

5,005

Stubbs, R. A. 1960 SOME ENGINEERING CONSIDERATIONS FOR THE MANNED ORBITING VEHICLE. Can. Aeronaut. J. 6:375-379, Nov. 1960

ABSTRACT: Cabin pressure, temperature, and constituent gases, along with man's tolerance to accelerations during launch, orbit, and reentry are discussed in this paper. (CARI)

5,006

Stubbs, S.M. 1963 INVESTIGATION OF THE SKID-ROCKER LANDING CHARACTERISTICS OF SPACECRAFT MODELS. (National Aeronautics and Space Administration, Washington) Technical Note D-1624, April 1963

ABSTRACT: A "belly-landing" technique in which the vehicle was caused to skid and rock on its curved lower surface (heat shield) in order to convert sinking-speed energy into angular energy was investigated on a hard-surface runway for speed ranges that might be encountered in the use of a paraglider letdown system. Landings were also made in calm water. Landing motions and acceleration data were obtained over a range of landing attitudes, horizontal velocities, and vertical velocities. Stability limits for various center-of-gravity locations were determined for hard-surface landings. A brief experimental study was made of the effect of a small shock absorber on accelerations and rocking motions.

5,007

Stuckman, E.C. 1959 PROJECT MERCURY, PILOT SUPPORT SYSTEM DEVELOPMENT LIVE SPECIMEN EXPERIMENT. (McDonnell Aircraft Corporation) Report 6875, Serial No. 11, 1959.

ABSTRACT: Four live female Yorkshire pigs were subjected to impact landing tests simulating the Mercury capsule landing in a laboratory investigation of the energy absorbing characteristics of columned aluminum honeycomb. Two specimens sustained impact accelerations of approximately 38g without injury while the other two sustained impact accelerations of approximately 58g with only minor internal injuries. None of the specimens were rendered senseless by the impact. Preliminary biological analysis of the specimens indicates the improbability of serious effects from any of the injuries of the test subjects.

5,008

Sturm, R. 1944 DESCRIPTION OF A DEVICE FOR MEASURING BLOOD PRESSURE UNDER INCREASED G. (Acceleration Conference, Rochester, Minn.) 23 Feb. 1944

ABSTRACT: An inflatable cuff covers the wrist of the subject. Cuff pressure and

finger pulsations are recorded. Systolic blood pressure is taken as that pressure just below the cuff pressure which cuts off finger pulsations. Blood pressure at any level of the body may be determined by anchoring the hand at that level.

Trial runs show that blood pressure is well maintained at heart level during 5 to 6 "g" on the centrifuge. This does not look as if venous return were impaired.

5,009

Sturm, R. E., & E. H. Wood 1944 AN INSTANTANEOUSLY RECORDING CARDIOTACHOMETER APPLICABLE TO THE STUDY OF HEART RATE CHANGES IN HUMAN BEINGS DURING EXPOSURES TO ACCELERATION (Mayo Clinic) CAM No. 371; Sept. 1944

ABSTRACT: For human centrifuge studies of acceleration a record of instantaneous heart rate is necessary. The circuit diagrams and an explanation of the operation of a suitable cardiometer are given. The instrument is activated by the R wave impulse of the ECG but can be adapted for activation by ear opacity, volume, or pressure pulse impulses. By appropriate modification the instrument can be used to record the instantaneous rate of occurrence of any phenomenon which produces or can be caused to produce changes in electrical potentials.

5,010

Sturm, R. E., E. H. Wood & E. H. Lambert 1945 DETERMINATION OF MAN'S BLOOD PRESSURE ON THE HUMAN CENTRIFUGE DURING POSITIVE ACCELERATION. Fed. Proc. 4(1):69, March 1945.

ABSTRACT: An apparatus consisting of the following parts has been devised for the indirect determination of man's systolic blood pressure on the human centrifuge: (1) an inflatable cuff surrounding the wrist; (2) a magnetically operated inflating valve, which on opening raises the cuff pressure 40 mm. of mercury; (3) a constant leak, deflating the cuff approximately 10 mm. of mercury per second; (4) a photo-electric opacity pulse detector on a finger distal to the cuff and (5) an adjustable electronic synchronizer, which opens the magnetic inflating valve in response to impulses received from the photo-electric pulse detector.

In operation, the cuff pressure is raised above systolic blood pressure. The constant leak then slowly reduces this pressure. When a systolic pressure peak pushes a pulse wave past the cuff, it is detected in a finger. The pulse activates the magnetic valve, which instantly raises the cuff pressure 40 mm. of mercury. By simultaneously recording the finger pulsations and the wrist cuff pressure a determination of systolic blood pressure at the wrist is obtained every three or four heart beats.

During exposure to positive acceleration the blood pressure at the level of the eyes fell approximately 20 to 30 mm. of mercury per g increase in acceleration. The maximal fall occurred within seven seconds and was followed by recovery of the blood pressure level while acceleration was maintained. Thus like other physiologic changes in man during positive acceleration, the blood pressure displays a period of failure followed by a period of compensation.

5,011

Sturm, R. E., & E. H. Wood 1946 AN INSTANTANEOUSLY RECORDING CARDIOTACHOMETER.
(Acceleration Lab., Mayo Aero Medical Unit, Rochester, Minn.)

ABSTRACT: An instrument has been developed which continuously and instantaneously records the heart rate. In principle, the device consists of an electrical circuit which deflects a galvanometer at a constant rate; the swing of the galvanometer is interrupted and returned to the zero position instantaneously ($\frac{1}{50}$ second) by the R-wave of the electrocardiogram. Thus, the length of the galvanometer deflection is proportional to the interval between successive R-waves and when used with a suitable camera the device plots a graphic record of the heart rate with each heart beat.

The instrument was designed to allow convenient study of the rapid changes in heart rate which occur in man during exposure to positive acceleration and for this purpose has been extensively and satisfactorily used in this laboratory for some years. It has been found that throughout the period of progressive failure which is encountered during the first six to eleven seconds of exposure to positive gram the heart rate rapidly increases. If the acceleration is maintained, the period of compensation then occurs and this increase is checked and the heart rate is usually slowed.

Although as used in these studies the instrument is activated by the R-wave impulses of the electrocardiogram, it can easily be adapted to record the pulse rate from opacity, volume or pressure pulse impulses. Also, by appropriate modification it can be used to record the instantaneous rate of occurrence of other phenomena which produce or can be made to produce changes in electrical potentials.
(Federal Proceedings 5(1):102, 1946)

5,012

Suchs, L.D. 1952 HISTORICAL SKETCHES OF THE CATAPULT DEVELOPMENT PROGRAM
(Pitman-Dunn Labs., Frankford Arsenal, Philadelphia, Pa.) 29-30 Sep. 1952,
ASTIA AD-14 357

5,013

Sudan, E. J. 1942 LES EFFECTS PHYSIOLOGIQUES DUS AUX GRANDES VITESSES
(The physiological effects of very high velocity)
Schweiz. Aero Rev. 229-230, 1942.
ABSTRACT: Aeronaut. Engng. Rev. 179, 1942.

5,014

Suddath, J. H. 1960 A THEORETICAL STUDY OF THE ANGULAR MOTIONS OF SPINNING
BODIES IN SPACE. NASA TR R-83

5,015

Sueda, M. 1937 INFLUENCES OF VIBRATIONS: EFFECT ON BODY WEIGHT AND LIFE PERIODS OF ANIMALS
Mitt. Med. Acad. Kyoto (Kyoto-Ikadaigaku Zasshi) 21:1703, 1704

ABSTRACT: A train in motion produces two types of vibration: vertical or, up-and-down, and a side-to-side lurching movement. To test the effects of these motions upon the body-weight and the life period of animals, the following experiments were performed.

1. One group of rabbits was placed in a box constructed so as to shake vertically with a vibrating amplitude of 2 cm and at a vibration speed of 140 times per minute. A second group of rabbits was placed in a box prepared to reproduce the lurching vibrations of trains, i.e., the box moved from side-to-side with an angle of inclination $70^{\circ}34'4''$, and at a vibrating speed of 140 times per minute. These two boxes were shaken continuously by electric power and the effects upon the animals noted.

It was found that the vertical vibration caused by relatively slight injuries. The body weight decreases rather slowly at first, but after a certain period the decreasing stops despite the continuance of the vibrations. The body weight thus lost was not recovered even after a long rest. Some of the animals lived for a long period under these conditions although some of them died of disease which developed while they were being shaken.

Those animals subjected to the lurching motions died after 9 to 21 days (mean 16.5), the rate at which the body weight declined was much higher than in the case of the animals shaken vertically. Just prior to death, the weight of the animals suffered an additional sudden decrease.

From these results, and from my former conclusions concerning the life period of spermatozoa subjected to vibrations, we may conclude that the vertical motion of trains has but relatively little harmful effect upon passengers while the lurching motion has a much more serious effect.

2. Two groups of white rats under an absolute fast were subjected to continuous horizontal vibrations. The vibrating amplitude of the first group was 2 cm, and of the second 4 cm. The first group died in 2.5 days, and the second in 2.0 days, while those rats on an absolute fast not being subjected to vibrations (the controls) lived for about 6 days. These results demonstrate the injurious effects of vibration upon the life period of animals. The longer the period of vibration is continued, the greater the rate at which the body weight diminishes.

5,016

Sueda, M. 1938 EXPERIMENTAL STUDY OF THE EFFECT OF VIBRATIONS UPON THE BLOOD PRESSURE OF RABBITS. Mitt. Med. Akad. Kyoto, 24:672-676

ABSTRACT: A group of male rabbits were placed in a box prepared to reproduce the lurching vibrations of trains and the box was moved for 24 hours continuously. At certain intervals during and after the shaking operation, the maximal blood pressure was examined. The results were as follows:

1. In the case of a large number of animals (a) the maximal pressure rises during the course of the shaking process. In the case of the remainder (b) the pressure falls. Following 24 hours of continuous shaking, the blood pressure returns essentially to its original point in both groups.

2. In the case of convalescent animals, the blood pressure rises slightly in group "a" and remains at this point even after 24 hours of repose. In group "b" the blood pressure rises slightly at the beginning of the process, then falls, a fall from which it does not recover even after 24 hours of repose.

5,017

Sullivan, G., T. A. Schulkins, and T. Freedman 1961 INTERNALIZED ANIMAL
TELEMETRY SYSTEM—BIOMEDICAL AND SURGICAL CONSIDERATIONS.
Aerospace Medicine 32(3):249, March 1961.

ABSTRACT: This paper describes an experimental chronic instrumentation system that makes use of a single channel telemeter to eliminate the disadvantages usually seen in conventional animal instrumentation systems. Discussed are the size and shape of the telemeter unit, the selection of site of implementation and the physiological parameter selected for experimental transmission. The electrode type and location and the introduction of artifacts are discussed as well as the surgical procedure and post operative convalescence. Finally the physiological data obtained and the significance of this data in evaluating the response of the cardiovascular system to severe environmental conditions of loud noise, severe vibration and large G forces is reviewed.

5,018

Sullivan, G.H., C.J. Martell, & G. Weltman 1963 MYOELECTRIC SERVO
CONTROL. (Spacelabs, Inc., Van Nuys, California)

ABSTRACT: Under high accelerative forces, it becomes extremely difficult for a pilot physically to move his arms and hands to exercise control over his craft. By attempting to move his arms, the pilot generates muscles action potentials, or myoelectric signals, which may be utilized as a control source. The basic arm movements desired, and the muscles involved, were determined and the myoelectric activity patterns characteristic of the movements measured. Transforms were performed on the "raw" signals and control logics which relates myoelectric signals to desired servoaction were written. A simulator trainer was constructed which accepts the myoelectric inputs from sets of three or four muscles, indicates the desired arm movement, performs the preset logic on the elicited myoelectric signals, provides success-failure feedback and drives a splint in uniplanar up-down movement. The development of the control logics and servo system mark a significant advance in prosthetic control with direct application to amputees and malformed (Thalidomide) children.
(Aerospace Medicine 34(3):267, March 1963)

5,019

Sullivan, James 1962 MAN AGAINST SPACE--HIGH G AND ZERO G.
Science World, Vol 4, No. 5 4 April 1962

5,020

Summerfield, M. 1957 PROBLEMS OF LAUNCHING AN EARTH SATELLITE. PART I
Astronautics 2(4): Nov. 1957

5,021

Summerfield, M. 1957 PROBLEMS OF LAUNCHING AN EARTH SATELLITE. PART II.
Astronautics 2(5): Dec. 1957

5,022

Sunderman, J.F. 1958 BIBLIOGRAPHY OF SPACE LITERATURE
AF Mag. , 41:168-174, March 1958

ABSTRACT: Books on missiles, rockets, satellites, astronautics, space, space-flight, and closely related fields, listed by subject area and by the year published.

5,023

Suvorov, P. M. 1958 EFFECT OF ANGULAR ACCELERATION ON THE SECRETORY
AND MOTOR ACTIVITY OF THE HUMAN STOMACH Bull. Exper. Biol. and Med.
45(5):531-532, May 1958.

ABSTRACT: Secretion of gastric juice was measured in human subjects during and after angular accelerations of 3-5 g for 30 seconds. Gastric secretion was stimulated by inflation of rubber bag in the stomach or by ingestion of a 5% alcohol solution. Acceleration was found to produce an inhibition of gastric secretion for 10-30 minutes, followed by a sharp increase in activity. Increased secretion was generally accompanied by increases in the free and total acidity and peptic activity of the juice. Periodic contractions of the stomach were unchanged. Repeated accelerations at intervals of 5-6 days had no significant effect on the gastric response to acceleration.

5,024

Suvorov, P. M. 1958 VLIIVANIE RADIAL'NYKH USKORENIY NA SEKRETSIU SLIUNNYKH, ZHELUDOCHNYKH ZHELEZ I PERIODICHESKIE SOKRASHCHENIYA ZHELUDKA (The Effects of Radial Accelerations on Salivary and Gastric Gland Secretion and on Periodic Gastric Contraction).
Biull. eksp. biol. med. 46(9):28-34, Sept. 1958.

ABSTRACT: The author studied the effects of radial accelerations on the secretion of parotid glands, gastric glands, and on periodical stomach contractions. Radial accelerations in the craniocaudal and caudocranial directions caused inhibition of the reflex salivary secretion and of periodic stomach contractions. A spontaneous secretion of the gastric juice was noted in high accelerations in dogs with a Basov stomach fistula. Disturbance of the para-sympathetic innervation in a dog with an isolated Heidenhain stomach pouch resulted in the absence of spontaneous gastric secretion. However, a prolonged inhibition of gastric secretion was noted in these conditions. It is assumed that the changes described above are connected with the changes in the nervous system particularly in its parasympathetic and sympathetic portions.

5,025

Suvorov, P. M. 1959 "EFFECT OF ANGULAR ACCELERATION ON THE SECRETORY AND MOTOR ACTIVITY OF THE HUMAN STOMACH."
A.M.A. Proceedings, April 1959

Abstract: Five persons were subjected to radial accelerations. During accelerations and for ten to thirty minutes after their discontinuance there was complete absence of gastric secretion followed by a period of increased secretion (about three times more than under normal conditions). Upon repeated stimulation, only insignificant normalization of these changes took place. The periodic contractions of the stomach remained unchanged.

5,026

Suvorov, P. M., & M. G. Papkov 1960 (CENTRIFUGE TESTS ON FLYING PERSONNEL WITH FUNCTIONAL CNS DISTURBANCES.) Voyenno-meditsinskiy zhurnal 1960 (8):73-76.

ABSTRACT: A study of the effect of radial acceleration on personnel with functional CNS disturbances, but fit for flying duty. During acceleration the normal regulation of the cardio-vascular system is impaired. The use of the centrifuge in aviation medicine allows more direct investigation of the ability of personnel to withstand radial acceleration and hence their more accurate medical assessment. (CARI)

5,027

Suvorov, P.M. and M.G. Papkov 1960 THE VALUE FOR MEDICAL EXPERTISE
OF EXAMINING FLIGHT PERSONNEL WITH FUNCTIONAL DISTURBANCES OF THE NERVOUS
SYSTEM IN A CENTRIFUGE. Military Medical Journal (8):117-122,
JPRS #7609, August 1960

5,028

Surosky, A. E., D. A. Hill, & J. S. di Rende 1959 GRAVITY-ZERO GRAVITY ---
ENVIRONMENTAL CONTINUUM. In 1959 Proceedings of the Institute of Environ-
mental Sciences, Annual Technical Meeting, April 22-24, 1959, La Salle Hotel,
Chicago, Illinois (Institute of Environmental Sciences, Mt. Prospect, Ill.)
pp. 189-192

ABSTRACT: Gravity, a universal environment, is rapidly assuming a critical role
as an environmental parameter. Its decrease with increasing altitude and its
rapid effective variation from zero to several g's leads to some unusual design
problems. This paper conjectures on the nature of gravity and future utilization
of its gradient. The effects of the gravity-zero gravity continuum on men and
equipment are discussed. Some thoughts are presented concerning the "gravity"
environment in the test laboratory. (AUTHOR)

5,029

Suzuki, J., & G. Totsuka 1960 POSTROTATORY NYSTAGMUS: MODIFICATIONS OBSERVED
IN EXPERIMENTS WITH REPEATED ROTATORY STIMULATION. Acta oto-laryngol.
51:570-578

5,030

Suzuki, J. I., & A. Komatsuzaki 1962 CLINICAL APPLICATION OF OPTOKINETIC
NYSTAGMUS: OPTOKINETIC PATTERN TEST. Acta oto-laryngologica (Stockholm)
54(1):49-55, Jan. 1962

ABSTRACT: Optokinetic nystagmus was provoked by constant acceleration followed
by constant deceleration of an electrically controlled rotating drum. Nystagmus
thus induced was recorded on a chart fed at the speed of 0.1 cm./sec. Two-channel
electronystagmography was used with time constants of 6 seconds and 0.015 seconds
in order to approximate the former to eye deviation and the latter to eye speed.
Eye speed of the slow-phase-induced nystagmus in normals increases and decreases
in close approximation to the angular speed of the drum. The patterns obtained
were denominated "optokinetic pattern" (OKP), and the procedure "OKP test".
OKP was modified by a weak spontaneous vestibular nystagmus in proportion to its
degree. When optokinetic stimulation was applied to spontaneous nystagmus of
ocular or central origin, OKP appeared to show characteristic patterns according
to causative lesions. An analysis of these patterns, therefore, is expected to
contribute to differentiation and identification of spontaneous nystagmus.
(AUTHOR)

5,031

Swearingen, J.J. 1950 PROTECTION OF PASSENGERS AND AIR CREW FROM AIR
BLAST EFFECTS OF EXPLOSIVE DECOMPRESSION.
(Civil Aeromedical Research Institute, Federal Aviation Agency,
Oklahoma City, Oklahoma) Project No. 50-516, CARI Report No. 1,
Aug. 1950.

ABSTRACT: Sudden loss of pressure as the result of structural failure in pressurized aircraft results in the immediate exposure of personnel to two major stresses: wind blast and lack of oxygen. The Civil Aviation Medical Research Laboratories have recently studied the effects of the air blast of explosive decompression on "passengers" seated at various distances from windows of the same dimensions as those found in some current transport aircraft. The first method of protection considered is location of the seats beyond the boundaries of the danger area. The second is application of the simple principle of increasing the time of pressure equalization. Application of this latter principle appears to be practical, need not interfere with vision, and will not cause uneasiness since passengers will not be aware of its use.

5,032

Swearingen, J.J. & D.J. Morrow 1956 MOTIONS OF THE HEAD AND TRUNK
ALLOWED BY SAFETY BELT RESTRAINT DURING IMPACT.
(Civil Aeronautics Medical Research Laboratory, Federal Aviation Agency,
Oklahoma City, Okla) Project. No. 53-204. June 1956.

ABSTRACT: This study was conducted to record and describe the actual path of motion of the head and trunk as it is propelled forward or to the side over a safety belt in a crash. Records of these orbits of motion for one hundred male subjects are presented in the three figures immediately following: Because of the low forces (about 1 g) used to displace the body in this study, the measurements presented here must be considered as minimal protective distances. In the crash situation two factors will certainly act to permit greater movements of the body. These are : (a) the greater forces involved in crashes, and (b) the practice of passengers wearing their lap safety belt more loosely than the standard maintained for these tests. In this connection laboratory tests were conducted, and even under the 1 g forward loading, it was demonstrated that the soft tissues of the abdomen are compressed until the safety belt is virtually a straight line across the iliac crest of the pelvis. Hence the forward displacement of the body will be increased one inch for every two inches of safety belt not pulled through the buckle.

5,033

Swearingen, J.J., E.B. McFadden, J.D. Garner, & J.G. Blethrow 1960 HUMAN VOLUNTARY TOLERANCE TO VERTICAL IMPACT. (Paper, 31st Annual Meeting of the Aerospace Medical Association, Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 1960). Aerospace Med. 31(12):989-998

ABSTRACT: Results of several facets of testing of human tolerance to vertical impact forces in standing and sitting positions are presented. Tentative strength of the legs at various knee angles was determined in the standing position by static and dynamic tests. In addition x-ray studies of bone deformation during static loading were made.

5,034

Swearingen, J.J., E.B. McFadden, J.D. Garner, J.G. Blethrow and W. Reed 1960 PROTECTION OF SHIPBOARD PERSONNEL AGAINST THE EFFECTS OF SEVERE SHORT-LIVED UPWARD FORCES RESULTING FROM UNDERWATER EXPLOSIONS. (Federal Aviation Agency, Civil Aeromedical Research Inst., Oklahoma City, Okla) Contr. NA-onr-104-51, Jan. 1960

ABSTRACT: Human voluntary tolerances to vertical impact were determined while standing with knees locked, standing with knees bending, squatting, and seated in a rigid chair. Various energy-dissipating materials and devices were evaluated for protection against vertical impact.

5,035

Swearingen, J. J. & E. B. McFadden 1960 STUDIES OF AIR LOADS ON MAN. (Civil Aeromedical Research Institute, Federal Aviation Agency, Oklahoma City, Oklahoma) CARI Report 63-9, See also Human Factors, 2(2):84-91. May 1960.

ABSTRACT: Data obtained in three different studies related to measurement of forces on the body due to air movement are summarized. The effects of short duration blast forces on personnel seated or standing at various distances from openings during pressure loss, blast forces necessary to disorient the body from numerous positions, effects of clothing on the drag forces, and measurements of forces and moments on the body during wind tunnel tests are discussed and compared.

5,036

Swearingen, J. J. & E. B. McFadden 1960 STUDIES OF AIR LOADS ON MAN. Human Factors, 2(2):84-91, May 1960
See Also Civil Aeromedical Research Institute, Federal Aviation Agency, Oklahoma City, Oklahoma. CARI Report 63-9

ABSTRACT: Data obtained in three different studies related to measurement

of forces on the body due to air movement are summarized. The effects of short duration blast forces on personnel seated or standing at various distances from openings during pressure loss, blast forces necessary to disorient the body from numerous positions, effects of clothing on the drag forces, and measurements of forces and moments on the body during wind tunnel tests are discussed and compared.

5,037

Swearingen, J. J., E. B. McFadden, J. D. Garner, and J. G. Blethrow 1960
DETERMINATION OF HUMAN TOLERANCE TO VERTICAL IMPACT FORCES (FAA,
Oklahoma City, Oklahoma Contract NAonr 25-58, Task No. NR 102-074.

ABSTRACT: Relative strength of the legs at various knee angles was determined in the standing position by three different test procedures. Man's weakest knee angle was found to be 60°.

X-ray studies of the legs and feet during vertical loading failed to reveal any bending of the femur or tibia or compression of cartilages in the knee or ankle. There was a slight lateral bending of the fibula and the tarsal and metatarsal bones were displaced downward.

Human voluntary tolerances to vertical impact were determined while (1) standing with knees stiff, (2) standing with knees bending, (3) squatting, and (4) seated in a rigid chair. In addition, various energy-absorbing materials and devices were evaluated for protection against vertical impact. These tolerances and evaluations are being summarized.

5,038

Swearingen, J.J. & R.G. Snyder 1961 HUMAN TOLERANCE TO VERTICAL IMPACT.
(Paper, Symposium on Biomechanics of Body Restraint and Head Protection,
Naval Air Material Center, Philadelphia, Pa., June 14-15, 1961)

ABSTRACT: The results of several studies concerned with the voluntary physiological tolerance limits and transmission of impact forces parallel to the body's longitudinal axis (caudal-cranial) are presented. Over 500 tests of 13 male subjects were conducted utilizing an instrumented drop test apparatus. Impact forces at the foot and seat level and attenuation at shoulder level was measured for each subject. Results of the seated impacts showed that subjects seated on a rigid chair seat reached voluntary tolerance (complaints of severe pains in chest, head, abdomen, and lumbar spinal areas) when the shoulder accelerometer reached 10-12 G at over 600 G/sec. with mean initial impact loads of 95 G (.0075 sec, 19,000 g/sec jolt). Various materials and methods including Styrofoam, polyvinyl chloride, undrawn nylon, horsehair and rubber, hydraulic bleed pistons, and Stafoam were studied in an attempt to increase the deceleration time and subjects tolerance. Of these, Stafoam indicated most promise as a significant damping agent. Standing impact tolerance was studied with knees locked stiffly and with knees flexed. Attempts to determine static leg loading

through double exposure x-rays was essentially negative. Strength of the legs at various knee angles in both static and dynamic tests, and human tolerance to impact in the squatting position were also investigated. Brief discussion of more recent vertical deceleration research activities at CARI are noted.

5,039

Swearingen, J. J. 1962 DETERMINATION OF CENTERS OF GRAVITY OF MAN.
(FAA, Civil Aeromedical Research Institute, Oklahoma City, Okla.)
62-14 August 1962.

5,040

Swearingen, J. J., A. H. Hasbrook, R. G. Snyder, & E. B. McFadden 1962 KINE-
MATIC BEHAVIOR OF THE HUMAN BODY DURING DECELERATION. Reprint Aerospace
Medicine 33:188-197, Feb. 1962
See also (Civil Aeromedical Research Institute, Federal Aviation Agency,
Oklahoma City, Oklahoma) Rept. 62-13; ASTIA AD-283 938; June 1962

ABSTRACT: The geometry of motion of the head, trunk and appendages was estab-
lished for one hundred male subjects restrained by a safety belt during forward
and side dynamic loadings. Lethal structures of present aircraft seating and
cockpit arrangements are revealed by correlating crash injuries with these kine-
matic data. In addition an analysis of the forces created by body kinematics dur-
ing forward deceleration sheds new light on seat anchorage problems. (AUTHOR)

5,041

Sweeney, H. M., & H. S. Mayerson 1937 EFFECT OF POSTURE ON CARDIAC OUTPUT.
Amer. J. Physiol. 120:329-335

5,042

Sweeney, H.M. and E.J. Baldes 1946 INVESTIGATION OF HUMAN TOLERANCE
DURING HIGH LINEAR DECELERATION - A STUDY OF HUMAN TOLERANCE TO FORCES
DEVELOPED IN AIRCRAFT CRASHES. Special CAM Report, 14 June 1946

5,043

Sweeney, H.M. 1948 PRINCIPLES OF PROTECTION AGAINST EFFECTS OF
NEGATIVE G. Federation Proc., 7:121

ABSTRACT: A colored motion picture was made to show methods of protecting against
the effects of negative acceleration. The development of hemorrhage and petechiae

in the sinuses and conjunctivae is shown in man and animals. Motion pictures of the blood vessels of the brain of a monkey with a lucite calvarium under g show that within the closed box of the skull fluid counter-pressure protects against blood vessel ruptures. The technique of radial arterial and frontal vein cannulation using an Ungar type double needle is demonstrated together with the use of a Gauer-Wetterer inductance pressure gauge for measurement of venous and arterial pressure in man while undergoing negative acceleration. This film shown pictures of humans undergoing abrupt accelerations demonstrating the greater tolerance achieved by shortening the period of application of g. The principle of protection afforded by inclination of the long axis of the body to the direction of the g-force is demonstrated.

5,044

Sweeney, H. M. 1949 HUMAN CENTRIFUGE IN OPERATION AT AERO MEDICAL LABORATORY TO DETERMINE "G" TOLERANCES. Technical Data Digest pp. 15-24, 1 April 1949

ABSTRACT: High-speed postwar aircraft have intensified the problem of determining exactly how many g's a pilot can tolerate in an average turn lasting from 10 to 15 seconds. The Air Materiel Command's Aero Medical Laboratory uses a human centrifuge, which simulates the flight of a fast plane in a turn, to find out if anti-g suits, either presently used or proposed, are capable of protecting an airman from blackout and subsequent unconsciousness. (DACO)

5,045

Sweeney, H. M. 1951 HUMAN DECELERATOR
J. Avia. Med. 22(1):39-41; 49, Feb. 1951

ABSTRACT: A device for controlled linear deceleration has been developed, with which the three important factors of acceleration, magnitude, rate of change and duration, can be independently varied through a known reproducible range, permitting a quantitative application of all combinations of factors for the evaluation of the effect of each factor.

5,046

Swann, H. G. 1944 PHYSIOLOGICAL EFFECTS OF HIGH NEGATIVE MASK PRESSURES DURING A SIMULATED FREE FALL. (U. S. Army Airforce, Air Materiel Command, Wright Field, Ohio) TSEAL-3-696-68, Report #1, Nov. 1944.

5,047

Swann, H. G. 1945 PHYSIOLOGICAL EFFECTS OF HIGH NEGATIVE MASK PRESSURES DURING A SIMULATED FREE FALL. (U. S. Army Airforce, Air Materiel Command, Wright Field, Ohio) TSEAL 3-696-38A, Report #2, March 1945.

5,048

Sweeney, R. 1957 STUDIES PROBE MAN'S FUNCTION IN SPACE.
Aviation Week, 67(26):45-47,49. Dec. 30, 1957

ABSTRACT: Research activities are described on problems of man's existence and function during space flight as carried out by three Southern California contractors: North American Aviation, Convair, and the Douglas Aircraft Company. These studies, taking place before manned space flight is attempted, range from proposals (as in the case for North American) to a service for specific investigations to company-under-written general thinking efforts. Convair projects described include investigations of (1) human tolerance to complex and transverse accelerations; (2) human tolerance to combined environmental stresses in today's high-performance aircraft; (3) criteria concerning selection and training of bio-satellite crews; (4) calculations on a manned nuclear-propelled space vehicle; and (5) human factors in design of minimum capability required for a manned orbital vehicle. Douglas Aircraft Co. work has been categorized into three phases: supersonic at altitudes up to 100,000 ft.; hypersonic, over Mach 5, flight at altitudes up to one million feet; and pure space flight.

5,049

Sweeney, Richard 1958 SPACE MONOPOLIZES CONTROL STUDY
Aviation Week 68:34-35, Feb. 10, 1958

ABSTRACT: It was indicated at a USAF Control-Display Integration Symposium in early February that space flight technology study proposals would be along the following lines: reference and coordinate systems; acceleration control; and flight path reference.

5,050

Sweeney, Richard 1958 PILOT OUTLINES ORBITAL TEST PROGRAM
Aviat. Wk. 68:51-52, April 28, 1958

ABSTRACT: Summary of a paper by A.W. Blackburn in which is outlined a four-phase program for flight testing an operational vehicle system proposed to place a manned aircraft in orbit. Design and performance parameters are taken from vonBraun's Mars project and scaled down.

5,051

Sweeney, R. 1959 CENTRIFUGE CHECKS ORBITAL PILOT STRESSES.
Aviation Week 70(23):52-53, 55, 59, 8 June 1959

5,052

Sweeney, R. 1959 CENTRIFUGE TESTS PILOT RE-ENTRY CONTROL Aviat. Week 71:89,
July 6, 1959

5,053

Sweitzer, Dorothy I. 1960 ASTRONAUTICS INFORMATION. BIOLOGICAL AND ARTIFICIAL
INTELLIGENCE
(Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena) Dec. 1960, Literature
search no. 254, Contract NASw-6 ASTIA AD 251 506

5,054

Sweitzer, Dorothy I. 1961 ASTRONAUTICS INFORMATION. BIOLOGICAL AND ARTIFICIAL
INTELLIGENCE
(Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena) May 1961, Suppl. to
Literature search no. 254, AD 251 506, Contract NASw-6 ASTIA AD 262 179

5,055

Switzer, R.E. 1951 FINAL REPORT--PHYSIOLOGICAL, BIOCHEMICAL AND
ANATOMICAL EFFECTS OF ACCELERATION ON THE BODY RELATIVE TO PILOT
POSITION IN HIGH-SPEED AIRCRAFT. (A reprint of USN project by
the University of Southern California). Pub. no. M 35-51, 10 July 1951.

5,056

Syrotynin, M. M. 1961 COSMIC MEDICINE AND ITS TASKS (Kosmichna
Medytsyna ta Yiyi Zavdannya)
Trans. of Fiziologichnyy Zhurnal (USSR) 7(1):3-8, 1961.
(Joint Publications Research Service, New York, N. Y.)
June 14, 1961 JPRS: 9418

ACCELERATION

T

5,057

Taborelli, R. V., I. G. Bowen, & E. R. Fletcher 1959 TERTIARY EFFECTS OF
BLAST--DISPLACEMENT (OPERATION PLUMBBOB). (U. S. Civil Effects Test Group)
Report WT-1469; Project 33.3; 22 May 1959

ABSTRACT: The objective of Project 33.3 was to determine the velocity-time and distance-time histories of anthropomorphic dummies and equivalent spheres (idealized models having an acceleration coefficient α equal to that of the dummy) displaced by blast winds. The dummies and spheres were located at stations within regions of about 5 and 7 psi overpressures.

The technique used for recording the movement of these objects was phototriangulation. Analysis of the films obtained gave the velocity and distance in the case of one shot. In a second shot the field of view was obscured by smoke (perhaps dust too) before any motion could be recorded by the cameras.

In one phase of the experiment, equivalent spheres were caught in flight at near predicted maximum velocity by missile traps. The depth of sphere penetration in the calibrated capture medium was then used to compute the sphere velocity.

(AUTHOR)

5,058

Tabusse, L., & R. Mainard 1956 LES EFFETS DE LA VITESSE ET DES ACCELERATIONS
SUR LE SYSTEME CARDIOVASCULAIRE. (THE EFFECTS OF SPEED AND ACCELERATIONS ON
THE CARDIOVASCULAR SYSTEM.) La santé de l'homme (Lyon) 92:5-7, Jan.-Feb.,
1956

ABSTRACT: The effects of high speed and accelerations on the cardiovascular system as shown by research and actual supersonic flight are briefly outlined. Changes have been observed in the electrocardiogram, arterial pressure, cardiac rhythm, and vasomotricity. It is concluded that supersonic flight is dangerous for the cardiovascular system, and may cause ischemic hypoxia which will eventually lead to anoxic hypoxia.

5,059

Tabusse, L., R. P. Delahaye & R. Pannier 1962 [APROPOS OF EJECTION FROM AN AIRPLANE AT SUPERSONIC SPEED]
Rev. Med. Aero (Paris) 2:53-57, Nov.-Dec. 1962 (France)

5,060

Tadokoro, Y. 1943 EFFECTS OF ACCELERATION ON THE CARDIAC FUNCTION IN HUMAN SUBJECTS. II. ON THE ELECTROCARDIOGRAPH AND APICAL ELECTROKYMOGRAPH.
Kokuigaku, 1(1):71, Oct. 1943.

ABSTRACT: Ten healthy males were subjected to 4 positive G for 10 seconds. Electrocardiogram from chest lead and apical electrokymography was examined using carbon microphone. In EKG, the delayed intraventricular conduction, R wave lowered, disappearance of T wave was noticed. Apical kymography showed diminished shape in aortic wave and tension wave.

5,061

Tait, J. and W.J. McNally 1934 SOME FEATURES OF THE ACTION OF THE UTRICULAR MACULAE (AND OF THE ASSOCIATED ACTION OF THE SEMICIRCULAR CANALS) OF THE FROG. Philos. Trans. Roy. Soc. B. 224(513):241-286

5,062

Takahashi, J. 1944 THE EFFECTS OF ACCELERATION ON THE HUMAN BODY.
Kokuigaku, 2(1,2):158, Aug. 1944.

ABSTRACT:

- 1) Comparison of appearance of blackout between while normal breathing and Valsalva maneuver under positive G stress was studied.
- 2) Changes of pulse rate under positive and transverse G stress were recorded.
- 3) Neurological study during and after G stress were done.

5,063

Takahashi, J. & K. Tanimura 1944 EFFECT OF CENTRIFUGAL ACCELERATION ON THE
INTERNAL ORGANS IN HUMAN SUBJECTS.
Kokuigaku, 2(1,2):160, Aug. 1944.

ABSTRACT: Under the stress of positive 4 G with normal breathing, cardiac silhouette markedly decreased in transverse and longitudinal diameter and cardiac area, but vertical diameter decreased a little. The heart axis approached to the vertical from horizontal. During maximal expiration under the same G stress, transverse and longitudinal diameters show little changes and cardiac area decreases slightly. The main axis of heart approaches the horizontal.

5,063

Talbot, J.M. 1958 UNEXPLAINED AIRCRAFT ACCIDENTS IN THE U.S. AIR FORCES IN
EUROPE. J. Aviation Med. 29(2):111-116.

ABSTRACT: The following points deserve emphasis. The reported experiences of USAFE flyers show convincingly that hypoxia and spatial disorientation and, to a lesser extent, decompression sickness, are continuing threats to flight safety and crew effectiveness.. There is a serious and compelling requirement to improve the logistics and maintenance of personal protective flying equipment. The reported USAFE experiences firmly support present policy that requires thorough refresher training of jet aircrew personnel in flight physiology and protective equipment every 18 months. In the USAFE experience may be found ample justification for both fundamental and applied research for a better understanding of human performance capabilities and limitations, and for improving the design and reliability of the equipment that is essential to flying safety and aircrew effectiveness.

5,064

Tantzen, R.G. 1959 DATA REDUCTION REPORT OF SPACE-TIME SLED DATA (Air Force
Missile Development Center, Holloman Air Force Base, N. Mex.) Misc. rept.
no. 59-2-21, proj. no. 5201, 29 July 1959, ASTIA AD-222 590

ABSTRACT: This paper is the data reduction of the space-time system for a particular sled run on the Holloman Track.

It contains a listing of the recorded times the sled passed interrupters placed at 13-foot intervals along the track. These raw times are smoothed by a least squares process. Velocities and accelerations are computed and listed at 13-foot intervals. Explanations of computation procedures and confidence limits are given. Graphs of velocity and acceleration are included.

5,065

Tantzen, R.G., W.C. Crehl 1961 MASTER FILE OF DATA OF THE HOLLOMAN TRACK
(Air Force Missile Development Center, Holloman AFB, New Mexico)
TR-61-10, April, 1961. ASTIA AD 255 757.

ABSTRACT: This master file serves as a basis for computing data in any desired coordinated system. In addition to the survey data printed in this report, the information is available on IBM cards, on Remington Rand magnetic tape (Uniservo) and on IBM magnetic tape (704).

5,066

Tate, K.A. 1951 PERFORMANCE AND STRUCTURAL INTEGRITY TEST OF TYPE HG MK-1
CATAPULT (Naval Aircraft Factory, Philadelphia, Pa.) 24 July 1951; Rept. no.
M-5039, ASTIA AD-102 384

ABSTRACT The object of the tests was to prove the integrity and determine the performance characteristics of the subject catapult. The tests were also conducted to obtain the characteristics of the MK-4 Arresting Gear for operation under conditions required for use with the HG-MK-1 Catapult. The HG-MK-1 catapult performance is shown. Characteristics of acceleration and oil back pressure for ten consecutive launchings at various "G" values requested by another agency are also shown. Sample acceleration histories of 2300 and 3020 pound deadloads are shown. The acceleration curves obtained vary from a pure trapezoidal form due to the presence of vibratory peaks particularly during the first portion of the run. Arrestation will impose a minimum deceleration of 2.5 G's on the load.

5,067

Tatum, A.L. 1949 MOTION SICKNESS.
Wisconsin M. J., 48: 930

5,068

Taub, J., et al. 1954 CRASH INJURY STUDY. KLM ROYAL DUTCH AIRLINES CON-
VAIR 240 ACCIDENT AT SCHIPHOL AIRPORT ON MAY 25, 1953.
(KLM-Royal Dutch Airlines and Dutch Dept. Aviation (RLVD), July 1954)

5,069

v. Tavel, F. 1947 THE IMPORTANCE OF THE TIME FACTOR FOR DISTURBANCES DUE TO ACCELERATION DURING MILITARY FLIGHT. Schweizerische Medizinische Wochenschrift 77(22/23):611-614

ABSTRACT: It was pointed out that the time factor is of practical importance for the development of disturbances, particularly unconsciousness during flights related with high accelerations acting on the pilot. For better understanding of this factor in prevention and causality of flight accidents and for indoctrination a handy chart was developed and described. The datas were gathered from observations in several test flights during short and long acting accelerations and from some indications in the literature. The possible causes of some disturbances and their relations to anoxia are discussed. (AUTHOR)

5,070

Taylor, D., & S.R. Harris 1957 A VISUALIZATION STUDY OF WIND BLAST EFFECTS ON FLIGHT CLOTHING AND PERSONAL GEAR (U) (Arnold Engineering Development Ctr., Arnold Air Force Station, Tenn.) AEDC-TR-57-13, Aug. 1957. ASTIA AD 135 335

5,071

Taylor, E.J., R.F. Chandler, L.W. Rhein, R.H. Edwards & V.L. Carter 1963 THE EFFECTS OF SEVERE IMPACT ON BEARS
Paper: 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, Los Angeles, Calif., April 29-May 2, 1963

ABSTRACT: As one phase of the NASA impact studies, a series of high level deceleration test were performed with bears on the Daisy Deceleration test facility. A series of 11 tests were accomplished at impacts as high as 92 g's and velocities as high as 68.5 ft/sec. The test subject was oriented in the -G (eyeballs up), +G (eyeballs left), -G (eyeballs right), and right and left oblique positions (eyeballs up and right, eyeballs up and left). No significant biological effects were noted in any runs at moderately severe levels (35-50g); at -92g_z, one animal died after a marked vagotonic shock, complicated by severe fractures, visceral lacerations and pulmonary trauma.

5,072

Taylor, E. R. 1958 PHYSICAL AND PHYSIOLOGICAL DATA FOR BIOASTRONAUTICS.
(School of Aviation Medicine, Brooks AFB, Texas) 18 March 1958

ABSTRACT: The purpose of this publication is to gather together, under one cover, useful data pertinent to space flight, both physical environments of various portions of space, and the needs and limitations of the human organism.

5,073

Taylor, E. R., & L. W. Rhein 1962 EFFECTS OF IMPACT - RELATIVE BRADYCARDIA
(Paper, 33rd Annual Meeting of the Aerospace Medical Assoc., 9-12 April 1962, Atlantic City, N. J.)

ABSTRACT: While awaiting acceleration and impact, the heart rate tends to increase due both to work of respiration against restraint and to epinephrine. Immediately after impact, there is a slowing of the rate lasting several seconds, after which the rate returns to or even exceeds the pre-impact rate. This relative bradycardia has been shown to be directly related to phase of respiration at impact; if at full inspiration, the effect is maximal. The effects of atropine are shown. The relationship to blast injury is discussed. The use of this effect in human sled testing is presented. (J. Aerospace Medicine 33(3):355-356, Mar.1962)

5,074

Taylor, Ellis R. & Leroy W. Rhein 1962 THE NATURE OF REFLEX BRISKNESS
(6571 st Aeromedical Research Lab., Holloman Air Force Base, New Mexico)
ARL-TDR-62-27 Project 7850; Task 785001 Dec. 1962

ABSTRACT: An accelerometer sensor was used in the testing of patellar and other deep tendon reflexes. A qualitative difference was noted in the time-history and wave form produced by patients with the clinical picture of "increased briskness" due to well-demonstrated upper motor neuron pathology. The "brisk" reflex achieves maximum force in the same time as normal, but maintains this force at approximately the same level for .04 to .10 seconds; at this time damping occurs quickly. In contrast, normal subjects exhibit damping instantaneously after reaching peak acceleration. Thus, the phenomenon of briskness is a prolongation of peak acceleration, hence of peak force.

5,075

Taylor, E.R. 1962 THROMBOCYTOPENIA FOLOWING ABRUPT DECELERATION.
A PRELIMINARY COMMUNICATION. (6571st Aeromedical Research Lab.,
Holloman Air Force Base, N. Mex.) Rept. No. ARL TDR 62-30,
December 1962. ASTIA AD 293 880

ABSTRACT: A series of six progressively severe abrupt acceleration tests was conducted on seven human sled subjects in the forward-facing position, with the final two impacts on each subject being -20Gx peak, at an onset rate of 800G/sec. Thrombocyte counts made before, 1 hour after and 24 hours after impact revealed a one-hour post-impact decrease of major proportion, with full recovery to mean pre-impact thrombocyte concentrations by 24 hours post-impact. An elevation of pre-impact (baseline) thrombocyte counts occurred after the first and fifth tests. Various mechanisms for this effect are presented and areas of potential use are outlined. (Author)

5,076

Taylor, E. R., L. W. Rhein, & J. F. Ferguson 1962 THE EFFECT OF IMPACT UPON THE PATELLAR AND OTHER DEEP TENDON REFLEXES. (6571st Aeromedical Research Lab., Holloman AFB, N. Mex.) Proj. 7850; ARL TDR 62-18; ASTIA AD-284 461; Aug. 1962

ABSTRACT: Alterations of the deep tendon reflexes have been frequently observed in humans after impact. A series of experiments was conducted to study reflexes in humans undergoing a 15 seat G impact, with a control group undergoing a 5 seat G impact. Using standard clinical examination and notation techniques, no quantitative differences were noted between the experimental and control groups. In the opinion of the medical examiners, however, a slight increase in 'briskness' was found in the experimental group in contrast with the control group. Development of a reflex sensor suitable for sled testing is necessary for further work in this investigation. (AUTHOR)

5,077

Taylor, E. R., L. W. Rhein, & G. R. Beers 1962 EFFECT OF ATROPINE UPON THE RELATIVE BRADYCARDIA ASSOCIATED WITH IMPACT. (6571st Aeromedical Research Lab., Holloman AFB, N. Mex.) Rept. No. ARL TDR 62-13; Proj. 7850; ASTIA AD-282 884; Aug. 1962

ABSTRACT: The relative bradycardia immediately following impact in the backward-facing configuration at 15 G's is demonstrated to be abolished completely in humans by the intramuscular injection of 1.6 milligrams of atropine sulphate 45 to 60 minutes preceding impact. This evidence supports the hypothesis previously advanced that bradycardia is due to a vagal reflex from an undetermined sensor system and mediated through the vagus nerve to the heart. (AUTHOR)

5,078

Taylor, E.R. and L.W. Rhein 1962 A COMPARISON OF METHODS OF IMPACT
EXPERIMENTATION CONTROL. (6571st Aeromedical Research Lab., Holloman
AFB, N. Mexico) ARL TDR 62-19, Proj. 7850, ASTIA AD 282 885.

ABSTRACT: The validity of using, as a control, subjects undergoing acceleration and minimal impact as compared with using subjects undergoing deliberate abort at the completion of countdown was tested, using heart rate as the criterion for comparison. Subjects undergoing acceleration and minimal impact were found to have a statistically significant increase in heart rate immediately post-impact as compared with the subjects not fired. This effect is attributed to preliminary acceleration; since experimental subjects undergo preliminary acceleration also, control subjects should undergo actual acceleration and minimal impact. (Author)

5,079

Taylor, E. R. 1962 BIODYNAMICS OF AEROSPACE FLIGHT
(U. S. Air Force) Project No. 7850, 31 Jan. 1962

5,080

Taylor, E.R. and R.F. Chandler 1962 A SIMPLE REFLEX SENSOR:
A DESCRIPTION AND TRIAL USE. (Aeromedical Research Laboratory,
Holloman AFB, New Mexico) Technical Documentary Rept. no. ARL-TDR-62-23,
ASTIA AD- 286-850, September 1962

ABSTRACT: A simple device for the quantitative measurement of deep tendon reflexes was designed with locally available materials. This device consists of a strain gage accelerometer and mounting, a battery source, and an electrocardiographic recorder.

Preliminary clinical investigation with this device indicates that the device has both practical and theoretical advantages over other existing reflex sensing and recording devices.

5,081

Taylor, E.R. 1963 BIODYNAMICS: PAST, PRESENT AND FUTURE.
(6571st Aeromedical Research Lab., Aerospace Medical Div., Air Force
Systems Command, Holloman Air Force Base, New Mexico)
Report No. ARL-TDR-63-10, March 1963. ASTIA AD 402 084

ABSTRACT: A brief operational definition of biodynamics is presented.

Following a condensed history of the field, including a review of weaknesses of the transient mechanical analytic approach, present biological research activities are listed. A definition of working relationships between disciplines is advanced.

5,082

Taylor, E.R. 1963 PROBLEMS AND TECHNIQUES OF HUMAN SLED SUBJECT SELECTION. (6571st Aeromedical Research Lab., Holloman AFB, N. Mexico) Report. No. ARL TDR 63-5, March 1963, ASTIA AD-299 472

ABSTRACT: The present methods of human sled subject selection for abrupt acceleration experimentation are enumerated. The problem in validity of selection from the population at risk, while maintaining safety, is discussed. Selection examinations include medical history and physical examination, X-ray photographs, anthropometry, neurological evaluation, electroencephalography, clinical psychological appraisal, laboratory measurements, electrocardiography trial impact, and prolonged clinical appraisal.

5,083

Taylor, E. R., R. F. Chandler, L. W. Rhein, R. H. Edwards, & V. L. Carter 1963 THE EFFECTS OF SEVERE IMPACT ON BEARS. (Paper, 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, Los Angeles, Calif., April 29-May 2, 1963)

5,084

Taylor, H. R. 1955 AN INSTRUMENT FOR INVESTIGATING AUTOMOBILE BRAKE USAGE UNDER PRACTICAL CONDITIONS. Electronic Engineering 27:470-476, Nov. 1955

ABSTRACT: The instrument provides a detailed record of when and how the brakes on a car were used so that the effects of speed, drive, route, traffic, etc. could be investigated. A tachometer generator was driven by the propeller shaft and also generated a voltage proportional to the angular speed of the rear wheels. This signal was differentiated electrically to measure the angular deceleration of the wheels. A voltage proportional to the power dissipation at the brakes was derived from the product of the speed signal and the hydraulic pressure in the braking system which was measured with a potentiometer transducer. The temperature of the bulk of one brake drum was measured by a thermistor. These four signals were suitably amplified and applied to a four-pen recorder.

5,085

Taylor, J.W. 1960 X-IRRADIATION AND ACCELERATION STRESS.
(Aviation Medical Acceleration Lab., Naval Air Development Center,
Johnsville, Pa.) NADC-MA-6003, 1 March 1960. ASTIA AD 234 596

ABSTRACT: It was determined whether a correlation existed between the stress due to ex-irradiation and the stress due to acceleration. Sprague-Dawley rats were exposed to an acute dose of $600 \text{ r} \pm 20\%$ x-irradiation and then centrifuged at 20 G for 7 minutes. The data resulting from this procedure was then compared with data for two control groups, one centrifuged and one irradiated. There appeared to be no significant correlation between irradiation stress and acceleration stress at the experimental levels used in the study. (Author)

5,086

Taylor, N.B.G., J. Hunter and W.H. Johnson. 1957 ANTIDIURESIS AS A
MEASUREMENT OF LABORATORY INDUCED MOTION SICKNESS.
Can. J. Biochem. Physiol. 35:1017-1027

5,087

Taylor, W. J. R., W. H. Johnson, and E. A. Sellers 1960 CARDIOVASCULAR
CHANGES WITH VESTIBULAR STIMULATION
Aerospace Medicine 31(8):627-638 August 1960

ABSTRACT: Individuals susceptible to motion sickness were found to demonstrate characteristic cardiovascular reactions in response to selected physical stimuli. These reactions have been shown to differ from those in a comparable group of subjects who were more resistant to vestibular stimulation. One hundred randomly selected RCAF aircrew candidates, ages seventeen to twenty-seven years, were subjected to controlled vestibular stimulation; forty-one subjects by swing, fifty-nine on a turntable. Changes in blood pressure, heart rate and A-V conduction time were analyzed. With vestibular stimulation by either method, both systolic and diastolic pressure rose; the heart rate initially rose and then fell. The P-R interval shortened initially and then became more prolonged. These changes were compared with those occurring in the same subject after exercise, with carotid sinus pressure and with eyeball pressure. The turntable

population was divided into two groups according to the degree of susceptibility to experimentally produced motionsickness. The motion sick group showed a smaller rise in systolic blood pressure than the less susceptible group, while the rise in diastolic pressure was more pronounced. An elevation in heart rate was initially present in the motion sick group. Heart rate finally decreased in both groups. Early in the period of rotation the A-V conduction time of the susceptible group was shorter than the resting value, becoming more prolonged toward the end of exposure. No change in P-R interval occurred in the non-reactive group. The cardiovascular reaction pattern after exercise, with carotid sinus pressure and with eyeball pressure of the subjects experiencing motion sickness was likewise shown to differ from that of the non-sick group. The findings of this study demonstrate a correlation between autonomic reactivity and susceptibility to motion sickness.

5,088

Taylos, C., S. C. Allen, & V. E. Hall 19 A STUDY OF ORTHOSTATIC INSUFFICIENCY BY THE TILT BOARD METHOD. (Stanford University) CAM No. 1

ABSTRACT: Out of 91 healthy male subjects aged 18-28, 20 were fainters and 71 non-fainters. The accumulation of blood in the lower part of the body causes cerebral anoxia. It can be prevented by leg bandaging and, to some extent, by physical training.

5,089

Teare, D. 1951 POST-MORTEM EXAMINATIONS ON AIR-CRASH VICTIMS
British M. J. (4733):707-708, Sept. 22, 1951

ABSTRACT: The author describes fatal injuries received by passengers and crew members in an airplane crash. He suggests that certain parts of an aircraft are more dangerous in the event of a crash than others.

5,090

Technisch Documentatie en Informatie Centrum voor de Krijgsmacht 1959 SPACE MEDICINE BIBLIOGRAPHY. (Technisch Documentatie en Informatie Centrum voor de Krijgsmacht (Netherlands). ASTIA AD-227 817, Feb. 1959

5,091

Tedeschi, C.G. 1944 CUMULATIVE EFFECTS OF REPEATED HEAD TRAUMA OF MINIMAL INTENSITY; OBSERVATIONS ON EXPERIMENTAL ANIMALS Proc. Soc. exp. Biol. Med. 57:264-266

5,092

Tenney, S.M., & C.R. Honig, 1955 THE EFFECT OF THE ANTI-G SUIT ON THE BALLISTOCARDIOGRAM. REVERSAL OF NORMAL RESPIRATORY VARIATION AND CHANGE IN THORACIC BLOOD VOLUME. J. Aviation Med. 26(3):194-199

ABSTRACT: The standard U.S. Air Force pneumatic anti-G suit (type G-4A when inflated to a pressure above 75 mm. Hg. caused a diminution or reversal of the normal respiratory variation of the systolic complexes of the BCG. Indirect evidence has been presented to show that the pulmonary blood reservoir is enlarged at the time the respiratory variation is reversed from normal, and with this observation an explanation has been sought for the change in right and left ventricular force relationships.

5,093

Tereshkovich, K.A. 1936 DISTURBANCE OF VEGETATIVE NERVOUS SYSTEM IN PARACHUTE JUMPERS. Klinicheskaya meditsina, (Moskva) 8:405-8

5,094

Tereshkovich, K. I. 1937 THE HIGH-SPEED AVIATION AND THE PILOT. The Plane (Samolet) 6:20

5,095

Tereschovich, K. 1937 WIRKUNG DER BESCHLEUNIGUNG AUF DES ORGANISMS (Effects of Acceleration Upon the Organs) Vyestn. Vozd. Flota 19(4): 29-34.

5,096

Terry, C.W. 1945 FLIGHT TESTS OF ANTI-BLACKOUT EQUIPMENT.
(Committee on Aviation Med., U.S. National Research Council,
Washington, D.C.) CAM # 426, 25 April 1945.

5,097

Thaler, 1943 INVESTIGATION OF THE INFLUENCE OF HIGH WIND VELOCITY
ON THE UNPROTECTED HUMAN HEAD. Deutsche Luftfahrtforschung, Sept. 10, 1943.

5,098

Thatcher, J. O. M. 1942 PARA TROOPS AND PARA PHYSICIANS
Nav. med. Bull., Washington 40:280-281, 1942

5,099

Theis, F.V. 1943 ATMOSPHERIC AND IMMERSION BLAST INJURIES, War Med., (Chicago)
4:262-269.

5,100

Thetford, P. E., & F. E. Guedry 1952 JUDGMENT OF THE POSTURAL VERTICAL
DURING EXPOSURE TO A MISLEADING VISUAL FRAMEWORK IN UNILATERALLY LABYRINTH-
ECTOMIZED SUBJECTS. (Naval School of Aviation Medicine, Pensacola, Fla.)
Proj. NM 001 110 500.27., 28 July 1952. ASTIA ATI 169369

ABSTRACT: Four unilaterally labyrinthectomized human Ss made judgments of the postural vertical in the presence of a tilted visual framework. In general, the estimates of postural verticality were not displaced in the direction of the injured side. The tilted visual framework did not have unusual effects on the judgments rendered hence these Ss with one functional labyrinth did not demonstrate a less stable conception of verticality than previously observed 'normals.'

5,101

Thetford, P. E., & F. E. Guedry 1952 THE POSTURAL VERTICAL IN UNILATERALLY LABYRINTHECTOMIZED INDIVIDUALS. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.26., 1 June 1952
ASTIA ATI 159 447

5,102

Thieme, F. P. 1950 LUMBAR BREAKDOWN CAUSED BY ERECT POSTURE IN MAN. With emphasis on Spondylolisthesis and Herniated Intervertebral Discs. (University of Michigan, Anthropological Papers No. 4, University of Michigan Press, 1950.

ABSTRACT: It was found that the mechanical strains resulting from erect posture and lumbar curvature, particularly a shear component of the vertical compression forces, are the contributory cause of the two types (spondylolisthesis and herniated intervertebral discs) of low back breakdown which are discussed here.

A short discussion of the evolutionary adaptations of man, in relation to the assumption of erect posture, is included.

5,103

Thomas, A.R. 1941 "BLAST CHEST": RADIOLOGIC ASPECT OF PULMONARY CHANGES FOLLOWING EXPOSURE TO HIGH PRESSURE WAVES Brit. J. Radiol. 14:403-406

5,104

Thomas, H. B., Jr. 1961 RESEARCH, DEVELOPMENT, TEST AND EVALUATION IN THE NAVY (Research Paper: U. S. Naval Postgraduate School, 1961) Rept. VF 3886

5,105

Thomas, L.J. 1962 A BIBLIOGRAPHY OF REPORTS ISSUED BY THE BEHAVIORAL SCIENCES LABORATORY: ENGINEERING PSYCHOLOGY, TRAINING PSYCHOLOGY ENVIRONMENTAL STRESS, SIMULATION TECHNIQUES AND PHYSICAL ANTHROPOLOGY. (Behavioral Sciences Lab., 6570th Aerospace Medical Research Laboratories, AMC, Wright-Patterson AFB, Dayton, Ohio) ASTIA AD-282 281, June 1962

CONTENTS: This bibliography lists, by functional groupings, the technical reports, technical notes, contractor reports, memorandum reports, and journal articles prepared by the Behavioral Sciences Laboratory, and its contractors from 1945 through 1961.

5,106

Thomas, L.J. 1963 A BIBLIOGRAPHY OF REPORTS ISSUED BY THE BEHAVIORAL SCIENCES LABORATORY: ENGINEERING PSYCHOLOGY, TRAINING PSYCHOLOGY, ENVIRONMENTAL STRESS, SIMULATION TECHNIQUES, AND PHYSICAL ANTHROPOLOGY (Behavioral Sciences Laboratory, 6570th Aerospace Medical Research Lab., Aerospace Medical Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio) March 1963.

ABSTRACT: This bibliography lists, by functional groupings, the technical reports, technical notes, contractor reports, memorandum reports, and journal articles prepared by the behavior sciences laboratory, and its contractors, from 1946 through 1962.

5,107

Thomlinson, J. 1960 EMERGENCY STOPPING OF AIRCRAFT WHICH OVER-RUN AIR-FIELD RUNWAYS
(Advisory Group for Aeronautical Research and Development, Paris, France)
7 March 1960 Rept no 226 ASTIA AD 232 995

Summary: Many of the various ways that have either been tried or proposed for stopping aircraft which overrun an airfield runway are discussed. Soft ground over-run area schemes are discussed and not regarded with favor. Mechanical schemes are considered where special fittings, such as an arresting hook, are provided on the aircraft, and also where no such fittings are provided. Aircraft catching devices, such as arresting wires and barrier nets, are examined and the energy absorption systems which might be used are described. Some of the more important points in the mechanics of these schemes are briefly mentioned. (Author)

5,108

Thompson, A.B. 1959 PHYSIOLOGICAL AND PSYCHOLOGICAL CONSIDERATIONS FOR MANNED SPACE FLIGHT (Vought Astronautics Div. of Chance Vought Aircraft, Inc., Dallas) CVA-E9R-12349, 1 June 1959

5,109

Thompson, A. B. 1962 A PROPOSED NEW CONCEPT FOR ESTIMATING THE LIMIT OF HUMAN TOLERANCE TO IMPACT ACCELERATION. (Paper presented at the Aerospace Med. Assoc. Conf., Atlantic City, N. J., 11 April 1962.)
Aerospace Medicine 33(11):1349-1355, Nov. 1962

SUMMARY: Mathematical techniques are being developed for determining human whole body response to various impact accelerations, but no satisfactory method is avail-

able for defining the human response tolerance limit to impact loads resulting from abrupt decelerations. Limits set by total G vs. time, rate of onset, and velocity change are ill-defined and variable. A concept is proposed whereby limits are set by the force exerted per unit area on the body by the restraint or support system at maximum deceleration. Correlation is made between blast tolerance, sled test tolerance, and automobile accident and fall impact survivals which indicates that 28 to 32 pounds per square inch is the onset level for shock and 45 to 55 pounds per square inch is the level for 50 per cent mortality for transverse accelerations of less than 0.07 second duration. In this concept G, rate of onset, and onset time are all dependent variables while impact force per unit area, delta velocity change and impact pulse time define the tolerance envelope. (AUTHOR) (Aerospace Medicine 33(3):355-356, March 1962)

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Thompson, G.V.E. 1957 ASTRONAUTICS AT CRANFIELD Aeronautics 37:60

ABSTRACT: Summaries of papers read at the symposium on "High Altitude and Satellite Rockets" held at the RAF College of Aeronautics, 18-20 July 1957.

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Thomson, F.B., W.K. Kerr and B. Rose 1942 ABILITY OF THE C2F OXYGEN DEMAND VALVE TO FUNCTION NORMALLY AT ACCELERATIONS UP TO 10 G.
(National Research Council, Canada) Report # C-2603, October 15, 1942

ABSTRACT: The sample of the C2F Oxygen Demand Valve was tested in all positions at accelerations from 1 to 10 G and no significant change in function was noted. Removal of the spring from the oxygen inlet valve did not impair the function at an acceleration of 10 G. The clothing clip (6D-175) maintained its grip without slipping at forces equivalent to those resulting from an acceleration of 15 G.

5,112

Thomson, F.B. and W.K. Kerr 1943 THE EFFECTS OF G ON OXYGEN EQUIPMENT.
(National Research Council, Canada) Report #C-2824, June 8, 1943

ABSTRACT: The R.A.F. type MK VIII A# oxygen regulator, R.C.A.F. type C3B, American Pioneer type A12, and American Aro type A12 oxygen demand valves all

function normally up to 10G, in the vertical position. The R.C.A.F. type C2 oxygen mask and type C2 suspension when adjusted comfortably does not slip on the face at less than 5 G and only slipped more than suspension when adjusted comfortably does not slip at less than 4 G, may slip grossly at 5 to 7 G and on two out of three tests was pulled off the nose at 7 1/2 G. In order to prevent slipping of the oxygen mask off the face under G it is important to limit the elasticity of the suspension to the least amount compatible with comfort.

5,113

Thompson, W.C. 1956 MODEL DITCHING INVESTIGATION OF A JET TRANSPORT AIRPLANE WITH VARIOUS ENGINE INSTALLATIONS (National Advisory Committee for Aeronautics Langley Aeronautical Laboratory, Langley Field, Va.) NACA RM L56G10, 20 August 1956

ABSTRACT: The ditching characteristics of a jet transport airplane with various engine configurations were investigated in Langley tank No. 2. A dynamic model was used to determine the probable ditching behavior in calm water and the best ditching procedure. Various conditions of damage, engine installations, landing attitude, and speed were investigated. Data were obtained from visual observations, acceleration records, and motion pictures.

5,114

Thompson, W.C. 1961 INVESTIGATION OF WATER- POND ARRESTING OF A DYNAMIC MODEL OF A JET TRANSPORT. (National Aeronautics and Space Administration, Washington, D.C) NASA Technical note D-732, ASTIA AD- 256 505, May 1961

ABSTRACT: An investigation was made to obtain data which would aid in determining the practicability of using a water-pond arresting system for airplane runway overrun. Tests were made with several water-pond configurations, water depths, and airplane entry speeds. The waterpond could stop the model for most of the test conditions, although there was some damage to the model at the higher water entry speeds. (Author)

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Thompson, W. O., P. K. Thompson, & M. E. Dailey 1928 THE EFFECT OF POSTURE UPON THE COMPOSITION AND VOLUME OF THE BLOOD IN MAN. J. Clin. Invest. 5:573-604

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Thorndike, R. L. 1951 THE HUMAN FACTOR IN ACCIDENTS, WITH SPECIAL
REFERENCE TO AIRCRAFT ACCIDENTS. (USAF School of Aviation Medicine,
Randolph Field, Texas) Project No. 21-30-001, Report No. 1, February
1951.

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Thorner, M. W. 1942 QUESTIONNAIRE ANALYSIS OF THE PROBLEM OF AIRSICKNESS
AS IT IS MET WITHIN STATIONS IN THE CONTINENTAL UNITED STATES
(School of Aviation Medicine, USAF Randolph AF Base, Texas) Report
No. 38-1, September 1942.

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Tillman, J.M. 1956 NORTHWEST AIRLINES B-377 DITCHING, APRIL 2, 1956, NEAR
SEATTLE, WASHINGTON
(CAB Hearing)

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Tillman, J.M. 1956 CRASH SAFETY CONSIDERATIONS, UNITED AIRLINES DC-8.
(United Airlines) September 10, 1956.

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Timakov, V. 1960 MAN AND THE COSMOS
Trans. of Sovetskii Kraanyi Krest (USSR) 10(1):12-13, 1960
(Office of Technical Services, Washington, D.C.)
April 3, 1962 62-24912

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Timmons, D.E. 1954 NOTES ON HIGH ALTITUDE BAILOUT.
(Flight Test Engineering Division, Human Factors Branch)
18 Nov. 1954.

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Titov, G.S. 1962 REPORT OF MAJOR GHERMAN S. TITOV AT FIFTH PLENARY MEETING OF COSPAR ON MAY 3, 1962
Committee of Space Research (COSPAR), The Hague (Netherlands) NASA N62-15330

ABSTRACT: Major Gherman S. Titov's speech, given at the Fifth Plenary Meeting of COSPAR, includes details of his flight on August 6-7, 1961, in the spacecraft Vostok II. Major Titov reviews the purpose and accomplishments of his flight. He indicates that reentry into the earth's atmosphere was accomplished by means of a parachute mechanism. The physical sensations he encountered during the flight are discussed.

5,123

Titov, G. 1962 MY DAY IN SPACE
Spaceflight, 4 (5): 146-150. Sept. 1962

ABSTRACT: This is an abridged version of the speech made by the Russian astronaut German Titov on May 3, 1962, at the 3rd Space Science Symposium in Washington, D.C. Various aspects of his 17-orbit flight of August 6-7, 1961, discussed included launching, entering orbit, actual flight, re-entering the atmosphere, and landing. The basic physiological functions conformed well to flight loads and stresses. The flight indicated that man can withstand the effect of weightlessness for 24 hours. Some motion sickness was encountered which later abated, but eating, drinking, muscle coordination, and task performance remained good. The flight was preceded by two preparatory stages, a training program consisting of theoretical, special physical, medico-biological, technical, and flight factors; and an immediate preflight period.

5,124

Tkachuk, V.R. 1959 RASCHET GORIZONTAL'NYKH SOSTAVLIAIUSHCHIKH VETRA PRI UCHETE VNUSTRENNEGO TRENIYA I NELIENINYKH CHLENOV USKORENIYA (COMPUTATION OF THE HORIZONTAL WIND COMPONENTS WHEN CALCULATING THE INTERNAL FRICTION AND NON-LINEAR TERMS OF ACCELERATION (American Meteorological Society, Boston, Mass.)
Trans. no. T-R-220 of Akademiia Nauk SSSR, Izvestiia, Seriia Georizicheskaiia, no. 12; Contract AF 19(604)1936) ASTIA AD 236 563.

ABSTRACT: The question of the distribution of wind velocity in the friction layer - the lower layer of the atmosphere which is up to 1 km high - is of great interest. The difference between the wind observed near the earth and in the free atmosphere, the vertical wind motions in the upper atmosphere (not only in the friction layer, but even much higher than it), the formation of low and frontal clouds, etc., are a function of this distribution.

5,125

Tobias, C.A. & J.V. Slater 1961 CERTAIN ASPECTS OF SPACE BIOLOGY
(Space Sciences Laboratory & Donner Laboratory of Biophysics & Medical Physics,
Univ. of Calif., Berkeley, Calif.) USAEC & NASA Series No. 2; Issue No. 7,
August 1, 1961

ABSTRACT: In this publication, the authors reach the following conclusions:
(1) Space flight for man involves a great many physiological and psychological stresses. It is imperative that we carry out further research to understand man's homeostatic responses to these stresses and their limits. (2) Acceleration forces greater than 1 "g" cause profound chronic alterations in animal longevity, development, and physiology. (3) The condition of weightlessness presents a challenge to the biophysicist, for it presents a new environment, previously untested. It will probably cause chronic alterations in: (a) growth, differentiation and development. (b) longevity and metabolic physiology, with perhaps beneficial effects. (4) Underlying physical causes for the effects of weightlessness probably involve alterations in convection patterns. These appear to change the mode of mixing and of phase changes and might also result in reduced cell division. (5) Radiation hazards, particularly from flares and from heavy primaries, present a serious problem. For long voyages shielding must be applied. For the most space radiations accelerators are available or could be built to evaluate biological effects. Two types of studies are of great interest: (a) neurological effects of radiation. (b) developmental effects in embryonic forms. (6) Knowledge in biology is gained slowly and many experiments need to be done. It would be useful if each satellite in the physical programs, particularly those that are to be recovered, would leave some space for a biological experiment. (7) Complete knowledge of planetary life will be gained only when man himself can go to the planets, hence the approaches described above are of some immediate significance. (Author)

5,126

Tobias, C. A. and J. V. Slater 1962 OUR VIEW OF SPACE BIOLOGY WIDENS
Astronautics 7(1):20-22, 47-52. Jan. 1962

ABSTRACT: Putting a man safely into space requires knowledge concerning his ability to withstand the stresses resulting from acceleration-deceleration, weightlessness, temperature changes, vibrations, tumbling, artificial gas environments, and radiations. The importance of biological research in the space program is emphasized. For example, in radiobiology, two aspects under study are the neurological effects of radiation, and its developmental physicist. Underlying physical causes for the effects of weightlessness probably involve alterations in convection patterns of liquids and gases. These appear to change the mode of mixing and the phase changes and might also result in reduced cell division. Many examples are given of phenomena both observed and considered for future research.

5,127

Tobias, P., & J. P. Meehan 1963 THE ACCELERATION PHOSPHENE
(Paper, 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, Los Angeles, Calif., April 28 - May 2, 1963)

ABSTRACT: The investigation of phosphenes, or the sensation of light in the absence of light, dates back to antiquity. Recent investigations at the University of Southern California Human Centrifuge have produced a vivid visual phosphene, never before described nor reported during exposure to positive acceleration.

This report reviews the methods of producing phosphenes in general, and the acceleration phosphene in particular. A detailed and graphic description is presented; and the results of several experiments conducted with 60 subjects is reported. These experiments investigated the universality of this phenomenon, its G threshold, characteristics; and the effects on this threshold of (1) dark adaptation, (2) breathing 100 per cent oxygen, and (3) breathing 11 per cent oxygen.

Finally, evidence for the relationship between the phosphene and the cardiac pressor response is presented, giving some explanation to the origin of this entopic sensation and indicating areas for future research.

5,128

Tobin, W. J., R. Cicconi, J. T. Vandover and C. S. Wohl 1943 PARACHUTE
INJURIES
Army med. Bul. (66):202-221. 1943

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Tobin, W. J. 1944 PARACHUTE INJURIES
Milit. Surg. 94:222-224. 1944

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Toda AIR SICKNESS RESEARCH REPORTS PARTS I, II, and III. (JAPANESE)
(Appendix 7 of ATIG Report No. 36)

In: J. G. B. Castor, "List and Disposition of Documents Collected by
The Aero-Medical Section, Air Technical Intelligence Group," ATIG
Report No. 241.

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Tolle, E.A. 1960 SIMULATED COMBINED VIBRATION, SUSTAINED ACCELERATION AND EXTREME TEMPERATURE ENVIRONMENTS. (Aeronautical Accessories Lab., Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC TN 59-351, Feb. 1960. ASTIA AD 236 057.

ABSTRACT: A simulator believed to be the first of its kind to produce simultaneous steady acceleration, vibratory acceleration, and extreme temperature is described. It comprises a 450 pound force electro-dynamic vibrator and temperature box installed on a large-mass centrifuge. The combination of environments produced by this simulator makes possible more realistic testing of certain ballistic missile components than otherwise would be possible. Design and performance characteristics are presented, and component testing results are discussed. (Author)

5,132

Tolles, Walter E. & William J. Carbery 1959 A SYSTEM FOR MONITORING THE ELECTROCARDIOGRAM DURING BODY MOVEMENT. WADD TR 58-453; ASTIA AD 215 538.

ABSTRACT: This investigation was undertaken to develop a system for monitoring the electrocardiogram during body movement. Two new lead systems were devised that produced interpretable electrocardiograms and were insensitive to moderate body movements. A new stainless-steel mesh electrode designed for this investigation provided technically satisfactory electrocardiograms during all body movements. The best method of applying these electrodes to the skin was with adhesive tape. Good electrode-to-skin contact was obtained for as long as 6 hours. For monitoring of the electrocardiogram with the new lead system, a recording frequency band pass of 0.1 to 20 cps produced interpretable electrocardiograms during moderate body movement. With more strenuous activities, a recording frequency band pass of 0.8 to 10 cps produced interpretable electrocardiograms; however, the amplitude and shape of the characteristic waves were modified.

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Tomcsak, S. L. 1960 DECELERATOR BAG STUDY
(Wright Air Development Center, Wright Field, Ohio) WADC TR 59 775,
June 1960.

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Tompkins, V.H. 1956 THE SIGNIFICANCE OF THE ABNORMAL ELECTROENCEPHALOGRAM
IN AIRCREW (Eighth AGARD Aeromedical Panel Meeting, Copenhagen, May 1956)

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Topliff, E.D.L. A STUDY OF ENERGY ABSORBING MATERIALS FOR THE PREVENTION OF
IMPACT INJURY. (Defence Research Medical Laboratories, Toronto, Canada)
F-8.

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Torii, K., T. Tsuji & H. Ishii 1944 HEARING AND VESTIBULAR FUNCTION UNDER
G STRESS. Kokuigaku 1:137

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Tourin, B. & S. Macri 1953 AIRCRAFT SAFETY BELTS: THEIR INJURY EFFECT ON
THE HUMAN BODY. (Aviation Crash Injury Research)

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Tower, D. B. and D. McEachern 1948 ACETYLCHOLINE AND NEURONAL ACTIVITY IN
CRANIO-CEREBRAL TRAUMA. J. Clin. Invest. 27:558.

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Townsend, F. M., V. A. Stembidge & F. K. Mostofi 1957 THE ROLE OF THE
PATHOLOGIST IN AIRCRAFT ACCIDENT INVESTIGATIONS. Aero. Eng. Rev.
16:65-67, July 1957.

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Townsend, F. M. and W. H. Davidson 1961 EXPERIENCE OF THE ARMED FORCES INSTITUTE OF PATHOLOGY IN AIRCRAFT ACCIDENT INVESTIGATION, 1956-1960.
(Armed Forces Inst. of Pathology, Army Medical Center, Washington, D.C.)
Reprint from Military Medicine 126:335-339, May 1961.

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Townsend, F.M and W.H. Davidson 1961 EXPERIENCE OF THE ARMED FORCES INSTITUTE OF PATHOLOGY IN AIRCRAFT ACCIDENT INVESTIGATION, 1956-1960.
(Army Medical Center, Washington, D.C.) ASTIA AD-258 526

5,147

Townsend, F.M., B.C. Doyle and W.H. Davidson 1961 TWO YEARS' EXPERIENCE IN COMBINED ENGINEERING AND PATHOLOGY INVESTIGATION OF AIRCRAFT ACCIDENTS.
(Paper, 32nd Annual Meeting of the Aerospace Medical Association in Chicago, Illinois, 24-27 April 1961)

ABSTRACT: The Aerospace Pathology Branch of the Armed Forces Institute of Pathology has assisted the Civil Aeronautics Board and the Federal Aviation Agency in the medical investigation of seventeen commercial and/or civil aircraft accidents since November 1957. The work of the Human Factors Committee of the CAB, combined with that of the pathology studies, has assisted greatly in reconstructing the mechanism of injuries sustained in passenger and crew fatalities. A review of this work again emphasizes the necessity of a rearward facing seat in future commercial aircraft with a better system of passenger "tie-down". A continuing effort to improve existing forward facing seats and installation of rearward facing seats on newly certificated transport aircraft will be discussed.
(Aerospace Medicine 32(3):250, March 1961)

5,148

Townsend, F. M., W. H. Davidson, & B. C. Doyle 1962 TWO YEARS' EXPERIENCE IN COMBINED ENGINEERING AND PATHOLOGY INVESTIGATION IN AIRCRAFT ACCIDENTS.
(Paper, 32nd Annual Meeting of the Aerospace Medical Association in Chicago, Illinois, 24 April 1961)
Aerospace Medicine 33:913-919, 1962

ABSTRACT: In the accidents in which crash injury played a major role, the findings indicate that there are certain factors that must be considered in the design of future aircraft.
The evidence is definite that there is a relationship between the injuries sustained by the passengers and the forward facings seats of present commercial

aircraft.

Much can be done by the airframe and equipment designer to eliminate and/or minimize injuries and fatalities resulting from aircraft accidents. First, it is essential that the occupants remain in the seats and the seats remain attached to the airframe structure. Assuming that the seat will remain attached and the passenger will remain in the seat, how can the designer eliminate the leg injuries sustained by passengers that are presently occurring in aircraft accidents? There are four alternatives: increase the seat spacing, eliminate the aft stretcher at the bottom of the seat, install leg retention devices, or, install a properly designed rearward facing seat. (CARI)

5,149

Trapp, R. F. 1963 AN EVALUATION OF SPACE RESEARCH REQUIREMENTS
(Am. Inst. of Aeron. and Astronautics, N. Y.)
AIAA Paper 63-131 May 2, 1963

ABSTRACT: The need for a manned space laboratory is discussed. The prime justification for this laboratory is for research on the physiological, psychological, and performance aspects of long-duration weightless manned flight and attendant problems, such as enduring reentry following prolonged weightlessness. Key among the secondary reasons for the manned laboratory is experimentation in the weightless environment in which man is an integral part or in which he adds measurably to the value of the experiment. The four possible future space missions which could profit by information obtained in the laboratory are: lunar base, operational space station, planetary flyby, and planetary landing. (N63-18836)

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Travis, R. C. 1944 PERCEPTION AND BODILY ADJUSTMENT UNDER CHANGING ROTARY ACCELERATIONS: A NEW TECHNIQUE. The American Journal of Psychology 57(4):468-481, Oct. 1944

ABSTRACT: The primary purpose of this paper is to describe a new apparatus and technic for producing and recording accelerative movements in the rotation-chair and to record experiments carried out with it..." The apparatus permits the study of the accuracy of the observer's adjustment when instructed to keep his body motionless. Seven different periods of motion and 1 immobile period were used; the periods of motion varied in duration, magnitude, and acceleration. Three trials blindfolded and 3 with the eyes open were given

to determine the perception of direction. Subjects were 100 college men and 99 college women; scores were in percentage of a perfect score.

Results were: (1) blindfolded, men's mean = 51, women's = 47, CR = 2.4; (2) with vision, men's mean = 81, women's = 77, CR = 2.9. Ten trials were made of S's accuracy in compensating for motion. The results showed a steady improvement during the 10 trials, with small sex differences in favor of the women and greater variability for the men. It is clear that these 2 performances demand different skills; r between maintaining bodily orientation and perception of motion without visual cues = $-.13$; with visual cues, $-.06$. It is suggested that these techniques offer promise for the selection of flying personnel.

5,151

Travis, R.C. 1945 AN EXPERIMENTAL ANALYSIS OF DYNAMIC AND STATIC EQUILIBRIUM
J. exp. Psychol. 35:216-234

ABSTRACT: An experimental analysis of the factors involved in the two kinds of equilibrium and of the interrelationship of their components yielded the following major results: The dynamic component of equilibration is unrelated to the static component. There is practically no correlation between balancing skill on the stabilometer and ability manually to maintain orientation of a rotation chair in continuous displacement. Weight is of relatively greater importance than height in dynamic stabilometer performance, and distance from the center of gravity to the foot base line shows high correlation with standing height. When weight is controlled, there is a small sex difference in favor of women's performance on the stabilometer. Both dynamic and static equilibrium show greatly superior performance when visual cues operate. While mild exercise increases body sway significantly as a result of increased respiration and therefore of head movements, it shows little effect on dynamic stabilometer performance. A correlation of 150 between eyemanual co-ordination and balancing skill is believed to show presence of a steadiness factor in the two performances.

5,152

Traylor, M.E., Jr. and R.L. Player 1959 A SUMMARY OF REPORTS PRODUCED UNDER ARDC PROJECT 1080; "PROTECTIVE CONSTRUCTION AND TARGET VULNERABILITY" AND ITS PREDECESSORS (Air Force Special Weapons Center, Kirtland AFB, N. Mexico) Rept. No. AFSWC-TN-59-11, March 1959, ASTIA AD 307 301.

ABSTRACT: The purpose of this report is to summarize the work of this structures Division, its predecessors, and its contractors in blast effects

research, in order that other interested agencies may be made cognizant of the results obtained far and, in turn, to effect closer coordination and cooperation. Some of the work mentioned was performed under tasks that are now terminated and not specifically mentioned. (Author)

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Treat, W. C. 1955 MOTION SICKNESS.

(San Diego State College Foundation) ASTIA AD-95139, July 1955
Contract Nonr-1268(01).

ABSTRACT: Because those deaf persons who lack vestibular sensitivity have been demonstrated to be immune to motion sickness, the internal mechanism responsible for the malady has been defined as the semi-circular canals of the inner ear. The kinds of motion that most readily induce sickness have been found to be quite specific. Rotation, by itself, does not make subjects sick, but when accelerations and decelerations, separated by constant speed, are introduced into rotational apparatus, the subjects become sick. Furthermore, it has been shown that rotation in several planes favors sickness. It has been found that a variety of "minor" stimulus conditions help or hinder motion sickness. Visual disorientation, uncomfortable warmth, and unpleasant odors are reported to facilitate sickness. Where there is much to occupy the attention of a person, as in the case of an airplane pilot, motion sickness seldom occurs even under adverse conditions of motion. In the case of air-sickness, Chinn and Milch have concluded that Phenergan is the most effective preventative yet discovered and produced the fewest annoying side-effects. For seasickness, Dramamine has long been the favorite of the Navy. It should be noted that no drug has yet been discovered that has no adverse effects.

5,154

Tremblay, H. G. 1961 THE CENTRIFUGE SIMULATION OF THE X-15

(Paper, Panel on Acceleration Stress of the Armed Forces-NRC Committee on Bio-Astronautics, 6-11 March 1961, NASA Ames Research Ctr., Moffett Field, Calif.)

5,155

Trilling, Leon 1950 THE IMPACT OF A BODY ON A WATER SURFACE AT AN
ARBITRARY ANGLE

J. Appl. Phys., 21 (1): 161-170

ABSTRACT: This paper presents an approximate method of determining the pressure distribution during impact on the surface of a body which strikes a horizontal water surface at an arbitrary angle. The effect of the splash is neglected and the pressure on the free boundary is assumed proportional to the potential, as if the process were an impulse. The shape of the submerged portion of the striking body is approximated by a semi-ellipse (two dimensions) a hemisphere, half an ellipsoid of revolution and half a general ellipsoid. Under those conditions explicit results for the pressure distribution are found.

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Tripp, R. C. H. 1945 RECENT ADVANCES IN RESEARCH ON PARACHUTES IN
THE GERMAN AIR FORCE. (RAF, Institute of Aviation Medicine,
Farnborough) FPRC 635, July 1945.

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Trojan, S. and L. Jilek 1961 PROCEDURES AFFECTING THE RESISTANCE OF RATS
TO POSITIVE ACCELERATION DURING ONTOGENY.
In Physiol. Bohemoslov 10:467-473, 1961.

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Trumbull, R., H.I. Chinn, C.H. Maag, L.J. Milch, S.W. Handford, R. Seibert,
P. Sperling and P.K. Smith. 1960 EFFECT OF CERTAIN DRUGS ON THE
INCIDENCE OF SEASICKNESS. Clin Pharmacol Ther 1:280-3, May-June 1960

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Tschermak-Seysenegg, A. 1932 PHYSIOLOGISCH-OPTISCHE BEOBACHTUNGEN IM FLUGZEUG
UND IM ROTATORIUM (Physiological-Optical Observations in the Aircraft
and in the Rotarium)
Forsch. Fortschr. dtsh. Wiss. (Berlin) 8: 72-73

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Tsiolkovskii, K. E. 1911 INVESTIGATION OF OUTER SPACE BY JET PROPULSION
Unedited rough draft trans. of mono., Tsiolkovskii, K. E., Sobranie
Sochinenii, v. 2: Reaktivnye Letatelnye Apparaty, 1954, p. 100-139,
(Originally pub. in Airflight Herald, 1911, sic).
(Office of Technical Services, Washington, D.C.)
Oct. 25, 1960 61-27426

ABSTRACT: Tsiolkovsky's pioneer (1911) theoretical derivations for a
"rocket" or jet-propulsion device for space flight are reprinted.

5,161

Tsuda, J. 1943 THE CARDIAC FUNCTION AND ACCELERATION.
Kokuigaku 1:72

ABSTRACT: When positive G was applied, the pulse rate increased up to 39, then
decreased slightly. Until negative 4G has reached, the pulse rate also increased
but in higher G, it deteriorate rapidly and showed arrhythmia. In case of trans-
verse G, it decreased slightly probably due to the vestibular reflex. The increas-
ed heart rate will suggest the augmentation of cardiac function.

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Tsuji, T. 1943 EXPERIMENTAL STUDY ON THE EFFECT OF FORCE ON THE
DISTURBANCE IN AUDITORY FUNCTION.
Kokuigaku, 2(1,2):163, Oct. 1943.

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Tsuji, T. 1943 INVESTIGATION OF THE HEARING DISTURBANCES DUE TO ACCELERATION
STRESS. Kokuigaku 1:112

ABSTRACT: The guinea pig weighing 400 to 500 g that has concha movement reflex
for the acoustic stimulations was used for the experiment. The movement of the
concha was recorded on the smoked paper by the tanbour. It is recognized that
under positive G the hearing faculty decreased considerably being suggested by
the decreased amplitude of the concha movement.

5,164

Turnbow, James W. 1961 U.S. ARMY H-25 HELICOPTER DROP TEST OCTOBER 22, 1960
(U.S. Army Transportation Research Command) Contract DA-44-177-TC-624 TREC
Technical Report 60-76; AvCIR 2-TR-125.

ABSTRACT: This report presents the results of an exploratory, experimental study. A Piasecki Model H-25A helicopter has been employed in recreating a typical accident approximating an unsuccessful attempt to attain autorotation from a low altitude power failure. Relatively high (50G to 100G) vertical and longitudinal accelerations have been observed for periods in the order of 10 milliseconds in an impact leaving the cabin area of the airframe reasonably intact. Failure of all seats occurred without failure of either seat belts or shoulder harness.

The instrumentation and research techniques used in (1) the measurement of the impact forces and accelerations, (2) the determination of the feasibility of the utilization of on-board recorders, and (3) the evaluation of certain problems inherent in the dynamic crash testing of full-scale helicopter and VTOL aircraft were presented in an earlier preliminary report.

5,165

Turnbow, J.W., V.E. Rothe, G.M. Bruggink, & H.F. Roegner 1962 CRASH
INJURY EVALUATION. MILITARY TROOP SEAT DESIGN CRITERIA.
(U.S. Army Transportation Research Command, Fort Eustis, Va.)
TREC TR 62-79, Nov. 1962.

ABSTRACT: This report was prepared by Aviation Crash Injury Research. It contains the results of a careful analysis of troop seat deficiencies conducted over the past three years. The analysis was made in light of accident experience with this seat, human tolerance as presently known, and accelerations and forces which may be anticipated in potentially survivable accidents involving army aircraft.

The analysis revealed that the strength requirements quoted in current military specifications are considerably lower than (1) those which would be dictated by the upper limit of accelerations which can be tolerated by the occupants of the seats; (2) they were also lower than the accelerations and forces which probably occur in many Army air-craft accidents. 22* This substantiates the observation by the Army that these seats fail under relatively minor accident conditions, thus subjecting the occupant to further hazards, especially to increased contact injuries.

On the basis of the detailed examination of current specifications, human tolerance, and impact acceleration data, it is recommended that the troop seat specifications be revised and that dynamic load factors of 25 G for 0.20 second plus 45 G for 0.10 second be adopted for troop seat design in the longitudinal and lateral directions and 25 G for 0.10 second for the vertical direction. In addition, an energy absorption capability must be incorporated into the seat system to reduce the vertical accelerations on the occupant, which would frequently exceed 25G, to a tolerable level.

5,166

Turnbow, J. W. 1962 A DYNAMIC CRASH TEST OF AN H-25 HELICOPTER.
(Paper, National Aeronautic Meeting, April 3-6, 1962), Society of
Automotive Engineers, New York, New York. No. 517A

ABSTRACT: An H-25A Piasecki helicopter has been employed in recreating a "typical" accident occurring with both longitudinal and vertical velocity components at impact. Acceleration patterns at various stations in the aircraft and in the dummy occupants have been found to be incomparable with the results of similar tests conducted for fixed-wing aircraft by NACA. For the helicopter, large magnitude, short duration, accelerations have been observed. By contrast, accelerations of smaller magnitude but with relatively longer duration were found for transport type aircraft by NACA. When the acceleration environment for the H-25 is compared with known tolerance limits for human subjects, evidence of the need for modification in crew and passenger seats to provide better crash protection for the aircraft's occupants becomes apparent.

5,167

Turnbridge, R. E. and J. V. Wilson 1943 BLAST INJURY: PATHOLOGIC AND
CLINICAL FINDINGS Quart. J. Med. 12:169-184.

5,168

Turnbridge, R. E. 1945 CAUSE EFFECT AND TREATMENT OF AIR BLAST INJURIES
War Med., (Chicago) 7:3-6.

5,169

Tuttle, A.D. and H.G. Armstrong 1939 THE ROLE OF AVIATION MEDICINE IN THE
DEVELOPMENT OF AVIATION. Mil. Surgeon, 85:285-301

ABSTRACT: The outstanding problems in the field of aviation medicine are: effects of altitude; psycho-physiologic characteristics of the airman; effects of speed, vibration, noise, etc.; aside from selection of pilots and maintenance of fitness in the same. The pilot must possess a complex of psycho-physiologic aptitudes relating to acuity of vision, depth perception, sense of motion, balance, orientation, and other reactions relating to the sense organs and the central nervous system.

Valuable data in aviation medicine with regard to ocular functions were furnished by Berens and Wilmer. The credit of furnishing the fundamental basis for blind flying should be attributed to Major Myers.

The upper limit for consciousness in unacclimatized men during short exposures appears to be between 23,000 and 25,000 feet.

During the first World War many pilots refused to use oxygen until reaching 17,000 to 20,000 feet. However, the "ceilings" were getting progressively lower as the war went on, indicating cumulative ill effects. The latter on mind and body were demonstrated by Barcroft, McFarland and Armstrong at an altitude of from 10,000 to 12,000 feet.

5,170

Tuttle, A. D., & G. R. Wendt 1946 STUDIES IN MOTION SICKNESS: II. AIRSICKNESS AMONG ONE HUNDRED EIGHTY-NINE AIRLINE STEWARDESSES AND ITS RELATIONSHIP TO PREVIOUS HISTORY OF MOTION SICKNESS. (Civil Aeronautics Administration, Washington, D. C.) April 1946; Rept. No. 60

SUMMARY: A questionnaire was administered to 189 United Air Lines stewardesses requiring them to report the frequency and degree to which they had been airsick, and the conditions under which it occurred. The questionnaire also included an inventory of motion sickness on boats, trains, autos, and other devices. The frequency of airsickness was: 42% had vomited from airsickness; 36% had experienced lesser degrees of sickness; 22% had been completely free of sickness. And a priori scoring key was applied to the inventory of motion sickness on devices. Two people rated the airsickness part of the questionnaire for amount of sickness. The correlation of inventory and airsickness scores was .53, showing that history of sickness on other devices yields some useful prediction of airsickness. Significant conditions of airsickness, according to the stewardesses, were: rough air, fatigue, illness at time of emplaning, psychological factors, gastric factors, high altitude, odors, and heat. (CAA)

5,171

Tyrer, J. and K.V. Robertson 1944 REPORT ON ANTI-G EQUIPMENT.
(Report, Comm. Flying Personnel Research) RAAF -FR 95, 13 Aug. 1944

5,172

Tyler, D. B. 1948-49 THE EFFECT ON MARKSMANSHIP OF SOME MOTION SICKNESS PREPARATIONS CONTAINING BARBITURATES AND HYOSCINE.
J. Appl. Physiol. 1: 737

5,173

Tyler, D.B. and P. Bard 1949 MOTION SICKNESS.
Physiol. Rev., 29:311

ACCELERATION

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5,174

Unger, H. R. & L. J. Milch 1959 THE EFFICACY OF TRILAFON IN POTENTIATING BONAMINE MOTION SICKNESS PROPHYLAXIS IN DOGS. (School of Aviation Medicine, Randolph AFB) Rept. no. 59-78; ASTIA AD 226 474.

ABSTRACT: A standardized swinging procedure was utilized to induce vomiting in a group of normal mongrel dogs. Only dogs which exhibited emesis consistently within a 30-minute interval during a premedication control period were considered susceptible. The susceptible animals were randomly placed in three treatment groups - namely, placebo, bonamine^R, and the combination of bonamine^R with trilafo^Rn. Prolongation of vomiting time represents an elevated threshold of vestibular stimulation along the labyrinthine-vomiting center chain. Bonamine^R and the combination of bonamine^R with trilafo^Rn exhibited a protective effect against swing-induced emesis. Trilafo^Rn, a potent tranquilizer, has no protective effect when used alone and in combination with bonamine^R affords a degree of protection which is no greater than the effect shown by bonamine^R alone. It is therefore concluded (a) that the action of trilafo^Rn does not contribute to the protection afforded by bonamine^R against swing-induced vestibular stimulation and, therefore, (b) that stimuli arising from those brain centers affected by trilafo^Rn have not been shown to be contributing factors in the etiology of motion-induced emesis. (Author)

5,175

University of Florida 1956 ANALOG SIMULATOR SYSTEM (Department of Engineering Mechanics, Engineering and Industrial Experiment Station, University of Florida, Gainesville, Florida) Contract Number AF 08(616)-36, Task 2, August 1956, ASTIA AD-106 702

ABSTRACT: This Instruction Manual presents the theory, design, operation and maintenance of the Analog Simulator System, a special-purpose mathematical machine that gives the response acceleration of a single-degree-of-freedom mass-spring system whose support is subjected to some given shock excitation. The Simulator System is capable of arbitrary variations, within wide limits, of the two parameters of the mass-spring system, the natural frequency and damping coefficient. Also, the System mechanizes the application of the generalized spectrum criterion for the severity of shock, which was developed in a previous Phase Report.

5,173

Tyler, D.B. and P. Bard 1949 MOTION SICKNESS.
Physiol. Rev., 29:311

ACCELERATION

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5,174

Unger, H. R. & L. J. Milch 1959 THE EFFICACY OF TRILAFON IN POTENTIATING BONAMINE MOTION SICKNESS PROPHYLAXIS IN DOGS. (School of Aviation Medicine, Randolph AFB) Rept. no. 59-78; ASTIA AD 226 474.

ABSTRACT: A standardized swinging procedure was utilized to induce vomiting in a group of normal mongrel dogs. Only dogs which exhibited emesis consistently within a 30-minute interval during a premedication control period were considered susceptible. The susceptible animals were randomly placed in three treatment groups - namely, placebo, bonamine^R, and the combination of bonamine^R with trilafo^Rn. Prolongation of vomiting time represents an elevated threshold of vestibular stimulation along the labyrinthine-vomiting center chain. Bonamine^R and the combination of bonamine^R with trilafo^Rn exhibited a protective effect against swing-induced emesis. Trilafo^Rn, a potent tranquilizer, has no protective effect when used alone and in combination with bonamine^R affords a degree of protection which is no greater than the effect shown by bonamine^R alone. It is therefore concluded (a) that the action of trilafo^Rn does not contribute to the protection afforded by bonamine^R against swing-induced vestibular stimulation and, therefore, (b) that stimuli arising from those brain centers affected by trilafo^Rn have not been shown to be contributing factors in the etiology of motion-induced emesis. (Author)

5,175

University of Florida 1956 ANALOG SIMULATOR SYSTEM (Department of Engineering Mechanics, Engineering and Industrial Experiment Station, University of Florida, Gainesville, Florida) Contract Number AF 08(616)-36, Task 2, August 1956, ASTIA AD-106 702

ABSTRACT: This Instruction Manual presents the theory, design, operation and maintenance of the Analog Simulator System, a special-purpose mathematical machine that gives the response acceleration of a single-degree-of-freedom mass-spring system whose support is subjected to some given shock excitation. The Simulator System is capable of arbitrary variations, within wide limits, of the two parameters of the mass-spring system, the natural frequency and damping coefficient. Also, the System mechanizes the application of the generalized spectrum criterion for the severity of shock, which was developed in a previous Phase Report.

5,176

MOTION PICTURE

University of Southern Calif., School of Medicine 1951 ESCAPE FROM HIGH-SPEED AIRCRAFT AND THE PROBLEM OF COMPOUND ACCELERATIONS: A LABORATORY STUDY. (Presented at the twenty-second meeting of the Aero Medical Association in Denver, Colorado, May 1951)

5,177

University of Virginia COMPARATIVE STRESS ANALYSIS FOR LARGE DYNAMIC ACCELERATORS
(Research Laboratories for the Engineering Sciences, University of Virginia)
Contract AF 29(600)-3465, Phase I, 6571st Aeromedical Research Laboratory, Holloman AFB, New Mexico (Publication of Final Report expected in August 1963)

5,178

Uradniecek, R. K. 1961 EVALUATION OF A PRECISION CENTRIFUGE FOR USE IN LINEARITY CHECKING GUIDANCE ACCELEROMETERS. In 1961 Proceedings of the Institute of Environmental Sciences National Meeting, April 5, 6, 7, 1961, Washington, D.C. (Mt. Prospect, Ill.: Institute of Environmental Sciences, P. O. Box 191) pp. 299-303

ABSTRACT: The purpose of this evaluation was to determine the operating characteristics of a precision centrifuge. Areas of most importance were precision platform excursions and angular velocity measurements. A second objective was to make modifications and recommendations to improve the centrifuge test facility. Results of the evaluation will be used to clarify performance characteristics of guidance accelerometers in an extensive linearity test program. (AUTHOR)

5,179

Urschel, D.L. 1962 MEDICAL FACTORS IN NON-FATAL AIRCRAFT ACCIDENTS.
(Paper, 33rd annual meeting of the Aerospace Medical Association, Atlantic City, N.J., 9-12 April 1962)

5,180

Usachev, V.V. 1956 NA USLOVNYE SOSUDISTO-DVIGATEL'NYE REFLEKSY
(Effects of Radial Acceleration on Conditioned Vasomotor Reflexes)
Zhurnal Vysshei Nervnoi Deistel Nosti Imeni I.P. Palova 6(3):555-560,
May-June 1956.

ABSTRACT: The effects of acceleration on the central nervous system were

studied by plethysmographic measurement of changes in the conditional vasomotor (vasoconstriction) reflexes to a bell and unconditional vasomotor reflexes to cold water stimulation. Five healthy males, 21 to 32 years of age, were subjected to positive acceleration in a centrifuge of 3.5 m. radius. Maximum force was exerted for 20 sec. The decline of both, cold-pressor reflex and the conditional vasomotor reflex, and the increase in the respective latencies during the first twenty to twenty-six minutes after rotation attest to the dominance of inhibition processes under acceleration in those parts of brain which regulate the vascular tonus.

5,181

Usachev. V. V. 1957 K VOPROSU O PRICHINEKH ZRITEL'NYKH NARUSHENIY PRI DLITEL'NYKH USKORENIYAKH. (THE PROBLEM OF VISUAL DISTURBANCES AT SUSTAINED ACCELERATIONS.) Voyenno-meditsinskiy Zhurnal (Military Medical Journal) 4:19-21, 1956. (Translation in USAF Air Intelligence Information Report "Acceleration and the Human Organism". IR-1282-57, 20 March 1957).

5,182

Usachev, V. 1958 ACCELERATION DURING SUPERSONIC FLIGHTS
Sovetskaya Aviatsiya (Moscow), 12 July 1958

ABSTRACT: Prolonged period of acceleration during flights faster than sound produces certain changes in the human organism. Inability of the human organism to withstand G-force even of comparatively low magnitude places a limit on the possibility of carrying out tactical air maneuvers. The human organism is capable of withstanding adverse effects of acceleration. Protective mechanism come into action as soon as the centrifugal forces appear and the vascular reflexes immediately begin to regulate the arterial pressure more effectively and to accommodate the activity of heart to new conditions. Blood pressure evens out and blood flow in the brain remains at sufficiently high levels. Muscle tension in the stomach and in the lower extremities, during acceleration hinder blood flow into the lower half of the body, thereby compensating to some degree any disturbance in circulation. It has been proven that a period of combat training and various physical exercises help to improve blood circulation. This helps the human organism to become more responsive to signals, thus limiting the adverse effects of G-forces. At present, fighter pilots wear anti-G suits which improve blood flow in the brain. (CARI)

5,183

Usachev. 1960 MAN IN FLIGHT AND CHANGE IN GRAVITY.
Sovetskaya Aviatsiya (USSR) p. 3, 22 August 1958
LC or SLA 60-23534

ABSTRACT: When head to foot accelerations of 4 G's last for 3-5 seconds,

contraction in peripheral vision usually results, and after 1-2 seconds only central vision remains unimpaired. Accelerations of 5 G's lasting 4-6 seconds causes the central vision to become hazy and finally lost. Consequently, acceleration of 5 G's, lasting 10-20 seconds, is the limit of tolerance for the majority of healthy people who have not been conditioned. However great magnitudes can be tolerated for brief times. In ejection from an aircraft 18-20 G's for 0.1-0.15 seconds can be well tolerated. Danger of significant G forces decreases with altitude because thinness of the atmosphere precludes violent maneuvers. Anti-G suits and an inclined position can help to increase tolerance. It is important to note that the main symptoms which alert the pilot are visual disturbances.

5,184

Usachev, V. V. 1961 VLIYANIE RADIAL'NYKH USKORENIY NA DVIGATEL'NYE
USLOVNYE REFLEKSY (Effect of Radial Acceleration on Motor-Conditioned
Reflexes)
(Trans. of Zhurnal Vysshei Nervonoi Deyatel'nosti (USSR) 11(1):22-28,
1961)
(Office of Technical Services, Washington, D.C.) 61-27393

5,185

Useller, J.W., and J.S. Algranti 1960 PILOT REACTION TO HIGH-SPEED ROTATION
(Lewis Research Center, Cleveland, Ohio, Presented at IAF Meeting, Stockholm,
Sweden, August 1960) National Aeronautics and Space Administration Report No.
E-990.

5,186

Useller, J. W., & J. S. Algranti 1960 PILOT CONTROL OF SPACE VEHICLE TUMBLING
(Paper, Institute of Aeronautics & Space, National Specialists Meeting on
"Guidance of Aerospace Vehicles", 25-27 May 1960, Boston, Mass.)

5,187

Uyemura, M. & A. Ishida 1940 HYDROMECHANISCHE UNTERSUCHUNGEN ÜBER DEN
BLUTDRUCK DER NETZHAUTGEFÄSSE (Hydro-mechanical Studies Concerning
the Blood Pressure of the Retinal Vessels)
Acta Societatis Ophthalmologicae Japonicae (Tokyo) 44(2): 1114-1139

5,188

Uyemera, M. and A. Ishida 1940 HYDROMECHANIC STUDIES ON THE BLOOD
PRESSURE OF THE RETINAL BLOOD VESSELS. (Nippon Gankagakkai Zasshi.)
Acta Soc. Ophth., (Japan), 44:1114-39. Abstract: J. Aviat Med., 12:266

ABSTRACT: Four healthy males were measured for the capillary blood pressure of the macula lutea in different body positions by means of Uyemura and Sugnanuma's ophthalmodynamometer. The retinal blood pressure in a horizontal position was higher than in a vertical position and increased by 3.9, 10.7, and 19.6 mm. Hg., respectively, when the body was tilted head downward at a certain speed to angles of 15, 30, 45, and 60 degrees.

The brachial blood pressure, which was measured simultaneously, did not change at any position. The rise of the retinal blood pressure was due to the stagnation of blood in the retinal capillaries brought about by centrifugal force. With repeated experiments the rise became less and less noticeable as a result of the adaptation of the subject. When the tilting was done at a slow and constant rate, no rise in the retinal blood pressure was observed. By contrast, when the tilting was done suddenly and rapidly, the retinal blood pressure rose twice as high as normal. Hence the blood pressure in the retinal capillaries is subject to hydrodynamic principles and is changed by centrifugal force when the body is in motion, unless compensated by physiologic adaptation.

5,189

U. S. Adjutant General's Office 1958 MILITARY ASPECTS OF SPACE EXPLORATION
(A SELECTED LIST OF TITLES) (Adjutant General's Office, Washington, D. C.)
Special Bibliography No. 16; ASTIA AD-220 815; 5 June 1958

ABSTRACT: This bibliographic survey has been made at the request of the Office, Chief of Research and Development, Department of the Army. Its aims and objectives are specific - to throw light on available unclassified literature which points up the military implications of space exploration. In the process of research it became evident to the analysts of the Army Library, that the scope of unclassified materials dealing exclusively with the military aspects of the subject were limited, and that the available materials tend to emphasize the subject indirectly rather than directly. Nevertheless, through careful selection, it was possible to assemble approximately 300 titles which should prove helpful to those who seek information on the military implications of space exploration. The broader aspects of space exploration, involving the overall scientific and nonscientific trends and activities, have been deliberately excluded from this compilation. (AUTHOR)

5,190

U.S.A.F., Aerospace Information Division 1961 SOVIET LITERATURE ON LIFE SUPPORT
SYSTEMS
(Science and Technology Branch, Aerospace Information Division) AID Work
Assignment No. 22, Report / AID Report 61-168 December 20, 1961
ASTIA AD 271 154

ABSTRACT: This is the seventh in a monthly report series reviewing Soviet developments in life support systems as reflected in Soviet publications. This

report is based on materials made available at the Aerospace Information Division during October-November 1961. Items are selected from Soviet open literature and include scientific publications and literature of a popular type.

The materials in this report deal with the following topics: Space medicine and biology.

5,191

U.S. Aerospace Information Div. 1961 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS (Science and Technology Branch, Aerospace Information Div, Washington, D.C.) AID Work Assignment No. 22, Report 6, AID Report 61-143, Oct 27, 1961. ASTIA AD 267 926

ABSTRACT: This is the sixth in a monthly report series reviewing Soviet developments in life support systems as reflected in Soviet publications. It reviews Soviet developments in space biology, medicine, vehicle ecology, and life support instrumentation. This report is based on materials made available at the Aerospace Information Division during September 1961. Items are selected from Soviet open literature and include scientific publications and literature of a popular type.

5,192

U.S. Air Information Division 1961 COMPREHENSIVE ANALYSIS OF SOVIET SPACE PROGRAM (BASED ON SOVIET OPEN LITERATURE 1958-61) (Science and Technology Section, Air Information Division) AID Rept. 61-72; 22 May 1961; ASTIA AD 260 501

ABSTRACT: This report is based on more than 200 articles, official (TASS) reports, sketches, and books published in connection with the Soviet space program. The report reflects information on Soviet space technology covering a period of about 3 years (1958-61). The report consists primarily of comments published by Soviet specialists in astronautics and of opinions formed by the writer on the basis of his analysis of this information. In most cases, the Soviet comments and opinions are closely paraphrased, rather than directly quoted. In expressing his own opinions and conclusions, the writer has attempted to show the inferences on which they are based. The literature surveyed has led the writer toward several tentative conclusions which, if correct, may be of considerable significance. These opinions concern the launching and recovery systems used in the Soviet space programs.

5,193

U.S.A.F., Air Information Division 1961 FURTHER DETAILS ON GAGARIN FLIGHT (Science and Technology Branch, Air Information Division) AID Rept. 61-113 July 27, 1961 ASTIA AD 261 454

ABSTRACT: The present brief report recounts certain details found in three

articles published by USSR scientists and discusses the implications of this information. The first article was written by Professor G.V. Petrovich and published in the Vestnik of the Academy of Sciences USSR. The second is a TASS interview with Professor V.V. Dobronravov. The third was written by Inna Yavorskaya, scientific secretary of the Interplanetary Travel Commission of the Academy of Sciences USSR.

5,194

U.S.A.F., Air Information Div. 1961 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS
(Science & Technology Section, Air Information Division) AID Work Assignment
No. 22, Rept. 4; AID Rept. 61-109; July 1961 ASTIA AD 261 452

ABSTRACT: This is the fourth in a monthly report series reviewing Soviet developments in life support systems as reflected in Soviet publications. This report is based on materials made available at the Air Information Division during June 1961. Items are selected from Soviet open literature and include scientific publications and literature of a popular type. The materials in this report deal with the following topics:

- I. Space Medicine and biology
- II. Space physiology
- III. Space psychology
- IV. Space vehicle ecology

5,195

U.S. Air Information Division 1961 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS
Science and Technology Section, Air Information Division AID Rept. 61-41
March 24, 1961 ASTIA AD 254 410

ABSTRACT: This is the first in a monthly report series reviewing Soviet developments in life support systems as reflected in Soviet publications. In this series, materials will be grouped according to the following topics: I. Space medicine and biology; I. Space physiology; III. Perceptual physiology; IV. Space psychology; V. Space vehicle ecology; VI. Survival conditions; and VII. Instrumentation. This report is based on source materials made available at the Air Information Division during February, 1961. Items are selected from Soviet open literature and include scientific publications and literature of a popular type. Materials in this report deal with topics I, II, V, and VI.

5,196

U.S. Aerospace Information Division 1961 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS. (Science and Technology Branch, Aerospace Information Division)
AID Report 61-156, 30 Nov. 1961. ASTIA AD 269 794.

CONTENTS:
Ecological System

Stress Factors - Acceleration, Noise, Vibration
Weightlessness
Radiation Effects
Training and Biotelemetry

5,197

U.S. Aerospace Information Division. 1962 SOVIET MANNED SPACE FLIGHT INDIVIDUALS AND COMPONENTS OF THE USSR SPACE COMMAND SYSTEM-SUPPLEMENT (BASED ON SOVIET OPEN LITERATURE 1961-1962). (Aerospace Information Division, Science and Technology Branch, Wash., D.C.) AID rept. no. 62-129; ASTIA AD-285 329; 12 Sept. 1962

5,198

U.S.A.F. Aerospace Information Division 1962 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS (Aerospace Information Division, Washington, D.C.) AID Report 62-95, 3 July 1962. ASTIA AD 288 432

ABSTRACT: The first 18 paragraphs of this article (pp. 1217-1219) deal with the achievements of Soviet space science, the discovery of the three "cosmic speeds" progress in rocketry, planned aspects of the Soviet space program, the rise of space biology, the space-flight factors which affect life, the role of telemetry, the hazards of space flight, and space medicine. These are dealt with in general terms and have been published earlier in many Soviet publications.

5,199

U.S. Aerospace Information Div. 1962 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS (Aerospace Information Div., Washington, D.C.) AID-62-28, NASA N6214686, Feb. 1962

ABSTRACT: This report reviews Soviet developments in space biology, medicine, and physiology. (AUTHOR ABSTRACT)

5,200

U. S. Aerospace Information Div. 1962 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS (Aerospace Information Div., Washington, D.C., Jan. 1962) AID-62-17, NASA N62-14685

ABSTRACT: This report reviews Soviet developments in space physiology. (AUTHOR ABSTRACT)

5,201

Aerospace Information Division 1962 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS
A. BIOSCIENCES
Aerospace Information Division, AID Work Assignment No. 22, AID Report 62-61
March 31, 1962 ASTIA AD 276 171

ABSTRACT: This is the tenth in a monthly report series reviewing Soviet developments in life support systems as reflected in Soviet publications. This report is based on materials made available at the Aerospace Information Division during March 1961. Items are selected from Soviet open literature and include scientific publications and literature of a popular type. The materials in this report deal with the following topics: I. Space medicine and biology and II. Space physiology.

5,202

U.S. Aerospace Information Div. 1962 SOVIET MANNED SPACE FLIGHT LIFE SUPPORT SYSTEMS: MEDICAL AND BIOLOGICAL ASPECTS OF THE VOSTOK-3 AND VOSTOK-4 FLIGHTS. (Aerospace Information Division, Washington, D.C.)
AID Report No. 62-191, November 1962. ASTIA AD 291 911.

ABSTRACT: The medical and biological aspects of the Vostok-3 and Vostok-4 flight, including selections of orbits, physical and psychological preparation, medical monitoring, radiation protection, diet, cabin ecology, and projected problems for interplanetary flight, were reviewed. The sources are from Soviet open-literature, chiefly newspapers, published in the period August-October 1962.

5,203

Aerospace Information Div. 1962 PRINCIPLES OF LIFE SUPPORT IN SPACE BASED ON SOVIET OPEN LITERATURE PUBLISHED IN CONNECTION WITH THE VOSTOK-3 AND VOSTOK-4 LAUNCHINGS
Aerospace Information Div., Washington, D.C. 5 Dec. 1962 ASTIA AD 291 910

ABSTRACT: Descriptions of the principles of life support in space used by Soviet specialists at the present time for orbital flights, and those which are being discussed and developed for future long-range missions have been extracted from more than two hundred articles and TASS reports published predominantly in Soviet newspapers in connection with the launching of the Vostok-3 and Vostok-4 spaceships. The articles were written by various specialists in the field of space technology, including academicians, corresponding members of the Academy of Sciences, professors, doctors of biological sciences, doctors of medical sciences, candidates of medical and technical sciences and physics and mathematics, engineers, science reporters, and cosmonauts. Primary emphasis was placed on the discussions of data which describe the design elements of equipment used in space application, including the spaceship cabin, automatic devices, equipment used in the cosmonaut training program. Psychological and physiological conditioning and responses and safety factors are included. (Author)

5,204

Aerospace Information Division 1963 SOVIET LITERATURE ON LIFE SUPPORT
SYSTEMS. A. BIOSCIENCES (Aerospace Information Division, Library of
Congress, Washington, D.C.) AID Report P-63-45, 29 March 1963.

ABSTRACT: This is the thirteenth in a series reviewing Soviet developments in life support systems. It is based on materials made available at the Aerospace Information Division through December 1962. Items are selected from Soviet open literature.

The materials in this series are grouped according to the following topics:

Part A (Biosciences)

- I. Space medicine and biology
- II. Space physiology
- III. Perceptual physiology
- IV. Space psychology
- V. Space vehicle ecology
- VI. Survival conditions

Part B (Instrumentation).

Materials in this report deal with topics I, II, and V.

5,205

U.S. Aerospace Information Division 1963 SOVIET BIOMEDICAL MONITORING IN SPACE
FLIGHT METHODS, TECHNIQUES, AND EQUIPMENT
(Aerospace Information Division, Library of Congress) AID Work Assignment No. 22
AID Report P-63-42 March 27, 1963 ASTIA AD 402 620

ABSTRACT: This report consists of eleven abstracts, one of an article in Etudes sovietiques and ten of articles in two recently published Soviet collections, Pervyye kosmicheskiye polety cheloveka (First space flights of man) and Problemy kosmicheskoy biologii (Problems of space biology).

5,206

Aerospace Medical Association 1960 PRESENT ACTIVITIES IN THE LIFE
SCIENCES. (Life Sciences Committee, Aerospace Medical Association,
Washington, D.C.)

ABSTRACT: This publication contains a list of the present research activity in the field of life sciences with a corresponding list of laboratory names and locations and chief investigators who are doing research work in the fields listed.

5,207

USAF Aerospace Medical Center 1960 LECTURES IN AEROSPACE MEDICINE,
11 - 15 JANUARY 1960. (School of Aviation Medicine, USAF Aerospace
Medical Center (ATC), Brooks AFB, Texas)

ABSTRACT: This lecture series includes twenty-four lectures presented to an audience composed of distinguished foreign representatives, U.S. military officers, and outstanding research and university representatives.

5,208

USAF Aerospace Medical Center Jan. 1961 LECTURES IN AEROSPACE MEDICINE,
16-20 JANUARY 1961. (Conducted at the School of Aviation Medicine,
Brooks AFB, Texas)

ABSTRACT: This lecture series includes twenty-six lectures presented to an audience composed of distinguished foreign representatives, U.S. military officers, and outstanding research and university representatives.

5,209

U.S. School of Aviation Medicine 1962 BIOASTRONAUTICS. ADVANCES IN RESEARCH.
(School of Aviation Medicine, Randolph Air Force Base, Tex.)
March 1959. ASTIA AD 226 473

CONTENTS:

Definitions and subdivisions of space (bioastronautical aspect)
by H. Strughold
Bio-paks: Instrumentation and biomedical research Primates in space
Center of gravity and moments of inertia measurements for seat plus a
rhesus monkey, by H.G. Clamann
Summary of immunochemical analyses on sera from humans exposed in a
simulated altitude chamber, by W.G. Glenn
Survival terrestrial micro-organism under simulated Martian conditions,
by J.D. Fulton.
Photosynthetic gas exchangers and recyclers used in closed ecological
system studies, by W.A. Kratz
Man in Space, by B. Balke
Physiological instrumentation of man during light, by C.H. Kratochvil
Carbon monoxide phenomena in green plants systems, by S.S. Wilks,
R.M. Adams, J.A. Green and E.G. Shaw

5,210

U.S. Aerospace Technical Intelligence Center 1961 DETAILS OF THE LEGENDARY
FLIGHT
Aerospace Technical Intelligence Center, Wright-Patterson AFB, Ohio
Trans. No. MOL-1035 16 April 1961 ASTIA AD 261 805
Original Source: Komsomol'skaya Pravda 91(11031): 1-3

5,211

U.S. Air Forces War Dept., 1943 EFFECT OF ACCELERATION ON ESCAPE FROM AIRCRAFT. Appendix J. TSELA-3-697-11, 28 Feb. 1943.

5,212

U.S. Air Force 1945 EFFECT OF ACCELERATION ON ESCAPE FROM AIRCRAFT (Paper, Conference on "Human Factors in the Design and Operation of Aircraft" Aero Medical Laboratory, Engineering Division, Wright-Patterson AFB, Ohio, 19, 20 Jan. 1945) ASTIA ATI 12 729

5,213

U.S. Air Force 1948 VENOUS PRESSURE IN THE HEAD UNDER NEGATIVE ACCELERATION (Aeronautical Medical Laboratory, Wright-Patterson AFB, Ohio) 15 Jan. 1948.

5,214

U.S. Air Force 1949 SYNOPSIS OF THE AERO-MEDICAL ASPECTS OF JET-PROPELLED AIRCRAFT. (USAF Air Materiel Command, Wright-Patterson AFB, Ohio) Jan. 1949. ASTIA ATI 56 134.

ABSTRACT: This publication contains brief summaries of aero medical problems arising today from the use of jet aircraft. Specifically, there are sections concerning the problems of high altitude flight, problems of high speed flight, and problems concerning flight safety. In many sections nothing new has been added since the war, except a better understanding of human requirements. In others, much new material has been included and many new problems clarified.

5,215

U.S. Air Force Air Materiel Command 1950 HIGH ALTITUDE BAIL-OUTS. (USAF, AMC, Holloman AFB, N.M.) Memorandum Report MCREXD-695, Sept. 1950.

ABSTRACT: Experimental results are presented of fourteen human tests accomplished at Holloman Air Force Base, which prove the feasibility of escape at high altitude from a physiological standpoint and demonstrate the practicability of automatic equipment for ejection seat and free bailout methods of escape.

5,216

U.S. Air Force 1950 BACK INJURY IN JET-AIRCRAFT ACCIDENTS; 28 CASES-HARD LANDINGS. (USAF Flying Safety, Norton AFB, Calif) Informal Report.

5,217

USAF 1950 GERMAN AVIATION MEDICINE, WORLD WAR II.
(School of Aviation Medicine, Wash. D.C.)

5,218

U.S. Air Force 1951 PARACHUTE HANDBOOK
(Parachute Branch, Equipment Lab., Wright Air Development Ctr., Wright-Patterson AFB, Ohio) 1 March 1951. ASTIA ATI 35532.

5,219

U.S. Air Force 1952 THE BEGINNINGS OF RESEARCH IN SPACE BIOLOGY AT THE AIR
FORCE MISSILE DEVELOPMENT CENTER, HOLLOMAN AIR FORCE BASE, NEW MEXICO,
1946-1952
Air Force Missile Development Ctr., Holloman AFB, N. Mex. ASTIA AD 208 018

ABSTRACT: The first installment toward fulfilling the need for examining the history of Air Force participation in space-biology research. A serious study of the origins of biological projects, their gradual evolution, and their scientific and technical contributions is of considerable value in avoiding old mistakes or duplicating previous effort, and for suggesting new paths of endeavor in the planning and pursuit of the more complex programs required in the immediate future. The V-2 and Aerobee rocket experiments and balloon flights are reviewed, with emphasis upon the biomedical information obtained therefrom. Experiments included fungus spores, fruit flies, mice, hamsters, cats, dogs, and monkeys as subjects. The effect at high speed and altitude of G forces, subgravity, and cosmic radiation were major factors explored. Experience gained in rocket and balloon launching, instrumentation and recovery techniques, and the growing collection of scientific data particularly related to cosmic radiation and subgravity problems marked the practical beginnings of Air Force research in space biology.

5,220

USAF 1952 PHYSICS AND MEDICINE OF THE UPPER ATMOSPHERE.
(School of Aviation Medicine, Randolph Field, Texas)

5,221

U.S. Air Force 1953 PROJECT PHYSIOLOGY OF ROCKET FLIGHT, MX NO.2. (Holloman
(Air Development Center, Holloman Air Force Base, N. Mexico)

5,222

U.S. Air Force 1953 PROJECT PHYSIOLOGY OF ROCKET FLIGHT, MX NO.
1450-R. (Holloman Air Development Center, Holloman AFB, N. Mex.)
Weekly test status report for week ending 24 Feb. 1953.
Report No. HDT 319.1/27

5,223

U.S. Air Force 1953 **PHYSIOLOGY OF FLIGHT: USAF Manual 160-30.**
(Washington, D.C. : U.S. Government Printing Office, 1953)

5,224

USAF 1954 **FLIGHT SURGEON'S MANUAL.** (Manual 160-5, Dept AF, Oct. 1954)

5,225

U. S. Air Force 1954 **HADC SEMI-ANNUAL PROGRESS REPORT, "ABRUPT DECELERATION"**
JULY-DECEMBER, 1954. (Aeromedical Field Laboratory, AFMDC, Holloman AFB,
N. Mex.)

5,226

U. S. Air Force June 1955 **SEMI-ANNUAL PROGRESS REPORT --- PROJECT 7850,**
January-June 1955 (Aeromedical Field Laboratory, Air Force Missile
Development Center, Holloman AFB, New Mexico)

5,227

U.S. Air Force 21 June 1955 **TEST REPORT ON ESCAPE FROM AIRCRAFT AT HIGH**
SPEED AND ALTITUDE. (Aeromedical Field Laboratory, Air Force Missile
Development Center, Holloman AFB, New Mexico) Rept. No. 2, 21 June 1955

5,228

U. S. Air Force July 1956 - Nov. 1956 **OPERATIONAL REPORT ... 1 JULY 1956**
THROUGH 28 NOVEMBER 1956. (Air Force Missile Development Center, Holloman
AFB, N. Mex.)

5,229

USAF Air Force 1956 **ARDC SLED TESTS EJECTION IMPACT FORCES.**
Aviation Week 65(24):81-83, 10 Dec. 1956.

ABSTRACT: The new catapult sled "Daisy Track" installed at the Holloman Air
Development Center is described. Some of the studies on the effects of abrupt
deceleration and on the best body position for emergency ejection are mentioned.
briefly.

5,230

U.S. Air Force, trans. P.P. Batrechenko 1956 OPYT MEDITSINSKOGO OBESKENKENIYA TRASIROVKI A PROTIVOPEREGRUZOCHNYYN USTROYSTVOM LETNOGO SOSTAVA CHASTI. (Experience with Medical Supervision During the Training of the Flying Personnel of the Unit in the Use of Pressure Suit Equipment) Voyenno-meditsinskiy Zhurnal (Military Medical Journal) 3:64-65, 1956. USAF Translation: IR-1037-57. 1957

5,231

U.S. Air Force 1956 UNITED STATES AIR FORCE PARACHUTE HANDBOOK. (Wright Air Development Center, Air Research and Development Command, Wright-Patterson AFB, Ohio) WADC Technical Report 55-265, Dec. 1956. ASTIA AD 118036.

ABSTRACT: The United States Air Force Parachute Handbook is a collection of information, test results, and other technical data pertaining to the application, design, construction, and testing, of parachutes, parachute systems, and accessories. The contents of the Handbook represent the state-of-the-art of parachute development, design, fabrication, and testing, and will be amended as the state-of-the-art advances.

5,232

U.S. Air Force, trans. 1956 AT THE AEROMEDICAL SECTION OF THE LEARNED MEDICAL COUNCIL ATTACHED TO THE CHIEF OF THE MAIN MILITARY MEDICAL ADMINISTRATION. (V Sektsii Aviatsionnoy Meditsiny Ughenogo Medits Irskogo Pri Machal'Nike Gvmi) compiled from two sources: Voyenno-Meditsinskiy Zhurnal (Military Medical Journal) 5:95-96 (1956) and Vestnik Vezdushnogo Flota (Herald of the Air Fleet) 5:83-84 (1956). (Trans. in, USAF Air Intelligence Information Report IR-1621-56. 13 Aug. 1956)

5,233

U. S. Air Force 1956 U. S. A. F. SUPERSONIC AIR RESEARCH TEST TRACK: PROJECT SMART. Shell Aviation News 221:12-14, Nov. 1956

ABSTRACT: The Air Force supersonic military air research track (SMART), 12,000 feet long, across the flat top of Hurricane Mesa, Utah, terminates at the brink of a 1,500 foot escarpment. Test vehicles can be accelerated to supersonic speeds along this track and escape devices such as ejection seats released from them to continue over the cliffs, their descent being checked by the same parachutes used in high performance aircraft. Illustrations are included of the rocket sled, dummy, and ejection seat, and of test ejections.

5,334

U. S. Air Force Sept. 1957 DAISY TRACK TESTS. (Air Force Missile Development Center, Holloman AFB, New Mex.) Test Report No. 6, 10 Sept. 1957, p. 4

5,335

U. S. Air Force 1957 AUTOMOTIVE CRASH TEST PROGRAM.
(Aeromedical Field Laboratory, Air Force Missile Development Center, Holloman AFB, N. Mex.) 17 May 1957

5,336

U. S. Air Force 1957 SYMPOSIUM NO. 3 PHYSICAL STANDARDS AND SELECTION, AVIATION MEDICINE RESIDENCY TRAINING PROGRAM, 19-20 FEBRUARY 1957 (School of Aviation Medicine, Randolph AFB, Texas) ASTIA AD-144 144

CONTENTS:

The philosophy of physical standards for military service;
The history of physical standards in the USAF
Pulmonary function standards
Cardiovascular standards
The electrocardiogram in the selection of flying personnel
Serum lipoprotein and pilot selection
Eye standards for visual acuity, depth perception, and muscle balance
Visual standards -- color vision
Discussion of papers
Eye, nose, and throat standards
The establishment of norms
Conservation of the trained airman
The stability of the nervous system
Psychiatric standards
The significance of loss of consciousness
Specific requirements of the Strategic Air Command
Physiological selection;
Standards for acceleration;
Job requirements and matching standards
The job of flying high-performance aircraft
Physical standards for high-altitude indoctrination
Selection and the man-machine complex

5,337

U.S. Air Force 1957 PROJECT 91- MX -981 - AERO MED SLED RUN DATA--HOLLOMAN TRACK. ISSUE III. (Air Force Missile Development Center, Holloman AFB, New Mexico) 1 May 1957.

5,338

U.S. Air Force 1957 VERTIGO/DISORIENTATION.
(Headquarters Tactical Air Command, Langley AFB, VA.)
Tactical Air Command Surgeon's Bull. 7(2):14-17, Feb. 1957.

ABSTRACT: A review of human factors involved in major aircraft accidents for the period of January-September 1956, reveals that vertigo and/or disorientation accounted for 32 of the 116 major accidents. Most typical cases of vertigo are transient and usually of short duration and consist of illusions of pitch, sensations of turning while in straight and level flight and vice versa. These are usually overcome by strict instrument interpretation. The Coriolis reaction, however, is more dangerous and causes more severe reactions in pilots leading to uncontrollable flight situations immediately after changing radio channels.

5,339

U.S. Air Force 1957 THE HOLLOWMAN TRACK.
(Air Research & Development Command, Air Force Missile Development Ctr., Holloman AFB, New Mexico) AFMDC TR 57-1, Sept. 1957. ASTIA AD 150 248.

ABSTRACT: A means for testing which permits the dynamic loads of free-flight tests, and yet insures recovery of the test object, was born of this necessity. Supersonic tracks allow proper programming. The Holloman Track, at the Air Force Missile Development Center of the Air Research and Development Command, USAF is the largest track facility in the Department of Defense. It is the purpose of this booklet to acquaint prospective track users with the potentialities of the Holloman Track.

5,340

USAF Air Intelligence, trans. 1957 ACCELERATION AND THE HUMAN ORGANISM.
(USAF Air Intelligence Report) IR-1282-57. See V. I. Babushkin, V. V. Malkin, & V. V. Usachev; and V. V. Usachev, 1957.

5,341

USAF Air Intelligence, trans. 1957 PHYSIOLOGY OF ACCELERATION: A CONTRADICTORY BETWEEN D. YE. ROZENBLYUM AND G. L. KOMENDANTOV. (USAF Air Intelligence Information Report) IR-1407-57. See D. Ye. Rozenblyum; G. L. Komendantov; K. M. Shalay et al.; and A. P. Popov. 1956

5,342

USAF Air Intelligence, trans. 1957 TWO PROBLEMS IN ACCELERATION: CUMULATIVE EFFECT AND X-RAY EXAMINATIONS. (USAF Air Intelligence Information Report) IR-1600-57. See S. A. Gozulov; and A. R. Manzurov, 1956.

5,343

USAF Office of Scientific Research 1957 ASTRONAUTICS SYMPOSIUM,
1st - 2nd 1957-1958 (New York: Symposium Publications Division,
Pergamon Press)

5,344

U. S. Air Force 1957 ASTRONAUTICS SYMPOSIUM, SAN DIEGO, CALIFORNIA, FEBRUARY
18-20, 1957, SUMMARY SESSION. (Air Force Office of Scientific Research)
AFOSR-TR-57-14

5,345

USAF, Wright Air Development Center 1958 SPACE TRAVEL: PROBLEMS AND PROSPECTS
(Wright Air Development Center, Wright-Patterson AFB, Ohio) December, 1958

ABSTRACT: This publication is a bibliographical listing of books and articles
dealing with space travel. Much of the material was originally presented by
the American Rocket Society, the Institute of the Aeronautical Sciences, and
the Society of Automotive Engineers.

5,346

U. S. Air Force 1958 RESEARCH ACCOMPLISHMENTS IN BIODYNAMICS: DECELERATION
AND IMPACT AT THE AIR FORCE MISSILE DEVELOPMENT CENTER, HOLLOMAN AIR FORCE
BASE, NEW MEXICO, 1955-1958. (Air Force Missile Development Ctr., Holloman
AFB, N. Mex.) ASTIA AD-208 015

ABSTRACT: In the monograph here presented, Dr. David Bushnell, of the Air
Force Missile Development Center's Historical Office, presents a carefully
documented account of the successes and failures encountered in biodynamics
research programs other than escape physiology. He has endeavored to place
these accomplishments within the larger context of such work undertaken else-
where by the United States Air Force, the United States Navy, industrial
corporations and academic institutions of the United States, plus some
consideration of related efforts in Canada, Germany, and the Soviet Union.
This is the sixth of the series of monographs published this year devoted to
aspects of the history of research in space biology and biodynamics in the
Aeromedical Field Laboratory.

5,347

U.S. Air Force 1958 REPORTS ON SPACE MEDICINE - 1958
Air University, School of Aviation Medicine, Randolph AFB, Texas Feb. 1958

ABSTRACT: This publication contains the following papers: "Human Performance
in the Space Travel Environment" by G.T. Hauty; "Supersonic and Hypersonic

Human Flight" by J.E. Ward, S.J. Gerathewohl and G.R. Steinkamp; "Human Engineering of the Sealed Space Cabin" by G.R. Steinkamp; "Fatigue, Confinement, and Proficiency Decrement" by G.T. Hauty and R.B. Payne; "The Feasibility of Recycling Human Urine for Utilization in a Closed Ecological System" by W.R. Hawkins; "Space Cabin Requirements as Seen by Subjects in the Space Cabin Simulator" by W.R. Hawkins and G.T. Hauty; and "Weightlessness - The Problem and the Air Force Research Program" by S.J. Gerathewohl.

5,348

U.S.. Air Force Special Weapons Center PROCEEDINGS OF THIRD SHOCK TUBE
SYMPOSIUM 10 - 12 MARCH 1959. (Air Force Special Weapons Center,
Air Research and Development Command, Kirtland AFB, New Mexico)
ASTIA AD-230333

5,349

USAF 1959 ANNOTATED BIBLIOGRAPHY OF SOVIET AIR AND SPACE PROJECTS
(AEROMEDICAL ASPECTS)
Trans. from Soviet open sources, 1951-1959.
(Office of Technical Services, Washington, D.C.)
May 19, 1959 59-16479

ABSTRACT: Abstracts are given for over 100 papers on problems in space flight. The papers are listed alphabetically by author under the headings: (1) aeromedical program; (2) air personnel; selection and training; (3) human engineering; (4) manned weapon system; (5) space projects; (6) space vehicle life support systems: algae photosynthesis.

5,350

USAF 1959 HIGH ALTITUDE SCOUTS (AND) RESEARCH OF PARAMOUNT IMPORTANCE
(Razvedchiki Bol'shikh Vysot (and) Issledovaniya Pervostepennogo
Znacheniya)
Trans from Pravda (Moscow) 1959, No. 189, P. 6, 1 and a summary trans
of 3 articles on the same subject from Izvestiya (USSR) 1959, no. 160,
p. 3.
(Office of Technical Services, Washington, D.C.)
Aug. 3, 1959 59-19716

ABSTRACT: The scouts are 2 dogs and a rabbit, test animals used in experiments on weightlessness. The ballistic rocket which served as a vehicle for the animals is not described. There is nothing specific on physiological findings.

5,351

USAF 1959 PROSPECTORS OF GREAT HEIGHTS (Razvedchiki Bol'shikh Vysot)
Trans. of Pravda, Moscow (USSR) no. 189(14948) p. 6., 1959.
(Office of Technical Services, Washington, D.C.)
Jan. 1960 60-19078

ABSTRACT: The scouts are 2 dogs and a rabbit, test animals used in experiments on weightlessness. The ballistic rocket which served as a vehicle for the animals is not described. There is nothing specific on physiological findings.

5,352

U. S. Air Force 1959 BIBLIOGRAPHY ON AEROMEDICAL RESEARCH WITH ABSTRACTS.
(Wright Air Development Div., Wright-Patterson AFB, Ohio) ASTIA AD-247 101,
Dec. 1959

5,353

U.S. Air Force 1959 DISCOVERER III BIOMEDICAL DATA REPORT.
(Directorate of Bioastronautics Projects, Air Force Ballistic Missile
Division, Headquarters ARDC, Los Angeles, Calif.) WDZPB Report No. 2
ASTIA AD 241 853

ABSTRACT: Four C-57 black mice lived through the stresses of launch and accelerative forces produced by the two stage Discoverer vehicle and through more than 500 seconds of weightlessness. Speciment activity correlated with ignition and burn-out of each stage and marked activity occurred during weightlessness. Speciment activity correlated with ignition and burn-out of each stage and marked activity occurred during weightlessness. The life support system of the Mark I biomedical recovery capsule functioned satisfactorily from lift-off to 790 seconds. The atmosphere, continuously moved through a ducted gas control system, varied between 330 mm Hg oxygen partial pressure, maintained a low pCO₂ and low relative humidity (below 60%) with a constant but relatively low temperature of 56° F. During flight, no leaks occurred in the capsule or oxygen system and the latter functioned normally to maintain a satisfactory cell pressure between 6.3 to 7.0 psia from an oxygen cylinder maintaining approximately 1200 psig.

The primary biomedical mission objective was not achieved because of failure of the Discoverer III vehicle to gain sufficient velocity, resulting in a prolonged ballistic trajectory, rather than the programmed orbit. However, part or all of secondary mission objectives were achieved.

5,354

U. S. Air Force 1959 BIOASTRONAUTICS - ADVANCES IN RESEARCH
(Air University, School of Aviation Medicine, Randolph AFB, Texas)
ASTIA AD-226 473

ABSTRACT: In this publication fifteen special progress reports are published which deal with problems applicable in rocket flight and satellite flight (chapters on "Bio-Paks" and "Primates in Space"). Others report about progress in fields which will be of usefulness in more advanced space operations (chapters on "Photosynthetic Gas Exchanges...." and "Man in Space").

5,355

U. S. Air Force 1960 AEROMEDICAL FIELD LABORATORY MEETS THE CHALLENGE OF
BIOASTRONAUTICS. Holloman Monthly News Bulletin 5(1):6, 8, 11-12, Nov. 1960

ABSTRACT: The research problems in this field presently under consideration and development by Holloman's Aeromedical Field Laboratory are discussed in this article.

5,356

U.S. Air Force 1960 PROCEEDINGS OF WADC SPACE TECHNOLOGY LECTURE SERIES,
VOLUME I, TECHNICAL AREAS
Wright Air Development Ctr., Wright-Patterson AFB, Ohio WADC TR 59-732
ASTIA AD 235 424

ABSTRACT: This report is a consolidation of the papers presented by members of the WADC laboratories at its Space Technology Lecture Series between 7 Oct. 1958 and 11 Dec. 1958. The papers were prepared for the purpose of cross-education and therefore are directed toward an audience representing many disciplines of science and engineering. The presentations contained basic technical as well as state-of-the-art information in at least sixteen unique technical areas and subsystems directly related to space technology. The topics covered in this report are as follows: Propulsion; Flight Mechanics and Structures; Flight Control; Guidance; Communications; Secondary Power; Supporting Subsystems; Reconnaissance; and Vehicle Defense, technical areas: International Geophysical Year - The Ground Work for Space Flight; Environment of Space; Mechanics of Space Flight; Electromagnetics; Space Medicine; and Materials.

5,357

U.S. Air Force 1960 PROCEEDINGS OF WADC SPACE TECHNOLOGY LECTURE SERIES,
VOLUME 2 SUBSYSTEMS-PART I. (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TR 59-732, April 1960. ASTIA AD 236 641.

ABSTRACT: This report is a consolidation of the papers presented by members of the WADC laboratories at its Space Technology Lecture Series between 7 Oct 1958.

and 11 Dec. 1958. The papers were prepared for the purpose of cross-education and therefore are directed toward an audience representing many disciplines of science and engineering. The presentations contained basic technical as well as state-of-the-art information in at least sixteen unique technical areas and subsystems directly related to space technology. Areas covered in this report are the following: Propulsion; Flight Mechanics and Structures; Flight Control; Guidance; Communications; Secondary Power; Supporting Subsystems; Reconnaissance; Vehicle Defense.

5,358

U.S. Air Force Missile Development Center 1960 HOLLOMAN TRACK CAPABILITIES
(Air Force Missile Development Center, Holloman AFB, New Mexico)
AFMDC Technical Report 60-24, Nov. 1960. ASTIA AD 250 057.

5,359

U.S. Air Force Missile Development Center 1960 THE BEGINNINGS OF RESEARCH IN
SPACE BIOLOGY 1946-1952 (Holloman AFB, New Mexico)

5,360

U.S. Air Force 1960 OPERATIONAL SUITABILITY TEST OF THE MODEL 66C PENDANT
SUPPORT SYSTEM FOR THE BAK-6/F27A AIRCRAFT ARRESTING SYSTEM (WATER SQUEEZER)
(4750th Test Squadron, Tyndall AFB, Fla.) (Tactics & Application Engineering)
Proj. Rept. ADC/73AD/59-18. April 1960. ASTIA AD 252 617.

SUMMARY (a): The Model 66C Pendant Support System provides a retractable runway pendant cable for the BAK-6/F27A Aircraft Arresting System. The system is pneumatically powered and can be controlled electrically from the control tower or manually from the side of the runway. The pendant cable is raised and lowered on eight leaf spring type supports spaced twenty feet apart. A semaphore at the side of the runway gives a visual indication of the system position.

The test was conducted at Kincheloe AFB, Michigan, during March and early April 1960. The three test phases included twelve F-102A high speed tire versus pendant support damage investigation taxi runs, ten F-106A high speed tailhook versus pendant support damage investigation engagements and four system freezing effects investigation tests. The Model 66C in the raised position was found to be a satisfactory pendant cable supporting system to insure successful engagements without damage to aircraft tires or tailhooks. The system was rendered inoperative by freezing in the retracted position and all major systems deficiencies resulted from the effects of cold weather.

Recommendations are made that an operative heating system be provided for cold weather locations and that certain design changes be incorporated if reliance is to be placed on ice removal chemicals only. Additional design changes or construction deficiency corrections are recommended for the actuator solenoid valves, actuator pit, semaphore and pendant cable groove.

5,361

U.S. Air Force Air Information Div. 1961 PHENOMENA IN THE UPPER ATMOSPHERE.
REVIEW OF SOVIET LITERATURE. (Science and Tech. Sect., Air Information
Div., Washington, D.C.) AID Rept. 61-69, 31 May 1961. ASTIA AD 257 913.

ABSTRACT: Materials in this analysis deal with the following topics; (1) Solar radiation and the ionosphere, (2) Van Allen belts and cosmic rays, (3) Telluric currents, (4) atmospheric electricity, and (5) Satellite and missile data.
(Author)

5,362

USAF 1961 FIRST FLIGHT OF MAN INTO SPACE (SOME DETAILS ON PREPARATIONS
FOR THE FLIGHT AND THE FLIGHT ITSELF ON THE SATELLITE "VOSTOK").
Trans. from Ekonomicheskaya Gazeta (USSR) no. 89(951) p. 3, 1961.
July 27, 1961 ASTIA AD 261 826

5,363

United States Air Force 1961 FIRST ARTICLE FUNCTIONAL TEST OF THE BAK-9/F48A
AIRCRAFT ARRESTING BARRIER
(4750 Test Squadron, Tyncall AFB, Florida) Project ADC/73AD/61-5, Final Report
July 10, 1961 ASTIA AD 261746

ABSTRACT: The BAK-9/F48A Aircraft Arresting Barrier is a rotary friction brake type energy absorber. The distressed aircraft's tailhook engages a runway pendant cable which pulls two nylon tapes from storage reels mounted on a common shaft between two disc type brakes. The reels revolve and drive a hydraulic pump which supplies pressure to a control unit. The control unit applies constantly varying pressure to the reel brakes so as to stop the aircraft in 1000 feet regardless of engaging speed. An electric motor retrieves the system in 3½ minutes. The system will stop a 45,000 pound aircraft at 161 knots or a 55,000 pound aircraft at 141 knots without exceeding 2.0 G deceleration or conservative tape strengths.

The first article functional test was conducted at Seymour Johnson Air Force Base, North Carolina, for MOAMA and ASD. Fifteen F-106A and two F-101B arrestments were made at speeds of 52 to 106 knots and aircraft weights of 28,500 to 43,500 pounds. The system was tested at ambient, +120°F and -30°F temperatures. On-centerline and 75 foot off-center engagements were made. A barrier intercoupling disconnect feature was tested.

The system performed very satisfactorily under these conditions. A tendency for tape twisting during retrieval was corrected. Recommendations for immediate operational use, reduction of runout distance to 950 feet, and certain crash crew and air crew training were made.

5,364

USAF 1961 DETAILS OF THE LEGENDARY FLIGHT Komsomol'skaya
Pravda (Aerospace Technical Intelligence Center, Wright-
Patterson AFB, Ohio) Trans. no. MCL-1035 27 July 1961.
ASTIA AD 261 805.

5,365

USAF 1961 THE FIRST MANNED SPACE FLIGHT
Trans. from Pravda (Moscow) (USSR) no. 115(15605) p. 1, 3-4, 1961.
July 27, 1961 ASTIA AD 261 822.

5,366

U. S. Air Force 1961 PUBLICATIONS OF THE SCHOOL OF AVIATION MEDICINE, INDEX,
FISCAL YEAR 1960 (School of Aviation Medicine, USAF Aerospace Medical
Ctr. (ATC) Brooks AFB, Texas) ASTIA AD 250 040, Jan. 1961

5,367

U.S. Air Force 1961 AT SUPERSONIC VELOCITY.
(Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB,
Ohio) Trans. No. FTD-TT-61-203, 27 November 1961. ASTIA AD 268 072
From Sovetskaya Litva, p. 3. 28 July 1961.

ABSTRACT: New types of ejection seats were developed in recent years. Instead of pyrotechnic cartridges, they use rocket engines. The most perfect samples allow ejections at velocities up to 24000 km/hr. Developed also were the first samples of special safety capsules. They are like small cabins formed by extensive walls. Such a capsule closes automatically and becomes hermetically sealed prior to catapulting, offering protection against counter stream of air, and safe landing. In addition, it serves as a container for rescue devices (Parachutes, emergency supply, oxygen equipment, etc.) and as a rescue raft in case of falling into the water. (Author)

5,368

U.S. Air Force 1961 A STUDY OF USAF SURVIVAL ACCIDENTS 1 JANUARY 1958
THROUGH 31 DECEMBER 1961. (Directorate of Flight Safety Research, Norton
AFB, Calif.) Study no. 17-62, Dec. 31, 1961. ASTIA AD 285 130.

ABSTRACT: Major USAF aircraft accidents resulting in survival situations continue to occur in significant numbers. A survival accident is defined as any accident resulting in a water landing or any accident where rescue was delayed for one or more hours. During the period 1 Jan 1958- 31 Dec. 1961, one in every ten USAF major aircraft accidents resulted in a survival situation. In a great many of

these, excessive delays in the location and recovery of downed crewmembers were indicated. These delays resulted in the loss of highly trained crewmembers and presented definite hazards to the survival of many others. The survivors are frequently subjected to exposure and adverse conditions for long periods of time in remote, uninhabited areas. The physical and mental stresses attributed to exposure in survival situations, though difficult to evaluate, undoubtedly are major factors in the eventual outcome of these cases. It becomes increasingly apparent that the existing search and rescue effort, as well as survival training, must be improved to reduce the incidence of post accident conditions from which crew survival is a matter of chance. An urgent requirement exists for an improved personal locator device.

5,369

U.S. Air Force 1961 ITEMS OF INTEREST: NEW INDICATIONS IN SOVIET SPACE TECHNOLOGY. (Air Information Division, Science and Technology Section, Washington, D.C.) AID Report 61-40, 28 March 1961. ASTIA AD 254 409.

ABSTRACT: Academician N.M. Sisakyan discusses certain biological data obtained in experiments with animals during vertical and orbital flights.

5,370

U.S. Air Force 1961 PERIODICAL REPORT ON AEROMEDICINE: BIOPHYSICAL ASPECTS OF GAGARIN'S FLIGHT. (1126th USAF FAG, Arlington Hall Station, Arlington, Va.) Rept. 1452517

ABSTRACT: The authors point out that the design of the spacecraft "Vostok I" incorporated many years of work by numerous groups of scientists and engineers. It takes into consideration the data yielded by probes on geophysical, ballistic, and space rockets, satellites, and space ships as well as the data on properties of space surrounding the earth.

The problems discussed by the authors are varied. The problem of meteorite danger was investigated in particular detail. Radiation danger was examined with equal zeal. The problem of temperature conditions arose because of the exposure of the spacecraft to extreme heat. Gagarin's solution to the problem of acceleration is reviewed. Although the authors avoid stating Gagarin's reaction to weightlessness, they do include it as a very real problem in space flight. The authors then give a brief description of the interior of the space cabin and the function of television cameras throughout the flight. (CARI)

5,371

U.S. Air Force 1961 PERIODICAL REPORT ON AEROMEDICINE IN THE U.S.S.R.; 61-24
(1126th USAF FAG, Arlington Hall Station, Arlington, Va.) Rept. 1452577.

ABSTRACT: This is a report dealing with: (a) Contents of a book entitled Psychology of the Flying Profession; (b) Comparative Physiological study of tolerance to radial acceleration; (c) The Sixth Congress of the Ukr. Society of Physiologists, and (d) Astronaut training and manned space flights. It gives a description of Gagarin's training prior to his space flight. The author places emphasis on the fact that fear about the adverse effect of transition to g's upon reentry proved groundless. (CARI)

5,372

U.S. Air Force, trans. 1961 SOVIET AVIATION (SELECTED ARTICLES)
(Aerospace Technical Intelligence Center, Wright-Patterson AFB, Ohio)
Trans. No. MCL-405, 21 Dec. 1961. ASTIA AD 258 497.

CONTENTS:

Optical orientation device on the voyage to the Cosmos, by V. Arsent'yev
How the speed of the rocket was changed, by B. Maksimachev
Cosmic rocket planes of the future, by S.S. Ustinov
Problems of science and technology transport rockets, by G. Petrovskiy

5,373

U.S. Air Force 1961 REVIEW OF AERONAUTICAL AND SPACE MEDICINE.
(SELECTED ARTICLES). (Aerospace Technical Intelligence Center,
Wright-Patterson AFB, Ohio) Trans. No. MCL-787, 25 April 1961.
ASTIA AD 259 594.

CONTENTS:

Pulmonary volume reports on 124 athletes ranging in ages from 20 to 39 years,
by G. Fumagalli, R. Serra, and S. Berzolla
Modification of the electrocardiogram of albino rats subjected to tangential
(transversal) acceleration before and after splenectomy, by C. Vacca &
L. Vacca
Behavior of body weight, heart rate and arterial pressure in 1,000 Italian
pilots in relation to their age and performance, by A. Scano
Quantitative evaluation of the ballistocardiogram after muscular strain
Effect of low barometric pressure and of some tranquilizers on the spontaneous
motorial activity of mice, by F. Sparvieri
Symposium on medical radiobiology.

5,374

U.S. Air Force 1961 FROM MAN-MADE SATELLITES TO INTERPLANETARY FLIGHTS.
(Ot Iskusstvennykh Sputnikov K Mekplanetnym Poletam)
(Aerospace Technical Intelligence Ctr., Wright-Patterson AFB, Ohio)
Trans. No. MCL-1301, 18 Sept. 1961. ASTIA AD 264 626.

5,375

USAF 1962 FIRST IN THE WORLD GROUP FLIGHT IN COSMIC SPACE (BASIC RESULTS)
Trans. from Pravda (Moscow) (USSR), no. 295(16151) p. 1-3, Oct. 22, 1962.
(Office of Technical Services, Washington, D.C.)
Nov. 29, 1962 63-13906

5,376

U.S. Air Force 1962 LECTURES IN AEROSPACE MEDICINE JANUARY 8-12, 1962.
(Held at the School of Aerospace Medicine, USAF Aerospace Medical Division
(AFSC) Brooks AFB, Texas)

ABSTRACT: The complete text of lectures presented at the School of Aerospace Medicine. Also included is an introduction to each of the speakers and a welcome address by Brig. Gen. Theodore C. Bedwell, Jr.

5,377

U.S. Air Force 1962 TECHNIQUES OF PHYSIOLOGICAL MONITORING,
I. FUNDAMENTALS. (Aerospace Medical Research Laboratories, Wright-
Patterson AFB, Ohio) Final Report. AMRL-TDR-62-98. Sept. 1962.
ASTIA AD 288 906

ABSTRACT: This volume is the first of a three-volume handbook covering the applications of electronics in monitoring bioelectric physiological responses. The fundamental concepts and methods presented in this volume form a foundation for the detailed technical discussions in the succeeding volumes and, it is hoped, to provide a common language and basis of understanding between the physiologist and electronic engineer engaged in this field. The data obtained by monitoring physiologist and electronic engineer engaged in this field. The data obtained by monitoring physiological responses in varied environments can be used to improve the efficiency and increase the safety of a human subject in aircraft and spacecraft.

5,378

USAF 1962 FEASIBILITY STUDY OF HYPERSONIC PARACHUTE FREE FLIGHT TEST
CAPABILITY (Phase I)
(Flight Accessories Laboratory Aeronautical Systems Div. Air Force
Systems Command Wright-Patterson Air Force Base, Ohio) ASD-TR-61-600.
ASTIA-275578

ABSTRACT: A study has been conducted to determine the feasibility of establishing a free-flight test capability for aerodynamic decelerators at supersonic and hypersonic velocities. Methods for boosting test vehicle weights of 250,500, 800, and 2000 pounds to various altitudes and Mach numbers utilizing presently available rocket motors and range facilities and evaluated. Test altitudes vary from 2000 to 250,000 feet for a Mach number range of 1.0 to 10. Instrumentation requirements for measuring decelerator performance characteristics and vehicle flight parameters are investigated. Methods for water and land recovery of the payload section of the vehicles are presented. The results of the study indicate that presently available vehicle design and instrumentation techniques, as well as existing range facilities, may be employed.

5,379

U. S. Air Force 1962 THE EFFECTS OF EXPOSURE TO SIMULATED LAUNCH AND RE-ENTRY
PROFILES ON CHIMPANZEE PERFORMANCE. (6571st Aeromedical Research Lab.,
Holloman AFB, N. Mex.) Rept. ARL-TDR-62-1; March 1962

ABSTRACT: Five chimpanzees trained to perform a continuous avoidance task were exposed to the acceleration profiles simulating the conditions of launch and re-entry which exist when a capsule is placed into orbit. Performance during launch and re-entry differed from the base-line period which immediately preceded each of the three launches. However, performance immediately following launch and re-entry indicated that the animals recovered rapidly and tolerated the insults well.

5,380

U. S. Air Force Missile Development Center 1962 HOLLOMAN TRACK CAPABILITIES
(Air Force Missile Development Center, Holloman AFB, N. Mex.) MDC-TDR-62-9;
ASTIA AD-286 761; Sept. 1962

ABSTRACT: Because the Holloman Track can closely simulate missile free flight environment and allow closer observation during and after a run, it is an ideal development facility for use between laboratory and free flight tests of guidance and other missile systems.
The Holloman Track is the longest and most precisely aligned test track in the free world. The design and construction was based on experience gained at Holloman and the other major tracks. Track testing has been in progress here since 1950, when the SNARK missile was tested. Since this time, dozens of varied programs have been successfully accomplished, building a valuable reservoir of experience.

The test sled brings together the payload, propulsion, instrumentation, and other accessory equipment, and is of major importance in the test program. The AFMDC Track Test Division has pursued a long-range sled development program which has resulted in the following: (1) a dual-rail sled than can carry a 200-lb. payload to 3,600 ft. per second at 56 g maximum acceleration, (2) a monorail sled that can carry a 150 lb. payload to over 3,800 ft. per second, and (3) various liquid-fueled sleds which, with a long thrust duration, can achieve relatively high velocities with a large payload and low accelerations.

A similar development program has produced a high-quality instrumentation support capability as follows: (1) operational FM/FM, PCM, and PDM telemetry systems in the 800 mc region, (2) miniaturized, rugged, dependable sled-borne tape recorders, (3) a velocity-measuring system with an error of less than one part in 20,000, (4) the most advanced timing and programming system in existence, and (5) sufficient numbers and types of data collection cameras to furnish practically any optical coverage required. (AUTHOR)

5,381

U. S. Air Force 1962 EFFECTS OF ACCELERATIVE FORCE
In Flight Surgeon's Manual, Air Force Manual No. 161-1, Chap. 5, 17 Jan. 1962

5,382

U.S. Air Force 1962 STUDY OF A DRAG BRAKE SATELLITE RECOVERY SYSTEM,
VOLUME I (Aeronautical Systems Division, Wright-Patterson AFB, Ohio)
ASD TR 61-348, Vol. 1. ASTIA AD 274 087.

ABSTRACT: Research and development on the Drag Brake Satellite System, advanced to preliminary design stage for structure and subsystems, are fully documented. Included are preliminary designs and the preceding research and engineering, specifications, text planning and requirements, peripheral supporting studies and problem areas. Significant advances in coated wire mesh skin development and nominal trajectory follower type of control systems are reported. In this 4-volume report, Vol. I contains general introductory material and discusses the Drag Brake System and mission, and structure.

5,383

U.S. Air Force 1962 STUDY OF A DRAG BRAKE SATELLITE RECOVERY SYSTEM,
VOLUME II (Aeronautical Systems Division, Wright-Patterson AFB, Ohio)
ASD TR 61-348, Vol. 2. ASTIA AD 275 253.

ABSTRACT: Research and development on the Drag Brake Satellite System, advanced to preliminary design stage for structure and subsystems, are fully documented. Included are preliminary designs and the preceding research and engineering, specifications, text planning and requirements, peripheral supporting studies and problem areas. Significant advances in coated wire mesh skin development and nominal trajectory follower type of control systems are reported.

5,384

U.S. Air Force Academy 1962 SYMPOSIUM ON BALLISTIC MISSILE AND SPACE TECHNOLOGY, SEVENTH, August 13-16, 1962. TRANSACTIONS. (Aerospace Corp., Los Angeles) MX-3

5,385

U.S. Air Force 1962 STUDY OF A DRAG BRAKE SATELLITE RECOVERY SYSTEM, VOLUME III. (Aeronautical Systems Division, Wright-Patterson AFB, Ohio) ASD TR 61-348, Vol. 3. ASTIA AD 274 088.

ABSTRACT: Aerospace dynamics (Aerodynamics, aeroelasticity, and upper atmosphere physics); Ground support (Mechanical and electrical maintenance ground equipment, electrical test support equipment, and balloon and orbital test programs); and System tests (Laboratory test and quality assurance program, wind tunnel tests, flight test program, operational support, and hot tests).

5,386

U.S. Air Force 1962 STUDY OF A DRAG BRAKE SATELLITE RECOVERY SYSTEM, VOLUME IV (Aeronautical Systems Division, Wright-Patterson AFB, Ohio) ASD TR 61-348, ASTIA AD 274 089.

ABSTRACT: Research and development on the Drag Brake Satellite System, advanced to preliminary design stage for structure and subsystems, are fully documented. Included are preliminary designs and the preceding research and engineering, specifications, text planning and requirements, peripheral supporting studies and problem areas. Significant advances in coated wire mesh skin development and nominal trajectory follower type of control systems are reported.

5,387

U.S. Air Force 1962 TECHNICAL PROGRAM SUMMARY (6571st Aeromedical Research Laboratory Aerospace Medical Division, Holloman AFB, New Mexico) March 1962.

5,388

U.S. Air Force 1963 NEW GERMANY (SELECTED ARTICLES)
Translation Services Branch, Foreign Technology Division, WP-AFB, Ohio
FTD-TT-62-1584/1+4 Jan. 17, 1963 ASTIA AD 295 769
Original Source: German Newspaper, Neues Deutschland, August 14, 1962,
Pp. 1 & 2

ABSTRACT: This publication contains a group of articles praising the flights of spaceships Vostok III and Vostok IV.

5,389

U.S. Air Force 1963 A DIGITAL READOUT TECHNIC APPLICABLE TO LABORATORY AND AEROSPACE MEDICAL MONITORING OF PHYSIOLOGIC DATA.
(USAF School of Aerospace Medicine, Brooks AFB, Texas)
Technical Report No. SAM-TDR-62-139, Feb. 1963. ASTIA AD 403 481

ABSTRACT: This report describes a technic for digital readout of systolic and diastolic blood pressure, heart rate, and respiratory minute volume, applicable to wire telemetry in the laboratory as well as wireless telemetry from aerospace vehicles. General description of the technic and specific construction details are given.

5,390

U. S. Air Force 1963 INVESTIGATION OF CREW ESCAPE SYSTEM SURFACE IMPACT TECHNIQUES FOR ADVANCED AEROSPACE VEHICLES.
(Aeronautical Systems Division, Dir/Aero-mechanics, Flight Dynamics Lab., Wright-Patterson AFB, Ohio) Final Report ASD-TDR-63-173, May 1960.

ABSTRACT: This report describes the results of a four-part study related to the parachute landing impacts of a manned capsule. A survey of literature, with the objective of establishing human tolerance to rapidly applied acceleration, revealed a substantial discrepancy among the data published by investigators in this area. The tolerance limits published in HIAD were accepted as the parametric limits for the present study, pending the completion of advanced studies in this area. Analyses of typical parachute landings revealed that horizontal velocities of up to 56 fps and vertical velocities of up to 33 fps are possible. Secondary impacts resulting from toppling are likely. Active and passive attenuation methods were quantitatively evaluated in an effort to determine an optimum attenuator. From the results of this evaluation, it was recommended that an active type system be developed to negate the horizontal velocity and that a conventional passive type system be employed to alleviate the vertical impact. A study of experimental techniques indicated that part-scale model testing is feasible and advantageous for a program in which prototype attenuators are validated. Methodologies were derived for dynamic scaling of the results obtained from small model experiments to permit prediction of full size model performance.

5,391

U.S. Air Force ACCELERATION STUDIES ON MERCURY ASTRONAUT CANDIDATES.
(WADC Tech. Report in preparation.)

5,392

MOTION PICTURE

U. S. Air Force Film Library Ctr. 1956 HUMAN FACTORS IN RESEARCH AND DEVELOPMENT. (Air Force Film Library Center, St. Louis, Mo.) (Proj. 50/6/S-82)
Film No. ER-64

ABSTRACT: Depicts five areas of investigation performed on the Human Factors program by ARDC, showing personnel equipment, explosive decompression, Air Force clothing research, downward ejection, and wind blast and deceleration at high speeds.

5,393

U.S. AAF Air Technical Service Command 1947 NOTES ON DECELERATION AT
BAIL-OUT OF AIRCRAFT. Memorandum Reel -C 262. A.T.I. 7236
10 April 1947.

ABSTRACT: In this report the results are presented of considerations and calculations covering deceleration, velocity, and time during bail-out of high speed aircraft. As a result of the high speed the air forces on a human body leaving a plane without opened parachute are very high and can increase to such an extent that the limit a man can withstand may be surpassed. The decelerations were investigated for velocities from 300 mph to 600 mph, for altitudes from sea level to 40,000 ft and for drag areas from the largest and smallest cross-section of a human body, for average drag area obtained from human free-falling tests, and for a human body leaving a plane with ejection seat.

5,394

U.S. Air Force Air University Library 1958 EARTH SATELLITES
Special Bibliography No. 118, Supplement No. 1, Maxwell AFB

ABSTRACT: Lists 127 selected references in Air University Library including books, documents, and periodicals.

5,395

USAF Foreign Tech. Div. 1962 AVIATSIYA I KOSMONAVTIKA (Aviation and
Cosmonautics) (Foreign Tech. Div., Air Force Systems Command,
Wright-Patterson AFB, Ohio) FTD Rept. No. ST 62 9, Sept. 1962.
ASTIA AD 409 050.

5,396

U.S.A.F., Foreign Tech. Div. 1962 EARTH-SPACE-EARTH (SELECTED ARTICLES)
(Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio)
Trans. No. FTD-TT-62-1416 Oct. 11, 1962 ASTIA AD 292-224
Original Source: Zemlya-Zosmos-Zemlya, (Sbornik Materialov, Opublikovannykh
V Gazete "Pravda" Izdatel'stvo "Pravda", (Moskva), 24, Pp. 10, 13, 14, 27,
30, 31 45-47, 51, 52, 56, 57 and 61. 16 Aug. 1962

ABSTRACT: This publication contains articles by the following titles: "Vostok-3
in Outer Space"; "News from Outer Space"; "Vostok-4 in Orbit"; "News from Outer
Space"; "Research Program is Being Executed Successfully"; "Conversation in
Outer Space"; "Food of Gods"; "Precisely According to Program"; "Before the
Completion of a Historical Flight"; and "Good Wishes to Nations of the World."

5,397

USAF, Foreign Technology Division 1962 (U) AVIATION AND
COSMONAUTICS (Foreign Technology Division, Wright-Patterson AFB,
Ohio) FTD-ST-62-9, 44(9) 1962.

ABSTRACT: A translation of the special issue of the Russian periodical,
Aviation and Cosmonautics, commemorating the dual flight of Andriyan
Nikolayev and Pavel Popovich in August 1962. Includes official
communiqués released before, during, and after the flight and speeches
and statements by Soviet officials and cosmonauts.

5,398

USAF, Foreign Technology Division 1963 AVIATION REVIEW (Selected
Articles) (Foreign Technology Division, Wright-Patterson AFB,
Ohio) FTD-TT-63-219/1. Letecky Obzor, 6(8):625, 268, 269. 1962.
ASTIA AD 409 271.

This publication contains articles on the following subjects: Modification
of jet passenger aircraft TU-104A; a new airfield in Moscow; and true
flying saucers.

5,399

U.S. AAF Headquarters 1945 INTERROGATIONS OF GERMAN PERSONNEL INTERESTED
IN GERMAN AVIATION. (U.S. AAF Headquarters, U.S. Strategic Air Forces
in Europe, Aero-medical Research Section) 15 Aug. 1945

ABSTRACT: The work on catapult seats started in 1939 for the Ju-88. The
original stimulus for the work was the necessity for getting pilots out of
a test plane which was being used in a study of the critical value of flutter
and engine pressures. This first development was an ejection seat, activated

by rubber cords that gave a calculated clearance over the rudder of 1/2 meter at 600 kilometers per hour speed of the aircraft. This seat was to have had a maximum acceleration of 10 g.

As the speed of military aircraft was increased, the German statistics showed that there were more and more accidents involved in escape from the plane and this provided a further stimulus to the development of ejection seats was the conservation of oxygen during escape at high altitudes. He stated that at the heights which they were flying the oxygen reserve was not enough to make it possible for a man to get out of the plane if he had to do any appreciable amount of work. It is his present opinion that all aircraft capable of speeds of over 500 kilometers per hour should have ejection seats.

5,400

U. S. Air Force Missile Development Center 1957 MAJOR ACHIEVEMENTS IN SPACE
BIOLOGY AT THE AIR FORCE MISSILE DEVELOPMENT CENTER, 1953-1957.
(Air Force Missile Development Center, Holloman AFB, N. Mex.)
ASTIA AD 208 016

ABSTRACT: This historiographical effort was prepared as part of a larger history of aeromedical research at Holloman AFB. Important technological advances, discussed in the initial portion of this study, contributed to outstanding accomplishments in two broad fields of space biology research - cosmic radiation and controlled artificial environments. Scientific and engineering progress in these latter fields is the main theme of this publication, which culminates with a review of the record-making Manhigh II flight.

5,401

U. S. Air Force School of Aviation Medicine n.d. AIR SICKNESS - CAUSES AND
PREVENTION. (School of Aviation Medicine, Randolph AFB, Texas)
ATI-117 794

ABSTRACT: airsickness among air crew personnel, or among those carried by aerial transport, represents a wastage of military efficiency. Each airsick member of an air crew, whether he be pilot, bombardier, gunner, navigator, or engineer, is unable to perform his duties with alertness and zeal if his attention is focused upon his physical condition. Airborne troops who are unable to disembark and accomplish their missions with dispatch because of airsickness, are to that degree casualties, and therefore do not justify their selection for an important combat mission. Furthermore, the student pilot, who because his instructor thinks it necessary to "wring him out" on his first ride, may develop a distaste for flight and be lost forever to the flying training program. This small pamphlet has been written to point out how the knowledge which has been gleaned from Army Air Forces experience and research may be applied to make military forces more efficient.
(AUTHOR)

5,402

USAF School of Aviation Medicine 1958 EPITOME OF SPACE MEDICINE (Randolph AFB, Tex: U.S.A.F. School of Aviation Medicine) ASTIA AD 159052

ABSTRACT: Forty-one papers prepared by SA, personnel on various aspects of space medicine. The first ten are "Research Reports," the remainder are offprints of articles from scientific journals.

5,403

U.S. School of Aviation Medicine 1960 PUBLICATIONS OF THE SCHOOL OF AVIATION MEDICINE, Index, Fiscal Year 1959
School of Aviation Medicine Brooks Air Force Base, Texas

ABSTRACT: This publication lists the research reports and aeromedical reviews from the School of Aviation Medicine during the fiscal year, 1959.

5,404

U.S. School of Aviation Medicine 1960 ADVANCED COURSE IN AVIATION MEDICINE CURRICULUM (School of Aviation Medicine, Brooks AFB, Tex.) AF-SAM-Q-12, Course OAR 9356-1, 24, Aug. 1960

5,405

U. S. Air Force School of Aerospace Medicine 1962 PUBLICATIONS OF THE SCHOOL OF AEROSPACE MEDICINE, FISCAL YEARS 1961 AND 1962. (School of Aerospace Medicine, Brooks AFB, Texas) June 1962

5,406

School of Aerospace Medicine 1962 LECTURES IN AEROSPACE MEDICINE (School of Aerospace Medicine, Brooks Air Force Base, Tex)

5,407

U.S. School of Aviation Medicine 1962 BIOASTRONAUTICS. ADVANCES IN RESEARCH. (School of Aviation Medicine, Randolph Air Force Base, Tex.) March 1959. ASTIA AD 226 473

CONTENTS:

Definitions and subdivisions of space (bioastronautical aspect)
by H. Strughold
Bio-paks: Instrumentation and biomedical research Primates in space

Center of gravity and moments of inertia measurements for seat plus a rhesus monkey, by H.G. Clamann

Summary of immunochemical analyses on sera from humans exposed in a simulated altitude chamber, by W.G. Glenn

Survival terrestrial micro-organism under simulated Martian conditions, by J.D. Fulton.

Photosynthetic gas exchangers and recyclers used in closed ecological system studies, by W.A. Kratz

Man in Space, by B. Balke

Physiological instrumentation of man during light, by C.H. Kratochvil

Carbon monoxide phenomena in green plants systems, by S.S. Wilks, R.M. Adams, J.A. Green and E.G. Shaw

5,408

U. S. American Bosch Arma Corp. 1961 LOW RANGE ACCELEROMETER (U)
(American Bosch Arma Corp., Garden City, New York) ARMA RN DR-62-E653-1;
Document no. 20,043; Contract AF 33(616)7308, Proj. 4431, Jan. 1962,
ASTIA AD-329 646

ABSTRACT: Efforts were continued to produce feasibility models of an ultra-sensitive accelerometer suitable for inertial navigation of space vehicles with low thrust propulsion systems. All assembly and detail drawings were made and a large portion of the fabrication work was carried out. This includes the making of matched sensitive vibrating tapes. Work was initiated toward assembling the equipment required for the evaluation of the experimental models. Because of the high accuracy requirements, certain precise optical reference blocks are needed. Design and fabrication of the necessary mechanical fixtures was continued. (U) (AUTHOR)

5,409

U. S. Armed Services Technical Information Agency 1959 BIO-ASTRONAUTICS: AN
ASTIA REPORT BIBLIOGRAPHY (U) (Armed Services Technical Information Agency,
Arlington, Va.) ASTIA AD-306 007; Feb. 1959

ABSTRACT: This bibliography covers the subject matter from 1952 through 1958 insofar as report literature, represented by ASTIA holdings, is concerned.

5,410

U. S. Armed Services Technical Information Agency 1960 BIO-ASTRONAUTICS: AN
ASTIA REPORT BIBLIOGRAPHY (U) (Armed Services Technical Information Agency,
Arlington, Va.) ASTIA AD-315 200 (Suppl. to AD-306 007); Feb. 1960

ABSTRACT: Previous bibliographies have covered the literature on bio-astronautics thru 1958. This supplemental bibliography brings the subject matter up to date through 1959 insofar as report literature, represented by ASTIA holdings, is concerned.

5,411

U. S. Armed Services Technical Information Agency 1962 TECHNICAL ABSTRACT
BULLETIN. (Armed Services Technical Information Agency, Arlington, Va.)
Bulletin No. U62-2-6; June 1962

5,412

U. S. Armed Services Technical Information Agency 1962 TECHNICAL ABSTRACT
BULLETIN. (Armed Services Technical Information Agency, Arlington, Va.)
Bulletin No. U62-3-1; 1 July 1962

5,413

U.S. Armed Services Technical Information Agency 1962 TECHNICAL ABSTRACT
BULLETIN (Armed Services Technical Information Agency, Washington, D.C.)
Bulletin No. U62-3-2, 15 July 1962

5,414

U. S. Armed Services Technical Information Agency 1962 TECHNICAL ABSTRACT
BULLETIN. (Armed Services Technical Information Agency, Arlington, Virginia)
Bulletin No. U62-4-4; 15 Nov. 1962

5,415

U. S. Armed Services Technical Information Agency 1962 TECHNICAL ABSTRACT
BULLETIN (Armed Services Technical Information Agency) Bulletin No.
U62-4-5; 1 Dec. 1962

5,416

U.S. Armed Services Technical Information Agency 1962 TECHNICAL ABSTRACT
BULLETIN (Armed Services Technical Information Agency, Washington, D.C.)
Bulletin No. 62-3-3, 1 August 1962

5,417

U. S. Armed Services Technical Information Agency 1962 TECHNICAL ABSTRACT
BULLETIN. (Armed Services Technical Information Agency, Arlington, Virginia)
Bulletin No. U62-4-6; 15 December 1962

5,418

U. S. Armed Services Technical Information Agency 1962 TECHNICAL ABSTRACT
BULLETIN
(Armed Services Technical Information Agency, Department of Defense)
Bulletin No. U62-3-4 Pages 1-173 August 15, 1962

ABSTRACT: This issue contains AD numbers 275 350 thru 275 899 and 329 350
thru 329 549.

5,419

U. S. Armed Services Technical Information Agency 1963 TECHNICAL ABSTRACT
BULLETIN (Armed Services Technical Information Agency, Washington, D. C.)
Bulletin No. U63-1-6, 15 March 1963

5,420

U. S. Army Air Force 1942 INSTRUMENTS ON THE HUMAN CENTRIFUGE AT RCAF NO. 1
INITIAL TRAINING CENTER, TORONTO, CANADA. (Wright Field) Memo Rept.
Exp-M-49-695-16A; 21 Sept. 1942

ABSTRACT: Description of Canadian equipment including color motion picture
cameras, signal system, accelerometers, and electroencephalographs.

5,421

U. S. Army 1944 INJURIES ASSOCIATED WITH PARACHUTE ESCAPES
Air Surg. Bull 1(5):8-9.
(U. S. Army, Office of Flying Safety, Medical Division) 1944

5,422

Army Department 1957 THESES AND DISSERTATIONS IN THE HOLDINGS OF THE ARMY
LIBRARY (The Army Library, The Adjutant General's Office, Department of
the Army) 18 July 1957; ASTIA AD143 963

ABSTRACT: This compilation of theses and dissertations in the holdings of The
Army Library is being presented upon consultation with the Officers Assignment
Division (formerly Career Management Division) of The Adjutant General's
Office which coordinates the "training of military personnel at civilian
educational, commercial, and industrial institutions."

The present compilation, some of which have been received from sources other
than those covered by AR 350-200, contains approximately 350 titles, arranged
functionally by title in an alphabetical order within major and subordinate
subject classes. Such an arrangement should offer an easy method of locating
needed materials.

5,423

U.S. Dept. of the Army 1958 MISSILES, ROCKETS AND SATELLITES
(U.S. Government Printing Office, Washington, D.C.) Pamphlets 70-5-1-70-5-5
Five volumes

ABSTRACT: The bibliography includes the following titles: (I) U.S.S.R. (II) United States (III) Great Britain, France and Other Free Countries of the World (IV) Technology, Means and Methods (V) Earth Satellites and Space Exploration.

This bibliographic survey covers the period 1957 through March 1958 and includes about 1,500 unclassified titles, parts abstracted and annotated, selected from periodicals, books and studies.

Materials are arranged in alphabetical order, by title, within major and subordinate subject groups.

5,424

U.S. Army Airborne & Electronics Board 1959 PARACHUTE JUMPING FROM ARMY AIRCRAFT. (Army Airborne and Electronics Board, Fort Bragg, N.C.)
10 December 1959. ASTIA AD 230 498

ABSTRACT: This publication reviews the experiments conducted to determine safe procedures for parachute jumping from Army aircraft, except command type airplanes and reconnaissance helicopters (H-13 and H-23). It was found that the H-34 Helicopter, when modified by installation of the anchor cable with the addition of certain safety measures, is suitable for parachute delivery of a maximum of 10 combat equipped parachutists in temperate climates. When so modified, the H-34 Helicopter is suitable for consecutive parachute delivery of standard type aerial delivery containers from the door or from the cargo hook followed by combat equipped parachutists in temperate climates. The outlined procedures included in this report are suitable for parachute delivery of combat equipped parachutists and standard type aerial delivery containers from the H-34 Helicopter.

5,425

U. S. Department of the Army, Headquarters 1960 MISSILES, ROCKETS, AND SATELLITES, 1958 TO 1960. (Department of the Army, Headquarters, Washington, D. C.) Pamphlet No. 70-5-1 to 8

ABSTRACT: Eight annotated bibliographies, for the period 1957-Sept. 1960, covering various aspects of the subject, and titled as follows: I. "USSR", II. "United States," III. "Great Britain, France, and Other Free Countries of the World," IV. "Technology: Means and Methods," and V. "Earth Satellites and Space Exploration." This bibliography is continued as follows: Missiles, Rockets, and Space in War and Peace (70-5-6), Missiles, Rockets, and Space Vehicles 1959-1960 (70-5-7), and USSR: Missiles, Rockets, and Space Effort, A Bibliographic Record 1956-1960 (70-5-8).

5,426

U.S. Army 1960 ARMY AVIATION SAFETY WITH REFERENCE TO CRASH INJURY AND CRASH WORTHINESS PROGRAMS. (U.S. Army Transportation Research Command, Ft. Eurtis, Va) Tech. Rept 60-77, 30 Dec. 1960.

5,427

U. S. Army 1960 ABSTRACT BIBLIOGRAPHY TECHNICAL REPORTS PUBLISHED FISCAL YEAR 1960 (Quartermaster Field Evaluation Agency, U. S. Army Quartermaster Research and Engineering Command, Fort Lee, Virginia) ASTIA AD-241 381; July 1960

CONTENTS:

Research & Engineering Program
Applications Engineering Program
Airborne Program
Methods Research Program

5,428

U.S. Army 1963 BIBLIOGRAPHY OF REPORTS ACQUIRED BY CHABA.
(Armed Forces - NRC Committee on Hearing and Bio-Acoustics, Wash., D.C.)
ASTIA AD-298 057, January 1963

5,429

U.S. Army Air Force n.d. EFFECT OF MODERATE POSITIVE ACCELERATION ON ABILITY TO READ AIRCRAFT-TYPE INSTRUMENT DIALS.
(USAAF, AMC, Wright Field, Ohio) Memo Rept. No. TSEAA-694-10

5,430

U. S. Army Air Force 1942 INSTRUMENTS ON THE HUMAN CENTRIFUGE AT RCAF NO. 1 INITIAL TRAINING CENTER, TORONTO, CANADA. (Wright Field) Memo Rept. Exp-M-49-695-16A; 21 Sept. 1942

ABSTRACT: Description of Canadian equipment including color motion picture cameras, signal system, accelerometers, and electroencephalographs.

5,431

U.S. Army Air Force 1943 A COMPARISON OF THE CHANGES IN PULSE RATE AND IN BLOOD PRESSURE RESULTING FROM ANOXIA, INCREASED INTRATHORACIC PRESSURE AND CHANGE IN POSTURE. (USAAF School of Aviation Medicine, Randolph Field, Texas) Project 115, Report No. 1, 2 Feb. 1943.

ABSTRACT: Fourteen male subjects exposed to anoxia for 30 minutes at a

simulated altitude of 18,000 feet had an average pulse rate of 89 as compared to 75 at sea level. There was no consistent change in blood pressure.

Rising suddenly from a lying to a standing posture caused the pulse rate to increase from 70 to 90. There was also a decrease in both systolic and diastolic blood pressure at the end of 2 minutes which had no relation to the change in pulse rate.

The Valsalva experiment (40 mm Hg pressure) caused the pulse rate to increase from 82 to 115. Blood pressures could not be measured.

5,432

U. S. Army Air Forces 1943 ARMY AIR FORCES CONFERENCES ON ACCELERATION AT THE MONTREAL NEUROLOGICAL INSTITUTE. (Wright Field) Memo Rept. Eng-49-696-4B; 14 June 1943

PURPOSE: To report conferences on the effects of radial acceleration on the physiology of animals, held by Dr. H. Jasper (Montreal Neurological Institute) and Lt. C. A. Maaske (Wright Field).

(a) Safety of human subjects can be greatly promoted by preliminary centrifuge studies of animals. It was concluded that animal experimentation is vital to the elucidation of physiological changes occurring under "g".

(b) In animals the normal cardiac response to "g" unprotected is tachycardia superseded by bradycardia when "g" is removed. Failure to obtain tachycardia indicates poor or depressed cardiac reflexes and is a very grave sign. However, bradycardia with protection under "g" is a usual though not invariable response. With protection, form of the ECG is the best index of the subject's condition.

(c) Results of animal experimentation indicate that physiological events immediately following "g" exposure are as significant as results obtained under "g". Furthermore, these events vary with the duration of the exposure. The important indices are blood pressure, ECG, EEG, and respiration. Therefore all centrifuge studies should conform in "g"-time relationships to flight maneuvers.

(d) Three type of episodes are seen in monkeys under high positive "g".

(a) Cortical fit associated with sensitization of the cerebral cortex by ischemia followed by return of enough blood to produce convulsions. (This response is frequently seen where external anti-"g" protection is used.)

(b) Decerebrate attack--complete abolition of cortical brain waves. Extensive clonic spasms followed by decerebrate rigidity lasting many hours.

(c) Gasp reflex initiated by medullary anoxia. This can be differentiated from a cortical fit by its occurrence during rather than after "g" exposure

(e) Movies show that there is no drainage of blood from brain vessels under "g" unless air is allowed to enter the skull artificially.

(f) Where skull defects exist, the brain is pressed down on its base under "g" and an unusual type of blackout occurs produced by blockage of the optic nerve at the geniculate level.

(g) Animals immersed in water to the neck are partially protected from "g". The same amount of protection is conferred by immersion only to the xiphoid process, but if the water is lowered further, protection decreases sharply.

(h) The feasibility of raising intra-pulmonary pressure as a protective device was discussed. This project is especially important because Dr. Jasper has noted right heart failure and pulmonary engorgement of animals exposed to high "g" while protected.

5,433

U.S. Army Air Force 1946 INTERNAL INJURIES PRODUCED BY ABRUPT DECELERATION OF EXPERIMENTAL ANIMALS. (Army Air Force, School of Aviation Medicine) Rept. No. 1, Project No. 401, 15 Jan. 1946.

5,434

U.S. Army Air Force 1946 THE CURRENT CONTINENTAL USAAF ACCIDENT SITUATION. Medical Investigators' Accident Bulletin 2(10): October 1946. (AAF Flying Safety Service, Medical Safety Division)

5,435

U.S. Army Air Forces 1946 CERVICAL FRACTURE DESPITE THE USE OF THE SHOULDER HARNESS. In Accident Bulletin for Medical Investigators Page 2. (Continental U.S. Army Air Forces, Hq. AAF, AC/AS-3 Flight Operations Div., Flying Safety Branch) February 1946.

5,436

U.S. Army Air Force 1946 EFFECTS OF ABRUPT DECELERATION ON THE ELECTRO-CARDIOGRAM LEAD IN THE CAT IN THE SUPINE POSITION. Rept. No. 1, SAM Proj. No. 459, 21 Jan. 1946.

5,437

U.S. Army Air Force 1946 REQUIREMENTS FOR PILOT EJECTION IN FIGHTER AIRPLANES (U.S. AFF, Air Materiel Command, Eng. Div., Aircraft Laboratory) TSEAC11-4534-7-2, add. no. 1, 1 May 1946.

5,438

U.S. Army Air Force 1946 A METHOD FOR CALCULATING THE TRAJECTORY OF A MAN EJECTED FROM AN AIRPLANE (U.S. AAF Air Materiel Command, Eng. Div., Aircraft Lab.) MR TSEAC3-4534-1-1, 29 July 1946

5,439

U.S. Army Air Force 1946 ACCIDENT TYPES AND GENERAL CAUSE FACTORS: A. SUMMARY OF "REPORT ON THE HAZARDS OF ESCAPING FROM AIRCRAFT IN COMBAT" (R.A.F. Inst. of Avn. Med. - March 1946); B. SEAT FAILURES IN HIGH-SPEED AIRCRAFT. (AAF Flying Safety Service, Medical Safety Division) Medical Investigators' Accident Bulletin 2(10): October 1946.

5,440

U.S. Army Air Force 1947 ACCIDENT INVESTIGATING AND REPORTING.
(AAF Flying Safety Service, Medical Safety Division)
Medical Investigators' Accident Bulletin 3(5): May-June 1947.

5,441

U.S. Army Air Force 1947 VERY YOUNG PILOTS.
(AAF Flying Safety Service, Medical Safety Division) Medical
Investigators' Accident Bulletin 3(1): January 1947.

5,442

U.S. Army Air Forces 1947 NOTES ON DECELERATION AT BAIL-OUT OF AIRCRAFT.
(Army Air Forces Air Technical Service Command) Memorandum Reel C262
10 April 1947. ASTIA ATI 7236

5,443

U.S. Army Air Force 1947 SET: RESEARCH AND EXPERIMENTAL, PHYSIOLOGICAL
ASPECTS OF ORIENTATION AS THEY RELATE TO AVIATION.
(Superintendent of Documents, Washington, D.C.) PB 87452

5,444

U.S. Army Air Force 1947 CURRENT CONTINENTAL USAAF ACCIDENT SITUATION.
(AAF Flying Safety Service, Medical Safety Division)
Medical Investigators' Accident Bulletin 3(1): January 1947.

5,445

U.S. Army Air Force 1947 CURRENT CONTINENTAL USAAF ACCIDENT SITUATION.
(AAF Flying Safety Service, Medical Safety Division)
Medical Investigators' Accident Bulletin 3(5): May-June 1947.

5,446

U.S. Army Air Force 1947 ACCIDENT INVESTIGATION AND REPORTING.
(AAF Flying Safety Service, Medical Safety Division)
Medical Investigators' Accident Bulletin 3(1): January 1947.

5,447

U.S. Army Aviation 1959 SPECIAL BIBLIOGRAPHY NR. 1 (REVISED)
(United States Army Aviation School, Fort Rucker, Alabama) April 6, 1959
ASTIA AD 216 999

ABSTRACT: This bibliography supersedes Special Bibliography (No. 1), Army Aviation, dated June 1958. AD 209035

5,448

USA Board for Aviation Accident Research 1961 ACCIDENT SUMMARIES
AND SEMINAR REPORTS.
(USA Board for Aviation Accident Research, Fort Rucker, Ala.) Dec. 1961

ABSTRACT: This letter contains aviation accident summaries and seminar reports of interest to the flight surgeon. Included are papers on disorientation due to subclinical vestibular pathology, the graveyard spiral, vestibular stimulation and blood flow, high intensity noise and disorientation, pathology of fear, post mortem search, Navy ejection seat experience, principles of crash protective restraint, survey of helicopter accidents, and fatal aircraft accidents and disease of aircrew. (Tufts)

5,449

U. S. Army Transportation Research Command 1961 FACTOR ANALYSIS OF
LIGHTPLANE ACCIDENT IMPACT AND DAMAGE VARIABLES. (U.S. Army Transportation Research Command, Fort Eustis, Virginia) TREC Technical Rept. 61-122, August 1961.

5,450

U.S. Army Transportation Research Command 1961 RELATIONSHIP BETWEEN IMPACT VARIABLES AND INJURIES SUSTAINED IN LIGHTPLANE ACCIDENTS. (U.S. Army Transportation Research Command, Fort Eustis, Virginia) TREC Tech. Rept. 61-95, August 1961.

5,451

U.S. Central Intelligence Agency 1962 CHINESE SCIENCE
(Central Intelligence Agency, Washington, D.C.)
Scientific information rept., 5 Nov. 1962. ASTIA AD 332 795.

ABSTRACT: Chinese Science is a serialized report consisting of unevaluated information prepared as abstracts, summaries, and translations from recent Chinese publications falling under the subject headings Biological and Medical Sciences, Technical Sciences, Earth Sciences, Chemistry and Chemical Technology, mathematical and Physical Sciences.

5,452

U. S. Central Intelligence Agency, 1962 BIOLOGY AND MEDICINE (Central Intelligence Agency, Washington, D.C.) Summary rept. no. 3924, Oct. 1962, ASTIA AD-332 657

This is a serialized report consisting of unevaluated information prepared as abstracts, summaries, and translations from recent publications of the Sino-Soviet Bloc countries. (U) (AUTHOR)

5,453

U.S. Central Intelligence Agency 1963 CONSOLIDATED TRANSLATION SURVEY
Foreign Documents Division, Central Intelligence Agency Number 63 for March 1963
ASTIA AD 402 915

ABSTRACT: This Survey is prepared monthly by Foreign Documents Division, CIA, from lists received through cooperation of US government agencies and includes translations of such agencies, private industry, universities, research institutions, and commercial translation organizations. It is a compilation of foreign documentary projects, completed or started during the month preceding this publication. Translations are listed by area and subject category. Scientific projects are grouped as a section regardless of geographic area. Title in English, author, foreign language title of source of material, date and data of publication, and publication identification of the completed project are given when available.

5,454

U.S. Civil Aeromedical Research Institute 1961 F.A.A. FACILITIES AND PROGRAMS AS RELATED TO IMPACT ACCELERATION RESEARCH. Organization chart; program objectives, P&S Branch; present staffing, CARI: Facilities. (Federal Aviation Agency, Civil Aeromedical Research Institute, Oklahoma City, Okla.) 1 Nov. 1961.

5,455

U.S. Civil Aeronautics Board 1953 ACCIDENT INVESTIGATION REPORT - LAKE CENTRAL AIRLINES, INC. - INDIANAPOLIS, INDIANA, AUGUST 21, 1952.
File No. 1-0061, CAB, 10 April 1953.

5,456

U.S. Civil Aeronautics Board 1956 EASTERN AIRLINES M-404 ACCIDENT, HUNTINGTON, WEST VIRGINIA, JANUARY 15, 1956 (Civil Aeronautics Board, Washington, D.C.)

5,457

U.S. Civil Aeronautics Board 1957 OVERTSHOT ACCIDENTS IN U.S. SCHEDULES AND IRREGULAR AIR CARRIER OPERATIONS: TRANSPORT TYPE AIRCRAFT, 1950-1955. (Civil Aeronautics Board, Bureau of Safety, Washington, D.C.) 8 March 1957.

5,458

U.S. Civil Aeronautics Board 1959 AIRCRAFT ACCIDENT REPORT-PIPER MODEL PA-22, N 2945P, NEAR DOVER, DELAWARE, SEPTEMBER 23, 1958. File No. 2-0124, CAB, 10 Oct. 1959.

5,459

U.S. Civil Aeronautics Board 1960 GENERAL AVIATION ACCIDENTS, A STATISTICAL REVIEW, CALENDAR YEAR 1960. (Civil Aeronautics Board, Washington, D.C.)

ABSTRACT: This report furnishes certain statistical factors and related data pertaining to all general aviation by (non-air carrier) aircraft accidents (incident to flight which occurred during the year 1960. (CARI)

5,460

U.S. Civil Defense Adm. 1952 WINDOWLESS STRUCTURES, A STUDY IN BLAST-RESISTANT DESIGN. (Federal Civil Defense Administration) Technical Manual TM-5-4, June 1952.

5,461

U.S. Committee on Aeronautical & Space Sciences 1960 SPACE RESEARCH IN THE LIFE SCIENCES: AN INVENTORY OF RELATED PROGRAMS, RESOURCES AND FACILITIES. (86th Congress, Second Session, Washington, July 15, 1960)

5,462

U.S. Congress 1958 SPACE HANDBOOK: ASTRONAUTICS AND ITS APPLICATIONS (U.S. Congress, 85th, Second Session) December 29, 1958

ABSTRACT: An exhaustive report on the technology and applications of space probes and satellite vehicles is presented together with a discussion of general space research. Details are given of space environment, trajectories, and orbits, rocket vehicles, propulsion systems, propellants, internal power source, structures and materials, flight path and orientation control, guidance, communication, observation and tracking, atmospheric flight, landing and recovery, environment of manned systems, space stations and extraterrestrial bases, nuclear-weapons' effects in space, cost factors and ground facilities,

and current technology programs in the United States. Specific flight possibilities are discussed, and a wide variety of applications for satellite vehicles is outlined. The applications of scientific space exploration are reviewed. Also included is a description of progress in astronautics in other countries.

5,463

U.S. Congress Committee on Space & Astronautics. 1958 COMPILATION OF MATERIALS ON SPACE AND ASTRONAUTICS. (85th Congress, Second Session, Washington, 1958)

5,464

U. S. Continental Air Command 1956 PRELIMINARY REPORT ON A SUBSTANTIATED SUPERSONIC EJECTION. (Continental Air Command, Mitchell Air Force Base, N.Y.) Med. Training Bull. 3(3):1-5, Feb. 1956

5,465

U.S. Continental Army Command 1956 ARCTIC TEST OF PARACHUTE JUMPING FROM ARMY AIRCRAFT (L-20 AIRPLANE). (Continental Army Command, Arctic Test Branch, Big Delta, Alaska) Project AB 2354 (Arctic) Partial Rept. No. 1, 13 Nov. 1956. ASTIA AD 115 447

ABSTRACT: Effort is made to determine safe procedures for making parachute jumps from the L-20 aircraft under arctic winter conditions. Jump techniques were developed from temperate climate jump techniques. A total of 32 jumps were made without difficulty at ambient temperatures of 27 degrees to 14 degrees F, in sticks of 1 and 2 parachutists. Over-all results indicated that, after modification, the L-20 airplane will be suitable for consecutive aerial delivery of parachutists and equipment at ambient temperatures below 0 degrees F.

5,466

U.S. Continental Army Command 1956 PARACHUTE JUMPING FROM ARMY AIRCRAFT (H21C HELICOPTER). (Continental Army Command Board No. 5, Ft. Bragg, N.C.) Project No. AB 2354, Partial Rept. No. 3, 5 Sept. 1956. ASTIA AD 113 658

ABSTRACT: Jumps were performed by parachutists to determine safe procedures for the H-21C helicopter. The H-23C forward door was concluded to be suitable for the aerial delivery of a maximum of 10 parachutists wearing combat equipment. Safe jump procedures are outlined. (ASTIA)

5,467

U.S. Dept. of Commerce CATALOG OF TECHNICAL REPORTS
(U.S. Department of Commerce, Office of Technical Services, Washington,
D.C.) CTR-358

5,468

U.S. Department of Commerce 1962 MEDICAL AND BIOLOGICAL ASPECTS OF USSR SPACE
FLIGHTS
(U.S. Department of Commerce, Office of Technical Services, Joint Publications
Research Service) JPRS: 16,277 16 Nov. 1962 ASTIA AD 400 411

ABSTRACT: This publications contains translations of articles from the Russian-
language newspaper Meditsinskiy rabotnik (Medical Personnel), 17 August 1962,
page 3. Complete bibliographic information accompanies each article.

5,469

U.S. Dept. of Defense & U.S. Atomic Energy Com. 1950 THE EFFECTS OF ATOMIC
WEAPONS. (Prepared by the U.S. Department of Defense & the U.S. Atomic
Energy Commission) Sept. 1950.

5,470

U.S. Department of Defense 1957 THE EFFECTS OF NUCLEAR WEAPONS
(Prepared by U.S. Dept. of Defense, Published by U.S. Atomic Energy
Commission) June 1957.

5,471

U. S. Department of Health, Education & Welfare 1958 BIBLIOGRAPHY OF SPACE
MEDICINE (U. S. Dept. of Health, Education & Welfare, Public Health Service,
National Library of Medicine, Reference Division, Washington, D. C.)
Public Health Service Publication No. 617; Public Health Service Biblio-
graphy Series No. 21

CONTENTS:

This bibliography contains information on the following topics:

- Sealed Cabin Problems
- Acceleration/Deceleration
- Fractional and Zero Gravity
- Cosmic Radiation
- Survival Problems
- Psychological and Social Problems
- Ground Crew Problems
- Extra-Terrestrial Aspects

5,472

U.S. Department of Health, Education, and Welfare 1959 MEDICINE AND THE ALLIED PROFESSIONS - SOURCES OF CAREER INFORMATION FOR STUDENTS (U.S. Department of Health, Education, and Welfare, Washington D.C., Nov, 1959)

ABSTRACT: Students seeking career guidance in health and medical fields can usually obtain information from professional societies or national organizations for each occupation. These agencies offer a variety of pamphlets describing the nature of the work involved, the educational and other qualifications required, the availability and cost of training, and current opportunities and prevailing salaries.

Some medical occupations have been described in books and pamphlets independently published; these vary greatly in usefulness and timeliness. Those cited here have been chosen for their general availability in public and school libraries.

Under the first heading: GENERAL, are listed organizations and publications giving information on several occupations. The second heading: MEDICINE, is confined to the study of medicine exclusively. Following these, in alphabetical order, are the allied or ancillary professions and occupations.

5,473

U.S. Directorate of Research and Development 1960 FUNDAMENTALS OF ASTRONAUTICS (Directorate of Research and Development, Headquarters U.S.A.F., Washington, D.C.) ASTIA AD 252 825

ABSTRACT: This paper is intended to serve as a brief refresher for some of the physics and physiology of space flight. It will also define some of the more important astronautical terms and concepts. The author defines the separate layers of the Earth's atmosphere including the troposphere, stratosphere, ionosphere, and exosphere. He then discusses the solar system including the planets, satellites, asteroids, and sun. The physics of space flight is discussed with particular emphasis on rocket propulsion, thrust, specific impulse, mass ratios, thermal efficiency, and propulsion efficiency. The subject of human factors in space flight concentrates largely on the aspects of cabin environment requirements, waste disposal, weightlessness, isolation and sensory deprivation, cosmic radiation and limited G forces.

5,474

US FAA 1961 FAA HEADQUARTERS LIBRARY LIST OF UNPUBLISHED RESEARCH REPORTS, LISTED BY AD NUMBER CATALOGED BY AUTHOR, TITLE, SERIES AND CORPORATE ENTRY. December 1961. ASTIA Doc. No. AD-270 025

5,475

U. S. Federal Aviation Agency 1962 BIBLIOGRAPHIES OF TECHNICAL REPORTS
INFORMATION RETRIEVAL LIST NO. I (Office of Management Services, Administrative Services Div., Library Branch, Federal Aviation Agency, Washington, D.C.)
ASTIA AD-282 111; July 1962

ABSTRACT: This list of references has been compiled for the purpose of providing a guide to the basic bibliographies, subject indexes, and publications lists that are currently in the technical report collection of the Information Retrieval Section. The references vary from extensive bibliographies covering several hundred items to special reports with brief bibliographies. The following subjects are covered: Acoustics; Aerodynamics; Aeronautics; Air Traffic Control; Airports; Antennas; Aviation Medicine; Control Systems; Data Processing; Documentation; Electronics; Fuels and Power Supplies; Human Engineering; Infrared; Instrumentation; Logistics; Lubrication; Materials; Metals and Alloys; Meteorology; Microminiaturization; Microwave; Military Aviation; Noise; Operations Research; Radio and Radar; Reliability; Safety; Science (General); Semiconductors; Snow and Ice; Thermodynamics; Training. (CARI)

5,476

U. S. House of Representatives, 84th Cong., 2nd Session 1956 HEARINGS ON INVESTIGATION OF HIGHWAY TRAFFIC ACCIDENTS. (Wash. D. C.: U. S. Govt. Printing Office, 16, 23 July; 8-10 Aug.; 27-31 Aug.; 25-28 Sept. 1956.)
Pp. 909, 921-22.

5,477

U.S. Inter-Service Committee on Technical Facilities, Southeastern USA
SURVEY OF TECHNICAL FACILITIES
ASTIA AD 228 872

ABSTRACT: The Inter-Service Committee on Technical Facilities, Southeastern USA, was established in 1955 to promote the cooperative use of facilities and to interchange technical information among its member agencies. A significant portion of the Committee's responsibility is the dissemination of information about specialized facilities, equipment, and knowledge available at each station represented on the Committee.

A list of present members of the Committee is included. Requests for information should be addressed directly to the appropriate Committee member.

5,478

U. S. Joint Committee on Aviation Pathology 1956 AUTOPSY PERFORMED ON AN AIRCRAFT FATALITY (Joint Committee on Aviation Pathology, Washington, D. C.)
Memorandum No. 1, Feb. 1956

ABSTRACT: The need for carrying out full autopsies on all aircrew and passenger

casualties as a result of an aircraft accident is emphasized in order to elucidate the cause of accident, be it a pre-existing or acquired lesion of the pilot or defective or damaged aircraft. Steps for the pathologist to follow during accident analysis include (1) familiarization with the internal structure, seating arrangement, ejection mechanism and general layout of the plane involved; (2) observation of body position in relation to total wreckage, and condition in which body was found; (3) meticulous examination of exterior of the body and viscera, with necessary close-up photographs and X-rays, and removal of tissue for chemical, toxicological and histopathological examination; and (4) study of report of the accident itself.

5,479

U.S. Joint Publications Research Service 1962 THE EFFECTS OF CHANGES IN
THE GRAVITATIONAL FIELD ON THE COORDINATION OF MAN'S VOLUNTARY MOVEMENTS
(Joint Publications Research Service, Washington, D.C.)
JPRS-15539, 2 Oct. 1962. NASA N 62-17962

ABSTRACT: A study is made of the effect of changes in the gravitational field on the coordination of man's voluntary movements. The coordination of man's voluntary movements is disturbed by heightening of the gravitational field. Limits of the disturbances depend upon the condition and training of the person appearing in the field and are proportional to the logarithm of acceleration of force of weight. Systematic execution of the disturbed movement habit in a heightened gravitational field will lead to the restoration of coordination of movements. The indicated restoration will depend on the condition and training of the person appearing in this field, on the magnitude of gravitation and, in separate periods, is proportional to the logarithm of the time of the fulfillment of the movement. These deductions may be applied to the case of zero gravitation.

5,480

U.S. Joint Publications Research Service 1962 THE EFFECT OF OXYGEN
DEFICIENCY AND PROLONGED RADIAL ACCELERATION ON AN ANIMAL ORGANISM (Joint
Publications Research Service, Washington, D.C.) JPRS-15346, 19 Sept. 1962;
NASA N62-17780 (BYULL. EKSPTL. BIOL. I MED. (MOSCOW) 53(4):42-46, 1962)

ABSTRACT: Animal studies are conducted to determine the effects of oxygen deficiency on conditioned reflex reactions of respiration and cardiac activity and the effects of acceleration on the organs of the thoracic cavity. Pressure chamber experiments were conducted at ground conditions as well as at simulated altitudes of 2000 to 10,000 meters. The dogs used in the tests were conditioned by the techniques of V.P. Protopopov. The acceleration tests were conducted in a centrifuge with a radius of 3.66 meters. The X-ray equipment was attached to the centrifuge for taking photographs during acceleration.

5,481

U.S. Joint Publications Research Service 1962 THE QUESTION OF PHYSICAL
HYGIENIC EVALUATION OF PULSE OSCILLATIONS
(Joint Publications Research Service, Washington, D.C.) JPRS-14974,
27 Aug. 1962. NASA N 62-17969

ABSTRACT: The study of physical-hygienic evaluation of pulse oscillations in the human organism is discussed. The most important factors in such studies is the establishment of indices which do not cause pathologic changes in the organism and their quantitative expression. For the accomplishment of this task, it is necessary on the widest scale to set up experimental models, primarily using sinusoidal oscillations. It is also necessary to carry out clinical studies using physiological and biochemical methods for the establishment of the early changes which cannot be detected by ordinary clinical methods. The hardness, the duration, the number of shocks per second, and the amplitude of the pulse oscillations should be obtained. It is especially necessary to determine the changes of acceleration with respect to time, since this is a combined index of hardness and is the most stable index.

5,482

U. S. Liaison Office, Technical Information Center 1961 TRANSLATION, ANNUAL
REPORT OF THE GERMAN AERONAUTICAL TEST LABORATORIES, 1958 (Liaison Office,
Technical Information Center, MCLTD, Wright-Patterson AFB, Ohio) Rept.
MCL-136/III; ASTIA AD-257 111, Jan. 1961

CONTENTS:

Ulbricht, G., Aircraft Radio Institute;
Quick, A. W., Institute for Control and Regulating Engineering;
Ruff, S., Aeromedical Institute;
Goertler, H., Institute for Applied Mathematics and Mechanics;
Spies, R., Testing Station for Aeronautical Instruments;
Gdaniec, O., Department for Scientific Reporting and Documentation;
Ulbricht, G., Institute for Microwaves;
Spengler, G., Institute for Aircraft Fuels and Lubricants;
Luerenbaum, K., Institute for Engine Dynamics;
Schmidt, F. A. F., Test Stand in Garmisch-Grainau;
Leist, K., Institute for Jet Propulsion;
Dehn, K., Institute for Thermodynamics and Combustion;
Eber, H., Institute for Strength Investigations;
Wille, R., Institute for Turbulence Research;
Oswatitsch, K., Institute for Theoretical Gas Dynamics;
Fingado, H., Institute for Flight Mechanics;
Naumann, A., Institute for Applied Gas Dynamics;

5,483

U.S. Marine Corps n.d. Aviation Equipment Office, Marine Aircraft Group 91, 9th Marine Aircraft Wing, Fleet Marine Force, USMCAS, Cherry Point, N.C.

ABSTRACT: A total of 14 tests of the current anti-"g" suit (G-4) were made by Marine aviators. It was found to prevent blackout under high "g" and to reduce pilot fatigue. The suit is uncomfortable only if improperly fitted. Sticking of the pressure regulator valve may occur in new equipment but is easily corrected. It is concluded that the G-4 is a valuable and practical piece of equipment.

Tables of the pressure provided by the valve from 2 to 8 "g" and of the permissible maximum acceleration of the F4U and 10,000 to 30,000 feet are included.

5,484

U.S. Marine 1960 MARINE PHYSICAL LABORATORY BIBLIOGRAPHY
JULY 1946 - JUNE 1960. (Marine Physical Laboratory of the Scripps Institution of Oceanography, San Diego 52, Calif.) ASTIA AD-240 420, 25 July 1960

5,485

National Advisory Committee for Aeronautics LOAD ASSUMPTIONS FOR THE
LANDING IMPACT OF SEAPLANES. (National Advisory Committee for Aeronautics, Washington, D.C.) Technical Memorandum 643.

5,486

National Advisory Committee for Aeronautics 19 GENERALIZED THEORETICAL
AND EXPERIMENTAL INVESTIGATION OF MOTIONS AND HYDROLOADS EXPERIENCED BY
V-BOTTOM SEAPLANES DURING STEP-LANDING IMPACTS. (National Advisory Committee
for Aeronautics, Washington, D.C.) Technical Note 1493.

5,487

U.S. National Advisory Committee for Aeronautics 1909-1932 BIBLIOGRAPHY
OF AERONAUTICS. Wash., D.C., Government Printing Office, 1921-36

Bibliography of aeronautics (1909-1916) inclusive is presented by Paul Brockett, quoting the titles of current publications, together with the

periodicals in which they had been published (in English and foreign languages) the second volume treating titles of articles published during or after the First World War. The third volume is dated 1922, and so on (in rotation) until 1932. In the first volume no subdivision is devoted to medicine, but there are articles mentioned on "orientation." From the second volume, articles on medicine are indexed only occasionally.

5,488

National Advisory Committee for Aeronautics 1940 INDEX OF REPORTS ON AERO-NAUTICAL RESEARCH. (National Advisory Committee for Aeronautics, Washington, D. C.) Sept. 1940

5,489

National Advisory Committee for Aeronautics 1953 REPORT OF CRASH DATA TO INDUSTRY. Aviation Week 59(21):26-28, 30, Nov. 23, 1953.

5,490

National Advisory Committee for Aeronautics 1956 NACA CONFERENCE ON AIRPLANE CRASH-IMPACT LOADS, CRASH INJURIES AND PRINCIPLES OF SEAT DESIGN FOR CRASH WORTHINESS
(Lewis Flight Propulsion Laboratory, Cleveland, Ohio, April 17, 1956)

ABSTRACT: This volume contains copies of the technical papers presented at the NACA Conference on "Airplane Crash-Impact Loads, Crash Injuries, and Principles of Seat Design for Crash Worthiness" on April 17, 1956 at the Lewis Flight Propulsion Laboratory. A list of invitees and attendees is included.

5,491

U.S. National Advisory Committee for Aeronautics 1957 ACCELERATIONS IN FIGHTER AIRPLANE CRASHES (Lewis Flight Propulsion Lab., Cleveland, Ohio)
NACA RM E57G11

5,492

NASA 1960 CONFERENCE ON MEDICAL RESULTS OF U.S. MANNED SUB-ORBITAL SPACE FLIGHT
(Government Printing Office, Washington, D.C., 6 June 1961)

5,493

National Aeronautics and Space Administration. 1960 FIRST PLANNING
CONFERENCE ON BIOMEDICAL EXPERIMENTS IN EXTRATERRESTRIAL ENVIRONMENTS,
HELD UNDER THE AUSPICES OF NASA, WASHINGTON, D.C., 20 JUNE 1960.
TN D-781, ASTIA AD-250 068

ABSTRACT: Thirty of the nations leading experimental biologists conferred with the staff of the NASA Office of Life Science Programs. The group recommended emphasis on the following: extraterrestrial life, effects of simulated extreme environments, cellular and biological systems in space conditions, decontamination of space probes and vehicles, effects of space on biological rhythms and animal orientation, and photosynthesis in ecosystems.

5,494

NASA 1960 MAJOR ACTIVITIES IN THE NASA PROGRAMS
(The National Aeronautics and Space Administration, Washington 25, D.C.)
October 1, 1959 - March 31, 1960

ABSTRACT: Herein are recounted major activities of the National Aeronautics and Space Administration from October 1, 1959, through March 31, 1960, the third half-year period since NASA came into being.

This publication comprises: (1) an introductory chapter which summarizes the status of current NASA programs and briefly outlines long-range planning; (2) a detailed, 17-chapter discussion of progress in NASA aeronautics and space research and development; and (3) fourteen appendices that include memberships of principal Congressional and NASA committees, an analysis by the NASA Bioscience Advisory Committee of the role of the life sciences in space exploration, lists of research grants and contracts and research and development contracts, and the NASA financial statement for the period.

5,495

National Aeronautics and Space Administration. 1960 ARTIFICIAL EARTH
SATELLITES NO. 3 1959. Transl. from: Iskusstvennyye Sputniki Zemli,
No. 3, NASA Techn. Transl. F-8

CONTENTS: Presented are abstracts of 13 articles on artificial earth satellites and related subjects, which comprise the third of a series of publications by the Academy of Sciences USSR, titled "Iskusstvennyye Sputniki Zemli," no. 3, 1959.

5,496

U S. NASA 1961 RESULTS OF THE FIRST US MANNED SUBORBITAL SPACE FLIGHT.
(National Aeronautics and Space Administration, Washington, D.C.)
June 6, 1961. ASTIA AD 259 061

ABSTRACT: This document is a record of the proceedings of a conference on the

results of the first U.S. manned suborbital space flight. This conference was held by the NASA, in cooperation with the National Institutes of Health and the National Academy of Sciences, at the U.S. Department of State auditorium on June 6, 1961. The papers presented were prepared by representatives of the NASA Space Task Group in collaboration with personnel from various Department of Defense medical installations, the University of Pennsylvania, and McDonnell Aircraft Corp.

5,497

National Aeronautics and Space Administration 1961 NATIONAL WIND-TUNNEL
SUMMARY. (National Aeronautics and Space Administration, Wash., D.C.)
ASTIA AD-262 938, July 1961

ABSTRACT: A ready reference is provided on current wind-tunnel facilities for governmental, industrial and institutional organizations that employ wind tunnels in the U.D. The tables contain data on major wind tunnels owned by the Department of Defense, the National Aeronautics and Space Administration (NASA), industrial organizations, and universities. The information was obtained from questionnaires completed and returned by the operators of the wind tunnels. Included are facilities that are now in operation or being constructed and those that are currently authorized. The wind tunnels reported in this survey are classified according to their size and speed range. (Author)

5,498

U. S. National Aeronautics and Space Administration 1961 RESULTS OF THE SECOND
U. S. MANNED SUBORBITAL SPACE FLIGHT, JULY 21, 1961 (National Aeronautics
and Space Administration, Washington, D. C.) ASTIA AD-270 539; 21 July 1961

CONTENTS: Spacecraft and flight plan for the Mercury-Redstone 4 flight;
Results of the MR-4 preflight and postflight medical examination
conducted on astronaut Virgil I. Grissom
Physiological responses of the astronaut in the MR-4 space flight
Flight surgeon's report for Mercury-Redstone Missions 3 and 4
Results of inflight pilot performance studies for the MR-4 flight; and
Pilot's flight report.

(ASTIA)

5,499

U. S. National Aeronautics and Space Administration 1961 PROCEEDINGS OF A
CONFERENCE ON RESULTS OF THE FIRST U. S. MANNED SUBORBITAL SPACE FLIGHT.
(National Aeronautics and Space Administration, Washington, D. C.)
6 June 1961, ASTIA AD 259 061

CONTENTS:

Kraft, C. C., Jr., Flight Plan for the MR-3 Manned Flight;
Bond, A. C., Mercury Spacecraft Systems;

White, S. C., Review of Biomedical Systems for MR-3 Flight;
Jackson, C. B., Jr., Results of Preflight and Postflight Medical
Examinations;
Henry, J. P., Bioinstrumentation in MR-3 Flight;
Augerson, S., Physiological Responses of the Astronaut in the MR-3 Flight;
Slayton, D. K., Pilot Training and Preflight Preparation;
Voas, R. B., J. J. van Bockel, R. G. Zedekar, & P. W. Backer, Results of
In-Flight Pilot Performance;
Shepard, A. B., Jr., Pilot's Flight Report, Including In-Flight Films.

5,500

U.S. National Aeronautics & Space Administration 1962 ORBITAL FLIGHT OF
JOHN H. GLENN, JR. (A text of the hearings before the committee on
Aeronautical and Space Sciences, U.S. Senate, February 28, 1962)
Available from U.S. Printing Office (35 cents)

CONTENTS: Contains testimony of three NASA officials and three astronauts
basic statistics of Glenn's flight; chronology of Glenn's day, February 20,
1962; transcript of all public-address announcements during Glenn flight;
transcripts of Glenn post-flight press conferences and Glenn message to joint
meeting of Congress, February 26.

5,501

U. S. National Aeronautics & Space Administration 1962 RESULTS OF THE FIRST
UNITED STATES MANNED ORBITAL SPACE FLIGHT, FEBRUARY 20, 1962. (National
Aeronautics & Space Administration, Washington, D. C.)

ABSTRACT: This document presents the results of the first United States manned
orbital space flight conducted on February 20, 1962. The prelaunch activities,
spacecraft description, flight operations, flight data, and postflight analyses
presented form a continuation of the information previously published for the
two United States manned suborbital space flights conducted on May 5, 1961, and
July 21, 1961, respectively, by the National Aeronautics & Space Administration.
(NASA)

5,502

NASA 1962 RESULTS OF THE SECOND U.S. MANNED ORBITAL SPACE FLIGHT, MAY 24, 1962
(National Aeronautics and Space Administration, Washington, D.C. 1962)

ABSTRACT: Discussions are presented of performance of the spacecraft and
launch systems, the modified Mercury Network, mission support personnel, and
the astronaut (M. Scott Carpenter), together with analyses of observed space
phenomena and the medical aspects of the mission. These form a continuation of
the information previously published for the first United States manned orbital
flight, conducted on February 20, 1962, and the two manned sub-orbital space
flights. An appendix is included of MA-7 air-ground voice communication.
Pertinent papers are abstracted separately.

U. S. National Aeronautics & Space Administration 1962 PROCEEDINGS OF THE
SECOND NATIONAL CONFERENCE ON THE PEACEFUL USES OF SPACE, SEATTLE, WASHINGTON,
MAY 8-10, 1962. (National Aeronautics & Space Administration, Washington,
D. C.) NASA SP-8

CONTENTS:

Newell, H. E., Space Science--Earth, Sun, and Stars;
Cortright, E. M., Space Science--Moon and Planets;
Ames, M. B., Jr., Space Vehicle Research;
Finger, H. B., Nuclear Energy: The Space Exploration Energy Source;
Tepper, M., Meteorological Satellites;
Jaffe, L., NASA Communications Satellite Program;
Buckley, E. C., Tracking and Data Acquisition;
Gilruth, R. R., Projects Mercury & Gemini;
Low, G. M., Project Apollo;
von Braun, W., Launch Vehicles & Launch Operations;
Johnson, D. S., Satellites & Weather Forecasting;
Kreuzer, B., Low-Altitude Repeater Satellites;
Felker, J. H., Telstar Project;
Adler, F. P., Synchronous-Orbit Communications Satellites;
Paglin, M. D., Regulatory Aspects of Satellite Communications Systems;
Furnas, H., Some Foreign Policy Implications of Space Science;
Meckling, W. H., The Economic Importance of Space Technology;
Gordon, D., Panel Discussion: How Will Space Research Affect Youth's Future?
Beck, Jack, Panel Discussion: Impact of Space Programs on Society;
Simons, D. G., Manhigh Balloon Flights in Perspective;
Kittinger, J. W., Jr., Discussion of Project Excelsior;
Ross, M. D., A Consideration of the U. S. Navy Strato-Lab Balloon Program
and its Contributions to Manned Space Flight;
Armstrong, N. A., J. A. Walker, F. S. Petersen, & R. M. White, The X-15
Flight Program;
Glenn, J. H., Jr., Astronaut's Report on Project Mercury

5,503

National Aeronautics and Space Administration 1962 ASTRONAUTICS INFORMATION
VOL. V NO. 4. (Jet Propulsion Laboratory California Institute of Technology
Pasadena, California) April 1962, NAS 7-100, ASTIA AD-275 020

ABSTRACT: Coverage of Astronautics Information Abstracts is restricted to the
subject of spaceflight and to applicable data and techniques. Areas currently being
reported by other information agencies are usually excluded. However, data and
techniques arising from other technologies are reported if the relationship to
astronautics is clear. For example, coverage is given to propulsion when related
to specific space travel missions and to meteorology when related to the envelope
beyond the stratosphere. Aeronautics, communications, guidance, instrumentation,
materials, vehicle engineering, etc., are treated similarly, the intent being to
give full coverage to astronautics but to exclude peripheral material.

5,504

U. S. National Aeronautics & Space Administration 1962 RESULTS OF THE THIRD UNITED STATES MANNED ORBITAL SPACE FLIGHT, OCTOBER 3, 1962. (National Aeronautics & Space Administration, Washington, D. C.) NASA SP-12

ABSTRACT: This document presents the results of the third United States manned orbital space flight conducted on October 3, 1962. The performance discussions of the spacecraft and launch-vehicle systems, the flight control personnel, and the astronaut, together with a detailed analysis of the medical aspects of the flight, form a continuation of the information previously published for the first two United States manned orbital flights, conducted on February 20, and May 24, 1962, and the two manned suborbital space flights. (AUTHOR)

5,505

U. S. National Aeronautics and Space Administration 1962 BIOASTRONAUTICS (National Aeronautics and Space Administration, Washington, D. C.) NASA SP-18; Dec. 1962

CONTENTS:

Smith, G. B., Jr., Environmental Biology
Gerathewohl, S. J., & B. E. Gernandt, Physiological and Behavioral Sciences,
Johnston, R. S., Bioengineering,
Young, R. S., Exobiology

5,506

National Aeronautics and Space Administration 1963 ASTRONAUTICAL AND AERONAUTICAL EVENTS OF 1962. REPORT TO THE COMMITTEE ON SCIENCE AND ASTRONAUTICS, U.S. HOUSE OF REPRESENTATIVES, EIGHTY-EIGHTH CONGRESS, FIRST SESSION.
(NASA, Washington, D. C.) N63-19071

ABSTRACT: A chronology of astronautical and aeronautical events occurring in 1962 is presented. Two appendices are included, one on the satellites, space probes, and manned spaceflights launched during the year, and the other on the major NASA launchings from 1958 to 1962. (N63-19071)

5,507

National Aeronautics & Space Administration 1963 SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS. (National Aeronautics & Space Administration, Washington, D.C.) Vol. 1, No. 8, April 23, 1963.

ABSTRACT: Contents include Life Sciences, human and space vehicle data.

5,508

National Aeronautics and Space Administration 1963 THE TRIUMPH OF
ASTRONAUT L. GORDON COOPER, JR. AND THE FAITH 7, MAY 15-16, 1963.
(NASA, Manned Spacecraft Center, Houston, Tex.)
N63-18852

ABSTRACT: The flight of astronaut L. Gordon Cooper in the Faith 7 space capsule is discussed. Included are the prelaunch preparations, the launch itself, orbit, experimental aspects of the flight, aeromedical studies, the flashing beacon experiment, satellite instrumentation, astronaut protection systems, and the recovery mechanism. (N63-18852)

5,509

National Aeronautics & Space Administration 1963 SCIENTIFIC AND TECHNICAL
AEROSPACE REPORTS. (National Aeronautics & Space Administration,
Washington, D.C.) Vol. 1, No. 7, April 8, 1963.

ABSTRACT:

Contents include life sciences and space vehicle data.

5,510

National Aeronautics & Space Administration 1963 SCIENTIFIC AND TECHNICAL
AEROSPACE REPORTS. (National Aeronautics & Space Administration,
Washington, D.C.) Vol. 1, No. 4, Feb. 23, 1963.

ABSTRACT:

Contents include: Life Sciences, stresses and loads, launch and space vehicles and human behavior.

5,511

National Aeronautics & Space Administration 1963 SCIENTIFIC AND TECHNICAL
AEROSPACE REPORTS. (National Aeronautics & Space Administration,
Washington, D.C.) Vol. 1, No. 2. Jan. 23, 1963.

CONTENTS: Life sciences and space vehicle data

5,512

NASA 1963 PROCEEDINGS OF THE CONFERENCE ON SPACE-AGE PLANNING:
A PART OF THE THIRD NATIONAL CONFERENCE ON THE PEACEFUL USES OF SPACE,
CHICAGO, MAY 1-9, 1963. (National Aeronautics and Space Administration,
Wash., D.C.) NASA SP-40

5,513

National Aeronautics & Space Administration 1963 SCIENTIFIC AND TECHNICAL
AEROSPACE REPORTS. (National Aeronautics & Space Administration,
Washington, D.C.) Vo. 1, No. 5, March 8, 1963.

ABSTRACT: Contents include Life Sciences, human behavior, and space vehicle
data.

5,514

U.S. National Bureau of Standards 1946 PORTABLE CALIBRATOR OF
"PULSE" TYPE FOR HIGH FREQUENCY ACCELEROMETERS.
Progress Report 13, NBS Lab No. 65128, BuAer TED NBS 4025,
12 September 1946.

5,515

U.S. National Bureau of Standards 1949 TEST OF OMNIDIRECTIONAL ACCELEROMETER
FOR OFFICE OF NAVAL RESEARCH. National Bureau of Standards Laboratory
Rept. No. 6.4/1-238, 3 Aug. 1949

5,516

U. S. National Library of Medicine 1958 BIBLIOGRAPHY OF SPACE MEDICINE
(Department of Health, Education and Welfare, Public Health Service)
No. 617, Bibliography Series No. 21

ABSTRACT: References for this bibliography have been selected from a search of
the indexes and catalogs of the National Library of Medicine, and from examina-
tion of the principal aviation, aviation medicine, and astronautical publications;
they are arranged in broad subject classes, in inverse chronological order,
alphabetically by author within the years.

5,517

National Research Council 1942 MINUTES OF THE 1ST MEETING OF THE SUBCOMMITTEE
ON ACCELERATION. (National Research Council, Washington, D. C.) 28 Sept.
1942

5,518

National Research Council 1942 BIBLIOGRAPHY OF AIR SICKNESS AND SEA SICKNESS
(National Research Council, Committee on Aviation Medicine, Washington, D.C.)
C.A.M. Report No. 82, Nov. 1942.

5,519

National Research Council 1942 MINUTES OF THE SECOND MEETING OF THE SUBCOM-
MITTEE ON ACCELERATION. (National Research Council, Washington, D. C.)
2 Dec. 1942

5,520

National Research Council 1943 MINUTES OF THE FOURTH MEETING OF THE
SUBCOMMITTEE ON ACCELERATION. (National Research Council, Washington, D.C.)
17 Sept. 1943

5,521

National Research Council 1943 MINUTES OF THE THIRD MEETING OF THE SUBCOM-
MITTEE ON ACCELERATION. (National Research Council, Washington, D. C.)
29 March 1943

5,522

National Research Council 1943 REPORT ON BLAST INJURIES
(National Research Council, Division of Medical Sciences, Washington, D.C.)
June 1943.

5,523

National Research Council 1944 MINUTES OF THE FIFTH MEETING OF THE SUBCOM-
MITTEE ON ACCELERATION (Mayo Aero Medical Unit, Rochester, Minn., Feb.
23-24, 1944)

5,524

U.S. National Research Council 1944 THIRD CRASH INJURY CONFERENCE,
ARMY, NAVY, C.A.A. AND N.R.C. 15 - 16 May 1944.

ABSTRACT: The subject of this conference will be the safer cockpit. The first two crash injury conferences were largely devoted to basic information. We have now reached the stage where many of the questions can be answered with sufficient accuracy to permit applications in cockpit design. It seems advisable at this meeting to confine the discussion to the cockpit. We hope to secure (a) recommendations for changes that can be made in the near future without radical alterations in structure, and (b) suggestions for radical changes that will eventually provide a cockpit that is "ideal" for comfort, ease of control, and safety in case of crash.

,525

National Research Council 1944 MINUTES OF THE SIXTH MEETING OF THE SUBCOMMITTEE
ON ACCELERATION (National Academy of Science Building, Washington, D.C.,
7 June 1944)

5,526

National Research Council 1946 BIBLIOGRAPHY ON AVIATION MEDICINE
(National Research Council, Division of Medical Sciences) Vol. I.
ASTIA ATI 208 592.

5,527

National Research Council 1946 BIBLIOGRAPHY ON AVIATION MEDICINE.
(National Research Council, Division of Medical Sciences)
Vol. II. ASTIA ATI 208 593.

5,528

National Research Council 1958 SOME OF THE RESULTS OF SCIENTIFIC RESEARCHES
ON THE FIRST TWO SOVIET ARTIFICIAL EARTH SATELLITES
(National Academy of Sciences, Washington, D.C.) Memo TP-21, June 10, 1958

ABSTRACT: This report is a translation of a communication from the USSR on
the scientific results of the first two Soviet artificial earth satellites
launches on October 4, 1957 and November 3, 1957.

Data is given on results of radio and optical observations of the satellites.
The doppler effect was utilized to determine the parameters of the satellites'
orbits. Optical observations were made with special photocinetheodolites and
photographs of the satellites' tracks were obtained with modernized aerophoto-
cameras. The most successful method of photographing was the operation with
electro-optical interferometers.

Air-density and temperature measurements were obtained from observations
of the satellites' orbits. The rate of decrease in density is characterized by
a "height of homogeneous atmosphere," which is proportional to air temperature
and inversely proportional to its molecular weight. Density measurements proved
5 to 10 times greater than the values originally assumed. Air temperature
derived from the received data is greater than had been theoretically assumed.

Data received in the observations of radio signals transmitted from the
satellites indicated that electron-density values in the outer ionosphere
(above the main maximum) decreases with altitude 5 to 6 times slower than it
increases below the maximum. Cosmic ray data showed that from an altitude of
225 to 700 km the intensity of radiation increases by approximately 40%.

Data from the biological investigation carried out in Sputnik II indicated
that the animal withstood the physiological effects of acceleration without
too much difficulty; however, the phenomenon of weightlessness prevented it
from returning to normal as quickly as in laboratory experiments.

5,529

National Research Council 1961 HUMAN ACCELERATION: BIBLIOGRAPHY, TERMINOLOGY, ACCELERATION ENVIRONMENTS.
(National Academy of Sciences, National Research Council, Washington, D.C.)
Publication 913, Library of Congress Catalog Card No. 61-60079.

CONTENTS:

Bates, G., A Bibliography Index for Cataloging the Acceleration Literature;
Clark, C.C., J.D. Hardy, & R.J. Crosbie, A Proposed Physiological
Acceleration Terminology with an Historical Review;
Hessberg, R.R., Acceleration Environments Pertinent to Aerospace Medical
Research.

5,530

National Academy of Sciences 1961 THE TRAINING OF ASTRONAUTS. REPORT
OF A WORKING GROUP CONFERENCE
National Academy of Sciences - National Research Council, Washington, D.C.
Publ. no. 873, 1961
ASTIA AD 263 763

CONTENTS:

Training aspects of the X-15 program.
Man's integration into the Mercury capsule.
Project Mercury astronaut training program.
Some implications of Project Mercury.
Experience for future astronaut training programs.
Dyna-Soar pilot training.

5,531

U. S. National Research Council 1961 THE TRAINING OF ASTRONAUTS. REPORT OF
A WORKING GROUP CONFERENCE. (National Academy of Sciences, National Research
Council, Washington, D. C.) Publication No. 873; ASTIA AD-263 763
Library of Congress Catalog Number 61-60021

CONTENTS:

Training aspects of the X-15 Program;
Man's Integration into the Mercury Capsule;
Project Mercury Astronaut Training Program;
Some Implications of Project Mercury;
Experience for Future Astronaut Training Programs;
Dyna-Soar Pilot Training.

5,532

National Research Council 1961 SPACE SCIENCE BOARD ABSTRACTS:
SYMPOSIUM ON IMPACT ACCELERATION STRESS. Presented at Brooks AFB, Tex
by Man in Space Committee, Space Science Board, Nat. Acad. of Sciences
and NASA, 27-29 Nov. 1961.

5,533

U.S. National Research Council 1961 REPORTS ON HUMAN ACCELERATION
(National Research Council, Committee on Bio-Astronautics) Publication 901
ASTIA AD 266 077

ABSTRACT: This publication contains papers on the following subjects: "Safety Monitoring" by Edwin P. Hiatt; "Physiologic Endpoints" by J.P. Meehan; "Psychological Testing" by Robert Galambos. Taken together, these reports summarize what is known about physiological and psychological testing under acceleration stress, and point to ways by which we can discover still more.

5,534

National Research Council 1962 IMPACT ACCELERATION STRESS: PROCEEDINGS OF A SYMPOSIUM WITH A COMPREHENSIVE CHRONOLOGICAL BIBLIOGRAPHY
(National Academy of Sciences, National Research Council, Washington, D.C.)
Publication No. 977

ABSTRACT: The purpose of the symposium is twofold: (1) the exchange of research information, plans and future programs among scientists in the field of acceleration stress, with particular emphasis on impact acceleration, and (2) the development of authoritative recommendations regarding the goals for impact research and development in the United States in terms of the programs, facilities, personnel, and funding necessary to attain these objectives.

This book contains the text of all formal papers and panel discussions presented at this meeting. A bibliography has been included with this publication to provide readers with fairly comprehensive information on literature relating to the biological effects of impact acceleration.

5,535

U. S. Naval Air Development Ctr. 1954 ACCOMPLISHMENT SUMMARY OF AVIATION
MEDICAL ACCELERATION LABORATORY. (Naval Air Development Ctr., Johnsville,
Pa.) ASTIA AD-52 476

ABSTRACT: A brief account is given of the various studies in aviation medicine undertaken at the Aviation Medical Acceleration Laboratory. A 50-ft centrifuge was employed in studying human tolerance to acceleration. An acceleration chart was prepared summarizing the type of acceleration, direction of body movement, aircraft maneuver, and maximum human and animal exposures. Other studies involved the simulation of uncontrolled aircraft, the evaluation of acceleration-protective devices, and the effect of simulated high-altitude, high-velocity, or high-performance flying on various physiological, biochemical, psychophysical, and pathological conditions. Consideration was given to the use of X-ray motion pictures in studying circulatory and visceral movements under acceleration stress.
(ASTIA)

5,536

U.S. Naval Air Development Center 1955 THE EFFECTS OF TONIC ELECTRICAL STIMULATION AS A MEANS OF COMBATING ADVERSE CIRCULATORY DISTURBANCES CAUSED BY ACCELERATION (Naval Air Development Center, Johnsville, Pa.) NADC-MA-5501. 25 January 1955.

5,537

U.S. Naval Air Development Center 1955 INFLIGHT PHYSIOLOGICAL AND PSYCHOLOGICAL REACTIONS TO THE SUPINE POSITION. (U.S. Naval Air Development Center, Johnsville, Pa.) 31 Dec. 1955.

5,538

U.S. Naval Air Development Ctr. 1955 AVIATION MEDICAL ACCELERATION LABORATORY RESEARCH PROGRESS REPORT 31 DECEMBER 1955 (Naval Air Development Ctr., Johnsville, Pa.) ASTIA AD 83 499

ABSTRACT: With the advent of high-altitude, high-velocity, high-performance flying in military aircraft, it has become necessary to intensively engage in research in aviation medicine to determine the physiological limits imposed on the body by such aircraft. The Human Centrifuge at the Aviation Medical Acceleration Laboratory, Johnsville, Pennsylvania, was specifically designed and is particularly suited for research in aviation medicine having the above objectives, and simulation of high-altitude, high-velocity, high-performance aircraft can be made with this device under controlled conditions, and with performance. This report reviews some of the important contributions related to the above objectives.

5,539

U. S. Naval Air Development Ctr. 1955 ANTI-BLACKOUT EQUIPMENT, DETERMINATION OF LIMITATIONS OF EQUIPMENT AND PERSONNEL. (Naval Air Development Ctr., Johnsville, Pa.) Project TED ADC AE-5201.3; 31 Dec. 1955

ABSTRACT: Experimental work on G protection and limitations of G suits, the integrated suit, the full pressure half suit, supination, and a combination of G suit and supination has been completed. The maximum protection against blackout was provided with the subject wearing a Z-2 anti-blackout suit and straining while supinated 65 degrees. One hundred percent of the subjects withstood 7 G for 30 seconds without peripheral light loss.

5,540

U.S. Naval Air Development Center 1957 ACCELERATION PROBLEMS IN SPACE FLIGHT. (U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-5909, Dec. 1957.

5,541

U.S. Naval Air Development Ctr. 1958 STATUS REPORT ON ANIMAL SATELLITE
(Naval Air Development Center, Johnsville, Pa.) NADC Letter Report AE-1412

ABSTRACT: Progress which has been made in the biosatellite program since its initiation on February 27, 1958, is listed. The preparations for this animal satellite which has not been put in orbit were made with cooperation of the Franklin Institute.

5,542

U.S. Naval Air Development Ctr. 1958 COMPARATIVE EVALUATION OF A STANDARD FACE CURTAIN AND AN EXPERIMENTAL D-RING LOCATED ON THE SEAT FRONT AS MODES OF ACTUATING EJECTION DURING EXPOSURE TO ACCELERATION.
(Naval Air Development Ctr., Johnsville, Pa.) NADC AE5205, MA 3-3585, 5 May 1958.

5,543

U. S. Naval Air Development Ctr. 1959 EVALUATION OF THE TORSO-HEAD RESTRAINT SYSTEM AND THE INTEGRATED HARNESS RESTRAINT SYSTEM UNDER CONDITIONS OF ACCELERATION. (Naval Air Development Ctr., Johnsville, Pa.) MA-82-2621; ASTIA AD-257 375; 2 Apr. 1959

ABSTRACT: An investigation was carried out at the Aviation Medical Acceleration Laboratory to evaluate the torso-head restraint system developed under BuAer research contract Nos. 57-737 with respect to its ability to restrain the pilot under conditions of sustained and fluctuating patterns of acceleration. A model F4H-1 aircraft ejection seat equipped with the torso-head restraint system was used for this investigation. In addition, the integrated harness restraint system used with the Martin-Baker G-5 ejection seat was also evaluated under conditions of sustained acceleration. This report presents the results of the investigation.

5,544

U.S. Naval Air Development Ctr. 1959 TORSO-HEAD RESTRAINT SYSTEM FOR THE MODEL F4H-1 AIRPLANE. (Naval Air Development Ctr., Johnsville, Pa.) Rept. No. MA-82-1390, 20 Feb. 1959. ASTIA AD 257 374

ABSTRACT: A study was conducted to evaluate an experimental torso-head restraint system to be used in the flight tests of the Model F4H-1 airplane. This study was concerned with the adequacy of the restraint offered by the system with respect to protection of the pilot during exposure to acceleration. Three specific acceleration patterns representing extreme conditions which

might occur during the course of the flight tests were investigated. Also determined in the course of the study was the ability of subjects to operate the stick and rudder pedals, the aircraft drogue chute, and both ejection controls under these conditions of acceleration while using the torso-head restraint. Results indicated that to the degree that the conditions of flight of the F4H-1 were simulated in this study the pilot will be adequately restrained by this seat and restraint system and will be able to operate the stick control, rudder pedals, drogue chute control, and the ejection controls under actual flight conditions. (Author)

5,545

U.S. Naval Air Development Center 1960 NADC BIOLOGICAL INSTRUMENTATION SYMPOSIUM OF DECEMBER 10, 1958: SEVENTH LETTER REPORT CONCERNING (U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-16021, July 12, 1960. ASTIA AD 242 449.

ABSTRACT: This is a preliminary report of tests carried out on the Aviation Medical Acceleration Laboratory (AMAL) Bioinstrumentation package during which six channels were transmitted on an assigned frequency of 232.4 megacycles from the package mounted in the AMAL centrifuge gondola to the AMAL monitoring and recording system.

Aircraft operation of the package using either tape recording or direct telemetry will be the subject of a subsequent paper. Work is continuing on the modification of various sensor subpackages which will interchangeable fit in the AMAL bio-instrumentation package to allow versatility in the selection of psychological and environmental parameters to be studied for a particular program. A complete report of detailed specifications on all components is in preparation.

5,546

U.S. Air Naval Air Development Center 1960 NADC BIOLOGICAL INSTRUMENTATION SYMPOSIUM OF DECEMBER 10, 1958: SIXTH LETTER REPORT CONCERNING (U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-16018 July 5, 1960. ASTIA AD 242 448.

ABSTRACT: The report constitutes a summary of the investigations carried out on three types of respiration sensor systems which have been developed and evaluated at the Aviation Medical Acceleration Laboratory (AMAL) during the past nine months. The three types of respiration sensor systems are: (a) strain gauge chest strap (2) respiratory gas flow rates with calibrated spirometer tracings (3) AMAL lip mike thermistor.

Development and evaluation of respiratory sensors is continuing. Under current study are a respiratory rate meter, an isothermal thermistor mean flow sensor and a respiratory gas sampling and analysis system. A complete report of detailed specifications of all components is in preparation.

5,547

U.S. Naval Air Development Ctr. 1960 BIOPROBE, DEVELOPMENT AND STUDY WITH,
(Naval Air Development Ctr., Johnsville, Pa.) NADC-MA 16007

ABSTRACT: Some technical details of the bioprobe and the results of test runs with rats are described.

5,548

U.S. Naval Air Development Center 1961 NAVY CENTRIFUGE AND NORTH
AMERICAN AVIATION G SEAT SIMULATIONS OF LOW ALTITUDE FLIGHT, PROGRAM 2
(U.S. Naval Air Development Center, Johnsville, Pa.) Progress Report.
NADC-MA-L6128, Rept. No. MA-2, 18 July 1961. ASTIA AD 327-415L
(Confidential Report)

5,549

U.S. NAMC BODY RESTRAINT AND HEAD PROTECTION. NAMC.

5,550

U.S. Naval Air Materiel Center DEFENSE THROUGH RESEARCH.
(U.S. Naval Air Materiel Ctr., Philadelphia, Pa.)

ABSTRACT: This publication is an illustrated resume of the phases of work conducted by the Naval Air Materiel Center.

5,551

U.S. Naval Air Materiel Center 1960 DETERMINATION OF TEST INSTRUMENTATION
REQUIREMENTS FOR BIOLOGICAL AIRBORNE AND ASTRONAUTICAL TESTS.
(U.S. Naval Air Materiel Center, Philadelphia, Pa.)
Project TED NAM AE-1403.1, ASTIA AD 234 091.

ABSTRACT: A description of electrodes suitable for obtaining ECG records when worn under protective clothing during prolonged exposures in adverse environmental conditions has been given. The manner in which these electrodes were applied to the surface of the body was also indicated.

5,552

U.S. Naval Air Materiel Ctr. 1960 A BIBLIOGRAPHY OF PSYCHOPHYSIOLOGICAL STUDIES RELEVANT TO SPACE AND ORBITAL FLIGHT (U.S. Naval Air Materiel Ctr., Air Crew Equipment Laboratory, Philadelphia, Pa.) NAMC-ACEL-441

ABSTRACT: Lists 582 entries (on 3 x 5 inch file-card forms) based on a literature review through April, 1960 of psychological, physiological, and environmental reports pertinent to man's role in space and orbital flight.

5,553

U.S. Naval Air Material Center 1961 PROGRAM FOR SYMPOSIUM ON BIOMECHANICS OF BODY RESTRAINT AND HEAD INJURY. (Sponsored by the Office of Naval Research, The Bureau of Naval Weapons and the Air Crew Equipment Laboratory. Naval Air Material Center, Philadelphia. 14-15 June, 1961)

ABSTRACT: The objectives of the Symposium were to (1) review and bring up-to-date the theoretical biological knowledge on acceleration injuries, (2) review and bring up-to-date engineering progress in the design of protective devices, and (3) foster the interchange of ideas between the two disciplines with the hope of eventually developing better protection against linear acceleration.

This Compendium contains a copy of the program, those abstracts of papers which were submitted for inclusion herein, and a complete list of attendees.

5,554

U.S. Naval Air Test Center 1959 TYPICAL ACCELERATION LOADS IMPOSED ON PILOTS DURING CATAPULTING AND ARRESTING. (Naval Air Test Center, Patuxent River, Md.) Final Rept. Proj. TED PTR SI-43108, FT35-149, Rept. No. 1, 3 Apr. 1959 ASTIA AD 214 749

ABSTRACT: Tests were conducted to find the time histories of cockpit accelerations during catapulting and arresting with three current airplane models. The airplanes used for the tests were the F4D-1, F11F-1, and F6U-1. The F8U launch from the steam catapult resulted in severe tracking oscillations as evidenced by the lateral acceleration. This acceleration was not uncomfortable to the pilot, however. Pilots consider H8 catapult launches extremely severe and disorienting compared to steam catapult launches. This is attributed to the rapid build-up to a sustained high longitudinal acceleration associated with H8 launches. The high transient g onset rate of the steam catapult produces no uncomfortable effect because of the short duration of initial peak longitudinal acceleration. Free-flight arrested landings subject the cockpit to high normal accelerations. This is particularly true of F11F and F4D airplanes which often engage the wire at a high angle of attack, resulting in rapid pitch rate. High-sink landings impose accelerations which sometimes result in critical situations.

5,555

U.S. Naval Aviation Safety Ctr. 1956 EJECTION SEAT STUDY: A REPORT
OF EJECTIONS AND BAILOUTS, AUGUST 1949 THROUGH MAY 1956.
(Naval Aviation Safety Ctr., Norfolk, Va.) ASTIA AD 125 052

ABSTRACT: A study is presented on the ejection seat in emergency escape from naval aircraft from the first ejection in August 1949 through May 1956. The findings demonstrate an increase in the ejection rate per unit hours flown, and a pronounced relationship between successful ejection and altitude and speed. Successful bailouts may be made at lower altitudes and slower speed than can ejections. Ejecting from F9F, F7U and TV model aircraft is significantly more dangerous than from F2H and FJ models. Bailing out from FAU model aircraft is more dangerous than that from AD and SNJ models. Injuries sustained during ejections occur mainly upon landing, by the forces involved in ejecting the seat and the pilot, and by the shock of the opening parachute. Injuries sustained during bailouts occur upon landing, in the cockpit, upon the fuselage, and by parachute shock. A large and significant difference was found in the number of injuries between trained parachute jumpers and untrained ones. (Author)

5,556

U.S. Naval Gun Factory 1957 OPERATION AND MAINTENANCE INSTRUCTIONS FOR POWDER
TYPE STORES CATAPULT
(U.S. Naval Gun Factory, Washington 25, D.C.) NAVORD Report 5519 NGF-T-30-57
ASTIA AD 143 563

ABSTRACT: The purpose of this publication is to provide instructions for test personnel for the operation and maintenance of the powder type stores catapult test apparatus, which is under the technical cognizance of the Bureau of Ordnance. The instructions conform in all respects to the policies prescribed by the Chief of Naval Operations. The information in this publication includes a brief general description of the materials and equipment to be tested, the test apparatus to be used, and the test procedures to be followed. Instructional materials herein include specific instructions in regard to the proper operation and maintenance of the major functional assemblies and subassemblies, and detail descriptions of the same.

5,557

U. S. Naval Postgraduate School 1956 LIST OF THESES SUBMITTED BY OFFICER
STUDENTS IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR DEGREES THROUGH 1956
(U. S. Naval Postgraduate School, Monterey, California) Research Paper No.
14

5,558

U. S. Naval Postgraduate School 1957 LIST OF THESES SUBMITTED BY OFFICER STUDENTS IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR DEGREES FOR 1957 (U. S. Naval Postgraduate School, Monterey, Calif.) Research Paper No. 19

5,559

U. S. Naval Postgraduate School 1958 LIST OF THESES SUBMITTED BY OFFICER STUDENTS IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR DEGREES FOR 1958. (U. S. Naval Postgraduate School, Monterey, Calif.) Research Paper No. 20

5,560

U. S. Naval Postgraduate School 1959 LIST OF THESES SUBMITTED BY OFFICER STUDENTS IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR DEGREES FOR 1959 (U. S. Naval Postgraduate School, Monterey, Calif.) Research Paper No. 21

5,561

U. S. Naval Postgraduate School 1960 LIST OF THESES SUBMITTED BY OFFICER STUDENTS IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR DEGREES FOR 1960 (U. S. Naval Postgraduate School, Monterey, Calif.) Research Paper No. 27

5,562

U. S. Naval Postgraduate School 1961 LIST OF THESES SUBMITTED BY OFFICER STUDENTS IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR DEGREES FOR 1961 (U. S. Naval Postgraduate School, Monterey, Calif.) Research Paper No. 30; ASTIA AD-270 117

5,563

U.S. Naval Research Laboratory 1961 NAVY HIGH-IMPACT SHOCK MACHINES FOR LIGHT-WEIGHT AND MEDIUMWEIGHT EQUIPMENT I. Vigness (Shock and Vibration Branch, U.S. Naval Research Laboratory, Washington, D.C.) NRL Report 5618 June 1, 1961 ASTIA AD 260 008

ABSTRACT: Descriptions are given of the Navy HI shock machines for lightweight and mediumweight equipment. Shock motions are given for standard loading conditions. These are illustrated by acceleration-, velocity-, and displacement-time relations. Maximum values of velocities and displacements, and of accelerations passed by various low-pass filters, are presented. Shock spectra are presented for selected conditions. Equivalent displacement- and velocity-shock, together with maximum values of acceleration, can be established for their

respective effective frequency ranges from observations of the shock spectra.

Concepts relative to the specification of shock tests are considered. These include brief considerations of analyses of shock motions, methods of specifying a shock test, and what is meant by simulation of field conditions. It is indicated that shock tests should not be specified in terms of shock motions, or spectra, unless the values specified by considered only as nominal values.

5,564

U.S. Naval School of Aviation Medicine 1955 DISORIENTATION: A CAUSE OF PILOT ERROR. (U.S. Naval School of Aviation Medicine, Naval Air Station, Pensacola Fla.) Research Proj. No. NM 001 110 100.39, 2 March 1955. ASTIA AD 66 703.

ABSTRACT: This report which is written primarily for flight surgeons summarizes and organizes a large number of studies bearing on disorientation (vertigo) in aircraft pilots. It is organized in terms of the perceptual processes which lead to proper orientation and disorientation in flight and attempts to show their relation to the pilot's task. Disorientation in flight is considered to be due to psychophysiological causes which should be regarded as the inevitable consequence of placing man in a task for which he is not fitted either by endowment or past training. An attempt is made to present explanations of pilots' experiences with disorientation in psychophysiological terms. Some suggestions are made to prevent disorientation and to deal with it when it does occur.

5,565

U. S. Naval School of Aviation Medicine 1960 BIBLIOGRAPHY: PSYCHOLOGICAL RESEARCH IN THE U. S. NAVAL SCHOOL OF AVIATION MEDICINE. (Naval School of Aviation Medicine, Pensacola, Fla.) ASTIA AD-258 939, July 1950 - June 1960

5,566

U. S. Naval School of Aviation Medicine 1961 COMPREHENSIVE BIBLIOGRAPHY OF RESEARCH REPORTS ISSUED OVER A NINETEEN-YEAR PERIOD BY THE U. S. NAVAL SCHOOL OF AVIATION MEDICINE. (Naval School of Aviation Medicine, Pensacola, Fla.) ASTIA AD-258 940, May 1, 1961

5,567

U.S. Navy Yard 1941 ACCELERATION BELT.
(RAF, Institute of Aviation Medicine, Farnborough)
FPRC 263(c), March 1941.

5,568

U.S. Navy 1943 REPORT ON CAUSATION OF BLAST INJURY.
Naval Medical Bulletin 41:363-366, Mar. 1943.

5,569

MOTION PICTURE

U.S. Navy Department 1943 G AND YOU. (Navy Department)

ABSTRACT: Presents the problem of high acceleration and its physical effects on pilots. Demonstrates the accelerometer and the centrifuge. Shows various tests performed to determine the effects of G upon pilots. Explains the basic principles of the flying suit and shows how it is fitted to the pilot.

5,570

U.S. Navy 1945 ACCELERATION: INFORMATION ON AND CENTRIFUGE
INDOCTRINATION OF FLIGHT SURGEONS. (Navy Dept., Naval Air Station,
San Diego, Calif.) 22 October 1945

5,571

U.S. Navy Dept. June 1946 SPECIFICATION FOR HUMAN CENTRIFUGE DEVICE 9-G-1.
(Navy Dept., Office of Research & Inventions, Special Devices Division)

5,572

U.S. Navy 1947 TISSUE DEFORMATION IN AIRCRAFT CRASHES.
(Division of Aviation Medicine)
Navy Department Bumed News Letter, Aviation Supplement 9(1):
December 1947.

5,573

U.S. Navy 1949 NAVAL ORDNANCE LABORATORY DROP TESTER (40) XD-1A,
DESIGN, CONSTRUCTION AND CALIBRATION OF (PROJECT NOL-26-Re2b-281-3)
(Naval Ordnance Laboratory, White Oak, Silver Spring, Maryland)
Naval Ordnance Lab. Memorandum 10292, ASTIA AD-103435, 14 June 1949

ABSTRACT: A 40 ft guided drop tester has been constructed and installed in the White Oak explosive test area, where it is designated as Building 320

The drop tester provides a facility for applying reproducible shock patterns characterized by peak accelerations up to 30,000 g and velocity changes

up to 75 feet per second. The primary application of the drop facility is for conducting safety tests on unarmed, live-loaded fuzes.

This report describes the drop tester and its operation, presents calibration data and reviews the basic design considerations. The personnel who contributed to its development are listed.

5,574

U.S. Navy 1950 BIBLIOGRAPHY OF HUMAN ENGINEERING REPORTS. (REVISED)
(US Office of Naval Research, Special Devices Center, Port Washington,
N.Y.) Library of Congress PB 103234

5,575

U.S. Navy 1950 A SYMPOSIUM: PSYCHOPHYSIOLOGICAL FACTORS IN SPATIAL ORIENTATION
(School of Aviation Medicine, Pensacola, Fla.) 30-31 Oct. 1950.
ASTIA ATI 178 831

5,576

U.S. Navy 1951 INVESTIGATION OF HUMAN TOLERANCE TO COMBINED ACCELERATIONS.
(U.S. Naval Air Development Center, Philadelphia, Pa.)

5,577

U.S. Navy 1954 SUMMARIES OF RESEARCH.
(Naval Medical Research Institute, National Naval Medical Center,
Bethesda, Maryland) 1 January - 30 June 1954, ASTIA AD-46495

ABSTRACT: These summaries cover the research reported upon during the first six months of 1954. A series of Lectures and Reviews are referred to only by title. In order to facilitate distribution, classified studies are not included.

5,578

U.S. Navy 1956 THIRD SUPERSONIC TRACK SYMPOSIUM PROGRAM, CHINA LAKE,
CALIFORNIA, 24-27 SEPTEMBER 1956.

5,579

U.S. Navy 1957 EXPERIMENTAL INVESTIGATION OF THE PRESSURE
DISTRIBUTION ON AXI- SYMMETRIC FLAT-FACE CONE-TYPE BODIES AT SUPERSONIC
AND HYPERSONIC SPEEDS. (U.S. Naval Ordnance Lab., White Oak, Maryland)
Navord Report 5659, ASTIA AD-156190, 1 October 1957

ABSTRACT: An extensive systematic experimental investigation of the pressure distribution on blunt body shapes at supersonic and hypersonic speeds is in progress. The results obtained from the initial phase of this investigation are given. The experimental wind tunnel results are for six variations on a general truncated cone-type body shape. The data cover a Mach number range from about 1.75 to 8.00 for bodies with 2-inch and 5-inch base diameters. Also included are typical schlieren and shadow photographs obtained for a number of the body shapes. In addition, shadow graphs and aerodynamic drag data were obtained for a single configuration in the Pressurized Range.

5,580

U.S. Navy Department 1960 PROGRESS REPORT ABSTRACTS
(Physiology Branch, Office of Naval Research) ONR Rept. ACR-45, Jan. 1960.

ABSTRACT: This publication consists of a collection of 77 short progress reports prepared by the investigators sponsored by the physiology Branch of the Office of Naval Research. It is designed to meet a need for reciprocal exchange of conveniently summarized research data among these investigators. Subjects covered may fall under one of more of the following generalized topics.

(1) Nerve and muscle function, (2) regulatory systems and functions, (3) physical factors in biological systems, (4) aviation physiology, (5) underwater physiology, (6) physiological problems of climatic stresses, and (7) adjustments to operational hazards.

5,581

U.S. Navy 1960 DETERMINATION OF TEST INSTRUMENTATION REQUIREMENTS
FOR BIOLOGICAL AIRBORNE AND ASTRONAUTICAL TESTS; REQUEST FOR
(Air Crew Equipment Lab., Naval Air Material Center, Pa.)
Letter Report. Project TED no. NAM AE-1403.1, Rept. no. 2137
28 March 1960. ASTIA AD 234 091

ABSTRACT: A description of electrodes suitable for obtaining ECG records when worn under protective clothing during prolonged exposures in adverse environmental conditions has been given. The manner in which these electrodes were applied to the surface of the body was also indicated. The electrodes were found to give clinically acceptable ECG recordings during tests lasting over 12 hr. During this time, subjects dressed as shown in enclosure (5) were exposed to very warm and humid environmental conditions.

After wearing these electrodes for 46 hr, a subject having fair, thin skin showed no skin changes other than a moderate reddening at the areas of contact. After removing the electrodes, these reddened areas disappeared within 6 hr. In no case, when these electrodes were used, did any of the subjects report discomfort arising from the electrodes or the lead wires.
(Author)

5,582

U.S. Navy 1961 MOTION PICTURES, SCENE DESCRIPTIONS AND SAFETY
PROCEDURES OF NAVY CENTRIFUGE SIMULATIONS OF THE X-15 RESEARCH AIRCRAFT.
(Aviation Medical Acceleration Lab., Naval Air Development Center,
Johnsville, Pa.) Progress Rept. NADC-MA L6126, 26 July 1961.
ASTIA AD 271 927

5,583

U.S. Office of Naval Research 1946 MONTHLY REPORT OF THE SPECIAL DEVICES CENTER
DECEMBER 1946
Office of Naval Research, Special Devices Center, Port Washington, L.I., N.Y.
ASTIA ATI 28590

ABSTRACT: Synthetic training devices, teaching aids, human engineering, tactical evaluators, research tools, and training methods are the fields for which special devices have been developed. In order to familiarize the operator with his duties new training techniques include assessing dry aircraft rocket and bombing runs, remote scoring target, projector smoke generator, coordination of navigation devices, and contact-flight simulator. A discussion is given of the pilot ejection seat which is necessary for escape from high-speed aircraft. New developments in sighting for aircraft and anti-aircraft gun systems are automatic sighting systems combining radar information, a gyro unit, a computer, and servos. It is suggested that television be used for mass training of personnel which is an important factor in emergencies.

5,584

US Office of Naval Research 1954 BIBLIOGRAPHY OF UNCLASSIFIED RESEARCH
REPORTS (PSYCHOLOGICAL RESEARCH)
(US Office of Naval Research, Psychological Sciences Div.)
Library of Congress PB 116382

5,585

U.S. Office of Naval Research 1954 BIBLIOGRAPHY ON RESEARCH REPORTS
(PSYCHOLOGICAL) JANUARY 1947 - January 1954
(US Office of Naval Research, Physiological Psychology Branch)
Library of Congress PB 116303

5,586

US Office of Naval Research 1956 BIBLIOGRAPHY OF HUMAN ENGINEERING
REPORTS. (US Office of Naval Research, Special Devices Center,
Port Washington, N.Y.) OTS PB 121452

5,587

U. S. Office of Naval Research 1956 BIBLIOGRAPHY ON MOTION SICKNESS.
(Office of Naval Research, Physiological Psychology Branch, Psychological
Sciences Division, Washington, D. C., Joint Services Committee for the Study
of Motion Sickness) Rept. No. 2; ONR Rept. No. ACR-3; ASTIA AD103 549

ABSTRACT: A title bibliography containing selected references pertinent to an
evaluation of the protective effects of drugs in motion sickness is presented. The
references represent the literature which appeared up to and through the year 1954.

5,588

Office of Naval Research 1961 SYMPOSIUM PROCEEDINGS STRUCTURAL DYNAMICS OF
HIGH SPEED FLIGHT LOS ANGELES, CALIFORNIA -APRIL 24,25, 26, 1961
(Office of Naval Research, Washington, D.C.) Rept. no. CR-62,
ASTIA AD-264 140

CONTENTS: Concepts for aeroelastic system approximations; static aerodynamics
for flutter analyses; flutter at high mach numbers; an indicial flutter
analysis for hypersonic delta wings; a theory for aeroelastic studies of delta
lifting surfaces; flutter of flat panels in a low supersonic flow; flutter of
rectangular panels; model flight testing on high-speed tracks; liquid behavior
in rocket propellant tanks; dynamics of LP vehicles; aero-inertial control
system; dynamic loads of missile configurations; wind loads on a vertically
rising vehicle; random gust and taxi response calculations for delta wing
aircraft; blast-loading on airfoils; stall buffeting loads; a method for
analyzing heated wings; deformational response of heated wing structures; thermal
stiffness; acoustic fatigue tests for elevated temperatures structural design;
structural vibration in space vehicles; structural response to noise inputs;
captive missile response to random pressures; structural response to the noise
input of the Saturn engines; the environmental vibration problem.

5,589

Public Health Service 1958 BIBLIOGRAPHY OF SPACE MEDICINE
(Public Health Service, Washington, D.C.) Publication no. 617 (Bibliography
series 21), 1958, 49 pp.

ABSTRACT: This bibliography contains references on acceleration, deceleration,
and partial and zero gravity.

5,590

U. S. Quartermaster Research & Engineering Command 1960 AIR DELIVERY ENGINEERING STUDY, M-831, AIRBORNE DITCHER. (Quartermaster Field Evaluation Agency, U. S. Army Quartermaster Research & Engineering Command, Fort Lee, Va.) Technical Rept. E-51; FEA ABN 5937; Sept. 1960

ABSTRACT: An air delivery engineering test was conducted to determine the structural adequacy of the M-831 Airborne Ditcher for air delivery. Both static and airdrop tests were made to obtain the necessary data required for evaluation. Standard air delivery equipment was used wherever possible. The air delivery system was designed for an impact velocity of 25 feet per second and an impact deceleration not to exceed 20 g's or a damage susceptibility factor of 20.

Four instrumented static drop tests were performed at the FEA's Static Drop Facility from a height of 8 feet to determine a suitable energy dissipating unit. The results of static drop tests gave an average impact load factor of 17.9 g's. Five airdrop tests were made on the FEA's Tracking Range from a C-130 aircraft flying at an indicated airspeed of 130 knots and an absolute altitude of 1,500 feet. The gross weight of the system, rigged for air delivery, was 20,600 pounds.

A 24-foot fist ribbon cargo extraction parachute was used for extraction and 6 G-11A cargo parachutes were used for retardation. The extraction force varied between 17,000 and 19,500 pounds and the average opening force for each of the 6 G-11A cargo parachutes was 2.23 g's. The results of the airdrop tests gave the average equilibrium rate of descent, w_{eo} , as 21.7 feet per second.

It was concluded that the test item is functionally suitable for air delivery providing the test item is modified to include (1) 4 suspension points, (2) 4 load-bearing plates attached to the basic frame, and (3) installation of a permanent brace to secure the discharge conveyor assembly.

It was recommended that the M-831 Airborne Ditcher be submitted to the appropriate agencies for air delivery service test when the proposed modifications are accomplished. (Abstract Bibliography Technical Reports Published Fiscal Year 1961, Quartermaster Research & Engineering, Airborne Test Activity, Yuma Test Station, Arizona, ASTIA AD-262 197, Aug. 1961)

5,591

U. S. Quartermaster Research & Engineering Command 1961 AIR DELIVERY ENGINEERING STUDY OF TRANSPORTER, LIQUID, ROLLING WHEEL TYPE, 600-GALLON, T-4 (Quartermaster Airborne Test Activity, Quartermaster Research & Engineering Command, U. S. Army, Yuma Test Station, Arizona) Technical Rept. E-59; ATA 61014; March 1961

ABSTRACT: An air delivery engineering study was conducted to determine the structural adequacy of the Transporter, Liquid, Rolling Wheel Type, 600-Gallon, T-4, for low velocity type air delivery; to design a low velocity air delivery system for use with U. S. Air Force aircraft, utilizing standard air delivery components wherever possible; and to determine if the air delivery system is functionally suitable to submit to the appropriate agencies for service test. A series of static drop tests were conducted to determine the structural adequacy

of the test item when dropped using standard air type equipment and paperboard honeycomb energy dissipating material. The air delivery system was designed for an impact velocity of 25 feet per second and an impact deceleration of 20 g's. A series of airdrop tests were conducted to determine the functional suitability of the air delivery system. These tests were conducted from a C-130 cargo aircraft flying at 130 knots indicated airspeed and 1500 feet absolute altitude. The gross weight of the CEP system, prepared for air delivery, was 8700 pounds. A 22-foot cargo extraction parachute was used for extraction and three G-11A cargo parachutes were used for load retardation.

It was concluded that the test item was structurally adequate for air delivery and the proposed air delivery system was functionally suitable for air delivery and recommended that the air delivery system be submitted to the appropriate agencies for service test. (Abstract Bibliography Technical Reports Published Fiscal Year 1961, Quartermaster Research & Engineering, Airborne Test Activity, Yuma Test Station, Arizona, ASTIA AD-262 197; Aug. 1961)

5,592

U. S. Quartermaster Research & Engineering Command 1961 ABSTRACT BIBLIOGRAPHY
TECHNICAL REPORTS PUBLISHED FISCAL YEAR 1961 (Quartermaster Research &
Engineering, Airborne Test Activity, Yuma Test Station, Arizona) ASTIA
AD-262 197; Aug. 1961

5,593

U.S. Select Committee on Astronautics and Space Explorations. 1959 SPACE
HANDBOOK: ASTRONAUTICS AND ITS APPLICATIONS. (85th Congress, Second session
Washington, 1959)

5,594

U.S. Senate 1958 ASTRONAUTICS AND SPACE EXPLORATION
(Hearings before the House Select Committee on Astronautics and Space
Exploration, 85th Congress, 2nd Session, on HR 11881, Washington: GPO)

ABSTRACT: Testimony by many of the nation's leading space scientists in April-May 1958 prior to the enactment of legislation creating NASA. Volume is a valuable source book covering such aspects of space as law, medicine, vehicles, and research, and such projects as Vanguard and the IGY.

5,595

U.S. War Dept. 1943 PHYSIOLOGICAL ASPECTS OF FLYING
TM 1-705, (Washington: U.S. Government Printing Office, 1943)

ABSTRACT: Paragraph 55. Effects of centrifugal forces: (p) loss or blackout of

vision as it occurs in making a sudden change in direction at high speed: The visual mechanism being peculiarly sensitive to lack of oxygen or blood-flow, fails to function under the above conditions, and when 6 G's are reached, a dark curtain usually flashes over the sense of vision causing the blackout, the effect being in proportion to the force and time endured. At high forces even short periods of time are sufficient to produce loss of vision.

5,596

U.S. Work Projects Administration 1941 BIBLIOGRAPHY OF AERONAUTICS, SUPPLEMENT TO PART 48- PARACHUTES: PART 49- ROCKET PROPULSION: PART 50- STRATOSPHERIC FLIGHT

(U. S. Work Projects Administration, New York, New York) Compiled from the Index of Aeronautics of the Institute of the Aeronautical Sciences. 47p., March 1941

ABSTRACT: Includes articles, books and pamphlets bringing up-to-date the original parts of the bibliography. The latter were not accessible for review.

ACCELERATION

V

5,597

Vacca, C. and L. Vacca 1960 MODIFICATIONS OF THE ELECTROCARDIOGRAM
IN ALBINO RATS SUBJECTED TO TANGENTIAL (TRANSVERSE) ACCELERATIONS
BEFORE AND AFTER SPLENECTOMY. I.
In Riv. Med. Aero. 23:347-367, July-Sept. 1960 (Italy)

5,598

Vacca, C., P. De Franciscis, & L. Vacca 1961 VARIAZIONI DELL'ECG IN RATTI
ALBINI SPLENECTOMIZZATI A VARIA DISTANZA DI TEMPO ED IN TOPI CON AGENESIA
DELLA MILZA, TRATTATI CON OMOGENATO TOTALE DI MILZA E SOTTOPOSTI AD
ACCELERAZIONI TANGENZIALI (TRANSVERSALI) II. (ELECTROCARDIOGRAPHIC VARIA-
TIONS IN ALBINO RATS SPLENECTOMIZED AT VARIOUS TIME INTERVALS AND IN MICE
WITH SPLENIC AGENESIS TREATED WITH TOTAL SPLENIC HOMOGENATES AND SUBJECTED
TO TANGENTIAL (TRANSVERSE) ACCELERATIONS. II. Rivista di medicina aeronauti-
ca e spaziale (Roma) 24(4):501-532, Oct.-Dec. 1961

ABSTRACT: Dramatic electrocardiographic (ECG) alterations were observed in rats
newly splenectomized (from 5 and 45 days), splenectomized about one year
previously, and in mice with splenic agenesis who were subjected to transverse
accelerations of 3 and 6 g for 2-3 minutes, and 10 g for 2 minutes. The time
required for return of ECG patterns at rest to normal after accelerations in rats
splenectomized for 1 year (about 20-25 minutes) was equal to that of animals
newly splenectomized. Intraperitoneal injection of bovine splenic homogenate 45
minutes before exposure to acceleration restored the normal ECG at rest in less
time (10-12 minutes in newly splenectomized animals and 5-7 minutes in those
splenectomized from 6 months on). Mice with splenic agenesis behaved similar to
animals splenectomized from 6 months to 1 year. It is postulated that a functional
relationship exists between the spleen and the heart under conditions of stress.
The injection of splenic homogenate may have a remarkable effect on heart dis-
orders produced by transverse acceleration because it reduces the time necessary
to restore a normal resting ECG to half.

5,599

Vacca, C. & C. Koch 1962 INFLUENCE OF VASOSENSORY REFLEXOGENIC AREAS ON
VESTIBULAR FUNCTION IN THE RABBIT SUBJECTED TO HIGH TRANSVERSE ACCELERATIONS.
Riv. Med. Aero. 25:641-652, Oct.-Dec. 1962 (It)

5,600

Vacca, C., & L. Vacca 1962 EKGRAPHIC MODIFICATIONS IN ALBINO RATS DURING TANGENTIAL ACCELERATIONS BEFORE AND AFTER SPLENECTOMY (PRELIMINARY COMMUNICATION) In Barbour, A. B., & H. E. Whittingham, eds., Human Problems of Supersonic and Hypersonic Flight (New York, Oxford, London, Paris: Pergamon Press, 1962) pp. 170-185

5,601

Vaeth, J.G. 1952 ESCAPE FROM EARTH Flying 51:26-27

ABSTRACT: A scientist at the US Navy Special Devices Center, Office of Naval Research, discusses the problems involved in escaping from the earth's gravitational pull.

5,602

Valentine, G. 1956 DYNAMIC ANALYSIS-EMERGENCY ESCAPE SYSTEMS. (Stanley Aviation Corp., Denver, Colorado) Document No. 451; Contract AF 33(600)32054; ASTIA AD-115 879; 13 July 1956

ABSTRACT: This report presents an appraisal of twelve configurations of emergency escape devices. They are: (1) Upward seat, forward facing; (2) Upward seat, forward facing with added mass; (3) Downward seat, forward facing; (4) Downward seat, forward facing with added mass; (5) Seat-capsule, forward facing; (6) Seat-capsule, forward facing with added mass; (7) Upward seat aft facing; (8) Upward seat aft facing with added mass; (9) Downward seat aft facing; (10) Downward seat aft facing with added mass; (11) Seat capsule, aft facing; and (12) Seat capsule, aft facing with added mass. The following characteristics of the more promising of these configurations were determined for ejection at 650 knots EAS at sea level and 44000 feet altitude: (1) Trajectory to tail. (2) Spinal and cross-body accelerations vs. time. (3) Pitching acceleration, velocity and altitude vs. time. Also determined were thruster requirements for upward ejection at maximum q and minimum airspeed and low altitude escape limitations for critical configurations.

5,603

Valentine, G. A. 1958 Proposal - ENCAPSULATED SEAT (Stanley Aviation Corporation, Denver, Colo.) Document No. 645.

ABSTRACT: Presented herein is the Stanley Aviation design proposal for an emergency escape system capable of functioning successfully at speed and altitude regimes compatible with the Convair-Fort Worth B-58 airplane.

5,604

Valentine, G.A. 1960 HUMAN FACTOR CONSIDERATIONS IN THE DESIGN OF THE B-58
ESCAPE CAPSULE. (Paper, 31st Annual Meeting of the Aerospace Medical
Assoc., Americana Hotel, Bal Harbour, Miami Beach, Fla., May 19-11, 1960)

ABSTRACT: The Convair B-58 will be equipped with an escape capsule in each cockpit. The escape capsule is designed to provide protection in case of cockpit decompression at altitude, permit emergency egress throughout the speed and altitude range of the B-58, and serve as an aid to survival on either water or land under any climatic condition. In the event that cockpit pressurization is lost, the B-58 pilot and crew members can actuate handles which initiate the following series of actions: torso and leg positioning, capsule door closure, and capsule pressurization. The pilot's capsule permits the pilot to fly the aircraft being encapsulated. Thus, the aircraft can be flown to an altitude where pressurization is not required. Capsule ejection is initiated by the aircraft crew using either or both of the two ejection triggers. The capsule doors provide protection against windblast as the capsule enters the airstream. Careful rocket catapult design and good stability, provided by a stabilization parachute, hold accelerations within human tolerance limits. The stabilization equipment is jettisoned as the recovery parachute is deployed. Landing accelerations are minimized through the use of an impact attenuating air bag. Automatically inflated flotation cells on outriggers are used to provide buoyancy and stability when the capsule lands on water. Critical survival equipment is accessible to the capsule occupant with the doors closed. A complete set of Strategic Air Command survival equipment is provided in each capsule and is readily accessible with the capsule doors opened.

5,605

Valentine, G. A. 1962 HUMAN FACTORS CONSIDERATIONS IN THE DESIGN OF THE B-58
ESCAPE CAPSULE. In Barbour, A. B., & H. E. Whittingham, eds., Human Problems of Supersonic and Hypersonic Flight (New York, Oxford, London, Paris: Pergamon Press, 1962) pp. 286-294

5,606

van Allen, J. A. 1952 THE ANGULAR MOTION OF HIGH-ALTITUDE ROCKETS
In White, C. S., & O. O. Benson, Jr., eds., Physics and Medicine of the Upper Atmosphere, A Study of the Aeropause (Albuquerque, N. Mex.: Univ. of New Mexico Press, 1952) pp. 412-431.

5,607

van Allen, J. A. 1952 METHODS AND VEHICLES FOR RESEARCH IN THE HIGH
ATMOSPHERE. In White, C. S., & O. O. Benson, Jr., eds., Physics and Medicine of the Upper Atmosphere, A Study of the Aeropause pp. 394

5,608

van de Water, M. 1942-43. PULLING OUT OF FAST DIVES Chem. Leaflet
16:1135-1138.

ABSTRACT: The fastest power dive does not hurt the pilot; the trouble comes when he has to pull out of it quickly. A sudden stop, abrupt change in speed, or a rapid alteration of direction, especially in loops, if a curve is made at too great a speed or in too sharp a turn, have a pronounced ill effect on the pilot.

A normal aviator can stand 4.5 to 5.5 G's for 3 to 4 seconds without ill effects. A radius of 1,500 feet is required, to keep the acceleration below 5 G's.

The eyes are particularly affected by failure of circulation in the head. First they seem covered by a gray haze. If the high strain is maintained, abruptly everything goes black. Experienced fliers get used to blacking out. "Negative gravities" of from seat-to-head forces cause a "redding out". Low negative G's minus 3 or 4 may produce very serious conditions.

5,609

van der Wal, F. L. and W. D. Young 1958 A PRELIMINARY EXPERIMENT
WITH RECOVERABLE BIOLOGICAL PAYLOADS IN BALLISTIC ROCKETS. PROJECT MIA
(Space Technology Laboratories, Inc., Redondo Beach, Calif.)
GM-TR-0165-00498, STL reprint no. 298, Sept. 1958

ABSTRACT: Mice carried in the nose cone of long-range ballistic missiles have successfully survived re-entry into the atmosphere. In most aspects, the environmental conditions experienced by these subjects exceeded in severity those which will be imposed on satellite passengers. Although no new technique were used, this program represents a significant step forward from the early pioneering flights of mice and monkeys in relatively low-performance sounding rockets. The relative success of these experiments permits a considerable degree of confidence in the ultimate successful recovery of biological payloads from future satellite vehicles.

The project, known as Project MIA (Mouse-In-Able), was planned as a noninterference experiment in conjunction with the Project Able re-entry test program. In each of the three Able flights, one mouse was carried in the nose cone. Although none of the nose cones was recovered, telemetered physiological records were obtained on the second and third Able flights.

Preparation for the flights included planning of the program, designing and fabricating of the MIA package, developing of instrumentation (including the technique of sensor implantation in the animal and signal amplification), testing of the assemble unit (including the mouse) for duration and ability to withstand environmental conditions anticipated in the flight profile, and providing equipment and instruction to personnel aboard the recovery ships to assure obtaining maximum experimental data. This preparatory work was accomplished and the first flight occurred within one month after official authorization.

This report includes a detailed description of the physical system, and the preliminary tests and flight preparations, the instrumentation used in flight, and the resulting signal pattern. The special problems associated with the use of living payloads in space-flight vehicles are also discussed.

5,610

van der Wal, F. L., & W. D. Young 1959 PROJECT MIA (MOUSE-IN-ABLE),
EXPERIMENTS ON PHYSIOLOGICAL RESPONSE TO SPACEFLIGHT. J. American
Rocket Society 29:716-720, Oct. 1959.

ABSTRACT: This project was planned as a noninterference experiment in conjunction with the Project Able reentry test program employing as the launching vehicle a 2-stage missile consisting of the Douglas Thor IREM and The Aerojet 1040 liquid propellant rocket. Three Able vehicles were flown: 4/23, 7/9, and 7/23/58. Each carried a mouse. Although none of the nose cones was recovered, telemetered physiological records (heart rate) were obtained on the second (for mouse Laska) and third (for mouse Benji) flights. The amount and nature of the data available were extremely limited, and therefore no generalized conclusions regarding the behavior of space mice could be drawn. Among the observations were the following: (1) Take-off conditions were not severe enough to produce any evidence of violent or continuing response from the mice. (2) The acceleration loads during burning were essentially paralleled by Laska's heart rate, though this characteristic was not displayed by Benji under similar load conditions. (3) The observed decrease in Laska's heart rate at first-stage burnout was gradual; at second-stage burnout it was sharp. This is in opposition to the heart-rate behavior reported for Laika, the Russian satellite dog. No trend was detected in Benji's heart rate at first-stage burnout, but a distinct increase to slightly above his preflight reading was apparent at the beginning of weightlessness. (4) Since both mice flew to a maximum altitude of 1400 statute miles (as compared with Laika's apogee of 1050 miles), they returned to earth from a higher altitude than that reached by any other living organism. (5) Laska, and probably Benji, returned to sea level alive after experiencing reentry conditions approaching those associated with satellite reentry. (6) No evidence of distress due to weightlessness was noted in either flight. The mice were weightless for longer periods than any animal other than Laika. (7) There is every reason to believe that both Laska and Benji would have been recovered alive after their flights if the nose cones had been retrieved. The report includes a description of the physical system, the preliminary tests, development of the instrumentation used in flight, and the resulting signal pattern. The special problems associated with the use of living payloads in space-flight vehicles are discussed..

5,611

van Egmond, A. A. J., J. J. Groen, & L. B. W. Jongkees 1949 THE MECHANICS
OF THE SEMICIRCULAR CANAL. J. Physiol. 110:1-17.

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van Egmond, A. A. K., J. J. Groen, and L. B. W. Jongkees 1952 THE
FUNCTION OF THE VESTIBULAR ORGAN (S. Karger, Basel, Switzerland)

5,613

van Liere, E.J. 1957 SPACE MEDICINE
West Virginia Med. J. 53(8): 297-301 Aug. 1957

ABSTRACT: An outline is made of some of the physiologic problems encountered in space flight, including those arising from accelerations, weightlessness, rapid decompression, and hypoxia. As a result of such flights physicians will have to treat such things as radiation sickness, ultraviolet and thermal burns, cosmic ray damage, sterility, accidents due to meteors, and fractures sustained by assuming incorrect position when acceleration begins. Mention is made of the emotional strain and physical and mental fatigue which are conducive to bringing about neuroses in spacemen.

5,614

Van Middlesworth, L., and S.W. Britton 1946 PROTECTION AGAINST ACCELERATORY FORCES BY CO₂ INHALATION Federation Proceedings 5:107

ABSTRACT: Increased tolerance to positive acceleratory forces has been demonstrated with monkeys, cats, and dogs which inhaled CO₂/O₂ mixtures before and during the acceleration. Brachial arterial pressure, EKG, and EEG were continuously recorded in more than 200 exposures of 30 animals. 13-20% CO₂ in O₂ administered (at sea level) to monkeys for 18-180 seconds, or to dogs 50-180 seconds, prevented about 40% of the blood pressure changes ordinarily observed at 4 "g" per 10-second exposure. When this mixture was inhaled for more than 300-400 seconds the beneficial effect was lost.

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van Middlesworth, L., & R. F. Kline 1948 PROTECTION AGAINST ACCELERATORY FORCES BY CARBON DIOXIDE INHALATION. Am. J. Physiol., 152:22-6.

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van Rossum, J. W. M. 1962 BIBLIOGRAPHY ON BLAST, SHOCK WAVES AND ALLIED TOPICS, FEATURING NUCLEAR EXPLOSIONS (Technisch Documentatie en Informatie Centrum voor de Krijgsmacht (Netherlands)).

ABSTRACT: Entries include references to reports pertaining to characteristics of nuclear explosions - air burst, ground burst and underwater burst - together with the response of structures to blast loading. Attention is paid to measurements, experimental techniques and testing equipment. Many of the references in this report bear only a marginal relationship with the subject mentioned, but their findings are of interest as adding to the over-all picture. This bibliography is divided in main headings each with several subheadings. The use of some topics as subdivisions of other topics has been indicated by cross references. References have been arranged chronologically with the latest references placed first. An author index is provided. (Author)

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van Woerden, J. 1959 LITERATUUROVERZICHT (OVER RUIMTEVAARTGENEESKUNDE)
(SPACE MEDICINE BIBLIOGRAPHY) (Technisch Documentatie en Informatie Centrum
voor de Krijgsmacht, den Haag, Netherlands) Report No. TDCK-16903;
ASTIA AD-227 817; Feb. 1959

ABSTRACT: This bibliography contains summaries of reports and articles on space
medicine, compiled from the abstract - cards indexes of the Netherlands Armed
Services Technical Documentation and Information Center.

SECOND ABSTRACT: This bibliography contains one hundred eight abstracts on space
medicine compiled from reports and articles at the Netherlands Armed Service
Technical Documentation and Information Centre. Most of the abstracts are in
English, but some are in German or Dutch. The bibliography covers the field of
space medicine from biological and physiological problems to psychological
variables.

5,618

van Woerden, J. 1959 UNITERMS: SPACE FLIGHT MEDICINE
(Netherlands Armed Services Technical Documentation and Information
Centre, Den Haag, The Netherlands)
UDC: 613.693:629.19, TDCK 16903, Feb. 1959.

ABSTRACT: This bibliography on space medicine contains summaries of reports
and articles compiled from the abstract card indices of the Netherlands Armed
Services Technical Documentation and Information Centre. Some of the reports
are available on loan from the Centre. The index indicates wide coverage of
factors related to space travel from biological and physiological to
psychological variables; design of vehicles and suits, radiological problems
of space flight, etc. One hundred eight abstracts are included. A majority
are in English, but some are in German or Dutch.

5,619

Van Wulfften-Palthe, P. M. 1922 FUNCTION OF THE DEEPER SENSIBILITY AND
OF THE VESTIBULAR ORGANS IN FLYING. Acta oto-laryng 4:415.

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Varene, P. & C. Jacquemin 1961 DOES AN OBSTRUCTIVE RESPIRATORY SYNDROME
DURING TRANSVERSE ACCELERATION EXIST?
Rev. Med. Aero (Paris) 2:51-54, Dec. 1961 (Fr)

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Varene, P. and C. Jaczuemin 1961 BRONCHIAL RESISTANCE DURING TRANSVERSE
ACCELERATIONS
In C. R. Acad. Sci. (Paris) 252:3652-3654, June 5, 1961 (France)

5,622

Vary, V. V. Oct. 1958 UNITED STATES AIR FORCE DEVELOPMENT OF AIRCRAFT
ARRESTING GEAR. ASTIA AD 227 468. (Presented at the Thirteenth
Meeting of the Flight Test Panel, held from 21st to 25th Oct, 1958,
in Copenhagen, Denmark)

SUMMARY: For many years Navy airplanes have required arresting gear and catapults for carrier operation. This has meant a considerable weight penalty to the airplane structure, which has had to be designed to withstand horizontal arresting accelerations up to 6 g and also large vertical accelerations due to the relatively high vertical speed of contact with the deck. A relatively low stalling speed--to keep within required launching and arresting energies--has been another penalty. Land based Air Force airplanes have, until recently, gone in for longer runways and, consequently, can operate at greater loads and speeds. This makes the design of arresting gear for Air Force Airplanes much more difficult than for the short-stroke, high-g Navy airplane. This report describes the United States Air Force Arresting Gear Program and discusses various devices by which engagement can be effected and the airplane successfully arrested. At the present time, emergency arrestment only is the USAF goal, but the future for normal routine operational arrestment is also discussed.

5,623

Vasilevskii, V. & Yu. Fedotov 1963 MEDICINE AND THE COSMOS
(Joint Publications Research Service, Washington, D.C.)
Trans. of Molodoi Kommunist (USSR) 20(12):45-50, 1962.
9 April 1963. ASTIA AD 408 243

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Vasil'yev, G. 1959 KABINA KOSMICHESKEY RAKETY (Cabin of a Space Rocket)
Sovet. Aviat. (USSR) p. 4, 12 Sept. 1959.
(Air Technical Intelligence Ctr., Wright-Patterson AFB, Ohio)
Rept. No. ATIC-1256225, 22 Oct. 1959.

ABSTRACT: The use of Tsiolkenskii's chamber, filled with water, in place of the usual cabin by pilots of fighter planes and by astronauts is suggested by the author as a means for counteracting the effects of great g-force exerted on the human body during certain maneuvers.

5,625

Vaughan, V.L., Jr. 1959 WATER-LANDING IMPACT ACCELERATIONS FOR THREE MODELS OF REENTRY CAPSULES. (Langley Research Center, Langley Field, Va.) NASA TN D-145, ASTIA AD 227296

ABSTRACT: Three conical models were tested to determine the rigid-body impact accelerations for nominal flightpaths angles of 90° and 65°, a range of contact attitudes of -30° to 30°, and a range of full-scale vertical contact velocity from 10 to 45 feet per second. Accelerations of the models at impact were measured along the X (roll) and Z (Yaw) axes.

5,626

Vaughan, Victor L., Jr. 1961 LANDING CHARACTERISTICS AND FLOTATION PROPERTIES OF A REENTRY CAPSULE. NASA TN D-653 ASTIA AD 251 188

ABSTRACT: An investigation has been conducted to determine the rigid-body impact accelerations of a reentry capsule during simulated parachute-supported landings on sand and on water. Tests were also made to determine the flotation properties of the capsule. Two 1/6-scale dynamically similar models, one a landing impact model and one a flotation model, were used in the investigation. Tests were made at a variety of flight paths to simulate the effect of surface winds that might act on the capsule during parachute letdown. A range of contact attitudes was investigated to simulate the attitude the capsule might have upon contact as a result of the capsule swinging under the parachute. Landing impact accelerations were measured along the X-axis (roll) and Z-axis (yaw) by accelerometers located at the center of gravity of the models. The maximum accelerations along the X-axis measured at the center of gravity were about 74g for sand landings and about 33g for water landings. The maximum onset rates of acceleration, also along the X-axis, were about 25,000g per second for sand landings and about 12,800g per second for water landings. Accelerations 2.05 feet in front and in back of the center of gravity for water landings varied as much as +65 percent from those Z-axis were about 25g for sand landings and about 9g for water landings. The capsule with a dry interior was stable with center-of-gravity locations at 1.21 feet and 1.08 feet measured above the maximum diameter of the capsule. The capsule was unstable with a center-of-gravity location at 1.33 feet and would turn over on its side. The weight of a man and his survival equipment in the canister caused the capsule to turn over on its side for all center-of-gravity conditions tested.

5,627

Velasco do Pando, M. 1959 ARTIFICIAL SATELLITES AND INTERPLANETARY TRAVEL: PHYSIOLOGICAL EFFECTS OF CHANGE IN GRAVITY. A.M.A. Proceedings, April 1959.

ABSTRACT: This is the corrected and extended version of part of an analytical study (Sec. 13) on the launching of space rockets, which was published

in a previous issue of the same journal (52(1):11-61, 1958. An attempt is made of correlating mathematically basic physiological and physical parameters. If j represents the effects of gravity experienced by a space traveler within the space vehicle ("sensible gravity"), the following formula applies:

$$j = \frac{d^2y}{dt^2} + \frac{ga^2}{(a+y)^2}$$

in which y is the altitude, t the time, g the gravitational acceleration on the surface of the earth, and a the terrestrial radius. In this formula the expression $\frac{d^2y}{dt^2}$ represents the effective vertical acceleration and $\frac{ga^2}{(a+y)^2}$ the

effects of terrestrial acceleration at the altitude y . The validity of the formula is tested for the following conditions: (1) the vehicle rests on the terrestrial surface; (2) the vehicle travels unaccelerated at a given altitude (this being the case when the upward acceleration equals the weight of the vehicle); (3) the vehicle travels at a given altitude and at a given acceleration and (4) the vehicle travels through outer space with the rocket motor shut off (the occupants are in a state of weightlessness). In conclusion, the author derives optimal values for escape velocity and trajectory of the hypothetical space ship.

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Venson, V.G., E.L. Beckman, K.R. Coburn & R.M. Chambers 1961 EFFECTS OF WEIGHTLESSNESS AS SIMULATED BY TOTAL BODY IMMERSION UPON HUMAN RESPONSE TO POSITIVE ACCELERATION. (Naval Air Development Center, Aviation Medical Acceleration Lab., Johnsville, Pa.) Rept. No. NADC-MA-6132, June 26, 1961, ASTIA AD 212 329. See Also Aerospace Med., 33(2):198-203, Feb. 1962.

ABSTRACT: Using underwater breathing equipment, twelve members of the Underwater Demolition Team No. 21 were completely immersed in water for eighteen hours. The subjects had no ill effects as a result of the immersion. Following immersion, their responses to positive acceleration were determined by observing the G level at which the limitation of ocular motility under acceleration (LOMA) occurred. This G level is approximately the same as when greyout occurs when subjects are exposed to positive acceleration. A small but significant decrease in the G level at which LOMA occurred was found following the period of immersion.

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Verliac, F.A. 1940 CONNAISSANCES ACTUELLES SUR L'INFLUENCE DES ACCELERATIONS EN AVION SUR L'ORGANISME (Actual Understanding on the Influence of Aircraft Acceleration on the Body) (These de Paris: Le Francois 1940 52 p.)

5,630

Vigness, I. 1961 NAVY HIGH-IMPACT SHOCK MACHINES FOR LIGHTWEIGHT AND MEDIUMWEIGHT EQUIPMENT (Naval Research Laboratory) Report. 5618. June 1, 1961.

Descriptions are given of the Navy HI shock machines for lightweight and mediumweight equipment. Shock motions are given for standard loading conditions. These are illustrated by acceleration-, velocity, and displacement-time relations. Maximum values of velocities and displacements, and of accelerations passed by various low-mass filters, are presented. Shock spectra are presented for selected conditions. Equivalent displacement- and velocity-shock, together with maximum values of acceleration, can be established for their respective effective frequency ranges from observations of the shock spectra.

5,631

Villela, A.A., W. Lins, Jr. & A. Lobao 1950 ACCELERATION AND VENOUS SYSTEM: NEW OCCUPATIONAL DISEASE
Arquivos Brasileiros de Cardiologia (Sao Paulo) 3: 295-312.

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Villetorte, P. 1961 SUMMARY OF DISCUSSION; IN THE CHAIR: MR. P. VILLETORTE
International Road Safety and Traffic Review 9:50

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Vinacke, W. E. 1946 THE CONCEPT OF AVIATOR'S "VERTIGO".
(Naval School of Aviation Medicine, Pensacola, Fla.) Proj. MR005.13-6001.1. 7., 8 May 1946

ABSTRACT: Research in an effort to clarify the kinds of disorientation characteristic of flying under various conditions, and to elucidate the effects of disorientation upon the pilot, and to clarify a term employed by pilots to describe these reactions.

5,634

Vinacke, W. E. 1946 "VERTIGO" AS EXPERIENCED BY NAVAL AVIATORS.
(Naval School of Aviation Medicine, Pensacola, Fla.) Proj. MR005.13-6001. 1.12., 3 July 1946

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Vinacke, W.E. 1946 TYPES OF ILLUSIONS EXPERIENCED BY AIRCRAFT PILOTS Amer. Psychologist 1:282

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Vinacke, W. E. 1946 PREDICTING THE SUSCEPTIBILITY OF AVIATORS TO "VERTIGO". (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. MR005.13-6001. 1.10., 21 June 1946

5,637

Vinacke, W. E. 1947 ILLUSIONS EXPERIENCED BY AIRCRAFT PILOTS WHILE FLYING. J. Aviat. Med. 18(4):308-325.

SUMMARY & CONCLUSIONS: From case material on sixty-seven pilots, interviewed on the subject of "vertigo", seventy-seven instances of sensory illusions were selected by the author. An attempt was made to include all the different illusory phenomena reported by the pilots, where illusion is defined as a "mistaken perception." Five psychologists were asked to classify the seventy-seven items into meaningful categories. Agreement among the five classifiers was ascertained and names assigned to the general types of illusions represented by the items. Each of these is discussed in terms of the probable etiology involved and the effect of the illusion on the behavior of the pilot. The illusions reported in the study are of five general types which, in practice, are not always separable; namely, visual, non-visual, conflicting sensory cues, dissociational or recognition, and emotional. Visual illusions include confusion of lights, splitting of lights (diplopia), autokinesis, depth perception, relative motion, and perspective illusions. There is also evidence that visual hallucinations occasionally occur. Non-visual illusions include failure to perceive rotation itself, or the after-effects of rotation, or both, false sensations, after-effects of rotation, and correct perception with wrong reference point. There may also occasionally be non-visual hallucinations. Illusions resulting from conflicting sensory cues may occur in the visual field, in the non-visual field, or in combinations of the two. Dissociational or recognition illusions include phenomena of jamais vu, déjà vu, loss of sense of direction, and loss of the sense of time. General emotional disturbance is non-specific and results in generalized disorientation, including perceptual, rather than in specific illusions occurring in flight affords insight into the environment of the aviator, and the adjustment of the aviator to that environment. Adjustment to the flight environment has two aspects, erroneous response to environmental cues (such as illusions), and the psychological, or emotional and cognitive state of the aviator.

5,638

Violette, F., R. Senelar, & A. Loubiere 1959 EFFECTS OF WEAK AND PROLONGED ACCELERATIONS ON DOG KIDNEYS (EFFETS DES ACCÉLÉRATIONS DE FAIBLE VALEUR ET DE DUREE PROLONGEE SUR LE REIN DU CHIEN) J. Physiol. (Paris) 51(3):575-576, May-June 1959.

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Violette, Francois 1961 CENTRIFUGES IN FRANCE: PAST AND PRESENT RESULTS. ACCELERATION RESEARCH PROGRAM IN FRANCE. (Paper, Panel on Acceleration Stress of the Armed Forces-NRC Committee on Bio-Astronautics, 6-11 March 1961, NASA Ames Research Ctr., Moffett Field, Calif.)

5,640

Violette, F. 1961 FRENCH OBSERVATIONS AND RESEARCHES CONCERNING IMPACT OF CRASHES. (Presented at Impact Acceleration Symposium, Brooks AFB, 27-30, 1961)

ABSTRACT: Observations and research results of the French Air Force Medical Corps on impact and crash include the following: (1) For wounded patients that are carried with feet forward on longitudinally set stretchers, two straps are sufficient -- one on the base of the thorax, the other on the middle of the thighs. These straps, usually moderately tightened, must be sufficiently tightened in case of crash to prevent any slipping of the wounded on the stretcher. The restraint may be comfortized: (a) with stoppers placed on the arms of the stretchers, and (b) by broadening the straps (three inches or 7.5 cm). A release-pin system is recommended for quick strap release. (2) The telescopic ejection seat is superior to the ejection seats with solid axis guns. Also, the breaking-joint of the spine was about the seventh thoracic vertebra. In addition, a helmet chinstrap in high-speed ejection is both useless and dangerous. (3) In the emergency ditching of a helicopter, the impact shock on the cabin floor was not felt by the standing crew members; nevertheless, the pilot and copilot both received spinal fractures although well strapped. In such accidents the impact deceleration may be transmitted without softening from the floor to the seat and to the strapped subject.

5,641

Violette, F. 1962 FRENCH OBSERVATIONS AND RESEARCHES CONCERNING IMPACT AND CRASH

(In: Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, pp. 35-38)

ABSTRACT: Few researches have been accomplished in France concerning crash and impact problems because of the lack of finances to purchase the needed equipment. Private societies manufacturing cars and planes have also been kept back because of the prices of the devices, and until now just followed the progress of the researches completed in other countries, mostly in the United States.

French current medical literature concerning impact consists of general reviews and does not bring forth any new facts.

Problems concerning crash and impact have therefore been raised at the French air Medical Corps which tried to give them a solution. (1) The problem of contention of transported wounded personnel in the crash. (2) The problem of choice between ejection seat with full gun and with telescopic gun. (3) Casualties of the flying Personnel occurred during emergency crash or ditching of helicopter and contributed in putting forth a particular traumatology.

M. S., & O. Backstrom, Jr. 1943 AN ANALYSIS OF GRAPHIC RECORDS OF
NOT PERFORMANCE OBTAINED BY MEANS OF THE R-S RIDE RECORDER. (CAA Division
Research, Washington, D. C.) Rept. No. 23; Nov. 1943

R-S ride recorder records movement of aircraft in 3 dimensions.
for mapping "g" patterns of aerial maneuvers.

Nov, C. E. N. S. Sedina et. al. 1959 RESEARCH ON NEUROPHYSIOLOGY
THE MILITARY MEDICAL ACADEMY IMENI S. M. KIROV
Trans. of Tezisy Dokladov Nauchnoy Sessii, Voenno-Meditsinskaya
Akademiya imeni S. M. Kirova (These of Reports of the
Scientific Session of the Military-Medical Order of Lenin Academy,
imeni S. M. Kirov) Leningrad, P. 6-8, 31-32, 35-37, 46-48, and 54-55,
Oct. 29-Nov. 2, 1956.
Library of Congress, Washington, D.C.) 59-13369

Min, Yu. M., V.I. Yazdovskiy et al. 1962 THE FIRST MANNED SPACE FLIGHTS
(Pervyye Kosmicheskiye Polety Cheloveka)
Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio
Trans. No. FTD-TT-62-1619 Dec. 7, 1962 ASTIA AD 294 537
Original Source: Mediko-Biologicheskkiye Issledovaniya (Moskva)

ACT: Contents include material on the following subjects:

ing cosmonauts in controlling the ship

Support in space flight

Microclimatic conditions in a spaceship cabin

Food and water supply

Support and recovery systems

Radiation protection

The biological effect of cosmic radiation in spaceships

Measures providing radiation safety on the flights of Gagarin and Titov

The protective properties of space suits

Emergency supply pack of the cosmonaut

Systems for landing the cosmonaut

Acclimatization-training flights on aircraft under weightlessness conditions

Biological investigations

Acclimatization and method of carrying out physical training exercises

Results of the medical examination of the astronauts

Results of physiological investigations and medical monitoring during spaceflight

Physiological reactions of the astronauts in flight

5,642

Viteles, M. S., & O. Backstrom, Jr. 1943 AN ANALYSIS OF GRAPHIC RECORDS OF PILOT PERFORMANCE OBTAINED BY MEANS OF THE R-S RIDE RECORDER. (CAA Division of Research, Washington, D. C.) Rept. No. 23; Nov. 1943

ABSTRACT: R-S ride recorder records movement of aircraft in 3 dimensions. Useful for mapping "g" patterns of aerial maneuvers.

5,643

Vladimirov, C. E. N. S. Sedina et. al. 1959 RESEARCH ON NEUROPHYSIOLOGY AT THE MILITARY MEDICAL ACADEMY IMENI S. M. KIROV
(Trans. of Tezisy Dokladov Nauchnoy Sessii, Voenno-Meditsinskaya Ordena Lenina Akademiya imeni S. M. Kirova (These of Reports of the Scientific Session of the Military-Medical Order of Lenin Academy, imeni S. M. Kirov) Leningrad, P. 6-8, 31-32, 35-37, 46-48, and 54-55, Oct. 29-Nov. 2, 1956.
(Library of Congress, Washington, D.C.) 59-13369

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Vloynkin, Yu. M., V.I. Yazdovskiy et al. 1962 THE FIRST MANNED SPACE FLIGHTS (Pervyye Kosmicheskiye Polety Cheloveka)
Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio
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The protective properties of space suits

Emergency supply pack of the cosmonaut

Systems for landing the cosmonaut

Familiarization-training flights on aircraft under weightlessness conditions

Psychological investigations

Organization and method of carrying out physical training exercises

Results of the medical examination of the astronauts

Methods of physiological investigations and medical monitoring during spaceflight

The physiological reactions of the astronauts in flight

5,645

Voas, R.B. 1961 PROJECT MERCURY ASTRONAUT TRAINING PROGRAM
In: The Training of Astronauts (National Academy of Sciences, National Research Council) Publication No. 873, Pp. 22-40

ABSTRACT: A general over-all outline of the training program is given. A brief discussion is presented of the astronaut selection program and basic considerations for the training program. Training in vehicle operation includes lectures, field trips, and study programs of the various capsule systems. Simulators for training in attitude control during orbit and retrofire, navigation, control of tumbling, environmental control of the cabin, and management of procedures are discussed. Training in various scientific disciplines is described along with the various lecture courses that each astronaut takes. Space flight conditions such as disorientation, weightlessness, reduced pressure, etc., are described and simulated for the astronauts. A physical fitness program for the trainees is discussed pertaining to weight control, breathing control, and general physical conditioning. Countdown procedures and ground communications are recovery-survival methods are part of ground activity training. Maintenance of flight skills as a method to maintain vigilant decision making is accomplished by regular flights in high-performance jet aircraft. The significance of this program on future space flight is discussed. (J. Aerospace Med. 33(11): 1403, Nov. 1962)

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Voas, R. B. 1961 PROJECT MERCURY: ASTRONAUT TRAINING PROGRAM.
PHYSCOPHYSIOLOGICAL (Sic) ASPECTS OF SPACE FLIGHT. (Columbia Univ. Press) Pp. 96-116. Jan. 1961.

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Voas, R.B. 1963 TRAINING MAN FOR SPACE
Paper: Lectures in Aerospace Medicine, School of Aviation Medicine, Brooks AFB, Texas, 4-8 February 1963

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Vogel, P. 1931 ÜBER DIE BEDINGUNGEN DES OPTOKINETISCHEN SCHWINDELS (Concerning the Condition of the Optical Illusion)
Pflüg. Arch. ges. Physiol. (Berlin) 228: 510

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Vokhmyanin, P. 1936 RESULTS OF MEDICAL OBSERVATION OF A GROUP OF HIGH SPEED FLYERS
Voenna-sanitarnoe delo (Moscow) 11: 19-22

5,650

Vollmecke, A. R. 1961 PROPOSAL FOR STUDY OF A DYNAMIC TESTING DEVICE FOR AIRCRAFT AND COMPONENTS (General Dynamics Corp., Convair Division, San Diego, Calif.) Rept. No. ZS-308; ASTIA AD-259 117; 20 June 1961

ABSTRACT: General Dynamics/Convair has, in the development of commercial aircraft, been actively engaged in a program of delethalization of cabins and seats under simulated crash conditions. Experience includes design and use of such energy devices as HYGE, rocket sleds, pendulum swings, electro-hydraulic and electropneumatic servo systems. Data systems associated with these test programs have also been designed, manufactured, installed and serviced by General Dynamics/Convair personnel. The proposal presented in this report defines system concepts based upon actual test experience. Emphasis is placed upon reliability and repeatability of testing to known input values of acceleration or deceleration. Practical engineering principles of size limitations, initial system cost, cost per test 'shot', time between consecutive 'shots', and ease of test parameter change are the basis for system concept choices.

A preliminary study by General Dynamics/Convair indicates that inherent advantages exist within two different and separate test concepts. The first is that of programming the specimen acceleration from rest-to-velocity; the second is to decelerate the moving specimen from velocity-to-rest. The g-forces that occur through either acceleration or deceleration are identical, so far as the specimen or its mere image is concerned. Any damage that takes place is the result of g-forces. If the forces are applied in a particular pattern, reach a particular magnitude, and extend through a particular time duration, it makes no difference whether they are created by an acceleration or a deceleration of the object under test, as long as the object is oriented correctly on the test machine. The test facility, therefore, in both cases would consist of an accelerator, a track-guided test vehicle (with a specimen receiver capable of acceleration in three coordinate directions), a decelerator and a data acquisition station.

General Dynamics/Convair proposes that the two test concepts as defined within this report be given consideration with choice of final system to be based upon thorough engineering evaluation.

(AUTHOR)

5,651

Volynkin, Yu. M., V.I. Yazdovskiy et al 1962 THE FIRST MANNED SPACE FLIGHTS (Translation Services Branch, Foreign Technology Division, Wright-Patterson AFB, Ohio) FTD-TT-62-1619/1+2 7 Dec. 1962 ASTIA AD 294 537

ABSTRACT: The radiation situation during Yu. A. Gagarin's and G.S. Titov's flights was favorable. The biotelemetric equipment installed on the space ships, operated reliably and secured registration of all physiological indices specified by the program. The increase in frequency of the pulse in the pre-launching period and in a portion of entry, connected with the inevitable emotional strain and acceleration and deceleration forces, was not accompanied by changes in the electrocardiogram and kinetocardiogram, going out the frame of the sinus tachycardia. The astronauts did not experience difficulties in eating and drinking. It was established that under conditions of weightlessness, the usual daily rhythm of sleep and wakefulness is not disturbed. Urination under conditions of weightlessness was done without difficulty. Dizziness, perspiration during weightlessness, were provoked by sharp movements of the head and observations of the moving surface of the earth in the illuminator.

5,652

Volynkin, Yu. M. et al 1962 THE FIRST MANNED SPACE FLIGHTS
Trans. of mono. Pervye Kosmicheskie Polety Cheloveka, Moscow, 1962.
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General problems of flight
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Teaching (and training) cosmonauts in controlling the

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von Beckh, H.J.A. 1955 VELOCIDAD, ACCERACION, GRAVITACION.
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von Beckh, H. J. 1958 PHYSIOLOGY OF LAUNCHING AND RE-ENTRY STRESS IN RODENTS.
(Air Force Missile Development Center, Holloman AFB, N. Mex.) AFMDC TN 58-11
ASTIA AD 154 105, Aug. 1958.

Summary: Centrifuge runs with rodents, by several investigators are reviewed.
It is concluded that accelerative forces per se would not endanger these animals in bio-satellite experiments. However, environmental stresses and the absence of gravity could lower their resistance, and therefore, a reliable G-protection for the animal is proposed. (Author)

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von Beckh, H.J. 1958 FLIGHT EXPERIMENTS ABOUT HUMAN REACTIONS TO
ACCELERATIONS WHICH ARE FOLLOWED OR PRECEDED BY THE WEIGHTLESS STATE.
(Air Force Missile Development Center, Holloman AFB, New Mexico)
Report No. TN 58-15, Dec. 1958. ASTIA AD 154 108.

ABSTRACT: Flight experiments which simulated Pre-weightlessness and Post-weightlessness acceleration were conducted in jet aircraft. It was shown that alternations of acceleration and the weightless state decrease the acceleration tolerance of the subject and the efficiency of the physiological recovery mechanisms. The implications for planning of manned space flight are: (1) thrust values and re-entry profiles must take the lower acceleration -tolerance into consideration; and (2) adequate G- protection must be designed for the pilot, to prevent dangerous effects of unavoidable high accelerations. (Author)

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von Beckh, H.J. 1958 FLIGHT EXPERIMENTS ABOUT HUMAN REACTIONS TO ACCELERATIONS WHICH ARE FOLLOWED OR PRECEDED BY WEIGHTLESSNESS. (Ninth International Astronautical Congress, Amsterdam, 25-30 Aug. 1958)

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von Beckh, H.J. 1958 MULTI-DIRECTIONAL G-PROTECTION IN SPACE FLIGHT AND ESCAPE Paper, Second European Congress of Aviation Medicine, Stockholm, September, 16-19, 1957

See also: J. Aviat. Med. 29(5): 335-341, 1958

ABSTRACT: It is known that maximum human tolerance to G-loads is obtained if the accelerations are acting at right angles to the long axis of the body. This report describes a device, termed the "anti-G capsule", which is pivoted about the lateral axis of the craft and automatically assumes a position, such that the resultant of all acting accelerations is perpendicular to the heart-head line of the subject. The ejection and stabilization mechanism of this capsule would also afford an analogous G protection during and after escape from a disabled aircraft or space vehicle within the lower layers of the atmosphere.

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von Beckh, H. J. 1958 MULTI-DIRECTIONAL G PROTECTION IN SPACE FLIGHT AND DURING ESCAPE. A THEORETICAL APPROACH. J. of Aviation Medicine 29(5):335-342, May 1958

ABSTRACT: It is known that maximum human tolerance to G-loads is obtained if the accelerations are acting at right angles to the long axis of the body. This report describes a device, termed the "anti-G capsule," which is pivoted about the lateral axis of the craft and automatically assumes a position, such that the resultant of all acting accelerations, is perpendicular to the heart-head line of the subject. The ejection and stabilization mechanism of this capsule would also afford an analogous G protection during and after escape from a disabled aircraft or space vehicle within the lower layers of the atmosphere.

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von Beckh, H. J. 1958 MULTIDIRECTIONAL G-PROTECTION IN SPACE VEHICLES. In Hecht, F., ed., VIIIth International Congress, Barcelona, 1957 (Vienna: Springer, 1958) pp. 37-46

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von Beckh, H.J. 1958 MULTI-DIRECTIONAL G-PROTECTION IN SPACE VEHICLES
J. Brit. Interplan. Soc. 16(9): 525-533, Sept./Oct. 1958

ABSTRACT: In this paper there is described a device which could grant this multidirectional g-protection by automatic positioning. The resultant of all acting accelerations would be presented at right angles to the head-heart line of the operator. This device, termed the "Anti-G Capsule," would at the same time afford an analogous g-protection during and after escape from a disabled space vehicle within the lower layers of the atmosphere. An anti-g capsule for providing multidirectional protection for pilots of space vehicles during periods of acceleration, by automatic positioning, is described and the relevant literature is reviewed. (Literatuuroverzicht (Over Ruimtevaartgeneeskunde) (Space Medicine Bibliography) (Technisch Documentatie en Informatie Centrum voor de Drijgsmacht, den Haag, Netherlands) Rept. No. TDCK-16903; Feb. 1959; ASTIA AD 227 817)

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von Beckh, H.J. & G.J.D. Schock 1958 CENTRIFUGE EXPERIMENTS ON HIGH-G LOADS
IN MICE AND THEIR POSSIBLE ALLEVIATION BY MULTIDIRECTIONAL ANTI-G DEVICES
Air Force Missile Development Ctr., Holloman AFB, N. Mex. AFMDC TN 58-10
Aug. 1958 ASTIA AD 154 104

ABSTRACT: Using the centrifuge, time-tolerance limits on transversely positioned mice were studied and the results compared with longitudinal G-tolerance values reported by other authors. The possibilities of a multidirectional G-protection during escape trajectories and the re-entry phase are discussed. (Author)

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von Beckh, H. J. 1958 HUMAN REACTIONS DURING FLIGHT TO ACCELERATION
PRECEDED BY OR FOLLOWED BY WEIGHTLESSNESS.
Air Force Missile Development Center, Holloman AFB, New Mexico
AFMDC TN-58-12 ASTIA AD 154 108.

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von Beckh, H.J. 1959 HUMAN REACTIONS DURING FLIGHT TO ACCELERATION PRECEDED
BY OR FOLLOWED BY WEIGHTLESSNESS
Aerospace Medicine 30(6): 391-409
See also: AFMDC TN 58-15 ASTIA AD 154 108

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von Beckh, J.H. 1959 FLIGHT EXPERIMENTS ABOUT HUMAN REACTIONS TO ACCELERATIONS
WHICH ARE FOLLOWED OR PRECEDED BY THE WEIGHTLESS STATE
Aerospace Medicine 30(6): 391-409, June 1959

ABSTRACT: Alternation of weightlessness and acceleration results in a decrease of acceleration tolerance and of the efficiency of physiologic recovery mechanisms. This indicates that acceleration thresholds of reversible and irreversible injury will be lower in space flight conditions than in the one G field of man's earthly environment. Defects of circulation, muscular effectiveness, vision, and of conscious judgment will occur at lower acceleration values and will probably continue for longer times than they do under present normal flight conditions. In an astronautical venture depending upon the skill of a human pilot, a blackout, lapse of judgment or even the slightest reduction in efficiency at a crucial time, could undoubtedly cause the failure of the mission.

The implications for planning of manned space flight are, first, that thrust values and reentry profiles must take the lower acceleration tolerance into consideration and second, that adequate G protection must be designed for the pilot to prevent dangerous effects of high acceleration.

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von Beckh, H.J. 1959 WEIGHTLESSNESS AND SPACE FLIGHT
Astronautics 4(2):26-27, 84-86, Feb. 1959.

ABSTRACT: Deterioration of neuromuscular coordination and disorientation are considered to be originated by the weightless state per se. However, more complex problems arise during extended space flights, as well as during alternate acceleration and weightlessness, such as occurs during the ascent and re-entry of space vehicles. Results of experiments in jet aircraft are cited to show that the weightless state aggravates other physiological conditions, which, in combination, pose serious problems to man in space flight. Subjects reported experiences of increased susceptibility to or severity of acceleration effects when they entered positive G states immediately after experiencing weightlessness. Subjects who normally blacked out at 5 G could tolerate only 3.5 to 4 G in the experiments. In the opposite case, when acceleration preceded weightlessness, physiological recovery mechanisms seemed disturbed. Blackout lasted longer, and more severe discomfort and chest pains were reported. Cinematographic observations, registrations of heart rate, electrocardiograms, and galvanic skin responses corroborated the subjective reports. It is suggested that extended weightlessness may lead to lessened muscle tone and strength, as well as to inconveniences to the cardiovascular system. The heart, having transported the blood without the force of gravity during the weightless state, would need a certain time for adaptation after re-entry into the gravity field of the earth or of another planet.

(Aerospace Medicine 30(6):456, July 1959)

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von Beckh, H.J. 1959 FLIGHT EXPERIMENTS ABOUT HUMAN REACTIONS TO ACCELERATIONS WHICH ARE FOLLOWED OR PRECEDED BY WEIGHTLESSNESS.
In: International Astronautical Congress, Proceedings of the IXth, 1958
(Wien : Springer - Verlag, 1958, pp. 507-525)

ABSTRACT: Alteration of weightlessness and accelerations results in a decrease of acceleration tolerance and of the efficiency of physiologic recovery mechanism. The implications for planning manned space flight are, first, that thrust values and re-entry profiles must take the lower acceleration tolerance into consideration, and second, that adequate G protection must be designed for the pilot, to prevent dangerous effects of unavoidable high accelerations.

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von Beckh, H.J. 1960 A SUMMARY OF MOTION SICKNESS EXPERIENCES IN WEIGHTLESS FLIGHTS CONDUCTED BY THE AEROMEDICAL FIELD LABORATORY
(Paper, Symposium on Motion Sickness in Weightlessness Research, March 1960, Wright-Patterson AFB, Ohio)

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von Békésy, G. 1939 UBER DIE VIBRATIONSEMPFINDUNG (Concerning the Vibration Experience)
Akustische Zeitschrift 4: 316-334

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Akustische Zeitschrift 5: 113-124

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von Békésy, G. 1959 NEURAL FUNNELING ALONG THE SKIN AND BETWEEN THE INNER AND OUTER HAIR CELLS OF THE COCHLEA. Reprint Journal of the Acoustical Society of America 31:1236-1249, Sept. 1959; ASTIA AD-229 246
See also (Psycho-Acoustic Lab., Harvard Univ., Cambridge, Mass.) Contract No. 186615; ASTIA AD-229 246; 1 June 1959.

ABSTRACT: An attempt has been made to show that (1) the rotating tones in hearing, (2) the rotating vibrations on the skin, (3) the difference limen for the smallest perceptible distance on the skin, and (4) Mach's law of contrast are all

consequence of the same funneling action of the nervous system. In many situations the role of the funneling action can be better understood if a neural funneling unit is proposed, taking into account that a local stimulus produces both an area of activity and, around it, an area of decreased sensitivity. Since the inner and outer hair cells in the cochlea show a difference in sensitivity, the funneling action between these areas of different sensitivity has been investigated. It has been found that, between such areas, the locus of the sensation is continuously displaced as the intensity of the stimulus is increased. This suggests that along the organ of Corti there is a longitudinal displacement produced by variations in frequency, and a radial displacement between the outer and inner hair cells produced by variations in sound pressure. Thus there seems to be a pitch-loudness coordinate system in the ear. The cochlear model (J. Acoust. Soc. Am. 27:830-841, 1955) with nerve supply was therefore further developed into a cochlear model with more and less sensitive nerve supplies, in order to represent the outer and inner hair cells in the organ of Corti. (AUTHOR)

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In Marbarger, J. P., ed., Space Medicine; The Human Factor in Flights
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ORBIT TO THE EARTH In White, C. S., & O. O. Benson, Jr., eds., Physics
and Medicine of the Upper Atmosphere, A Study of the Aeropause (Albuquer-
que, N. Mex.: Univ. of New Mexico Press, 1952) pp. 432-440

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ARTIFICIAL SATELLITES SPACE MEDICINE (Illinois: University of Illinois
Press, 1956)

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Society of Experimental Test Pilots 3(11): Aug. 1959
See also reprint Newsletter

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16-20 January 1961 (Conducted at the School of Aviation Medicine, Brooks
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CAN WITHSTAND IN A SITTING POSITION (DIE ERTRAGLICHKEITSGRENZEN
BEI FLIEHKRAFTBELASTUNG FUER DEN SITZENDEN FLUGZEUGFUEHER) ASTIA
ATI 76 179.

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von Diringshofen, H. 1932 DIE BEDEUTUNG VON HYDROSTATISCHEN DRUCKUNTERSCHIEDEN
FÜR DEN BLUTKREISLAUF DES MENSCHEN BEI EINWIRKUNG HOHER BESCHLEUNIGUNGEN
(The Meaning of Hydrostatic Pressure Differences for the Blood Circulation
of Man, Then Effects of High Accelerations)
Zeitschrift für Flugtechnik und Motorluftschiffahrt (Munich; Berlin) 23: 164-165

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von Diringshofen, H. & B. Belonoschkin 1932 EXPERIMENTELLE UNTERSUCHUNGEN
UBER DEN EINFLUSS HOHER BESCHLEUNIGUNGEN AUF DEN BLUTDRUCK DES MENSCHEN
(Influence of Great Acceleration on Blood Pressure of Man Particularly
During Aerial Flights)
Zeitschrift für Biologie (Munich) 93: 79-92.

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von Diringshofen, H. 1933 ÜBER DIE WIRKUNG VON BESCHLEUNIGUNGEN IM FLUGE AUF
DES MENSCHEN (The Effects of Accelerations During Flight Upon Man)
Zeitschrift für Flugtechnik und Motorluftschiffahrt (Munich; Berlin) 24: 589-592

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BESCHLEUNIGUNG (Effect of Acceleration on Blood Pressure and Hemostatics)
Verh. dtsch. Ges. Kreislaufforsch (Dresden) 6: 146-153.

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von Diringshofen, H. 1934 DIE WIRKUNG VON GRADLINIGEN BESCHLEUNIGUNG UND VON ZENTRIFUGALKRAFTEN AUF DER MENSCHEN. EXPERIMENTELLE UNTERSUCHUNGEN ÜBER DEN EINFLUSS HOHER BESCHLEUNIGUNGEN AUF BLUTDRUCK, HERZSCHLAG, UND ATMUNG DES MENSCHEN IN MOTORFLUG. (INFLUENCE OF GREAT ACCELERATION OF SPEED ON BLOOD PRESSURE, HEART RATE AND RESPIRATION DURING FLYING.) Zeitschrift für Biologie (münchen) 95:551-566
See also abstract: J. Avia. Med. 7:50-51, 1936.

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von Diringshofen, H. 1934 EFFECT OF SPEED AND CENTRIFUGAL AT FORCE ON HUMAN BEINGS. II. Experimental studies on the effect of high speed on the blood pressure, pulse and respiration of aviators. Zeitschr. f. Biol., 95:551-566, 1934.

ABSTRACT: Physiologic test flights as well as observations of hemostatic and hemodynamic conditions have demonstrated that a further investigation of the effect of speed upon the circulation will require continuous blood pressure determination during flight with simultaneous registration of pulse and respiratory frequency as well as type of respiration, recorded synchronously with the speed and altitude levels, at a centrifugal force corresponding to 4 times the gravity or 4 g. The portable electrocardiograph of the Siemens Reiniger firm was used. This instrument permits of a continuous five minute registration. An electric stop clock device was added to indicate 10 second intervals. (Löbner, Berlin.) It served for synchronization of the various records (electrocardiogram, blood pressure, pneumatotachogram, and the speedometer). The electrocardiogram was hung in the back seat of the plane in such a manner as to be within reach of the pilot. The electrocardiographic recording mechanism was changed in reaction to speed. To ascertain the pulse frequency it was necessary to make recalculations if the speed varied within the ten second intervals. The plate electrodes of the electrocardiogram were arranged to the right shoulder, left hip. Even during spins fairly reliable electrocardiograms can be taken. Blood pressure readings were taken with the autotonograph but being very sensitive to changes in speed and to concussion it had to be reconstructed for the present purpose. Hochrein's pneumotachograph was used for ascertaining the respiratory rate. Curves, diagrams and plates illustrating the apparatus are included. The results confirm the marked increase in blood pressure in response to acceleration and show that the degree of rise in blood pressure, increase in pulse frequency and respiratory frequency depend both on the duration as well as the degree of acceleration. (J. Avia. Med. 7(1):50-51).

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von Diringshofen, H. 1934 DIE WIRKUNG VON GRADLINIGEN BESCHLEUNIGUNGEN UND VON ZENTRIFUGALKRAFTEN AUF DEN MENSCHEN. (Effects of linear acceleration and centrifugal forces on man) Zeitschrift fur Biologie, 95:1-26.

ABSTRACT: von Diringshofen showed that hemostatic forces cause visual disturbances in pilots during quick turns (centrifugal forces). A disturbance of circulation in the brain and retina due to hydrostatic blood pressure and a lowering of pressure in the brain arteries as compared to the pressure in the heart region is the basis for this reaction. He has devised a method of computing the hydrostatic changes in blood pressure in each bodily region as dependent on the acceleration acting on the body. Thus the acceleration at which each individual will have disturbances of vision or of consciousness can be plotted. Acceleration effects on the circulatory system were studied by the author theoretically and experimentally by performing curves and steep spirals in flight. In this first communication he presented the hemostatics of the circulation of the blood under the influence of acceleration, placing special emphasis upon the importance of hemostatic consideration as a basis for the investigation of hemodynamics of the circulation under the influence of accelerations. Visual disturbances, observed by the flier as a result of centrifugal forces at the time of rapid changes in flight direction, may be explained solely on the basis of hemostatic considerations. According to the author these visual disturbances are due to a circulatory disturbance (hyphemia) in the brain or in the retina of the eye as a result of hydrostatic reduction in blood pressure in the cerebral arteries as compared with the blood pressure at the level of the heart. By means of a schematic arrangement the hydrostatically changed pressure for the blood vessels of every part of the body, as dependent upon the degree of acceleration, may be read or computed. The hemostatically induced changes in blood pressure in the veins and arteries are explained as to their practical effects in normal flying and upside down flying. In the next communication (II) the author will give the results of simultaneous investigation of blood pressure, frequency of heart beat, and respiration under the influence of high accelerations in curve and steep spiral flights. He will explain his method of electrocardiography, in man during motor flight. In these investigations the "individual basic curves" of blood changes at heart level, dependent upon the degree of acceleration, were obtained for various periods of acceleration. These curves represent a certain "norm" and may give information concerning the ability of the individual to hear high accelerations, by way of showing at what degree of acceleration disturbance of vision and consciousness may be expected. (J. Aviation Med. 5:123-124 (1934).

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von Diringshofen, H. 1934 UBER DIE WIRKUNG DES CORIOLISBESCHLEUNIGUNGEN AUF DAS LABYRINTH BEIM TRUDELN EINES MOTORFLUGZEUGES (The Effect of Complimentary (Coriolis) Accelerations on the Labyrinth During Spinning of an Airplane) Luftfahrtforschung (Munich) 11: 150-151; 22 June 1934

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von Diringshofen, H. 1935 LOS MAS IMPORTANTES PROBLEMS DE LA MEDICINA AERONAUTICA (The Most Important Problems of Aviation Medicine) Revista médica germano-ibero-americana (Leipzig) 8: 418-438

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von Diringshofen, H. 1935 DIE WICHTIGSTEN AUFGABEN DES FLIEGERARZTES UND DER LUFTFAHRTMEDIZIN (The Most Important Tasks of the Flight Surgeon and Aviation Medicine). Deutsche Medizinische Wochenschrift (Stuttgart) 61:461-464 & 545-547.

ABSTRACT: Much German research deals with the problems of oxygen deficiencies. Effect of speed on the heart is studied. Even at 5 g. the normal blood pressure is not able to pump the blood from the heart to the brain. However, blood pressure rises in compensatory effort. This compensatory rise in blood pressure required from 10 to 20 minutes to develop and can be aided voluntarily by the pilot by tensing his limbs and abdominal muscles. Much greater speed can be tolerated in a lying position.

Brief accelerations to 8 g. may be tolerated without ill effect, whereas acceleration above 5 g. lasting several seconds may cause visual disturbance. Very brief accelerations to 10.5 g. may cause cerebral concussions. Systematic studies are needed to determine the limits of tolerance of the normal person. Small pilots are preferable to tall pilots because there is less distance for the heart to pump the blood to the brain. Studies during flight are indispensable and a technic for the objective study of these conditions during flight is necessary. Sudden traction on the pericardium has been known to cause cardiac arrest. Simultaneous records of the pulse, blood pressure, and respiration during flight should be made. ABSTRACT: (Limited) Journal of Aviation Medicine, 6(4):160-161.

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von Diringshofen, H. 1936 UBER DIE WIRKUNG HOHER BESCHLEUNIGUNGEN UND FLIEHKRAEFTE AUF DEN MENSCHEN (Effect of Great Accelerations of Speed and Centrifugal Force on Man) Luftfahrtmedizinische Abhandlungen (Leipzig) 1: 72-85

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von Diringshofen, H. 1959 SENSORY-PHYSIOLOGICAL OBSERVATIONS DURING THE
TRANSITION FROM ACCELERATION TO WEIGHTLESSNESS
Raketentechnik und Raumfahrtforschung (Stuttgart) 3(2): 33-35 (In German)
Translated in: U.S. Joint Publications Research Service, Feltman Research and
Engineering Labs., Picatinny Arsenal, Dover, N.J., Picatinny Arsenal
Translation No. 61, Pp. 1-8, Nov. 1959 ASTIA AD 228 967
See also: J. Aerospace Medicine 30(8): 621-622

ABSTRACT: A review of three experiments is presented concerning the immediate physiologic and psychologic effects of short exposures to subgravity. (1) About 20 years ago, the author induced weightlessness by vertical dives in a Ju-87 aircraft for durations of 7-8 seconds (radial acceleration 8 G). The psychologic reaction was a pleasant one, and the sensation of "slumping", which usually introduces weightlessness episodes, was not perceived. (2) In 1954, while in Argentina, the author achieved weightlessness in parabolic flight for durations of 12-14 seconds, preceded by an acceleration of 5 G lasting 5 seconds. Transitional accelerations of 2 G preceding weightlessness lasted 2 seconds. Disagreeable sensations of "slumping" and of falling through empty space were distinctly perceived for about 5 seconds after the onset of weightlessness, leading over eventually to a sensation of floating in space. (3) In a "subgravity tower" designed by Dr. T. Lomonaco at the Aeromedical Research Institute in Rome, weightlessness was produced in a seat suspended from and catapulted upward by rubber straps fastened to the top of a 15-m.-high tower. Initial acceleration was 3 G and lasted .5 second. Three launchings were carried out consecutively, inducing weightlessness for 2, 1.3, and .8 seconds, respectively. At the point of transition from acceleration to weightlessness a very disagreeable sensation of falling was perceived. The findings of these three experiments, in conjunction with results of more extensive experiments carried out in the United States by Gerathewohl and others, can only be considered preliminary to weightlessness conditions in space travel. There is evidence to the effect that acclimatization takes place when weightlessness extends over longer periods. It appears that nausea and other disagreeable sensations are experienced less frequently by individuals actively engaged in navigation or in other mind-absorbing tasks than by "passive" riders. In conclusion, the author speculates on the possibility that changes in G force during the various accelerative launching stages may be particularly inductive to "space sickness".

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von Diringshofen, H. 1961 CONSIDERATIONS FOR SPECIAL INSTRUMENT FLIGHT
TRAINING TO MINIMIZE SPACIAL DISORIENTATION
Aerospace Medicine 32(5):442-443, May 1961.

ABSTRACT: The problem of the unlimited control of the high speed aircraft during instrument flight is discussed. The present practice of a combination of visual and instrument combat flying is said to be one of the main causes of spatial disorientation and vertigo. As speeds increase the danger also increases. Thus, the need for increased instrument training in blind flight is stressed in order to minimize spatial disorientation. The artificial horizon indicator and warning signals to avoid dangerous flight situations are discussed as important unsolved display problems. (Tufts)

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von Diringshofen, H. 1944 BLOOD CIRCULATION IN CHANGING FIELD OF GRAVITY
Deutsche Medizinische Wochenschrift (Stuttgart) 70: 150; 17 March 1944.

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The Air Surgeon's Bulletin. 2(11):410

ABSTRACT: "Some interesting gossip about Heinz von Diringshofen,.....is related by an intelligence report from Headquarters of the IX Service Command. He was given his own research laboratory at the University of Frankfurt after having differences with Strughold, the top man in German Air Force aeromedical research. This laboratory was almost completely destroyed by bombings only 2 months after work had been started, but inspection of a wrecked centrifuge found there and various reports written by von Diringshofen lead to the belief that the centrifuge probably had been used for experimental studies on the labyrinth. He also had been working on the problem of resuscitation with a rather complicated tilt table.....". (CARI)

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von Diringshofen, H. 1950 BESCHLEUNIGUNGSWIRKUNGEN IM RONTGENBILD (Acceleration Effects in the X-ray Pictures)
Weltraumfahrt 1: 135-137

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von Diringshofen, H. 1952 MEDIZINISCHE PROBLEME DER RAUMFAHRT (MEDICAL PROBLEMS OF SPACE FLIGHT)
(In: Raumfahrtforschung, Ed. by H. Gartmann, Munich, Oldenburg Press, 1952)

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Riv. Med. Aero. (Roma) 22:15-25, July-Sept. 1959

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DES IM FLUGZEUG SITZENDEN MENSCHEN (Effect of Centrifugal Acceleration
in Flight on Circulation of Man in Sitting Position)
Luftfahrtmedizin 6: 152-165, 1942

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von Diringshofen, H. 1942 INCREASED DANGER OF CIRCULATORY COLLAPSE
DUE TO SIMULTANEOUS ACTION OF ALTITUDE AND ACCELERATION IN AIR-
PLANES. War Med., 2:373.

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von Diringshofen, H. 1943 THE JU-89 EQUIPPED FOR MEDICAL FLIGHT RESEARCH
J. Royal Aeronautical Soc. 47:416-417, 1943
See also Flugsport 35:108-111, 1943

ABSTRACT: Acceleration tolerance was determined in a JU-89 on 22 subjects in 200
plane runs, the highest acceleration used being 8.5 "g" for 3 seconds.

| % Subjects | <u>Grayout</u> | <u>Blackout</u> | <u>Collapse</u> |
|------------|----------------|-----------------|-----------------|
| 80 | 5 "g" | 5.5 "g" | 6 "g" |
| 50 | 6 "g" | 6.8 "g" | 7.5 "g" |
| 20 | 6.5 "g" | 7.5 "g" | 8.0 "g" |

When subjects became anoxic, collapse occurred in 2 to 3 seconds at 3 "g".

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von Diringshofen, H. 1943 AENDERUNG DER LAGE DES MENSCHEN IM SCHWEREFELD
DER ERDE (Change of the Human Position in the Field of Gravity of
the Earth)
Deutsche Medizinische Wochenschrift (Stuttgart) 69: 498.

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von Diringshofen, H. 1943 DER MENSCH IM VERÄNDERTEN SCHWEREFELD (Man in the
Changed Field of Gravity)
Klinische Wochenschrift (Berlin) 22: 450

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von Diringshofen, H. 1943 MAN IN CHANGING FIELD OF GRAVITY: EFFECTS
OF CHANGES IN POSTURE WHILE FLYING. Muenchen Med. Wschr. 90:279,
April 1943.

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von Diringshofen, H. 1940 UNTERSUCHUNGEN IM FLUGZEUG UBER DIE ERHOHTE
KOLLAPSGEFAHR DURCH GLEICHZEITIGE EINWIRKUNG VON HOHE UND BESCHLEUNIGUNG
(Increased Danger of Circulatory Collapse Due to Simultaneous Action of
Altitude and Acceleration in Airplanes)
Verh. dtsh. Ges. Kreislaufforsch. (Dresden) 13: 92-97

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von Diringshofen, H. 1941 THE EFFECT OF THE CENTRIFUGAL FORCES ON
THE BLOOD CIRCULATION OF THE AIRCRAFT PILOT.
Luftfahrtmedizin 6:152-165. R.T.P. Translation No. 1680 May 1941.

ABSTRACT: Reactions to "g" may be divided into 3 categories depending on
cardiovascular tone of pilot.

- a. In those with high blood pressure and normal or increased minute
volume of heart, blackout threshold is high and recovery very rapid.
- b. In those with normal or low blood pressure and adequate circulation,
visual difficulties occur at moderately low values of "g" accompanied by
insufficient filling of the right auricle. The left ventricle is definitely
flattened.
- c. In those with weak cardiovascular systems, the whole circulation
fails under "g". Muscle tone is lost and the heart beats empty. A long
period of recovery is necessary. This is very dangerous.

5,705

von Diringshofen, H. 1941 DIE WIRKUNG VON FLIEHKRAFTEN AUF DEN BLATKREISLAUF
DES IM FLUGZEUG SITZENDEN MENSCHEN (The Effect of the Centrifugal Forces
on the Blood Circulation of the Aircraft Pilot)
Luftfahrtmedizin 6: 152-165
(R.T.P. Translation No. 1680 issued by the Ministry of Aircraft Production)

ABSTRACT: Reactions to "g" may be divided into 3 categories depending on
cardiovascular tone of pilot. In those with high blood pressure and normal
or increased minute volume of heart, blackout threshold is high and recovery
very rapid. In those with normal or low blood pressure and adequate circulation,
visual difficulties occur at moderately low values of "g" accompanied by
insufficient filling of the right auricle. The left ventricle is definitely
flattened. In those with weak cardiovascular systems, the whole circulation
fails under "g". Muscle tone is lost and the heart beats empty. A long period
of recovery is necessary. This is very dangerous.

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von Diringshofen, H. 1938 UNTERSUCHUNGEN IM MOTORFLUGZEUG ZUR BESTIMMUNG DER ERTRAGLICHKEITSGRENZEN GEGENÜBER FLIEHKRAFTEN (Determination of Limits of Endurance of Acceleration During Flight)
Luftfahrtmedizin 2: 321-332

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von Diringshofen, H. 1939 MEDICAL GUIDE FOR FLYING PERSONNEL (Toronto: Univ. of Toronto Press)

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von Diringshofen, H. MEDICAL GUIDE FOR FLYING PERSONNEL.
Translation; V.E. Henderson, University of Toronto Press, 1940

ABSTRACT: This monograph considers high flights, the effect of acceleration and of centrifugal force, the importance of the sense organs for the flier, sensory illusions in blind flying, the effects of noise and vibration and the cause of air sickness, sport for flying personnel, hygiene, the important points in the medical examination of flying personnel, and the flier and his medical officer.

Persons sitting in an airplane may suffer the following disturbances:

- (1) Those occurring during the normal increase in centrifugal force which is of short duration.
- (a) The visual disturbances which occur in one or two seconds after the force is applied and quickly disappear as the centrifugal forces diminishes. These are the well known "gray veil" or "mist before the eyes" which, if the force is greater, becomes the "blackout" the total loss of vision with consciousness retained.
- (b) The same disturbance together with temporary loss of consciousness.
- (2) The deep, long-lasting loss of consciousness due to the centrifugal forces overstraining the circulation and leading to a circulatory collapse (collapse due to excessive strain)
- (3) A very transitory disturbance of vision with a slight clouding of consciousness after a short zoom upward.

The disturbance of vision and consciousness most frequently observed occur only one and one-half to two seconds after the beginning of the centrifugal force and end almost with its cessation. Dependent on the magnitude of the force the disturbances are more or less marked.

A very slight disturbance consists in a "gray veil." The outlines of the objects under observation, instruments, etc., are no longer sharp. They appear as though they were seen through a mist, which becomes thicker as the force increases and thins as it decreases. With increasing centrifugal force the mistiness passes into blindness, which is described as the eyes becoming black or "blacking out." Consciousness is quite clear and thinking undisturbed.

There is no longer any doubt that disturbances of blood flow in the retina of the eye and in the brain are the cause of the disturbances.

5,695

von Diringshofen, H. 1937 TOLERABLE CENTRIFUGAL FORCES AND EFFECT OF POSTURE. (Biz Zu welcher Staerke kann der Mensch im Flugzeug Zentrifugalkraefte vertragen.....Koerperhaltung) ASTIA ATI-60740, March 1937.

ABSTRACT: Maximum tolerable centrifugal forces which the human can withstand without ill effects and their effects of posture were investigated. A series of tests with individuals in an erect or slightly stooped sitting position showed that the maximum endurance to centrifugal force of three seconds duration is 4 to 8 g. In a crouched posture this figure may be increased to 8 to 10 g. This is approximately twice the figure which has been cited and accepted in technical circles. Of the individuals tested, 50% withstood 8.5 times the force of gravity for three seconds without visual disturbance and without loss of consciousness.

5,696

von Diringshofen, H. 1937 KORPERLICHE BEANSPRUCHUNG DER BESATZUNG IN HOCHWERTIGEN FLUGZEUGEN (Bodily Requirement of the Crew in High Value Aircraft)
Luftwehr. (Berlin) 4: 359-366

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von Diringshofen, H. 1938 BESCHLEUNIGUNGSFRAGEN AUS DER PRAXIS (Acceleration Questions Out of the Practice)
Luftfahrtmedizinische Abhandlungen (Leipzig) 2: 103-115

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von Diringshofen, H. 1938 VORLAUFIGE MITTEILUNG UBER RONTGENAUFNAHMEN UND DURCHLEUCHTUNGEN DES HERZENS BEI FLIEHKRAFT-EINWIRKUNGEN IM FLUGZEUG (Roentgenography and Roentgenoscopy of Heart During Acceleration: Preliminary Report)
Luftfahrtmedizin 2: 281-286

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von Diringshofen, H. 1938 FÜR DEN TRUPPENARZT PRAKTISCH WICHTIG FRAGEN DER LUFTFAHRTMEDIZIN (Practical, Important Questions of Aeromedicine for the Company Doctor)
Luftfahrtmedizinische Abhandlungen (Leipzig) 2: 252-253

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von Diringshofen, H. 1936 INFLUENCE OF GREAT ACCELERATION OF SPEED ON BLOOD PRESSURE, HEART RATE AND RESPIRATION DURING FLYING. (DIE WIRKUNG VON GRADLINIGEN BESCHLEUNIGUNG UND VON ZENTRIFUGALKRAFTEN AUF DER MENSCHEN. EXPERIMENTELLE UNTERSUCHUNGEN UBER DEN EINFLUSS HOHER BESCHLEUNIGUNGEN AUF BLUTDRUCK, HERZSCHLAG, UND ATMUNG DES MENSCHEN IN MOTORFLUG).
Abstract: J. Avia. Med. 7:50-51
See also Ztschr. f. Biol. 95:551-566, 1934.

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von Diringshofen, H. 1936 UBER DEN EINFLUSS DER KORPERHALTUNG FUR DAS ERTRAGEN HOHER BESCHLEUNIGUNGEN (Influence of Body Posture on Ability to Endure Greatly Accelerated Speed and Evaluation)
Verh. dtsh. Ges. inn. Med. (Munich) 48: 283-287.

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von Diringshofen, H. 1936 UNTERSUCHUNGEN IM FLUGZEUG UBER SEH-UND BEWUSSTSEINSSSTORUNGEN DURCH ZENTRIFUGALBESCHLEUNIGUNGEN (Research in the Aircraft Concerning Sight and Consciousness Disturbances Through Centrifugal Accelerations)
Klinische Wochenschrift (Berlin) 15: 877

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von Diringshofen, H. 1936 UNTERSUCHUNGEN DER ERTRAGLICHKEITSGRENZEN FUR ZENTRIFUGALKRAFT IM MOTORFLUG (Extent to Which Centrifugal Forces May Be Withstood in Airplanes)
Verh. dtsh. Ges. Kreislaufforsch (Dresden) 9: 288-290

5,694

von Diringshofen, H. 1937 MAXIMUM TOLERABLE CENTRIFUGAL FORCES AND EFFECT OF POSTURE (PART 3 OF 10 PARTS) (BIZ ZU WELCHER STAERKE KANN DER MENSCH IM FLUGZEUG ZENTRIFUGALKRAEFTE VERTRAGEN... KOERPERHALTUNG) ASTIA ATI 60740.

ABSTRACT: Maximum tolerable centrifugal forces which the human can withstand without ill effects and their effects of posture were investigated. A series of tests with individuals in an erect or slightly stooped sitting position showed that the maximum endurance to centrifugal force of three seconds duration is 4 to 8 g. In a crouched posture this figure may be increased to 8 to 10 g. This is approximately twice the figure which has been cited and accepted in technical circles. Of the individuals tested, 50% withstood 8.5 times the force of gravity for three seconds without visual disturbance and without loss of consciousness.

5,720

von Diringshofen, H. 1961 INTERNATIONALES SYMPOSIUM UBER LUST-UND RAUMMEDIZIN (International Symposium on Aerospace Medicine) (Weltraumfahrt (Frankfurt), 12(1):11-12, Feb. 1961, in German)

ABSTRACT: The symposium was sponsored by the Aviation Medicine Institute of the Argentine Air Force and was held October 6-13, 1960, at the School of Medicine, University of Buenos Aires. The outlook of the United States on the relative importance of psychological tests in the evaluation of space flight candidates was compared to the outlook of Europe on the same subject. However, most discussion centered around the psychological aspects of space flight and acceleration forces and tolerances. Films were shown of rocket-sled and weightlessness tests.

5,721

von Diringshofen, H. 1962 BEITRAGE UND ANREGUNGEN DER RAUMFAHRTMEDIZIN FUR ANDERE GEBIETE DER MEDIZIN (The Contributions and Stimulations of Space Medicine to Other Fields of Medicine)
In Antonio Ambrosini, Ed. RENDICONTI DEL CONGRESSO INTERNAZIONALE--L'UOMO E LA TECNICA NELL'ERA NUCLEARE E SPAZIALE, 18-21 APRILE 1962, (Proceedings of the International Congress--Man and Technology in the Nuclear and Space Age, 40th Trade Fair, Milan, April, 18-21, 1962)
Rome, Italy: Associazione Internazionale Uomo nello Spazio
Pp. 505-511 N63-18941ⁿ

ABSTRACT: The value of investigations inot space medical problems and the results of research in several medical areas are reviewed to determine the practical value of stimulating interest in space medicine among all medical sciences. Results indicate that the scientific value of such a widespread medical interest would be in excess of the psychological and physiological requirements of manned spaceflight. (N63-18941)

5,722

Von Doenhoff, A. E. and G. W. Jones, Jr. 1953 AN ANALYSIS OF THE POWER-OFF LANDING MANEUVER IN TERMS OF THE CAPABILITIES OF THE PILOT AND THE AERODYNAMIC CHARACTERISTICS OF THE AIRPLANE. NACA TN 2967, Aug. 1953.

5,723

von Gierke, Henning E., & Eugene Steinmetz MOTION DEVICES FOR LINEAR AND ANGULAR OSCILLATION AND FOR ABRUPT ACCELERATION STUDIES ON HUMAN SUBJECTS. NRC. No. 903.

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von Gierke, H. E., & E. Steinmetz 1961 MOTION DEVICES FOR LINEAR AND ANGULAR OSCILLATION AND FOR ABRUPT ACCELERATION STUDIES ON HUMAN SUBJECTS (IMPACT). A DESCRIPTION OF FACILITIES IN USE AND PROPOSED. (U. S. Armed Forces--National Research Council, Committee on Bio-Astronautics, Washington, D. C.) Publication No. 903; ASTIA AD-266 078.

ABSTRACT: This report briefly describes the purposes, design principles, motion capabilities, and control and safety features of some forty facilities designed to study the effects of linear and angular oscillations and of abrupt acceleration on human safety and performance. Some facilities presently under study but not yet built are also included. Photographs or schematic drawings of the design are presented for those devices for which they are available. The report includes the geographical locations of the facilities and the contact point for obtaining further information on each. (Authors)

5,725

von Gierke, H.E. 1961 BIOMECHANICS OF IMPACT INJURY.
(Aerospace Medical Lab., Wright-Patterson AFB, Ohio)

ABSTRACT: A review of the biomechanics of impact injury indicates that (1) Steady-state vibration studies are very helpful for interpreting impact tolerance data. The mechanical models for the human body derived from such studies are useful as a basis for theoretical analysis and prediction of impact response. (2) Theoretical analysis of the response of the complex human system to impact loads shows clearly that a complete description of the force-time function of the impact load is necessary to define response or tolerance uniquely. Only in very limited impact-duration ranges can a single parameter such as peak acceleration, impulse, or rate-of-onset be considered primary to the response.

5,726

von Gierke, H.E. & R.R. Coermann 1961 THE BIODYNAMICS OF HUMAN RESPONSE TO VIBRATION AND IMPACT
In: Proceedings of the International Congress of Aviation and Cosmonautical Medicine, Paris, September, 1961
See also: Revue de Medicine Aeronautique, Vol. 2, 1962.
See also: Industrial Medicine and Surgery 32: 30-32, 1963.

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Von Gierke, Henning 1961 IMPACT ANALYSIS: INSTRUMENTATION PROBLEMS
(Paper, Symposium On Impact Acceleration Stress, Brooks Air Force Base, San Antonio, Texas, November 27-29, 1961)

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Von Gierke, H.E. 1961 THE RELATION BETWEEN STEADY STATE RESPONSE AND IMPACT RESPONSE OF THE HUMAN BODY. (Paper, Symposium on Biomechanics of Body Restraint and Head Protection, Naval Air Materiel Ctr., Philadelphia, Pa., 14-15 June 1961)

ABSTRACT: The physical properties of human body tissue and the behavior of the body as a passive mechanical system are reviewed. The physiological and pathological effects limiting human tolerance to vibration and impact loads and their connections with the body's physical responses are discussed. For excitation with steady state vibration and abrupt acceleration patterns containing frequencies below approximately 50 cps, the body's response can be described by analyzing the body as a lumped parameter system. Recent studies contributed to a further refinement of such a mechanical model and to a quantitative determination of its parameters. This model is useful in studying the dynamics of the body exposed to the various steady state and transient force patterns of interest in aerospace operations but has also broader physiological applications. Mechanical impedance measurements on anthropomorphic dummies are compared with measurements on live subjects. The limitations in using dummies instead of human subjects are discussed and suggestions are made to improve present-day dummies and to evaluate quantitatively their dynamic properties. The theoretical and analysis presented helps in interpreting biological effects, in guiding future experimentation, and in developing and understanding protective measures. Gaps in our present knowledge and parameters to be investigated to make existing data more adequate to arrive at definitive vibration and impact exposure criteria are discussed.

5,729

von Gierke, Henning E. 1962 BIOMECHANICS OF IMPACT INJURY
In: Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, pp. 121-122

ABSTRACT: A review of the biomechanics of impact injury indicates that: (1) Steady-state vibration studies are very helpful for interpreting impact tolerance data. The mechanical models for the human body derived from such studies are useful as a basis for theoretical analysis and prediction of impact response. (2) Theoretical analysis of the response of the complex human system to impact loads shows clearly that a complete description of the force-time function of the impact load is necessary to define response or tolerance uniquely. Only in very limited impact-duration ranges can a single parameter such as peak acceleration, impulse, or rate-of-onset be considered primary to the response.

5,730

von Gierke, H.E. & E.P. Hiatt 1962 BIODYNAMICS OF SPACE FLIGHT
In: Singer, S.F., ed., Progress in the Astronautical Sciences, 1: 343-401
See also: WADD-Q-1

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von Greim, R. 1931 KUNSTFLUG (Skill Flight)
Flugsport (Frankfurt a.m.) 23: 104-116

5,732

von Hermann, F. 1952 PRONE FLYING
Sailplane and Glider, London, 20:5-7, June 1952.

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von Hoerner, Sebastian 1962 THE GENERAL LIMITS OF SPACE TRAVEL
Science 137(3523):18-23

Summary: This article summarizes the basic facts concerning the possibility of interstellar travel, ignoring technical difficulties. Only such fundamental properties as time, acceleration, power, mass, and energy are considered.

The discussion touches on fuel energy content and exhaust velocity requirements, distances (of the order of 18.6-820 light-years), speeds (approaching the velocity of light), energy content of nuclear fuels utilizing annihilation, fusion, and fission (tabulated), human tolerance to long-term acceleration ($=1g$), relativistic time-dilatation (tabulated), time requirements (at 98% velocity of light, 14 years to travel 18.6 light-years; 300 years to travel 820 light-years).

Author's personal conclusion: "Space travel, even in the most distant future, will be confined completely to our own planetary system, and a similar conclusion will hold for any other civilization, no matter how advanced it may be." (CARI)

5,734

Von Tavell, F. May 1947 IMPORTANCE OF TIME FACTOR FOR DISTURBANCES DUE
TO ACCELERATION DURING MILITARY FLIGHT.
Schweiz. med. Wchnschr. 77:611-614. 31 May 1947

5,735

von Wenusch, F.R. 1898 DIE WIRKUNG DER CENTRIFUGALKRAFT AUF DIE BLUTCIRCULATION
(The Effect of Centrifugal Force Upon the Blood Circulation)
Wiener klinische Wochenschrift (Vienna) 11: 361-365.

5,736

von Wittern, W.W. 1952 FORCE BALLISTOCARDIOGRAPHY.
(Wright Air Development Center, Wright-Patterson AFB, Ohio)
WADC Tech. Report 52-340 Nov. 1952.

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von Wittern, W.W. 1953 BALLISTOCARDIOGRAPHY WITH ELIMINATION OF THE INFLUENCE OF THE VIBRATION PROPERTIES OF THE BODY.
American Heart Journal, 46(5):705-714, Nov. 1953.

5,738

Voyachek, M.E. & I. Steinman 1943 FUNDAMENTALS OF AVIATION MEDICINE
(Assoc. Comm. on Av. Med. Res. of the Natl. Res. Council. Canada)
The Univ. of Toronto Press

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Vykukal, H.C., G.W. Stinnett & R.P. Gallant 1961 PERFORMANCE OF AN INTERCHANGEABLE, MOBILE-PILOT RESTRAINT-SYSTEM DESIGNED FOR USE IN A MODERATELY HIGH ACCELERATION FIELD. (Paper, Aerospace Medical Assoc., Chicago, Ill., 24-27 April 1961)

5,740

Vykukal, H.C., G.W. Stinnett & R.P. Gallant 1961 PERFORMANCE OF AN INTERCHANGEABLE, MOBILE-PILOT-RESTRAINT-SYSTEM DESIGNED FOR USE IN A MODERATELY HIGH ACCELERATION FIELD
Aerospace Medicine 32(3): 251. March 1961

ABSTRACT: A continuing program has been underway at the NASA Ames Research Center to provide a pilot-restraint system suitable for use in research programs designed to investigate the ability of pilots to perform meaningful control tasks while being subjected to large acceleration forces as would be encountered in re-entry vehicles returning from orbital or lunar missions. Previous investigations have used the NASA contour couch which has proved to be unwieldy to handle and is not interchangeable between pilots. At the present, two modified separate pilot restraint systems have been built and tested at the University of Southern California centrifuge, up to levels of 8 g eyeballs in, eyeballs out, and eyeballs down. Modifications to the support concepts as a result of this testing were made, and this new support system was used in a recent program conducted at the AMAL-NADC Johnsville centrifuge. These systems, in part, are mobile, feature quick ingress and exit, a novel pneumatic bladder back support automatically adjusting to the pilot's contour, and are considered by the user pilots to be equal or superior to previous systems experienced. This paper will describe the various support systems and outline the pilot's acceptance of these systems noting those areas requiring improvement. Consideration will be given to the adaptability of the present approach to vibration and impact stresses.

5,741

Vykukal, H.C., R.P. Gallant, & G.W. Stinnett 1961 AN INTERCHANGEABLE, MOBILE PILOT-RESTRAINT SYSTEM, DESIGNED FOR USE IN A MODERATELY HIGH ACCELERATION FIELD. J. Aerospace Med. 33(3):279-285, March 1962.

ABSTRACT: A pilots' mobile restraint suit, developed at the Ames Research Center of the National Aeronautics and Space Administration is described. The primary purpose of this restraint and support system was to permit simulator studies of flight vehicle control under varying conditions of acceleration stress. Although not tested under impact accelerations or lateral transverse forces, it is believed that the basic concept would be useful for an orbital or space vehicle. A list of 8 restraint suit requirements is given with pictures and a detailed description. (CARI)

ACCELERATION

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5,742

Wacholder, B.V. and E. Fayer April 1960 CRITICAL ENVIRONMENTS ENCOUNTERED
BY HIGH-ALTITUDE VEHICLES.
(1960 Proceedings of the Institute of Environmental Sciences, 19-35)

ABSTRACT: Four typical vehicles were tracked from the launching pad and orbit through to re-entry into the Earth's atmosphere. It is our belief that only through such a study can we obtain the necessary insight into the problems of the environment throughout the vehicle's flight path. This study leads to the conclusion that the critical environments are vacuum, radiation, and temperature. In addition micrometeorites have to be considered as a possible hazard to vehicle's flight path. This study leads to the conclusion that the critical environments are vacuum, radiation, and temperature. In addition micrometeorites have to be considered as a possible hazard to vehicles designed to stay in orbit for an extended period of time. The effect of the unique space environment of radiation and vacuum on the more susceptible materials and components such as plastics and semiconductors was also outlined.

It is planned to continue the study to determine instrumentation requirements to monitor the deleterious space environments.

5,743

Wacholder, B.V. & E. Fayer 1960 STUDY OF INSTRUMENTATION AND TECHNIQUES FOR
MONITORING VEHICLE AND EQUIPMENT ENVIRONMENTS AT HIGH ALTITUDE INSTRUMENTA-
TION AND MONITORING TECHNIQUES
Wright Air Development Division, Air Research and Development Command, Wright-
Patterson AFB, Ohio WADC TN-59-307, Vol. III June 1960
ASTIA AD 268 090

ABSTRACT: Instrumentation techniques are presented which are available within the state-of-the-art; an instrumentation system is proposed for the monitoring of high-altitude environments encountered by typical vehicles. The high altitude environmental effects on typical vehicles and equipment is summarized. The present airborne-instrumentation state-of-the-art is presented for measuring temperature, pressure, strain, vibration, acceleration, radiation, meteorite detection, and acoustic noise. A feasible instrumentation system is discussed for monitoring these deleterious environments. In addition, recommendations are made for an extension of this study to cover environments created by nuclear and other advanced propulsion systems. Another recommendation is the continuation of the instrumentation study to effect a complete design specification for an environmental monitoring system for a particular vehicle.

5,744

Wacholder, B.V. and E.Fayer 1961 STUDY OF INSTRUMENTATION AND TECHNIQUES
FOR MONITORING VEHICLE AND EQUIPMENT ENVIRONMENTS AT HIGH ALTITUDE.
VOLUME I. VEHICLES AND ENVIRONMENTS. WADC TN 59 307, ASTIA AD 266288

ABSTRACT: Typical aerospace vehicles and their trajectories are described. The operating environments of these vehicles, in the region of space between the earth and the moon, are discussed. Those vehicles studied include the boost-glide vehicle, nearearth orbiting vehicles, extreme elliptical orbiting vehicles traversing the Van Allen radiation belts, transfer vehicles, and lunar vehicles. Each vehicle studied typifies some environmental problem, such as re-entry conditions or radiation effects. (Author)

5,745

Waggoner, J. N. et al 1960 PRESENT ACTIVITIES IN THE LIFE SCIENCES.
1960 Report by the Life Sciences Committee, Aerospace Medical
Association, Washington, D. C.

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Wagner, E. 1886 FORTGESETZTE UNTERSUCHUNGEN ÜBER DEN EINFLUSS DER SCHWERE
AUF DEN KREISLAUF (Continued Research Concerning the Influence of Gravity
Upon the Circulation)
Pflüg. Arch. ges. Physiol. (Berlin) 39: 371-386.

5,747

Wahl, N. E. & A. A. Whiting 1948 HEAD IMPACT INVESTIGATION. FINAL REPORT.
(Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y.) Contract No.
N6ori-119, Rept. No. OG-537-D-9, Jan. 1, 1948. ASTIA ATI 201 360.

ABSTRACT: The objectives of this project were the collection of data on accelerations, impact blows, and the determination of protective characteristics of panels and structural configurations.

A plastic head form filled with a gelatinous material was developed to have strength characteristics similar to those of a human head. This 9-1/2 pound head form was designed to fracture when dropped five feet onto a flat, rigid surface.

A shock cord actuated catapult apparatus was developed to project the head forms into test panels and other structural configurations. This device produced a range of impact velocities of the head form from 15 to 140 feet per second. The head form was cradled on a catapult car which was mounted on two horizontal rails. The shock cords accelerated the head form over a distance of 6 feet, at which point the shock cords arrested the catapult car and the head form continued to travel in free flight approximately 8 feet to the test panel.

5,748

Waite, G. E. n.d. INVESTIGATION INTO THE EFFECT OF ALTITUDE AND ANOXIA ON "BLACKING-OUT" THRESHOLD. (Great Britain, Flying Personnel Research Committee) Rept. No. FPRC 213

5,749

Wahl, N.E., Whiting, A.A. 1948 HEAD IMPACT INVESTIGATION - PROGRESS REPORT FOR AUGUST (Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.) Report No. OG-537-D-7, NR-172-384, Contract No. N5ori-119, Task Order 8, 1 Jan. 1948. TIP U1912

ABSTRACT: This program is divided into two phases; one, the development of plastic head forms and two, the evaluation and crash testing of these forms.

During the past month, fifteen head forms were fabricated for test purposes and material for additional head forms has been prepared.

Difficulties were experienced in the instrumentation set-up which required some changes before actual testing could be started.

Several successful test runs were made against 1/8" 24ST aluminum alloy flat panels.

With impact velocities of approximately 30 feet per second, the head form was decelerated at approximately 195 G's with no damage to the head form at the point of impact. There was however, a failure of the head form in contre-coup with a shattering fracture at the rear of the head form.

5,750

Wahl, N.E., A.A. Whiting 1948 HEAD IMPACT INVESTIGATION - PROGRESS REPORT FOR SEPTEMBER (Cornell Aeronautical Laboratory, Inc. Buffalo 21, N.Y.) Rept. No. OG-537-D-8; NR-172-384; Contract No. N6ori-119, Task Order VIII, 1 Jan. 1948 TIP U2186

ABSTRACT: During the past month, additional tests have been run against 1/8" 24ST aluminum alloy flat panels, aluminum alloy curved panels, and sandwich con-

struction panels using balsa wood and Styrofoam. An additional series of tests have been run using several tubes of different materials.

Tests conducted at impact velocities up to 60 ft. per second indicate that the sandwich construction panel offers excellent protection for the head form. 24ST aluminum alloy tubes with low diameter: thickness ratio severely damaged the head form on impact. By increasing the diameter: thickness ratio, the tubes were less destructive to the head form on impact.

The test work on various panels is nearing completion and the next report published will be the final report summarizing all work covered under this contract.

5,751

Wahl, N.E. & A.A. Whiting 1948 HEAD IMPACT INVESTIGATION
(Cornell Aeronautical Lab., Inc., Buffalo, N.Y.) Report No OG-537-D-9
NR 172-384, 22 Dec. 1948. ASTIA AD 201360.

ABSTRACT: The objectives of this project were the collection of data on accelerations impact blows, and the determination of protective characteristics of panels and structural configurations.

A plastic head form filled with a gelatinous material was developed to have strength characteristics similar to those of a human head. This 9-1/2 pound head form was designed to fracture when dropped five feet onto a flat, rigid surface.

A shock cord actuated catapult apparatus was developed to project the head forms into test panels and other structural configurations.

It was found that with proper considerations for the design of impact structures it is entirely possible to absorb impact energies of 400-800 in. lbs. without fracture of the skull. Prevention of skull fractures by proper energy absorption devices will greatly reduce the number of fatal injuries received in airplane crashes. However, fracture of the skull is only one indication of a lethal blow and many deaths have been recorded where the brain has been injured as a result of a head blow without skull fractures.

5,752

Wakeley, C.P.G. 1943 BLAST INJURIES (DR. JOHN BURNS LECTURE) Glasgow Med. J.
139:91-102

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Wald, H., M. Guernsey, & F. H. Scott 1937 SOME EFFECTS OF ALTERATION OF
POSTURE ON ARTERIAL BLOOD PRESSURE. Amer. Heart J. 14:319-330

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Walchner, O. & F.M. Sawyer 1958 PARACHUTIST SPIN PROBLEM.
(USAF, Wright-Patterson AFB, Ohio) WADC TN-58-261. Sept. 1958.

5,755

Walchner, O. & F.M. Sawyer 1960 PARACHUTIST'S SPIN PROBLEM
(Aeronautical Research Lab., Wright Air Development Div., Wright-
Patterson AFB, Ohio) Proj. No. 1366, Rept. No. ARL TN 60-150,
Sept. 1958. ASTIA AD 250 438

ABSTRACT: Research was undertaken to furnish the Aerospace Medical Laboratory an estimate of the spinrates possible when a man falls free from high altitudes in a supine position. The spinning moments acting on a small model in a uniform airflow were determined for some configurations which were slightly unsymmetrical with respect to the spinaxis. The spinrates were then calculated assuming that the body does not pitch and roll during the fall. For a vertical fall from an altitude of 83,000 ft, spinrates were determined which far exceed the value which may be fatal to man. (Author)

5,756

Walchner, O. 1961 PARACHUTIST'S SPIN PROBLEM.
In Bergeret, P., ed., Escape and Survival: Clinical and Biological
Problems in Aero Space Medicine. (Advisory Group for Aeronautical
Research and Development, Paris) AGARDograph No. 52. pp. 10-17
ASTIA Doc. No. AD 261 881.

ABSTRACT: The Aeronautical Research Laboratory of the Air Force Research Division was recently informed of the hazardous flat spin conditions that a parachutist is likely to encounter during a free fall from high altitude. The problem was approached through a study of the autorotation characteristics inherent in different configurations, including man. The tests described here indicated that the spin could be controlled, for instance, by proper orientation and attitudes of the feet or other limbs. However, controlling a flat spin in this

way certainly would require extensive training and would suppose that the man is not in state of shock and has not lost consciousness. Also, the pressure suit worn at high altitudes probably will not allow sufficient freedom to steer the body with the limbs. The fall must be spin proof until a safe altitude is reached at which the parachute can be opened. It was shown that small asymmetries in the configuration may lead to autorotation. The configuration and the flexibility of limbs of man offer very many possibilities for such undesirable asymmetries. The idea of eliminating these asymmetries in shape by placing the man in a capsule is not encouraging after the flat spinning cylinder has been observed in a vertical air flow. Maybe the only efficient approach to a solution to the parachutist's spin problem will be to develop means of preventing a man from assuming a flat position during the fall.

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Waldman, A. N. 1961 PIEZORESISTIVE ACCELEROMETERS
In 1961 Proceedings of the Institute of Environmental Sciences National Meeting, April 5, 6, 7, 1961, Washington, D. C. (Mt. Prospect, Ill.: Institute of Environmental Sciences, P. O. Box 191) pp. 627-633

5,758

Walhout, G.J. , D.J. Schneider & L.E. Spencer 1961 INVESTIGATION, U.S. ARMY
H-21C VERTOL SHAWNEE HELICOPTER
Aviation Crash Injury Research, Phoenix, Arizona Contract DA-44-177-TC-707
TREC Technical Report 61-134 USATRECOM Task 9R95-20-001-01

ABSTRACT: Report is made of crash injury investigation involving a U.S. Army H-21C helicopter to determine the extent of injuries to occupants and aircraft damage. Wreckage was examined at the crash site, photographs obtained, and reconstruction of the approximate kinematics of the crash sequence made. It was found that crew seat attachments failed and injury-producing hazards were present in the aircraft which was extensively damaged. As a result of the findings, it is recommended, in part, that crew and passenger seat belt-shoulder harness tie-down be secured to the basic structure of the aircraft and that the use of cast aluminum for seat anchorages be discontinued.

5,759

Walhout, G. J. and H. W. Schweer Feb. 1962 AIRCRAFT ACCIDENT, HOLLOMAN AIR FORCE BASE, NEW MEXICO (Aviation Crash Injury Research, Phoenix, Ariz.) Rept.no. AvCIR 61-19; Contract DA 44-177-tc-802, TREC TR 62-9, Feb. 1962, ASTIA AD-275 183L

ABSTRACT: On October 26, 1961, a U.S. Army L-19, Serial No. 50-1654, of the Army Aviation Branch at Holloman Air Force Base, New Mexico, crashed while performing simulated bombing attacks on an Army bivouac. The crash site was approximately 3-½ miles west of the departure end of runway 25 at Holloman AFB, New Mexico.

A crash injury investigation of the accident was conducted on October 28-30, 1961 by Aviation Crash Injury Research (AvCIR) under the provisions of U.S. Army Transportation Research Command Contract No. DA 44-177-TC-802.

The investigation revealed that the pilot was seriously injured during impact and was then severely burned by the fire which developed at the end of the crash sequence. The observer, in the rear seat, was also injured when he released his lap belt and was ejected from the aircraft during the crash sequence. As a result of this investigation, it is recommended that: (1) The latching mechanism of the pilot's seat be improved. (2) Consideration be given to the development of crash-fire inerting systems for Army aircraft. Further efforts be devoted to the improvement of the APH-5 retention system. (4) Radio components underneath the rear seat be relocated or padded with energy absorbing material.

5,760

Walker, A. E., J. J. Kollross, and T. J. Case 1944 THE PHYSIOLOGICAL BASES OF CONCUSSION. J. Neurosurg. 1-103.

5,761

Walker, S M. 1955 ACCELERATION OF THE HEART BY KCl, INTRAPERITONEALLY INJECTED, IN THE DOG. (Univ. of Louisville School of Medicine, Louisville, Ky.)

ABSTRACT: Male mongrel dogs were anesthetized with 275 mg/kg of sodium barbital and prepared for recording the respiration, blood pressure, and ECG. A single dose (usually 600 mg/kg) of 2% KCl solution was injected intraperitoneally in 7 animals. The average survival time after KCl injection was 2 hr. and 25 min. The sinus rate was accelerated in 4 out of 7 experiments. Ectopic beats occurred in 5 cases. In all cases A-V block was followed by alternate slow and rapid ventricular beats. The rapid ventricular rate exceeded the initial sinus rate. For the 7 experiments the average sinus rate before KCl injection was 159/min. For the 7 experiments the average of the rapid ventricular rate after KCl injection was 197/

min. Although marked ventricular slowing occurred toward the end of each experiment, only 2 experiments terminated in cardiac arrest. The other 5 terminated in ventricular fibrillation. Previous reports in the literature have shown that intravenous injection of KCl usually produces slowing of the sinus pacemaker and of the ventricular rate. The present report shows that intraperitoneal injection of KCl usually produces acceleration of the sinus pacemaker and of the ventricular rate. (Federation Proceedings 14:486, Mar. 1955)

5,762

Walker, P. B. 1961 THE VICTOR ACCIDENT INVESTIGATION 1959-61.
(Royal Aircraft Establishment, Great Britain) Report No. Structures 266.
ASTIA Doc. No. AD-324 763L. (Secret Report)

5,763

Walhout, G. J., D. J. Schneider & L. E. Spencer 1961 CRASH INJURY
INVESTIGATION: U. S. ARMY H-21C VERTOL SHAWNEE HELICOPTER, TOBYHANNA,
PENNSYLVANIA, 23 AUGUST 1961. (Aviation Crash Injury Research, Phoenix,
Arizona) AvCIR 61-11, TREC Tech. Rept. 61-134, September 1961.

ABSTRACT: Report is made of crash injury investigation involving a U.S. Army H-21C helicopter to determine the extent of injuries to occupants and aircraft damage. Wreckage was examined at the crash site, photographs obtained, and reconstruction of the approximate kinematics of the crash sequence made. It was found that crew seat attachments failed and injury-producing hazards were present in the aircraft which was extensively damaged. As a result of the findings, it is recommended, in part, that crew and passenger seat belt shoulder harness tiedown be secured to the basic structure of the aircraft and that the use of cast aluminum for seat anchorages be discontinued. (AUTHOR)

5,764

Walhout, G. J. & H. W. Schweer 1962 CRASH INJURY INVESTIGATION: U. S.
ARMY L-19A AIRCRAFT ACCIDENT, HOLLOMAN AIR FORCE BASE, NEW MEXICO,
26 October 1961. (Aviation Crash Injury Research, Phoenix, Arizona)
AvCIR 61-19, TREC Tech. Rept. 62-9, February 1962.

ABSTRACT: Report is made of crash injury investigation involving a U.S. Army L-19A aircraft to determine cause of injuries and extent of aircraft damage. Wreckage was examined at the crash site, photographs obtained, and reconstruction of the approximate kinematics of the crash sequence made.

The investigation revealed that the pilot was seriously injured during impact and was then severely burned by the fire which developed at the end of the crash sequence. The observer, in the rear seat, was also injured when he released his lap belt and was ejected from the aircraft during the crash sequence. As a result of this investigation, it is recommended that:

1. The latching mechanism of the pilot's seat be improved
2. Consideration be given to the development of crash-fire inerting systems for Army aircraft.
3. Further efforts be devoted to the improvement of the APH-5 retention system.
4. Radio components underneath the rear seat be relocated or padded with energy absorbing material. (AUTHOR)

5,765

Walker, A. Earl, Jerry J. Kollros, & Theodore J. Case 1944 THE PHYSIOLOGICAL BASIS OF CONCUSSION
(J. of Neurosurg. 1(2):103-116 March 1944)

ABSTRACT: Analysis of the clinical manifestations of concussion in the cat, dog and monkey show that they are the result of intense excitation of the central nervous system at the moment of the blow to the head.

At the moment of concussion a marked electrical discharge occurs within the central nervous system. In the vinethene-novocaine anesthetized animal the cortical activity is increased in frequency following the initial discharge (afterdischarge) for 10 to 20 seconds, then decreases until there is little spontaneous activity (extinction). Within several minutes the electroencephalogram becomes practically normal again.

At the moment of a blow on the skull a sudden increase in pressure at the site of impact occurs with pressure waves being transmitted throughout the intracranial cavity.

It is concluded that these mechanical forces produce a breakdown of the polarized cell membranes of many neurones in the central nervous system, thus discharging their axones. This intense traumatic excitation is followed by the same electroencephalographic, chemical and clinical phenomena which characterize intense stimulation of the nervous system by electrical, chemical or other agents. (AUTHOR)

5,766

Walker, Robert Y. 1962 WHAT CAN MAN CONTRIBUTE TO OPERATIONS IN SPACE
In: (School of Aerospace Medicine) Lectures in Aerospace Medicine, 1962
pp. 173-190

ABSTRACT: Man has some real capabilities to contribute to space flights that cannot be duplicated by machines. Man has the specific advantages of being

able to economically, simply, and without fixed pre-programming sense, synthesize, judge, and act as an intelligent subsystem responding to events in the performance of the vehicle and the mission to gain the greatest returns. From these reasons, it is imperative that man be included at an early stage in space vehicles to speed up the development and application of such vehicles. This will insure and expedite the growth of such systems to their ultimate operational value for man's use.

5,767

Walsh, E.G. 1957 PHYSIOLOGY OF THE NERVOUS SYSTEM (London, England, Longmans, Green, and Co., 1957)

5,768

Walters, G. R., C. C. Wunder, and Lincoln Smith March 1960 MULTIFIELD CENTRIFUGE FOR LIFE-LONG EXPOSURE OF SMALL MAMMALS . Reprinted from Journal of Applied Physiology 15(2):307-308.

5,769

Walton, L. 1953 TYPICAL IMPACTS OF JET AIRCRAFT LAND CRASHES J. Aviation Med. 24:474-482

5,770

Wang, Kenneth, & Lu Ting 1960 ANALYTIC SOLUTIONS OF PLANAR REENTRY TRAJECTORIES WITH LIFT AND DRAG. (Polytechnic Institute of Brooklyn, New York) PIBAL Rept. No. 601; Contract AF 49(638)445; AFOSR TN 60-508; ASTIA AD-237 370; Apr. 1960

ABSTRACT: An approximate analytic solution was obtained for the shallow re-entry trajectory with aerodynamic forces. The limitation on the entry velocity was removed by retaining the gravitation and the centrifugal terms in the equations

of motion. The solution is applicable to trajectories with entry velocity differing much from the circular orbit velocity. For constant lift and drag coefficients the solutions are expressed as 2 algebraic relations. The first one relates the angle of inclination to the atmospheric density or altitude. The second one relates the velocity to the density. For lift and drag coefficients varying as a function of altitude, the solutions may be modified accordingly. For a given entry condition and vehicle area/wt ratio, the first relation is independent of the drag coefficient. Thus it can be tabulated for various lift coefficients only. The second relation gives the velocity at any point of the trajectory for a given drag coefficient. The acceleration experienced by the pilot, and the total acceleration at any point of the trajectory, can be calculated once the velocity and the density are known. It is found that the maximum acceleration can be approximated by the acceleration at $\gamma=0$, where γ is the angle of inclination. For trajectories consisting of multiple entries and exits the exit velocity and exit angle can be computed by a simple iteration. (AUTHOR)

5,771

Wang, K. and L. Ting 1961 APPROXIMATE SOLUTIONS FOR REENTRY TRAJECTORIES WITH AERODYNAMIC FORCES. (Brooklyn, Polytechnic Inst.)
Contr. AF-49(638)445, Rept. no. 647, AFOSR-684, May 1961

ABSTRACT: Approximate analytic solutions for planar trajectories with constant lift and drag coefficients are obtained by improving and extending the analytic solution of Allen and Eggers, and that of Lees, Hartwig, and Cohen. The solutions are derived in a closed form of simple functions expressing the relations between the velocity, the angle of inclination, and the density, or elevation. Using these relations, the acceleration experienced by the pilot and the peak value can be calculated. Before reaching the peak acceleration and the trajectory of constant lift and drag coefficients can be changed to a trajectory with constant designed acceleration by lift and drag modulation.

5,772

Wang, S. C., & H. I. Chinn 1952 EMETIC TRIGGER ZONE AND MOTION SICKNESS IN DOGS. (College of Physicians & Surgeons, Columbia Univ., New York, and School of Aviation Medicine, Randolph Field, Texas)

ABSTRACT: Wang and Borison (1950) have localized a chemoreceptive trigger zone for emesis in the caudal portion of the medulla. Ablation of this zone protects dogs from vomiting to apomorphine and other centrally acting emetics. The vomiting center remains intact in these animals, because they vomit to threshold doses of orally administered copper sulphate. Twelve dogs which have been consistently sensitive to swinging motion on 4 successive weekly trials are selected for the operations: The results shown in the labyrinthectomized and cerebellar animals are in conformity with those reported by Sjöberg (1931) and by Tyler and Bard (1949), respectively. The findings on trigger zone ablated dogs (see table) indicate that the chemoreceptive zone is in the direct pathway concerned with the vestibular reflex in producing motion sickness. The mechanism involved in the mediation of impulses to this zone is now under study.

5,773

Wang, S. C., & H. I. Chinn 1956 EXPERIMENTAL MOTION SICKNESS IN DOGS: IMPORTANCE OF LABYRINTH AND VESTIBULAR CEREBELLUM. Amer. J. Physiol. 185(3):617-623, June 1956

ABSTRACT: Bilateral labyrinthectomy or ablation of the nodulus and uvula of the cerebellum was observed to eliminate vomiting responses to prolonged swinging motion in dogs selected for their normal susceptibility to motion sickness. Incomplete extirpation of these structures produced partial or total resistance to motion sickness. The animals operated upon exhibited generally normal responses to intravenously administered apomorphine or to orally administered copper sulfate. The results indicate that the vestibular impulses produced by motion traverse the nodulus and uvula of the cerebellum and the chemoceptive emetic trigger zone before reaching the medullary vomiting center.

5,774

Wang, S. C., H. I. Chinn, & A. A. Renze 1957 EXPERIMENTAL MOTION SICKNESS IN DOGS: ROLE OF ABDOMINAL VISCERAL AFFERENTS. (School of Aviation Medicine, Brooks AFB, Texas) Rept. No. 57-112, June 1957

5,775

Ward, A. A., Jr. 1960 EXPERIMENTAL CONCUSSION. FINAL REPORT.
(University of Washington School of Medicine, Seattle, Wash.)
Contract NONR 942(00), Proj. NR 101 127, c. 1960

ABSTRACT: A brief summary was given of research directed at physiological mechanisms responsible for the coma that follows acceleration--acceleration concussion. The technique used was that of monitoring alterations in neural activity after a blow to the head in cats and monkeys. Neurophysiological studies following acceleration concussion were made. A study of drugs for clinical treatment of this condition was also conducted. (Tufts)

5,776

Ward, A. A., Jr. 1961 EXPERIMENTAL CONCUSSION.
(School of Medicine, Washington University, Seattle) (Contract Nonr-94200, Proj. NR 101 127) ASTIA Doc. No. 264 899.

5,777

Ward, Arthur A., Jr. June 1961 PHYSIOLOGICAL BASIS FOR CONCUSSION.
(Laper, Symposium on Biomechanics of Body Restraint and Head Protection,
Naval Air Material Center, Philadelphia, Penn. June 14-15, 1961)

ABSTRACT: Within the brain, a complex biological communication device containing 10 billion elements, there are circuits within the central core which appear to play an indispensable role in the maintenance of consciousness. The function of this reticular activating system, which projects diffusely to many parts of the brain, is dependent upon a continuous input of sensory signals. If this sensory driving is blocked in any fashion, activity in these critical circuits then "runs down" and consciousness is lost. Direct damage to these circuits in the upper brain stem and central thalamus thus produces coma; while blocking transmission of sensory input upon which its activity depends by means of various drugs is the basis for the loss of consciousness during anesthesia. It appears that, following acceleration concussion, changes in those circuits responsible for the sensory driving of the reticular system are also produced so that transmission is blocked and loss of consciousness occurs.

There is evidence to suggest that the human nervous system handles many items of information simultaneously whereas modern computers tend to do one thing at a time. This use of parallel paths with multilevel referencing coupled with systems of second and third order feedback circuits provides a high redundancy figure for the brain with equivalent functional reliability. Were it not for this property, unattainable demands of reliability would be placed upon individual switching elements of the brain. These factors may play a role in the ability of the brain to withstand relatively high forces before concussion occurs.

5,778

Ward, B., E. Schumacher and F. Bloetscher 1960 A SPACE FLIGHT ESCAPE SYSTEM.
In 1960 Proceedings of the Institute of Environmental Sciences, Pp. 298-300.

ABSTRACT: The severity of the external environment that occurs during ballistic re-entry depends upon configuration, ballistic coefficient; surface emissivity, the initial conditions of altitude, velocity and flight path angle; and the method of control for the escape capsule of a manned re-entry vehicle. A jettisonable crew escape capsule is presented for a glide re-entry type of space vehicle which provides an escape capability utilizing drag-stabilized ballistic re-entry. Escape trajectories within specific flight corridor limits are given, and the sequential environmental parameters of temperature, acceleration and atmosphere are analyzed in their relation to vehicle design and human requirements. The capsule internal environment is also discussed and a design solution for its control is presented.

5,779

Ward, J.W. and S.L. Clark 1945 INJURY TO PARANASAL SINUSES BY
SIMULATED BLAST IMPACTS. Report # 70 (abstracted), Comm. Neurosurgery,
12 March 1945

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Wardill, T. E. M. 1948 PHYSIOLOGIC EFFECTS OF FLYING
Caribbean M. J. 10:49-57 (nos. 1-2)

5,781

Ware, Ray. W. 1962 BIO-INSTRUMENTATION FOR SPACE FLIGHT
In: (School of Aerospace Medicine) Lectures in Aerospace Medicine, 1962
pp. 159-172

ABSTRACT: This paper is on the topic of biomedical monitoring with emphasis on the practical and theoretical aspects of biomedical instrumentation. It contains a detailed discussion of the techniques used to obtain the measurements of physiological variables in flight. The physiological parameters discussed are the following: EKG (heart rate); respiratory rate and depth (pulmonary ventilation); blood pressure (systolic and diastolic); body temperature, including both the average of several skin temperature loci and "core" temperature; EEG, GSR: psychomotor performance and; eye movements.

5,782

Warren, J.K. 1962 ASTRONAUTICA E MEDICINA (Astronautics and Medicine)
Rassenga medica e culturale (Milano) 39(9): 15-18, 51. Sept. 1962.

ABSTRACT: Results of recent American and Russian research projects and space missions are reviewed concerned with man in space as affected by magnetic fields, solar radiations, gravitational forces, weightlessness, accelerations, decelerations, and psychological factors. Pictures of a space environment simulator and gondola to study disorientation and the effects of accelerative forces are included. (Aerospace Medicine 34(3): 271. March 1963)

5,783

Warren, N.D. 1950 AN INVESTIGATION OF CERTAIN AFTEREFFECTS OF INTERMITTENT RADIAL ACCELERATION. (The Psychological Laboratory, The University of Southern California) Psychological Research on the Human Centrifuge, Report No. 8. Oct. 1950.

ABSTRACT: Healthy young male students were employed as subjects in an attempt to determine the aftereffects of prolonged exposure to moderate g intensities.

The subjects were divided into experimental and control groups. A battery of six tests was administered to each group before rotation on the human centrifuge and again at the conclusion of the rotation.

The experimental group was subjected to 3 G's for one minute every eight minutes for a total of 7 minutes. The same exposure schedule was employed for the control group except that the g intensity was 1 1/2 instead of 3 g. (Note: a body at rest on the surface of the earth is being accelerated toward its center with a force of one gravity.)

An analysis of the results was made. T-ratios of the mean differences were computed in order to evaluate the within group differences, and t-ratios based on the mean gains were computed for the between group differences.

5,784

Warren, N.D. 1950 PSYCHOLOGICAL RESEARCH ON THE UNIVERSITY OF SOUTHERN CALIFORNIA HUMAN CENTRIFUGE. (Abstract) Amer Psychol., 5(9):465, September 1950

5,785

Warren, B. H., J. A. Roman and A. Graybiel 1963 EXCLUSION OF ANGULAR ACCELERATIONS AS THE PRINCIPAL CAUSE OF VISUAL ILLUSIONS DURING PARABOLIC FLIGHT MANEUVERS. (U.S.A.F. School of Aerospace Medicine, Brooks AFB, Texas) SAM-TDR-63-78.

ABSTRACT: The angular accelerations produced in the pitch axis during parabolic flights in the F-100F jet aircraft were reversed 180° with reference to the experimental subject. This was accomplished by flying the aircraft upside down during most of the subgravity period. During such reversal of angular accelerations, no difference was noted in the observed apparent displacements of a visual real target and afterimage from those observed when the aircraft was flown right side up.

The conclusion is drawn that the angular accelerations resulting in the above maneuvers are not a significant factor in producing visual illusions previously observed and described during the subgravity phase.

5,786

Warren, J.K. 1962 ASTRONAUTICA E MEDICINA (ASTRONAUTICS AND MEDICINE)
Rassenga medica e culturale (Milano) 39(9): 15-18, 51. Sept. 1962.

ABSTRACT: Results of recent American and Russian research projects and space missions are reviewed concerned with man in space as affected by magnetic fields, solar radiations, gravitational forces, weightlessness, accelerations, decelerations, and psychological factors. Pictures of a space environment simulator and gondola to study disorientation and the effects of accelerative forces are included. (Aerospace Medicine 34(3): 271, March 1963)

5,787

Warren, N. D., W. S. Zimmerman, A. A. Canfield, & R. C. Wilson 1948 THE
INFLUENCE OF GRIP UPON ABILITY TO ESTIMATE ACCURATELY THE PULLING FORCE
APPLIED TO AN AIRCRAFT STICK. (Dept. of Psychol., Univ. of Southern
Calif.) Contract No. N6 ori 77, Task Order 3, Jan. 1948

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Warren, N.D., R.C. Wilson, G.A. Green, G.L. Bryan, N.E. Willmorth 1950.
AN INVESTIGATION OF CERTAIN AFTEREFFECTS OF INTERMITTENT RADIAL ACCEL-
ERATION. (Reports from the Psychological Lab., Univ. of Southern Calif.)
(Psychological Research on the Human Centrifuge, Rept. no. 3, under
contract no. N6ori 77, Task Order 3, Office of Naval Research)

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Warren, N.D. 1950 PSYCHOLOGICAL EFFECTS OF INCREASED POSITIVE RADIAL
ACCELERATION. In U.S. Office of Naval Research, A symposium:
Psychophysiological factors in spatial orientation. Washington, D.C.
Pp. 52-54 ONR Proj. Nr. 143-098. Contract N6ori77, Task III, Pensacola,
Florida.

ABSTRACT: In the program of psychological research on the human centrifuge at the University of Southern California, two kinds of problems have been studied: (a) the effects upon certain primary abilities, such as spatial orientation, perceptual speed, etc., and (b) changes in some more complex functions whose applications to design and to personnel questions are more direct. In the latter group are studies of reaching speed and accuracy, and if maximum force which can be applied to airplane controls. Continuing studies in the field indicate that the type of movement required of the subject has a relationship to the speed and accuracy of the movement which may suggest the most advantageous location, not only of emergency control, but of particular kinds of knobs and switches.

5,790

Warren, N. D. 1950 PSYCHOLOGICAL RESEARCH ON THE UNIVERSITY OF SOUTHERN CALIFORNIA HUMAN CENTRIFUGE. (Paper, 30th Annual Meeting of the Western Psychological Assoc., 27-29 April 1950, Santa Barbara, Calif.)

ABSTRACT: Research under Office of Naval Research Contract N6ori77, Task Order 3, is concerned with both theoretical and practical aspects of the effects of positive radial acceleration (g) on human subjects. The centrifuge permits application of controlled amounts of g to (and beyond) the limits of human tolerance. These forces simulate those experienced by flyers during certain maneuvers of the airplane. Results have applicability to problems of aircraft design and to psychophysiological theory. (Amer. Psychologist 5(9):465, Sept. 1950)

5,791

Warren, N. D. 1951 THE EFFECTS OF INCREASED POSITIVE RADIAL ACCELERATION ON REACHING AND MANIPULATING TOGGLE SWITCHES. (University of Southern Calif.) June 1951

5,792

Warren, N.D., G.L. Bryan, R.C. Wilson, N.E. Willmorth, & D.W. Svenson.
1951 PSYCHOLOGICAL RESEARCH ON THE HUMAN CENTRIFUGE.
ASTIA AD 159 432;

5,793

Warrick, M. J., & D. W. Lund 1946 EFFECT OF MODERATE POSITIVE ACCELERATION (G) ON ABILITY TO READ AIRCRAFT-TYPE INSTRUMENT DIALS. (Air Material Command, Wright Field, Dayton, Ohio) Rept. No. TSEAA-694-10; ASTIA ATI-110 567; 15 Nov. 1946

ABSTRACT: This study was conducted to determine whether or not a pilot's ability to read aircraft instrument dials is impaired by a positive G force less than that required to produce blackout. Nine common aircraft instrument dials were reproduced in a printed dial reading test of the true-false type. Thirty-four rated military pilots were given this test on the human centrifuge under conditions of $1\frac{1}{2}$ and of 3 G. It was found that the pilots attempted to read as many dials under conditions of 3 G as they did under conditions of $1\frac{1}{2}$ G. However, under conditions of 3 G, 24% of their readings were erroneous as compared with 18% under conditions of $1\frac{1}{2}$ G. This increase of errors is statistically significant at the 1 percent level of confidence.

5,794

Warrick, M. J., R. E. Nelson, & D. W. Lund 1947 EFFECT OF INCREASED POSITIVE ACCELERATION (G) ON ABILITY TO READ AIRCRAFT INSTRUMENT DIALS. In P. M. Fitts, ed., Psychological Research on Equipment Design (Air Materiel Command Wright-Patterson AFB, Ohio) Rept. No. 19, ATI-125 983, pp. 257-264

SUMMARY AND CONCLUSIONS: 1) The purpose of this study was to determine whether the ability to read aircraft instrument dials is impaired under conditions of moderately low G. Thirty-four rated military pilots were required to read printed simulated instrument dials under conditions of $1\frac{1}{2}$ and 3 G as produced by the human centrifuge. It was found that the subjects made significantly more errors under conditions of 3 G than they did under conditions of $1\frac{1}{2}$ G. 2) Since the ability to read simulated aircraft dials accurately was decreased under conditions of 3 G as compared to conditions of $1\frac{1}{2}$ G, it is concluded that moderate G impairs the ability to read aircraft instruments. (AUTHOR)

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Waterfield, R. L. 1931 THE EFFECT OF POSTURE ON THE VOLUME OF THE LEG.
J. Physiol. 72:121-131

5,796

Waterfield, R. L. 1931 THE EFFECTS OF POSTURE ON THE CIRCULATING BLOOD VOLUME. J. Physiol. 72:110-120

5,797

Waters, J. W. 1954 DITCHING. Flying Safety, 10 (4): 6-9.

ABSTRACT: This is an article dealing with ditching under night and instrument conditions.

5,798

Waters, J. W. 1955 DITCHING. Flying Safety (April 1955): 6-9.

ABSTRACT: This article describes procedures for forced landings upon water, at night, and flying by instruments. First of all it is necessary to establish the circumstances

of the sea and wind, in order to choose the proper landing direction. If the pilot is unable to obtain this information himself, he may obtain it from the flight traffic directions of the "Rescue Coordination Center". It is better, however, that the flyer make his own observations by use of flares. The article then describes the landing procedure with the use of two flares MK5 by 600,000/CP, which each burn three minutes. A follow-up article will describe the method to be used when an accompanying aircraft is present.

5,799

Waters, M.H.L. & A.C. Browning 1961 THE USE OF PARACHUTES AT HIGH
SPEED AND HIGH ALTITUDE (Royal Aircraft Establishment, Gt. Britain)
Technical note No. Mech. Eng. 340, August 1961. ASTIA AD 267 692

ABSTRACT: Parachutes are considered generally as inflatable drag devices, and their use in rocket recovery is studied. The speeds concerned are supersonic and the altitudes range to 300,000 ft., which is the effective limit of the earth's atmosphere. Most of the note discusses the higher altitude region (1000,000 to 3000,000 ft.) where forced inflation is necessary, and aerodynamic heating is important. On the basis of vertical re-entry trajectories, broad design limits for drag devices are suggested, and weight estimates made. Satellite recovery is not treated, but the techniques needed there are common to rocket recovery. Parachute systems are practical for recovering rocket parts, and experiments needed to develop such systems are outlined.
(Author)

5,800

Watson, J. F., N. S. Cherniack, F. W. Zechman 1960 RESPIRATORY MECHANICS
DURING FORWARD ACCELERATION. (Wright Air Development Division) WADD
TR 60-594, ASTIA AD 252 621, Sept. 1960
See also abstract: Fed. Proc. 19:375
See also J. Clin. Invest. 39(11):1737-1743, Nov. 1960

Summary (a): Static relaxation pressure volume curves of the thorax and lung were obtained on 4 trained subjects while in the supine position on the human centrifuge at 1, 2, 3, and 4 g. As acceleration increased, the intrapulmonic pressure increased for a constant volume shifting the pressure volume curve downward and to the right. Compliance of the thorax and lung decreases from 1 to 4 g as the result of the fall in pulmonary mid-position. Inspiration during 4 g acceleration, regardless of the end expiratory position was always active. Elastic work of breathing approximately doubles from 1 to 4 g while nonelastic work does not change.

Absolute lung volumes during acceleration decrease proportionately [sic] with the exception of residual volume which did not change. Since these changes are similar to those described during negative pressure breathing, positive pressure breathing is suggested as a means by which respiration during forward acceleration may be improved and toleration increased. (AUTHOR)

5,801

Watson, J. F., N. S. Cherniack, & F. W. Zechman 1960 RESPIRATORY MECHANICS
DURING FORWARD ACCELERATION. J. Clin. Invest. 39(11):1737-1743, Nov. 1960
See also Fed. Proc. 19:375
See also (Wright Air Development Div., Wright-Patterson AFB, Ohio) WADD
TR 60-594; ASTIA AD-252 621; Sept. 1960, (F)

SUMMARY (a): Static relaxation pressure volume curves of the thorax and lung were obtained on 4 trained subjects while in the supine position on the human centrifuge at 1, 2, 3, and 4 g. As acceleration increased, the intrapulmonic pressure increased for a constant volume shifting the pressure volume curve downward and to the right. Compliance of the thorax and lung decreases from 1 to 4 g as the result of the fall in pulmonary mid-position. Inspiration during 4 g acceleration, regardless of the end expiratory position was always active. Elastic work of breathing approximately doubles from 1 to 4 g while nonelastic work does not change. Absolute lung volumes during acceleration decrease proportionately (sic) with the exception of residual volume which did not change. Since these changes are similar to those described during negative pressure breathing, positive pressure breathing is suggested as a means by which respiration during forward acceleration may be improved and tolerance increased. (AUTHOR)

5,802

Watson, J. F., N. S. Cherniack, F. W. Zechman 1960 RESPIRATORY MECHANICS
DURING FORWARD ACCELERATION. Fed. Proc. 19:375
See also (Wright Air Development Division) WADD TR 60-594; ASTIA AD 252 621
Sept. 1960. (F)
See also J. Clin. Invest. 39(11):1737-1743, Nov. 1960

Summary (a): Static relaxation pressure volume curves of the thorax and lung were obtained on 4 trained subjects while in the supine position on the human centrifuge at 1, 2, 3, and 4 g. As acceleration increased, the intrapulmonic pressure increased for a constant volume shifting the pressure volume curve downward and to the right. Compliance of the thorax and lung decreases from 1 to 4 g as the result of the fall in pulmonary mid-position. Inspiration during 4 g acceleration, regardless of the end expiratory position was always active. Elastic work of breathing approximately doubles from 1 to 4 g while nonelastic work does not change. Absolute lung volumes during acceleration decrease proportionately [sic] with the exception of residual volume which did not change. Since these changes are similar to those described during negative pressure breathing, positive pressure breathing is suggested as a means by which respiration during forward acceleration may be improved and toleration increased. (AUTHOR)

5,803

Watson, John F. & Rita M. Rapp 1961 EFFECT OF FORWARD ACCELERATION ON RENAL HEMODYNAMICS, ELECTROLYTE EXCRETION, AND WATER CLEARANCE
(Aeronautical Systems Division, Aerospace Medical Laboratory, Wright-Patterson Air Force Base, Ohio) ASD TR 61-375 Project 7222; Task 71746 ASTIA AD 267340, Aug. 1961.

ABSTRACT: The effect of forward acceleration on renal hemodynamics, electrolyte excretion, and water clearance has been studied in six normal human subjects. Forward acceleration produced a slight increase in glomerular filtration rate and effective renal plasma flow during and after the stress. Following centrifugation there was a 20- to 35-minute lag before the appearance of an increase in urine volume and free water clearance. These changes in water excretion were transient, not accompanied by a natriuresis nor associated with changes in serum osmolality. Physiologic responses to forward acceleration and negative pressure breathing were compared. We concluded that forward acceleration, like negative pressure breathing, induces an increase in intrathoracic blood volume which inhibits the release of anti-diuretic hormone via a non-osmotic, volume sensitive receptor mechanism located within the intrathoracic vascular space. (author)

5,804

Watson, J. F. & N. S. Cherniack 1961 EFFECT OF POSITIVE PRESSURE BREATHING ON THE RESPIRATORY MECHANICS AND TOLERANCE TO FORWARD ACCELERATION
(USAF Biomedical Lab., Wright-Patterson AFB, Ohio)
Proj. 7222, Task 71746, ASD TR 61 398, Aug. 1961

ABSTRACT: The hypothesis that positive pressure breathing may reverse the abnormalities of respiratory mechanics produced by forward acceleration and thereby increase tolerance limits was studied experimentally. Vital capacity, inspiratory reserve, tidal air, and expiratory reserve were measured in four Ss at 4, 6, and 8 g with and without positive pressure; 100 percent oxygen was used in both cases. Time tolerances and vital capacity with and without pressure breathing were determined in nine Ss at ten g; each S rode until he felt he could no longer withstand further acceleration. Changes in lung volumes and time tolerances due to positive pressure breathing were analyzed. (Tufts)

5,805

Watson, J. F. & N. S. Cherniack 1961 EFFECTS OF POSITIVE PRESSURE BREATHING ON THE RESPIRATORY MECHANICS AND TOLERANCE TO FORWARD ACCELERATION. Rept. for 1 Mar - 18 May 59 on Biophysics of Flight.
(Aerospace Medical Lab., Aeronautical Systems Div., Wright-Patterson AFB, Ohio) ASD TR 61-398, August 1961. ASTIA Doc. No. AD-268 565.

ABSTRACT: The main factors limiting tolerance to forward acceleration are dyspnea, chest pain, and difficulty in inspiring. Previous studies of the mechanics of respiration during forward acceleration revealed the follow-

ing: (1) lung volumes decreased proportionately with the exception of residual volume; (2) resting midpulmonary position decreased; (3) intrapulmonic pressure increased for a constant volume; (4) static and dynamic pulmonary compliance decreased; (5) elastic work of breathing increased due to the work necessary to overcome the additional resistance resulting from acceleration. The effects of positive pressure breathing on lung volumes and time tolerance to forward acceleration of 12 trained subjects were studied. Positive pressure breathing significantly increased lung volumes, particularly the expiratory reserve volume. This increase in lung volumes was associated with a 67 percent mean increase in time tolerance. Positive pressure breathing is therefore both a practical and physiologically sound countermeasure by which tolerance to forward acceleration can be improved and human safety during prolonged exposures increased. (Author)

See Also J. Clin. Invest. (In press, 1960)

5,806

Watson, J. F. & Rita M. Rapp 1961 EFFECT OF FORWARD ACCELERATION ON RENAL HEMODYNAMICS, ELECTROLYTE EXCRETION, AND WATER CLEARANCE. (USAF Biomedical Lab., Wright-Patterson AFB, Ohio)
Proj. 7222, Task 71746, ASD TR 61 375, Aug. 1961

ABSTRACT: The effect of forward acceleration on renal hemodynamics, electrolyte excretion, and water clearance was studied in six normal human Ss. Physiologic responses to forward acceleration and negative pressure breathing were compared. (Tufts)

5,807

Watson, J. F., & N. S. Cherniack 1962 THE EFFECT OF POSITIVE PRESSURE BREATHING ON THE RESPIRATORY MECHANICS AND TOLERANCE TO FORWARD ACCELERATION. In Barbour, A. B., & H. E. Whittingham, eds., Human Problems of Supersonic and Hypersonic Flight (New York, Oxford, London, Paris: Pergamon Press, 1962) pp. 313-324
NOTE: Reel 11, Flash 5

5,808

Watson, J. F., & R. M. Rapp 1962 EFFECT OF FORWARD ACCELERATION ON RENAL FUNCTION. J. Applied Physiol. 17(3):413-416, May 1962

ABSTRACT: The effect of forward acceleration on renal hemodynamics, electrolyte excretion, and water clearance was studied in six normal human subjects. Forward acceleration produced a slight increase in glomerular filtration rate and effective renal plasma flow during and after stress. After centrifugation there was a 20-35 minute lag before the appearance of an increase in urine volume and free water clearance. These changes in water excretion were transient and were not accompanied by a natriuresis nor associated with changes in serum osmolality. Physiologic responses to forward acceleration and negative pressure breathing were compared. It is suggested that forward acceleration, like negative pressure breathing, may induce an increase in intrathoracic blood volume which inhibits the release of antidiuretic hormone via a nonosmotic volume-sensitive receptor mechanism located within the intrathoracic vascular space. (AUTHOR)

5,809

Watson, J.T. 1961 GRAVITATIONAL CONTROL RESEARCH
(Report, Faculty of the Graduate School of Southern Methodist University
as Partial Fulfillment of the Requirements for the Degree of Master of
Science in Electrical Engineering) Feb. 1961. ASTIA AD 253 588.

ABSTRACT: Success in attaining control over gravitation seems unquestionably tied to a better understanding of gravitation. At the present time, most of the work being done towards gaining gravitational control is centered around the quest for better knowledge concerning the nature of gravitation. This report will be concerned with some of the more applicable theories and research. The information will be discussed in four sections: Introduction, Characteristics of Gravitation, Theories of Gravitation, and Current Research Effort. Some of the material will, of necessity, fall into more than one category.

5,810

Watson, William L. 1961 THE VALSALVA MANEUVER: ITS RELATIONSHIP TO CHRONIC RECURRENT AEROTITIS MEDIA
(School of Aerospace Medicine, USAF Aerospace Medical Center (ATC), Brooks Air Force Base, Texas) Review 5-61 ASTIA AD 264464

ABSTRACT: Aerotitis media is an acute or chronic traumatic inflammation of the middle ear and is caused by inadequate ventilation of the middle ear during ascent or descent in flight. One generally accepted way of equalizing the pressure is by performing the Valsalva maneuver.

The studies for this report have adopted a new approach to the problem of testing pilots by using the Valsalva maneuver. The rationale for this study is based on the assumption that flight personnel who have accrued many hours of flying time have not suffered chronic recurrent attacks of aerotitis media, since otherwise they would have been removed from flying status. This is a report on the procedures, results, review of subject records, and Air Force implications of the studies.

5,811

Watson- Jones, R. 1941 FRACTURES OF THE SPINE SUSTAINED BY RAF PILOTS AND THE RELATIONSHIP OF THESE INJURIES TO THE SUTTON HARNESS, PARACHUTE HARNESS AND OTHER EQUIPMENT.
(Flying Personnel Research Committee, Canada) FPRC Report No. 274,
April 1941

5,812

Watson-Jones, R. 1943 FRACTURES AND JOINT INJURIES. 2nd Ed. Edinburgh: Livingston, 1943.

5,813

Watt, G.E. 1940 CENTRIFUGAL ACCELERATION IN AIRCRAFT AS IT AFFECTS THE FIGHTER PILOT. (RAF, Institute of Aviation Medicine, Farnborough) FPRC 136(b), May 1940.

5,814

Watt, G. E. 1940 INVESTIGATION INTO THE EFFECT OF ALTITUDE AND ANOXIA ON "BLACKING-OUT" THRESHOLD. (Royal Air Force, Farnborough) FPRC 213. ASTIA ATI 206 402.

ABSTRACT: Plane tests were made at 10,000 and 15,500 feet with and without oxygen. Failure to use oxygen at 10,000 feet lowers "g" tolerance by 0.5 "g". This was confirmed at 15,500 feet, where complete blackout occurred at 5.9 "g" as opposed to 6.9 "g" at 10,000 feet using oxygen. Tolerance was constant from 20,000 to 32,000 feet when using oxygen.

5,815

Watts, D. T., E. S. Mendelson, H. N. Hunter, A. T. Kornfield, & J. R. Poppen TOLERANCES TO VERTICAL ACCELERATION REQUIRED FOR SEAT EJECTION. (Naval Air Experimental Station, Philadelphia, Pa.) J. of Aviation Med. 18:88, 1947.

5,816

Watts, D.T., E.S. Mendelson, & A.T. Kornfield 1946 PILOT'S ESCAPE FROM HIGH PERFORMANCE AIRCRAFT MECHANISM FOR DEVELOPMENT AND TEST OF (Aero Medical Equipment Laboratory, Naval Air Experimental Station, Naval Air Material Center, Philadelphia) Report No. 1 TED No. NAM 256005, 20 Jan. 1947. ASTIA ATI 206 052

ABSTRACT: Tests were conducted in the field of ejection for the following purposes: (a) To investigate the operation of personnel ejection catapults for use in escape from aircraft. (B) To evaluate the safety and comfort of such existing devices, viz. the Martin-Baker (MBA) multiple charge, slowly accelerating practical factors affecting human comfort and safety during upward ejection in a conventional aircraft seat with standard harness and cushions. (d) To estimate the upper limits of acceleration from seat to head that may be tolerated for seat ejection. (e) To obtain physiological information for the improvement or development of ejection seats. A complete description of the tests and results is given in this publication.

5,817

Watts, D.T., E.S. Mendelson, & A.T. Kornfield 1947 HUMAN TOLERANCE TO ACCELERATIONS APPLIED FROM SEAT TO HEAD DURING EJECTION SEAT TESTS; PILOT'S ESCAPE FROM HIGH PERFORMANCE AIRCRAFT MECHANISM FOR -DEVELOPMENT AND TEST OF (Aero Medical Equipment Lab., Naval Air Experimental Station, Naval Air Material Ctr., Pa.) Project TED No. NAM 256005, Rept. No. 1, Jan. 1947. ASTIA ATI 206052

CONCLUSIONS: Average subjects have repeatedly ridden on the MBA 40", 52" and 60" catapults and have attained average velocities of 55.4, 63.4, and 60.4 ft/sec respectively. Average maximum "G" recorded on the catapult seat

and the hip, shoulder and head of subjects have been 17.4, 19.9, 18.5 and 17.0 "G" respectively. These accelerations have not resulted in significantly undesirable reactions and it is believed average aviation personnel could tolerate such accelerations with no injury.

The T-2 catapult with a much faster initial rate of acceleration produces unbalanced oscillations in the seat-cushion-subject mass system. This results in excessive accelerations recorded on the subject and man's limitation is approached while obtaining a maximum ejection velocity of 40 to 47.5 ft/sec. No conclusions can be made as to the absolute optimum rate of seat acceleration for personnel ejection catapults. However, from the practical standpoint these experiments have shown that seat acceleration rates up to 100 "G" per second have not produced significant internal oscillations in the seat-cushion-subject mass with resultant excessive accelerations on the subject. Acceleration rates of 100 to 200 "g" per second begin to elicit excessive accelerations on the subject and rates of 200 to 700 "G" per second lead to such highly excessive acceleration on the subject that the performance of any catapult with a given stroke is definitely limited. This phenomenon might be controlled to some extent by the use of highly damped cushions, but the more logical point of control is in the catapult imparting the accelerations and it is believed that the present seat parachute and cushion is a highly satisfactory cushioning system for ejection seats.

As shown under the condition of these experiments average men can safely tolerate the acceleration required to obtain adequate velocity for seat ejection. It is expected that other problems associated with seat ejection from aircraft can be solved. This is borne out by the live ejection of Lt. A.J. Furtek on 30 Oct. 1946. at an IAS of 250 mph. (Author)

5,818

Watts, D. T., E. S. Mendelson, & H. N. Hunter 1947 EVALUATION OF FACE
CURTAIN AND ARM REST FOR USE ON EJECTION SEATS. (Naval Air Experimental
Station, Philadelphia, Pa.) TED No. NAM 256005, Rept. No. 4, March 1947

ABSTRACT: Experiments were conducted comparing arm rests and a face curtain for use on ejection seats. The curtain is pulled from above the head to the level of the sternum. This fires the catapult, restrains the head and partially supports the weight of the hands, arms and shoulders during the following acceleration. The curtain satisfactorily restrained the head and shoulders at accelerations from 17 to 21 G. With arm rests undesirable flexion of the body occurred at 10 to 12 G. Subjective reactions using the curtain were much less severe at the higher accelerations than they were at the lower values using the arms rests. It is concluded that the curtain is absolutely essential and is more protective than arm rests for use on ejection seats at accelerations up to 21 G.

5,819

Watts, D.T., E.S. Mendelson, H.N. Hunter, A.T. Kornfield & J.R. Poppen 1947
TOLERANCE TO VERTICAL ACCELERATION REQUIRED FOR SEAT EJECTION
The Journal of Aviation Medicine 18 (6): 554-564 December 1947

ABSTRACT: The problem of bailing out of military aircraft and the desirability of the ejection seat as a means of escape are discussed. A 105-foot test rig and experimental procedures are described. Results are given of sixty ejection seat experiments in which volunteer subjects were exposed to maximum acceleration in the range of approximately 18 to 21 g. It is concluded that, under the conditions of the experiments, average men can tolerate this acceleration, which is adequate to eject aviators from aircraft. Careful recordings of catapult pressure and resultant accelerations were essential for the control and analysis of the forces to which personnel were exposed. Satisfactory instrumentation for this purpose has been assembled and its use described. The dynamic response of the seat-cushion-subject mass to the suddenly applied ejection force is analyzed and discussed. This analysis has led to the improvement of existing catapults and the development of new and superior ejection devices.

5,820

Watts, D.T., E.S. Mendelson and A.T. Kornfield 1947 PRELIMINARY TESTS OF
SUDDEN UPWARD ACCELERATION ON SITTING MEN. Am. J. M. Sc., 213:754

5,821

Weaver, J. A., & R. F. Gray 1962 THE PERCEPTION OF OCULOGRAVIC ILLUSIONS BY
INVERTED SUBJECTS. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA
6207; ASTIA AD-282 544; 6 July 1962

ABSTRACT: Four inverted subjects were exposed to varying centrifugal accelerations on a human centrifuge. They noted that as the centrifugal acceleration varied, there was an accompanying variation of the visual vertical (oculogravic illusion). As indicated by the oculogravic illusion, inverted and upright subjects are approximately equally sensitive to centrifugal acceleration. It was found that the otolith organs are about as sensitive to lateral centrifugal acceleration of inverted subjects as they are to lateral centrifugal acceleration of erect subjects. (AUTHOR)

5,822

Weaver, J., M. Rubinstein, C.C. Clark, & R.F. Gray 1962 ENCAPSULATION OF HUMANS IN RIGID POLYURETHANE FOAM FOR USE AS A RESTRAINT SYSTEM IN HIGH ACCELERATION ENVIRONMENT. (Naval Air Development Center, Johnsville, Pa.) Report No. NADC-MA 6147, May 31, 1962.

ABSTRACT: Molded seats and couches have the advantages of distributing accelerative loads developed by the user's body across the maximum possible area. This report discusses experiments with complete encapsulation of humans in rigid casts of polyurethane foam for periods of more than two hours. The procedures discussed were judged by a subject to give better support in an acceleration environment than other forms of human restraint tested at the Aviation Medical Acceleration Laboratory, U.S. Naval Air Development Center, Johnsville, Pa. Considerable progress in solving the problems associated with casting humans in this material was made during these experiments. It was found possible to form a complete rigid cast around a human in five minutes and possible to remove this cast in less than three minutes. Subjects have stayed encapsulated in foam casts for periods of up to 30 minutes without special provisions for cooling. Vestilatable garments permit persons to stay encapsulated in the foam for periods of at least two hours. The immobilization leads muscle and joint pain which increases with time and sets limits on tolerance to being submerged in this type of rigid cast. (Author)

5,823

Webb Associates 1962 FORCE FIELDS

In: NASA Life Sciences Data Book (National Aeronautics and Space Administration, Washington, D.C.) Contract NASr-89. June 1962

ABSTRACT: This handbook provides 28 pages of charts and summaries from the various force fields. Areas covered include: acceleration (experience, impact, transverse G limits, acceleration terminology, variations in G tolerance, G vector and consciousness, direction of force, maximum tolerable acceleration profiles, G protection by water immersion); tolerance to tumbling; deceleration (abrupt transverse, positive and negative G decelerations, tolerance to vertical impact, human impact sensitivity, impact tolerance); G fields in rotating space vehicles; vibration, (response, tolerances, physiological effects, psychophysical factors, performance functions, transmission, oxygen consumption, respiratory ventilation, and tracking performance); resonance of the abdominal wall; oscillations; high dynamic pressures; and blast injury.

5,824

Webb, L.S. 1954 NAVAL ORDNANCE LABORATORY MEMORANDA, NAVORDS, AND REPORTS PUBLISHED BY THE AEROBALLISTIC RESEARCH DEPARTMENT OCTOBER 1945- DECEMBER 1953 (Naval Ordnance Lab., White Oak, Md.) 12 March 1954; Aeroballistic research rept. no. 222; NAVORD rept. no. 3660; ASTIA AD-134 631

5,825

Webb, M.G. 1957 PILOT'S ABILITY TO ACTUATE COCKPIT CONTROLS UNDER G CONDITIONS
U.S. Naval Air Development Center, Johnsville, Pa. NADC-MA-LR20 March 29, 1957

ABSTRACT: An F4D ejection seat with face curtain was mounted in the gondola of the AMAL centrifuge, facing outward and the face curtain was connected to the control circuit of the centrifuge in such a way that pulling the face curtain stopped the centrifuge. One series of five runs was conducted with a build-up to peak G on each run of 12.5 seconds, at which time a signal was given and the subject activated the curtain handle. Maximum G on the first run was 2.5 G, and increments of 0.5 were used on subsequent runs until the fifth run, at which time the subject failed to reach the face curtain at 4.5 G. This failure at 4.5 G was attributed to a deficiency of the present safety harness system, leading to the possible conclusion that the presently-used safety harness system, when used in conjunction with the face curtain ejection seat firing mechanism, may prove to be outmoded.

5,826

Webb, M. G. 1958 SOME EFFECTS OF ACCELERATION ON HUMAN SUBJECTS.
(Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5812; ASTIA AD-209 082;
30 Sept. 1958 See also J. Avia. Med. 29(12):879-884

ABSTRACT: The most important physical effects of acceleration on human subjects as observed at the Aviation Medical Acceleration Laboratory are presented in this report. Damage to the peripheral superficial veins can be prevented with adequate counterpressure with elastic bandages. By carefully choosing and monitoring subjects it should be possible to prevent cardiac emergencies. Observations suggest that aviators who experience unconsciousness in flight due to acceleration should not land immediately, but should stay aloft for some time if fuel aboard will permit it. A definite study should be done to determine this. Serious damage to the labyrinth may be prevented by early recognition of danger signs. Further studies will undoubtedly reveal the best orientation of the human body in a G field to prevent chest pain. The intestinal bleeding and chest pain which occur in vibration studies indicate the need for extensive animal research in this relatively untouched area of investigation. (AUTHOR)

5,827

Webb, M. G. 1958 SOME EFFECTS OF ACCELERATION ON HUMAN SUBJECTS
J. Avia. Med. 29(12):879-884
See also (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5812;
ASTIA AD-209 082; 30 Sept. 1958

ABSTRACT: The most important physical effects of acceleration on human subjects as observed at the Aviation Medical Acceleration Laboratory are presented in this