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STAR (N-10000 Series) N81-10001 – N81-12010

IAA (A-10000 Series) A81-10001 – A81-12784

AEROSPACE MEDICINE AND BIOLOGY

**A CONTINUING BIBLIOGRAPHY
WITH INDEXES**

(Supplement 216)

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 January 1981 in

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



Scientific and Technical Information Branch

1981

National Aeronautics and Space Administration

Washington, DC

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 120 reports, articles and other documents announced during January 1981 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.

Two indexes -- subject and personal author -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1981 Supplements.

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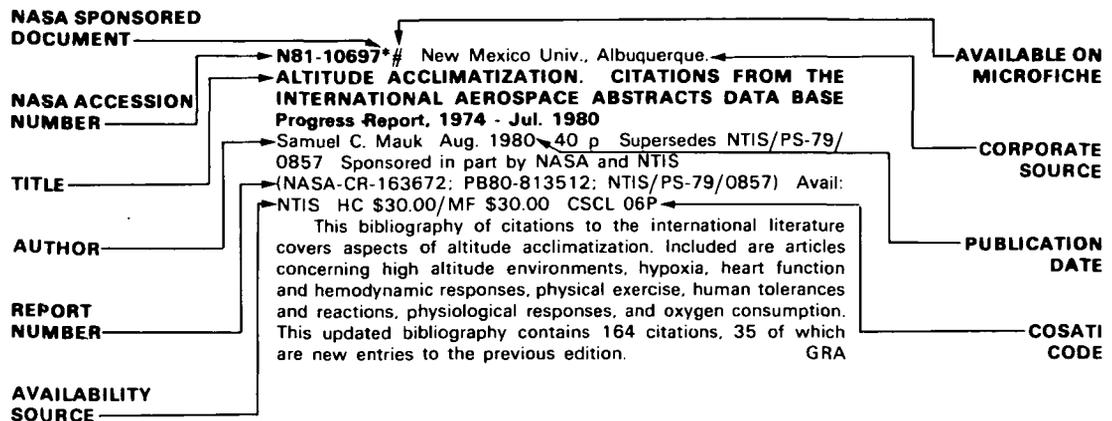
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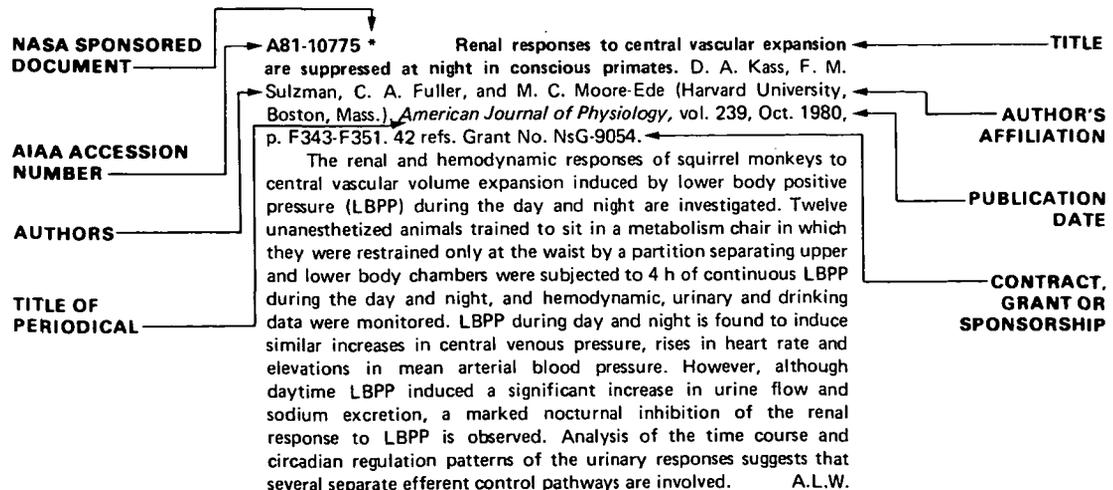
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TYPICAL CITATION AND ABSTRACT FROM IAA



AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 216)

FEBRUARY 1981

IAA ENTRIES

A81-10050 # Some aspects of sensing the ambient medium (Problemy vospriiatiia vneshnei sredy). A. K. Platonov. In: Scientific problems of robot technology (Nauchnye problemy robototekhniki). Moscow, Izdatel'stvo Nauka, 1980, p. 50-61. In Russian.

Some aspects of organizing the measurement of the characteristics of the ambient medium in the information systems of sensing robots are examined. Problems involved in the construction of ambient-medium models are classified in two groups, and methods of shortening information sequences in the sensing systems are proposed for each of the groups. Models of the sensing systems are described. V.P.

A81-10123 # Regional hemodynamic shifts and the condition of vasomotor regulation during 182 days of antiorthostatic hypokinesia (Regionarnye gemodinamicheskie sdvigi i sostoianie vazomotornoi reguliatsii pri 182-sutochnoi antiortostaticheskoi gipokinezii). T. D. Vasil'eva, M. E. Gugushvili, Kh. Kh. Iarulin, and T. A. Nikolaeva. *Fiziologiya Cheloveka*, vol. 6, Sept.-Oct. 1980, p. 799-803. 7 refs. In Russian.

The effects of prolonged antiorthostatic hypokinesia on the hemodynamics of the brain, vertebral-basilar system, lung, liver and crus are investigated. A four-channel rheograph on an eight-channel electroencephalograph was used to record fronto-mastoidal and bimastoidal rheoencephalograms and rheograms of the right lung, liver and crus of 18 male volunteers undergoing six months of antiorthostatic hypokinesia at an inclination of -4 deg with respect to the horizontal. Significant changes are found in the hemodynamics and vasomotor regulation of the spinal cord, lung, liver and crus following six months, with those subjects asked to perform twice daily physical exercises showing less marked changes. The greatest changes in hemodynamics, observed in subjects who did not exercise, consisted of an increase in pulse blood load with elevated arterial and venous tonus in the vessels of the brain and vertebral-basilar system. Finally, it is found that periods of up to 50 days were required for the recovery of hemodynamic indicators to their initial levels.

A.L.W.

A81-10124 # The dependence of nystagmus direction on cupula position and the direction of endolymph flow during sinusoidal rotation (Zavisimost' napravleniia nistagma ot polozeniia kupuly i napravlennosti toka endolimfy pri sinusoidal'nom vrashchenii). O. A. Vorob'ev. *Fiziologiya Cheloveka*, vol. 6, Sept.-Oct. 1980, p. 931-933. 9 refs. In Russian.

The direction of horizontal nystagmus is investigated for various stages of sinusoidal rotation. Electronystagmography of subjects undergoing sinusoidal rotation at various angular velocities reveals that changes in nystagmus direction occur as the direction of rotation is reversed, with different nystagmus directions present during acceleration in a single direction. Examination of the behavior of the cupulo-endolymphatic system reveals that the direction of

horizontal nystagmus is uniquely correlated at all stages of rotation only with the position of the cupula with respect to its rest position, and not with the direction of endolymph flow. A.L.W.

A81-10374 # For the furthest improvement of the medical security of air force personnel (Zadal'neishee uluchshenie meditsinskogo obespecheniia lichnogo sostava voenno-vozdushnykh sil). N. M. Rudnyi. *Voenna-Meditsinskii Zhurnal*, Aug. 1980, p. 7-10. In Russian.

Activities of the medical services branch of the Soviet air force in ensuring the health of air force personnel are reviewed. Attention is given to the improving disease record of air force personnel, treatment and diagnostic facilities, the qualifications of medical specialists, the medical selection of pilot candidates, studies of the effects of the flight environment on flight crew health, preflight physical and psychophysiological testing, the design of training programs and work routines, the training of medical service officers, pilot retraining, and physical training for flight. The necessity of the constant development of medical skills and initiative to the further improvement of medical services is emphasized. A.L.W.

A81-10375 # Characteristics of the clinical picture and diagnosis of uncomplicated peptic ulcers in flight personnel (Osobennosti kliniki i diagnostiki neoslozhnennoi iazvennoi bolezni u letnogo sostava). V. D. Vlasov. *Voenna-Meditsinskii Zhurnal*, Aug. 1980, p. 49-52. In Russian.

The clinical characteristics and diagnostic procedures for uncomplicated gastric and duodenal peptic ulcers in flight personnel are discussed. Clinical observations are presented which show that uncomplicated peptic ulcers develop primarily in younger flight crew members (31-40 years old), and are characterized by a mild, typical course often occurring against a background of a decrease in the secretory, acid-forming and motor functions of the stomach. The diagnosis of the condition, which is performed with the aid of X-ray observations, gastric juice analysis, electrogastrography and sometimes gastroduodenoscopy, is made difficult by the frequent absence of classical symptoms and patient unwillingness to report complaints. Clinical indications for examination for peptic ulcers are proposed. A.L.W.

A81-10464 # Formation of double-strand breaks in the DNA of gamma-irradiated bacteria, depending on the functioning of processes of fast repair of single-strand breaks of DNA (Formirovanie dvunitnykh razryvov v DNK gamma-obluchennykh bakterii v zavisimosti ot funktsionirovaniia protsessov bystroj reparatsii odnunitnykh razryvov DNK). S. I. Petrov and A. I. Gaziev (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 253, no. 6, 1980, p. 1500-1503. 12 refs. In Russian.

A81-10617 Ventilation, perfusion, and cardiogenic oscillations of the single-breath N₂ test. Y. Cormier and D. Nadeau (Hôpital Laval, Sainte-Foy, Quebec, Canada). *Journal of Applied*

Physiology: Respiratory, Environmental and Exercise Physiology, vol. 49, Oct. 1980, p. 552-557. 10 refs.

The mirror image of the single-breath N₂ test (SB-N₂) can be obtained after the N₂ has been removed from the lungs by 100 percent O₂ washout and a vital capacity of air inspired. In 10 normal subjects studied with this technique (SB-R), phase IV and cardiogenic oscillations (CO) were similar in magnitude but reversed in direction to the SB-N₂ values. The slope of phase III was also reversed, but its values were 35 percent smaller than in SB-N₂ (P less than 0.01). In a second group of 10 normal subjects, the effect of a 60-sec end-inspiratory breath hold on both SB-N₂ and SB-R was studied. With each technique, breath holding had no influence on phase IV and its slope. The slope of phase III decreased by 32 percent in SB-N₂ and 44 percent in SB-R (P less than 0.001). The magnitude of CO was not altered by breath holding in SB-N₂ but increased by 72 percent in SB-R (P less than 0.001). These results imply certain differences in the N₂ gradients responsible for each parameter. Also, the data can be used to identify the ventilation and perfusion characteristics of lung regions that decrease their emptying during cardiac systole and thus give rise to CO. (Author)

A81-10618 Oxygen uptake and energy expenditure during horizontal treadmill running. R. D. Hagan, T. Strathman, L. Strathman, and L. R. Gettman (Institute for Aerobics Research, Dallas, Tex.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Oct. 1980, p. 571-575. 25 refs.

The investigation compared linear and curvilinear regression equations relating oxygen uptake and energy expenditure to running velocity and examined the effects of age, sex, and maximal aerobic power on these relations in well conditioned male and female runners. One-variable linear equations that use running velocity as the independent variable for predicting oxygen uptake and energy expenditure had coefficients of determination (r^2) of 0.86 and 0.897, respectively. Two-variable linear equations that use body mass and velocity as independent variables had r^2 values of 0.895 and 0.901 for the same relation. Age, sex, and maximal aerobic power did not influence the relations between oxygen uptake, energy expenditure, and running velocity. Stepwise regression indicated that the two-variable linear equations had the highest r^2 values suggesting that between the running velocities of 8.8 and 16.9 km/h these equations best express the relation of oxygen uptake and energy expenditure to running velocity. (Author)

A81-10619 * Model for antiorthostatic hypokinesia - Head-down tilt effects on water and salt excretion. D. R. Deavers, X. J. Musacchia, and G. A. Meininger (Louisville, University, Louisville, Ky.; Missouri-Columbia, University, Columbia, Mo.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Oct. 1980, p. 576-582. 29 refs. Grants No. NsG-2191; No. NsG-2325.

Water and electrolyte excretion was investigated in antiorthostatic hypokinetic and orthostatic hypokinetic and control rats in metabolic cages. Significant (t test, P less than 0.05) diuresis, natriuresis, and kaliuresis occurred in the antiorthostatic hypokinetic subjects but did not occur in either the orthostatic hypokinetic or controls. Recovery from antiorthostatic hypokinesia was characterized by retention of water, sodium, and potassium. Patterns of changes in body weight and food and water consumption were virtually identical in antiorthostatic and orthostatic hypokinetic rats and thus could not account for the differences in renal handling of water and electrolytes. Also, differences in ingestion of food and water in controls could not account for differences in excretion of water and electrolytes between these and antiorthostatic hypokinetic rats. It was concluded that the antiorthostatic position was responsible for the diuresis and natriuresis and that the antiorthostatic hypokinetic rat appears to be a good model for the study of water and electrolyte excretion during conditions such as bed rest, water immersion, and exposure to weightlessness. (Author)

A81-10620 Effects of expiratory loading on respiration in humans. B. Gothe and N. S. Cherniack (Case Western Reserve University, Cleveland, Ohio). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Oct. 1980, p. 601-608. 33 refs. Research supported by the U.S. Veterans Administration; Grant No. NIH-HL-20847.

The effects are examined of expiratory resistive loads of 10 and 18 cmH₂O/l-sec in healthy subjects on ventilation and occlusion pressure responses to CO₂, respiratory muscle electromyogram, pattern of breathing, and thoracoabdominal movements. In addition, ventilation and occlusion pressure responses to CO₂ breathing are compared elicited by breathing through an inspiratory resistive load of 10 cmH₂O/l-sec to those produced by an expiratory load of similar magnitude. Both inspiratory and expiratory loads decreased ventilatory responses to CO₂ and increased the tidal volume achieved at any given level of ventilation. Depression of ventilatory responses to CO₂ was greater with the larger than with the smaller expiratory load, but the decrease was not in proportion to the difference in the severity of the loads. Occlusion pressure responses were increased significantly by the inspiratory resistive load but not by the smaller expiratory load. However, occlusion pressure responses to CO₂ were significantly larger with the greater expiratory load than control. Increase in occlusion pressure observed could not be explained by changes in functional residual capacity or chemical drive. The larger expiratory load also produced significant increases in electrical activity measured during both inspiration and expiration. These results suggest that sufficiently severe impediments to breathing, even when they are exclusively expiratory, can enhance inspiratory muscle activity in conscious humans. (Author)

A81-10621 * Effects of gravitational profiles on the rat's thermoregulatory response to cold. E. R. Schertel, J. M. Horowitz, and B. A. Horwitz (California, University, Davis, Calif.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Oct. 1980, p. 663-668. 17 refs. Grant No. NsG-2234.

Unrestrained rats were subjected to a 1-h period of cold exposure during centrifugation to characterize their ability to regulate core temperature T(c) and to determine if this regulation was dependent on the amplitude of the hypergravic field before the cold exposure. T(c) was measured in unrestrained rats by the use of a thermistor implanted adjacent to the carotid artery. One hour of cold exposure applied over the last hour of either a 1-, 4-, 7-, 13-, 19-, 25-, or 37-h period at 3 G evoked a decrease in T(c) of about 3 C. This fall in T(c) was significantly greater than changes in T(c) in cold-exposed rats at 1 G. No significant differences were found between the measured decreases in T(c) observed for the 1-h cold exposures during the first 37 h at 3 G. However, when rats were subjected concurrently to cold and acceleration after eight days at 3 G, they exhibited a smaller fall in T(c) suggesting a partial recovery of the acceleration-induced impairment of temperature regulation. In another series of experiments, the gravitational field profile was changed in amplitude in three different ways during the 3-h period preceding the 1-h cold exposure at 3 G. Despite the different gravitational field profiles before cold, the magnitude of the fall in T(c) over the 1-h period of cold exposure was the same in all cases. These results suggest that the thermoregulatory impairment has a rapid onset, is a manifestation of an ongoing effect of hypergravity, and is not dependent on the prior G profile. The inability of rats to maintain T(c) when cold exposed may be transient as indicated by the partial recovery of regulation by the eighth day. (Author)

A81-10622 * Cardiovascular responses to static exercise in distance runners and weight lifters. J. C. Longhurst, A. R. Kelly, W. J. Gonyea, and J. H. Mitchell (Texas, University, Dallas, Tex.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Oct. 1980, p. 676-683. 31 refs. Research supported by the Lawson and Rogers Lacy Research Fund in Cardiovascular Disease; Grants No. NIH-HO-6296-18; No. NsG-9026.

Three groups of athletes including long-distance runners, competitive and amateur weight lifters, and age- and sex-matched control subjects have been studied by hemodynamic and echocardiographic methods in order to determine the effect of the training programs on the cardiovascular response to static exercise. Blood pressure, heart rate, and double product data at rest and at fatigue suggest that competitive endurance (dynamic exercise) training alters the cardiovascular response to static exercise. In contrast to endurance exercise, weight lifting (static exercise) training does not alter the cardiovascular response to static exercise: weight lifters responded to static exercise in a manner very similar to that of the control subjects. V.L.

A81-10773 Myocardial adenosine and coronary resistance during increased cardiac performance. J. E. McKenzie, F. P. McCoy, and E. L. Bockman (Louisiana State University, Medical Center, New Orleans, La.). *American Journal of Physiology*, vol. 239, Oct. 1980, p. H509-H515. 30 refs. Grant No. NIH-HL-17932.

A81-10774 Influence of CO₂ on cardiovascular response to hypoxia in conscious dogs. R. C. Koehler, B. W. McDonald, and J. A. Krasney (New York, State University, Buffalo, N.Y.). *American Journal of Physiology*, vol. 239, Oct. 1980, p. H545-H558. 40 refs. Grants No. NIH-HL-18416; No. NIH-HL-14414.

A81-10775 * Renal responses to central vascular expansion are suppressed at night in conscious primates. D. A. Kass, F. M. Sulzman, C. A. Fuller, and M. C. Moore-Ede (Harvard University, Boston, Mass.). *American Journal of Physiology*, vol. 239, Oct. 1980, p. F343-F351. 42 refs. Grant No. NsG-9054.

The renal and hemodynamic responses of squirrel monkeys to central vascular volume expansion induced by lower body positive pressure (LBPP) during the day and night are investigated. Twelve unanesthetized animals trained to sit in a metabolism chair in which they were restrained only at the waist by a partition separating upper and lower body chambers were subjected to 4 h of continuous LBPP during the day and night, and hemodynamic, urinary and drinking data were monitored. LBPP during day and night is found to induce similar increases in central venous pressure, rises in heart rate and elevations in mean arterial blood pressure. However, although daytime LBPP induced a significant increase in urine flow and sodium excretion, a marked nocturnal inhibition of the renal response to LBPP is observed. Analysis of the time course and circadian regulation patterns of the urinary responses suggests that several separate efferent control pathways are involved. A.L.W.

A81-10823 The vestibular apparatus. D. E. Parker (Miami University, Oxford, Ohio). *Scientific American*, vol. 243, Nov. 1980, p. 118-121, 125-130, 132, 134, 135.

The vestibular apparatus of the inner ear is discussed. The structure and function of the otolith organs, which are sensitive to linear accelerations, and the semicircular canals, which respond to angular accelerations, are described. Connections in the brain between nerve fibers originating from the three sources of information for the system of balance and orientation, that is the vestibular, visual and somatic sensory systems, and their implications for the isolation of vestibular contributions to balance, are indicated. Experiments demonstrating multimodal compensation and longer-term adaptation to disturbances to orientation are presented. Consideration is then given to the opportunities presented by conditions of weightlessness to the study of the vestibular system. Proposed experiments to be flown on board Spacelab and studies of space motion sickness in the Apollo and Skylab astronauts are indicated, together with the hypotheses of otolith-semicircular canal sensory mismatch and fluid shifts developed to account for space motion sickness. A.L.W.

A81-11193 Towards an objective assessment of the 'maximal voluntary contraction' component in routine muscle strength measurements. K. H. E. Kroemer and W. S. Marras (Wayne State

University, Detroit, Mich.). *European Journal of Applied Physiology*, vol. 45, no. 1, 1980, p. 1-9. 17 refs. Research supported by the University of Michigan.

Routine measurements of muscle strength capabilities commonly use external dynamometers against which the subject exerts maximal voluntary contractions of muscles in static (isometric) tests. These tests require active cooperation of the subject, i.e., full motivation to 'give the best'. At present, no practicable techniques exist that provide objective clues indicating that indeed a maximal effort is delivered, or if only a portion of the available strength is exerted. This paper describes experiments performed with 30 subjects which indicate that the rate of strength build-up in repeated exertions may provide objective criteria to judge whether or not a subject exerts full muscular strength in a routine test. (Author)

A81-11194 Effects of fatigue on the series elastic component of human muscle. B. Vigreux, J. C. Cnockaert, and E. Pertuzon (Lille 1, Université, Villeneuve-d'Ascq, Nord, France). *European Journal of Applied Physiology*, vol. 45, no. 1, 1980, p. 11-17. 18 refs.

The compliance-force relationship (K-F) of fatigued human muscle is compared with that of nonfatigued human muscle. The K-F relationships are established under electromyographic control in two cases: (1) the F variation coming from the decrease in maximum voluntary force which appears in fatigue produced by rhythmic flexions against an elastic resistance, where compliance is measured at regular intervals as fatigue developed; and (2) compliance is measured at different predetermined levels of force (maximal and submaximal) without the appearance of fatigue. The K-F relationship graphs are curved for both fatigued and nonfatigued muscle with compliance increasing as the force decreases. Yet, the fatigued muscle is more compliant than the nonfatigued muscle for the same value of force. The results are discussed in relation to mechanical muscular properties and to the two-component muscle model of Hill (1938). A.C.W.

A81-11195 A simple method for measuring oxygen uptake on a single breath basis. A. Veicsteinas (Milano, Università; Centro di Studi di Fisiologia del Lavoro Muscolare, Milan, Italy) and M. Gussoni (Brescia, Università, Brescia; CNR, Centro di Studi di Fisiologia del Lavoro Muscolare, Milan, Italy). *European Journal of Applied Physiology*, vol. 45, no. 1, 1980, p. 19-24. 19 refs.

A simple method for calculating oxygen uptake is described whereby each expiratory volume is collected in a collapsible bag (4 l capacity) which is surrounded by a rigid box connected to a spirometer. A system of tubes with two solenoid valves is operated by a manual switch during expiration, and during inspiration when a vacuum pump empties the bag. An O₂ and CO₂ analyzer sampling line as well as temperature and pressure probes are inserted into the tube connecting the bag to the vacuum, enabling the expired volume to be recorded (by the spirometer output) during expiration and its composition analyzed during the immediately following inspiratory phase. Therefore, gas exchange measurements can be performed on each single breath and by measuring VO₂ at steady state over periods of about 1 minute, values are obtained which are practically equal to those yielded by the standard open circuit method (average ratio equals 1.01). Advantages of the proposed method include the reduction of the dead space of the system to a minimum (70 ml), and the simplicity of calculating the VO₂ of a single breath which are together quite suitable for determining VO₂ kinetics at the onset and offset of exercise. A.C.W.

A81-11196 Altered hormonal response to short-term bicycle exercise in young men after prolonged physical strain, caloric deficit, and sleep deprivation. P. K. Opstad, A. Aakvaag (Aker Hospital, Oslo, Norway), and T. O. Rognum (Institute of Work Physiology, Oslo, Norway). *European Journal of Applied Physiology*, vol. 45, no. 1, 1980, p. 51-62. 45 refs.

A81-11197 A contribution to the topography of temperature regulation in man. J. Werner and T. Reents (Bochum,

Ruhr-Universität, Bochum, West Germany). *European Journal of Applied Physiology*, vol. 45, no. 1, 1980, p. 87-94. 25 refs.

Steady-state curves of body temperature and effector mechanisms of temperature regulation in man are determined for different areas of the body by means of climatic chamber studies. The results agree well with steady-state curves given by Stolwijk and Hardy (1966) which were based on weight measurements. Under cold conditions local temperature differences are found to be significant, while under warm conditions, a more uniform distribution of body heat is found. Evaporative heat loss is directly measured, and skin blood flow is recorded by the fluvographic method, showing considerable local differences under the influence of environmental temperature. This might be the consequence of a distributed parameter control strategy (Gilles 1973) which can be adapted to requirements such as exercise or partial thermal stress of the body. A mathematical model of human temperature regulation is derived from experimental results which incorporates the importance of the spatial distribution of system variables. A.C.W.

A81-11231 On the role of dynamic models in quantitative posturography. S. H. Koozekanani, C. W. Stockwell, R. B. McGhee (Ohio State University, Columbus, Ohio), and F. Firoozmand (Toledo Scale Corp., Toledo, Ohio). *IEEE Transactions on Biomedical Engineering*, vol. BME-27, Oct. 1980, p. 605-609. 22 refs. NSF Grant No. ENG-78-18957; Grant No. NIH-NS-13903.

Conventional approaches to posturography typically make use of force-plate instrumentation to measure the movement of the center of pressure of ground reaction forces during quiet standing. This paper shows that such information can be obtained indirectly by using a four-mass inverted pendulum dynamic model for the body as the basis for processing motion data transmitted directly from television cameras to an on-line computer. Preliminary experimental results suggest that this approach may eventually yield improved clinical procedures. (Author)

A81-11233 Compound eyes - Old and new optical mechanisms. M. F. Land (Sussex, University, Brighton, England). *Nature*, vol. 287, Oct. 23, 1980, p. 681-686. 50 refs.

Proposed mechanisms for image formation in the compound eyes of insects and crustaceans are reviewed. The work of Exner (1891) on the king crab *Limulus* and the glowworm *Lampyrus* is discussed, with attention given to his concepts of a lens cylinder, that is, a cylinder with a graded refractive index densest along its axis, and superposition image formation. The observations of Kuiper (1962) which revealed no significant refractive index variations in the crystalline cones of certain crustaceans and lead to the proposal of higher-index light-guide-like structures in place of lens cylinders and superposition are then considered, and the current position which regards most insect eyes to behave as superposition eyes in the dark and Kuiper's apposition eyes in the light is presented. Superposition in crustacean eyes without lens cylinders by the use of reflecting planes is then considered, and indicators of superposition mechanisms and phylogeny in the crustacea are discussed. Finally, applications of the principles of the refractive and reflective superposition eye to the design of X-ray telescopes and image transmission systems are indicated. A.L.W.

A81-11353 Training tomorrow's carrier jet pilots. B. Kovit. *Grumman Aerospace Horizons*, vol. 16, no. 3, 1980, p. 12-23.

A new integrated systems approach to training Navy jet pilots is discussed. The system, known as VTXTS, is built around the new carrier-based training airplane VTX. The intermediate and advanced training courses incorporate computerized instructional technology and methods to achieve a better flow within the program. The role of skilled instructors is considered, along with the increased use of motion and visual simulators. An automated management system integrates all aspects of the training program. R.C.

A81-11440 # Is it dangerous to handle glass fibers - The physiological action of artificial mineral fibers (Est-il dangereux de manipuler la fibre de verre - Action physiologique des fibres minérales artificielles). Mr. Esquevin (Vetrotex-Saint-Gobain, Neuilly-sur-Seine, Hauts-de-Seine, France). *Plastiques Renforcés, Fibres de Verre Textile*, vol. 19, Sept. 1980, p. 8-15. 49 refs. In French.

The possible health hazards caused by artificial mineral fibers are considered in view of results from an experiment conducted on animals which are subjected to fiber inhalation and results from two American cancer studies on persons who were exposed to fibers in American factories. The characteristics of the fibers are described including fiber types, fiber production methods, fiber morphology based on diameter and length, and fiber concentrations within the air. The effects of different sized fiber particles, including amianthus on skin, eyes, respiratory passages, bronchi, and lungs are reviewed. Suggestions are made for ways to provide efficient protection to workers and proposals for French research programs regarding the problems of fibers are outlined. A.C.W.

A81-11629 New developments in cockpit human interfaces. E. B. Davies and J. B. Peckham (Royal Aircraft Establishment, Farnborough, Hants., England). In: International Council of the Aeronautical Sciences, Congress, 12th, Munich, West Germany, October 12-17, 1980, Proceedings. New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 338-346.

Developments in the use of new interfaces between the pilot and his cockpit are reviewed. Attention is given to touch sensing displays, in which pilot input is conveyed by tactile pressure on the relevant display (presumably a CRT), helmet sights, which determine the angular positions of objects outside the cockpit by measuring the angular coordinates of the pilot's helmet, when pointing towards them and direct voice input systems using automatic speech recognition. Advantages in pilot performance to be obtained by the incorporation of these experimental systems are pointed out. A.L.W.

A81-11632 On the possibilities of pilots to get information from outside by vision. H.-E. Hoffmann (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Cologne, West Germany). In: International Council of the Aeronautical Sciences, Congress, 12th, Munich, West Germany, October 12-17, 1980, Proceedings. New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 360-370. 13 refs.

The maximum visual detection range of aircraft and the ability to recognize details of a ground object were investigated. The effects of the size and shape of the aircraft, and the type of background on the maximum detection and recognition ranges of pilots were investigated. A test procedure to determine flight visibility and visibility of ground objects consisted of continually reducing the distance between the observers and the objects being observed until it was possible to detect or recognize them. The maximum detection range while observing a truck with the background of green grass, a cornfield, and yellow sand was determined; the maximum detection ranges were also recorded for 100, 150, and 1000 watt obstacle beacons. A.T.

A81-11719 Two dimensional echocardiographic recognition of the descending thoracic aorta - Value in differentiating pericardial from pleural effusions. W. S. Haaz, G. S. Mintz, M. N. Kotler, W. Parry, and B. L. Segal (Hahnemann Medical College and Hospital, Philadelphia, Pa.). *American Journal of Cardiology*, vol. 46, Nov. 1980, p. 739-743. 22 refs.

The course and location of the descending thoracic aorta as visualized by two-dimensional echocardiography are investigated as means of differentiating between pericardial and pleural effusions. M mode echocardiography and two-dimensional echocardiography were performed on 40 patients with pericardial and/or pleural effusions and 41 control patients undergoing cardiac surgery. Sixteen patients with isolated pericardial effusions were found to have an echo-free

space between the descending thoracic aorta and left ventricular posterior wall in the parasternal short-axis view, while nine patients with isolated pleural effusions were found to exhibit echo-free spaces posterior to the descending aorta and 15 with both effusions were observed to have echo-free spaces in both positions. The two-dimensional echocardiographic results were confirmed anatomically for all but one of the patients with effusions and for the controls, in whom no posterior echo-free spaces with respect to the aorta were detected and who had no visible pericardial or pleural effusions. Advantages of two-dimensional echocardiography over M mode echocardiography in the detection of pericardial effusions are noted.

A.L.W.

A81-11720 **Methodologic problems of exercise testing for coronary artery disease - Groups, analysis and bias.** J. T. Philbrick, R. I. Horwitz, and A. R. Feinstein (Yale University, New Haven, Conn.). *American Journal of Cardiology*, vol. 46, Nov. 1980, p. 807-812. 39 refs. Research supported by the U.S. Veterans Administration.

To determine why exercise testing remains controversial as a diagnostic test for coronary artery disease, a methodologic review was undertaken of 33 studies comprising 7501 patients who had undergone both exercise tests and coronary angiography. Of seven methodologic standards for research design, only one received general compliance: the requirement for an adequate variety of anatomic lesions. Less than half of the studies complied with any of the remaining six standards: adequate identification of the groups selected for study; adequate analysis for relevant chest pain syndromes; avoidance of a limited challenge group; and avoidance of work-up bias, diagnostic review bias and test review bias. Only one study has met as many as five standards. These methodologic problems may explain the wide range of sensitivity (35 to 88%) and specificity (41 to 100%) found for exercise testing. (Author)

A81-11776 # **The effect of pharmacological destruction of hypothalamic monoaminergic structures on body temperature and gaseous exchange at acute cooling of the organism (Effekt farmakologicheskoi destruktivii monoaminergicheskikh struktur gipotalamusa na temperaturu tela i gazoobmen pri ostrom okhlazhdenii).** E. M. Stabrovskii and L. S. Shpanskaia (Institut Uovershenstvovaniia Vrachei, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 66, Sept. 1980, p. 1307-1311. 6 refs. In Russian.

A81-11814 # **The viscoelastic properties of the tissue from a human heart aortic valve (Viazkoprugie svoistva tkani aortal'nogo klapanu serdtsa cheloveka).** A. D. Dorogin, L. E. Mal'tsev, and V. I. Kucheriuk (Tiumenskii Industrial'nyi - Institut, Tiumenskii Inzhenerno-Stroitel'nyi Institut, Tyumen, USSR). *Mekhanika Kompozitnykh Materialov*, July-Aug. 1980, p. 692-698. 13 refs. In Russian.

A relaxation and creep function of bipolymeric materials was derived using data obtained by a creep measuring device with instantaneous loading of a specimen. Creep curves were plotted for various stresses which determined the linear viscoelastic property region and the 'instantaneous' stress-strain relationship. This relationship will make it possible to estimate the viscoelastic properties of the aortal valve tissue. A.T.

A81-12231 **Physiological responses of men and women to prolonged dry heat exposure.** B. A. Avellini, Y. Shapiro, K. B. Pandolf, N. A. Pimental, and R. F. Goldman (U.S. Army, Research Institute of Environmental Medicine, Natick, Mass.). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1081-1085. 16 refs.

A81-12232 * **Effect of weightlessness and centrifugation on red cell survival in rats subjected to space flight.** H. A. Leon (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.), L. V. Serova (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR), and S. A.

Landau (U.S. Veterans Administration, Medical Center, Syracuse, N.Y.). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1091-1094. 13 refs.

Rats were flown aboard the Soviet biosatellite Cosmos 936 for 18.5 d during August, 1977. Five rats were subjected to near-weightless space flight, as with Cosmos 782, and five rats were subjected to a 1-G force via an on-board centrifuge. These rats and three control groups were injected with 2-(C-14) glycine 19 d preflight. The flight rats were recovered from orbit after 18.5 d of space flight. Erythrocyte hemolysis and lifespan were evaluated in the five groups of rats by quantitation of radioactive carbon monoxide exhaled in the breath which arises from the breakdown of the previously labeled hemoglobin. The results support the previous findings wherein hemolysis was found to increase as a result of weightless space flight. A comparison to the centrifuged animals indicates that artificial gravity attenuates the effect of weightlessness on hemolysis and appears to normalize the hemolytic rate in the early postflight period. (Author)

A81-12233 **Coronary blood flow during +Gz stress in +Gz conditioned adult miniature swine.** M. H. Laughlin, W. M. Witt, and R. N. Whittaker, Jr. (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1104-1108. 24 refs.

The effects of adaptation to vertical acceleration on the response of coronary blood flow in adult miniature swine to +Gz stress are investigated. Four animals were exposed to simulated aerial combat maneuver acceleration profiles for a period of four weeks wearing anti-G suits, following which coronary blood flow was measured by the radiolabeled microsphere technique under resting conditions, during 60-sec exposures to +3Gz and +5Gz and 10 min after +5Gz exposure. Although the conditioned animals were observed to exhibit lower heart rates and no gross cardiac pathology during acceleration exposure, coronary blood flow was not observed to differ from that of the animals prior to conditioning, being increased two to three fold upon exposure to +3Gz and +5Gz. Results thus indicate that one month of acceleration conditioning has no significant effect on coronary blood flow responses to +Gz stress, and support the concept that these responses can be predicted using accepted physiological principles of coronary blood flow regulation. A.L.W.

A81-12234 **Dependence of optokinetic nystagmus characteristics upon recording techniques.** L. A. Abel, C. Wall, III, B. T. Troost, and F. O. Black (Pittsburgh, University, Pittsburgh, Pa.). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1112, 1113. 6 refs.

The presence of infrared recording spectacles in the visual field is shown, under certain conditions, to influence human eye movement responses to optokinetic stimulation. Electrooculographic recording of optokinetic nystagmus (OKN) of the 'follow' and 'stare' type were made in four normal subjects, both with and without infrared spectacles. The ratio of slow phase velocity to target velocity was computed. This measure showed that wearing the spectacles produced no statistically significant change for 'follow' but a significant decrement for 'stare' OKN. The latter finding suggests that the advantage of more accurate eye movement recording offered by infrared spectacles should be weighed against a possible response decrement most probably caused by a stabilized image in the visual periphery. (Author)

A81-12235 **Alterations in cardiac rate and rhythm in miniature swine during simulated aerial combat maneuver +Gz stress.** W. M. Witt, M. H. Laughlin, and J. W. Burns (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1114-1118. 28 refs.

Electrocardiograms were recorded from 18 chronically instrumented, conscious, female miniature swine before, during, and after exposures to +Gz stress. The animals were exposed to five simulated aerial combat maneuver (SACM) type acceleration profiles which

spanned approximately 106 sec and included two 5-sec+9Gz peaks. A 5-min rest period separated each SACM exposure. Maximum heart rates during +Gz decreased over the course of the 5 SACMS - 241 + or - 4 /m and 224 + or - 5 b/m for the first and last exposures, respectively. Resting heart rates obtained 5 min after each SACM exposure were steadily increased from a control of 86 + or - 5 b/m to a final of 129 + or - 8 b/m. Of the 18 animals studied, 10 developed arrhythmias during +Gz, or within the first minute after +Gz exposure. Arrhythmias exhibited included premature atrial and ventricular contractions, intraventricular conduction defects, sinus arrhythmias, premature junctional contractions, atrial bigeminy, ectopic atrial and ventricular rhythms, complete A-V dissociation, left anterior arborization-block, and junctional rhythms with aberrant conduction. While arrhythmias were not uncommonly observed during +Gz, most occurred at the end of the SACM profile or immediately following the SACM. (Author)

A81-12236 **Fasting or feeding - A survey of fast-jet aircrew nutrition in the Royal Air Force Strike Command, 1979.** M. G. P. Fisher and D. W. Atkinson (RAF, Strike Command, High Wycombe, Bucks., England). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1119-1122. 13 refs.

A81-12237 **Maximal oxygen uptake - Its measurement, application, and limitations.** M. H. Harrison, G. A. Brown, and L. A. Cochrane (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1123-1127. 33 refs.

Maximal aerobic power (VO₂ max) was determined by direct measurement in 10 male subjects exercising on a bicycle ergometer and running uphill on a treadmill at speeds of 10 and 12 km/h. There was no significant difference between VO₂ max measured at the two treadmill speeds, but the VO₂ max measured on the bicycle was 20% lower than on the treadmill. An estimate of the variance of the treadmill-determined VO₂ max was obtained from repeated measurements on five subjects. The 95% tolerance interval about a single measurement of VO₂ max was + or - 7.8 ml/kg-min. It is recommended that when indirect methods for determining VO₂ max are calibrated against the direct method, the latter should be based on the treadmill. Reservations are expressed concerning the value of the direct method for determining VO₂ max, and of the concept of VO₂ max as a measure of physical fitness. (Author)

A81-12238 **A comparison of some indirect methods for predicting maximal oxygen uptake.** M. H. Harrison, D. L. Bruce, G. A. Brown, and L. A. Cochrane (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1128-1133. 23 refs.

Nine male subjects took part in a comparative evaluation of four indirect tests commonly used for predicting maximum aerobic power (VO₂ max). In three of these tests (involving cycling, stepping, and walking) VO₂ max was predicted from submaximal heart rates; in the fourth, VO₂ max was predicted from the time taken to run 2 km. Additionally, VO₂ max was predicted from the body fat content. All predicted values were compared with the VO₂ max determined directly on a treadmill. The best estimates of VO₂ max were provided by the timed run, and by the step test. Both heart rate measured during walking and body fat content proved totally inadequate for the reliable prediction of VO₂ max. Taking into account such factors as cost, safety, and the time required for testing, it is concluded that the timed run is the submaximal test most suited to the indirect determination of VO₂ max. (Author)

A81-12239 **The respiratory response to microwaves.** C. O. Criborn and C.-J. Clemenson (Forsvarets Forskningsanstalt, Stockholm, Sweden). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1139-1143. 10 refs.

The effects of microwaves of 2450 MHz on mice are examined for intensities of 1, 10, and 100 mW/sq cm, equaling a dose of 300 mW/min/sq cm. Measurements of the respiratory minute volume and

the rectal temperature are used to evaluate the influence of heat and heat regulation. Data for the conditioned acoustic reaction which is affected at the onset of irradiation and remains for several minutes after irradiation has finished is used to indicate the effects on the nervous system. The results suggest that the nervous system is involved independently of the existing heat and thermal regulatory processes during and after irradiation with the microwaves. A.C.W.

A81-12240 **Electrocardiographic aspects of acute left anterior hemiblock induced by exercise.** R. A. Oliveros, J. Seaworth, P. W. Dlabal, and C. H. Beckmann (USAF, Medical Center, Lackland AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1144-1146. 12 refs.

A81-12242 **Coronary bypass in an airline pilot.** A. Saint-Pierre (Air Canada, Medical Services, Montreal, Canada). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1150-1152.

The case of a 42-year-old airline captain grounded for obstructive coronary artery disease is reviewed. The investigation showed two selective lesions on one vessel. A bypass procedure was successful. Postoperative evaluation demonstrated on above-average physical performance without any symptoms. Adequate blood flow in the coronary bed and no heart muscle damage were also shown. The criteria for return to work are discussed. (Author)

A81-12243 **Suspected coronary artery disease among military aviation personnel.** W. Buckendorf, S. E. Warren, and W. V. R. Vieweg (U.S. Navy, Naval Regional Medical Center, San Diego, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 51, Oct. 1980, p. 1153-1158. 30 refs.

The medical records of 127 military aviation personnel having undergone complete cardiovascular evaluations for ischemic heart disease are analyzed in order to determine the prevalence, means of diagnosing and possibilities for rehabilitation of coronary artery disease in the population. Four patient groups are distinguished: (1) asymptomatic; (2) atypical chest pain; (3) angina pectoris; and (4) status post-myocardial infarction. While all groups are of comparable age, risk factors for ischemic heart disease are found most frequently in groups 3 and 4. A positive exercise stress test is found to be of most value in the last two groups, while a negative test is more valuable in the first two. Cardiac catheterization reveals evidence of high grade obstructive coronary artery disease in 4%, 17%, 50% and 81% of the groups, respectively. It is concluded that aggressive attempts to rule out coronary artery disease seem justified in suspect personnel. It is also pointed out that those individuals rehabilitated after a diagnosis of ischemic heart disease remain at risk for acute coronary insufficiency, and should be subject to additional studies before a return to full flight status. A.L.W.

A81-12252 **Self-paced hard work comparing men and women.** W. J. Evans, F. R. Winsmann, K. B. Pandolf, and R. F. Goldman (U.S. Army, Army Research Institute of Environmental Medicine, Natick, Mass.). *Ergonomics*, vol. 23, July 1980, p. 613-621.

Six males and six females performed hard work while walking on four terrains with zero, 10, and 20 kg loads. The walking rate, energy expenditure, and the heart beats were recorded; the walking speed and energy expenditure of the males was significantly higher than of the females over blacktop, dirt, light brush, and heavy brush roads. The relative energy expenditures of the males and females were similar for all conditions, indicating that the voluntary hard work rate is dependent on the maximal aerobic power. A.T.

A81-12253 **The specificity of endurance training on muscular power and muscle fibre size.** S. H. Constable (Arizona, University, Tucson, Ariz.), R. L. Collins, and G. S. Krahenbuhl (Arizona State University, Tempe, Ariz.). *Ergonomics*, vol. 23, July 1980, p. 667-678. 38 refs.

The specificity of endurance training concepts was examined by training 6 female students in 30 min of continuous running 3

times/wk for 12 weeks. Tests including measurements of muscular leg power and cardiovascular endurance were made; a muscle biopsy from the lateral aspect of the gastrocnemius muscle was also performed. The training produced important changes in the exercising of subjects for the 12-min run; no changes were found in the tests of muscular power of individual fiber areas. A.T.

A81-12254 **A reassessment of a running test as a measure of cardiorespiratory fitness.** W. S. Myles, T. E. Brown, and J. I. Pope (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada). *Ergonomics*, vol. 23, June 1980, p. 543-547. 16 refs.

The cardiorespiratory fitness of young Canadian servicemen was evaluated by means of 2.4 and 4.8 km runs, and a submaximal bicycle ergometer test. The maximal aerobic power was measured using a treadmill; the heart rates recorded by telemetry confirmed that the subjects exerted a maximum effort in both running tests. The duration of the 2.4 km run correlated with the maximal aerobic power measured directly; the maximal aerobic power predicted from the heart rate during the submaximal exercise correlated poorly with the direct measurement. The study showed that the 2.4 km run is a valid measure of cardiorespiratory fitness for young healthy men. A.T.

A81-12255 **Influence of air flow and skin temperature on sweating at the onset, during and following exercise.** C. T. M. Davies (Medical Research Council, Environmental Physiology Unit, London, England). *Ergonomics*, vol. 23, June 1980, p. 559-569. 19 refs.

The effect of convective air flow, skin temperature, and rapid changes in work rate on body evaporative sweat loss was studied in 4 males using resistance hygrometry. The changes in sweat rate can be detected at the onset and cessation of exercise; during exercise, the whole body and local sweat rates were correlated, with the local sweat rate showing a close relationship with the increase in core temperature. It was concluded that during exercise the integrating and modulating effects of skin temperature from different regions of the body are responsible for the control of sweat loss under conditions of constant central thermal drive. A.T.

A81-12256 **Motor performance in relation to control-display gain and target width.** L. Buck (National Research Council, Control Systems and Human Engineering Laboratory, Ottawa, Canada). *Ergonomics*, vol. 23, June 1980, p. 579-589. 12 refs.

Five groups of subjects performed a target alignment task using a joystick-oscilloscope system with different control-display gains. Time taken to move to the target depended upon the width of the area into which the joystick had to be placed in order to align the target, while time taken to correct overshoots depended upon that factor and also the width of the target area on the oscilloscope. Movement precision as measured by overshoot rate depended upon target location and not upon target width whether measured on the joystick or oscilloscope. There was evidence of a movement time-overshoot rate trade-off. The results call into question recent views on the significance of control-display gain in the design of the operator-machine interface. (Author)

A81-12257 **Human circadian rhythms in heart rate response to a maximal exercise stress.** C. J. Cohen (Western Illinois University, Macomb, Ill.). *Ergonomics*, vol. 23, June 1980, p. 591-595. 14 refs.

Circadian rhythmicity of heart rate response to maximal exercise tasks was investigated by means of bicycle ergometer rides at pedal rates of 50 rpm against a predicted starting resistance. Statistical analysis of the resting heart data indicated circadian rhythmicity, but the heart rate response to maximal exercise stress did not show a specific within-day variation because of absence of definite rhythmicity. A.T.

A81-12463 # **Biological hazards associated with cosmic-ray and solar flare exposures.** R. Silberberg and C. H. Tsao (U.S. Navy,

Laboratory for Cosmic Ray Physics, Washington, D.C.). In: International Cosmic Ray Conference, 16th, Kyoto, Japan, August 6-18, 1979, Conference Papers. Volume 5. Tokyo, University of Tokyo, 1980, p. 317-322. 7 refs.

Highly ionizing particles like heavy ions and neutron-generated nuclear recoils have a particularly high relative biological effectiveness for radiation damage. A neutron recoil dose as low as 0.5 rad doubles the probability of contracting leukemia. Without inert or magnetic shielding, such a dose can be delivered in space by cosmic-ray iron nuclei in about a year. At atmospheric depths of 20 to 60 g/sq cm, at altitudes 20 to 25 km, the flux of neutrons exceeds that at ground level by three orders of magnitude. An exposure of about a year at flight altitudes of supersonic planes over the polar regions delivers a neutron dose that would double the probability of contracting leukemia to 0.0006 within a 15-year interval. Risks at times of large solar flares will also be explored. Procedures for reducing the radiation damage to unobservable levels will be discussed. (Author)

A81-12751 **Sanitary transports on long distance flights and contra indications to air travel (Transports sanitaires sur long-courrier et contre-indications des voyages aériens).** M. Cara. (*Les Entretiens de Médecine Aéronautique et Tropicale, Yamoussoukro, Ivory Coast, Feb. 19-25, 1979.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 1st Quarter, 1980, p. 15-17. In French.

The article briefly discusses the principle problems involved in the aerial transport of patients and their accompanying medical staff. The general risk of aerial transport is small compared to terrestrial and aquatic transport modes and the conditions in the pressurized cabin actually reduce the contraindications related to the patient's state. The major problem appears to be the possibility of infecting the medical staff and the aircraft. A.C.W.

A81-12752 **Resuscitation on board long distance flights (Réanimation a bord des longs courriers).** Mr. Bondurand. (*Les Entretiens de Médecine Aéronautique et Tropicale, Yamoussoukro, Ivory Coast, Feb. 19-25, 1979.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 1st Quarter, 1980, p. 18-21. In French.

The article outlines five criteria for performing inflight resuscitation which are: (1) the maintenance of aircraft security in regards to the transport of medical apparatus and gas cylinders, (2) the preservation of the cabin's environment, (3) the rapid placement of the patient upon a mattress, (4) the maintenance of the patient's vitals, and (5) the organization of a receiving ground medical staff at the designated airport. It is confirmed that the possibilities of resuscitation movements are relatively limited on board commercial airplanes due to the position of the patient. Two methods for preparing the patient for artificial respiration are discussed as well as methods for insuring carcio-vascular stability. A.C.W.

A81-12753 **Viral diseases and air transport (Maladies virales et transports aériens).** A. Chippaux (Institut Pasteur de Côte d'Ivoire, Abid'an, Ivory Coast). (*Les Entretiens de Médecine Aéronautique et Tropicale, Yamoussoukro, Ivory Coast, Feb. 19-25, 1979.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyberbare*, vol. 19, 1st Quarter, 1980, p. 28-33. 44 refs. In French.

The principal viral diseases which are considered potentially dangerous are reviewed in regards to their respective modes of transmission. These transmission modes are connected to air travel and include direct human contact, contact with living vertebrates transported by aircraft, and contact with arthropod carriers. Some preventive measures to combat viral diseases are briefly discussed for both travelers and regional populations. A.C.W.

A81-12754 **Cholera and air transport - True and false problems (Choléra et transports aériens vrais et faux problèmes).** L. Lapeysonnie. (*Les Entretiens de Médecine Aéronautique et Tropicale, Yamoussoukro, Ivory Coast, Feb. 19-25, 1979.*) *Médecine*

Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare, vol. 19, 1st Quarter, 1980, p. 34, 35. In French.

A81-12755 Human factors in Mirage 2000 missions (Facteurs humains des missions du Mirage 2000). H. Vieillefond (Centre d'Essais en Vol, Laboratoire de Médecine Aéronautique, Brétigny-sur-Orge, Essonne, France). (NATO, AGARD, Meeting, Lisbon, Portugal, Oct. 28, 1979.) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 1st Quarter, 1980, p. 45-49, 15 refs. In French.

Characteristics of modern aircraft as exhibited in the French Mirage 2000 which require an adaptation of the pilot, include the aircraft's increased maneuverability, an increased flight altitude, and a change in the pilots' tasks. The article emphasizes the physiopathological effects of the aircraft's rapid variation in acceleration, and an increased flying altitude upon the pilot. The physiopathological effects caused from an increased altitude can be assessed and various protective measures for the pilot are briefly discussed. Although the pilots' physical tasks have been decreased with the development of aircraft such as the Mirage 2000, a corresponding increase in mental tasks has evolved whose effect is not yet known. A.C.W.

A81-12756 Pressure variations and the inner ear during diving (Variations de pression et oreille interne en plongée). F. Demard (Nice, Université, Nice, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, no. 74, 1980, p. 89-94. 61 refs. In French.

The major hypotheses seeking to explain the range of clinical manifestations of the inner ear encountered upon exposure to the pressure variations involved in diving are reviewed. Following a brief survey of the discovery of inner ear problems related to pressure changes, consideration is given to the results of experiments demonstrating auditory and vestibular impairment upon exposure to simulated depths and the symptomatology of cochlear-vestibular lesions, which usually become apparent following diving. Mechanisms for the transmission of increased pressure to the inner ear, which results in the rupture of various cochlear and vestibular components, and the effects of decompression which often act in conjunction with biochemical effects, are examined, and the effects of cold, physical condition and breathing gas composition on the development of such lesions are considered. It is pointed out that the pathogenic mechanism and consequently the course of treatment are believed to depend on the circumstances of the dive, and recommendations are presented for preventing inner ear accidents. A.L.W.

A81-12757 Flight after diving (Le vol après la plongée). H. Vieillefond (Centre d'Essais en Vol, Laboratoire de Médecine Aéronautique, Brétigny-sur-Orge, Essonne, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, no. 74, 1980, p. 101-104. 9 refs. In French.

The appearance of aeroembolisms during aircraft flight following diving is discussed in light of recent experience with the phenomenon. The mechanisms giving rise to aeroembolisms following exposure to high pressures are examined, and the role of decompressions encountered during aircraft flight in provoking the symptoms is indicated. Results of experiments demonstrating the appearance of nitrogen bubbles in the blood at altitudes as low as 2000 m and a critical supersaturation coefficient less than 2 are indicated together with those concerning the effects of the amount of time between diving to various depths and aircraft flight at various altitudes on the probabilities of developing aeroembolisms. It is concluded that as it has been demonstrated that diving prior to flight considerably increases the risks of developing aeroembolisms, Air Force as well as civil aviation flight crews should be forbidden from engaging in any kind of diving at least 24 hours prior to flight. A.L.W.

A81-12758 Aeronautical medical education in France (L'enseignement de la médecine aéronautique en France). J. Colin (Service de Santé des Armées, Centre de Recherches, Clamart,

Hauts-de-Seine, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, no. 74, 1980, p. 111-113. In French.

The background, programs and organization of the instruction of doctors in aeronautical medicine in France are discussed. Following a brief review of the history of aeronautical medicine in France leading to the initiation of courses in the subject in 1934 and the subsequent creation of a degree program, the duties of the military or civilian doctor specializing in aeronautical medicine are indicated, with attention given to the selection and medical surveillance of flight personnel, the selection of appropriate therapies, aircraft hygiene and research. The French program of instruction in aeronautical medicine is presented which includes an introduction to the aerospace flight environment, the physiopathological consequences of flight conditions, the psychological and human factors aspects of flight, and the operational organization of courses of instruction in aeronautical medicine in the civilian and military sectors is outlined. Finally, aeronautical medical education in France is compared with that received by doctors in the United States, Great Britain, Germany and Italy. A.L.W.

A81-12759 Development of an actographic technique adapted to the study of microwave effects (Développement d'une technique d'actographie adaptée à l'étude des effets des microondes). M. J. Klein, C. I. Milhaud, A. Cheny, M. Dayt, and D. Bucaille (Centre d'Etudes et de Recherches de Médecine Aéronautique, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, no. 74, 1980, p. 114-120. 22 refs. In French. Direction des Recherches, Etudes et Techniques Contract No. 78-1002.

A technique for quantifying the motor activity of rodents subjected to microwave irradiation is presented. The method involves the direct optical monitoring of the presence or absence of motor activity in individual mice or rats by an analog optoelectronic device, the output of which is processed automatically to obtain actograms in real time. Pharmacological tests have been performed using compounds with known psychotropic effects which verify the sensitivity and dynamics of the apparatus. The technique thus appears suitable for routine laboratory use to determine the effects of microwave irradiation on the central nervous system and behavior. A.L.W.

A81-12760 Experimental study of the functional, aminergic and cerebrovascular effects of hypobaric hypoxia (Etude expérimentale des effets fonctionnels, aminergiques et cérébro-vasculaires d'une hypoxie hypobare). M. Le Poncin Lafitte, J. R. Rapin (Centre Hospitalier Universitaire Saint-Antoine, Paris, France), and P. C. Pesquies (Centre d'Etudes et de Recherches de Médecine Aéronautique, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, no. 74, 1980, p. 120-124. 29 refs. In French.

The response of the sympathetic nervous system and consequently cerebral functional activity to conditions of severe hypobaric hypoxia is investigated. Rats were exposed to 15 min of hypobaric hypoxia at a simulated altitude of 7180 m and an oxygen partial pressure of 33 mm Hg, and measurements were obtained of circulating adrenalin levels, heart rate, brain blood flow, cerebral noradrenalin levels and performance at a task to which they had been conditioned. Significant increases in circulating adrenalin and cerebral blood flow are observed, particularly in the areas of the bulb and hypothalamus. The increased blood flow to the brain thus permits an adequate supply of oxygen to these regions to maintain nonadrenalin levels and permit appropriate motor responses to external stimuli, at the expense of those areas responsible for all other functional activities. A.L.W.

A81-12761 Comparison of the secondary effects on visual function of two hypotonizing eye washes - An incidence in aeronautics at the time of ophthalmological examination of flight personnel (Comparaison des effets secondaires sur la fonction visuelle de deux collyres hypotonisants - Incidence aéronautique lors de

l'expertise ophtalmologique du personnel navigant). P. J. Manent, M. Maille, C. Mauclair, and J. C. Ballion (Centre Principal d'Expertise Médicale du Personnel Navigant, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, no. 74, 1980, p. 125, 127, 128. In French.

The secondary effects on visual function of two hypotonizing eye washes used in the treatment of glaucoma are compared in light of the importance of visual function in flight personnel. Drops of 2 percent pilocarpine nitrate and 0.50 percent timolol maleate were injected into different eyes of a 20-year-old volunteer with no history of ocular or visual difficulties, and tests concerning the state of the iridociliary muscles, subject aeronautical professional ability and visual function were performed. Following injection of pilocarpine, a classical myotic which acts by increasing the flowing ability of aqueous humor, an areflexic myosis, decrease in visual acuity and elevation of night vision threshold are observed, while timolol maleate, a beta-adrenergic block acting by the reduction of the ciliary action of the aqueous humor, did not cause any measurable change in visual function. It is concluded that, aside from its effects in reducing ocular hypertension, timolol appears to be better suited for use in pilots than conventional eye washes.

A.L.W.

A81-12762 Tropical diseases and air transport (Maladies tropicales et transports aériens). M. Gentilini and G. Brousse. *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, no. 74, 1980, p. 132-134. In French.

The spread of tropical diseases due to long-range air transportation is discussed. The major symptomologies of air passengers or crews affected with common tropical diseases are examined, with attention given to the various types of fevers, diarrheas and skin disturbances encountered. The transmission of malaria, trichinosis, filariasis and leishmaniasis by insect vectors carried on board aircraft to persons in temperate regions, usually in the vicinity of airports, is also discussed.

A.L.W.

A81-12763 The importance of certain parasitoses in air transport /amebiasis, schistosomiasis, trypanosomiasis, acariasis/ (Importance de certaines parasitoses dans les transports aériens /amibiase, bilharziose, trypanosomiase, acariens/). Mr. Doucet. *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, no. 74, 1980, p. 144-146. In French.

Consideration is given to the role of the tropical parasitic diseases amebiasis, schistosomiasis, trypanosomiasis and acariasis in air transport. The occurrence, etiology, symptoms and prognoses of the individual diseases are reviewed, and means for the prevention of their transmission among flight crews and passengers are indicated.

A.L.W.

A81-12764 Tropical diseases and the fitness of flight personnel (Maladies tropicales et aptitude du personnel navigant). R. Carre (Centre Principal d'Expertise Médicale du Personnel Navigant, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, no. 74, 1980, p. 146-150. In French.

The incidence of tropical diseases among flight personnel is examined for the years 1969-1972 in French civil and military crews who frequently make stop-overs in endemic regions or who are of overseas origin. Following a review of standard crew screening procedures, consideration is given to the incidence statistics of the various forms of the two most significant diseases: amebiasis and malaria, and the available types of chemical prophylaxis for malaria are discussed. The incidence of other diseases including parasitoses, epidermomycoses and viral and bacterial infection is also considered. It is concluded that as tropical diseases are becoming more frequent among flight personnel, aeronautical physicians must be alerted to their significance so as to prevent dangerous accidents.

A.L.W.

STAR ENTRIES

N81-10499# Joint Publications Research Service, Arlington, Va.

FUTURE, IMPACT OF BIOMEDICAL RESEARCH EXAMINED

In its West Europe Rept.: Sci. and Technol., No. 14 (JPRS-75070) 5 Feb. 1980 p 11-19 Transl. into ENGLISH from *Le Monde* (France), 10 Nov. 1979 9 p

Avail: NTIS HC A04/MF A01

Advances in modern biology during the past 25 years are reviewed with particular emphasis on the systematic study of mutant microorganisms. Risks associated with genetic manipulation are discussed as well as possible advantages in agriculture, clinical medicine, pharmacology, industry, and waste utilization.

A.R.H.

N81-10663 Joint Publications Research Service, Arlington, Va. **USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 14, NO. 5, 1980**

30 Oct. 1980 149 p refs Transl. into ENGLISH of *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 14, no. 5, Sep.-Oct. 1980 (JPRS-76727) Copyright. Avail: NTIS HC A07

Space flight stress and astronaut performance are discussed. Topics include astronaut selection, weightlessness effects, orthostatic tolerance, life support systems, and nutritional and exercise requirements.

N81-10664 Joint Publications Research Service, Arlington, Va. **FLUID-ELECTROLYTE HOMEOSTASIS AND WEIGHTLESSNESS**

O. G. Gazenko, A. I. Grigoryev, and Yu. V. Natochin *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 1-11 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 14, no. 5, Sep. - Oct. 1980 p 3-10

Avail: NTIS HC A07

Stable volume, osmotic concentration, and ionic composition of internal fluids are a mandatory prerequisite for persons to be in a good condition and highly efficient. Physiological systems regulate the concentration of each electrolyte in blood and other endogenous fluids, the balance between intake and output, and total salt content of the body. The purpose of this survey is to discuss the causes, mechanisms, and significance of disturbances in electrolyte metabolism, to determine whether they are primary or secondary, as well as to determine the systems changes which caused these disturbances. This is of basic importance to development of preventive methods and comprehension of the mechanisms of action of weightlessness on the human body.

E.D.K.

N81-10665 Joint Publications Research Service, Arlington, Va. **PROBLEMS AND PROSPECTS OF SPACE PHARMACOLOGY**

V. S. Shaskov and V. V. Sabayev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 12-28 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 14, no. 5, Sep. - Oct. 1980 p 10-20

Avail: NTIS HCA07

The Soviet and foreign literature on the pharmacological support of manned space flights is reviewed with emphasis on pharmacological prophylaxis and therapy of adverse effects of

the space environment. The future development of pharmacological studies as part of space medicine is discussed. E.D.K.

N81-10666 Joint Publications Research Service, Arlington, Va. **BIORHYTHMOLOGICAL STATUS AS ONE OF THE CRITERIA FOR COSMONAUT SCREENING**

S. I. Stepanova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 29-34 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 14, no. 5, Sep. - Oct. 1980 p 20-24

Avail: NTIS HC A07

The concept of biorhythmological status of the human body is discussed in two aspects, constancy and variability of circadian rhythms of vital functions. The relationship between the two parameters is described in the light of a hierarchic structure of the circadian system. The dependence of stress resistance upon integrity and level of organization of the circadian system is ascertained. The importance of assessment of biorhythmological status for proper cosmonaut selection is emphasized. E.D.K.

N81-10667 Joint Publications Research Service, Arlington, Va. **STUDY OF THE COMBINED EFFECT OF ANTIORTHOSTATIC POSITION AND LBNP ON MAN'S TRACKING ACCURACY AND SPATIAL ORIENTATION**

B. B. Bokhov, B. B. Yegorov, A. A. Savilov, and Yu. N. Taranenko *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 35-45 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 14, no. 5, Sep. - Oct. 1980 p 25-28

Avail: NTIS HC A07

Test subjects exposed to a head down tilt at -30 deg for an hour participated in the experiment. The use of lower body negative pressure (LBNP) during tilting improved precision of arrow orientation on the round shaped screen (during continuous tracking) but did not influence orientation relative to the gravitational axis and the long axis of the body. The selective effect of LBNP on the orientation can be attributed to the increased importance of inner coordinates due to the pressure of interior walls of the LBNP suit on the foot surface and blood pooling in the dependent part of the body. E.D.K.

N81-10668 Joint Publications Research Service, Arlington, Va. **CIRCULATORY REACTIONS OF FIRST CREW OF THE SALYUT-6 ORBITAL TEST WITH LBNP**

V. A. Degtyarev, L. Ya. Andriyako, V. M. Mikhaylov, V. N. Ragozin, Zh. G. Adamchik, I. V. Alferova, V. A. Andretsov, and A. N. Kozlov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 41-45 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 14, no. 5, Sep. - Oct. 1980 p 29-32

Avail: NTIS HC A07

During the first two weeks of space flight the crew members showed circulation reactions to LBNP that were typical of reduced orthostatic tolerance. At later flight stages (beginning with mission day 49) the Commander displayed a gradual recovery of the cardiovascular function. The Flight Engineer exhibited reactions indicating his decreased tolerance of LBNP tests. E.D.K.

N81-10669 Joint Publications Research Service, Arlington, Va. **DYNAMICS OF DIASTOLIC PHASE STRUCTURE DURING A 140 DAY SPACE FLIGHT**

I. V. Alferova, A. D. Yegorov, and A. P. Polyakova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 46-50 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 14, no. 5, Sep. - Oct. 1980 p 32-35

Avail: NTIS HC A07

The phasic structure of the diastole was examined by the kinetocardiographic (KKG) method. Mechanical signals were converted by means of a piezoceramic sensor, the receiving part of which, in the form of rubber capsules (4x6 cm in size) filled with porolon (plastic), was placed in the region of the apex

beat and fourth intercostal space on the right, on the parasternal line. The KKG was recorded on polynome-2M equipment at relative rest, and the data were transmitted to earth via telemetry channels. The studies were conducted 4 times before the flight, 16 times during the flight and twice in the postflight period. The following systolic parameters were measured: the phases of isometric relaxation; the rapid and slow filling; and the atrial systole. Significant results are reported. R.C.T.

N81-10670 Joint Publications Research Service, Arlington, Va.
RESULTS OF INFLIGHT ELECTROCARDIOGRAPHIC STUDIES OF SALYUT-5 CREW

V. A. Degtyarev, V. S. Bednenko, V. K. Gabyshev, V. A. Sapozhnikov, and V. P. Sidorov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Nov. 1980 p 51-55 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 35-38*

Avail: NTIS HC A07

In Salyut-5 crewmembers, electrocardiograms were recorded in 12 standard and D-S leads. No marked changes in bioelectric properties of the myocardium were detected. During the second part of the mission changes in the terminal portion of the ventricular complex in the left sternal leads were observed. It is presumed that they were induced by repolarization anomalies due to neurohormonal effects on myocardial metabolism. Members of the second crew did not exhibit similar electrocardiographic changes. R.C.T.

N81-10671 Joint Publications Research Service, Arlington, Va.
FUNCTIONAL ASYMMETRY OF OPERATOR PERFORMANCE

A. G. Fedoruk and T. A. Dobrokhotova *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 56-62 refs Transl. into ENGLISH Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, No. 5, Sept. - Oct. 1980 p 39-42*

Avail: NTIS HC A07

The relationship between the level of operator's activity and functional asymmetry of hands, feet, eyes and ears was established. It is shown that the level of the operator's activity is increased due to a well expressed right-handed asymmetry of hands, eyes and ears with feet asymmetry being of less importance. R.C.T.

N81-10672 Joint Publications Research Service, Arlington, Va.
EFFECT OF SOME FACTORS THAT SIMULATE SPACE FLIGHTS ON BLOOD PLASMA LEVELS OF FREE AND PROTEIN-BOUND 11-HYDROXYCORTICOSTEROIDS

S. S. Kalandarov, V. P. Bychkov, A. S. Ushakov, and G. I. Proskurova *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 63-69 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 43-47*

Avail: NTIS HC A07

Effect of space flight simulation factors (ascent to an altitude of 8,000 m, anticipation of centrifugation, psychological test, hypokinesia, and enclosure in an altitude chamber) on the content of free protein-bound 11-hydroxycorticosteroids in plasma was studied. This exposure produced changes in the total and fractional content of the hormones. The change depended on the simulation factor, duration of its action, and functional status of test subjects. Author

N81-10673 Joint Publications Research Service, Arlington, Va.
RENAL FUNCTION AND GLUCOCORTICOID ACTIVITY OF THE ADRENAL CORTEX DURING IMMERSION

I. S. Balakhovskiy and V. B. Noskov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 70-74 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 47-50*

Avail: NTIS HC A07

Renal and adrenal function was studied in six normal men

during and after 3 day water immersion used as weightlessness simulation. The renal excretion of fluid, basic electrolytes, creatinine and total 17-hydroxycorticosteroids (17-HOCS) for 24 hours and following a provocative water-load test (20 ml/kg) was measured. During the first post-immersion day diuresis increased by 77%, excretion of sodium by 42%, 17-HOCS by 43% and creatinine by 34% as compared to the pre-immersion level. Potassium excretion remained essentially unchanged. The circadian rhythm of excretion of the above substances was normal: at night the excretion decreased and in the morning increased noticeably. Renal function and adrenal activity was carried out 56 hours after the beginning of water immersion, using a provocative water-load test. Water excretory and osmoregulatory functions of kidneys, and glucocorticoid activity of adrenals remained normal. These data give evidence that during a 60 hour exposure to water immersion no functional hypocorticism develops. R.C.T.

N81-10674 Joint Publications Research Service, Arlington, Va.
ERYTHROCYTE BALANCE DURING 182-DAY HYPOKINESIA

T. Ye. Burkovskaya, A. V. Ilyukhin, V. I. Lobachik, and V. V. Zhidkov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 75-80 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 50-54*

Avail: NTIS HC A07

A prolonged head-down tilt resulted by the end of the second month in a significant decrease in the circulating blood volume at the expense of plasma and erythrocyte volumes. One of the factors that caused a reduction in the erythrocyte volume was their survival time shortening. The fact that during the rest four hypokinetic months there was no further decline in the erythrocyte count was attributed to adaptive developments: increase of bone marrow production and rate of differentiation of erythroid elements. Exercises used as a countermeasure could slightly counteract the adverse effects of head-down tilt. Author

N81-10675 Joint Publications Research Service, Arlington, Va.
EFFECT OF PROLONGED ANTIORTHOSTATIC POSITION ON CARDIAC BIOELECTRICAL ACTIVITY ACCORDING TO EKG TRACINGS FROM CORRECTED ORTHOGONAL LEADS

V. D. Turbasov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 81-87 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 54-59*

Avail: NTIS HC A07

The effect of the time of head-down tilting on electrocardiographic parameters was consistent and significant ($P < 0.05$): a slight increase in heart rate in groups 1 and 3, an increased time of atrioventricular conduction, an increased amplitude of the QRS complex, and a decreased amplitude of T wave, primarily in groups 1 and 3. No dystrophic signs were detected. The high level of heart rate in group 3 during the recovery period suggests a more pronounced decline of functional capabilities of the heart. There are grounds to believe that countermeasures produce a relatively greater effect on the function of the myocardium than on its metabolism. Author

N81-10676 Joint Publications Research Service, Arlington, Va.
VESTIBULAR NYSTAGMUS IN RATS AFTER HYPOKINESIA AND PROLONGED ROTATION

V. G. Vechkin and A. A. Shipov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 88-93 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 59-63*

Avail: NTIS HC A07

Changes in the latent period, number of beats, duration and frequency of the nystagmus were investigated in rats exposed to angular acceleration of an increasing value (10, 20, 30, and 40 degree/sq cm) after a 21 day exposure to hypokinesia per se or hypokinesia in a rotating device (with a radius of 141 cm,

rate of rotation of 33.3 rpm, and acceleration value of 2 g). The hypokinetic rats showed nystagmic changes only with the lowest acceleration used (10 deg/sq cm). The hypokinetic animals rapidly adapted to a repeated exposure to angular acceleration during the recovery period. A 21 day exposure to hypokinesia in a rotating device disturbed adaptation to a repeated effect of angular acceleration during recovery. Mechanisms of these effects are discussed. It is concluded that hypokinesia cannot be an adequate model for studying weightlessness effects on the vestibular function. Author

N81-10677 Joint Publications Research Service, Arlington, Va. **EFFECT OF EXERCISE, VITAMIN AND MINERAL SUPPLEMENTS ON REPRODUCTIVE FUNCTION OF ALBINO RATS DURING PROLONGED HYPOKINESIA**

Ye. A. Stroganova, Yu. F. Udalov, V. I. But, V. Ye. Potkin, and I. V. Rogacheva *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 94-98* refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 63-65*

Avail: NTIS HC A07

The reproductive function of white rats exposed to 30 day hypokinesia was studied. Hypokinetic females in a regular diet produced offspring in 33 percent and those on an enriched diet in 50 percent cases. The same values were obtained in exercising rats, the time allowed for their exercises making 3 percent of the total experimental time. A combined use of an enriched diet and exercises resulted in a 100 percent increase of pupping events. A.R.H.

N81-10678 Joint Publications Research Service, Arlington, Va. **STUDIES OF CENTRAL AND REGIONAL HEMODYNAMICS BY ISOTOPE AND IMPEDANCE METHODS DURING LBNP**

Kh. Kh. Yarullin, T. V. Benevolenskaya, V. I. Lobachik, T. D. Vasilyeva, V. A. Gornago, V. V. Degtyarenko, and N. F. Tarasov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 99-104* refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 66-70*

Avail: NTIS HC A07

The potential of impedance and isotope (intravenous injections of I-131 and In-113m In) methods to study regional and central hemodynamics was investigated on 12 test subjects exposed to LBNP. Both methods demonstrated marked changes in blood filling of the head and the chest, particularly during the first minutes of LBNP tests. This occurred together with a drastic increase in leg blood filling. The close similarity of regional hemodynamic changes detected by the two methods gives evidences that the simple and noninvasive impedance method can be well used for the above studies. Author

N81-10679 Joint Publications Research Service, Arlington, Va. **CHANGES IN MAIN PARAMETERS OF HUMAN HEMODYNAMICS WITH LOWER BODY COMPRESSED IN A G SUIT**

L. I. Letkova and K. I. Murakhovskiy *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 105-110* refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 70-73*

Avail: NTIS HC A07

Changes in cardiovascular parameters of test subjects wearing anti-G suits are studied under static conditions. Methods of radioactive label dilution, radiocardiography, and tetrapolar rheography were used. Results show that the highest level of physiological reactions, within short transition periods immediately after inflation and deflation of suit bladders. At the same time, in the course of compression, there is some tendency toward recovery of the base volumetric characteristics of circulation, which can apparently be considered a manifestation of compensatory reactions in response to mechanical compression of the lower body. M.G.

N81-10680 Joint Publications Research Service, Arlington, Va. **AUTOMATIC CONTROL OF GAS EXCHANGE IN THE AUTOTROPHIC COMPONENT OF A LIFE SUPPORT SYSTEM FOR HETEROTROPHIC ORGANISMS**

V. L. Korbut *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 111-116* refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 73-77*

Avail: NTIS HC A07

An automatic gas exchange control system for the autotrophic component in the life support system of heterotrophic organisms is described and tested. Wheat grown in a sealed phytotron was used as the model of the autotrophic element. The heterotrophic element was modeled by four albino rats put into a special airtight chamber. A high efficiency of the automatic gas exchange control system of plants integrated with animals is demonstrated. Balance characteristics of the integrated gas exchange in the plant-animal system are provided. M.G.

N81-10681 Joint Publications Research Service, Arlington, Va. **USE OF ULTRAVIOLET INSTRUMENT FOR MONITORING THE QUALITY OF RECLAIMED DRINKING WATER**

S. V. Chizhov, Yu. Ye. Sinyak, M. I. Shikina, and T. D. Kalinichenko *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980, (JPRS-7627) 30 Oct. 1980 p 117-120* refs Transl. into ENGLISH from *Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 77-79*

Avail: NTIS HC A07

The possibility of using a luminescence method for ongoing monitoring of the quality of drinking water reclaimed from the condensate of atmospheric moisture (CAM) and obtained from dissociation of hydrogen peroxide is explored. A semiautomatic ultraviolet fluorimeter was utilized. The sensitivity of the instrument to elementary alcohols and acids and construction materials used in the reclamation system was tested. The findings revealed that the sensitivity of the ultraviolet instrument constituted 0.001 percent for alcohols and 0.0001 percent for acids. Studies of construction materials revealed that, in experiments with distilled water, the resins and charcoals of the tested brands had no effect on the readings (in millivolts) of the luminescence instrument. Upon sorption purification of the CAM substitute, gel-like ion exchange resins imparted luminescence to reclaimed water. Such a phenomenon was not observed with use of porous ion exchange resins. Additional results and recommendations are given. M.G.

N81-10683 Joint Publications Research Service, Arlington, Va. **METHOD FOR PRODUCING CLINOSTATIC HYPOKINESIA IN MONKEYS**

T. G. Urmancheyeva and A. A. Dzhokua *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 126-130* refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow), v. 14, no. 5, Sep. - Oct. 1980 p 82-84*

Avail: NTIS HC A07

A method of producing clinostatic hypokinesia in monkeys is described. Monkeys (*Macaca rhesus*) were restricted by overalls, which buttoned in the back and had an opening in the perineal region. Over the entire length of the suit, from the arm hole to the ankle joint, pairs of tapes were stitched into the side seams at a certain distance from one another. These tapes are passed through openings that were made in a canvas-covered cot and tie the overalls to the cot. With such immobilization, the animal's legs are extended in the hip and knee joints. It retains freedom of movement in all of the arm articulations and in the ankles. The monkey was turned from back to abdomen periodically, every 2-3 days. An intact monkey was kept immobilized under these conditions for 45 days. On the whole, the disturbances that developed (weight loss, decreased volume and tonus of muscles of the lower extremities, statokinetic disturbances) and dynamics thereof in the readaptation period were similar to those seen in man submitted to long term clinostatic hypokinesia. M.G.

N81-10684 Joint Publications Research Service, Arlington, Va.
CERTAIN PERSONALITY CHARACTERISTICS AS RELATED TO SUCCESS OF PILOT TRAINING

Ye. V. Bannov and V. S. Lozinskiy *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 131-136 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 14, no. 5, Sep. - Oct. 1980 p 84-87

Avail: NTIS HC A07

The overall correlation between measured personality traits and such indicators of achievement in flight training level of development of the main mental processes, flying skills, training, and check out flying hours in basic flight training is studied. The survey methodologies are described which incorporate a 16 factor analysis of the personality. Results indicate that the well achieving cadets are characterized by such personality traits as higher intelligence than poor achievers, emotional stability, rationality, decisiveness, conscientiousness, courage, broad interests, practicality, leadership, vigor, good control over behavior and emotions, and sincerity. M.G.

N81-10685 Joint Publications Research Service, Arlington, Va.
BIOASTRONAUTICS YESTERDAY, TODAY AND TOMORROW

V. V. Budilovskiy and V. B. Pishchik *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 14, No. 5, 1980 (JPRS-7627) 30 Oct. 1980 p 137-144 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 14, no. 5, Sep. - Oct. 1980 p 88-92

Copyright. Avail: NTIS HC A07

A brief overview of major directions of bioastronautical research on the international scene is presented. The spaceborne experiments of the space shuttle and space lab missions are emphasized. M.G.

N81-10686 Washington State Univ., Pullman.
CALCIUM UPTAKE IN TRAINED AND EXHAUSTED ANIMALS Ph.D. Thesis

Marie Beauregard 1980 67 p

Avail: Univ. Microfilms Order No. 8025904

The effects of training or exhaustion in rats and hamsters were evaluated by measurements of succinate dehydrogenase (SDH) activity, colonic temperatures, glycogen depletion, and calcium uptake by the sarcoplasmic reticulum (SR). In the rat study, the training consisted of running on a treadmill for 1 hr/day for 5 days/wk at 26.8 m/min for 12 wks. Training induced a higher SDH activity in the trained rats ($P < 0.01$) than in the nontrained rats. Exhaustion procedure consisted of running on the treadmill at 20 m/min for the first hr., and then enhancing the workload by increasing the treadmill speed every hour or half hour thereafter. Colonic temperatures reached 41 C for both nontrained and trained exhausted rats. Training did not affect the magnitude of the glycogen depletion produced by exhaustion in either the gastrocnemius muscle or in liver. The transient depression in calcium uptake found in nontrained exhausted rats supports the contention that exhaustion is not caused by a severe impairment of SR functioning in nontrained animals. Dissert. Abstr.

N81-10687 Illinois Univ., Urbana,
THE ROLE OF PLASMA PROTEINS IN THE MAINTENANCE OF VASCULAR VOLUMES Ph.D. Thesis

Margaret Anne Kolka 1980 50 p

Avail: Univ. Microfilms Order No. 8024575

For adult males volunteered to participate in an incremental exercise test at five submaximal exercise intensities, as well as during maximal exercise. Prior to the exercise bout, each subject was equilibrated (0.5 hr) in both supine and upright positions. During each rest and exercise period, standard metabolic measurements were made, core temperature recorded and a peripheral venous blood sample drawn from an indwelling catheter in the cubital (arm) area. In each blood sample, the whole blood hemoglobin concentration, the hematocrit and the plasma concentrations of the total plasma proteins, albumin and the total globulin were determined. It suggested that the fluid volume alterations observed were the result of hydrostatic forces with

resultant water movement out of the vascular bed, and were not due to any active processes involving redistribution of proteins with the various fluid compartments. Dissert. Abstr.

N81-10688 Virginia Univ., Charlottesville.
STUDIES IN RESPIRATORY CONTROL Ph.D. Thesis

Matthew Lincoln Severns 1980 272 p

Avail: Univ. Microfilms Order No. 8024039

The control of respiration was studied. The interaction of the carotid chemoreceptor signals with the signals from other systemic sensors in providing a net drive to breathe was investigated. The chemoreceptor interaction was analyzed by separately perfusing the carotid sinuses from a set of gas exchangers to see whether or not the level of systemic stimulation or the order of presentation of stimuli affect the overall interaction. It was found that the stimuli combine in a less than additive manner. A mathematical model of the chemoreceptors in the ventrolateral surface of the medulla was constructed. These chemoreceptors are the dominant ones in determining the ventilatory response to changes in arterial carbon dioxide concentration. It was shown that a distributed parameter model commonly used to study oxygen transport to tissue (Krogh model) can be reduced to a lumped parameter model by space averaging of concentrations. Dissert. Abstr.

N81-10689 Missouri Univ. - Columbia.
AN AUTOMATED INDIRECT BLOOD PRESSURE INSTRUMENT BASED UPON ULTRASOUND Ph.D. Thesis

Chriswell Gene Hutchens 1979 194 p

Avail: Univ. Microfilms Order No. 8024362

The design, development and testing of an instrument for indirect determination of dog blood pressure is presented. The instrument uses ultrasonic wall velocity characterization techniques for determination of blood pressure. The blood pressure measurement instrument which is based upon a 6802 microprocessor, consists of a cuff with ultrasonic wall velocity transducer, liquid crystal display and a microcomputer for control and determination of systolic and diastolic blood pressures. Wall velocity and cuff pressure are digitized by the microcomputer. The results of 90 blood pressure determination on six dogs over pressure ranges from less than 50 torr to greater than 200 torr are presented. The analysis of data indicates that 80 percent of the time blood pressure determination will be + or - 10 and + or - 16 torr for systolic and diastolic pressure respectively. The instrument is demonstrative of the feasibility for a multispecies instrument. Dissert. Abstr.

N81-10690# Dunlap and Associates, Inc., La Jolla, Calif.
Western Div.

MEASURES OF NAVY PILOT WORKLOAD, SLEEP AND PERFORMANCE IN STRESSFUL ENVIRONMENTS Final Report

Clyde A. Brictson and Peter A. Young Jan. 1980 94 p refs (Contract N00014-77-C-0066; NR Proj. 201-284)

(AD-A087131) Avail: NTIS HC A05/MF A01 CSCL 05/10

Measures of Navy pilot workload, sleep and landing performance collected under two stressful environments--carrier deployment and carrier landing qualification are analyzed and described. The study was conducted to demonstrate the application and utility of data collection techniques in operational environments and to describe the typical workload and sleep activity of Navy pilots. Attack pilots and LSOs averaged 12 hour workdays at sea and supplemented their sleep by short naps during flying periods. Landing performance for attack aviators was remarkably high with boarding rates at night averaging 93 percent for the entire deployment. Performance decrement was noted both day and night only after extensive in port periods of flight inactivity. Recommendations and summary data are discussed. GRA

N81-10691# Duke Univ., Durham, N. C. Dept. of Ophthalmology.

RESEARCH ON GANGLION CELL RESPONSES AFTER LASER EXPOSURE OF THE RETINA Final Report, Jan. 1977 - Dec. 1978

Myron L. Wolbarsht May 1980 51 p refs

(Contract F33615-77-C-0609; AF Proj. 7757)

(AD-A087269; SAM-TR-80-18) Avail: NTIS
HC A04/MF A01 CSCL 06/18

Electrophysiological recordings were made from retinal ganglion cells in the macula (including fovea) of several species of Macaque monkeys. After exposure to high-intensity argon or HeNe lasers both above and below the lesion level, the receptive fields lacked a peripheral portion. This was accompanied by a slight increase in the central portion of the receptive field. Some quite large receptive fields were found around the fovea, often extending through it. The large receptive fields could also extend through the site of a laser lesion. No unsymmetrical changes in the receptive field were seen, even in receptive fields adjacent to, or partially within, a laser lesion site. Histological examination did not show any changes in the retinal organization adjacent to laser lesion even where the ganglion cells had center-only receptive fields. GRA

N81-10692# Michigan State Univ., East Lansing. Dept. of Biomechanics.

THE ACCURACY OF SCREW AXIS ANALYSIS USING POSITION DATA FROM ANATOMICAL MOTION STUDIES

Annual Report, 1 Nov. 1978 - 31 Oct. 1979

Marcus H. Jeffrey 5 May 1980 81 p refs

(Contract F49620-78-C-0012; AF Proj. 2313)

(AD-A089446; AFOSR-80-0868TR) Avail: NTIS
HC A05/MF A01 CSCL 06/2

Research involving the kinematics of human joint mobility often involves screw axis analysis. As a prelude to such research a screw axis analysis program was developed and implemented for use in the Systems Anthropometry Laboratory. This report presents a detailed discussion of the algorithm used to find Displacement Matrices (DM) and screw axis parameters. Error propagation due to uncertainty in DM is analytically developed and then demonstrated. The rotation angle is found to be the most critical screw axis parameter, and the components of a unit vector in the direction of the screw axis are the most sensitive to error. Using the condition number of a matrix, a method is developed and presented for evaluating the error propagation due to the matrix operations used to find DM. GRA

N81-10693# Federal Aviation Administration, Washington, D. C. Office of Aviation Medicine.

POSTMORTEM CORONARY ATHEROSCLEROSIS FINDING IN GENERAL AVIATION ACCIDENT PILOT FATALITIES: 1975 - 1977

C. F. Booze, Jr., J. K. Pidkowitz, A. W. Davis, and F. A. Bolding Feb. 1980 13 p refs

(AD-A089428; FAA-AM-80-8) Avail: NTIS HC A02/MF A01
CSCL 06/5

The autopsies of 764 pilots involved in fatal general aviation accidents during the years 1975-1977 were reviewed to appraise the age specific prevalence of coronary atherosclerosis among the autopsied group. Fifty-one percent of the pilots killed in aircraft accidents and autopsied during 1975-77 were found to have some degree of coronary atherosclerosis ranging from minimal to severe. However, only about 5 percent of the autopsied group were categorized as having severe coronary atherosclerosis. The rate per 1,000 of severe coronary atherosclerosis increased with age from 14.5 for ages less than 30 to 89.9 for ages 50 years and above, with the rate nearly tripling from ages 30-39 to 40-49 (22.1 to 63.6). While the findings of this study are consistent with, and do parallel, the findings of other recent autopsy studies, the prevalence of coronary atherosclerosis among this group of autopsied airmen is less than would have been expected based on the results of these other studies. GRA

N81-10694# Virginia Polytechnic Inst. and State Univ., Blacksburg. Human Factors Lab.

DIGITAL IMAGE PROCESSING SYSTEMS AND AN APPROACH TO THE DISPLAY OF COLORS OF SPECIFIED CHROMINANCE

Willard W. Farley and James C. Gutmann 1 Aug. 1980 40 p refs

(Contract N00014-78-C-0238; NR Proj. 196-155)

(AD-A089587; VPI-HFL-80-ORNL-80-2) Avail: NTIS
HC A03/MF A01 CSCL 05/5

The recent proliferation of color displays has accentuated the need for a metric of color contrast which can be used to predict human operator performance. To obtain the data for forming a metric of color contrast, one needs the capability of presenting a broad range of colors in varying geometric arrangements. This report describes an approach to developing the capability to display colors of known chromaticity using a color digital image processing system. This report covers the development of measurement technique and software used in characterizing the display system, the reduction of spectroradiometric data, the use of color mixing equations for color digital image processing systems, and the development of display system software. GRA

N81-10695# European Space Agency, Paris (France).
A METHOD FOR SEMI-AUTOMATIC ANALYSIS OF EYE MOVEMENTS

Hans Radke Jun. 1980 28 p refs Transl. into ENGLISH of "Ein Verfahren zur Teilautomatisierten Auswertung von Blickbewegungsmessungen" Rept. DFVLR-Mitt-79-02 DFVLR, Brunswick, Dec. 1978 Original report in GERMAN previously announced as N80-23005

(ESA-TT-475; DFVLR-Mitt-79-02) Avail: NTIS
HC A03/MF A01; DFVLR, Cologne DM 7.80

The measurement and analysis of the operator's visual behavior is described in terms of its importance as a tool for human factor research on the layout of displays and controls. However, the analysis of eye point of regard data is difficult and time consuming. A semiautomatic computer aided procedure is described, which reduces the time needed for data analysis.

Author (ESA)

N81-10696# European Space Agency, Paris (France).
THE INFLUENCE OF HYPERBARIC ENVIRONMENT IN COMBINATION WITH WORKLOAD AND CONFINEMENT ON HUMAN INFORMATION PROCESSING

Klaus-Martin Goerters Dec. 1979 16 p refs Transl. into ENGLISH from 'Die Beeinflussung der geistigen Konzentrationsfaehigkeit durch Ueberdruck unter beruecksichtigung der zusaetzlichen Belastungsfaktoren Arbeitsbeanspruchung u. Isolation', DFVLR, Bad Godesberg, West Germany, Report DFVLR-FB-78-12, Jul. 1978 Original report in GERMAN previously announced as N79-30926 Original German report available from DFVLR, Cologne DM 8.20

(ESA-TT-567; DFVLR-FB-78-12) Avail: NTIS
HC A02/MF A01

A test requiring perceptual speed, memory, and numerical ability was given to subjects before and during working conditions with varying degrees of work load, confinement, and ambient pressure. Results demonstrate that high workload and confinement for several days do not lower the test scores, but rising partial pressure of nitrogen results in performance decrements. These decrements are already present at an N2 partial pressure of 3 bar abs.

Author (ESA)

N81-10697*# New Mexico Univ., Albuquerque.
ALTITUDE ACCLIMATIZATION. CITATIONS FROM THE INTERNATIONAL AEROSPACE ABSTRACTS DATA BASE Progress Report, 1974 - Jul. 1980

Samuel C. Mauk Aug. 1980 40 p Supersedes NTIS/PS-79/0857 Sponsored in part by NASA and NTIS (NASA-CR-163672; PB80-813512; NTIS/PS-79/0857) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 06P

This bibliography of citations to the international literature covers aspects of altitude acclimatization. Included are articles concerning high altitude environments, hypoxia, heart function and hemodynamic responses, physical exercise, human tolerances and reactions, physiological responses, and oxygen consumption. This updated bibliography contains 164 citations, 35 of which are new entries to the previous edition. GRA

N81-10698 Kansas Univ., Lawrence.
THE MAP CONTEXT AS A SOURCE OF PERCEPTUAL ERROR IN GRADUATED CIRCLE MAPS Ph.D. Thesis
Patricia Purcell Gilmartin 1980 167 p
Avail: Univ. Microfilms Order No. 8026675

Psychological theory suggests that the nature of the context within which a map symbol is placed can influence the perceived characteristics of the symbol. It was hypothesized that the apparent size of proportional circles on a map would be affected by certain properties of the visual environment of the map. The variables examined were (1) the effect of size contrast between a test circle and closely adjacent circles; (2) the presence or absence on the map of internal borders; and (3) the size of the test circle, itself. A psychophysical test was used to measure the extent to which the perceived sizes of test circles was biased by each of these variables. Analysis of variance techniques determined the statistical significance of the findings for each variable and all combinations of variables. Results indicate that size contrast between a given map symbol and other elements of the visual environment can alter the perceived size of the symbol. Perceptions are relatively accurate when anchored by a legend consisting of at least three circles. Dissert. Abstr.

N81-10699# Yale Univ., New Haven, Conn. School of Organization.

THE METHODOLOGY OF DIAGNOSING GROUP AND INTERGROUP RELATIONS IN ORGANIZATIONS

Clayton P. Alderfer Jun. 1980 42 p refs
(Contract N00014-79-C-0626; NR Proj. 170-891)
(AD-A087474; CPA-80-5) Avail: NTIS HC A03/MF A01 CSCL 05/10

The aim of organizational diagnosis is to produce learning about the system for its members. Diagnosis is a process consisting of three phases: entry, data collection, and feedback. Each phase has its own primary and secondary objectives that contribute to the work of the other phases. As a result, organizational diagnosis is a self-correcting process that permits the activities of subsequent phases to build upon the accomplishments of earlier periods and to correct limitations that arise from the inevitably incomplete work that must occur with dynamic living systems. The process of organizational diagnosis is shaped by the condition of the system being studied. The effects of underbounded and overbounded organizations influence what will happen to diagnosticians as they attempt to proceed with entry, data collection, and feedback. Respondent system dynamics in part determine the consequences of using certain diagnostic techniques. The effect of the intersection between the diagnostic process and an understanding of system dynamics is to establish a series of contingencies that suggest which techniques in what order are most appropriate to particular system conditions. GRA

N81-10700# Yale Univ., New Haven, Conn. School of Organization and Management.

GROUP INTERGROUP RELATIONS IN LIVING HUMAN SPECIES

Clayton P. Alderfer Jun. 1980 58 p refs
(Contract N00014-79-C-0626; NR Proj. 170-891)
(AD-A087473; CPA-80-4) Avail: NTIS HC A04/MF A01 CSCL 05/10

Understanding group and intergroup relations in living human systems takes three orders of conceptual framework. The first pertains to those aspects of groups that share properties with all living systems. The second deals with properties of three levels of human systems: individuals, groups, and organizations. And the third uses concepts uniquely suited to the phenomena of group and intergroup relations in organizations. The concept of parallel processes explains interdependence of phenomena at the different levels of analysis and provides a means to relate dynamic processes in human systems and in the diagnostic process itself. As presented in chapter one, the philosophy of clinical social science dictates that investigators examine themselves as well as the phenomena they study. Therefore, the concepts presented here are intended for use not only by investigators to understand groups and social systems but also to observe and change themselves, if appropriate, as they conduct research. The theory applies to the researched and to the researcher. GRA

N81-10701# Decision Research Corp., Eugene, Oreg.
HOW WELL DO PROBABILITY EXPERTS ASSESS PROBABILITIES? Technical Report, Jan. - Aug. 1980
Sarah Lichtenstein and Baruch Fischhoff Aug. 1980 32 p

refs

(Contract N00014-80-C-0150)
(AD-A089619; PTR-1092-80-8)
HC A03/MF A01 CSCL 05/10

Avail: NTIS

Past research on people's ability to assess probabilities has shown two common errors, overconfidence in one's knowledge and insensitivity to task difficulty. This research has created a new class of experts: those who have studied probability assessors and who are aware of the common errors. The performance of eight such experts is here compared to the performance of twelve untrained subjects and fifteen who had previously received training in probability assessment. All subjects responded to 500 general-knowledge items whose difficulty could be measured a priori from the item context. The experts appeared to have overcorrected for the overconfidence error: they were notably underconfident, whereas the untrained subjects were overconfident and the trained subjects were mixed. The experts were more sensitive than the other two groups to variations in item difficulty. However, even they showed a substantial insensitivity to difficulty, relative to ideal performance. Introspection suggests that this second error would be hard to overcome. GRA

N81-10702# Research Inst. of National Defence, Stockholm (Sweden).

VISUAL EFFECTS OF SAMPLING IN DIGITAL PICTURE PROCESSING. A PILOT STUDY

Lena Linde, Hans Marmolin, and Sten Nyberg Feb. 1980 33 p refs

(FOA-C-53001-H9) Avail: NTIS HC A03/MF A01

Experiments were designed to study how sampling distortions due to aliasing and band limitation are perceived and affect image quality. Sampling effects were investigated with two different scenes. The first experiment comprised ratings of subjective similarity between pictures processed with different combinations of prefiltering and sample frequency. The second experiment comprised subjective ratings of similarity between pictures processed with different combinations of white Gaussian noise and sample frequency. The similarities were analyzed by a multidimensional scaling technique (INDSCAL). The multidimensional analyses indicated that the subjective sampling effects could appear as unhomogeneous noise texture (false spots), illdefined contours, displaced contours or loss of pattern elements; however, the saliency of each dimension was found to depend on scene properties. Author (ESA)

N81-10703# European Space Agency, Paris (France).

A STUDY ON PILOT/OBSERVER INTERACTION IN ALIGNING A HELICOPTER WITH A TARGET

Erhard Danneberg Jan. 1980 32 p refs Transl. into ENGLISH of "Untersuchung des Zusammenwirkens von Pilot und Beobachter beim Ausrichten des Hubschraubers auf ein Ziel". Rept. DFVLR-FB-79-04, DFVLR, Brunswick, Nov. 1978 Original report in GERMAN previously announced as N79-30945

(ESA-TT-480; DFVLR-FB-79-04) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8.70

Speed and stability of the alignment of a helicopter with a target are investigated by means of a system simulation. Variables are the maximum yaw rate of the helicopter, the maximum pan rate of the steerable sight or sensor, and their optical magnification. The results obtained provided favorable combinations of these parameters for two different cases, i.e., target acquisition and target already picked up by means of the sight or sensor, respectively. Author (ESA)

N81-11627*# University of Central Florida, Orlando. Dept. of Biological Sciences.

A CONTINUATION OF BASE-LINE STUDIES FOR ENVIRONMENTALLY MONITORING SPACE TRANSPORTATION SYSTEMS AT JOHN F. KENNEDY SPACE CENTER. VOLUME 2: CHEMICAL STUDIES OF RAINFALL AND SOIL ANALYSIS Final Report, Jul. 1977 - Mar. 1979

B. C. Madsen Aug. 1980 638 p refs

(Contract NAS10-8986)

(NASA-CR-163122; KSC-TR-51-2-Vol-2)

Avail: NTIS

HC A99/MF A01 CSCL 13B

The results of a study which was designed to monitor, characterize, and evaluate the chemical composition of precipitation (rain) which fell at the Kennedy Space Center, Florida (KSC) during the period July 1977 to March 1979 are reported. Results which were obtained from a soil sampling and associated chemical analysis are discussed. The purpose of these studies was to determine the environmental perturbations which might be caused by NASA space activities. Author

N81-11628# Chicago Univ., Ill.
MOLECULAR BIOLOGY OF ENVIRONMENTAL AROMATIC HYDROCARBONS Progress Report, 1 Jan. - 31 Dec. 1980
 Samuel B. Weiss Jul. 1980 12 p
 (Contract DE-AC02-80EV-10328)
 (DOE/EV-10328/1) Avail: NTIS HC A02/MF A01

Three different aspects of hydrocarbon action are investigated: the biochemical effect of benzo(a)pyrene-diol-epoxide on the replication of Simian virus 40; the reaction of benzo(a)pyrene-7,8-diol with viral DNA; and the effect of PAH derivatives on RNA transcription. DOE

N81-11629# Kansas State Univ., Manhattan. Dept. of Biochemistry.
MOLECULAR BASIS OF THE MUTAGENIC AND LETHAL EFFECTS OF ULTRAVIOLET IRRADIATION Progress Report

L. Grossman 1980 6 p
 (Contract DE-AC02-76EV-02814)
 (DOE/EV-02814/1) Avail: NTIS HC A02/MF A01

Research progress is reported in the purification of human placental DNA repair enzymes and the determination of their properties. DOE

N81-11630 Stanford Univ., Calif.
SIGNAL-PROCESSING TECHNIQUES AND TRANSDUCER-MULTIPLEXING CIRCUITRY FOR IMPLANTABLE DIMENSION AND BLOOD-FLOW MEASUREMENT SYSTEMS Ph.D. Thesis

Eric Joseph David Wildi 1980 224 p
 Avail: Univ. Microfilms Order No. 8024757

The advent of integrated circuits made possible the development of sophisticated totally implantable instruments for use in long term animal research. A spectral analysis of the sent and received signals in a pulsed Doppler ultrasonic blood flowmeter demonstrates the limited use of the standard Doppler equation in determining system performance in the presence of short ultrasonic bursts and the need for audio filters having an $f/\sin(f)$ amplitude characteristic in their passband. An investigation of the Doppler based blood/muscle interface detection technique identifies the need for automatic gain control in the feedback circuitry to obtain stable operation, and a small signal model describes the tracking dynamics in terms of known system parameters. Multiplexing at the transducer level is the most attractive method for extending the capability of current implantable units to multiple dimension and/or flow measurements. Several architectures for new multiparameter systems are proposed, and in vitro and in vivo experiments involving hard wired multiple pulsed and CW Doppler flowmeters validate the transducer multiplexing approach. Dissert. Abstr.

N81-11631# Fairchild Republic Div., Farmingdale, N. Y.
SPACECRAFT SURGICAL SCRUB SYSTEM Final Report
 M. Abbate 3 Oct. 1980 15 p refs
 (Contract NAS9-16024)
 (NASA-CR-160882; MS187R5003) Avail: NTIS
 HC A02/MF A01 CSCL 06B

Ease of handling and control in zero gravity and minimizing the quantity of water required were prime considerations. The program tasks include the selection of biocidal agent from among the variety used for surgical scrub, formulation of a dispensing system, test, and delivery of flight dispensers. The choice of an iodophore was based on effectiveness on single applications, general familiarity among surgeons, and previous qualification for space use. The delivery system was a choice between the squeeze foamer system and impregnated polyurethane foam pads.

The impregnated foam pad was recommended because it is a simpler system since the squeeze foamer requires some applicator to effectively clean the skin surfaces, whereas the foam pad is the applicator and agent combined. Testing demonstrated that both systems are effective for use as surgical scrubs. S.F.

N81-11632# Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, Md.

THE PRONE PROTECTED POSTURE

David T. Kilminster and Gary L. Holloway Aug. 1980 122 p refs

(DA Proj. 1R7-65706-M-541)
 (AD-A089818; AMSAA-TR-284) Avail: NTIS
 HC A06/MF A01 CSCL 15/3

The prone protected posture is defined as a prone man taking cover in, under, or beside some piece of equipment, a man-made feature, or a natural feature. The vulnerability of a prone protected man is less than that of a prone man but greater than that of a man crouching in a foxhole. The prone protected man is described by nine different functions representative of mechanized infantry, artillery, supply, and transportation personnel. Eight of these functions are combined by a weighting scheme based on the Soviet Army organization into one function. The resultant function is used to calculate some representative lethal areas. GRA

N81-11633# Brookhaven National Lab., Upton, N. Y. Medical Research Center.

EFFECT OF PHYSICAL ACTIVITY ON BODY COMPOSITION

I. Zanzi, K. J. Ellis, J. Aloia, and S. H. Cohn 1980 8 p refs
 Presented at the 10th Steenback Symp., Madison, Wis., 8 Jun. 1980

(Contract DE-AC02-76CH-00016)
 (BNL-28008; CONF-800690-1) Avail: NTIS
 HC A02/MF A01

The relation between total body calcium, total body potassium and bone mineral content of the radius to the degree of physical activity in a population of normal subjects was determined. Measurement of the calcium was made by in-vivo total body neutron activation analysis. Bone mineral content of the radius and total body potassium, (an index of lean body mass) were measured by photon absorptiometry and the whole body counter, respectively. DOE

N81-11634# Argonne National Lab., Ill.
RADIOACTIVITY IN MAN: LEVELS, EFFECTS AND UNKNOWNNS

J. Rundo 1980 16 p refs Presented at the Public Meeting on Federal Res. into Biol. Effects of Ionizing Radiation, Bethesda, Md., 10-11 Mar. 1980

(Contract W-31-109-eng-38)
 (CONF-800392-1) Avail: NTIS HC A02/MF A01

The potential for significant human exposure to internal radiation is discussed. Sources of radiation considered include background radiation, fallout, reactor accidents, radioactive waste, and occupational exposure to various radioisotopes. GRA

N81-11635# Montclair State Coll., Upper Montclair, N.J.
THE INFLUENCE OF FIGURAL COMPLEXITY ON THE DETECTION, RECOGNITION, AND IDENTIFICATION OF TARGETS, IN COMPUTER GENERATED DISPLAYS Final Report

Moiria K. LeMay 30 Jul. 1980 42 p refs
 (Grant AF-AFOSR-0103-79; AF Proj. 2313)
 (AD-A089945; AFOSR-80-0965TR) Avail: NTIS
 HC A03/MF A01 CSCL 05/9

Computer-generated images (CGI) or displays in simulators provide a cost-effective approach to training pilots in the use of infrared and other types of electrooptical (E/O) displays for night flying. The cost of simulating objects on a CIG display is proportional to the amount of display complexity. The present investigation attempted to assess the amount of complexity in simulation necessary for the detection, recognition, and identification of targets in a scene. GRA

N81-11636# Maryland Univ., College Park. Computer Vision Lab.

USING QUADTREES TO SMOOTH IMAGES

Sanjay Ranade and Michael Shneier Apr. 1980 14 p refs
(Contract DAAG53-76-C-0138; DARPA Order 3206)
(AD-A090247; TR-894) Avail: NTIS HC A02/MF A01 CSCL 05/8

Three methods for smoothing images are presented. All three use variable numbers of picture points over which the smoothing functions are defined. The first method examines the histogram of a neighborhood of each point. The subset of gray values most similar to that of the point is used in calculating the smoothing functions. The other two methods use quadtree approximations to smooth the image. One of these uses the sizes of the leaves in the quadtree to determine neighborhood sizes over which to apply a smoothing function, while the other refines the gross smoothing defined by the quadtree. All the methods perform fairly well, but the quadtree methods are particularly attractive because of the information about region sizes and homogeneity provided by the quadtree structure. GRA

N81-11637# Pittsburgh Univ., Pa.

OBSERVED COMPENSATION FOR PROJECTIVE DISTORTION OF GRAPHIC DISPLAYS

Richard R. Rosinski and Harry L. Chiesi 15 Jul. 1980 56 p refs
(Contract N00014-77-C-0679)

(AD-A090188) Avail: NTIS HC A04/MF A01 CSCL 05/8
Graphic displays can provide accurate representations of three dimensional space only if they are viewed from the geometric center of projection. Other viewing conditions result in distortions of virtual space. In our earlier reports we have proposed two processes by which the perceptual system discounts these distortions: an active compensation and a passive categorization. The present report describes 3 sets of studies which demonstrate the nature of these processes. In the first experiment, observers made magnitude estimate judgments of the depth of unfamiliar, 7-sided objects. Distortions were induced by moving the center of projection. Judgments corresponded almost completely with the distorted virtual space. In the second experiment, distortions were induced by moving the observer. No effect of the distortions was found in this situation indicating perfect perceptual compensation. These results replicate and extend our earlier findings. GRA

N81-11638# Massachusetts Inst. of Tech., Cambridge. Dept. of Psychology.

EFFICIENT COMPUTATIONS AND REPRESENTATIONS OF VISIBLE SURFACES Final Report, 1 Oct. 1978 - 31 Oct. 1979

Whitman Richards and Kent A. Stevens Dec. 1979 75 p refs
(Grant AF-AFOSR-0020-79; AF Proj. 2313)
(AD-A089832; AFOSR-80-0966TR) Avail: NTIS HC A04/MF A01 CSCL 05/8

This report addresses two problems, the extraction of surface shape information from the image of contours lying on a surface and the determination of transparency. Our preliminary analyses discuss the constraints and assumptions that underly the perception of surface shape and transparency. The identification and elucidation of these assumptions and constraints is important for the design of flight simulators, in order that synthetic images are not built up from conflicting ones that will mislead the observer. The first part of the report examines our perception of surface contours (e.g., the projections of linear surface markings such as seams, wrinkles, pigmentation edges, glossy reflections, and shadow edges). Generally such contours lie interior to the silhouette of an object and have been regarded as merely contributing to texture, or to making the surface appear solid, or simply adding to the complexity of the image. In fact, they constitute an important source of information about surface shape. GRA

N81-11639# Dynamics Research Corp., Wilmington, Mass. Advanced Systems Dept.

HUMAN RESOURCES, LOGISTICS, AND COST FACTORS IN WEAPON SYSTEM DEVELOPMENT PROJECT SUMMARY Final Report

Gerard F. King and William R. Askren Brooks AFB, Texas AFHRL Sep. 1980 74 p refs
(Contract F33619-77-C-0016; AF Proj. 1959)
(AD-A089708; AFHRL-TR-80-8) Avail: NTIS HC A04/MF A01 CSCL 15/5

This report provides a summary of an Air Force advanced development effort, Integration and Application of Human Resource Technologies in Weapon System Design. The project resulted in the development and demonstration of a methodology, the coordinated human resource technology (CHRT), and its complementary consolidated data base. The methodology is applicable throughout weapon system acquisition and provides for (a) the early assessment of the system design and support plan impact on human resources, logistics, and costs, and (b) the development of a mutually supportive and coordinated training program and technical manual set. Specifically, this report summarizes (a) the development of CHRT and the CDB, (b) the demonstration of the CHRT and the CDB on major systems of the Advanced Medium STOL Transport, (c) CHRT and the CDB as they presently are defined, and (d) the guidelines for future application of CHRT and the CDB. GRA

N81-11986*# Auburn Univ., Ala. Dept. of Mathematics.

A RANKING ALGORITHM FOR SPACELAB CREW AND EXPERIMENT SCHEDULING

Robert D. Grone and Frank H. Mathis In Alabama Univ. Res. Rept.: The 1980 NASA/ASEE Summer Fac. Fellowship Program Oct. 1980 18 p
Avail: NTIS HC A99/MF A01 CSCL 05H

The problem of obtaining an optimal or near optimal schedule for scientific experiments to be performed on Spacelab missions is addressed. The current capabilities in this regard are examined and a method of ranking experiments in order of difficulty is developed to support the existing software. Experimental data is obtained from applying this method to the sets of experiments corresponding to Spacelab mission 1, 2, and 3. Finally, suggestions are made concerning desirable modifications and features of second generation software being developed for this problem. M.G.

N81-11990*# Alabama Univ. in Huntsville. Development Learning Program.

PAYLOAD CREW TRAINING COMPLEX (PCTC) UTILIZATION AND TRAINING PLAN Status Report

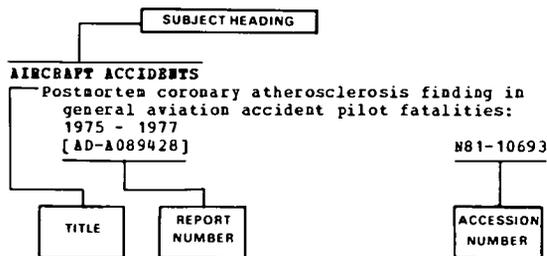
Michael R. Self In its Res. Rept.: The 1980 NASA/ASEE Summer Fac. Fellowship Program Oct. 1980 20 p refs

Avail: NTIS HC A99/MF A01 CSCL 05I

The physical facilities that comprise the payload crew training complex (PCTC) are described including the host simulator; experiment simulators; Spacelab aft flight deck, experiment pallet, and experiment rack mockups; the simulation director's console; payload operations control center; classrooms; and supporting soft- and hardware. The parameters of a training philosophy for payload crew training at the PCTC are established. Finally the development of the training plan is addressed including discussions of preassessment, and evaluation options. M.G.

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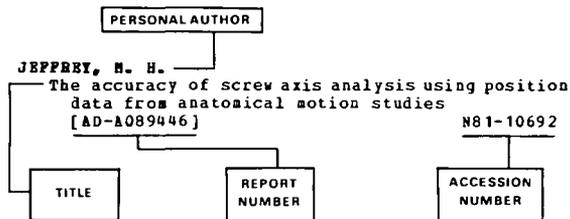
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