acetyl coenzyme A synthetases of Saccharomyces cerevisiae H P Klein and L Jahnke (NASA, Ames Research Center, Moffett Field, Calif) *Journal of Bacteriology,* vol 137, Jan 1979, p 179-184 20 refs

Previous studies on the yeast Saccharomyces cerevisiae have shown that two different forms of the enzyme acetyl coenzyme A synthetase (ACS) are present, depending on the conditions under which the cells are grown The paper evaluates the usefulness of a

method designed to assay both synthetases simultaneously in yeast homogenates The data presented confirm the possibility of simultaneous detection and estimation of the amount of both ACSs of S cerevisiae in crude homogenates of this strain, making possible the study of physiological factors involved in the formation of these isoenzymes One important factor for specifying which of the two enzymes is found in these yeast cells is the presence or absence of oxygen in their environment Aeration not only affects the ratio of the two ACSs but also appears to affect the cellular distribution of these enzymes Most of the data presented suggest the possibility that the nonaerobic ACS may serve as a precursor to the aerobic form S D

A79-30217 Adaptive locomotion of a multilegged robot over rough terrain R B McGhee (Ohio State University, Columbus, Ohio) and G I Iswandhi (Mead Paper Co , Chillicothe, Ohio) *IEEE Transactions on Systems, Man, and Cybernetics,* vol SMC-9, Apr 1979, p 176-182 25 refs NSF Grant No ENG-74-21664

The development of experimental computer-controlled adaptive walking machines is discussed The discussion concerns legged locomotion on a terrain that includes regions not suitable for weight bearing and which must therefore by avoided by the control computer in deciding when and where to successively place the feet of the vehicle over the rough terrain Attention is given to a complete problem formulation, a heuristic algorithm for solution of the relevant problem, and a preliminary assessment of the proposed algorithm by a computer simulation study S D

A79-30218 An algorithm to ascertain critical regions of human tracking ability D W Repperger, E J Hartzell, W C Summers (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio), S L Ward, and B C Glass (Systems Research Laboratories, Inc , Dayton, Ohio) *IEEE Transactions on Systems, Man, and Cybernetics,* vol SMC-9, Apr 1979, p 183-196 28 refs USAF-supported research

A statistical algorithm is developed to study human tracking behavior in a precognitive tracking task The algorithm presented here determines the point in time when a tracking task becomes too difficult for the human to follow Consequently, different behavior responses are observed to occur A decision rule based on a statistical test of normality is used to delineate the two regions of tracking behavior The proof of convergence of this algorithm to a unique solution is given Data from a good and poor tracker are analyzed using this algorithm to illustrate how to utilize the approach presented here (Author)

A79-30222 A model of human decisionmaking in fault diagnosis tasks that include feedback and redundancy W B Rouse (Illinois, University, Urbana, Ill) *IEEE Transactions on Systems, Man, and Cybernetics,* vol SMC 9, Apr 1979, p 237 241 7 refs Grant No DAHC19 78 G-0011

A79-30223 A comparison of control modes for time-delayed remote manipulation G P Starr (New Mexico, University, Albuquerque, N Mex) *IEEE Transactions on Systems, Man, and Cybernetics,* vol SMC-9, Apr 1979, p 241 246 9 refs

Master-slave and resolved-motion rate control are compared on a peg transfer task in the presence of time delays from 0 0 to 3 0 s, using the Ames arm Data acquisition was fully automated, and completion time was broken into three segments - withdrawal, transport, and adjustment/insertion Master-slave was superior in all three task segments with no time-delay However, master-slave degraded more rapidly with delay than rate control, especially as the task demanded more accuracy The subject reported much less fatigue and frustration when using rate control It is concluded that resolved-motion rate control may be more effective for fine-positioning segments of time-delayed manipulation (Author)

A79-30624 * Effect of sodium and calcium ingestion on thermoregulation during exercise in man J E Greenleaf, P J Brock, J T Morse, W Van Beaumont, L D Montgomery, V A Convertino, and G R Mangseth (NASA, Ames Research Center, Moffett Field, Calif) In New trends in thermal physiology Paris, Masson, 1978, p 157-160 5 refs

The effects of hypertonic sodium and calcium ingestion on body temperature during exercise in cool and hot environments are investigated Rectal and mean skin temperatures, sweat rates and arm and leg total blood flows were measured in men during periods of rest, submaximal exercise and recovery at temperatures of 26 5 C and 39 4 C after ingestion of NaCl and CaCl2 solutions In both environments, higher rectal temperatures are observed after hypertonic sodium ingestion, which is also associated with attenuated blood flow in the extremities, lower sweat rates and slightly higher skin temperature in the heat, indicating significant thermoregulatory responses Hypertonic calcium and isotonic sodium cause no temperature change, although calcium caused a reduction of blood flow in the extremities A L W

A79-30651 Biodynamic effects of canopy loss in the TF-15 aircraft W F Kendall, Jr and R C Hill (USAF, Flight Test Center, Edwards AFB, Calif) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 338-342

In-flight canopy loss in high-speed fighter or trainer aircraft poses serious aeromedical problems for the crew-members To assess these problems in the TF-15, a series of canopy-off tests were conducted Preliminary phases of the test consisted of a taxi and a flight test up to 485 knots with a pilot in the front seat and an instrumented dummy in the back seat Upon evaluation of these results, a taxi phase and a flight phase were conducted with a pilot in the front seat and a live subject in the back seat Maximum air-speed attained was 410 knots The front crewmember experienced no serious control or medical problems during all phases The back crewmember did experience problems such as loss of communications, loss of vision, helmet lift, high frequency head buffet, and exhalation difficulties Airspeed, seat height, and body position had the greatest effect on the severity of the windblast Angle of bank, angle of attack, and acceleration had little effect The aft crewmember was able to significantly decrease windblast effects by leaning forward and pulling his head and helmet forward and down with his hand (Author)

A79-30652 Plasma electrolytes in relation to altitude tolerance in rats T Purshottam (Defence Research and Development Establishment, Biochemistry Div , Gwalior, India) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 343-345 22 refs

Plasma concentrations of Na(+), K(+) and Cl(-) ions did not change significantly whereas that of (HCO3)- dropped to one-third of its initial value in rats during their 15 min of gasping at a simulated altitude of 10,000 m at 33 C, which was their survival threshold Administration of methamphetamine (2 mg/kg), imipramine (2 mg/kg) and adrenaline (7 mg/kg) i p were ineffective in prolonging the survival time of rats, whereas acetazolamide (40 mg/kg), furosemide (2 mg/kg) and caffeine citrate (10 mg/kg) significantly increased their survival under hypoxia, (p less than 0 001, 0 01, and 0 05, respectively) (Author)

A79-30653 * Changes in apparent body orientation and sensory localization induced by vibration of postural muscles - Vibratory myesthetic illusions. J R Lackner (Brandeis University, Waltham, MIT, Cambridge, Mass) and M S Levine (Brandeis University, Waltham, Mass) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 346-354 28 refs Contract No NAS9 15147

Human experiments are carried out which support the observation of Goodwin (1973) and Goodwin et al (1972) that vibration of skeletal muscles can elicit illusory limb motion These experiments extend the class of possible myesthetic illusions by showing that vibration of the appropriate muscles can produce illusory body motion in nearly any desired direction Such illusory changes in

posture occur only when visual information about body orientation is absent, these changes in apparent posture are sometimes accompanied by a slow-phase nystagmus that compensates for the direction of apparent body motion During illusory body motion a stationary target light that is fixated will appear to move with the body at the same apparent velocity However, this pattern of apparent body motion and conjoint visual - defined as proprioqyral illusion - is suppressed if the subject is in a fully illuminated environment providing cues about true body orientation Persuasive evidence is thus provided for the contribution of both muscle afferent and touch-pressure information to the supraspinal mechanisms that determine apparent orientation on the basis of ongoing patterns of interoceptive and exteroceptive activity S D

A79-30654 Effects of phase manipulation on speech intelligibility through communication headsets T H Townsend and C C Olsen (Central Michigan University, Hearing Clinic, Mount Pleasant, Mich) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 355, 356 8 refs

A masking level difference (MLD) paradigm was established by rewiring the earphones of a communications headset out-of-phase Essentially no release from masking could be measured, however, on a crew of listeners in the cabin of a light aircraft The experiment was replicated in the laboratory so that the exact phase of the aircraft noise masker could be controlled The substantial MLD obtained in this environment led to the conclusion that the noise reaching the ears in the cockpit was of random phase, which almost eliminates the MLD Therefore, rewiring headsets out-of-phase provides no advantage in intelligibility (Author)

A79-30655 * Tissue gas and blood analyses of human subjects breathing 80% argon and 20% oxygen D J Horrigan, C H Wells, M M Guest, G B Hart, and J E Goodpasture (NASA, Johnson Space Center, Medical Research Branch, Houston, Texas, University, Galveston, Tex) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 357-362 39 refs

Eight human volunteers, individually studied in a hyperbaric chamber, breathed (1) air at 1 ATA, (2) 80% argon and 20% oxygen at 1 ATA for 30 min, (3) air at 1 ATA for 30 min, (4) 100% O2 at 1 ATA for 30 min, (5) air at 1 ATA for 30 min, (6) 100% O2 at 2 ATA for 60 min, and (7) 80% argon and 20% oxygen at 1 ATA for 30 min Oxygen, carbon dioxide, nitrogen, and argon tensions were measured in muscle and subcutaneous tissue by mass spectroscopic analyses Venous blood obtained at regular intervals was analyzed for coagulation and fibrinolytic factors Inert gas narcosis was not observed After breathing argon for 30 min, muscle argon tensions were almost three times the subcutaneous tensions Argon wash in mirrored nitrogen wash-out Argon wash-in and wash-out had no effect on tissue PO2 or PCO2 Coagulation and fibrinolytic changes usually associated with vascular bubbles were absent (Author)

A79-30656 Mechanical vs ischemic mechanisms for decompression sickness B A Hills (Texas, University, Galveston, Tex) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 363-367 25 refs Contract No N00014-75-C-1035

Twenty kangaroo rats were used to investigate the effect of exposure to low oxygen levels (0 11 atm O2 inspired partial pressure) prior to decompression from a steady-state condition This hypoxia was found to afford significant protection against limb bends as simulated in those animals by tail biting Yet, it potentiated neurologic symptoms compared with a control exposure on air with the same level of nitrogen supersaturation However, the incidence of simulated limb bends in the same animals was the same with hypoxia as with another control exposure at a pressure estimated to give extravascular bubbles of the same size upon decompression The results are, therefore, consistent with a simple mechanical basis for limb bends, but are difficult to explain by any ischemic mechanism since a general hypoxia exacerbates any pain produced by oxygen deficiency in the tissues However, the reverse may be true for some forms of neurologic decompression sickness and the two such cases reported here are consistent with that view, although not statistically significant (Author)

A79-30657 * Reproductive adaptation in Drosophila exposed to oxygen-enriched atmospheres G Kloek and L Winkle (Kentucky State University, Frankfort, Ky) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 368-371 10 refs Grant No NsG-801

Ten successive generations of a Drosophila melanogaster population were exposed to an atmospheric mix of 50% oxygen/50% nitrogen at standard pressure This atmospheric mix has been shown to be toxic to this species and causes significantly shortened life span By the fifth generation, survivorship and life span for the first 25-30 days were identical to control populations and total life span was shorter by only a few days Egg-laying rates were stable in the experimental populations but below those of the controls Hatching success was identical between experimental and control populations Even though the egg-laying rates were lower in 50% oxygen, it was concluded that the population had adapted and could maintain a stable population in these conditions The near normal life spans, normal hatching rates, and overall population stability, exhibited following five generations of adaptation, were considered sufficient to allow continued reproduction in spite of a reduced egg-laying rate (Author)

A79-30658 Responses of high altitude natives to a standard cold test at sea level L Mathew, S S Purkayastha, A Jayashankar, and R P Sharma (Defence Institute of Physiology and Allied Sciences, Delhi, India) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 372-375 23 refs

A79-30659 Measurement and scaling of workload in complex performance. W D Chiles, A E Jennings (FAA, Civil Aeromedical Institute, Oklahoma City, Okla), and E A Alluisi (Old Dominion University, Norfolk, Va) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 376-381 10 refs

An objective method is developed for scaling different levels of workload on human operators involved in man-machine systems The Civil Aeromedical Institute's multiple task performance battery is used to provide several tasks (monitoring lights, monitoring meters, two-dimensional compensatory tracking, pattern identification, mental arithmetic, and problem solving) in different combinations to generate varying job demands and, presumably, varying levels of workload A total of 94 volunteer male subjects is tested, divided in two groups tested on one and two days, respectively A scale of workload is derived for five complex task-combination conditions The scale provided reliable values that were stable on replication The major restriction to the method's use is the requirement of employing at least 50 subjects in order to yield stable scale values S D

A79-30660 * Oculogravic illusion in response to straight-ahead acceleration of a CF-104 aircraft A Graybiel, G L Jennings (U S Navy, Naval Aerospace Medical Research Laboratory, Pensacola, Fla), W H Johnson (Ontario Crippled Childrens' Centre, Toronto, Canada), K E Money, and R E Malcolm (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 382-386 16 refs Research supported by the Defence and Civil Institute of Environmental Medicine NASA Order T-9140-E, Navy Project F51524,ZF51524005

Experimental subjects wore goggles that restricted monocular vision to a luminous line fixed relative to the head, and they were exposed on one occasion to a straight ahead acceleration of an aircraft and on another occasion to a tilting chair The magnitude of change of direction of the resultant acceleration was the same on both occasions, but the perceived movement of the luminous line from the two stimuli was very different In response to the aircraft

stimulus, the oculogravic illusion was experienced and the luminous line was perceived as tilting relative to the subject, in response to the tilting chair stimulus, the line was perceived as remaining fixed relative to the subject It was concluded that the oculogravic illusion, as experienced in the aircraft (and previously in centrifuges), is a true illusion and not merely a fact of physics (Author)

A79-30661 **Cardiac response to whole-body heating** M A B Frey and R A Kenney (George Washington University, Washington, D C) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 387-389 12 refs

Systolic time interval analysis was used to assess changes in ventricular function during heat stress Seven subjects (4 M + 3 F, 22-35 yr) participated in the experiments The heating procedure was the following both legs of seated subjects were immersed to the knees in stirred water maintained at 42-45 C, the subjects' upper legs and trunks were enclosed in nonpermeable plastic and covered with a sheet blanket to reduce heat loss, after 30 min of heating, the water and plastic were removed The parameters measured were HR and R-R interval, LVET, and PEP Results were compared by t test at the 0 05 significance level The results pointed to a two stage cardiac response to heat vagal withdrawal followed by a strong sympathetic outflow to the heart affecting both inotropic and chronotropic characteristics S D

A79-30662 * **Rotation at 30 RPM about the Z axis after 6 hours in the 10-deg head-down position Effect on susceptibility to motion sickness** A Graybiel (U S Navy, Naval Aerospace Medical Research Laboratory, Pensacola, Fla) and J R Lackner (Brandeis University, Waltham, MIT, Cambridge, Mass) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 390-392 5 refs Contract No NAS9-15147 NASA Order T 9140-E, NASA Order T-590413

Intraindividual differences in susceptibility to motion sickness were measured in 14 subjects for two conditions of rotation at 30 rpm in the 10-deg head-down position In one condition, subjects were in the 10-deg head-down position for 6 h prior to the onset of rotation, in the other condition, the delay was only 15 min In both conditions, there were changes in vital capacity, indicating a redistribution of movable body fluids Subjects tended to be less susceptible to motion sickness when they were recumbent for 6 h prior to rotation These results are counterevidence for the hypothesis that shifts of body fluid are responsible in large part for the motion sickness elicited in orbital space flight (Author)

A79-30663 **Saccadic velocity characteristics Intrinsic variability and fatigue** D Schmidt (Universitats Augenklinik, Freiburg im Breisgau, West Germany), L A Abel, L F Dell'Osso, and R B Daroff (Miami Veterans Administration Hospital, Miami, University, Miami, Fla) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 393-395

Saccadic eye movements exhibit a characteristic peak velocity vs amplitude relationship As with all quantifications of biological function, there exists an associated intra- and intersubject variability of this relationship This paper documents this variability and demonstrates both the absence of a predictable short-term 'muscle fatigue' effect and the presence of a generalized 'mental fatigue' (i e , tiredness) effect (Author)

A79-30664 **Cerebral accident subsequent to G-force loading - A case report** J W Ellis, Jr and J S Currie (USAF, TAC Hospital, Dobbins AFB, Ga) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 399, 400

A case review of a CVA in a 57 year-old general officer due to positive G-force loading is presented, which is apparently the first such documented episode recorded in the literature This case reflects the concern about high G-force loading seen in newer high-performance aircraft and has significance in the assignment of older individuals to high G force environments (Author)

A79-30665 **Survey on eye comfort in aircraft I - Flight attendants.** W G Eng (U S Navy, Eye Clinic, Alameda, Calif) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 401-404 9 refs Research supported by the Association of Flight Attendants

A large representation of experienced flight attendants (95% female and 70% 26-33 years old) were included in a three month study in order to assess the extent and nature of the various factors that might affect their eye comfort The attendants were asked to fill out the survey based on their experience while working in flight The survey items were potential factors influencing eye comfort, such as smoking, air conditioning, bright lights, and napping The vision status of the respondents was divided into four categories no correction, glass wearers, hard contact lens wearers, and soft contact lens wearers The common eye problem characterized by conjunctival redness and eye irritation occurred in 95% of the flight attendants Both wearers and nonwearers of contact lenses reported similar eye problems There appears to be a number of eye irritants in the aircraft environment contributing to eye discomfort, but smoking was indicated by the respondents to be the most adverse factor S D

A79-30666 **Space osteoporosis - An electromagnetic hypothesis** A A Marino, R O Becker (Veterans Administration Medical Center, Syracuse, N Y), F X Hart (University of the South, Sewanee, Tenn), and F Anders, Jr (Louisiana State University, Shreveport, La) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 409, 410 14 refs Research supported by the U S Environmental Protection Agency, U S Veterans Administration, and NIH

Loss of body calcium during spaceflight is a potential problem in long voyages This loss does not appear to be caused by a deficiency in diet or exercise The idea is advanced that the altered electromagnetic environment experienced in space may be at least partially responsible It is shown that the electric field induced inside astronauts because of their motion in the geomagnetic field is greater than that which has produced a wide variety of biological effects in earth bound experiments (Author)

A79-30667 **Effect of hypoxia on the development of Drosophila melanogaster /Meigen/** L A Palos and G Blasko (I Medical Clinic, Budapest, Hungary) *Aviation, Space, and Environmental Medicine,* vol 50, Apr 1979, p 411, 412

A79-30695 # **Metal porphyrins in pre-Cambrian deposits as a probable evidence for early photosynthesis (Metalloporfiriny v otlozheniiakh dokembriia kak veroiatnye svidetel'stva drevnego fotosinteza)** M P Kolesnikov and I A Egorov (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR) *Akademiia Nauk SSSR, Doklady,* vol 244, Jan 11, 1979, p 470-473 15 refs In Russian

A79-30696 # **Paradoxical reaction of some intracellular antioxidative defense mechanisms during adaptation of the organism to hypoxia (Paradoksal'naia reaktsiia nekotorykh vnutrikletochnykh mekhanizmov zashchity ot kisloroda pri adaptatsii organizma k gipoksii)** A M Gerasimov, E A Kovalenko, N V Kasatkina, D Sh Amelina, T S Balashova, and T Iu Budennaia (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Ministerstvo Zdravookhraneniia, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) *Akademiia Nauk SSSR, Doklady,* vol 244, Jan 11, 1979, p 492-495 15 refs In Russian

Results are presented of animal experiments designed to study the behavior of antioxidative defense enzymes, such as glutathione peroxidase, glutathione reductase, superoxide dismutase, and peroxisomal oxidases in tissues of animals adapted to hypoxia through hypobaric training The study concerned white rats training daily for 6 hr over a period of 30 days in a pressure chamber at a pressure corresponding to 6 5-km altitude Experimental findings bear evidence to the maintenance in higher animals of biochemical adapta-

tion to oxygen surplus through regulation of the level of antioxidative enzymes, provided that on the cellular level there occurs periodically a specific oxygen overload. S D

A79-30701 # **Process of search control of coordinated movement in man (Protsess poiskovogo upravleniia koordinatsiei dvizhenii cheloveka)** L N Fitsner (Institut Problem Upravlenia, Moscow, USSR) *Akademiia Nauk SSSR, Doklady,* vol 244, Jan 21, 1979, p 775-777 In Russian

It has been established that control actions in the process of controlling the coordinated movement in man are generated by a search principle, in which the results of various probe actions are analyzed, and a dynamic model of the functioning of the search system of coordinated movement control has been constructed and tested (Fitsner, 1977) Principles for designing a physiological control system for coordinated movement are formulated P T H

A79-31122 # **The biomedical implications of engineering in space** A H Bellenkes *AIAA Student Journal,* vol 17, Spring 1979, p 18-23

The psychological and physiological effects of the space environment on astronauts engaged in engineering projects made possible by the Space Shuttle are discussed Weightlessness has been shown to produce problems in task performance, vestibular system dysfunction, cardiovascular abnormalities, loss of muscle strength and bone demineralization Astronauts must be psychologically prepared to deal with emergencies, relying on independence and initiative, and must also train to integrate perceptions of the direction, localization, color and dimensionality of an object by means of cues other than those available on earth Means such as artificial gravity are being studied to eliminate these problems, and missions are currently being planned to last up to one year A L W

A79-31164 # **Diagnostics of initial deficiency in cerebral circulation (Diagnostika nachal'noi nedostatochnosti tserebral'nogo krovoobrashchenia)** B I Parmenov-Trifilov *Voenno-Meditsinskii Zhurnal,* Jan 1979, p 39-43 In Russian

Detection of early symptoms of cerebrocirculatory deficiency is of prime importance for the practice of aviation and sports medicine as related to diagnostic medical examination Results are presented for long-term observations of 220 pilots aged 22-50 Atherosclerosis of cerebral vessels is found to be a major symptom of circulatory disorders due to morphological changes in cerebral vessels The etiology of cerebrocirculatory disorders is related to the combined action of various factors such as neurocirculatory dystonia, hypertension, initial cerebroatherosclerosis, and cervical osteochondrosis A detailed classification of the underlying etiologic factors of cerebrocirculatory deficiency is provided S D

A79-31165 # **Investigation of psychological compatibility of crew members of multiseat aircraft (Izuchenie psikhologicheskoi sovmestimosti chlenov ekipazhei mnogomestnykh samoletov)** Iu N Belyi *Voenno-Meditsinskii Zhurnal,* Jan 1979, p 54-57 6 refs In Russian

An experimental study of group dynamics is conducted to elucidate the role of psychological compatibility in flight activity, to substantiate and verify the methods of observing aircrews, and determine the most effective approach(es) to aircrew formation To this end, 22 crews are examined, each consisting of the flight commander, copilot, navigator, and conavigator engaged in flights lasting from 250 to 3000 hr over a period of at least 6 months It is found that the success of performing a prescribed task depends largely on the official most competent group leader, and that the efficiency of joint professional activity depends to a certain extent on the psychological compatibility of the group members The described group-dynamics-evaluating methodology should be used both for crew selection and for detection and correction of psychological incompatibility among aircrew members S D

A79-31178 # **Deductive derivation of a mathematical model for spectral sensitivity of the human organ of sight I, II (Deduktivnyi vyvod matematicheskoi modeli spektral'noi chuvstvitel'nosti organa zreniia cheloveka I, II)** V P Pchelinov *Problemy Bioniki,* no 20, 1978, p 23-42 11 refs In Russian

An experiment-planning method is developed which provides for obtaining objective data in studies of the spectral sensitivity of human vision Conditions for the presence of color are formulated along with a mathematical description of the concept of color An analysis of the properties of input signals submitted to the human organ of sight serves to differentiate type groups of these signals which are in turn treated as elements of a common set Further attention is devoted to proving theorems defining the linear properties of a function that converts input visual signals into ternary groups of numbers corresponding to coordinates of color An overall mathematical model of the spectral sensitivity of human vision is derived deductively, and rationale is given in favor of its objectivity and high reliability T M

A79-31179 # **The problem of optimally fast response as solved by the nerve cell (Zadacha optimal'nogo bystrodeistviia, reshaemaia nervnoi kletkoi)** V S Em and V G Pak *Problemy Bioniki,* no 20, 1978, p 69-79 10 refs In Russian

A mathematical model of exchange-process kinetics which accounts for the elementary structural organization of a cell is derived in an attempt to elucidate the process by which a nerve cell solves the problem of time-optimal response The nerve cell does not contain a special command unit that delivers control impulses Instead, control of the nerve cell subject to a variety of input stimuli is accomplished by self-reorganization of subcellular structures (ensembles of elements) The time-optimal response problem is solved by the nerve cell through self-reorganization of such probabilistic ensembles Mathematical trajectory points and parameter space boundaries are defined for conditions of integration or segregation of these ensembles T M

A79-31180 # **A bioengineering simulator of the human visual apparatus (Biotekhnicheskii imitator zritel'nogo apparata cheloveka)** V F Ananin *Problemy Bioniki,* no 20, 1978, p 79-86 10 refs In Russian

Existing hypotheses for the conversion and coding of external stimuli in the human retina are reviewed for the purpose of defining requirements which would have to be satisfied by a bioengineering model of the human visual system Principal design aspects of such a model are defined, and required characteristics are listed for constituent elements which include the optics, the scanning system, a photomosaic structure, gain circuit, and conduction system T M

A79-31181 # **Detection of conflict states in air traffic control of airport zones (Obnaruzhenie konfliktnykh situatsii pri upravlenii vozdushnym dvizheniem v aerodromnoi zone)** P P Novikov and A G Raputo *Problemy Bioniki,* no 20, 1978, p 132-139 In Russian

Experimental observations of the professional activity of air traffic controllers were used to construct a model for the process through which the controller adopts control solutions This model is employed to derive an algorithm for detecting potential-conflict states leading to hazardous situations Analysis of the algorithm shows improved efficiency in comparison with other conflict prediction methods General confirmation is provided for the validity of adopting a bionic approach when developing mathematical safeguards for complex control systems T M

A79-31490 # **Selecting the program of motions for a biped walking machine (Vybor programmy dvizhenia dvunogogo shagaiushchego apparata)** F G Karpinskii (Akademiia Nauk Ukrainskoi SSR, Institut Matematiki, Kiev, Ukrainian SSR) In Physical and engineering applications of boundary value problems (Fiziko-

tekhnicheskie prilozheniia kraevykh zadach) Kiev, Izdatel'stvo Naukova Dumka, 1978, p 201 216 10 refs In Russian

Selection of a program of planar motion of a bipedal walking machine is carried out by solving a variational problem As model of a walking machine, a solid with two ponderable legs is chosen The moment of inertia of the trunk relative to the leg suspension point, the mass of the trunk, and the distance from the leg suspension point to the center of gravity of the body were chosen in correspondence with human parameters The criterion functional takes into consider ation only constraints on the control variables The solution of the linear differential equation of motion providing a minimum of the criterion functional leads to a two-point boundary value problem with periodic boundary conditions Predicted curves of motion are compared with experimental ones for three types of models P T H

A79-31494 **Evaluation of models describing human operator control of slowly responding complex systems** J J Kok and R A van Wijk Delft, Technische Hogeschool, Doctor in de technische Wetenschappen Thesis, 1978 248 p 134 refs Research sponsored by the Nederlandse Organisatie Voor Zuiver-Wetenschappelijk Onderzoek

Models describing human operator behavior in the control of slowly responding complex systems are evaluated The observer/controller model, based on the optimal control model, is postulated for systems requiring direct and continuous control, while the observer/controller/decision model is designated for situations in which the operator assumes a supervisory role The identifiability of the observer/controller model is discussed and direct and maximum likelihood methods of identification presented The inverse optimal control problem and the observer problem are considered The observer/controller/decision model of a human supervisory situation is described and verified by comparison with a simple supervisory control situation and the control of the heading of a supertanker by the helmsman A L W

A79-31887 **Pilot preflight briefing utilizing an interactive computer generated Voice Response System** C L Weigel (FAA, Washington, D C) In Conference on Weather Forecasting and Analysis and Aviation Meteorology, Silver Spring, Md , October 16-19, 1978, Preprints Boston, Mass , American Meteorological Society, 1978, p 324-331

A brief description is presented of the basic problems that exist in the dissemination of preflight weather information today, taking into account the current development approach to one of the most promising preflight briefing techniques on the horizon, computer generated voice response In the last two years several parallel development activities have been directed at the application of voice response technology to the pilot direct access function Attention is given to the synthetic voice response, the digitized voice response system, weather data characteristics and vocabulary requirements, typical anomalies encountered in raw data, a public demonstration of the Voice Response System (VRS), the VRS demonstration results to date, and future development and applications G R

A79-31899 # **Auditory analysis of complex sound Electrophysiological investigations (Slukhovoi analiz slozhnykh zvukov Elektrofizologicheskoe issledovanie)** I A Vartanian Leningrad, Izdatel'stvo Nauka, 1978 152 p 306 refs In Russian

The monograph generalizes the evidence obtained by the author's experimental studies and available research work in the literature, concerning the structural-functional organization of the various sections of the auditory system Attention is given to the analysis of data on the regularities in the activity of central neurons and transformation of afferent impulse flow at various levels of the auditory pathway upon exposure to acoustic signals that simulate the properties of a natural acoustic environment It is shown that in the sequential nodes of the auditory pathway, the principles of detecting temporal changes in the parameters of acoustic stimuli assume an increasingly significant role The possibility of the neurons of classical auditory centers to participate in the organization of the auditory memory is discussed along with the hierarchical organization of central mechanisms for the analysis of unsteady-state signal parameters S D

A79-31906 # **Energetic aspects of adaptation (Energeticheskie aspekty adaptatsii)** L E Panin Leningrad, Izdatel'stvo Meditsina, 1978 192 p 235 refs In Russian

The book generalizes the results of studies on the assessment of carbohydrate-lipid (energetic) metabolism in humans exposed to adverse environmental factors, and in animals subjected to various subextremal and extremal stress factors Analysis of a large volume of data led to the conclusion that the stress state is characterized by a complex reorganization of all types of metabolism (carbohydrates, lipids, and proteins) It is shown that in the presence of prolonged stress there occurs a conversion from carbohydrate to lipid energetic metabolism The mechanisms of energetic reorganization are discussed for all organizational levels of a biosystem organism (entire body), organ, cell, and subcell Hormonal regulation of the enzymatic activity is emphasized, particularly the role of the hypophysis, adrenal glands, and pancreas The concept of 'energetic homeostasis' is introduced S D

A79-31950 # **Effect of the blockade of hypothalamic adrenergic structures on thermoregulatory reactions (Vliianie blokady adrenergicheskikh struktur gipotalamusa na termoreguliatornye reaktsii)** R A Arutiunian and S K Karapetian (Akademiia Nauk Armianskoi SSR, Institut Fiziologii, Yerevan, Armenian SSR) *Fiziologicheskii Zhurnal SSSR,* vol 65, Jan 1979, p 40-45 19 refs In Russian

A79-31988 # **Effect of paradoxical sleep deprivation on the acquisition of sound discrimination (Vliianie deprivatsii paradoksal'nogo sna na vyrabotku zvukovoi diskriminatsii)** N D Nemsadze (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR) *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia,* vol 92, Nov 1978, p 429-432 7 refs In Russian

The effect of paradoxical sleep deprivation on the acquisition of sound discrimination in conditioned nutritional behavior experiments on cats was studied Paradoxical sleep deprivation by waking the animal with significant emotional tension had no effect on acquisition of sound discrimination When paradoxical sleep is deprived by the method of Jouvet, accompanied by emotional tension, there is an impairment in the acquisition of sound discrimination P T H

A79-32100 # **Characteristics of serious carbon monoxide poisoning (Nekotorye osobennosti ostrykh otravlenii ugarnym gazom)** A V Pirtskhalava (Nauchno Issledovatel'skii Institut Skoroi Pomoshchi, Moscow, USSR) *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia,* vol 92, Oct 1978, p 221 224 7 refs In Russian

The study of the clinical record of various types of patients suffering from carbon monoxide poisoning shows that patients suffering from exposure to exhaust gases of automobiles in most cases develop psychoneurological symptoms taking a course typical of toxicohypoxic encephalopathy and trophic disorders The most pronounced symptoms of patients affected by a fire are observed in the upper respiratory tract, and take the form of acute tracheobronchitis and focal pneumonia P T H

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STAR ENTRIES

N79-20432*# Planning Research Corp., Kennedy Space Center Fla
ADVANCED LIFE SUPPORT EQUIPMENT FOR NITROGEN TETROXIDE ENVIRONMENTS
George H Bowman, III *In* NASA Kennedy Space Center Proc of the NASA/Fla' Inst of Tech Environ Eng Conf on Nitrogen Tetroxide Jun 1978 p 159-182 refs

Avail NTIS HC A10/MF A01 CSCL 06K

Design constraints considered in an effort to improve the self-contained atmospheric protection ensemble (SCAPE) are discussed Emphasis is placed on overcoming the hazards of personnel engaged in orbiter crash/rescue operations Specific topics covered include suit material permeability, sealing of all suit penetration, and maintaining a positive pressure within the suit J M S

N79-20712 Washington Univ., Seattle
MULTIPLE TRACER DIFFUSION METHODS FOR THE EVALUATION OF CEREBRAL CAPILLARY PERMEABILITY AND CAPILLARY BLOOD FLOW RATE IN THE RAT Ph D Thesis
Howard Brent Clark 1978 118 p
Avail Univ Microfilms Order No 7904177

Two methods are described for quantitating the cerebral vascular extraction fractions of diffusion limited radioactive tracer molecules in the rat The methods are based on measurement of changes in the ratio of the concentrations of the test tracer H-3-water or H-3-ethanol) and a freely diffusible reference tracer (C-14 butanol) that occur subsequent to differential extraction as the tracers pass through the brain vasculature One method employs a five microliter injection into the common carotid artery using a specially designed micro-needle that does not disrupt the normal arterial blood flow The other method, while also nondisruptive to vascular flow, allows, for analysis of all areas of the brain including regions not supplied by the carotid arteries Dissert Abstr

N79-20713 California Univ., Irvine
***REGULATION' OF THE CARBON DIOXIDE TENSION IN ARTERIAL BLOOD DURING INHALATION OF CARBON DIOXIDE IN BIRDS AND MAMMALS* Ph.D. Thesis**
Gordon Stewart Mitchell 1978 120 p
Avail Univ Microfilms Order No 7901963

The physiological responses of chickens and cats to low levels of inhaled carbon dioxide were studied In the first series of exeriments, 10 anesthesized male White Leghorn chickens were exposed to partial pressures of carbon dioxide in the inspired gas (P sub ICO2) between 0 and 35 torr Steady-state measurements of the CO2 tension in the arterial blood (P sub aCO2), the arterial hydrogen ion concentration ([H(+)]) and ventilation were made The afferent path of IPC is predominantly through the vagus nerve, therefore a second series of experiments were conducted to determine if sensory information from the vagus nerves is necessary for the regulation of P sub aCO2 at low P sub ICO2 in chickens and cats It is concluded that IPC mediates the ventilatory reflex at low P sub ICO2 in chickens, but if a CO2-sensitive intrapulmonary receptor mediates the reflex in cats, it must at least in part, follow a nonvagal afferent pathway Dissert Abstr

N79-20714*# National Aeronautics and Space Administration, Washington, D C
THE MEDUZA EXPERIMENT AN ORBITAL COMPLEX TEN WEEKS IN FLIGHT
V Ovcharov Mar 1979 6 p Transl into ENGLISH from Krasnaya Zvezda (USSR), 24 Aug 1978 p 3 Transl by Kanner (Leo) Associates, Redwood City, Calif
(Contract NASw-3199)
(NASA-TM-75394) Avail NTIS HC A02/MF A01 CSCL 06C

The newspaper article discusses the contribution of space *research to understanding the origin of life on Earth Part of* this basic research involves studying amino acids, ribonucleic acid and DNA molecules subjected to cosmic radiation The results from the Meduza experiment are not all analyzed as yet The article also discusses the psychological changes in cosmonauts as evidenced by their attitude towards biology experiments in space Author

N79-20715*# National Aeronautics and Space Administration, Washington, D C
PREBIOTIC COORDINATION CHEMISTRY. THE POTENTIAL ROLE OF TRANSITION-METAL COMPLEXES IN THE CHEMICAL EVOLUTION
Mihaly Beck Feb 1979 28 p refs Transl into ENGLISH from Kem Kozlem (Hungary) v 5, no 1-2, 1978 p 223-240 Transl by Kanner (Leo) Associates, Redwood City, Calif Original doc prep by Lajos Kossuth Univ
(Contract NASw-3199)
(NASA-TM-75381) Avail NTIS HC A03/MF A01 CSCL 06C

In approaching the extremely involved and complex problem of the origin of life consideration of the coordination chemistry appeared not only as a possibility but as a necessity The first model experiments appear to be promising because of prebiotic-type synthesis by means of transition-metal complexes It is especially significant that in some instances various types of vitally important substances (nucleic bases, amino acids) are formed simultaneously There is ground to hope that systematic studies in this field will clarify the role of transition-metal *complexes in the organizatorial phase of chemical evolution* It is obvious that researchers working in the fields of the chemistry of cyano and carbonyl complexes, and of the catalytic effect of transition-metal complexes are best suited to study these aspects of the attractive and interesting problem of the origin of life Author

N79-20716# Oregon State Univ., Corvallis Dept of Agricultural Chemistry
METABOLISM OF HYDRAZINE Annual Report, 17 Jan 1977 - 17 Jan 1978
F N Dost and D L Springer Wright-Patterson AFB, Ohio AMRL Sep 1978 22 p refs
(Contract F33615-77-C-0500, AF Proj 2312)
(AD-A062251, AMRL-TR-78-47) Avail NTIS HC A02/MF A01 CSCL 07/3

A closed, vacuum tight animal maintenance system has been devised that enables recovery of very small amounts of respiratory 15N over extended periods Animals with indwelling cannulas for injection and sampling are placed in a closed, circulating atmosphere of 75% SF6/25% O2 CO2 is removed in a soda lime trap, and O2 is added by a peristaltic pump controlled by a pressure sensitive switch At the time of collection the animal is euthanized and the atmosphere is circulated through a pyrogallol trap to remove most of the oxygen, then transferred by temperature gradient to a high vacuum system where SF6 if frozen out Preliminary studies of the disposition of intact hydrazine and its derivatives in rats are described Substantial amounts of a metabolite tentatively identified as diacetyl hydrazine were found in urine During continuous infusion of hydrazine, some animals maintained a constant blood hydrazine level, others were unregulated and experienced a continuous increase for the duration of infusion GRA

N79-20717# Oklahoma Univ Health Sciences Center, Oklahoma City
EFFECTS OF METHYLPREDNISOLONE SODIUM SUCCINATE ON CLEARANCE OF LIVINE E COLI FROM PERIPH-

ERAL BLOOD OF DOGS
Gary L White, Linda T Archer Ora F Elmore, and Learner B Hinshaw 28 Aug 1978 25 p refs
(Contract N00014-76-C-0229)
(AD-A062123, TR-131) Avail NTIS HC A02/MF A01 CSCL 06/5

Corticosteroids have been reported to potentiate infections, and yet recent clinical and experimental studies have documented their therapeutic effectiveness in both septic and endotoxin shock This study was designed to determine if methylprednisolone sodium succinate (MP) affects the clearance of live E coli organisms from peripheral blood of dogs The experimental group was pretreated with 30 mg/kg of MP while controls received equal volumes of saline Both control and MP pretreated dogs significantly reduced the number of E coli in peripheral blood by almost two orders of magnitude however there was no significant difference in clearance of E coli organisms between the two groups An initial leukopenia occured in both groups after E coli injections, however the subsequent development of leukocytosis in the MP group was significantly greater at -6 hours Rectal temperatures were higher in the MP group from -1 through -4 hours compared with the controls Hyperglycemia developed initially in both groups followed by a progressive hypoglycemia with survivors returning to near normal blood glucose concentrations Hemoconcentration occured in both groups with higher hematocrits being associated with mortality Results support the view that methylprednisolone sodium succinate does not affect the clearance of live E coli organisms Author (GRA)

N79-20718# Missouri Univ -Kansas City Dept of Biology
CITRIC ACID ENHANCEMENT OF COPPER SULFATE TOXICITY TO BLUE-GREEN ALGAE AND OTHER NUISANCE ORGANISMS
Michele S Stern Daniel H Stern, and Lisa L Ray 30 Nov 1978 95 p refs
(Contracts DI-14-34-0001-7053 DI-14-34-0001-7054)
(PB-289490/5, W79-01906, OWRT-A-099-MO(2)) Avail NTIS HC A05/MF A01 CSCL 06T

Copper toxicity tests were carried out using two species of blue-green algae Aphanizomenon flosaquae and Microcystis aeruginosa Copper concentrations of 300 micrograms/liter or higher inhibited the growth of Aphanizomenon The addition of 600 micrograms Cu(2+)/liter was the minmum copper concentration necessary to inhibit Microcystis growth over a 14-day experimental period Copper solubility and cupric ion toxicity were enhanced by the addition of citric acid A ratio of citric acid at eight times the weight of copper sulfate pentahydrate at a copper concentration of 500 micrograms/liter was inhibitory to Microcystis growth over a 14-day period The 8 1 mixture had the same effects as the addition of 600 micrograms Cu(2+)/liter GRA

N79-20719# Environmental Monitoring and Support Lab, Cincinnati Ohio
METHODS FOR MEASURING THE ACUTE TOXICITY OF EFFLUENTS TO AQUATIC ORGANISMS
William Peltier Jul 1978 62 p refs Revised
(PB-289605/8 EPA-600/4-78-012-REV) Avail NTIS HC A04/MF A01 CSCL 06T

The methods include a preliminary short-term (8-24 hr) range-finding (screening) test and a long-term (96 hr) flow through or alternate static, definitive test for use in determining the LC50 or EC50 of the waste Guidelines for effluent sampling and holding, facilities and equipment, dilution water, test species selection and handling, and data interpretation are reported GRA

N79-20720# Joint Publications Research Service, Arlington, Va
TRANSLATIONS ON USSR SCIENCE AND TECHNOLOGY BIOMEDICAL AND BEHAVIORAL SCIENCES, NO 50
18 Dec 1978 39 p refs Transl into ENGLISH from various Russian journals
(JPRS-72462) Copyright Avail NTIS HC A03/MF A01

Papers are presented on the following topics (1) agrotechnology - problems of bacterial contamination of the work zone in production of livestock products, (2) clinical medicine - the role of computers and mathematical models in the treatment of heart surgery patients (3) industrial microbiology - a complex feed additive and a proposed reorganization of nutrient yeast production, and (4) instruments and equipment - combined aspirator development for air sampling

N79-20721# Joint Publications Research Service, Arlington Va
THE ROLE OF COMPUTER TECHNOLOGY MATHEMATICAL MODELS IN TREATMENT OF PATIENTS FOLLOWING HEART SURGERY
V I Burakovskiy, V A Lishchuk, and I N Storozhenko *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci, No 50 (JPRS-72462) 18 Dec 1978 p 5-17 refs Transl into ENGLISH from Kardiologiya (Moscow), no 9, 1978 p 19-26

Copyright Avail NTIS HC A03/MF A01

Discussion is presented on computer monitoring, automated case histories, automated intensive care the role of automation in scientific research, and evaluation of patient status and choice of therapy by means of mathematical models A library of mathematical models and methods is presented for working with patients varying in scope of monitoring G Y

N79-20722# Joint Publications Research Service, Arlington, Va
NEW COMBINED ASPIRATOR FOR SAMPLING DEVELOPED
V V Tretyachenko and M Ya Nazar *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci, No 50 (JPRS-72462) 18 Dec 1978 p 23-26 Transl into ENGLISH from Gig Tr Prof Zabol (Moscow), no 9, 1978 p 55-57

Copyright Avail NTIS HC A03/MF A01

Having studied the most known methods of air sampling on a previous model an aspirator for air sampling operations on electric power and automobile engines was developed and introduced into practice The instrument was designed in such a way that it retains the same dimensions as the previous model but does not have parts mounted on the case The instrument weight increased by 100 grams A diagram of the combined aspirator is presented G Y

N79-20723 Lehigh Univ Bethlehem, Pa
MATHEMATICAL STUDIES OF OXYGEN TRANSPORT TO TISSUE Ph.D Thesis
Tseng-Chan Wang 1978 198 p
Avail Univ Microfilms Order No 7904323

A mathematical analysis of oxygen transport to tissue is presented A conceptual model is used that consists of a single capillary surrounded by a concentric cylinder of tissue Due to the nonlinearity of the relationship governing the dissociation of oxygen from hemoglobin, a nonlinear system of coupled equations results These equations describe the convection of oxygen by the flood in the capillary and its diffusion in the surrounding tissue An analysis of these equations for steady state conditions using the techniques of matched asymptotic expansions is presented The solutions obtained in this way are applicable when the mean capillary spacing is small compared to the capillary length A corresponding linear problem was solved exactly and the solution used to examine the accuracy of the perturbation solution Dissert Abstr

N79-20724# Massachusetts Inst of Tech, Cambridge Artificial Intelligence Lab
BANDPASS CHANNELS, ZERO-CROSSINGS, AND EARLY VISUAL INFORMATION PROCESSING
D Marr T Poggio and S Ullman Sep 1978 9 p refs
(Contract N00014-75-C-0643 Grant NSF MCS-77-07569)
(AD-A062338, AI-M-491) Avail NTIS HC A02/MF A01 CSCL 06/4

A recent advance by B F Logan in the theory of one octave bandpass signals may throw new light on spatial-frequency-tuned channels in early visual information processing Author (GRA)

N79-20725# Army Aeromedical Research Lab, Fort Rucker Ala

US ARMY AVIATION FATIGUE-RELATED ACCIDENTS, 1971-1977 Final Report

Gerald P Kruger and Yvonna F Jones Oct 1978 31 p refs (AD-A062486 USAARL-79-1) Avail NTIS HC A03/MF A01 CSCL 06/5

An accident data survey was made to determine how frequently aviator crew fatigue may have contributed to US Army aviation accidents from 1971 to 1977 All accident reports in the US Army Agency for Aviation Safety (USAAAVS) data base were reviewed Aviator fatigue was deemed to be a contributing factor in 42 rotary wing accidents which resulted in a total of 51 fatalities and 63 personnel injuries Fatigue contributed to 10 fixed wing accidents resulting in 3 fatalities and 5 injuries This paper categorizes these fatigue related accidents by aircraft and mission type and by time of day and day of week of the accident It also tabulates pilot activities prior to the accidents which promote the likelihood of pilot fatigue contributions The personnel and equipment costs of these accidents to the Army are estimated, and the relative importance of such accidents to the total US Army aviation accident picture is assessed

Author (GRA)

N79-20726# Mason (Virginia) Research Center, Seattle, Wash

HYPERBARIC DECOMPRESSION BY MEANS OF BUBBLE DETECTION Final Report

Kent H Smith and Lee Stayton 20 Apr 1978 146 p refs (Contract N00014-69-C-0402)

(AD-A062441) Avail NTIS HC A07/MF A01 CSCL 06/19

Present decompression procedures based on the Haldane concept, allow the maximum possible degree of supersaturation without producing decompression sickness in an attempt to provide the greatest rate of gas elimination and the shortest possible safe decompression The initially large supersaturation values experienced in a Haldane type decompression were shown to predispose bubble formation Using the Doppler detector implanted on the pulmonary artery or posterior vena cava in sheep and goats, we have demonstrated the presence of gaseous emboli in all Haldane model decompressions Emboli signals from implanted cuffs were clear with a high signal to noise ratio and were therefore adaptable for signal analysis and absolute quantitation with a gas emboli counter Gas emboli-free ascent procedures were developed using the ultrasonic detector and the emboli counter These gaseous emboli when detected in large numbers heralded the onset of decompression sickness Even in small numbers these emboli caused changes in platelet and fibrinogen survival times We conclude that the most probable cause of bubble formation in a Haldane type decompression is the initial ascent rate and that gas emboli are pathogenic and should be eliminated to provide a truly safe decompression

Author (GRA)

N79-20727# Syracuse Research Corp N Y

HEALTH EFFECTS ASSOCIATED WITH DIESEL EXHAUST EMISSIONS, LITERATURE REVIEW AND EVALUATION

Joseph Santodonato, Dipak Basu, and Philip Howard Nov 1978 165 p refs

(Contract EPA-68-02-2800)

(PB-289817/9 EPA-600/1-78-063) Avail NTIS HC A08/MF A01 CSCL 06T

Engineering tests have show a significant improvement in fuel economy in light duty vehicles equipped with diesel engines versus those equipped with gasoline engines Automobile manufacturers are considering a major program for conversion to diesel engines in the automobile fleet by 1985 Available studies show rather large differences in emissions from diesel engine exhausts as opposed to gasoline engine exhaust An assessment of the current state of knowledge regarding the health effects from diesel exhaust emissions and the identification of major research needs are important factors In order to accomplish this objective, the following information on diesel emissions was reviewed physical and chemical characteristics, biological effects in animals and man, epidemiologic studies, knowledge gaps, and research needs GRA

N79-20728# Office of Science and Technology Washington D C

A TECHNICAL REVIEW OF THE BIOLOGICAL EFFECTS OF NON-IONIZING RADIATION

15 May 1978 108 p refs

(PB-290166/8) Avail NTIS HC A06/MF A01 CSCL 06R

The report is a current statement designed to assist in the future development of a more formal long-term program is reported Radio-frequency radiation and electro-magnetic fields associated with high-voltage transmission are discussed GRA

N79-20729# Advisory Group for Aerospace Research and Development, Paris (France)

TECHNICAL EVALUATION REPORT ON THE AEROSPACE MEDICAL PANEL LONDON SPECIALISTS' MEETING, FALL 1977

Jan 1979 12 p ref Meeting held at London, 24-28 Oct 1977

(AGARD-AR-131 ISBN-92-835-1307-X) Avail NTIS HC A02/MF A01

Methods for early disease detection are required to assure optimum air crew selection criteria and to maintain air crew effectiveness in an increasingly stressful environment A universal approach to a basic framework for developing prospective medicine programs is far from being defined Yet, prospective medicine proves of value in risk identification and intervention Examination techniques for the assessment of cardiopulmonary diseases of flying personnel still shows deficiencies problems and the need for further research and development to help solve this important health problem

N79-20730# Air Force Medical Center Wright-Patterson AFB, Ohio

PROSPECTIVE MEDICINE OPPORTUNITIES IN AEROSPACE MEDICINE

J Triebwasser, ed *In* AGARD Tech Evaluation Rept on the Aerospace Med Panel London Specialists Meeting Jan 1979 p 1-3

Avail NTIS HC A02/MF A01

Various applications of prospective medicine techniques to the practice of aerospace medicine are discussed Studies were conducted in the special population of military aircrew on the prevalence/incidence of findings including multiple risk assessments, correlation of these with disease risks, and the results of efforts to modify the risk for disease and its clinical manifestations Major problem areas addressed include (1) the design and potential value of screening physical examinations and other health appraisal methods for the identification of aircrew members at risk for manifestations of disease having aeromedical significance, (2) methods for modifying risk with emphasis on disease prevention, and (3) definition of the significance of abnormal findings resulting from health appraisals conducted within an apparently healthy aircrew population A R H

N79-20731# School of Aerospace Medicine, Brooks AFB Tex Clinical Sciences Div

SPECIFIC FINDINGS IN CARDIOLOGY AND PULMONARY FUNCTION WITH SPECIAL EMPHASIS ON ASSESSMENT CRITERIA FOR FLYING

M C Lancaster, ed *In* AGARD Tech Evaluation Rept on the Aerospace Med Panel London Specialists' Meeting Jan 1979 p 5-7

Avail NTIS HC A02/MF A01

Normal values, natural history performance of testing methods, assessments of newer techniques for disease detection and definition and, philosophies of determination of flight fitness are discussed in relation to cardiopulmonary problems in flying personnel Research and development needs within the NATO countries are identified A R H

N79-20732# Joint Publications Research Service Arlington, Va

TRANSLATIONS ON USSR SCIENCE AND TECHNOLOGY

BIOMEDICAL AND BEHAVIORAL SCIENCES, NO 59. EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION

9 Mar 1979 56 p refs Transl into ENGLISH from various Russian Journals

(JPRS-72956) Copyright Avail NTIS HC A04/MF A01

The biological (physiological) effects of nonionizing electromagnetic radiation in the forms of magnetic fields, radio waves and microwaves on humans and animals are reported

N79-20733# Joint Publications Research Service Arlington Va

DECREASE IN THE FUNCTIONAL ABILITIES OF THE HEART AS A RESULT OF EXPOSURE OF AN ORGANISM TO AN ELECTROMAGNETIC FIELD OF INDUSTRIAL FREQUENCY

E V Prokhvatilo *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci, No 59 (JPRS-79256) 9 Mar 1979 p 1-4 refs Transl into ENGLISH from unknown source, contributed by the Kiev Scientific Research Inst

Avail NTIS HC A04/MF A01

Electromagnetic fields (EMP) of industrial frequency created by high voltage power transmission lines have assumed important significance for hygiene as physical factors in the environment which affect man This phenomenon is associated with the current rapid development of electromagnetics which requires continual raising of throughput capacity and increasing the range of power transmission lines The literature indicates an influence of an EMP of industrial frequency on the cardio-vascular system A study was undertaken to derive an indepth description of the character of cardiac activity changes resulting from exposure to low-intensity EMP of industrial frequency and the functional abilities of the heart during physical stress In the experiment the biological activity of the heart of rabbits was studied G Y

N79-20734# Joint Publications Research Service, Arlington, Va

BIOLOGICAL EFFECTS OF A MAGNETIC FIELD

V M Aristarkhov *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci, No 59 (JPRS-72956) 9 Mar 1979 p 5-8 refs Transl into ENGLISH from Izv Akad Nauk SSSR, Ser Biol (Moscow), no 1, 1979 p 122-123

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A critical analysis of certain theoretical approaches to an interpretation of the biological effects of a magnetic field (MF) are presented, adducing two hypotheses diffusion-oriented influence of the MF on the association of diamagnetoanisotropic molecules of biopolymers in solutions, and the kinetic influence of the MF on biochemical reactions participated in by free radicals The article corrects some misprints, inaccuracies in formulas, and an error that appeared in two articles with regard to calculations of the potential energy of deformation of the aromatic residue New approaches are presented for interpreting the possible diamagnetoanisotropic effect of the MF in specifically imbalanced, kinetic, and non-thermodynamic processes involving biopolymers G Y

N79-20735# Joint Publications Research Service, Arlington, Va

EFFECT OF RADIO WAVES OF A MILLIMETER FREQUENCY RANGE ON THE BODY OF MAN AND ANIMALS

N P Zalyubovskaya and R I Kiselev *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci, No 59 (JPRS-72956) 9 Mar 1979 p 9-15 refs Transl into ENGLISH from Gig Sanit (Moscow) no 8, 1978 p 35-39

Copyright Avail NTIS HC A04/MF A01

Observations were made of the state of health of 72 engineers and technicians (aged 20 to 50 years) servicing ultrahigh frequency generators of a millimeter frequency range for a period of 1 to 10 years Observations were for three years and during the winter months a periodic medical and biological examination was given each subject The workers complained of fatigue, drowsiness, headaches and loss of memory A more profound clarification of the effect of radio waves on the immunocompetent system and its specific function was the objective of another experiment on animals The experiment was conducted on 350 mice of the CBA line (250 irradiated and 100 control) Results showed that the irradiated animals leucocyte numbers in the peripheral blood decreased and the indices characterizing the nonspecific resistance of the body changed The animal experiment confirmed results of the worker experiment G Y

N79-20736# Joint Publications Research Service, Arlington, Va

IMMUNOLOGICAL EFFECTS OF MICROWAVE ACTION

M G Shandala and G I Vinogradov *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci, No 59 (JPRS-72956) 3 Sep 1979 p 16-21 refs Transl into ENGLISH from Gig Sanit (Moscow), no 10, 1978 p 34-38

Copyright Avail NTIS HC A04/MF A01

An attempt was made to reveal the reactions of the body's immune system in response to a low intensity SHF superhigh frequency electromagnetic field characterized by different power flux densities (PFD s)--50 10, 5, and 1 microns/sq cm The experimental conditions foresaw daily irradiation of guinea pigs for 30 days in specially outfitted chambers with a Luch-2 apparatus while systematically monitoring the PFD The immunological analyses were performed prior to irradiation, 2 and 4 weeks after it was begun, and 2, 4 and 8 weeks after termination of exposure In experiments on guinea pigs, the dynamics of the principal indicators of the body's nonspecific immunological reactivity (the phagocytic reaction of neutrophils in peripheral blood and the complement titer in blood serum) were studied G Y

N79-20737# Joint Publications Research Service, Arlington, Va

MAGNETIC FIELD EFFECT ON RADIAL PROCESSES IN BIOLOGICAL MEMBRANES

O G Kadnykov I I Zalyubovskyy V I Kobizskyy, and T I Vitovtova *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci, No 59 (JPRS-72956) 9 Mar 1979 p 22-27 refs Transl into ENGLISH from Dopov Akad Nauk Ukr RSR, Ser B (Kiev) no 10, Oct 1978 p 927-930

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The effect of magnetic fields on the consumption rate of oxygen in the autooxidation process of unsaturated fatty acids was studied using model membrane structures the liposomes The lipids were obtained from white matter of a bull s brain Results indicate that under the influence of a magnetic field changes may occur in the reaction kinetics of the free radical oxidation of lipids which may lead to macroscopical alterations in lipid components of the biomembrane A brief discussion on the study of magnetically sensitive processes involving enzymes in biomembranes is presented The magnetic sensitivity of the electron transfer reaction along the respiratory chain and of the related oxidative phosphorylation reactions were investigated The oxygen consumption of rat's liver mitochondria was determined G Y

N79-20738# Joint Publications Research Service Arlington Va

EFFECT OF DIFFERENT DOSES OF CENTIMETER-BAND ELECTROMAGNETIC OSCILLATIONS OF BIOCHEMILUMINESCENCE OF CENTRAL NERVOUS SYSTEM AND LIVER TISSUES

V R Faytelberg-Blank and A V Orlova *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci, No 59 (JPRS-72956) 9 Mar 1979 p 28-32 refs Transl into ENGLISH from Dopov Akad Nauk Ukr RSR, no 11, 1978 p 1035-1037

Avail NTIS HC A04/MF A01

The intensity of ultra-weak luminescence was investigated and how the tissues of the central nervous system and liver become enriched with products of peroxide oxidation of lipids

'under the effect of different doses of a superhigh-frequency electromagnetic field was determined Experiments were performed on 78 rats under conditions of acute experiment G Y

N79-20739# Joint Publications Research Service, Arlington, Va

EFFECT OF INFRA-LOW-FREQUENCY MAGNETIC FIELDS ON CELL DIVISION

A D Strazhizhovskiy G V Galaktionova, and P A Chermnykh *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci No 59 (JPRS-72956) 9 Mar 1979 p 33-39 refs Transl into ENGLISH from Izv Akad Nauk SSSR Ser Biol (Moscow) no 1 1979 p 124-127

Copyright Avail NTIS HC A04/MF A01

The effect of an IMF (infrared low-frequency magnetic field) with an intensity of 3-127 koer of one hour duration on the mitotic activity, frequency of chromosomal aberrations, and quantity of cells of the epithelium of a mouse cornea was studied It is shown that the resulting changes in the mitotic activity can be explained by reversible delay of cell division in the later stages of the mitotic cycle and their synchronic entry into mitosis after the delay is eliminated The nature of the relation of the effect to the intensity of the IMF testifies to the difference of its molecular mechanisms in the field of high and superhigh intensities G Y

N79-20740# Joint Publications Research Service Arlington Va

THE INFLUENCE OF SHF ELECTROMAGNETIC FIELDS ON THE SECRETORY FUNCTION OF THE STOMACH

N I Pospelov *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci , No 59 (JPRS-72956) 9 Mar 1979 p 40-45 refs Transl into ENGLISH from Izv Akad Nauk Kaz SSR (USSR), no 6, 1978 p 75-79

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Taking into account and influenced by the need for further investigation into the effect of superhigh frequency electromagnetic fields on the quantity and quality of excreted gastric juice in irradiation of the epigastric region, an experimental investigation was undertaken The observations were conducted in long-term experiments on 14 dogs with isolated stomachs The results of this experiment are presented and discussed G Y

N79-20741# Joint Publications Research Service, Arlington, Va

CHANGES IN CALCIUM ION ACTIVITY DUE TO MAGNETIZATION OF SOLUTION AS THE POSSIBLE MECHANISM OF BIOLOGICAL ACTION OF MAGNETIC FIELDS

A G Kartashev V A Kalyuzhin, R A Plyushch, and A V Vokhmintsev *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci , No 59 (JPRS-72956) 9 Mar 1979 p 46-50 refs Transl into ENGLISH from Electron Obrab Mater (USSR) no 6 1978 p 65-68

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A series of experiments was conducted on the effects of magnetized solutions of calcium chloride magnesium chloride and sodium chloride on the rate of fermentation of glucose by yeast function of myoneural preparations from the frog, and rate of fibrinolysis of rabbit blood plasma On the basis of magnetobiological investigations it is concluded that in theory any of the parameters of magnetic fields can be biologically significant In different series of tests, the magnetic field intensity was discretely changed in the range from 320 to 64,000 A/m at frequencies of 1 and 50 Hz with both vertical and horizontal orientation of force lines the degree of heterogeneity was varied from 20 to 50% G Y

N79-20742# Minnesota Univ Minneapolis Dept of Psychology

A CONSTRUCT VALIDATION OF ADAPTIVE ACHIEVEMENT TESTING

Isaac I Bejar and David J Weiss Nov 1978 38 p refs (Contract N00014-76-C-0627 RR0420401)
(AD-A063148 RR-78-4) Avail NTIS HC A03/MF A01 CSCL 05/10

The construct validities of conventional paper-and-pencil and adaptive achievement tests were compared using data from two independent groups of 269 and 230 college students Two adaptive achievement tests were computer administered to each group using the stradaptive testing strategy each group also completed two conventional classroom paper-and-pencil achievement tests All achievement tests were drawn from the same pool of achievement test items on which item characteristic curve (ICC) parameters had been determined Students were also administered two stradaptive vocabulary tests All tests were scored by maximum likelihood estimation using the three-parameter logistic model A nomological net was specified describing the relationships of the achievement tests to the achievement constructs and their relationships with the vocabulary construct and the vocabulary tests The parameters of the net were estimated by fitting the observed intercorrelations among the test scores to the nomological net using the methodology of linear structural equations Maximum likelihood estimates of the parameters of the nomological net indicated essentially equal validities for the classroom and adaptive tests in four comparisons The results of this study indicate that computer-administered adaptive tests can provide more valid measurement of achievement than conventional paper-and-pencil tests GRA

N79-20743# Air Force Human Resources Lab Brooks AFB, Tex

AIR-TO-AIR COMBAT SKILLS CONTRIBUTION OF PLATFORM MOTION TO INERTIAL TRAINING Final Report, Jan - May 1977

Lawrence D Pohlmann and John C Reed Oct 1978 25 p refs
(AF Proj 1123)
(AD-A062738, AFHRL-TR-78-53) Avail NTIS HC A02/MF A01 CSCL 15/3

This study was conducted to assess the contribution of six-degrees-of-freedom platform motion to the training effectiveness of the Simulator for Air-to-Air Combat(SAAC) for training initial air-to-air combat skills A transfer-of-training scheme was used Two classes of Air Force pilots receiving initial training in the F-4 aircraft were divided into three groups Two of the groups (eight pilots each) received training in Basic Fighter Maneuvers(BFM) using the SAAC, one group using platform motion and the other group not using platform motion The remaining group (six pilots) did not receive SAAC training All three groups followed the same syllabus in the aircraft Instructor pilot ratings of student performance on BFM tasks in the simulator and in four aircraft sorties for each student were collected Analyses of Variance (ANOVAs) of ratings in the simulator were used to assess initial differences and learning effects in the simulator ANOVAs of ratings in the aircraft were used to assess transfer of training effects Although learning effects in both simulator and aircraft were noted, the data did not show a transfer of training effect For the tasks investigated SAAC trained students did not perform better than those who did not receive SAAC training Performance differences between the Motion and No-Motion groups were negligible Potential reasons for this non-effectiveness and possible simulator and training program modifications for improving this training effectiveness are discussed Author (GRA)

N79-20744# Naval Aerospace Medical Research Lab , Pensacola, Fla

THE RELATIONSHIP BETWEEN AIR COMBAT MANEUVERING RANGE (ACMR) OUTPUT MEASURES AND INITIAL VISUAL ACQUISITION PERFORMANCE

Charles W Hutchins Jr Aug 1978 20 p ref
(ZF51524004)
(AD-A062134, NAMRL-SR-79-1) Avail NTIS HC A02/MF A01 CSCL 17/8

Initial visual acquisition of the adversary aircraft is a critically important task in air combat engagements In order to assess capabilities for the performance of this task it is necessary to identify the physical/flight variables which impact this perform-

ance Measures of 33 flight variables were recorded at the time of initial visual acquisition Linear regression analysis was utilized to determine the relationship of each variable to acquistion range Factor analysis revealed a clustering of the variables into four major factors relative direction, target velocity fighter velocity and relative altitude A multiple regression analysis was conducted, using these factors to predict acquistion range
Author (GRA)

N79-20745*# National Aeronautics and Space Administration, Washington, D C
SALYUT-6--SOYUZ-29 OUR COMMENTARY, THE CREW AND THE STATION
V Kravets Mar 1979 6 p Transl into ENGLISH from Pravda (USSR), No 199 18 Jul 1978 p 3 Transl by Kanner (Leo) Associates, Redwood City Calif
(Contract NASw-3199)
(NASA-TM-75393) Avail NTIS HC A02/MF A01 CSCL 05I

A newspaper article written by an assistant flight director which stresses the importance of cosmonaut training is presented The preliminary stage of training is discussed and the training of a crewmaker on a real spacecraft is briefly covered The success in training foreign cosmonauts by Soviets is also discussed The author feels that training is even more important today than it was seven or eight years ago because of the increased complexity of the experiments and the length of time a cosmonaut spends in space now
G Y

N79-20746*# National Aeronautics and Space Administration Pasadena Office Calif
TERMINAL GUIDANCE SENSOR SYSTEM Patent Application
Antal K Bejczy, inventor (to NASA) (JPL) Filed 23 Mar 1979 20 p,
(Contract NAS7-100)
(NASA-Case-NPO-14521-1, US-Patent-Appl-SN-023439) Avail NTIS HC A02/MF A01 CSCL 05H

A system is described for guiding a claw to the proper distance and into the proper orientation in yaw and pitch, to engage a grappling fixture The system includes four proximity sensors on the claw, that are arranged at the corners of an imaginary square which sense the distance to the top surface of the grappling fixture If a pair of sensors at opposite corners of the square sense a different distance to the top surface of the grappling fixture, then it is known that the claw is rotated about a corresponding axis with respect to the plane of the grappling fixture
NASA

N79-20747# Cincinnati Univ Ohio Dept of Engineering Science
MULTIBODY DYNAMICS INCLUDING TRANSLATION BETWEEN THE BODIES, WITH APPLICATION TO HEAD-NECK SYSTEMS Technical Report, 1 Oct 1976 - 30 Sep 1978
Ronald L Huston and Chris E Passarello 15 Sep 1978 64 p refs
(Contract N00014-76-C-0139)
(AD-A062114, UC-ES-091578-7-ONR) Avail NTIS HC A04/MF A01 CSCL 20/11

This report presents new and recently developed concepts which are useful for obtaining and solving equations of motion of multibody mechanical systems with translation between the respective bodies of the system These concepts are then applied in the study of human/neck systems in high acceleration configurations The developed concepts include the use of Euler parameters, Lagrange's form of d Alembert s principle, quasi-coordinates relative coordinates and body connection arrays This leads to the development of efficient computer algorithms for the coefficients of the equations of motion The developed procedures are applicable to chain-link' systems such as finite-segment cable models, mechanisms, manipulators, robots, and human body models The application with human head/neck models consists of a 54 degree of freedom three-dimensional system representing the head the vertebrae, and the connecting discs, muscles and ligaments The computer results for the system in a high acceleration configuration agree very closely with available experimental data
Author (GRA)

N79-20748# School of Aerospace Medicine, Brooks AFB, Tex
FIGHTER INDEX OF THERMAL STRESS RELATION TO WEATHER CONDITIONS AT ATC AND TAC BASES Interim Report, Sep 1977 - Sep 1978
Sarah A Nunneley and Richard F Stribley Nov 1978 26 p refs
(AF Proj 7930)
(AD-A062713 SAM-TR-78-33) Avail NTIS HC A03/MF A01 CSCL 06/19

The Fighter Index of Thermal Stress (FITS) is a tool recently developed for minimizing hazardous aircrew heat stress during hot-weather operations The FITS table, entered with ground dry bulb temperature (Tdb) and dewpoint temperature (Tdp), yields a numerical estimate of cockpit heat stress Superimposed on the table are Normal, Caution and Danger Zones with footnotes recommending appropriate precautions This report examines the relationship of FITS to typical weather conditions at 30 ATC and TAC bases in the continental United States An appendix presents a graph for each base indicating the frequency of readings in the Caution and Danger Zones for each hour of the day and month of the year
GRA

N79-20749# Hughes Aircraft Co Culver City Calif Display Systems Lab
BINOCULAR HOLOGRAPHIC HELMET MOUNTED DISPLAY Final Technical Report, Oct 1977 - Sep 1978
R E Heineman L W Bradford, and R A Lohmann Dec 1978 67 p
(Contract N62269-77-C-0504)
(AD-A062761, HAC-P78-538, HAC-REF-E1639
NADC-77228-30) Avail NTIS HC A04/MF A01 CSCL 20/6

This report describes the application of diffraction optics to the design of a helmet mounted display which permits binocular viewing of a dual fiber optics image source
Author (GRA)

N79-21740 Missouri Univ - Columbia
THE GROWTH KINETICS OF FRESHWATER ALGAE Ph D Thesis
David Edward Brune 1978 154 p
Avail Univ Microfilms Order No 7906850

The batch and chemostat methods were compared as the means of quantifying the carbon limited growth response of Scenedesmus quadricauda and Anabaena flos aquae It was found that the batch method was the more practical means of obtaining such data This method was used to obtain the carbon limited growth response of Scenedesmus quadricauda Chorella sp Anabaena flos aquae Selenastrum capricoriutum Microcoelus vaginatus and Oscillatoria sp at five different temperatures and four different light levels It was found that the growth response of these algae could be described reasonably well as a Monod fit of the specific growth rate vs the carbon dioxide concentration These data were used to demonstrate the importance of temperature light and carbon dioxide concentration in affecting algal species competition Mixed cultures of Anabaena flos aquae Chlorella sp and Scenedesmus quadricauda were grown and it was observed that interaction in mixed culture may in some cases, modify the growth response of these algae Dissert Abstr

N79-21741*# National Aeronautics and Space Administration Ames Research Center Moffett Field Calif
COMPUTER PROGRAM FOR CALCULATION OF OXYGEN UPTAKE
B L Castle G Castle and J E Greenleaf Apr 1979 13 p refs
(NASA-TM-78585, A-7890) Avail NTIS HC A02/MF A01 CSCL 06P

A description and operational precedures are presented for a computer program written in Super Basic, that calculates oxygen uptake carbon dioxide production and related ventilation parameters Program features include (1) the option of entering slope and intercept values of calibration curves for the O2 and CO2 and analyzers, (2) calculation of expired water vapor pressure, and (3) the option of entering inspured O2 and CO2 concentrations

The program is easily adaptable for programmable laboratory calculators Author

N79-21742*# Florida Inst of Tech Melbourne School of Science and Engineering
PHOTOSYNTHETHIC CARBON REDUCTION BY SEAGRASSES EXPOSED TO ULTRAVIOLET B RADIATION Final Technical Report
15 Mar 1979 45 p refs
(Contract NAS9-15516)
(NASA-CR-160144) Avail NTIS HC A03/MF A01 CSCL 06C

The species of seagrasses were selected on the basis of their dominance in the marine system, contribution to total productivity, and importance to the life histories of organisms in the Indian River lagoon system along the central Florida east coast The three seagrasses were Halophilia engelmannii, Halodule wrightii and Syringodium filiforme These seagrasses form an excellent experimental system as their areas of dominance fall more or less along a natural gradient of UV-B and photosynthetically active radiation (PAR) penetration The sensitivity of photosynthesis in the seagrasses was determined and their photosynthetic response to levels of UV-B simulating atmospheric ozone depletion was monitored Further experiments explore the possible attenuation or repair of UV-B induced photosynthetic inhibition by PAR the role of epiphytic growth upon seagrasses as a protective UV-B shield and the inhibition of photosynthesis in response to UV-A is studied G Y

N79-21743*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville, Ala
A METHOD FOR SEPARATING BIOLOGICAL CELLS Patent Application
D E Brooks, inventor (to NASA) 6 Mar 1979 11 p
(NASA-Case-MFS-23883-1 US-Patent-Appl-SN-017888) Avail NTIS HC A02/MF A01 CSCL 06C

A method for separating biological cells by suspending a mixed cell population in a body of aqueous polymer is described The system consists of phases for which these cells exhibit an affinity including at least one droplet phase with a surface potential and one droplet phase characterized by another surface potential The system is subjected to an electrostatic field established between a pair of electrodes with the field being of sufficient intensity for causing some of the droplets to migrate toward one of the electrodes with an attendant separation of the cells NASA

N79-21744*# National Aeronautics and Space Administration Washington, D C
MICROANALYTICAL IDENTIFICATION OF BARIUM SULPHATE CRYSTALS IN STATOLITHS OF CHARA RHIZOIDS
Klaus Schroeter, Andre Lauchli and Andreas Sievers Apr 1979 19 p refs Transl into ENGLISH from Planta (Berlin) Vol 122 1975 p 213-225 Transl by Kanner (Leo) Associates, Redwood City, Calif Original doc prep by the Botanical Inst of the Bonn Univ West Germany
(Contract NASw-3199)
(NASA-TM-75611) Avail NTIS HC A02/MF A01 CSCL 06C

In contrast to higher plants Chara rhizoids contain statolith vacuoles filled with biocrystallites of BaSO4 in the form of rods composed of globular subunits ca 7 nm in diameter The revelation of the crystallites under electron microscopy is dependent on the fixative best structural preservation was observed after fixation in a buffered glutaraldehyde + acrolein solution OsO4 and KMnO4 partially dissolved both the biocrystallites and synthetic BaSO4 Author

N79-21745# Joint Publications Research Service Arlington, Va
TRANSLATIONS ON USSR SCIENCE AND TECHNOLOGY BIOMEDICAL AND BEHAVIORAL SCIENCES, NO 60
2 Apr 1979 60 p refs Transl into ENGLISH from various Russian journals
(JPRS-73135) Copyright Avail NTIS HC A04/MF A01

Research is reported on liquid crystal development for medicine, the training effect of recognition of different alphabets of visual stimuli strontium-90 as a factor in environmental pollution The proceedings of the Orenbury symposium on mycotoxins are reviewed

N79-21746# Joint Publications Research Service Arlington, Va
LIQUID CRYSTAL DEVELOPMENTS FOR MEDICINE
A Savvov *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci No 60 (JPRS-73135) 2 Apr 1979 p 1-2 Transl into ENGLISH from Sots Industr (Moscow), no 38, 14 Feb 1979 p 6

Avail NTIS HC A04/MF A01

The use of polyethylene discs coated with liquid crystals of cholesterol esters to determine temperature changes of the skin is discussed F O S

N79-21747# Joint Publications Research Service Arlington Va
TRAINING EFFECT OF RECOGNITION OF DIFFERENT ALPHABETS OF VISUAL STIMULI
N V Turkina *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci No 60 (JPRS-73135) 2 Apr 1979 p 3-12 refs Transl into ENGLISH from Tekhn Estet ika (Moscow), no 1, 1979 p 12-15

Copyright Avail NTIS HC A04/MF A01

The influence of training on the temporal characteristics of identification of stimuli was studied by determining the time necessary for visual identification and the latent periods for oral responses Symbols, letters and positioning were used F O S

N79-21749# Joint Publications Research Service Arlington Va
ORENBURG SYMPOSIUM ON MYCOTOXINS
V I Bilay and L Ye Olifson *In its* Transl on USSR Sci and Technol Biomed and Behavioral Sci , No 60 (JPRS-73135) 2 Apr 1979 p 43-52 Transl into ENGLISH from Izv Akad Nauk SSSR Ser Biol (Moscow) no 1 1979 p 150-155 Symp held in Orenburg USSR 28-30 Sep 1977

Avail NTIS HC A04/MF A01

Research papers presented at the conference on problems of mycotoxicology are reviewed Topics discussed include present state of the growth of toxic forming fungi aspects of the mechanisms of effects of several mycotoxins, epidemiology and pathogenesis of mycotoxins characterization of the pathogenesis of animal mycotoxins, and toxins and their effects produced by specific fungi F O S

N79-21750* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston Tex
METABOLIC RATE METER AND METHOD Patent
Thomas Ivan Taylor (Isomet Corp Palisades Park N J) and Irving Warren Ruderman inventors (to NASA) Issued 13 Aug 1968 3 p Filed 2 Jul 1963 Sponsored by NASA
(NASA-Case-MSC-12239-1 US-Patent-3 396,719, US-Patent-Appl-SN-292340 US-Patent-Class-128 2 07) Avail US Patent and Trademark Office CSCL 06B

A method is described for measuring the dynamic metabolic rate of a human or animal The ratio of the exhaled carbon dioxide to a known amount of C(13)O2 introduced into the exhalation is determined by mass spectrometry This provides an instantaneous measurement of the carbon dioxide generated F O S

N79-21752 Pennsylvania State Univ , University Park
A COMPARISON OF SWEATING RESPONSES IN MEN AND WOMEN BEFORE AND AFTER ACCLIMATION TO HUMID HEAT Ph D Thesis
Barbara Ann Avellini 1978 140 p
Avail Univ Microfilms Order No 7909039

Four men and four women with comparable maximal aerobic capacities and equal surface areas and surface area to mass ratios underwent a three-hour stress test before and after a ten-day acclimation to humid heat Women were tested in both the pre- and post-ovulatory phases of the menstrual cycle (pre-OV, post-OV) Prior to acclimation the pre-OV women exhibited the longest tolerance times and lowest rectal temperatures and heart rates (HR) over the duration of the test Men secreted considerably more sweat per unit area than did the women in either phase of the cycle yet they demonstrated shorter tolerance times and higher body temperatures and HR During post-OV, women reacted similarly to the men, although their sweat rates were significantly less Following acclimation, the rectal temperature and HR of the three groups were similar while the discrepancy between the sweat rates of the men and women was magnified

Dissert Abstr

N79-21753 Duke Univ , Durham, N C
MULTI-CHANNEL STIMULATION OF PERIPHERAL NERVE TRUNKS Ph D Thesis
Cedric Frank Walker 1978 246 p
Avail Univ Microfilms Order No 7906996

First, using experimental animals an investigation of the extracellular potentials and muscular activities elicited by constant current stimulation applied to multiple points on a peripheral nerve trunk (the sciatic) was undertaken Second an investigation of the limitations of single channel stimulation was made using a human volunteer who had an implanted median nerve stimulator for sensory feedback purposes A full battery of psychophysical evaluations of perceived sensations was performed The third and final portion of this study involved the mapping of human peripheral nerves during surgical procedures Stimulation was applied radially to 12 points around the median or sciatic nerve, and the loci of the derived perceptions or motor responses were plotted as a function of the radial location of the applied stimulus to the nerve Dissert Abstr

N79-21754 Pennsylvania State Univ , University Park
X-RAY BACKSCATTER IMAGING Ph D Thesis
Bruce C Towe 1978 120 p
Avail Univ Microfilms Order No 7909141

A three-dimensional X-ray imaging technique is proposed Radiographs are produced by using the X-ray flux backscattered by an object under inspection Tomographic slices of the object can be produced in image planes perpendicular to the beam incidence The imaging technique produces radiographic backprojections of the internal features of an object from a frontal perspective Practical penetration depths of up to 5cm of tissue equivalent materials, and 1/2 inch aluminum, at 1mm resolution are demonstrated with 100 KVP X-ray energies Dissert Abstr

N79-21755 Pennsylvania Univ Philadelphia
METAL BIOELECTRODE POLARIZATION A FREQUENCY AND TIME DOMAIN ANALYSIS Ph D Thesis
Banu Onaral 1978 334 p
Avail Univ Microfilms Order No 7908777

Time and frequency dependent properties of bioelectrodes (Platinum and Elgiloy) are studied in the linear and nonlinear range with the ultimate aim of developing operational rules for the design and evaluation of stimulation electrodes The work described includes (1) phenomenological analysis of the electrode-electrolyte interface with emphasis on the limits of linear behavior using small-signal techniques in frequency and time domains, (2) electrode polarization impedance measurements covering seven decades of frequency starting at 1 mHz, (3) electrode overpotential measurements evoked by current and voltage steps over six decades of time duration (4) development of rules which define the onset of nonlinearity in both frequency and time domains and (5) discussion of the implications of metal electrode polarization research on biomedical (mainly stimulation) applications Dissert Abstr

N79-21756 Missouri Univ Columbia
A SYSTEMATIC APPROACH TO COMPUTER ANALYSIS OF PULMONARY VASCULAR PATTERNS Ph D Thesis
George Edward Moore 1978 273 p
Avail Univ Microfilms Order No 7906948

The qualitative/quantitative information which can be used in a computer analysis of pulmonary vascular patterns is described A method of assessing the quantity of blood flowing in the pulmonary circulatory system from the radiographic image is studied Areas investigated to determine the use of computer analysis of pulmonary vascular patterns include (1) radiographic image segments particularly of the lung to determine if there exists a region of maximum information (2) radiological findings in diagnosis of pulmonary vasculature (3) the correlation between cardiac catheterization data and radiological findings in diagnosis of pulmonary vasculature and (4) integration of the computer into the analysis of textural patterns on a statistical level

M M M

N79-21757 Florida Univ , Gainesville
THE DESIGN AND CONSTRUCTION OF A MINIATURE DOSIMETER FOR THE STUDY OF THE EFFECTS OF AIR CAVITIES IN RADIATION THERAPY Ph D Thesis
Marlene Hope Patricia McKetty 1978 140 p
Avail Univ Microfilms Order No 7907774

A miniature dosimeter utilizing silicon p-i-n chips was designed for performing in vivo measurements in radiation therapy The dosimeter which is less than 2 mm in diameter, can be inserted into patients and phantoms for rapid measurements An important advantage of this type of dosimeter over thermoluminescent dosimeters and miniature ionization chambers is the instant readout and the elimination of a waiting period between measurements Dissert Abstr

N79-21758 Bowling Green State Univ , Ohio
EFFECTS OF FILTERING ELECTROENCEPHALIC SIGNALS ON AUDITORY EVOKED BRAIN STEM RESPONSES Ph D Thesis
Dianne Jorgi Mecklenburg 1978 91 p
Avail Univ Microfilms Order No 7907989

The effects of filtering on the brain stem auditory evoked response were investigated Five filtering conditions in which the low-frequency cutoff was held constant and five conditions in which the high-frequency cutoff was held constant were used Fourteen subjects were tested using click stimuli Thirteen peak points including both positive and negative peaks were measured for amplitude and latency Analyses of variance were computed for the measurements of latency and amplitude and revealed that significant differences existed among the filtering conditions The specific findings are given Dissert Abstr

N79-21759# Office of Radiation Programs Washington, D C
RADIATION PROTECTION ACTIVITIES, 1977 Annual Report
Aug 1978 142 p refs
(PB-290215/3, EPA-520/4-78-003) Avail NTIS HC A07/MF A01 CSCL 06R

The activities of several Federal agencies involved in controlling medical X-ray exposures managing nuclear power plant effluents protecting workers exposed to radiation and monitoring fallout are surveyed as well as some of the less obvious activities The division of responsibilities within the Federal government is defined and some relevant congressional and judicial actions are summarized A list of pertinent 1977 Federal publications is provided GRA

N79-21760# National Technical Information Service, Springfield Va
BIOLOGICAL EFFECTS OF LASER RADIATION, VOLUME 1 A BIBLIOGRAPHY WITH ABSTRACTS Progress Report
Pernell W Crockett Feb 1979 247 p
(NTIS/PS-79/0019/4) Avail NTIS HC $28 00/MF $28 00 CSCL 06R

The bibliography cites reports on radiation injuries, permissible dosage protective devices, and safety measures Included are references on the pathology of eye lesions caused by lasers This updated bibliography contains 242 abstracts none of which are new entries to the previous edition GRA

N79-21761# National Technical Information Service, Springfield, Va

BIOLOGICAL EFFECTS OF LASER RADIATION, VOLUME 2 A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Jan. 1978

Elizabeth A Harrison Feb 1979 28 p Supersedes NTIS/PS-78/0036, NTIS/PS-77/0028 NTIS/PS-75/893, NTIS/PS-75/011 (NTIS/PS-79/0020/2 NTIS/PS-78/0036 NTIS/PS-77/0028 NTIS/PS-75/893 NTIS/PS-75/011) Avail NTIS HC $28 00/MF $28 00 CSCL 06R

The bibliography cites reports on radiation injuries permissible dosage, protective devices and safety measures Included are references on the pathology of eye lesions caused by lasers GRA

N79-21762# National Technical Information Service, Springfield Va

EFFECTS OF FATIGUE ON HUMAN BEHAVIOR AND PERFORMANCE A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Feb 1979

Mary E Young Mar 1979 194 p Supersedes NTIS/PS-77/0064 NTIS/PS-76/0095, NTIS/PS-75/161 (NTIS/PS-79/0071/5 NTIS/PS-78/0126, NTIS/PS-77/0064, NTIS/PS-76/0095 NTIS/PS-75/161) Avail NTIS HC $28 00/MF $28 00 CSCL 06S

References on the psychological and physiological effects of mental and physical fatigue are cited Reports on circadian rhythm work - rest schedules sleep deprivation and physical endurance are included GRA

N79-21763# Professional Staff Association of the Rancho Los Amigos Hospital, Inc Downey, Calif

EFFECTS OF OXIDES ON NITROGEN, CARBON MONOXIDE AND PHOTOCHEMICAL OXIDANTS ON THE ECG DURING EXERCISE AND ON CARDIOPULMONARY FUNCTION Final Report

William S Linn and Jack D Hackney 31 May 1978 50 p refs Sponsored by Coordinating Res Council Inc (PB-291595/7, CRC-APRAC-CAPM-21-74-2) Avail NTIS HC A03/MF A01 CSCL 06T

The effect on arterial blood oxygenation of exposure to 0 2 ppm ozone in purified air for two hours with intermittent light exercise and heat stress was assessed Twelve healthy volunteer subjects had blood gases measured before and during exposure through the use of an in-dwelling cannula in the brachial artery Six of these and six others underwent separate studies in which blood-gas measurements were made on arterialized blood collected from the earlobe after application of a vasodilating agent No evidence for an adverse effect of ozone on arterial oxygenation was found These results fail to confirm a previous report that exposure to 0 1 ppm ozone significantly disturbed arterial oxygenation GRA

N79-21764 Air Force Inst of Tech Wright-Patterson AFB, Ohio

ESTIMATION OF AIRCRAFT TARGET MOTION USING PATTERN RECOGNITION ORIENTATION MEASUREMENTS Ph D Thesis

Jerry Donald Kendrick 1978 205 p

Avail Univ Microfilms Order No 7908881

A new approach to estimating motion of a highly maneuvering aircraft target in an air-to-air tracking scenario is presented An interactive filter system is developed which provides an improved estimate of target motion states by conditioning kinematic filter estimates upon target aspect angle data Pattern recognition techniques used with an electro-optical tracker are presumed to provide this target aspect information A target orientation filter processes the aspect angle measurements by statistically weighting measured aspect angles with the current best estimate of target kinematics The aerodynamic lift equation is used to relate approximate angle of attack to target velocity and acceleration A novel statistical model for aircraft target normal acceleration is also developed to better represent unknown target accelerations Simulation results of realistic three-dimensional scenarios are presented to evaluate the performance of the interactive filter system Dissert Abstr

N79-21765* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

PROTECTIVE GARMENT VENTILATION SYSTEM Patent

Ronald Lang, inventor (to NASA) (United Aircraft Corp E Hartford Conn) Issued 6 Jan 1970 8 p Filed 6 Oct 1966 Sponsored by NASA

(NASA-Case-XMS-04928-1, US-Patent-3,487,765, US-Patent-Appl-SN-584914 US-Patent-Class-98-1) Avail US Patent and Trademark Office CSCL 06B

A method of and apparatus for ventilating a protective garment wherein the direction of flow of a ventilating and purging gas within portions of the garment may be reversed in order to compensate for changes in environment and activity of the wearer, is presented The method and apparatus also contemplates the establishment of a condition wherein the entire flow of ventilating gas is first directed to a helmet associated with the garment

Official Gazette of the U S Patent and Trademark Office

N79-21766* National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala

EMERGENCY SPACE-SUIT HELMET Patent

Harvey A Smith inventor (to NASA) (United Aircraft Corp , E Hartford Conn) Issued 2 Jun 1970 4 p Filed 24 Feb 1966 Sponsored by NASA

(NASA-Case-XMS-04673-1, US-Patent-3 514 785 US-Patent-Appl-SN-529884 US-Patent-Class-2-2 1) Avail US Patent and Trademark Office CSCL 06B

A collapsible automatically extensible emergency space helmet is described The unit when deflated is carried on the back of the wearer attached to the suit, so as not to interfere with normal activities When inflated the head of the wearer is completely incapsulated F O S

N79-21767 Air Force Inst of Tech , Wright-Patterson AFB, Ohio

AN ADAPTIVE CONTROLLER WHICH DISPLAYS HUMAN OPERATOR LIMITATIONS FOR A FIGHTER TYPE AIRCRAFT Ph D Thesis

Eric Kent Lindberg 1978 301 p

Avail Univ Microfilms Order No 7908879

A general adaptive controller which displays human operation limitations is developed for a fighter type aircraft flying a dynamic trajectory by using the total airframe-control system perturbation equations The adaptive controller is implemented using a forced separation controller with limitations The mathematical outcome is an adaptive forced separation controller which is flexible enough that it can be implemented on any aircraft control problem as long as the trajectory can be specified The stability of the closed loop system employing such a controller is demonstrated on an example using the longitudinal axis of a fighter type aircraft Analysis and synthesis techniques for the time varying aircraft model dynamics are demonstrated The outcome is the evolution of a method for analyzing total aircraft/controller response to perturbations on a general trajectory Dissert Abstr

N79-21768*# National Aeronautics and Space Administration, Washington D C

UTILIZATION OF THE WASTES OF VITAL ACTIVITY

B G Gusarov Yu A Drigo, V M Novikov N M Samsonov N S Farafonov S V Chizhov, and V I Yazdovskiy Feb 1979 49 p refs Transl into ENGLISH from the book Problemy Sozdaniya Zamkhutykh Ekologicheskikh Sistem" Moscow Nauka Press, 1967 p 141-170 Transl by Kanner (Leo) Associates Redwood City, Calif

(Contract NASw-3199)

(NASA-TM-75410) Avail NTIS HC A03/MF A01 CSCL 06K

The recycling of wastes from the biological complex for use in life-support systems is discussed Topics include laboratory equipment heat treatment of waste materials mineralization of waste products methods for production of ammonium hydroxide and nitric acid, the extraction of sodium chloride from mineralized products and the recovery of nutrient substances for plants from urine Author

N79-21769*# Rice Univ , Houston Tex Dept of Chemical Engineering

TRACE CONTAMINANT STUDIES OF HSC ADSORBENT M S Thesis
Dennis Tzyy-nian Yieh Dec 1978 78 p refs
(Contract NAS9-11827)
(NASA-CR-160148) Avail NTIS HC A05/MF A01 CSCL 06K

The adsorption and desorption of fifteen trace contaminants on HSC (polyethylenimine coated acrylic ester) adsorbent were experimentally investigated with the following two objectives to test the removal potential and the adsorption reversibility of the selected trace contaminants, and to test the effect a preadsorbed trace contaminant has on the CO2 adsorption capacity The experimental method for acquiring the adsorption equilibrium data used is based on the volumetric (or displacement) concept of vacuum adsorption From the experimental results it was found that the HSC adsorbent has good adsorption potential for contaminants of alcohol compounds, esters and benzene compounds whereas adsorption of ketone compounds oxidizing and reducing agents are detrimental to the adsorbent In addition all liquid contaminants reduce the CO2 capacity of HSC adsorbent F O S

N79-21770# Naval Postgraduate School Monterey Calif
A PRELIMINARY INVESTIGATION OF AURAL INPUT/OUTPUT SYSTEMS FOR IN-FLIGHT INFORMATION RETRIEVAL M S Thesis
Albert George Mertz Sep 1978 164 p refs
(AD-A063174) Avail NTIS HC A08/MF A01 CSCL 17/2

An analysis of two commercially available Speech Understanding Systems (SUS) was conducted Each system was tested against various background noise conditions Results obtained were compared with current criteria for SUS application in aircraft Additionally, since the P-3 Orion aircraft is being considered as a SUS test aircraft, a survey of Fleet P-3 pilots was conducted Their opinion was sought on what a SUS equipped microprocessor should be capable of accomplishing as an aid to the flight crew Author (GRA)

N79-21771# Army Cold Regions Test Center, Fort Greely Ark
MAN AND MATERIEL IN THE COLD REGIONS, PART 1
Jun 1978 69 p refs
(AD-A063752) Avail NTIS HC A04/MF A01 CSCL 15/7

In 25 years of testing all classes of military materiel under the operational conditions of cold regions the U S Army Cold Regions Test Center has amassed a unique store of experience This brochure has been prepared to summarize portions of this experience and to present attendant requirements and doctrine needed for successful military operations in cold regions Later sections of this text will develop in detail the conditions that are unique to this theater of operation It is, however important at the start to define what is meant by cold regions, i e , the physical and geographic parameters An example of a principal physical parameter is, of course ambient air temperature The unique manifestations of precipitation land surface vegetation etc , that are also of critical importance are largely derivative from the prevailing temperature GRA

N79-21772# Army Communications Research and Development Command Fort Monmouth, N J
MODELING AND ANALYSIS OF MAN-MACHINE INTERFACE INFORMATION Final Technical Report
Richard J DAccardi Jul 1978 89 p refs
(AD-A063515, CORADCOM-78-5) Avail NTIS HC A05/MF A01 CSCL 17/2

Considering the premise that communications systems are composed of electronic equipment, environmental effects and the human element one becomes aware of the difficulty in assuming knowledge of every aspect of a system In modeling or analyzing a system one should characterize each facet of the system separately by defining the most influential factors as stochastic variables and then proceed to estimate parameters and structure statistical models of operational efficiency One example of a non-stationary physical process that influences communications systems is derived from the response of a systems operator to various levels of environmental stress Due to the random nature of this phenomenon two logical approaches to forecasting and interpreting experimental results with respect to operator performance seems to lie within the realms of non-linear modeling and non-stationary time-series modeling The main objectives of this report are as follows (1) The design of a statistical experiment is presented for man-machine interface studies aimed at the standard teletypewriter terminal and the optical display terminal The structuring of this experiment includes time dependent and time independent formulations (2) Various classical and non-parametric statistical analyses are presented which provide insight as to what degree the environmental variables of ambient light and acoustic noise affect operator response (3) Two statistical models have been proposed for the analysis and interpretation of man-machine interface data A time-independent structuring is presented for predicting errors as a function of environmental variables and an optimal scheme is given for the determination of the errors GRA

N79-21773# Dynamic Science Phoenix, Ariz
TEST AND EVALUATION OF HEAD RESTRAINTS, SEAT BACKS, AND ANCHORAGES IN VEHICLES SUBJECTED TO REAR IMPACT COLLISION Final Report, Jan 1978 - Mar 1978
R Pirtle Jun 1978 182 p
(Contract DOT-HS-8-01886)
(PB-289779/1 DOT-HS-803671) Avail NTIS HC A09/MF A01 CSCL 13L

A series of car-to-car crash tests was conducted primarily for fuel system integrity These tests were additionally instrumented to allow for the collection of baseline data in other areas Baseline data collected during twelve of these tests is documented with regard to head restraint seat back and anchorage performance in rear impact collisions The struck vehicle in these tests was equipped with an instrumented 50th percentile male dummy located in the driver's seat string potentiometers and high-speed on-board motion pictures to document driver s seat and seat back motion and vehicle frame accelerometers to record the occupant compartment response A comparison between component failure/yield and causative forces is presented The driver seat backs in all but one test were deformed from their initial pre-test condition GRA

N79-21774# National Academy of Sciences - National Research Council, Washington D C Assembly of Life Science
EVALUATION OF RESEARCH ON SURROGATES FOR HUMANS IN MOTOR VEHICLE CRASHES Final Report, Apr - Jun 1978
Jun 1978 55 p refs
(Contract DOT-HS-8-01948)
(PB-291012/3 DOT-HS-803707) Avail NTIS HC A04/MF A01 CSCL 13L

A review of the current status of automobile crash research utilizing cadavers volunteers, animals and models was conducted The aim of the review was to determine the necessity for utilization of cadavers in such research All viable alternatives were examined and it was the unanimous view of the committee that the National Highway Traffic Safety Administration could not develop essential information for crash safety rulemaking without resorting to the use of cadavers in certain types of crash research GRA

N79-21775# Minicars Inc , Goleta Calif
DEVELOPMENT OF A SOLID PROPELLANT INFLATION TECHNIQUE FOR THE SUBCOMPACT CAR PASSENGER RESTRAINT SYSTEM, PHASE 1 Final Report, 1 Jul 1976 - Oct 1978
Michael Fitzpatrick Oct 1978 134 p
(Contract DOT-HS-6-01384)
(PB-290328/4 DOT-HS-803670) Avail NTIS HC A07/MF A01 CSCL 13F

A passenger air cushion system pyrotechnically inflated and used with a mechanical knee restraint system in an effort to provide acceptable 45 mph performance for a broad range of occupant sizes (from the 6-yr-old child to the 50th percentile adult male) and natural siting positions Progress toward this objective was achieved through sled tests in which the system was gradually developed and finalized GRA

N79-21776# Calspan Corp , Buffalo, N Y
PERFORMANCE EVALUATION OF TEST DUMMIES WITH FLESH PARTS PRODUCED WITH SUBSTITUTE FOAMING COMPOUNDS Final Report, Mar 1977 - Jul 1978
Daniel E Massing and Kenneth N Naab Jul 1978 191 p refs
(Contract DOT-HS-6-01514)
(PB-289951/6 CALSPAN-ZM-6015-V-1 DOT-HS-803711) Avail NTIS HC A09/MF A01 CSCL 05E

The objective of the research effort was to determine if Part 572 anthropomorphic dummy component flesh parts molded with Nitrosan and with alternate foaming materials designated as Compound A and Compound B resulted in different performance characteristics Component and sled tests were performed with pairs of Part 572 dummies made by each of the three current U S manufacturers of these devices The findings of a statistical study of repeatability and reproducibility of sled test results are presented wherein comparisons are made between dummies assembled with flesh parts made with Nitrosan and with either Compound A or Compound B GRA

N79-21777*# National Aeronautics and Space Administration, Washington, D C
PUBLICATIONS OF THE PLANETARY BIOLOGY PROGRAM FOR 1977 A SPECIAL BIBLIOGRAPHY
Linda G Pleasant comp and Richard S Young, comp Apr 1979 36 p
(NASA-TM-80338) Avail NTIS HC A03/MF A01 CSCL 03B

List of 1977 publications resulting from research under the auspices of NASA s Planetary Biology Program Author

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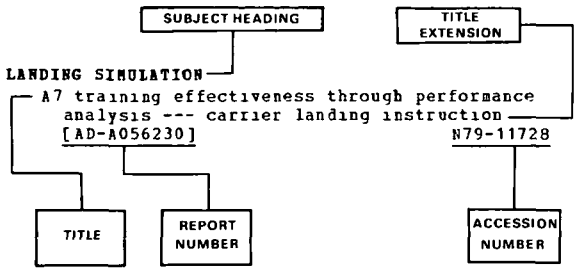

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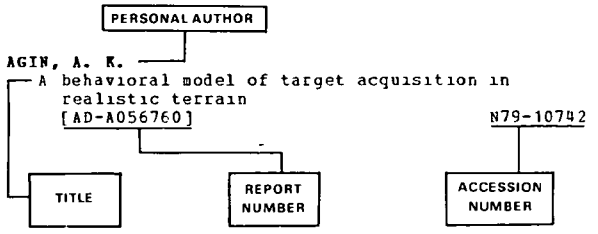

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