AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 165)

MARCH 1977

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 165)

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 February 1977 in

- Scientific and Technical Aerospace Reports (STAR)
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Scientific and Technical Information Office
MARCH 1977
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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INTRODUCTION

This Supplement to Aerospace Medicine and Biology (NASA SP-7011) lists 198 reports, articles and other documents announced during February 1977 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 1977 Supplements.
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TYPICAL CITATION AND ABSTRACT FROM STAR

N77-10799*# Joint Publications Research Service, Arlington, Va

ON THE POSSIBLE UNIQUENESS OF INTELLIGENT LIFE IN THE UNIVERSE


The modern conception of an expanding universe rejects theories of cosmic wonders, transformation of matter, or superintelligent cosmic factors as sources of intelligent life on earth. Life emerged on earth and became intelligent as the result of an extremely rare combination of improbable circumstances. The expansion of intelligent life in the universe will be accomplished by the establishment of artificial biospheres orbiting the moon or stationed in galaxies. Communications between these space colonies will rely on computer technology and radio astronomy.

TYPICAL CITATION AND ABSTRACT FROM IAA

A77-10058 Effects of head-down tilt on fluid and electrolyte balance L. Volcker, R. Jean-Charles, and A. V. Chobanian (Boston University, Boston, Mass.) Aviation, Space, and Environmental Medicine, vol 47, Oct 1976 p 1065-1068 26 refs Grants NGR 22 004-021, No NIH-RR 533

The metabolic effects of 5 deg tilt were studied in eight normal individuals. Exposure to tilt for 24 hr increased sodium excretion and decreased plasma volume. Plasma renin activity and plasma aldosterone levels were not significantly different from supine values during the first 6 hr of tilting, but were increased significantly at the end of the 24-hr tilt period. Creatinine clearance and potassium balance were not affected by the tilt. These findings indicate that head-down tilt induces a sodium diuresis and stimulation of the renin angiotensin-aldosterone system.
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AND BIOLOGY
A Continuing Bibliography (Suppl. 165)

MARCH 1977

IAA ENTRIES

A77-12980  Requirements concerning biotelemetry systems with examples regarding the application (Anforderungen an Biotelemetrie mit Anwendungsbispielen) Mr Hahn (Messerschmitt Bolkow Blohm GmbH, Ottobrunn, West Germany) Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Telemetrie-Messdatenerfassung, Echtzeitdatenreduzierung und -speicherung, Munich, West Germany, June 23, 24, 1976, Paper 76-123 7 p In German

Biotelemetry, as it is understood today by the applier, involves the transmission of data in the HF range. The requirements concerning a suitable biotelemetry system are related to low weight, long times of operation, the needed range, the number of channels which are required, aspects of precision and frequency range, environmental requirements, and transducer characteristics. Attention is also given to the advances made in the development of biotelemetry since its introduction in 1949 and to problems which have yet to be solved to make a wider application of telemetry methods possible.

A77-12984  Telemetry for biophysical experimental data from swimming probands (Telemetrie für biophysikalische Messwerte von schwimmenden Probanden) M Steinhöch (Raumfahrttelektronik GmbH und Co., Göggingen, West Germany) Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Telemetrie-Messdatenerfassung, Echtzeitdatenreduzierung und speicherung, Munich, West Germany, June 23, 24, 1976, Paper 16 p In German

For a number of applications it is desirable to obtain biophysical-experimental data from probands who are swimming in the water or who are diving. Such applications can be related to tests conducted with new diving equipment or with protective clothing for navy fliers who after a crash are floating in the water. Applications involving the transmission of data in underwater archeological studies are also conceivable. A description is given of various approaches for solving the problems connected with the considered applications. Attention is given to the mechanical design of the telemetry encoders, aspects of power supply, and the possibilities which exist for the transmission of the PCM signals.

A77-13042  Effect of low-level hypoxia on the performance quality of a human operator (Einwirkung mälerer Hypoxie auf die Leistungsfähigkeit des Menschen) A V Miroliubov (Voenno-Meditsinskaia Akademna, Leningrad, USSR) Fiziologija Cheloveka, vol 2, Jan-Feb 1976, p 127 130 7 refs In Russian

Experiments were conducted to study the performance quality of a human operator assigned with tracking functions and moving, without preliminary adaptation, into an environment with slightly reduced partial oxygen tension. Performance quality was examined using a model of single-coordinate tracking of a sinusoidal signal during breathing of air and a hypoxic mixture containing 15.8% O2. Analysis of tracking acts revealed four types of tracking. It is found that breathing the given hypoxic mixture degrades the tracking quality of a nonadapted operator due to impairment of the expiration process on the specified trajectory. The influence of small values of hypoxia is characterized by significant individual differences.

A77-13072  Evaluation of the working capacity of a pilot during flight duty (Otsenka rabotosposobnosti letchika v techenie letnoi smeny) N I Frolov Voenno-Meditsinsku Zhurnal, July 1976, p 65-68 In Russian

The working capacity of a pilot during the time he is at the controls - in the presence of sufficient level of health, training, and motivation - may be defined as his ability to perform the required tasks with a given efficiency and proper tension of the physiological systems of the body. The paper stresses that the working capacity should be assessed dynamically, based on a complex postflight analysis of the pilot’s activities observed by automatic flight parameter recording systems, along with an analysis of the relevant changes in the physiological functions of the pilot’s body. Attention should be directed to the evaluation of the pilot’s ‘attention potentiality’ and to the structure of his control movements through the use of the stabilizer and manual control. Such a complex evaluation is particularly suitable during intense flight duty, long interruptions between vacations, and mastering of a new skill.

A77-13073  On the possibility of using cephalography in aviation medical examination (O vozmožnosti ispol'zovaniia kefalografi v techenii vrahchabno-letnoi ekspertizy) V G Bazorov Voenno-Meditsinsku Zhurnal, Aug 1976, p 54-59 6 refs In Russian
A77-13074

Experiments were conducted on 100 healthy subjects aged 16-35 yr of different occupations (candidate and professional pilots, surface transportation drivers, and individuals of various professions) to assess the capabilities of using cephalography for a quantitative evaluation of static equilibrium in the practice of aviation medicine, especially in flight medical examination. Three types of cephalograms are identified and discussed in terms of normal, asymmetrical, and irregular patterns. The last two types are observed in the case of well-defined phenomena of vestibular dysfunction. A rapid and straightforward technique using a special ruler is described for assessing the cephalograms obtained, the whole process of evaluation requiring about 5 min in all. A cephalogram index is proposed for exact characterization of disorders in static equilibrium.

A77-13075

Changes in the heart rate and cardiac rhythm upon exposure to flight stress (Izmenennia chastoty i ritma serdechnikh sotkrashchenni pod vliyaniem letnoi naruzyki) O N Karnaukhov and Iu N Shushmarev Voenna Meditsinskii Zhurnal, Aug 1976, p 59-61 In Russian.

Electrocardiography and mechanocardiography were applied to flight personnel subjects aged 18-45 yr to study the changes in the heart rate (HR) and cardiac function of these transport aircraft crewmembers during their performance of flight tasks, during the period between flights, and during 24 hours of postflight rest. The flight tests were performed at an altitude of up to 2000 m for about 3 hr on 19 subjects, composed of 7 captains, 6 copilots, and 6 navigators. A prestart HR enhancement is observed in all subjects due to mobilization of organic systems prior to forthcoming task. No in-flight arrhythmias were observed. Post-flight observations indicate that the captains and copilots exhibit the highest tendency of increase in the HR. Atrial extrasystole is observed in two captains, which disappeared in the period between flights and 12-24 hr after flight. Occurrence of extrasystoles points to the enhancement of myocardial excitation under the action of flight factors.

A77-13076

Postflight changes in heart rate and arterial pressure in pilots (Izmenennia pul'sa i arterial'noi davlenia u letchikov posle poletov) N N Shorokhov Voenna Meditsinskii Zhurnal, Aug 1976, p 73-75 In Russian.

A77-13147


The paper reviews some of the basic concepts of the biophysics of proteins and takes note of some recent developments in the study of the role of solitons in energy transport in protein molecules and in the investigation of the molecular mechanism of muscular contraction. The high efficiency of energy transfer by proteins observed during hydrolysis of ATP may be explained by the creation of exceptionally stable excitations of the soliton type in the alpha-spiral strips of protein molecules. A model is proposed for sarcocere contraction in which all parts of the myosin molecule are active elements. More than half the liberated energy of ATP hydrolysis is converted to kinetic energy of excitation, which is transferred to a soliton.

A77-13150


Frequency and content of autoantibodies to DNA, skin reaction to intracutaneous administration of DNA solution, and the desoxyribonuclease activity of blood serum were measured in 288 people of different age and sex who were deemed to be healthy. The frequency and pronouncedness of the autoimmune reactions to DNA were found to increase with age. The peak of the autoimmune reaction in men is observed to occur ten years earlier (at age 65) than in women (at age 75). The desoxyribonuclease activity of the blood serum decreases with age. In persons of advanced age, a certain decrease in the frequency of autoimmune reactions and increase in DNA-ase activity is observed in comparison to the age range 60-75 years.

A77-13152


The paper sheds light on methodological problems in the theory of neurohumoral regulation, which have arisen during experimental and clinical investigations conducted by the authors. The discussion covers the fundamental principles of regulation theory, phlegmatic aspects of neurohumoral regulation, and concepts on the remote types of humoral regulation. Particular attention is directed to the role of conformational mobility of blood proteins in maintaining the homeostasis of the organism, along with the types of regulatory influence of the hypothalamus. Also discussed are the principles of stability and liability as well as the importance of the principle of reliability in the activity of neurohumoral systems.

A77-13153

Some possibilities of using the Sechenov effect of increasing working capacity to improve the functional state of the organism during motion sickness (Deiaki mozhivosti Sechenovskogo efekta pidvishennia pratssezdatnosti v polipshenni funktsional'noi stanu organizmu) T L Davydov'ska and V M Davydov'skyi (Kiev's'kii Derzhavnyi Universitet, Kiev, Ukrainian SSR) Fiziologichni Zhurnal, vol 22, July-Aug 1976, p 548-551 23 refs In Ukrainian.

A77-13154


A77-13155

Long-term adaptation of the heart to high-level stress (Dolgovremennaya adaptatsiya serdtsa k bol'shoi na-gruzke) F Z Meerson (Akademia Meditsinskikh Nauk SSSR, Moscow, USSR) Uspekhi Fiziologicheskikh Nauk, vol 7, July-Sept 1976, p 34 58 84 refs In Russian.

There exist two types of long-term adaptation of the heart to high-level stress: (1) cardiac adaptation to continuous stress, which develops during all major circulatory diseases in the form of compensatory hypertrophy of the heart, and (2) cardiac adaptation to periodically applied stress, which develops during intensive physical work in the form of what is known as a trained heart. Both types are based on the activation of the synthesis of nucleic acids and proteins in the myocardium and regulatory system of the heart. However, the result of adaptation is different for each type of adaptation. The work that can be done by unit mass of myocardium is increased in the case of trained heart and decreased in the case of...
compensatory hypertrophy, as compared to normal level. Emphasis is placed on elucidating the mechanism underlying this difference. A comparison is drawn between the metabolism, structure and function of the heart for these two types of cardiac adaptation. All the differences appear to be accounted for by events taking place on the genome level.


The paper presents a review of experimental evidence on the electrophysiology of the hippocampus, available from Soviet and foreign literature. The characteristics of the morphological structure of the hippocampus are outlined. A detailed description is given of the electrophysiological properties of the hippocampus neurons, possible mechanisms of their interaction for excitation and inhibition, and the impact of certain cerebral structures on the electrical activity of the hippocampus. The overall electrical activity of the hippocampus is discussed as related to the electrohippocampogram and evoked potentials, along with hypotheses on the nature of these phenomena. The study demonstrates the significance of the observed evidence to gain insight into the functional organization of the hippocampus and to elaborate some fundamental problems in general electrophysiology.


Changes of the alpha, delta and theta rhythms of four people, from 18 to 24 in age, conditioned by electrically induced sleep were recorded in an effort to study the development and mechanisms of such electric sleep. During electric sleep, a great increase (140-150% of the base value) was observed in the delta and theta activity of the cerebral cortex, while a great decrease (15-20% of the base value) was observed in the alpha rhythm. After electric stimulation was switched off, delta and theta activity decreased by 20-26%, while alpha activity increased by 50-55%. The effects of electric sleep on memory were also examined.


The hemodynamics of fifteen dogs that were reanimated by a method of artificial circulation after clinical death for 12 14 min was studied as a function of different blood volume rates. 197 plus or minus 26 milliliters/kg/min at the beginning of reanimation and 102 plus or minus 24 milliliters/kg/min at the end, for the first group, and 38 plus or minus 18 (at the beginning) and 20 plus or minus 6 milliliters/kg/min (at the end) for the second group. The following parameters were studied: cardiac output, the systolic index, the mean arterial pressure, heart rate, the working index of the left ventricle, and the peripheral resistance of the vessels. For the first group of dogs, it was found that the hemodynamic response was conditioned by a syndrome of hyperdynamics, while the second group was found to suffer from a primary insufficiency of blood circulation along with cessation of the homeometric and heterometric mechanisms of the self-regulation of heart activity.

A77-13190 / Principle of the invariance of the human auditory analyzer relative to scale change during the discrimination of tonal-impulse signals (Printsiop invariantnosti sluchovogo analizatora cheloveka otnositel'no izmeneniia masshtaba pri razlicheniia toinal'no-impul'snykh signalov) V A Saprykm and lu K Nikitin (Akademiia Nauk SSSR, Institut Evologicheskoi Fiziki i Biokhimii, Leningrad, USSR) Akademiia Nauk SSSR, Doklady, vol 229, July 1, 1976, p 244-246 11 refs in Russian

An experiment was devised to determine the systematic errors associated with the monocular identification of line orientation on a tachistoscope. Lines were oriented vertically, horizontally, and obliquely at 45 degree angles to the left and right of the vertical, and were viewed by the right and left eyes of three subjects. A matrix method for determining incorrect identifications showed that in the case of two of the subjects, a shift in line orientation 45 degrees clockwise predominates for the left eye, while a 45 degree counterclockwise shift predominates for the right eye. Exactly opposite shifts are observed for the third subject. The effect of binocular and monocular stimulation on the magnitude of response of binocular neurons of the visual cortex is investigated in an effort to define the mechanisms for the observed pattern of systematic errors.


Evolutionary inferences on the development of neuronal systems from lower to vertebrates are derived from comparative neuroanatomical/neurophysiological studies, in the absence of fossil evidence. While nerve systems for treatment of cutaneous sensory information are basically similar in all vertebrates, even the most primitive, an evolutionary sequence in complexity of organization is traced in the parallel pathways of reticular neurons (responding to chemical stimuli and disturbances in gravitational equilibrium with spinothalamic sensibility) and lemniscal neurons (exhibiting protopathic sensibility). While the reticular organization is itself versatile and adaptive, the lemniscal organization confers enormous advantages on life forms facing the aquatic environment.

A77-13337 / The heart in slow motion (Le coeur au ralent) P Perrier La Recherche, vol 7, Nov 1976, p 964, 965 In French

An arrangement utilizing an ultrasonic imaging device which exerts no adverse effects on the cardiac patient, a laser beam, and an acousto-optic coupler, to produce immediate high-resolution in vivo images of heart action in depth is described. Ultrasonic information.
is transferred to the laser beam, by interference with a material boasting of a high acousto-optic coupling coefficient. A mirror oscillating in step with the ultrasonic pulses makes it possible to direct the light beam instantaneously onto the appropriate region of a tapered variable-focal-length lens. Image rate can be adjusted from 50 images per second to 1500 images per second, with roughly 1.5 mm resolution in two dimensions. The outlook for improved cardiological imaging instrumentation of this type, possibly incorporating charge-coupling devices, and with reductions in price, is touched upon briefly.

R D V

A77-13507 Influence of inflation and atelectasis on the hypoxic pressor response in isolated dog lung lobes E J Guebberman (US Veterans Administration Center, Wood, Wis.) and C A Dawson (Wisconsin Medical College, Milwaukee, Wis.) Cardiovascular Research, vol 10, Nov 1976, p 672-677 17 refs Research supported by the Wisconsin Heart Association USVA Project 3415-02

A77-13508 Cardiovascular responses in man to a stream of cold air J M Hayward, W F Holmes, and B A Gooden (University Hospital, Nottingham, England) Cardiovascular Research, vol 10, Nov 1976, p 691-696 26 refs

A77-13517 * Formation of nucleoside 5'-polynucleotides under potentially prebiological conditions R Lohrmann (Salk Institute for Biological Studies, San Diego, Calif.) Journal of Molecular Evolution, vol 8, Oct 27, 1976, p 197-210 16 refs NASA-supported research, Grant No NIH-GM-13435

The characteristics and efficiencies of biochemical reactions involving nucleoside 5'-diphosphates and -triphosphates (important substrates of RNA and DNA synthesis) under conditions corresponding to the primitive prebiotic earth are investigated. Urea catalysis of the formation of linear inorganic polyphosphates and metal ions promoting the reactions are discussed. Linear polyphosphate was incubated with Mg(++) in the presence of a nucleoside 5'-phosphate, to yield nucleoside 5'-polynucleotides when products are dried, while Mg(++) prompts depolymerization to trimetaphosphate in aqueous solutions. Plausible biogenetic pathways are examined.

R D V

A77-13518 * Response to comments on thermal polypeptides P A Temussi (Miami, University, Coral Gables, Fla.) Journal of Molecular Evolution, vol 8, Oct 27, 1976, p 301-304. Reply, p 309 39 refs Grant No NGR-10007-008

A77-13586 Etioanpogenesis of motion sickness (K vopros ob etiopathogeneze bolezni dvzhenija) E M Buganov and F A Solodovnik Akademija Nauk SSSR, Izvestija, Seriya Biologicheskaja, July-Aug 1976, p 485-494 82 refs In Russian

An analysis of results pertaining to numerous studies on the physiology of the vestibular system and certain areas of the central nervous system revealed that the predisposition of virtually healthy individuals to motion sickness is independent of the behavior of the receptor portion of the vestibular system, and is rather determined by the behavior of certain regions of the human brain, and particularly, of the limbic-reticular complex. Motion sickness appears to be a particular type of disorder of human adaptation, acting as an indicator of disorder in the integrated adjustment of individuals suffering from constitutionally acquired deficiency in the limbic-reticular structure. The proposed hypothesis on the etiopathogenesis of motion sickness will make it possible to examine anew the cause and development of this state and outline future research trends in the diagnosis, prevention, and treatment of motion sickness.

A77-13587 Adaptation of the organism to weightlessness (Adaptatsia organisma k nevostnosti) I I Kas’tan Akademija Nauk SSSR, Izvestija, Seriya Biologicheskaja, July-Aug 1976, p 495-508 14 refs In Russian

The paper discusses experimental results obtained during numerous flights of subjects and cosmonauts aboard special aircraft and spacecraft. It is shown that in all the cases considered, adaptation of the organism to weightlessness occurs in both parabolic and orbital flights. Repeated stays aboard flight vehicles resulted, as a rule, in speeding up the process of adaptation.

A77-13701 Urinary catecholamine excretion on acute induction to high altitude /3,658 m/ R S Hoon, S C Sharma, V Balasubramanian, K S Chadha, and O P Mathew (Indian Armed Forces, Medical Services, New Delhi, India) Journal of Applied Physiology, vol 41, Nov 1976, pt 1, p 631-633 10 refs

Fifty healthy male volunteers, 21-34 yr of age, normally resident at altitudes less than 1000 m, were airlifted to 3658 m. Urinary excretion of catecholamines was measured at sea level (198 m) and on the 1st, 2nd, 4th, and 10th day of a stay at high altitude. The symptoms observed on exposure to high altitude were assigned arbitrary scores. The volunteers could, on this basis, be divided into symptomatic and asymptomatic groups. The two groups showed a markedly different pattern of urinary catecholamines excretion on exposure to high altitude and on return to sea level. Significant increase in the catecholamine excretion was observed in the symptomatic group only. A possible role for enhanced sympathoadrenal activity in the etiopathogenesis of high-altitude illnesses is postulated.

A77-13702 Human coagulation abnormalities during acute exposure to hypobaric hypoxia J T Maher (US Army, Research Institute of Environmental Medicine, Natick, Mass.), P H Levine (Memorial Hospital, Worcester, Mass.), and A Cymerman (Massachusetts, University, Worcester, Mass.) Journal of Applied Physiology, vol 41, Nov 1976, pt 1, p 702-707

Multiple coagulation studies were carried out in eight healthy young men at sea level (SL) and after 1, 24, and 48 hr at a simulated altitude of 4400 m. Platelet aggregation, as induced by ADP, epinephrine, and collagen, was not significantly altered by hypoxia. The symptoms observed on exposure to high altitude were assigned arbitrary scores. The volunteers could, on this basis, be divided into symptomatic and asymptomatic groups. The two groups showed a markedly different pattern of urinary catecholamines excretion on exposure to high altitude and on return to sea level. Significant increase in the catecholamine excretion was observed in the symptomatic group only. A possible role for enhanced sympathoadrenal activity in the etiopathogenesis of high-altitude illnesses is postulated.

the subject himself, (2) marking of these emotional states, and (3) imitation of such emotional states without emotional experience. It is shown that mental representation of emotion-involving events results in changes in the activity of the mimical muscle of the face and indices of the autonomic nervous system, depending on the type of emotion. Each of the emotional states considered exhibits a characteristic EMG pattern.

A77-14155

Bioelectrical activity of the brain during prolonged hypoxia in the anterohostate position (Bioelektricheskaya aktivnost' mozga pri distel'noi gipokmene v anterohostaticheskoi polozhenii) Z A Pokrovskaya, O G Rossinski, and E A Shaposhnikov (Akademia Meditsinskikh Nauk SSSR, Moscow, USSR) Fiziologia Cheloveka, vol 2, May-June 1976, p 318-324 9 refs In Russian

A77-14156

Characterization of the transitory state from wakefulness to somnolence from EEG data (Kharakteristika perekhodnogo sostoyanii ot bodrost'vannoi k dormule po dannym EEC). A77-14156 ff Characterization of the transitory state from wakefulness to somnolence from EEG data (Kharakteristika perekhodnogo sostoyanii ot bodrost'vannoi k dormule po dannym EEC) L M Puchinskaia, O M Grnidel', E M Bakar, and L D Volkova (Akademia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Akademia Meditsinskikh Nauk SSSR, Moscow, USSR) Fiziologia Cheloveka, vol 2, May-June 1976, p 347-353 14 refs In Russian

The paper is concerned with a statistical study of the parameters pertaining to the frequency analysis of the EEG of the occipital and central regions in the brain of healthy adult subjects in the state of wakefulness, transition to somnolence, and somnolence. It is shown that the transitory state can be differentiated from related states by a variety of indicators mean level of alpha-activity, amplitude variation coefficient of high-frequency rhythms (alpha, low-beta, high-beta), and the cross correlation coefficient of total energy and the alpha component of the biopotentials of the occipital and central regions. In particular, an increase in the correlation coefficient between the occipital and central regions with respect to total energy and to the alpha rhythm may be regarded as a characteristic feature of the transitory state.

A77-14157

Movement as an active factor in the organization of sleep (Dvizheniia kak aktiveny faktor v organizatsii sna) A Ts Gol'bin and Iu A Stupnitski (Gorodskoe Spetsiahzirovannoe Otdelenie po Lechenii Nevroiz, Leningrad, USSR) Fiziologia Cheloveka, vol 2, May-June 1976, p 354-361 16 refs In Russian

Experiments were carried out on 6 healthy subjects aged 14-16 yr and 12 patients aged 10-16 yr and afflicted with the 'swaying' syndrome with a view to studying their behavioral and electrophysiological patterns of sleep and wakefulness. Repeated studies of night sleep revealed a regular periodicity in sleeping pose, which is individually constant for each healthy subject. In addition, maximum number of motor, somatovegetative, and vocal responses were observed during paradoxical sleep and transitory states, and minimum number during the 3rd stage of sleep. An analysis of sleep characteristics in the patients with the swaying syndrome supports the hypothesis on the compensatory role of these swaying movements which, according to the principle of positive feedback, contribute to the activation of functionally weak synchronizing systems in the brain. Of particular importance is the drastically reduced activity of the vestibular system in the patients with the swaying syndrome.

A77-14158

General and local changes in the bioelectrical activity of the brain during mental activity (Osnovnie i lokal'nye izmeneniia bioelektricheskoi aktivnosti mozga vo vremia psikhi-cheskoi deiatel'nosti) E D Khomskaya (Moskovskii Gosudarstvennyi Universitet, Akademia Nauk SSSR, Institut Psikholoigii, Moscow, USSR) Fiziologia Cheloveka, vol 2, May-June 1976, p 372-385 143 refs In Russian

The paper presents a review of available theoretical and experimental evidence on the variation of the bioelectrical activity of the brain during mental activity such as performance of various psychological tests. Particular attention is given to general (generalized) and local (specific) changes in the various indices of the bioelectrical activity in different regions of the brain. These indices concern the frequency-amplitude changes in EEG, evoked potentials, spatial synchronization of biopotentials, and the like. Included in the discussion is the role of the frontal areas of the brain as well as the left and right hemispheres in achieving different types of mental activity. Evidence is presented in support of the integral or systemic nature of the bioelectrical activity of cortical and subcortical structures during mental activity.

A77-14159

Interrelationship between the parameters of evoked potential and the structure of sensory-perceptive process (Vzaimootnoshenna mezhdu parametrami vyzvannogo potentsiala i strukturama sensorno-pertsentivnogo protsessa) A M Ivanitski and L V Matveeva (Nauchno-Issledovatel'sku Institut Sudebnoi Psikhiatrii, Moscow, USSR) Fiziologia Cheloveka, vol 2, May-June 1976, p 386-399 38 refs In Russian

A psychophysiological experiment was conducted to determine the extent to which the parameters of evoked potential reflect the structure of sensory-perceptive process and to assess the possibility of using the evoked potential as an objective indicator of the sensory and extrasensory factors of perception. The results support the hypothesis that the parameters of evoked potential may be regarded as an objective indicator for the dynamic interaction of two types of information during acquisition and processing of sensory information. The proposed hypothesis is verified using signal detection theory, which permits a qualitative evaluation of the sensory (analyzer sensitivity) and extrasensory (decision making) components of the sensory-perceptive process. The early components of evoked potential show a positive correlation with the index of sensory sensitivity, whereas the late waves of evoked potential correlate with the criterion of decision making.

A77-14160

Memory and the functional state of the brain (Pamyat' i funktsional'noe sostoyanie mozga) A M Vein and I. Kamenetskaia (I Moskovski Meditsinskii Institut, Moscow, USSR) Fiziologia Cheloveka, vol 2, May-June 1976, p 400-406 11 refs In Russian

Results are presented for an experimental psychological study of memory in 471 patients with damaged temporal, hypothalamo-mesencephalic, and stem structures of the brain. Attention is focused on the functional stresses directed toward increasing the wakefulness level and addressed to the emotional sphere of the patient. The results were submitted to computer-aided statistical and correlation analyses. A major conclusion is the existence of obvious memory failure during local lesions of the cited structures as related to the functional state of the brain. It is suggested that correct understanding of the genesis of memory disorders requires consideration of both the focus of cerebral lesion and the functional state of the brain.

A77-14161

Human recognition of different types of acoustic signals emitted by monkeys (Cebus capucinus) (Raspoznavanie chelevokom raznykh typov zvukovykh signalov, izdavavemykh ob'ekam [Cebus capucinus] G V Gorsuhi, B V...

42
A77-14162 # Stressful mental activity and the regulatory state in the cardiovascular system (Nanazhennia umstvennaia deiatel'nost' i sostosanie regulativ svoesschno-sosudistoi sistemy) Iu I Kundiev, A O Navakatikian, L I Tomasheskia, V S Derkach, and A I Kovaleva (Kievski Institut Gigieny Truda i Profzabolevan, Kiev, Ukrain SSR) Fiziologija Cheloveka, vol 2, May-June 1976, p 433-440 11 refs In Russian

An experimental study of human recognition of sounds produced by monkeys (Cebus capucinus) in different behavioral situations revealed eight types of emitted acoustic signals. Each type of signal was characterized by a set of parameters assigned by the human subject to the signal perceived and belonging to the following classes: vowel-like, consonant-like, mixed (vowel + consonant), emotionally positive, emotionally negative, and emotionally neutral. The tone-pitch characteristics of the signals were divided into three classes: melodic, noisy, and mixed. A large number of responses are analyzed by similarity and the results are presented in matrices which define the classification of the signals produced by the animals. Recognition data are found to compare well with physical characteristics of the signals.

A77-14163 # Functional states of the human operator during monotonous work (Funktsional'nye sostosanii cheloveka-operatora pri monotonnom rabote) L G Voronin, M E Kramnik, L F Solov'eva, and D M El'tbert (Moskovski Gosudarstvenniy Universitet, Moscow, USSR) Fiziologija Cheloveka, vol 2, May-June 1976, p 441-445 7 refs In Russian

Results are presented for an experimental study of the fluctuation of the working capacity of a human operator assigned to perform a monotonous task in a man/machine system. Continuous recording of the functional state parameters was achieved for prognosis of successful performance. Three types of human operator activity were simulated: simple sensorimotor responses, perception and evaluation of alphabetic information, and solution of mental tasks. The results indicate that monotonous working conditions produce drowsiness, thereby sharply degrading the quality of all the tasks performed. The optimal functional states which ensure highest working capacity are found to be different for different kinds of human activity. The most reliable and informative indicator for prognosis of successful performance is shown to be the frequency of background EEG rhythms ECG, EOG, and GSR can only be viewed as supplementary indicators.

A77-14164 # Local and spatial variations of the alphacomponent in the EEG of human operators during task performance (Lokal'nye i prostranstvennye izmenenii a'fa-stosstvlavushchei EEG operatorov v protsesse deiatel'nosti) A V Mirolubov (Voenno-Meditsinskia Akademija, Leningrad, USSR) Fiziologija Cheloveka, vol 2, May-June 1976, p 456-463 24 refs In Russian

Experiments were conducted on 12 healthy male subjects aged 21-30 yr to study their EEG in three left unipolar leads (frontal, parietal, and occipital) during tracking of a stereotyped sinusoidal signal. The EEG results were submitted to a cross-correlation analysis. It is found that the EEG of a human operator performing a tracking task is marked by the proximity of the mean periods and the duration of the ascending phases of the alpha waves recorded in the left frontal, parietal, and occipital leads, along with spatial synchronization of the biopotentials of the cerebral regions considered. Tracking performance is associated with the co-tuning of the buildup rate of the alpha-wave amplitudes.
A77-14169 # Pulse technique for determining the electro-conductivity of brain tissue (Impal's'nyy metod opredelenia electroprovodnosti tkani mozga) Iu V Khon (Akademika Meditsinskikh Nauk SSSR, Leningrad, USSR) Fiziologiya Cheloveka, vol 2, May-June 1976, p 521-524 12 refs In Russian

Clinical and physiological studies necessitate the use of a technique for determining the electrical resistance of brain tissue in the vicinity of the working surface of the electrode used, under rectangular pulse operation with parameters close to actual ones during electrical stimulation of various cerebral structures for diagnostics and treatment purposes. A pulse technique for measuring the transient electrical resistance of electrode-brain tissue is described and tested on patients with parkinsonism, provided with long-term implanted electrodes. Particular attention is given to the design of the equivalent circuit through direct modeling with RC components. The proposed pulse technique revealed a high stability in the electroconducting properties of the brain tissue.

SD

A77-14170 # Slow electrical processes as indicator of the dynamics of functional state in the structures of the brain (Medlennye elektricheskie protsessy kak pokazatel' dinamiki funktsional'nogo sostoyan'ia glubokikh struktur golovnogo mozga) L S Labukhin (Akademika Meditsinskikh Nauk SSSR, Leningrad, USSR) Fiziologiya Cheloveka, vol 2, July-Aug 1976, p 549-557 24 refs In Russian

Neurophysiological experiments using implanted electrodes were conducted to study the trend changes in the slow electrical processes (SEP) in subcortical structures in patients with parkinsonism during diagnostic and therapeutic treatments. It is shown that SEP are capable of acting as a physiological indicator for objective evaluation and prediction of functional state dynamics both during diagnosis and therapy applied to patients with motor disturbances. Attention is focused on the arousal level estimated by the pronouncedness and spreading of responses of extra-slow SEP fluctuations to the activation of attention and emotionally significant tests.

SD

A77-14171 # Time of recognition, threshold time of display, and masking duration of patterns (Vremia uznazhavaniya, porogovoe vremya pred'avl'eniya i dlit'nost' maskirovaniya izobrazhenii) V M Krol' and L I Tanengol'ts (Akademika Nauk SSSR, Institut Problemy Upravlennia, Moscow, USSR) Fiziologiya Cheloveka, vol 2, July-Aug 1976, p 566-570 16 refs In Russian

Tachistoscopic experiments were carried out on five healthy subjects aged 22-25 yr to measure their motor reaction time to the display of single objects, line segments of different orientation, and light flashes. The threshold time of display necessary for pattern recognition is determined, along with maximum and minimum recognition time for the alphabet considered. A hypothesis is advanced that brightness and noise maskings have a surface effect and act only in the very early phases of the recognition process.

SD

A77-14172 # Relation between the size of visual image and its estimation (O zavisimosti mezhdum rezamerson zritel'nogo izobrazhenia i ego otsenki) M B Pavlovskaja (Akademika Nauk SSSR, Institut Fizicheskoi Kul'tury, Moscow, USSR) Fiziologiya Cheloveka, vol 2, July-Aug 1976, p 571-578 9 refs In Russian

Monocular tachistoscopic experiments were performed on human subjects to study the conversion of physical metrics for the true size of a given object to subjective-estimation metrics. Particular attention is given to establishing the type of image scaling in the human visual system. Size scaling was achieved by three methods: (1) method of selecting the average size between two reference values, (2) multiplication method for selecting the size greater than a reference value by a certain factor, and (3) fractionation method for selecting the size less than a reference value by a certain factor. It is shown that experimental findings compare well with the hypothesis on a power function for the conversion of physical metrics of size to subjective metrics with an exponent less than unity.

SD

A77-14173 # Investigation of the throughput of the auditory analyzer in persons of different age groups (Issledovanie propusknoi sposobnosti sluchayogo analizatora u ludei razlichnykh vozrastnykh grupp) A I Lopotko (Sanitarno-Gigemicheski Meditsinskii Institut, Leningrad, USSR) and A A Sagal (Akademika Nauk SSSR, Institut Evolutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) Fiziologiya Cheloveka, vol 2, July-Aug 1976, p 588-592 12 refs In Russian

The paper presents a procedure based on Jacobson's (1951) acoustic concepts and results for the evaluation of age-related changes in the throughput of the human auditory analyzer from audiometric data. The study determined the number of signals discriminable in frequency and intensity within the auditory field of individuals ranging in age between 16-19 and 94 yr. It is found that with increasing age the auditory throughput approximates a linear relation with a falling gradient of 0.05 bit/sec per year for simple signals and 0.5 bit/sec per year for multicomponent signals.

SD

A77-14174 # Vibrational tonic reflex and postural position (Vibratsionnyi tonicheski refleks i polozhenie tela) M L Latash and V S Gurinkel'm (Moskovskii Fiziko-Tekhnicheski Institut, Dologrupnuy, USSR) Fiziologiya Cheloveka, vol 2, July-Aug 1976, p 593-598 13 refs In Russian

Electromyographic experiments using surface electrodes were conducted on m rectus femoris and m biceps femoris in six healthy subjects during vibrational stimulation of the quadriceps tendon. The effect of postural position on the vibrational tonic reflex (VTR) is discussed for various positions of the body. Changeover type effects during vibrational stimulation of the quadriceps tendon are demonstrated, which are comparable to reciprocal inhibition. VTR is shown to depend on the mutual position of body parts along with their spatial position. VTR can be suppressed by foot pressure on the support. No unique dependence of VTR on muscle length is revealed.

SD

A77-14175 # Nature of tendon reflex (O prirode sukhozhil'nykh refleksakh) Ia M Kots (Institut Fizicheskoi Kul'tury, Moscow, USSR) Fiziologiya Cheloveka, vol 2, July-Aug 1976, p 599-610 52 refs In Russian

The nature of the Achilles tendon reflex in man is studied by comparing the changes occurring in this response and the electrically induced monosynaptic H-reflex in various experimental situations. It is found that in a resting man the Achilles tendon reflex has smaller amplitude than the H-reflex. A major conclusion is that unlike the H-reflex, the Achilles reflex lacks the post-tetanic potentiation typical of monosynaptic reflexes. The absence of post-tetanic potentiation in the Achilles reflex may be attributed either to the polysynaptic nature of this reflex or to a subthreshold afferent unit, or even to a combination of these two factors.

SD

A77-14176 # Investigation of reflex excitability of motor-neurons for two types of cyclic human motion (Issledovanie reflektornoi vozbudimosti motoneironov pri dvukh tipakh tsiklicheskikh dvizhenii u cheloveka) A V Syrovogin and M G Snota


A77-14180 // Objective techniques for investigation of human vision (Ob’ektivnye metody issledovanna zrenna cheloveka) V F Ananin (Vsouzounyi Nauchno Issledovatel’ski Institutes Meditsmskogo Prborostroenia, Moscow, USSR) Fiziolgich Cheloveka, vol 2, July-Aug 1976, p 693-698 In Russian

A77-14182 // Callous transfer of deep impulses from different receptors (Transfer callosal’noj dimpul’s profondi di diversa organe receptorate) T Manzoni, S Michelin, and G Spidalen (Ferrara, Universita, Ferrara, Italy) Accademia Nazionale dei Lincei, Atti, Rendiconti - Classe di Scienze Frasche, Matematiche e Naturali, vol 58, Apr 1975, p 655-661 11 refs In Italian Research supported by the Consiglio Nazionale delle Ricerche

Experiments consisting of the stimulation of some forelimb nerves and nerve branches of anesthetized cats were performed to determine the peripheral origin of Group I III deep afferent fibers, which are known to be linked to the somesthetic region of the corpus callosum. Mass potentials were recorded simultaneously from the dorsal root, from the surface of the contralateral post-central dimple area, and from fibers of the corpus callosum. Results indicate that the callosal transfer of deep information is significant only if it originates from extramuscular receptors (such as those in joints or interosseous membranes) or from nonmuscular terminals.


The information capacity of the acoustic analyzer is chosen as an integrative characteristic for studying the evolution with age of the human acoustic analyzer. The information (transmission) capacity C is defined as the logarithm (base 2) of the number of signals distinguishable in the system. Sensitivity to pitch and loudness of tone pulses was measured in subjects in eight age groups from 15 yrs to over 90 yrs. A fairly simple linear dropping off of the transmission capacity of the acoustic analyzer with the age of the subjects was noted.


Experiments consisted of the stimulation of some forelimb nerves and nerve branches of anesthetized cats were performed to determine the peripheral origin of Group I III deep afferent fibers, which are known to be linked to the somesthetic region of the corpus callosum. Mass potentials were recorded simultaneously from the dorsal root, from the surface of the contralateral post-central dimple area, and from fibers of the corpus callosum. Results indicate that the callosal transfer of deep information is significant only if it originates from extramuscular receptors (such as those in joints or interosseous membranes) or from nonmuscular terminals.

A77-14566 // Perceptual analysis of moving patterns (J Hochberg and P Fallon (Columbia University, New York, N Y ) Science, vol 194, Dec 3, 1976, p 1081-1083 5 refs Grant No NIH-R01-HD-06768-01A1

Configurations of moving points are often perceptually analyzed into relative and common vectors that are different from the actual
motions. If a movement configuration is abruptly replaced by a test point whose objective velocity continues the apparent (but illusory) course of one of the original points, observers perceive that course as uninterrupted and collinear. This finding provides a quantitative measure of the vector extraction phenomenon and was used to show that neither of the two current models adequately fits that phenomenon.

A77-14582 # Ergonomics and space medicine (Ergonomika i kosmicheskaya medicina) I Rudnyi and I Pestov Aviatsia i Kosmonavtika, no 7, 1976, p 34, 35 In Russian

Immediate and secondary effects of prolonged weightlessness under expected or already-tested space station conditions are discussed, along with a general discussion of spacecraft ergonomics. Problems of the human body to weightlessness engineering design of instruments and spacecraft furnishings to weightlessness, and adaptation of the machine-human system to weightlessness are emphasized. Medical tests as part of the planning for prolonged residences in orbit or in deep space, and ways of coping with shifted loads on human organs and atrophy or deconditioning of human organs and structures under weightlessness conditions, are also discussed. Principal factors to be considered in ergonomic design are outlined and some ergonomic defects encountered in space flights and spacecraft to date are mentioned.

A77-14626 Effects of the frequency content in complex air shock waves on lung injuries in rabbits C-J Clemenson and A Jonsson (Fortvareets Forskningsanstalt, Sundbyberg, Sweden) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1143-1152 15 refs

Rabbits were exposed in a nearly closed compartment to complex air shock waves of long duration and low overpressure. Severe lung injuries were observed at overpressures that, according to criteria applicable to simple wavefronts, should have caused no primary lung injury. Pressure-time functions near the thorax and, in some cases, within the thorax, were recorded. The former functions were subjected to spectral analysis, and were also used for calculating with mathematical models the response of the thorax of man and rabbit, respectively. Recorded and calculated pressure-time functions in the lungs of the rabbits showed good agreement. The analysis indicates that the frequency spectrum of the waves and resonance effects in the thorax might have been factors of importance for the production of the lung injuries and, therefore, should be considered when estimating hazards to man from experiments performed with animals.

A77-14627 Instrumentation for the rhesus monkey as a cardiovascular analog for man during air-combat maneuvering acceleration H H Erickson (USAF, School of Aerospace Medicine, Brooks AFB, Tex.) and J R Ritzman (US Army, Brooke Army Medical Center, Fort Sam Houston, Tex.) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1153-1156 24 refs

The development of high-performance, fighter attack aircraft has created a need for new techniques and methods to study the effects of acceleration stress on the cardiovascular system. Instrumentation methods were developed in the rhesus monkey (Macaca mulatta), in order to evaluate cardiovascular performance in a high-G, air-combat maneuvering environment. The results indicate that the rhesus monkey is a useful model in studying the effects of gravitational forces encountered by man during repetitive and maneuvering acceleration. The model permits investigation of risk limits, damage mechanisms, fatigue of the cardiovascular system, and pathophysiological responses to acceleration. Increasing the seat angle during acceleration provides protection to the cardiovascular system and results in improved eye-level blood pressure. Repeated exposure to sustained and maneuvering acceleration indicates that fatigue occurs and that cardiovascular compensation becomes inadequate.

A77-14628 Effectiveness of four water-cooled undergarments and a water-cooled cap in reducing heat stress G F Fonseca (US Army, Military Ergonomics Div., Natick, Mass.) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1159-1164 10 refs

The cooling provided by four different water-cooled undergarments was directly measured on a heated copper manikin dressed in a basic hot weather flight ensemble. This cooling, which represents absorption of the heat produced by the metabolic processes of the body plus that from the ambient environment in the cabin, was found to be almost directly proportional to the difference between the manikin skin temperature and the temperature of the cooling water at the inlet to a water-cooled undergarment. Although these cooling garments did not, by themselves, completely isolate the manikin surface against heat gain from the hot environment, they did remove about one-half of the potential for heat gain from the ambient environment before the heat reached the manikin surface. The water-cooled cap removed heat from the manikin equivalent to about one-third of the total metabolic heat production of a seated person.

A77-14629 Reaction time and accuracy of the saccadic eye movements of normal subjects in a moving-target task R W Baloh and V Honrubia (California, University, Los Angeles, Calif.) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1165-1167 16 refs Research supported by the Deafness Research Foundation, Grant No PHS-NS-09823

Reaction time and accuracy of saccadic eye movements in following a target which moved horizontally and in a step-wise fashion were quantitatively assessed in 32 normal subjects using a laboratory digital computer. At 95% confidence intervals, mean saccade reaction time and accuracy were 142 to 230 ms and 76 to 100% respectively. In any single subject reaction time and accuracy were highly symmetrical. There was no significant correlation between saccade amplitude and either reaction time or accuracy.

A77-14630 Simple reaction time during exercise, heat exposure, and heat acclimatization E Shvartz, A Meroz, A Mechtner, and H Binfeld (Tel Aviv University, Sheba Medical Center, Tel Aviv, Israel) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1168-1170 8 refs

Simple reaction time (RT) to a visual stimulus was recorded in six young men for 10 successive days. On the first day, RT was recorded at rest and during 2 h of bench-stepping at a load of 39 W at room temperature of 23 C. On the next 8 d, the same measurements were repeated during exercise in heat (40 C DB, 30 C WB), and on the tenth day they were again performed at 23 C. As compared with the resting position, exercise RT increased about 30% during exercise in both the temperate and hot environments on Days 1 and 2 in an unacclimated condition, despite the large increase in rectal temperature in heat. Heat acclimatization resulted in the usual decreases in heart rate and rectal temperature and in a decrease in RT on Day 10 at 23 C. Exercise RT did not differ from resting RT. The results show that exercise adversely affects simple RT, which is probably more related to the vibration experienced during exercise than to the increase in body temperature.

A77-14631 Heart biochemical responses 14 days after +Gz acceleration R T Dowell, L A Sordahl, J N Lindsey, and H L
A77-14632 * Sunworship and life expectancy of Drosophila melanogaster populations in abnormal oxygen-normal pressure regimes G, Kloeck, G, Ridgel, and D, Rainl (Kentucky State University, Frankfort, Ky.) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1171-1176 6 refs Grant No NsG-10-00801


A77-14634 Optimization of crew effectiveness in future cockpit design: Biomedical implications S J Gerathewohl (FAA, Office of Aviation Medicine, Washington, D C ) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1182-1187 15 refs

A77-14635 Evaluation of a face cooling device integrated with the standard HGU-type USAF flight helmet A T Kissin, M. Alexander, D. C, Smidley, W.J, Bushway, S. L, Ward, and D. H Lowe (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1188-1192 USAF-sponsored research

The effectiveness of face cooling in ameliorating the physiologic impact of a moderate-to-severe, operationally realistic, hyperthermic stress was demonstrated in a previous paper. Justification of the principle prompted efforts to develop a cooling device of improved design which, aesthetically and operationally, interfaced with the HGU 26/P standard Air Force helmet A single-piece, fiberglass partition was formed to and mounted on the shell with sufficient elevation to provide an air plenum between the two Ventilating air of 23 C at 0.17 cfm entered the plenum from the side and exited over the anterior edge of the shell. Tracking performance was unchanged with face cooling, however, significant reduction in physiologic strain was demonstrated. Elevations of rectal temperature and heart rate were suppressed by 46% and 45%, respectively. Sweat loss was reduced by 43%. Structural modifications of the helmet to accommodate the device are minimal (Author)

A77-14636 Arousing environmental stresses can improve performance, whatever people say E C Poulton (Medical Research Council, Applied Psychology Unit, Cambridge, England) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1193-1204 81 refs Research supported by the Medical Research Council of England

Contributions of some levels of heat, noise, vibration, and general stress to improve performance, despite results of tests indicating that these discomforting factors degrade efficiency and performance whenever present at whatever level, are discussed. Measures taken to avoid bias in subjective assessments are described. Some cases of discrepancies between actual performance and subjective assessments of performance reflecting discomfort factors known to the subject are cited. Evidence of improved performance accompanying increased discomfort (within limits) is cited. Bias built into experiments, whether instrumented or requiring subjective ratings by subjects, are cited. Experiments reported in the literature are analyzed extensively, and ways of eliminating bias are suggested (Author)

A77-14637 * Denitrogenation interruptions with air J P Cooke (USAF, School of Aerospace Medicine, Brooks AFB, Tex) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1205-1209 31 refs NASA Order T 82170

A 3-hour denitrogenation period at ground-level pressure with 95% O2-5% N2, with an air interruption of 5 min or more and matched with additional denitrogenation time equal to the interruption, will later result occasionally in altitude decompression sickness ('bends') during a 2-hour decompression exposure at 10,058 m equivalent with 92% O2-8% N2. Thus the equal time or 'mirror image' make-up time for loss of denitrogenation did not prevent bends 7 times in 17 subjects during 71 exposures with air interruptions, on the other hand, no case of bends was reported after uninterrupted denitrogenation periods. Nitrogen-loading during the interruptive period is believed to resupply the bends sites with additional nitrogen, which re-establishes conditions favorable to a high incidence of bends (Author)

A77-14638 * Airborne testing of three antimotion sickness preparations W H Johnson (Toronto, University, Toronto, Canada),
A77-14639

Acquired bundle branch block and its response to exercise testing in asymptomatic aircrewmen - A review with case reports
J E Whmnery and V Froehcher, Jr (USAF, Wilford Hall Medical Center, Lackland AFB, Tex.) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1217-1225 18 refs

Thirteen human volunteers were exposed to weekly flights in which standardized, steep turns were used to promote motion sickness. A combination of promethazine hydrochloride (25 mg) plus ephedrine sulphate (25 mg) was found to be equally as effective as the combination of 1 scopolamine hydrobromide (0.35 mg) plus d-amphetaamine sulphate (5 mg). Droperidol (2.5 mg) was indistinguishable from the placebo. It was concluded that the treatment of choice for motion sickness is promethazine plus ephedrine.

Author

A77-14640

Behavioral control as a tool in evaluating the functional state of cosmonauts in flight O G Gazenko, V I Miasnikov, and P N Uskov (Ministerstvo Zdравookhraneniya SSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Aviation, Space, and Environmental Medicine, vol 47, Nov 1976, p 1226-1227 5 refs

The present paper deals with an important problem of space medicine - control of the health of cosmonauts in flight based on their behavior. The paper discusses communication in space-time dialogue as the most promising method from the diagnostic point of view. Using a flight of the Soyuz spacecraft as one of the illustrations, the diagnostic importance of spatial-temporal characteristics of the dialogue is shown.

Author

A77-14679

Perspectives of using decompression of the lower half of the body in the practice of aviation physical examination (Perspektivy ispol'zovanna dekompressii nizhnei poloviny tela v praktike vrachebno-letnoi ekspertizy) P M Suvorov (Voenna-Meditsinskii Zhurnal, Sept 1976, p 63-67 7 refs

The difference in barometric pressure produced by decompression of the lower half of the body (DLHB) promotes the storage of blood in the lower part of the body, limits the venous return of that blood to the heart, and reduces the volume of actively circulating blood. Results are presented for a DLHB study on 3 groups of pilot trainees with an average age of 25 yr (26 healthy subjects, 99 subjects with syncopiac condition in their medical history, and 25 subjects with vaso-autonomic disturbances). Attention is focused on elucidation of major causes of decreased decompression tolerance in persons with syncopic condition, determination of the influence of age and time elapsed from the moment of syncope, and evaluation of the diagnostic value of DLHB functional testing in the practice of aviation physical examination.

Author

A77-14747

Effects of water immersion on renal hemodynamics in normal man M Epstein, R Levinson, and R Loutzenhiser (US Veterans Administration Hospital, Miami, University, Miami, Fla.) Journal of Applied Physiology, vol 41, Aug 1976, p 230-233 23 refs Research supported by the U S Veterans Administration, Grants No NGR 10-067-097, No NIH-RR 261

The present study was undertaken to delineate the effects of water immersion on the neck (NI) on renal plasma flow and glomerular filtration rate as assessed by the clearance of p-aminohippuric acid (PAH) and inulin, respectively. Nine normal male subjects were studied on two occasions, control and NI. The conditions of seated posture and time of day were identical. Immersion did not alter either clearance at a time when sodium excretion was increasing markedly. The constancy of PAH clearance during NI suggests that renal blood flow is unaltered and that the natriuresis of NI is mediated independently of alterations in overall renal perfusion. The sluggish decline of a natriuresis during recovery is consistent with the presence of a humoral factor contributing to the encountered natriuresis.

Author

A77-14801

Some problems of space medicine (Nekotoreye problemy kosmitcheskoj meditsiny) N N Gurovskii and A D Eggorov Kosmicheskaja Biologija i Avakosmicheskaja Meditsina, vol 10, no 6, 1976, p 3-14 29 refs In Russian

The paper is concerned with a number of problems solved by space medicine along with its major development stages. Particular attention is given to a discussion of the symptom complex that is superficially similar to motion sickness, changes in motor function during flight, cardiovascular changes during prolonged spaceflight, changes in water-electrolyte balance, calcium depletion in the bony tissue, as well as the anemia syndrome and changes in the immunologic susceptibility of the organism. Basic phases of human adaptation to weightlessness are identified, along with the mechanisms governing the behavior of physiologic functions in these conditions. Future trends of space medicine problems are pointed out.

Author

A77-14802

The cardiovascular system during hypokinesia of varying duration and intensity (Serededno-sozudsistaya sistema pri gipokinesno razlichennoi dlitel'nosti i vyrazhennosti) N P Panferova Kosmicheskaja Biologija i Avakosmicheskaja Meditsina, vol 10, no 6, 1976, p 15-20 15 refs In Russian

The paper gives and compares data on the orthostatic tolerance of man exposed to different hypotonic conditions of varying duration - water immersion (10 days), supine position at the chair close to the mean physiological rest posture (7-20 days), bed rest (10-120 days) and atrophy (20-40 days). The tolerance to orthostatic tests decreased to a larger extent after experiments in which the motor activity was significantly lowered water immersion, supine position in the chair and 120-day bed rest orthostatic tolerance reduced to a lesser extent after altitude chamber experiments. The level of decline of the motor activity was more important than the time of hypokinetic exposure.
reduction of adaptive capabilities of the cardiovascular system developed during the first 30 days of bed rest (Author)

A77-14803 // Hypokinetic tolerance of persons adapted to high altitudes (Perenovost' gopokinezii liu'm, adaptirovannyami k vyso kokogor'yu) V I Korol'kov and M M Murakhimov Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 20-24 23 refs In Russian

After a 26-day exposure to an altitude of 3200 m test subjects were kept in bed for 10 and 24 days Each experimental group consisted of 6 test subjects Physiological effects of the exposure were measured with respect to changes in the respiration, circulation and red blood systems as well as in the orthostatic and exercise tolerance High altitude adaptation which preceded bed rest did not arrest the development of orthostatic intolerance or the decrease of physical performance that resulted from the bed rest experiment (Author)

A77-14804 // Effect of prolonged hypokinesis on the PO2 dynamics in the rat brain tissues during orthostatic and antiorthostatic tests (Vliяние длительной гипокинезии на распределение PO2 в мозговой ткани крьс при орто и антIORТостатической положении) E A Kovalenko and A V Riazhskn Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 24-27 In Russian

Orthostatic (+6 deg) and antiorthostatic (2 deg) 30-day bed rest resulted in reduced taste sensitivity to nutritional stimuli, elevated mobilization of taste receptors of the tongue and decreased amplitude of the gastrointenstinal reflex. In exposure to the antioorthostatic position at a greater angle (5 deg) yielded opposite changes in the thresholds of taste sensitivity, phase changes in the mobilization of taste receptors and decreased amplitude of the gastrointestinal reflex. During the recovery period, taste sensitivity rapidly returned to the normal (Author)

A77-14805 // Effect of orthostatic and antiorthostatic hypokinesia on taste sensitivity in men (Vлияние ортостатической и антIORТостатической гипокинезии на вкусовую чувствительность) S M Budylma, V I Khvatova, and A I Volozhin Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 27-30 12 refs In Russian

Orthostatic (+6 deg) and antiorthostatic (2 deg) 30-day bed rest resulted in reduced taste sensitivity to nutritional stimuli, elevated mobilization of taste receptors of the tongue and decreased amplitude of the gastrointenstinal reflex. An exposure to the antioorthostatic position at a greater angle (5 deg) yielded opposite changes in the thresholds of taste sensitivity, phase changes in the mobilization of taste receptors and decreased amplitude of the gastrointestinal reflex. During the recovery period, taste sensitivity rapidly returned to the normal (Author)

A77-14806 // Changes in the central and peripheral circulation and acid-base balance of blood in dogs during tilt tests (Izmeneniia tsentral'nogo i pervencheskogo krovoobrashcheniia i kulozno-shchelachnogo ravenovsia krvi u sobak vo vremia passyvnoi ortostaticheskoi proby) V E Kats'kov Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 31-36 61 refs In Russian

Integral changes in circulation and acid-base equilibrium of blood were studied on urethane-chloralose anesthesized dogs during a 20 min tilt test. Against the background of a relatively stable mean pressure in the aorta, the blood flow in the aorta and aorto arterial diminished, pressure in the right atrium decreased and the heart rate increased. The phase of isometric contraction of the left ventricle increased, ejection time, mechanical systole and intrasystolic index decreased whereas the myocardial contractility increased. The blood flow in the liver, spleen and hind limb skin reduced and in hind limb muscles remained unaltered. In the arterial blood metabolic acidosis and hyperventilation developed (Author)

A77-14807 // Effect of muscle electrostimulation treatment, on orthostatic tolerance in man (Vliяние курса электростимуляции) V M Mirakhimov and V S Georgievskn Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 37-41 29 refs In Russian

Two series of experiments were conducted on six and twelve (3 groups of 4 persons each) healthy subjects in ambulatory and bed-ridden conditions, respectively, to assess the effect of electrostimulation on their orthostatic tolerance. The first series of experiments consisted of a 30-day test (5 times a week, 25-30 min daily) electrostimulation treatment groups of the muscles of the calves, thighs, back, and abdomen. The second series of experiments consisted of a 45-day test (6 times a week, twice a day for 30 min) electrostimulation treatment given to the subjects in bed-ridden orthostatic position with two different procedures for two of the three groups, the third group serving as the control. Heart rate and blood pressure results were submitted to statistical treatment. It is found that muscle electrostimulation had a beneficial effect on orthostatic tolerance in the ambulatory subjects. In the bed-ridden subjects, 20 electrode electrostimulation gave better results than 12-electrode electrostimulation. The third group of subjects, who were not electrostimulated during hypokinesis, showed a pronounced reduction in orthostatic tolerance (SD)

A77-14808 // Functional state of the acoustic analyzer in man exposed to +Gx (Funktionsnal'noe sostojanie zvukovogo analizatora cheleoveka pri uskorenii +Gx) A S Barer and V E Grishanov Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 41 47 23 refs In Russian

The functional state of the human acoustic analyzer was investigated during an exposure to +Gx acceleration of 4-14 g applied at an angle of 78 deg to the longitudinal axis of the body. During an exposure to 8.10 g the hearing state began to deteriorate. This included an increase in the tonal thresholds of hearing sensitivity with respect to the aural and bone conduction, and an increase in the differential thresholds of hearing with respect to intensity and pitch. With an increase in the acceleration value, these changes grew, reaching a maximum at 14 g. It is suggested that possible mechanisms of changes in the hearing sensitivity are associated with disorders in the systems of sound conduction and perception (Author)


Results are presented of an experimental study in which skin portions of different areas in piglets were exposed to soft X-rays. The biological effect of radiation was evaluated in terms of clinical, hematological, and biochemical changes in the animal's body. The data obtained point to the development of burn illness whose severity increased with an increase in the area of irradiated surface (SD)

A77-14810 // Clinical course of radiation damage at high altitudes (Klinicheskie techenie radiatsionnogo porazhenia v usloviiakh vysokokogor'ya) Iu G Grigor'ev, S B Damianov, M M Mirakhimov, Iu V Ferber, M P Kalandarova, B U Moldotashev, G N Przhivato, and A V Shafir Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 51-54 6 refs In Russian

Experiments were carried out on dogs at an altitude of 3200 m above sea level to evaluate the effect of high altitudes on the course of radiation sickness in animals exposed to gamma radiation. Clinical
observations, morphological examination of blood and bone marrow, and measurements of blood coagulation parameters were made at different time intervals. It is found that radiation of animals after a preliminary 25-day high altitude acclimatization and further stay at a high altitude results in alleviating the severity of radiation sickness. The clinical course of radiation sickness aggravated in dogs who were re-acclimated to high altitude following radiation exposure. It is suggested that dogs maintained at high altitudes before and after radiation exposure exhibit a more intense recovery, especially in erythropoiesis. These animals also showed steady decrease in blood clotting rate and prolonged maintenance of high activity for the fibrinolytic system.

Significance of the nonverbal characteristics of a speech signal in evaluating the psychophysical state of a pilot (Znachenie neverbal'nykh kharakteristik rechevogo signala dla otsenki psikhcheskogo i fizicheskogo sostoyaniya letchika) I. Schultz Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 54-58 18 refs In Russian

Results are presented for an experimental study designed to compare the objective characteristics of the speech signal of pilots and operators exposed to real extremal psychological stress with the various characteristics of persons subjected to different kinds of stressors simulating various types of flying operations in the laboratory. Analysis of the frequency, time, and dynamics characteristics of the acoustic signal is one of the useful and reliable methods for an objective assessment of the psychophysical state of a pilot. It is shown that the human voice alters most seriously in response to psychological stressors and factors that affect the normal mechanics of respiration as related to breathing under increased pressure and under acceleration. The voice remains unchanged during exposure to hypoxia and high ambient temperatures.

Excretion dynamics and composition of human wastes as derived from one-year experimental results (Dinamika vydeleniia i sostav nekotorykh produktov zhiznedel'nosti che- loveka po rezul'tatam godchnogo eksperimenta) Iu G Neledov, A N Kochetkova, V N Sokolov, and V G Vysotskii Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 58-62 17 refs In Russian

The one-year experiment in which three test subjects participated provided data on the rate and frequency of excretion of urine and feces, their composition and amount. The results obtained should be taken into consideration when designing and manufacturing human waste systems for space craft.

Dependence of blood carboxyhemoglobin level and expired carbon monoxide content in testes upon the CO concentration in the sealed-chamber atmosphere (Zavisimost' soderzhashchego karboksigemoglobina v krovi i kisloroda v vydhikhnom vozduke ispytatelei ot konsentracii CO v vozduke gemokamery) V P Savina, N L Sokolov, and E I Nikitin Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 62-66 11 refs In Russian

Six inductive seismocardiographic transducers were tested on a vibration rig to determine their amplitude frequency response and to evaluate their effect on the thoracic cage surface oscillation with a view towards reducing the errors in assessing the contractile function of the heart. The results of the measurement results were used to construct the mechanical equivalent diagram for the transfer of vibrations at the transducer/body surface interface, with allowance for the transducer weight. It is found that the resonant frequency of the transducer is 25 Hz, which lies within the working range for the frequency of precordial vibrations of low and ultralow frequency (0-50 Hz). The amplitude of the transducer's output signal is found to depend on its spatial orientation. Distortions caused by transducer weight can be eliminated by using a transducer that is 10 grams lighter with a sufficiently firm pressure on the thoracic cage without deforming it. One way of reducing the nonuniformity of the amplitude-frequency response of a seismocardiographic transducer is to increase damping through increased viscosity of the damping fluid.


Utilization of water supply recovery systems requires an operative monitoring of the quality of reclaimed water in space missions, which should be evaluated with a minimum number of parameters to ensure its physiological acceptability. The paper examines the suitability of measuring the total content of organic carbon as an effective tool for estimating the quality of reclaimed water. Data are presented on total organic carbon content, ratio of chemical consumption of oxygen and carbon in atmospheric condensate, and in urine condensate from low-temperature urine evaporation, and in potable water reclaimed from these sources by a sorption technique.

Investigating the possibility of using the transpiration moisture condensate of sweet potato for plant cultivation in biological life support systems (Issledovanie vozmozhnosti ispol'zovaniya kondensata transpiratsionnoi vlage batata dlia vyrashchiva- vannia rastenii v biologicheskikh sistehakh zhizneobespecheniya) T A Derendieva Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 70-73 8 refs In Russian

Hygiene evaluation of experimental samples of the antimicrobial underclothing containing hexachlorophene (Gigienicheskaya otsenka eksperimental'nykh obraztsov antimikrobnogo bel'ia, soderzhashchego geksakhlorofen) V V Borshchenko, F K Savinich, V P Gorshkov, and A P Rogatovskaya Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 72-76 7 refs In Russian

The hygienic examination of 12 samples of knitted underclothing which contained hexachlorophene added during fiber formation allowed the selection of four types that can be used under poor sanitary conditions. Considering possible changes in the proportion of various microorganisms during prolonged space flights, it is recommended that extensive investigation be carried out in order to demonstrate the suitability of antimicrobial underclothing in space missions.

Investigation of the characteristics of a seismocardiographic transducer (Issledovanie karakteristik seismo- kardiograficheskogo datchika) D G Maksimov, S G Odintsov, and G I Khenmets Kosmicheskaia Biologiya i Aviakosmicheskaia Meditsina, vol 10, no 6, 1976, p 76-78 5 refs In Russian

Six inductive seismocardiographic transducers were tested on a vibration rig to determine their amplitude frequency response and to evaluate their effect on the thoracic cage surface oscillation with a view towards reducing the errors in assessing the contractile function of the heart. The results of the measurement results were used to construct the mechanical equivalent diagram for the transfer of vibrations at the transducer/body surface interface, with allowance for the transducer weight. It is found that the resonant frequency of the transducer is 25 Hz, which lies within the working range for the frequency of precordial vibrations of low and ultralow frequency (0-50 Hz). The amplitude of the transducer's output signal is found to depend on its spatial orientation. Distortions caused by transducer weight can be eliminated by using a transducer that is 10 grams lighter with a sufficiently firm pressure on the thoracic cage without deforming it. One way of reducing the nonuniformity of the amplitude-frequency response of a seismocardiographic transducer is to increase damping through increased viscosity of the damping fluid.

Two-dimensional linear models of biped walking (Plasovye linienyye modeli dvunogo khod'by) V V Beletskii and T S Kirsanova Akademia Nauk SSSR, Izvestiya, Mekhanika Tverdogo Tela, July-Aug 1976, p 51-62 5 refs In Russian

An analytical two-dimensional model is constructed for the motion of a biped walking machine consisting of a balancing upper part and two legs. The rhythmic (periodic) motions of the machine
are examined along with the kinematics of leg transfer. Equations of motion are solved in an explicitly analytical form, assuming the machine to be making small two-dimensional oscillations. Three different walking styles complete, symmetrically human, and nonsymmetrically human are analyzed and compared energetically.

**A77 14903**

Estimate of capillary vessel performance during acceleration (Ocena zachowania sie naczyn wosotwych podczas dzialania przyspieszen) J Domaszuk and M Wojtkowiak (Wojewodzki Instytut Medycyny Lotniczej, Warsaw, Poland) Postepy Astronautyki, vol 9, no 3, 1976, p 73-80 10 refs In Polish

The vascular system of rats subjected to +Gz acceleration forces in a centrifuge was investigated. Albumin microspheres 20-50 microns in diameter labelled with I-131 isotope were injected intravenously before the centrifuge tests. Scintigrams revealed that the +Gz acceleration forces result in a progressive dilatation of capillaries in the lower parts of the body. Under extremal values of acceleration the diameter of dilated capillaries exceeds 50 microns. However, +Gz accelerations do not cause capillary expansion in the pulmonary circulation.

**A77 14958**


Aspects of hypertrophy, hypertension, and structural dilatation of the human heart are considered along with the effects of physical training and detraining on intrinsic cardiac control mechanisms, the effect of acute ischemia on cyclic AMP levels and other parameters in the cytosol and in mitochondria of hypertrophied and nonhypertrophied hearts, the collagen metabolism of the rat heart during experimental cardiac hypertension and the effect of digoxin treatment, and protein metabolism in the work-overloaded myocardium. Attention is given to factors controlling protein synthesis in heart muscle, the effect of complete and partial deconditioning on exercise-induced cardiovascular changes in the rat, physical activity and coronary collateral development, and occupational physical activity and coronary artery disease.

**A77 15203**

Models to aid user measurement of a computer network D E Morgan and R C Kolanko (Waterloo, University, Waterloo, Ontario, Canada) In National Telecommunications Conference, New Orleans, La., December 1-3, 1975, Conference Record Volume 2 New York, Institute of Electrical and Electronics Engineers, Inc., 1975, p 44-1 to 44-5 10 refs

A computer system model is described which aids monitoring, evaluating, and understanding the behavior of computer networks and networks from a user's viewpoint. The approach defines a real man-computer system in terms of layers of abstract machines, determines the measures needed in terms of these machines, makes the measurements on the real system, and then interprets them in terms of the abstract machines. A model instrumentation system based on simple queueing theory is presented, which serves as a basis for the computer network monitoring system used to observe the performance of a simple two-node computer network. The hierarchical approach to measurement allows the user to determine the measurements needed to achieve his goals, along with the tools and techniques necessary to perform the desired measurements.

**A77 15204**

Human perception of telecommunications responsiveness T E Bell (TRW Systems Group, Redondo Beach, Calif.) In National Telecommunications Conference, New Orleans, La., December 1-3, 1975, Conference Record Volume 2 New York, Institute of Electrical and Electronics Engineers, Inc., 1975, p 44-18 to 44-20 6 refs

It is argued from the point of view of informal studies that the analysis of the responsiveness of a computer system must use metrics that are related to responsiveness as humans perceive it. Attention is given to human perception of computer responsiveness in relation to the use of standard metrics (the mode and the mean), metrics of multiple parameters, and, objective-directed metrics. Perceived responsiveness is discussed in terms of static vs dynamic metrics. It is concluded that the standard metrics appear inadequate and a different methodology for designing and tuning on-line systems should be adopted.

**A77 15429**

Calibration of a multimode microwave exposure chamber E L Bronaugh and D R Kerns (Southwest Research Institute, San Antonio, Tex.) In International Symposium on Electromagnetic Compatibility, San Antonio, Tex., October 7-9, 1975, Record New York, Institute of Electrical and Electronics Engineers, Inc., 1975, p 5B11b1-5B11b5 8 refs

The experimental calibration program reported uses calorimetry as the means for measuring the power absorbed by the calibrating material. Deionized water is employed as the calibrating material. An approach is described for obtaining the relationship between the power density of a plane wave illuminating a parcel of material and the power absorbed by the parcel. Attention is given to aspects of power absorption in a chamber, the characteristics of power absorption by materials other than water, the experimental data needed, the plane-wave heating rate, the chamber heating rate, the equivalent plane-wave power density, and the variability of power absorption.

**A77 15490**


The BIOS-3 experimental complex was designed to test the feasibility of a life support system controlled autonomously from within by the inhabitants. The experiment lasted for six months, three men inhabiting the hermetic system simultaneously, and consisted of three stages: (1) the first stage used two equivalent phyotrons (a compartment of higher plants for photosynthesis), consisting of a wheat culture, and an assortment of vegetable plants, (2) the second stage one of the phyotrons was removed while a compartment of chlorella cultivators was introduced, and (3) the third stage used a phyotron which was exclusively an assortment of vegetable cultures. It was shown that an autonomous life control system using photosynthesis is feasible within a small confined space, but that immunological and microbiological research indicates that the medium created by the system is not fully suitable for man.

**A77 15524**

Adaptation to an 8-h shift in living routine by members of a socially isolated community D G Hughes (Alderhay Hospital, Liverpool, England) and S Folkard (Medical Research Council, Experimental Psychology Laboratory, Brighton, Sussex, England) Nature, vol 264, Dec 2, 1976, p 432-434 11 refs

The cost of categorization in visual search - Incomplete processing of targets and field items H Gietman (Pennsylvania, University, Philadelphia, Pa.) and J Jonides (Michigan, University, Ann Arbor, Mich.) Perception and Psycho-
A77-15617

A partial processing hypothesis is proposed to account for performance under a visual search condition where target and field items belong to the different conceptual categories, letter and digit (between-category search), as compared to a condition in which they belong to the same category (within-category search). This hypothesized mechanism implies that less information is registered and/or retained in between than in within-category search. This prediction was tested and confirmed in three experiments. The results indicate that both targets and field items are processed less deeply in between than in within-category search. (Author)

A77-15617 *  Head restraint enhances visual monitoring performance J S Warm, R G Wait (Cincinnati, University, Cincinnati, Ohio), and M Loeb (Louisville, University, Louisville, Ky) Perception and Psychophysics, vol 20, no 4, Oct 1976, p 299-304 22 refs Grant No NGL-36-004-014

Subjects monitored a visual display for occasional increments in the horizontal movement of a bar of light. When the display was viewed without head restraint, detection probability was directly related to the amplitude of the increments in movement which constituted critical signals and inversely related to background event rate (the frequency of neutral events in which critical signals were embedded). When positioning of the head was restrained by a headrest, the detectability of low-amplitude signals was enhanced considerably and the influence of background event rate was attenuated. The results are considered as providing further support for the importance of sense mode coupling in visual monitoring. (Author)

A77-15808  Negative aftereffects in visual perception O E Favreau (Montreal, Université, Montreal, Canada) and M C Corbalis (McGill University, Montreal, Canada) Scientific American, vol 235, Dec 1976, p 42-48 5 refs

It is found that, after looking at a bright light, a dark image of the object remains in the visual field for some time afterward. The phenomenon is called a negative afterimage. Attempts to understand visual aftereffects are discussed, taking into account investigations conducted by Plateau, the concept of normalization proposed by Gibson, the tilt aftereffect, general aspects of the neurophysiology of the visual system, and studies regarding the properties of neurons in the visual cortex of the cat brain. It appears that afterimages depend on the fatigue of cells in the early stages of visual processing. Figural and motion aftereffects appear to depend on properties of neurons at a higher level, perhaps in the visual cortex. (Author)

A77-16052  Photokeratography using moiré techniques M Chander, M M Bindal, A Kulshreshtha, and B K Agarwala (National Physical Laboratory of India, New Delhi, India) Applied Optics, vol 15, Dec 1976, p 2964, 2965 12 refs

The new technique for determining the corneal topography of the human eye described is a modification of the normal moiré technique (known as the oblique shadow method) for this purpose. The specific features of this modification are explained on the basis of a schematic of the experimental setup. Results obtained by the technique are presented. One is the modulated image of the grating on the corneal surface, obtained with single exposure, it shows how the grating lines are modulated over the corneal surface. Another result is a moiré contour photograph of the cornea, the moiré pattern was obtained by double exposure, superposing the unmodulated image of the grating over the reflected corneal image. (Author)
problem of studying these systems is undertaken with the goal of showing that techniques are now available which allows one to consider complex spatial organization in developing models for the study of the dynamics of biological systems. A specific example of the mitochondrial respiratory cycle in a stirred tank is given and this is contrasted to the situation where the outer membrane introduces the aspect of component transport. It is indicated that the complex reaction-diffusion systems one sees in single mitochondria as well as in aggregates of mitochondria are capable of multiple steady states and are also capable of establishing ion gradients as required for filtration in the proximal tubulars. Multiple steady states also allow for a switching process that can turn chemical reaction systems on and off. The techniques presented strongly suggest that many complex processes involving reaction-diffusion systems will exhibit multiple steady states and as such cannot be modeled by previous techniques which do not consider the structure.

Dissert Abstr

Michale K. Pinkstaff J. D. Thesis

Baylor University

THE HUMAN EYE AS A VISUAL ORIENTATION DETECTOR

Michael K. Pinkstaff

Baylor University

The interactions of spatial and chromatic (red and blue) channels in the human visual system are described. Results from psychophysical experiments have shown that superimposing a low luminance uniform background of one color upon a sinusoidal grating (4c/deg) of another color has no effect upon a subject's contrast threshold for that grating. This lack of contrast dilution was taken to indicate that, at low background luminance, the spatial pattern detectors responsible for detecting the gratings were color specific. Cross-color spatial adaptation is orientation specific. The orientation selectivities of same color and cross-color significant differences in either oxygen consumption or R Q were found. Analyses of metabolic rates employing past data were also performed and showed no seasonally linked change in sensitivity to the electromagnetic fields. Finally short term (one week) exposure of earthworms to the electromagnetic fields did not alter metabolic rates but confinement in nylon bags and translocation did thereby limiting meaningful conclusions.

Author (GRA)
effect of prolonged inhibition between orientation specific spatial excitation, it is suggested that such adaptation may be the after adaptation. When testing red gratings, the tuning curves were broader for cross-color (adapt blue test red) than for same-color (adapt red, test red) adaptation. The converse was true for testing blue gratings. As the experiments were so arranged that cross-color adaptation could not have been the result of direct test channel excitation, it is suggested that such adaptation may be the after-effect of prolonged inhibition between orientation specific spatial pattern detectors. 

**N77-12674#** Defence Research Board, Ottawa (Ontario)

**THE VESTIBULAR SYSTEM FOR EYE MOVEMENT CONTROL**


Available NTIS HC A13/MF A01

Inputs to the oculo-motor system are discussed using rotational and linear accelerative stimuli. Eye movements relative to head positions are discussed.

**N77-12675#** Defence Research Board, Ottawa (Ontario)

**PLASTICITY IN THE ADULT VESTIBULO-OCULAR REFLEX ARC**

G Melvill Jones In its DRB Aviation Med Res Unit Rept., Vol 5 Sep 1976 p 102-123 refs

Reflex movements of the eye are discussed in relation to vestibular contribution to orientation in adverse environments of flight and space.

**N77-12676#** Defence Research Board, Ottawa (Ontario)

**AN ADAPTIVE NEURAL MODEL COMPATIBLE WITH PLASTIC CHANGES INDUCED IN THE HUMAN VESTIBULO-OCULAR REFLEX BY PROLONGED OPTICAL REVERSAL OF VISION**

P Davies and G Melvill Jones In its DRB Aviation Med Res Unit Rept., Vol 5 Sep 1976 p 124-134 refs

A neural model was formulated to answer questions about changes between the vestibular and oculomotor system and whether these changes are responsible for complex gain phase behavior. It is shown that both excitatory and inhibitory influences can impinge simultaneously on cells in the vestibular nuclei projecting to the oculomotor system.

**N77-12677#** Defence Research Board, Ottawa (Ontario)

**THE RESPONSE TO SOUND OF IDENTIFIED RETICULO-SPIINAL CELLS**

S Rossignol In its DRB Aviation Med Res Unit Rept., Vol 5 Sep 1976 p 135-182 refs

Available NTIS HC A13/MF A01

The anatomy and physiology of reticulo-spinal (RS) cells were reported together with a comparison of the pattern of response to sound and other stimuli. Identification of RS cells was done by stimulating the ventral surface of the upper lumbar cord and recording extra-cellularly in the brain stem with large stainless steel microelectrodes. Because RS cells respond to sound and due to their role in locomotion, it was concluded that auditory influences on motor control may be mediated through reticulo-spinal pathways.

**N77-12678#** Defence Research Board, Ottawa (Ontario)

**SUBJECTIVE DETECTION OF VERTICAL ACCELERATION: A VELOCITY DEPENDENT RESPONSE?**

G Melvill Jones and L R Young In its DRB Aviation Med Res Unit Rept., Vol 5 Sep 1976 p 245-255 refs

Sponsored by NASA

Available NTIS HC A13/MF A01

Difficulties in the subjective tracking of the whole body vertical accelerative movement parallel to the long axis of the body is discussed. Whether the body is discussed which identified specifically the direction of imposed acceleration to be the difficulty rather than low sensitivity to vertical acceleration. The product of angular acceleration and time to detect proves to be constant over a wide range of suprathreshold step changes of angular acceleration. It is concluded that thresholds conditions are determined by the velocity attained rather than the acceleration amplitude for the semicircular canals.

**N77-12679#** Defence Research Board, Ottawa (Ontario)

**HUMAN SUBJECTIVE AND REFLEX RESPONSES TO SINSUSOIDAL VERTICAL ACCELERATION**

G Melvill Jones, R Roldh, and G H Downing In its DRB Aviation Med Res Unit Rept., Vol 5 Sep 1976 p 256-270 refs

Available NTIS HC A13/MF A01

Response characteristics are discussed of both subjective sensation and involuntary ocuomotor reaction to a wide range of sinusoidal frequencies of linear accelerations imposed in a vertical direction. Measurements of eye movements were conducted with eyes open behind blackout goggles at least 45 minutes dark adaptation to ensure minimal changes in electrooculographic gain. The results reveal quite different patterns of subjective and involuntary reflex dependence on the frequency of sinusoidal stimulation.

**N77-12680#** Methodist Hospital, Houston, Tex

**AUTOMATED ELECTROENCEPHALOGRAPHY SYSTEM AND ELECTROENCEPHALOGRAPHIC CORRELATES OF SPACE MOTION SICKNESS, PART 2**

James D Frost, Jr. 5 Nov 1976 25 p refs

(Contract NAS9-13870)

(NASA-CR-151106) Available NTIS HC A02/MF A01

Sleep pattern alterations were detected in two subjects by electroencephalographic, electrographic, and electromyographic monitoring before, during and after a 28 day bed rest. Standardized criteria were used for data analysis. During the second half of the bed-rest period, sleep latency and stage 3 increased, while total sleep time, stage 2, and REM latency decreased. In addition, during bed rest both subjects showed an increase in the number of REM periods and a slight increase in stage REM amount. No major alterations were seen in the recovery period. Of the alterations found to be associated with bed rest only one, the increase in stage 3 sleep, was also seen consistently during Skylab. Conversely, none of the post-flight changes seen following Skylab were observed during the post-bed-rest recovery period.

**N77-12681#** Witwatersrand Univ, Johannesburg (South Africa) School of Mechanical Engineering

**THE BEHAVIOUR OF SKIN TEMPERATURE PROFILES IN THE FOREARM OF A NUDE RESTING SUBJECT AT AIR TEMPERATURES FROM 24 C TO 34 C**

A M Patterson. Jul 1976 64 p refs


The transient responses of the temperature profiles during a period of four hours after entry into the climatic chamber are presented. The results show that the depth of a surface at which heat is believed to be released within the skin varies systematically with the rate of heat release, and depths of between 0.4 mm and 2.7 mm were observed in this study. A direct, in vivo determination of the thermal conductivity of unperfused skin tissue.
is also made, and the result 0.1 W/m K obtained. The fact that skin surface heat loss is predominantly accounted for by heat convected to the skin by blood is confirmed. Author

N77-12682# Istituto Superiore di Sanita, Rome (Italy) Lab di Fisica

REVIEW OF RADIOCHEMICAL METHODS FOR PU-239 DETECTION IN ENVIRONMENTAL AND BIOLOGICAL SAMPLES

S Greco, F Notargiaco, and C Riccobello 15 Oct 1975 39 p refs In ITALIAN, ENGLISH summary (ISS-R-75/12) Avail NTIS HC A03/MF A01

Radiochemical methods for detection and quantitative analysis of Pu-239 low levels in environmental (soil, water) or biological (urine, human wastes, etc.) samples are described. The methods include the ion exchange chromatography and the solvent extraction. The main physico-chemical properties of Pu-239 and its radiotoxic hazards are reviewed. Author (ESA)

N77-12683# Istituto Superiore di Sanita, Rome (Italy) Lab di Fisica

RADIATION EXPOSURE OF THE ITALIAN POPULATION DUE TO MEDICAL DIAGNOSTIC EXAMINATIONS IN 1974

S Benassi (CNEN, Rome), F Doboci (CNEN Rome) P L Indovina (Min della Sanita), E Prozzo L Puglioni P Salvadori, and A Susanna (CNEN, Rome) 20 Oct 1975 23 p refs Submitted for publication (ISS-P-75/13) Avail NTIS HC A02/MF A01

The genetically significant dose received by the Italian population due to diagnostic X-ray examination and radiopharmaceutical was investigated and preliminary results are presented. A rough estimation of dosage gives about 30 mrem, in good agreement with the values obtained from authors in different industrialized countries. These studies are being carried out to reveal eventual abuses of diagnostic radiation sources and to take adequate corrective measures. Author (ESA)

N77-12684# Istituto Superiore di Sanita, Rome (Italy) Lab di Fisica

HEALTH IMPLICATIONS OF THE RISKS CONNECTED WITH THE USE OF AMERICIUM 241 FOR LIGHTNING PROTECTION

M Belli, M Cremonese, and S Greco 10 Dec 1975 25 p refs In ITALIAN, ENGLISH summary (ISS-R-75/16) Avail NTIS HC A02/MF A01

Americium metabolism is reviewed together with some information on the biological and pathological effects following americium 241 contamination. In order to assess the risk due to the use of radioactive isotopes in lightning conductor installations and the resulting implications on public health, some aspects of radioprotection are presented and it is concluded that the use of americium 241 for lightning protection exposes the population to undue risks. Author (ESA)

N77-12685# Istituto Superiore di Sanita, Rome (Italy) Lab di Fisica

ELECTRON SPIN RESONANCE OF LYOPHILIZED BLOOD SAMPLE

M Bomba, M Flamini, P L Indovina, and A Rosati 11 Dec 1975 20 p refs In ITALIAN, ENGLISH summary (ISS-P-75/17) Avail NTIS HC A02/MF A01

Results obtained on lyophilized blood samples (whole blood, red cells, and plasma) from a control group are presented. The measurements show clearly the imperfections of the lyophilization method in obtaining reproducible results. Consequently, it is without any biological meaning. The electron spin resonance of lyophilized blood, at least in the region of free radicals, is unlikely to be of value as a diagnostic screening test for cancer. Author (ESA)

N77-12686# Illinois Univ., Chicago Dept of Materials Engineering


T Belytschko and L. Schwer Wright-Patterson AFB, Ohio AMPL Apr 1976 212 p refs (Contract F33615-74-C-5014) (AD-A025911, AMRL-TR-76-10) Avail NTIS HC A10/MF A01 CSCL 06/7

A three-dimensional, discrete model of the human spine, torso, and head was developed for the purpose of evaluating mechanical response in pilot ejection and it was developed in sufficient generality to be applicable to other body response problems, such as occupant response in aircraft crash and arbitrary loads on the head-spine system. There are no restrictions on the distribution or direction of applied loads, so a wide variety of situations can be treated. Results are presented for a variety of conditions, such as different rates on onset, ejection at angles, effects on lumbar curvature, and eccentric head loadings. It is shown that large initial curvatures and perfectly vertical acceleration loadings results in substantial flexural response of the spine, which causes large bending moments. It is further shown that the combination of the spine's low flexural stiffness, initial curvature, and mass eccentricity are such that stability cannot be maintained in a 10 g ejection without restraints or spine-torso-musculature interaction. Author (ESA)

N77-12687# Air Force Weapons Lab., Kirtland AFB, N Mex

ADJONT MONTE CARLO GENERATED RADIATION RESPONSE FUNCTIONS FOR THE B-1 AIRCRAFT Final Report

Albert J Alexander Apr 1976 54 p refs (AD-A025756, AFWL-TR-76-6) Avail NTIS HC A04/MF A01 CSCL 06/18

The adjoint Monte Carlo radiation transport technique is used to calculate radiation response functions for the B-1 aircraft. These radiation response functions are given for the neutron dose and also for the neutron plus the secondary gamma dose. The response functions are given for the head and stomach positions of the left front crew member. They can be varied with any angle and energy dependent neutron and/or gamma ray field exposure to give the radiation dose. The MORME multigroup, coupled neutron-gamma ray, Monte Carlo code is used for the adjoint transport in the B-1 aircraft which is modeled with combinatorial geometry. The theory and equations needed to evaluate the coupling integral in terms of the statistical weight of the adjunction on the coupling surface are developed. Author (ESA)

N77-12688# Army Aeromedical Research Lab., Fort Rucker, Ala

AEROMEDICAL REVIEW OF OXYGEN REQUIREMENTS OF US ARMY AVIATORS

Frank S Pettyjohn and Roderick J McNeal Apr 1976 24 p refs (AD-A024726, USAARL-76-19) Avail NTIS HC A02/MF A01 CSCL 06/19

Aeromedical review of US Army aircraft oxygen design criteria and military specification indicates physiologic inconsistencies. Oxygen duration charts in use for U-21 aircraft are computed on the basis of military specification using inspiratory minute volume (IMV) of 13.2 liters per minute (LPM), normal temperature (70F), pressure, dry (NTPD) Current oxygen duration charts for the RU-21 aircraft using constant flow regulator have overstated oxygen availability of 62.3% at 10,000 feet and 18.7% at 15,000 feet Type regulator and dilution schedule are listed for U-21 series aircraft. The current design inspiratory minute volume of 13.2 LPM NTPD is the basic design deficiency. The effects of the activity and stress of flight require an increase of design IMV. Author (ESA)

N77-12689# Human Factors Research, Inc., Goleta, Calif

MOTION SICKNESS INCIDENCE. EXPLORATORY STUDIES
Michael E McCauley, Jackson W Royal, C Dennis Wylie, James F O'Hanlon, and Robert R Mackie Apr 1976 63 p refs (Contract N00014-73-C-0040, NR Prog 105-841) (AD-A024709, Rept-1733-2) Avail NTIS HC A04/MF A01 CSCL 06/19
A series of experiments on human subjects assessed the effects of pitch and roll and habitation on motion sickness incidence (MSI). Pitch and roll angular accelerations even larger than expected at sea failed to systematically increase MSI habituation was evidenced in susceptible subjects who received consecutive daily 1-hour or 2-hour exposures to vertical motion habitation was greater for the longer exposure and the more severe motions. A mathematical model describing MSI as a function of the frequency and acceleration of vertical oscillation was refined by including exposure time as an independent variable. Investigation of frequencies of oscillation above 5 Hz confirmed the prediction of the model that MSI continues to decrease as a function of frequency for all frequencies greater than approximately 16 Hz.

N77-12690# Miami Univ., Oxford, Ohio
EFFECTS OF SOUND ON THE VESTIBULAR SYSTEM Final Report
D E Parker L A Ritz, R L Tubbs, and D L Wood Wright-Patterson AFB, Ohio AMRL Mar 1976 83 p refs (Contract F33615-73-C-0002, AF Prog 7231) (AD-A025565, AMRL-TR-75-89) Avail NTIS HC A05/MF A01 CSCL 06/5
Vestibular responses have been evoked from guinea pigs, monkeys, and human beings following stimulation with static pressure infrasound sustained audiofrequency sound, and repetitive audiofrequency transients. These observations lead to suggestions concerning the manner in which sound affects the vestibular receptors as well as to proposals concerning levels of sound exposure that might disturb human performance by influencing behaviors mediated at least in part by the vestibular system.

N77-12691# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio
EFFECTS OF ACCELERATION ON SELECTED SERUM ENZYMES Final Report, Mar - May 1974
Human volunteers were exposed to 30-second bouts of acceleration at 3, 4, 5, 6, and 7 G at each of three seat back angles on several different experimental days. Blood samples were taken immediately before the experiment and 24 hours later. Samples were analyzed for hematocrit, lactate dehydrogenase, lactate dehydrogenase isoenzyme distribution, creatine phosphokinase, creatine phosphokinase isoenzyme distribution, glutamate oxaloacetate transaminase and glutamate pyruvate transaminase. None of the tested biochemical parameters were outside normal clinical limits, however, small but statistically significant increases in creatine phosphokinase in two subjects and increases in lactate dehydrogenase and creatine phosphokinase in the subjects as a group were evident.

N77-12692# EEG Research Inst., Oslo (Norway)
CLEANCE AND SATURATION OF HYDROGEN GAS IN MAN WITH SPECIAL EMPHASIS ON THE BRAIN
Carl Wilhelm Sem-Jacobsen 1976 63 p refs (Contract N00014-72-C-0345)
[AD-A025592] Avail NTIS HC A04/MF A01 CSCL 06/19
Hydrogen gas clearance and saturation in the brain have been monitored in 22 subjects. The half-time for hydrogen gas clearance/saturation in the human brain may fluctuate between 1/2 minute and 30 minutes in grey matter and between 6 - 14 minutes in white matter. The half-time for hydrogen gas clearance and saturation in the ear-lobes may vary from 1 to 5 minutes, and from 2 to 20 minutes in the skeletal muscles. 8% CO2 added to the breathing air caused a drastic reduction of the half-time for saturation/clearance in certain areas in the brain. Changes in respiration produce great fluctuation in the half-time for gas clearance and saturation. Changes in blood flow in general or focal to some areas of the body produce drastic changes in the half-time for gas clearance and saturation to the involved area.

N77-12693# Joint Publications Research Service, Arlington, Va
USSR ACADEMY OF MEDICAL SCIENCES
A description of the USSR Academy of Medical Sciences, its components and membership is given.

N77-12694# Naval Postgraduate School, Monterey, Calif
THE EFFECT OF CONTINUOUS NOISE ON SHORT TERM MEMORY PERFORMANCE TASKS M S Thesis
Iver John Rivenes, Ill Sep 1975 33 p refs (AD-A025446) Avail NTIS HC A03/MF A01 CSCL 05/10
Naval officers routinely perform a number of tasks requiring short term memory under conditions of moderate background noise levels. The performance of 20 Navy officers on a serial short term memory task was analyzed under two levels of difficulty and two different sound levels. The purpose of the experiment was to determine whether moderate intensity, continuous noise had an effect on short term memory. Analysis of the data collected indicated that continuous noise at a sound level pressure of 85 dB had no effect on the subjects' short term memory. Levels of difficulty resulted in a significant difference in performance on the serial short term memory task used in this experiment.

N77-12695*# Illinois Univ., Urbana, Coordinated Science Lab
PILOT INTERACTION WITH AUTOMATED AIRBORNE DECISION MAKING SYSTEMS Semiannual Progress Report, May - Oct. 1976
William B Rouse, Yee-Yeen Chu, Joel S Greenstein, and Rex S Walden Oct 1976 50 p refs (Grant NSG-2119) Avail NTIS HC A03/MF A01 CSCL 05E
An investigation was made of interaction between a human pilot and automated on-board decision making systems. Research was initiated on the topic of pilot problem solving in automated and semi-automated flight management systems and attempts were made to develop a model of human decision making in a multi-task situation. A study was made of allocation of responsibility between human and computer, and discussed were various pilot performance parameters with varying degrees of automation. Optimal allocation of responsibility between human and computer was considered and some theoretical results found in the literature were presented. The pilot as a problem solver was discussed and the design of displays, controls, procedures and computer aids for problem solving tasks in automated and semi-automated systems was considered.
EFFECTIVENESS OF FOUR WATER COOLED UNDERGARMENTS AND A WATER COOLED CAP IN REDUCING HEAT STRESS

George F Fonseca Dec 1975 30 p refs
(A-D-A025216 USARIEM-T-23/76) Avail NTIS
HC A03/MF A01 CSCL 06/17
The cooling provided by four different water cooled undergarments was directly measured on a heated copper manikin dressed in a basic hot-weather flight coverall aircrew helmet socks and black boots. This cooling, which represents absorption of the heat produced by the metabolic processes of the body plus that from the ambient environment in the cabin, was found to be almost directly proportional to the difference between the manikin skin temperature and the temperature of the cooling water at the inlet to a water cooled undergarment. Isolation of the manikin surface from the hot environments was provided by only a water-cooled undergarment and the basic hot-weather clothing ensemble. Although these cooling garments did not by themselves completely isolate the manikin surface against heat gain from the hot environment, they did remove about one-half of the potential for heat gain from the ambient environment before the heat reached the manikin surface. The water cooled cap, which covered just the head (or only about 6% of the total body surface area) removed about 1/3 of the total metabolic heat production of a seated person.

N77-12697# Webb Associates, Yellow Springs, Ohio
SAMPLING AND DATA GATHERING STRATEGIES FOR FUTURE USAF ANTHROPOMETRY Final Report
Edmund Churchill Feb 1976 43 p refs
(Contract F33615-73-C-4086, AF Proj 7184)
(A-D-A025240, AMRL-TR-74-102) Avail NTIS
HC A03/MF A01 CSCL 06/5
Beginning with a comprehensive review of anthropometric resources already available, this report serves as a guide to more refined and less costly methods of acquiring needed anthropometric data to meet changing military requirements and to accommodate changing military populations. Many sampling schemes are described and evaluated for their utility in meeting specific USAF needs. Various measurement and sampling errors are discussed and the effects of each type of error on the statistics of major importance in design problems are explained. A multi-faceted plan for the future acquisition of USAF anthropometric data is recommended.

N77-12698# Army Materiel Command, Texarkana, Tex Intern Training Center
A FREE HEAD-MOVEMENT PUPILLOMETER SYSTEM Final Report
Alfred William Stillman Jr Aug 1975 70 p refs
(A-D-A025800, USAMC-ITC-02-08-75-114) Avail NTIS
HC A04/MF A01 CSCL 06/2
The report describes a realizable free head-movement solid-state pupillometer system using a 100-by-100 element charge-coupled device as the means of recording the diameter of the pupil of the eye. In this description are discussed basic concepts of pupillometers, charge-coupled devices and the application to pupillometry of one specific charge-coupled device with supporting solid-state circuitry integrated into this report are considerations of safety human factors and system maintenance.

N77-12699# Webb Associates, Yellow Springs, Ohio
STATISTICAL CONCEPTS IN DESIGN
John T McConville and Edmund Churchill May 1976 57 p refs
(Contract F33615-75-C-5003, AF Proj 7184)
(AD-A025750, AMRL-TR-76-29) Avail NTIS
HC A04/MF A01 CSCL 06/14
In seeking a manageable way to deal with variations for a large range of body sizes, it is a common practice for designers to use the height-weight distribution to demonstrate the usefulness of subgroups or undergarments. This study was designed to evaluate a psychomotor testing instrument known as the ZITA (Zero Input Tracking Analyzer). This instrument was being considered as a prediction device in the selection of applicants for the U.S. Navy aircrew training program. Analysis of the data obtained from six subjects (all U.S. Navy pilots) over 26 hours of testing showed the machine capable of consistent results in distinguishing between subjects with respect to this particular psychomotor task. A major disadvantage of the ZITA that became apparent was the amount of time (approximately 2 hours) required before learning curves were leveled out and the rate at which different individuals develop their learning curve.

N77-12701# Naval Postgraduate School, Monterey, Calif
AN ANALYSIS OF THE EFFECT OF A FLIGHT DIRECTOR ON PILOT PERFORMANCE IN A HELICOPTER HOVERING TASK M S Thesis
Timothy William Duffy Mar 1976 54 p refs
(AD-A025680) Avail NTIS HC A04/MF A01 CSCL 01/4
A fixed-base simulator evaluation of a flight director for maintaining longitudinal control of a helicopter in the hover mode of operation was made. Test subjects performed ninety-second precision hovering tasks utilizing two cockpit displays. The second display differed from the first only by the addition of the flight director indicator. The helicopter and each display were simulated on a hybrid computer. The hovering task consisted of minimizing root mean square longitudinal and vertical deviation from an initial equilibrium position. Root mean square performance data and numerical pilot opinion ratings were obtained. These data indicated significant improvement in performance when the flight director was being utilized.

N77-12702# Michigan Univ, Ann Arbor Highway Safety Research Inst
A PREDICTION OF RESPONSE OF THE HEAD AND NECK OF US ADULT MILITARY POPULATION TO DYNAMIC IMPACT ACCELERATION FROM SELECTED DYNAMIC TEST SUBJECTS Annual Report, Apr 1976 - Apr 1977
L W Schneider, B M Bowman, R G Snyder, and L S Peck May 1976 164 p refs
(Contract N00014-75-C-1077, NR Proj 105-832)
(AD-A025785, UM-HSRI-76-10, ATR-1) Avail NTIS
HC A08/MF A01 CSCL 06/19
Physical characteristics of the head and neck were measured on 18 male Navy volunteers who had previously undergone testing on the NAMRL sled facility at Michoud Station, New Orleans. Measurements include 55 standard anthropometric measures, 32 anthropometric measures of the seated subject, three dimensional head and neck range of motion neck muscle reflex times in response to head jerks and neck muscle voluntary isometric strength. These latter measurements were taken in both the sagittal and lateral planes. Measurement results were used to establish parameter values for the MVMA-2D Crash Victim Simulator data set in an attempt to reproduce the dynamic response of these volunteers to Gx sled acceleration at 6 and 15 G's. Procedures used for computing the various parameter values and comparisons between predicted and experimental results are presented in addition measurement data for 18-24 year females taken previously have been utilized to predict the dynamic response that would be expected if these subjects were tested at 6 and 15 G's.

N77-12703# Aerospace Medical Research Labs Wright-Patterson AFB, Ohio

TEST PLOT EVALUATION OF A RECLINED COCKPIT SEAT AS AN AID TO G TOLERANCE AND PERFORMANCE Final Report, Sep 1973 - Mar 1975
John W Frazier and Kenneth W McElreath Jan 1976 24 p refs (AF Proj 72222) (AD-A025784. AMRL-TR-75-73) Avail NTIS HC A02/MF A01 CSCL 06/17

Twenty-two student test pilots have participated in closed-loop tracking indoctrination runs on the Dynamic Environment Simulator. Each pilot flew through a series of profiles up to 6 G in both the conventional upright seat position and a 55 deg tilt back seat position. The subjective responses and pilot questionnaires are presented.

N77-12704# Naval Aerospace Medical Research Lab Pensacola, Fla

DEVELOPMENT OF A PROTOTYPE EXPERIMENTAL PLAN TO EVALUATE STABILIZED MEASURES OF AIRSICKNESS POTENTIAL W Carroll Hixson Fred E Guedry, Jr Joel W Norman D Glick, and Roger W Wiley 8 Mar 1976 27 p refs Sponsored in part by Army (AD-A025455 NAMRL-1223 USAARL-76-15) Avail NTIS HC A03/MF A01 CSCL 05/8

Investigators at the Naval Aerospace Medical Research Laboratory and the U S Army Aeromedical Research Laboratory conducted a combined field and laboratory study to evaluate observer performance while using an improved XM-76 stabilized viewing device. Air-to-ground observations were made in a UH-1 aircraft flying maneuvers modeled in part after a scout helicopter scenario. The experimental protocol was such that visual acuity data were collected under three different observation conditions: with the naked eye with XM-76 operated in its normal stabilized mode and with the XM-76 operated in a caged or nonstabilized mode. Measurements of selected airsickness symptoms were derived from an onboard flight observer and from postflight questionnaires. The resulting data indicate that the level of airsickness symptoms manifested by the subject group while using the device was higher than the baseline level present when the observations were made without the device. In contradiction to the hypothesis that the stabilization feature of such devices increases the airsickness potential, the general trend of the data showed the opposite effect.

N77-12705# Quest Research Corp. McLean, Va

FEASIBILITY OF IMPLEMENTING SPECIFIC PERFORMANCE MEASUREMENT TECHNIQUES Final Report

Diane G Loental Wright-Patterson Air Force Base, Ohio

The report presents two techniques for performance measurement in a manned weapon system. The particular system studied was the F-106 coplanar attack simulator located at the Systems Effectiveness Branch, Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio. The first technique involves the theoretical model of the human operator's flight control policies on the simulator. The second technique is empirical and derives performance measures from the simulator data.

N77-12706# Federal Highway Administration, Washington, D C

Traffic Systems Div

THE EFFECT OF AUDITORY AND VISUAL PRESENTATION OF NAVIGATIONAL MESSAGES ON MESSAGE RETENTION Final Report
Frank P Gatting Jun 1976 27 p refs (PB-256599/2 FHWA-RD-76-94) Avail NTIS HC A03/MF A01 CSCL 06J

Navigational messages containing from two to seven units of information were presented to three groups of subjects. One group of subjects received the messages after they had seen an alerting sign and, in response to the sign, turned the radio to a specified frequency to receive the message (manual group). A second group received the messages automatically and aurally (automatic group). The third group received the information visually. Performance of the three groups is compared.

N77-12707# Virginia Polytechnic Inst and State Univ., Blacksburg Dept of Aerospace and Ocean Engineering

NOTES ON THE COMPUTATION OF THE GENERALIZED ZETA AND DIGAMMA FUNCTIONS WITH PROGRAMS AND TABLES

Function subprograms for the computation of the digamma function and generalized zeta function are presented. Some new analytic results are given, and tables of 20 place values of the functions are provided in order to check the computer codes. The digamma function is tabulated for x = 0 5(0 5)10. and the generalized zeta function is given for s = 2(1/42 a = 0 05(0 5)1 12(5)10(1)21 Author (GRA)

N77-12708# Advisory Group for Aerospace Research and Development, Paris (France)

VISUAL AIDS AND EYE PROTECTION FOR THE AVIATOR

Information concerning visual aids and eye protective devices used by the aviator is discussed. Among the topics considered were protection from retinal burns and flash blindness due to atomic flash, vision with the AN/PVS-5 night vision goggle in-flight evaluation of optically stabilized target acquisition devices, and the correction of presbyopia.

N77-12709# Royal Aircraft Establishment Farnborough (England) Neurosciences Div

EYE PROTECTION, PROTECTIVE DEVICES AND VISUAL AIDS
The role of image intensifiers in aviation is also discussed in the Aviator Oct 1976 p 12 which provide sufficiently rapid decrease in transmitted light from ultraviolet, visible and infrared radiation encountered in nuclear explosions. Recent technological developments have resulted in additional functions being assigned to the helmet and visor. The additional functions range from static aids for distant vision to dynamic displays of information for use in weapon control and guidance, and aircraft management and situational information. Basic requirements for the protective equipment were established. The expanded functions for the protective equipment require that modifications be made in the equipment configuration. The modifications must be accomplished without sacrificing the basic functions of protection. Accomplishment of these two goals requires cooperation between the display designers and crew equipment specialists.

Transparent ferroelectric ceramic material, lead lanthanum zirconate titanate (PLZT), has enabled the development of large aperture electrooptic shutters in goggle or window type formats. Modifications must be accomplished without sacrificing the basic functions of protection. Accomplishment of these two goals requires cooperation between the display designers and crew equipment specialists.

Visualization with the AN/PVS-5 night vision goggle was measured. Visual modulation transfer functions of the man-goggle system were determined and compared to results obtained with unaided viewing. The man-goggle system performance was superior to unaided visual performance at average target luminances equivalent to 5% and 25% moon illuminances. A target luminance equivalent to a full moon illuminance, unaided visual performance was superior at higher spatial frequencies, while remaining poor at the lower spatial frequencies. Using a modified Howard-Dolman apparatus, it was determined that the stereoscopic threshold was degraded with the man-goggle system. Field measurements of relative depth discrimination using all available visual cues showed that performance of the man-goggle system was statistically equivalent to unaided photopic visual performance at intermediate viewing distances, but was inferior to unaided viewing at distances of 500 feet or greater.

vision dimming is a temporary deficit in visual perception in a subject submitted to intense luminous energy, at a level higher than that of his level of adaptation. Electrodes were implanted in a monkey and a rabbit to study the electrophysiological rectification and behavior caused by glare. The time of recuperation is measured.
when the device was stabilized and the magnitude when caged

N77-12717

IN-FLIGHT EVALUATION OF HAND-HELD OPTICALLY STABILIZED TARGET ACQUISITION DEVICES

David D Glick In AGARD Visual Aids and Eye Protection for the Aviator Oct 1976 p 13

Avail NTIS HC A05/MF A01

Several target acquisition devices are compared in-flight Considering size, weight complexity, and performance in an in-flight visual acuity task one of the devices looked promising. A group of twenty-nine subjects used a single device in a scout helicopter flight scenario. The device produced motion sickness and the experimental plan was designed to assess this as well as visual acuity in flight. The subjects flew the scenario first with unaided eye and then with the device in both a stabilized and unstabilized (caged) mode. The latter two flights were counterbalanced across subjects. Following the flight phase, the subjects were given a series of tests to evaluate individual susceptibility to motion sickness. Performance in the visual acuity task was significantly correlated with the alertness rating of an on-board experimenter however there was no significant difference between the magnitude of the symptoms observed when the device was stabilized and the magnitude when caged.

Author

N77-12718

ON THE HABITABILITY OF MARS: AN APPROACH TO PLANETARY ECOLOGY

M M Averner, ed and R D MacElroy ed Washington 1976 114 p refs (NA-SP-414) Avail NTIS HC A06/MF A01 CSCL 06F

The possibility of utilizing Mars as a habitat for terrestrial life, including man, is examined. Available data assumptions and speculations on the climate, physical state and chemical inventory of Mars are reviewed and compared with the known requirements and environmental limits of terrestrial life. No fundamental, insuperable limitation of the ability of Mars to support a terrestrial ecology is identified. The lack of an oxygen-containing atmosphere would prevent the unaided habitation of Mars by man. The present strong ultraviolet surface irradiation is an additional major barrier. The creation of an adequate oxygen and ozone-containing atmosphere on Mars may be feasible through the use of photosynthetic organisms. The time needed to generate such an atmosphere, however, might be several millions of years. This period might be drastically reduced by the synthesis of novel, Mars-adapted, oxygen producing photosynthetic strains by techniques of genetic engineering, and modifying the present Martian climate by melting of the Martian polar caps and concomitant advective and greenhouse heating effects.

Author

N77-13635

COMPUTER BASED ELECTRON BEAM TREATMENT PLANNING Ph D Thesis

Joseph Yen Ting 1976 305 p

Avail Univ Microfilms Order No 76-24970

The development of a computer based system for electron beam treatment planning in radiation therapy is discussed. Two major projects were completed to obtain the required data and machine information. (1) A hardware-software project to obtain tissue density of internal structures of patients and (2) a detailed study of the radiation characteristics of the 88-45 MeV. An electronic device was designed and built to accept transmission intensity data from patients examined with a dual probe scanner and to transmit this data to a large time sharing computer nearby.

Dissert Abstr

N77-13636

Iowa Univ Iowa City


Joseph Marcus Winston 1976 115 p

Avail Univ Microfilms Order No 76-26351

The hypothesis that there are non-carboxy/hemoglobin related actions of carbon monoxide which contribute to its lethality was investigated. Possible clinically significant interactions between carbon monoxide and drugs were also studied. An experimental design was developed which included determining the effect of various pretreatments including drugs and acute pre-exposure to carbon monoxide or hypoxic hypoxia, on carbon monoxide and hypoxic hypoxia lethality. If the lethal mechanism of carbon monoxide and hypoxic hypoxia are the same it was felt that pretreatments should alter lethality in a similar manner. Differing alternations of lethality by pretreatments would be evidence for different lethal mechanisms of carbon monoxide and hypoxic hypoxia.

Dissert Abstr

N77-13637

Wayne State Univ Detroit Mich


Larry Allen Frazer 1976 106 p

Avail Univ Microfilms Order No 76-26130

The relationship between acoustic reflexes and loudness discomfort levels was investigated. Acoustic reflex thresholds and loudness discomfort levels were obtained from sixteen normal hearing subjects for nine stimuli including speech babble, a 1000 Hz pure tone and seven noise bands centered around 1000 Hz (10 Hz 30 Hz 100 Hz 1/2, 1 2, and 4 octaves). Acoustic reflex thresholds were measured on an electroacoustic impedance bridge and subjects tracked their loudness discomfort levels through the use of a recording attenuator. The study was designed to compare the acoustic reflex and loudness discomfort level across different methods of stimulus presentation. The data were compiled to determine the relationship between reflex and loudness discomfort levels.

Dissert Abstr

N77-13638

Washington Univ Seattle

EFFECTS OF RATE AND DIRECTION OF AIR PRESSURE CHANGES ON TYPANOMETRY Ph D Thesis

Peggy Sue Williams 1976 178 p

Avail Univ Microfilms Order No 76-25472

The effect of the variables of rate and direction on automatic tympanometry are explored. Three features of the tympanogram that might be affected by these variables, peak amplitude, peak pressure and shape, were examined in two distinctly different populations. Group I subjects had normal tympanic membranes, and Group II subjects had flaccid tympanic membranes. Both groups had apparently normal middle ear function as determined by direct examination. The tympanogram was generated by...
manipulation of the rate of air pressure change and (2) what effect on amplitude and shape of the tympanogram is generated by manipulation of the direction of air pressure change? The rate of air pressure change alters the amplitude of tympanograms in both groups and direction has no effect. 

Dissert Abstr

N77-13639 Wichita State Univ. Kansas

HEMISPHERIC ASYMMETRY OF PERCEPTUAL AND ELECTROENCEPHALIC RESPONSES TO SPEECH STIMULI Ph D Thesis

Marilyn Park Warren 1976 259 p

Avail Univ Microfilms Order No 76-25358

Stimulus and task effects on perceptual and electroencephalographic asymmetry of responses to speech stimuli were examined in a two-part investigation. A total of 18 subjects listened to diphthong and diphthong consonant-vowel (CV) syllables consisting of a voiceless bilabial stop (/p/ /t/ /k/) plus the vowel /a/ spoken by a man, woman, or child. The stimulus tape contained equal numbers of four types of CV pairs: diphthong CV/diphthong voice, diphthong CV/diphthong voice, diphthong CV/diphthong voice, and diphthong CV/diphthong voice. Subjects heard all stimuli twice, once performing a phonemic discrimination task in which they identified the two CVs which they perceived and once performing a non-phonemic discrimination task in which they identified the two voices they perceived. Results for 12 right-handed female subjects showed a right ear advantage for the phonemic discrimination task but no ear advantage for the non-phonemic discrimination task. 

Dissert Abstr

N77-13640 Illinois Univ. Urbana-Champaign

INEQUALITY BETWEEN INSPIRED AND EXPIRED GASEOUS NITROGEN IN MAN FACT OR TECHNICAL ARTIFACT? Ph D Thesis

Ingird Charlotte Kuprat 1976 132 p

Avail Univ Microfilms Order No 76-24122

Gaseous N2 exchange was measured in nine healthy young men once while fasting and once 1 1/2 hours after high protein ingestion. Data were collected during bed rest for the last 3 hours of a 17-hour period of controlled diet, environment and activity. On the average, an N2 inequality was observed. High protein ingestion resulted in a significantly greater N2 evolution than fasting. However, there was a significant linear trend in the mean N2 evolved each hour. From comparison of the observed variations with subjects, diet, and time with the expected variation of instrumentation to measure N2 it concluded that inequality between the minute volume of N2 inspired and expired at rest is a real phenomenon not a technical artifact. These results raise questions as to the universal applicability of the traditional open-circuit technique for measuring respiratory gas exchange, which assumes that N2 inspired equals N2 expired.

Dissert Abstr

N77-13641 Ohio State Univ. Columbus


James Patrick Ary 1976 108 p

Avail Univ Microfilms Order No 76-24551

Stimulation of left or right half visual fields produces different evoked potential distributions across the occipital scalp. One model for the source of this potential distribution is an equivalent dipole located near the medial fissure and oriented tangential to the occipital scalp. It was found that stimulating with white lateral half checkerboard flashes produces two changes: (1) a shift toward a scalp surface-radial evoked potential distribution, and (2) a shift of localization toward the midline. To clarify the color dependence of this effect the brightness of the adapting field was raised above rod saturation to 2 000 cd/sq m and flashed checks of four different colors were employed as stimulus. Two of the three subjects tested showed potential distributions for yellow stimuli which were distinctly different from the distributions for the other colors.

Dissert Abstr

N77-13642 Washington Univ. Seattle

TRANSIENT RESPONSES TO SHIFTS OF ANGLE OF ILLUMINATION IN RETINAL NEURONS Ph D Thesis

Jack Henrik Belgum 1976 79 p

Avail Univ Microfilms Order No 75-25388

Intracellular recordings were made from Necturus retinal neurons. The retina was alternately illuminated by either of two large overlapping fields of background light incident upon the retina at different angles. A test flash of the same angle of incidence as one of the two backgrounds was presented on each background in turn. The intensity of one of the two backgrounds was systematically varied over a range of intensities likely to include an intensity matching the other background. Cells exhibiting the properties of receptors responded to each exchange with a transient hyperpolarization that could not be explained by an intensity mismatch. Bipolar cells produced equal and substantial responses to both exchanges at the matched intensity, as did amacrine cells. Ganglion cells also produced transient responses to exchange.

Dissert Abstr

N77-13644 Virginia Univ. Charlottesville

THE MICROCIRCULATORY BASIS OF FUNCTIONAL HYPEREMIA IN STRIATED MUSCLE Ph D Thesis

Richard John Gorczyzynski 1976 215 p

Avail Univ Microfilms Order No 76-25012

An investigation of the microcirculation of striated muscle was undertaken in an effort to (1) directly describe the behavior of the arterioles and capillary bed during striated muscle contraction (2) investigate the hypothesis that a change in the oxygen tension of contracting striated muscle is involved directly by an effect on the vascular smooth muscle of the arterioles or indirectly, via an effect upon striated muscle metabolism in the medication of contraction induced arteriolar vasodilation and (3) to investigate the possibility that the release of potassium by active muscle mediates the initiation of functional arteriolar vasodilation during contraction. Experiments were performed on the cremaster muscle of hamsters prepared for in vivo microscopy of the microcirculation.

Dissert Abstr

N77-13645 California Univ., Los Angeles

HUMAN EEG RESPONSE TO CERTAIN RHETORIC PATTERNED AUDITORY STIMULI, WITH POSSIBLE RELATIONS TO EEG LATERAL ASYMMETRY MEASURES AND EEG CORRELATES OF CHANTING Ph D Thesis

Linda Jean Rogers 1976 119 p

Avail Univ Microfilms Order No 76-25237

Dissert Abstr
MUSCLES Ph D Thesis
TION IN A HOT ENVIRONMENT PhD Thesis
controlled (and reasonably repetitive) activity cycles for different
The superficial muscles of the lower extremity are considered
load and speed variations during human activities is examined
EFFECT OF LOAD, SPEED, AND CONFIGURATION ON THE
superficial muscles are treated by several data analysis techniques
A specially instrumented bicycle ergometer is used to provide
Norman Richard Miller 1976 437 p
were compared to their own normally hydrated control responses
sustained a diuresis of at least 12 ml/minute for 45 minutes,
expanded 1-2% above resting control values when hyperhydra-
replaced all fluids lost After each resting subject
ingestion distilled, deionized water (37 C) with a volume equal
to 2% of individual body weight and then sustained by periodic
under the same test conditions Hyperhydration was evoked by
he exercised on a bicycle ergometer for two consecutive thirty
Plasma volume varied inversely with both ambient
temperature and exercise level when normally hydrated but
of all fluids lost After each resting subject
a diuresis of at least 12 ml/minute for 45 minutes,
expanded 1-2% above resting control values when hyperhydra-
et and exercising in the 23 C environment Plasma osmolality
of individual body weight and then sustained by periodic
in the 23 C environment Plasma osmolality
increase approximately 4% in the presence of this expanded plasma volume

N77-13647 Wisconsin Univ Madison
EFFECT OF LOAD, SPEED, AND CONFIGURATION ON THE
The feasibility of utilizing the electromyographic output of
The feasibility of using the electromyographic output of
the skeletal muscles (in conjunction with a mathematical
model) for quantification of muscle response to load and speed variations during human activities is examined
The superficial muscles of the lower extremity are considered
A specially instrumented bicycle ergometer is used to provide
controlled (and reasonably repetitive) activity cycles for different
load and speed conditions The electromygograms from ten
superficial muscles are treated by several data analysis techniques
including spectral evaluations of the nonstationary signal A
digital computer is described The IBM-380 computer was used to
digitize and filter the EEG signals for processing on an IBM-370
computer Using FORTRAN 4 the following spectra can be
calculated auto spectrum, cross-spectrum, and coherence
function The reliability of these spectra is discussed and the
Spast (spontaneous activity) program is designed with the
EEG recording system was tested by noise measurement, involving
Fourier transformation

N77-13650# Navys: Medical Research and Development
BIBLIOGRAPHY OF REPORTED BIOLOGICAL PHENOMENA
(AFFECTS) AND CLINICAL MANIFESTATIONS ATTRIBUTED TO MICROWAVE AND RADIO-FREQUENCY RADIATION, SUPPLEMENT NUMBER 7 Medical Research
Zorach R Glaser May 1976 30 p refs
More than 350 additional references on the biological
references to radiofrequency and microwave radiation, published
up to May 1976, are included in this bibliography of the world
literature Particular attention has been paid to the effects of
non-ionizing radiation on man at these frequencies The cit-
tations are arranged alphabetically by author (where possible), and
contents as much information as possible so as to assure effective
retrieval of the original documents Soviet and East European
literature is included in detail This report is the seventh
supplementary 'up-dated bibliographic listing to Naval Medical
Research Institute

N77-13651# Nederlands Instituut voor Praeventieve Geneeskunde TNO Leiden
WORKLOAD OF THE RADAR-AIR TRAFFIC CONTROLLERS AT SCHIPHOL Interim Report [INTERIMRAPPORT WERKBELASTING RADAR-LUCHTVERKEERSLEIDERS SCHIPHOL]
C K Peaemoog Jun 1975 29 p refs In DUTCH
The workload at the Amsterdam airport was measured with a
view to analyzing mental load factors and to studying the
effect of task performance on the air traffic controller Number
and content of the air traffic information strips, radio telephony
communication coordination with other air traffic sectors and
telephone calls with other air traffic control centers were registered
for five air traffic controllers during the week of Aug 6 1973
The results of the task analysis parameters were evaluated and
preliminary conclusions were made

N77-13648# Nederlands Instituut voor Praeventieve Geneeskunde TNO Leiden
STARRAHG INTERIM EVALUATION REPORT, MAY 1975 - APRIL 1976
15 Jun 1976 164 p
NASS-13170)
(LMSC-1500704) Avail NTIS HC AOT/MF A01 CSCL 06/8
The primary goals of the STARRAHG Program are to provide
data for developing health care for future manned spacecraft,
and to establish the feasibility of the STARRAHG concept for
improving the delivery of health care to remote areas on earth
Accordingly, the hardware and medical evaluations initiated during

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N77-13652# Tufts Univ., Medford, Mass Inst for Praxiological Research
HUMAN FACTORS ENGINEERING BIBLIOGRAPHIC SERIES VOLUME 5 1967 LITERATURE
This document is the fifth in a series of bibliographies covering the human factors engineering literature. It covers most of the journal target articles for the year 1967 GRA

N77-13663 Wayne State Univ., Detroit, Mich
VALIDATION STUDY OF THREE-DIMENSIONAL CRASH VICTIM SIMULATOR FOR PEDESTRIAN-VEHICLE IMPACT Ph.D Thesis
Arvind Jiwajee Padgaokar 1976 315 p
Avail Univ Microfilms Order No 76-26164
Minimizing injury during pedestrian vehicle impacts is studied using analytical simulation. The bases for the validation of a complex three-dimensional model are proposed. A method for the accurate measurement of three dimensional angular acceleration was developed and used to define completely the kinematics of the pedestrian three dimensional motion. For the sake of interchangeability of data, anatomically based coordinate systems were defined for many body segments using anthropometric landmarks. A brief description of the three-dimensional crash victim simulator is given. Impact data obtained under three different situations were used for validation of the model. A comparison between the experimental response and that generated by the analytical simulation was made. Dissert Abstr

N77-13664 Wayne State Univ., Detroit, Mich
FULL SCALE EXPERIMENTAL SIMULATION OF PEDESTRIAN-VEHICLE IMPACTS Ph.D Thesis
Kenneth Wayne Krieger 1976 250 p
Avail Univ Microfilms Order No 76-26150
A series of eight full-scale experiments simulating pedestrian vehicle impacts was carried out using an extensively instrumented anthropomorphic dummy and four equally well instrumented unembalmed cadavers. Tests sought to establish body segment kinematics including linear and angular acceleration. Impact characteristics during initial contact with the vehicle were studied in relation to those during subsequent ground contact. Further experiments were performed to determine force distribution characteristics of vehicle-pedestrian contact. Anthropometric (inertial) properties of human body segments and spring and viscous coefficients of the joints and joint stops. Dissert Abstr

N77-13665# Martin Manetta Corp., Denver, Colo
COMPARISON OF THE NONLINEAR DYNAMIC CHARACTERISTICS OF BARBER S-2 AND ASF RIDE CONTROL FREIGHT TRUCKS
This report describes an experiment conducted to provide data for constructing a mathematical pilot model for low visibility landing. The experiment was conducted using a hybrid flight simulator equipped with a three degree of freedom motion system and a terrain board visual system. The aircraft simulated was a C-135B and low visibility was simulated using a sky plate in relation to these models. The experimental task consisted of a single axis tracking task under additional workload. The three controlled elements used were a simulated transport aircraft at three different center of gravity positions, at which it was stable, neutral, and unstable respectively. The forcing function was a gust signal acting on the simulated aircraft. The additional loading task was an auditory choice task. The results of the experiment tend to favor the single-channel model of human information processing. Author (ESA)

N77-13666# Air Force Flight Dynamics Lab, Wright-Patterson AFB, Ohio
LOW VISIBILITY LANDING PILOT MODELING EXPERIMENT AND DATA, PHASE I Final Report, May-Sep 1974
Randall V. Gressang, Daniel L. Kugel, John R. Stone, and Joseph E. Pollard Apr 1976 394 p refs (AF Proj 2187) (AD-A025865, AFFDL-TR-75-41) Avail NTIS HC A03/MF A01 CSLC O1/2
This report describes an experiment conducted to provide data for constructing a mathematical pilot model for low visibility landing. The experiment was conducted using a hybrid flight simulator equipped with a three degree of freedom motion system and a terrain board visual system. The aircraft simulated was a C-135B and low visibility was simulated using a sky plate in the visual system. Pilots were obtained from the USAF Instrument Flight Center. Gust disturbances were used to increase pilot workload. The worst visibility simulated was Category 2 minimums. GRA

N77-13667# Army Combined Arms Combat Developments Activity, Fort Leavenworth, Kans
ANALYSIS OF PHASE II A OF FE 438
This report analyzes data collected from Field Experiment 438 on the ground-to-air visual detection experiment. Phase IIA was a one-sided experiment using AH-1G and OH-58 helicopters for detection at ranges from 1 to 5 kilometers by ground observers with unaided vision. The experiment provided
data on the time required for a ground observer to detect an
observation helicopter an attack helicopter (AH) or an attack
helicopter team (AHT) and the frequency of detection for each
configuration while situated in a firing position Independent
variables tested in the experiment were range, search sector,
canopy or no canopy helicopters lateral or no lateral movement
sky or terrain background single ship or helicopter team
presentation and for multiple pop-up tactics elapsed time between
first and second pop-up and location of the second pop-up
with respect to the initial pop-up Data gained from this
experiment when coupled with data from Phase IIB the
air-to-ground experiment will produce information required to
develop helicopter employment tactics Detection time determined
from the analysis of the data will be used in subsequent
experiments as a guide for constraining helicopter pop-up times
to reduce AHT vulnerability

N77-13660 Aeronautical Systems Div, Wright-Patterson AFB
Ohio A SCORING SYSTEM FOR THE QUANTITATIVE EVALUA-
TION OF PILOT PERFORMANCE DURING MICROWAVE
LANDING SYSTEM (MLS) APPROACHES Interim Technical
refs (AD-A025782, ASD-TR-75-17) Avail NTIS HC A02/MF A01
CSCL 05/9

The Crew Station Design Facility's scoring system for ILS
approaches and landings has been extended for use with
Microwave Landing System (MLS) approaches. The philosophy
of scoring systems is briefly discussed and the rationale for
this application is developed

N77-13661 Army Aeromedical Research Lab Fort Rucker, Ala
DYNAMIC VISUAL ACUITY IN FATIGUED PILOTS Final
Report Isaac Behar K A Kimball, and D A Anderson Jun 1976
15 p refs (DA Proj 3AO-62110-A-819)
(A-D-A027663 USAARL-76-24) Avail NTIS
HC A02/MF A01 CSCL 17/8
Six rotary wing aviators were subjects in a continuous
operation regimen involving some 12 hours of flying and 3.5 hours
sleep daily for five days. Estimates of performance on a dynamic
visual acuity (DVA) task were obtained several times each day
during the study using target velocities of 25 deg and 40 deg/sec.
DVA performance varied significantly during the fatigue regimen
when measurements were made with target velocities of 40
deg/sec, with lower velocity targets differences in DVA scores
were not significant This indicates the need to tax the oculomotor
system to demonstrate fatigue effects Fatigue effects were
partially obscured by practice effects which are considerable in
the DVA task DVA scores correlated only modestly with subjective
estimates of fatigue intensity and flying performance and IP
ratings of performance, but the cluster of correlations provided
a consistent picture

N77-13971 European Space Agency Pans (France)
DISCRETE TIME MODELLING OF HUMAN PILOT BEHAV-
IOUR Dominique Soulages, Daniel Cavalli et al In its La Rech
Aerospatiale, Bi-monthly Bull No 1976-2 (ESA-TT-352) Nov
1976 p 1-25 refs Translated into ENGLISH from La Rech
Aerospatiale, Bull Bimestriel (Pans), no 1976-2, Mar-Apr 1976
P 63-73 Presented at the 11th Ann Conf on manual Control,
Moffett Field, Calif., 21-23 May 1975
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**AEROSPACE MEDICINE AND BIOLOGY** / A Continuing Bibliography (Suppl. 165)  
MARCH 1977

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The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added separated from the title by three hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

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