Statistical treatment of sitting time data from twelve subjects gave essentially the same results as those obtained with 18 subjects. Localized discomfort in the back and buttocks was found more important than discomfort in the thighs, neck, shoulders, and lower legs in producing general discomfort. Seat parts were analyzed for their relative importances in achieving comfortable seating.

1,342

Slechta, R. F. & E. A. Wade 1959 COMPARATIVE EVALUATION OF AIRCRAFT SEAT CUSHIONS.
(Wright Air Development Command, Wright-Patterson AFB, Ohio) Tech. Rept. No. 58-311.

1,343

Slechta, R. F., & J. Forrest 1959 COMFORT EVALUATION OF THE C-118 PILOT SEAT (AEROTHERM) (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADD TR 58-312; ASTIA AD-212 559; March 1959
NOTE: CARI P&S 4.23
ABSTRACT: This study was undertaken in order to evaluate certain design characteristics of the C-118 Pilot Seat (Aerotherm) in terms of their adequacy for the maintenance of human comfort. The method of evaluation consisted primarily of subjective and behavioral laboratory tests administered by means of hourly questionnaires presented to seventeen subjects during a voluntary sitting period of seven hours maximum duration. On the basis of test data and specific comments made by the subjects, recommendations for seat design improvements were made.

1,344

Slechta, Robert F. and J. Forrest 1959 COMFORT EVALUATION OF THE C-97A/KC-97E PILOT SEAT (WEBER)
(Bio-Mechanics Laboratory, Department of Sociology, Tufts University)
WADC Technical Report 58-313 Contract No. AF 33(616)-3068, Novermber 1959
Project No. 7215 Task No. 71724 ASTIA AD 23513(0)

ABSTRACT: Certain design characteristics of the C-97A/KC-97E Pilot Seat (Weber) are evaluated in terms of human comfort. Evaluation consisted primarily of a battery of subjective and behavioral lab tests administered through hourly questionnaires presented to 16 subjects during a voluntary sitting period of 7 hours max duration. The max duration of sitting time permitted was

420 min, the voluntary time was 365.6 min. With intolerable discomfort rated (-10) and ideal comfort (+10), the average was +3.57. Hourly scale evaluations revealed that comfort decreased with time, but that at no point during the first 5 hours did the rating fall into the discomfort zone. For all body regions the average onset of discomfort was 198.0 min and that most discomfort was experienced in the buttocks, back and neck, in that order. Individual seat parts revealed certain inadequacies in the seat and back cushions, armrests, headrest, and manipulation of controls. Recommendations for seat design improvements are included.

1,345

Slecht, R. F., J. Forrest, W. K. Carter, et al. 1959 COMFORT EVALUATION OF THE C-124A PILOT SEAT (WEBER) (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TR 58-314; ASTIA AD 233 462; Nov. 1959

ABSTRACT: Certain design characteristics of the C-124A Pilot Seat (Weber) were evaluated in terms of their adequacy for the maintenance of human comfort. The evaluation method consisted primarily of subjective and behavioral laboratory tests through the use of hourly questionnaires presented to 18 subjects during a voluntary sitting period of 7 hours maximum duration. Although the maximum permitted sitting time was 420 minutes, the average voluntary time was 375.5 min. On a comfort scale ranging from intolerable discomfort (-10) to ideal comfort (+10), the average was +5.24. Hourly scale evaluations revealed that comfort began to decrease after 2 hours, but that the average rating did not fall into the discomfort zone during the first 5 hours. The average time of onset of discomfort for all body regions was 189.2 minutes, and that most discomfort was in the buttocks and the back. Individual seat part evaluation revealed inadequacies on seat and back cushions, armrests, headrest, and manipulation of controls. Recommendations for seat design improvements are included. (ASTIA)

1,346

Slingland, C. E. 1957 THE FITTING OF OUTER CLOTHING OVER THE MC-3 AND MC-4 PARTIAL PRESSURE SUITS.
(Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC Tech. Note 57-306. ASTIA AD 131 005

1,347

Sloane, M. 1963 EVALUATION OF PROPOSED GEMINI ENVIRONMENTAL PROFILE. (Air Crew Equipment Lab., Naval Air Material Center, Philadelphia, Pa.) NAEC ACEL 504, 18 June 1963. ASTIA AD 409 463L.

1,348

Slowik, J. and W. Weir 1963 INVESTIGATION OF CREW ESCAPE SYSTEM SURFACE IMPACT TECHNIQUES FOR ADVANCED AEROSPACE VEHICLES
(Flight Dynamics Laboratory, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson AFB, Ohio)
Proj. No. 1362 May 15, 1963 ASD-TDR-63-173

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.

1,349

Smedal, H. A., Stinnett, G. W. & R.C. Innis 1960 A RESTRAINT SYSTEM ENABLING PILOT CONTROL UNDER MODERATELY HIGH ACCELERATION IN A VARIED ACCELERATION FIELD
(National Aeronautics and Space Administration, Washington, D. C.)
NASA TN D 91, May 1960.

ABSTRACT: A pilot restraint was described which was used in a centrifuge program. The pilot was subjected to varied and relatively high accelerations up to seven g from two- to five-min. duration in the vehicle simulator while he performed complex tracking problems. In order to conduct these tests, it was necessary to design a special restraint system which combined a modified posterior mold or couch with an anterior restraint fabricated from nylon straps and nylon netting and incorporated head and face supports. (Tufts)

1,350

Smedal, H.A., H.C. Vykukal, R.P. Gallant, & G.W. Stinnett 1961 CREW PHYSICAL SUPPORT AND RESTRAINT IN ADVANCED MANNED FLIGHT SYSTEMS. American Rocket Society J. 31(11):1544-1548, Nov. 1961

ABSTRACT: A new concept in physical support and restraint for pilot and crews of motion flight simulators or advanced manned flight vehicles has been described. The principle of a wear-in restraint which is easily secured to or released from the support structure, which is part of the vehicle, is the basic concept in this support and restraint system. Its capability as a functional support and restraint for vehicle control studies during sustained accelerations has been established by its use in 3 human centrifuge programs. Its capability for tolerance to impact accelerations is unproven. Further improvements and testing is required in order to qualify it as an omnidirectional support and restraint system adequate for sustained and impact accelerations of high magnitude. (Authors)

1,351

Smiley, J. R. 1963 RCAF EJECTION EXPERIENCE: DECADE 1952 - 1961 (Paper, 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, Los Angeles, Calif., April 28 - May 2, 1963)

ABSTRACT: The first RCAF ejection was a successful escape from an F86 aircraft, 9 April 1952. In the ensuing decade 218 ejections took place out of which 165 aircrew survived. Each of the 165 has made a report on his experience, procedures and equipment. Where possible these data have been summarized or coded for analysis. This report shows the general background giving rise to ejections and the trend of survival rates by years. A review is then made of the circumstances surrounding fatal and successful ejections together with relationship between altitude, attitude and airspeed. The descent phase is examined in terms of retnetion of equipment, control, and problems of ladning. A summary of survival and rescue experience is then presented together with a summary of water landing. Of major interest is the study of injuries by type and site according to aircraft, phase of escape, preparation for ejection, control of descent and landing conditions. It has been found that the Martin-Baker seat does not give rise to so high a spinal fracture rate relative to other ejection systems as commonly thought.

1,352

Smit, T. A. 1961 DYNAMIC CALCULATION ON AIRCRAFT SEATS. (Royal Netherlands Aircraft Factories Fokker) Rept. No. FS-9, 25 May 1961

1,353

Smith, A. C. 1954 THE HUMAN PACKAGING PROBLEM.
(Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.)
Research Trends 2(2):1-6.

ABSTRACT: "Safer packaging" of the human occupant of an automobile may be achieved by either one of two methods; body restraint which prevents damaging impact with interior components of the automobile of reduction of the lethal or injury potential of the objects which the body (with principal emphasis on the head) might strike. Maximum protection is afforded by a combination of the two. Research is being condicted relative to both methods. This report deals with the body restraint methods available for protection of automobile passengers. The seat belt is discussed as the main body restraining device. Crash experiments using seat belts and dummies are also reviewed.

1,354

Smith, A. C. 1954 AN INVESTIGATION OF CRASH HAZARDS OF AUTOMOTIVE INTERIOR COMPONENTS FORWARD OF THE OCCUPANTS.
(Cornell Aero. Lab., Inc., Cornell University, N. Y.) Rept. No. YB-866-D-1

1,355

Smith, E. A. & R. W. Connor 1960 SURVIVAL CONSIDERATION FOR INTERPLANETARY MISSIONS
(Paper, SAE National Aeronautic Meeting, Los Angeles, Calif., Oct. 10-14, 1960) (Society of Automotive Engineers, Inc., New York, N. Y.) Rep. 244A, Oct. 1960.

ABSTRACT: The problem of survival during interplanetary flight is briefly examined for a round-trip Mars mission. The effects of performance and payload requirements on the philosophies of escape and on-board survival are examined for a particular vehicle concept, and the resulting selection of on-board survival is discussed. Representative vehicle subsystems are described from the standpoint of three basic design techniques: duplication of vital systems, multiple uses of vital systems, and repair capability. (Tufts)

1,356

Smith, E. W. 1959 THE DEVELOPMENT OF A ZERO ALTITUDE ESCAPE SYSTEM FOR SUBSONIC AIRPLANES. (Paper, Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, 27-29 April 1959)

ABSTRACT; Zero altitude, subsonic escape system design objectives were established as follows: (1) single stage initiation, (2) system reliability fully automatic, (3) automatic torso retention and release, (4) predictable aerodynamic stability, (5) sustained vertical thrust to gain maximum altitude above airplane flight path, (6) addition of drag to the ejected mass to reduce deceleration time at higher speeds, (7) non-separation of man and seat above 10,000 feet to control free fall stability, (8) parachute ripcord pull by separation of seat and man (elimination of long-time delays in automatic parachute openers). A three-stage thrust system was incorporated consisting of: (1) ballistic catapult to eject mass from airplane, (2) rocket to apply sustained thrust to the seat-man in the airstream, and (3) gas expanded bladder to eject airman from seat at separation. Weight studies disclosed a 1.25 inch differential between the 5 and 95 per cent seat-man with respect to the rocket thrust line. Weight and space considerations prohibited the use of aerodynamic aids or elaborate timing systems. Dynamic studies revealed the need for larger head plate area for the 95 per cent man in order to obtain the proper eye position. This was accomplished by holding the headrest stationary and varying the bucket height. All functions of the system are automatic after initiation, including separation. This system was developed for the Navy T2J Trainer. (J. Aviation Med. 30(3):203-204, March 1959)

1,357

Smith, E. W. 1959 DEVELOPMENT OF ZERO ALTITUDE ESCAPE SYSTEM FOR SUBSONIC AIRPLANES.
(North American Aviation, Columbus, Ohio) Rept. No. 59H-213; April 1959.

ABSTRACT: The escape system for the T2J-1 aircraft has been successfully tested. The system including the Command Selector provisions, provides stabilized, controlled acceleration trajectories with optimum recovery characteristics for both crewmen from ground level to maximum altitude at all flight speeds. T2J-1 airplanes will be in service by the U.S. Navy in the summer of 1959 with this escape system providing the widest range of capabilities for emergency escape ever supplied flight personnel.

1,358

Smith, E. W. 1959 THE DEVELOPMENT OF A ZERO ALTITUDE ESCAPE SYSTEM FOR SUBSONIC AIRPLANES.
(North American Aviation, Inc., Columbus, Ohio) Rept. No. NA59H-215

1,359

Smith, F. K. 1961 CENTRIFUGE METHODS AND TECHNIQUES IN THE U. S. NAVY In Bergeret, P., ed., Bio-Assay Techniques for Human Centrifuges and and Physiological Effects of Acceleration. (London, New York, Paris: Pergamon Press, 1961.) AGARDograph 48. Pp. 52-58.

ABSTRACT: A description is given of the human centrifuge at the Naval Air Development Center, Johnsville, Pa. This facility affords an excellent means of evaluating new restraint systems, of investigating pilot performance and physiological response under severe acceleration stresses, and of assisting in the exploration of new techniques which may aid man in his effort to conquer space. (EDITORS CONCLUSION)

1,360

Smith, L.D.T. & M.S. Baker 1950 SAFETY SHOULDER HARNESSES, TYPES G-1, G-2, AND G-3.
(USAF Air Material Command, Wright-Patterson AFB,Ohio) MCREXD-666-25B

ABSTRACT: Reports from aircraft contractors indicated that the standard Type B-16 shoulder harness was unsatisfactory for use due to its inability to integrate with various types of aircraft ejection seats currently in use. As a result of this deficiency the limited standard type B-15 shoulder harness was being substituted. The Type B-15 shoulder harness was not considered to be satisfactory because of its inferior strength characteristics, metal end fittings and impracticability for use with ejection seats. In view of the above, action was taken to design a new type or nodify the present type shoulder harness in order that the correct fit and adequate strength would be obtained for maximum protection of flying personnel. It was concluded that the Type G-1 shoulder harness can be used in conjunction with various types of non-ejection seats. The Types G-2 and G-3 shoulder harnesses are correctly designed to integrate with various types of ejection seats.

1,361

Smith, L. D. 1951 ANTI-BLOWOUT RESTRAINT FOR USE BY AIRCREW PERSONNEL
(Wright Air Dev. Center, Wright-Patterson AFB, Ohio) Rept. WCRDC-666-25C

ABSTRACT: Experiments were conducted to design and develop a safety restraint harness sutiable to protect aircrewmen from the effects of explosive decompressions in pressurized aircraft. A harness fulfilling these requirements would eliminate the diversified standard harnesses which were designed for a specific position on certain aircraft. It was concluded from the reaction of the harness under test that: (a) The design is satisfactory for the purpose intended. (b) The harness was designed with the aforementioned materials is superior to the present standard restraint harness used for the referenced positions.

1,362

Smith, L. D. 1951 CRASH OR DITCHING SEAT FOR B.47 AIRCRAFT. (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) Memo Rept. WCRDC-666-25D, 31 Oct. 1951.

ABSTRACT: To design and develop a safety restraint device suitable for the protection of aircrew personnel in the event of crash or ditching. The crash ditching seat as described in the aforementioned report is a more satisfactory item for the use of aircrew personnel, other than pilot or co-pilot on the Type B-47 aircraft in the event of crash or ditching operations than the Ditching Vest, Drawing.

1,363

Smith, M. D. 1954 EVALUATION OF "ENSOLITE" AS A PROTECTIVE PADDING MATERIAL AND THE DEVELOPMENT OF A "BEAM-PAD" INSTRUMENT CONTAINER. (Cornell Aero. Lab., Inc., Cornell University, N.Y.) Rept. No. YB-853-D-1.

1,364

Smith, W.A. 1951 PERSONAL PROTECTIVE EQUIPMENT. In THE HUMAN SIDE OF AIRCRAFT ACCIDENTS (Directorate of Flight Safety Research, Norton AFB, California) Publication M-36; 16-19 October, 1951, ASTIA ATI-197 463

ABSTRACT: This report is an evaluation of a study on ejection seats made by the author. Information of the suitability of ejection seats was obtained through questionnaires sent to all pilots who have intentionally used the ejection seat as a means of emergency escape from aircraft. It was found that ejection of the seat at too low an altitude is the greatest difficulty encountered and this will be much improved when automatic means of release from the seat is installed. This paper also reports of the availability and acceptability of oxygen equipment, survival equipment, and parachutes.

1,365

Snell Memorial Foundation 1957 COMPARATIVE IMPACT PERFORMANCE TESTS [illegible] (Snell Memorial Foundation, a Fellowship of the San Francisco Region, Sports Car Club of America) 18 May 1957.

1,366

Snell Memorial Foundation 1959 SNELL MEMORIAL FOUNDATION STANDARDS FOR RACING CRASH HELMETS.
(Snell Memorial Foundation, San Francisco, Calif.)

1,367

Snively, G.G. & C.O. Chichester 1959 STUDIES IN HEAD PROTECTION
Sports Car 16:37. Dec. 1959.

1,368

Snively, G.G. & C.O. Chichester 1962 EVALUATION AND DESIGN CRITERIA OF PROTECTIVE HEADGEAR. In M.K Cragun, ed., The Fifth Stapp Automotive Crash and Field Demonstration Conference, Sept. 14-16, 1961
Pp. 182-190

1,369

Snively, G.G. & C.O. Chischester 1962 SAFETY IN RACING, PART II
(Personnel Restraining Systems in Automotive Safety, work supported in part by Research Grant no. AC-51 of the U.S. Public Health Service. May 1962.)

1,370

Snodgrass, R.P. 1947 STATIC FIRING OF PILOT'S EJECTION SEAT INSTALLATION -MODEL XP-81. (Consolidated Vultee Aircraft Corp., Vultee Corp., Vultee Field, Calif.) Report DEVF 3067, ASTIA ATI-56954, April 1947

ABSTRACT: Operational tests were made of a pilot's ejection seat installation from the XF-81 fighter to determine the trajectory of the seat following ejection, and to test the ejection seat assembly, the catapult, and the fuselage for structural integrity under the loads imposed by the seat ejection. The operation of the seat installation was satisfactory. The center of gravity of the seat prior ejection was 8 ft above the ground. The seat cleared the cockpit and vertical tail satisfactorily, landing a distance of 68 ft aft of the main wheel axles (74 ft aft of the CG position of the seat when installed in the cockpit), and one foot to the center line of the airplane. Maximum height reached by the seat in its trajectory was 43 ft above the ground. An interval of 3.6 sec elapsed from initial motion of the seat to its contact with the ground.

1,371

Snyder, R G. 1959 A NEW APPROACH TO THE PROBLEM OF INCREASING HUMAN TOLERANCE TO HIGH DECELERATION FORCES.
Journal of the Arizona Academy of Science 1(2):68-71

SUMMARY: Preliminary design and theory of a full back brace restraint system intended for wear under flight clothing by pilots of high performance aircraft is briefly described. It is hypothesized that such a protective device might not only decrease physical fatigue on long flights, but due to its individual support characteristics might offer a method of substantially increasing human tolerance to abrupt multi-directional deceleration forces. Such a system might have an immediate usefulness in reduction of the present high incidence of vertebral fractures incurred by pilots of high performance aircraft, and might be utilized by personnel of space vehicles. (Author)

1,372

Snyder, R.G. 1959 BRACING MAN FOR SPACE FLIGHT.
(Paper, American Anthropological Assoc. and Sociedad Mexicana de Antropologia, Mexico City, Dec. 1959)

ABSTRACT: The author of this paper discusses a frequently encountered aspect of abrupt deceleration which occurs in the field of aviation--that of the vertebral injury. Vertebral fractures are of particular concern due to the increasing incidence of this type of injury resulting from high impact situations. A major explanation for the increasing incidence of vertebral injuries appears to be due to the increase in the vertical component of deceleration force diagrams. Present restraint systems do not give adequate support because they are basically designed for lineal deceleration protection only. Recognition of this point is observed in the recent modification of the shoulder harness inertial reel locking device in fighter type aircraft. The proposed bracing restraint is designed to keep the back in optimal position for high deceleration loads. Use of a bracing restraint would tend to keep the back in optimal position for such loads. In regard to comfort it is believed that if this support were properly fitted and snugged, it would provide the pilot with support which he does not have at present. The most important consideration in such a system is the degree of additional protection which could be obtained. In instances of abrupt deceleration while wearing such a device, the force normally borne by the lumbar area of the vertebral column would be partially absorbed by the bracing system.

1,373

Snyder, R. G. 1961 MANNED SPACE FLIGHT VEHICLES AND THE PHYSICAL ANTHROPOLOGIST
Amer. J. phys. Anthrop. 19(2):185-194, June 1961.

ABSTRACT: This paper briefly considers a number ot the current and future areas of aerospace research which are of primary interest to the physical anthropologist. Some are: seating and restraint systems for aircrew members (including studies of human tolerance to various forces, e.g., acceleration, deceleration, multidirectional, and negative and positive g, and development of a restraint system to protect against these forces), anthropomorphic simulation devices and techniques for basic research (e.g., dummies), biomechanics under partial or zero g (e.g., initiating self-locomotion), and physical responses under extreme vibration or buffeting. (Tufts)

1,374

Snyder, R.G. 1961 A BIBLIOGRAPHY OF ANTHROPOMETRIC DATA.
(SAE Meeting #14, Santa Monica, Calif. 20-21 April, 1961) Physical Anthropology, Protection and Survival Branch. Civil Aeromedical Research Inst., Fed. Aviation Agency, Okla,.City, Okla.

1,375

Snyder, R.Z. & E.T. Kephart 1956 ESTABLISHMENT OF A QUALIFIED PRODUCTS LIST FOR TYPE Z-2 AND TYPE Z-3 ANTI-BLACKOUT SUITS, CONFORMING TO MIL-S-5085 (Aer)-3 SUBMITTED BY SEYMOUR WALLAS AND COMPANY
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR16 Jan. 9, 1956

ABSTRACT: This report includes the procedures and results of qualification tests performed on the Z-2 anti-blackout suit manufactured by Seymour Wallas and Company, St. Louis, Missouri. The Z-2 suit conformed to all specifications listed in MIL-S-5085 (Aer)-3. It is recommended that the suit be entered on the Qualified Products List.

1,376

Snyder, R.Z. 1958 CONVENTIONAL AND NEW TYPE FLIGHT RESTRAINT EQUIPMENT (U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR43 March 26, 1958

ABSTRACT: The integrated anti-blackout suit was evaluated for its restraint characteristics. It had been noted that the single point shoulder harness used in past centrifuge simulations of flight accelerations allowed excessive lateral movement of the body when exposed to lateral force. It is recommended that both the conventional and integrated suit shoulder restraints have a two-point attachment, one directly in back of each shoulder so that each shoulder is restrained to provide the pilot adequate support against lateral movements.

1,377

Snyder, R.Z. 1958 FIRE RESISTANT Z-2 ANTI-BLACKOUT COVERALL SUIT MANUFACTURED BY DAVID CLARK CO.; QUALIFICATION TEST OF (U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR38 Jan. 31, 1958

ABSTRACT: This report includes the results of qualification tests performed on the David Clark fire-resistant Z-2 suit. The tests performed were in accordance with para. 4.6.2, 4.6.3, 4.6.4, 4.6.5, and 4.6.6 of specification MIL-S-5085 A (Aer). Conformance to para. 4.6.2, 4.6.3, 4.6.4, and 4.6.6 was indicated but not conformance to para. 4.6.5. It is not recommended that the suit be put on the Qualified Products List until the nonconformance is remedied.

1,378

Society of Automotive Engineers 1955 S.A.E. RECOMMENDS TEST PROCEDURES FOR MOTOR VEHICLE LAP BELTS.
S.A.E. Journal 63(12):45-47, Dec. 1955.

1,379

Soong, W. E. 1951 DESIGNING HYDRAULIC DAMPERS
Machine Design 23(8): Aug. 1951

1,380

Sorin, B. A. n.d. BACKWARD VS. FORWARD FACING TRANSPORT SEATS (Bureau of Weapons, U. S. Navy)

1,381

Sorin, B.A. 1955 THE RELATIVE CRASH PROTECTIVE QUALITIES AND DEFICIENCIES OF MIL-S-7877 PASSENGER SEATS IN FORWARD AND AFT FACING POSITIONS. (BuAer, Flight Safety Foundation, Inc.)

1,382

Sorin, A. B. 1957 THE RELATIVE CRASH PROTECTIVE QUALITIES AND DEFICIENCIES OF THE MIL-S-7877 PASSENGER SEATS IN FORWARD AND AFT FACING POSITIONS (Paper, American Medical Association Convention, May 7, 1957)

1,383

Soule, C. W. 1956 SAFETY SEAT LOWERING DEVICE FOR AIRCRAFT PASSENGER. U. S. Patent 2,749,065, June 5, 1956

ABSTRACT: A safety lowering device for aircraft passengers is described and illustrated whereby one or more passengers may be released from an airplane in flight and be safely delivered to the ground. He may be released singly and selectively at the will of the pilot or other attendant. The passenger being discharged has no control. Each device is equipped with a parachute that will not open until such time as the person is free of the airplane a sufficient distance to prevent entanglement with the aircraft. The device consists of a collapsible seat, surrounded by hinged hollow walls, collapsible passenger-receiving bag-like member, and hinged doors

1,384

Spalholz, R.R. 1950 AN EXPERIMENTAL INVESTIGATION OF THE STABILITY CHARACTERISTICS OF A 1/5 SCALE MODEL CREW EJECTION SEAT (Engineering Research Section, Republic Aviation Corporation) Report No. ERF-53 June 16, 1950 ASTIA ATI 90 328

ABSTRACT: Wind tunnel tests were conducted in the Duct Test and Heat Exchange Laboratory on a 1/5 scale model crew ejection seat. Points of stable equilibrium about both pitch and yaw axes were determined, as well as the magnitudes of the

restoring moments.

This investigation consisted of model seat tests with and without flaps and parachute. A series of stabilizing flaps was tested and a design developed that satisfactorily meets the requirements set forth in reference.

1,385

Spells, K. E. 1956 THEORETICAL MODEL OF THE AIR VENTILATED SUITS: SOME CALCULATIONS OF HEAT TRANSFER AND TEMPERATURE DISTRIBUTION WHEN AIR FLOWS THROUGH A PERMEABLE MATERIAL.
(Inst. Aviation Med., R.A.F., Farnborough) FPRC Rept. 975, July 1956.

1,386

Spells, K. E. 1961 THEORETICAL MODEL OF THE AIR-VENTILATED SUIT: THE CASE WHEN THE BOUNDARY CONDITION AT THE OUTER SURFACE IS THAT OF HEAT FLUX DEPENDENT ON A HEAT TRANSFER COEFFICIENT. (RAF, Institute of Aviation Medicine, Farnborough) FPRC No. 1137, Jan. 1961

1,387

Sperry, E.G., H.P. Nielsen, I.M. Barash, 1955 DOWNWARD EJECTIONS AT HIGH SPEEDS AND HIGH ALTITUDES. J. Aviation Med. 25(5):356-372

SUMMARY AND CONCLUSION: The instances of delayed separation from the seat in which the subject was thrown from the seat by the recovery parachute warrant discussion. In each case the subjects were in the seat for approximately ten seconds following ejection. They were experienced parachutists and had each made at least one previous ejection test. They were instructed shortly before take off to open manually the lap belt at the first opportunity, it being assumed that they could never beat the automatic function of the belt release. In each case, interrogation disclosed that they had maintained an alert and observing mind. This was proved by checking their description of events against the photographic results. However, there was apparently no sense of time, in that each man had no idea that ten seconds had elapsed. When thrown from the seat, they were just beginning to take corrective action. This may explain reports of fatal emergency ejections in which apparently successful ejections have been completed at moderate altitudes, but with no subsequent attempt to clear the seat or pull the rip cord.

1,388

Stanfield, R. I. 1957 USAF REPORTS REARWARD SEATING SAFER. Aviation Week 66(6):91, 11 Feb. 1957.

1,389

Stanley Aviation Corporation 1952 STANLEY AVIATION INTEGRATED CRASH AND SURVIVAL GARMENT. Contract AF 33(038)-22934.

1,390

Stanley Aviation Corporation 1960 FOOTBALL, HUMAN FACTORS, AND THE B-58 Machine Design, News Report - July 7, 1960

ABSTRACT: After being awarded an Air Force contract to build escape capsules for Convair's three-man B-58 Hustler, Stanley Aviation Corporation conducted several acceleration tests using football players from Colorado University. Accelerometers mounted on their shoulder pads recorded the startling information that they had absorbed from three to five times as much shock as the Air Force believed feasible.

Because of these tests, crew members of combat aircraft will again enjoy the freedom of "shirtsleeve" flight. The escape capsule for the B-58 not only eliminates the need for clumsy pressure suits but promises crewmen infinitely safer separation from a stricken aircraft at any speed and altitude.

An assortment of gas-initiated devices controls the ejection sequence. Leg and torso positioning, door closure, pressurization, and rocket powered departure from the aircraft occur in a matter of a few seconds (the capsule's three doors rotate closed within 1 second).

If the pilot chooses, he can fly the aircraft after encapsulation--the control stick is inside the capsule and essential flight instruments are visible through a window.

If the capsule should land in water, an immersion valve releases pressurized air to inflate flotation ballons attached to the ends of four outrigger booms. The crew member can safely stay afloat in Beaufort Scale 5 seas (19-24 mph) for at least 72 hours.

The capsule, by specification, will have an over-all reliability of at least 97 percent at an 80 percent confidence level)

1,391

Stanley Aviation Corp. 1960 PROPOSAL, LIGHT OBSERVATION HELICOPTER SEATS (Stanley Aviation Corp., Denver, Colo.) 9 Dec. 1960

1,392

Stanley Aviation Corp. 1960 REVISED GROUND LANDING SYSTEM FOR THE PROJECT MERCURY CAPSULE (Proposal, Stanley Aviation Corporation, Denver, Colo.) No. 756, Sept. 1960.

1,393

Stanley, R.M. 1960 DESIGN FEATURES OF THE B-58 ESCAPE CAPSULE Aero/Space Engineering 19(1):42-45

ABSTRACT: The world's first supersonic bomber, the USAF's B-58 Hustler, required a supersonic ejection seat and related equipment that did not interfere with normal cockpit activities. The ejection capsules developed by the Stanley Aviation Corporation make "shirtsleeve" flight in combat planes a reality for the first time in 15 years. The seat encapsulation and automatic pressurization features, the inherent protection from wind blast effects, and the provisions for landing in the capsule contribute most to this result. The B-58 escape capsules have been designed also to provide capability for saving the pilot and crew at low altitudes and low speeds. Acceleration loads upon ejection at high or low speeds and upon impact with the ground or water will be within human tolerance limits.

1,394

Stapp, J.P. 1948 ANALYSIS OF INJURIES SUSTAINED AND EVALUATION OF PROTECTIVE EQUIPMENT USED BY PILOT IN TF 80-C, no. 48-358 MAJOR ACCIDENT OF 8 SEPTEMBER 1948. (Engr. Div., USAF Air Materiel Command, Muroc AFB, Calif.) Memo. Report MBEC-1303, 22 Nov. 1948.

1,395

Stapp, J.P. 1951 HUMAN EXPOSURE TO LINEAR DECELERATION FORCES IN THE BACKWARD FACING SEATED POSITION. Mil. Surgeon 109:106-108

1,396

Stapp, J.P. 1951 HUMAN EXPOSURES TO LINEAR DECELERATION II. THE FORWARD-FACING POSITION AND THE DEVELOPMENT OF A CRASH HARNESS. (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TR 5915, Dec. 1951.

ABSTRACT: Human volunteer subjects have sustained exposure to 45.4 g at 493 g per second rate of onset of deceleration and up to 38.6 g at 1370 g per sec rate of onset of deceleration in the forward facing seated position, and up to 35.0 g at 1150 g per second rate of onset in the backward facing seated position without exceeding the limits of voluntary tolerance.

The two factors limiting voluntary tolerance were the configuration of restraining harness and the rate of change of deceleration at higher than 35.0 g peaks.

The minimum modification of the existing USAF standard lap belt and shoulder harness for adequate protection up to 45.0 g and 36 psi consists in adding the inverted-V leg strap and using No. 13 nylon in place of no. 8 nylon in the shoulder straps.

No evidence of cumulative effects due to repeated exposures to decelerative forces has been found in any of the twelve subjects, one of whom sustained 26 exposures in a period of 50 months.

1,397

Stapp, J.P. 1951 IMPROVED PILOT SHOULDER HARNESSES WITHSTAND 38.6 G CRASHES. Technical Data Digest, Jan. 1951

1,398

Stapp, J.P. 1952 BACKWARD FACING POSITION. (Letter, To Col. Ralph E. Switzer, USAF (MC, Chief, Medical Safety Div. 5 November 1952

1,399

Stapp, J.P. 1953 CRASH PROTECTION IN AIR TRANSPORTS. Aeronaut. Eng. Rev., 12(4):71-78

ABSTRACT: In 1947, tubular steel sled slipper with one to four solid fuel rockets for propulsion was mounted on a standard gage track. Peak decelerations exceeding 100 g would thus be reproduced. Parachute dummies, chimpanzees, and

human subjects were used in these experiments. Later a standard ejection seat catapult was developed which was suspended from a monorail. The carriage was decelerated by impinging against a lead cone at the end of the rail. With anesthetized pigs as subjects, motion pictures, instrument readings, and autopsy data provided the bases for analysis. Time-displacement data for human subjects are given in the paper. It was found that humans show the most severe transient physiological effects when subjected to a rate of change of deceleration of 1,370 g per sec. and a peak acceleration of 38.6 g. Protection of human occupants is limited by such factors as dynamic stress limitations of the aircraft, relative positions of seats, specifications of life belts, and sex and age factors.

1,400

Stapp, J.P., & H.P. Nielsen 1953 PROPOSED TESTS FOR ESCAPE FROM VERY HIGH VELOCITY AIRCRAFT. (Holloman Air Development Center, Holloman AFB, New Mex.) ASTIA AD 26 626

SUMMARY: The hazards faced by crew members when they escape from high-speed aircraft at high altitudes are described. At 15,000 ft. problems arise from the low temperature, low atmospheric pressure, tumbling and spinning, wind blast, and deceleration. The literature concerning the effect of such factors on human physiology is reviewed. In the study of the effects of deceleration on the human body, a highspeed sled, track, and water braking system are considered.

1,401

Stapp, J.P. & S.T. Lewis 1956 CRITERIA FOR CRASH PROTECTION IN ARMED FORCES GROUND VEHICLES. (Holloman AFB, New Mex.) HADC TN, April 1956

ABSTRACT: An evaluation of the problem of crash protection for ground vehicle occupants involved in accidents is presented. Modification of ground vehicles in order to improve their crash protection characteristics is recommended. Specifications for lap belts and lap belt installations are described and the use of these belts on a trial basis with the Office of Ground Safety as the monitoring agency is recommended. This report will assist in solving the problem of reducing injuries to occupants of vehicles involved in accidents.

1,402

Stapp, J.P. 1956 HUMAN FACTORS OF SUPERSONIC ESCAPE
Preprint no. 748 (SAE 1956)

1,403

Stapp, J.P. 1956 MEASUREMENT FOR SURVIVAL
Ordnance 40(216):975-979, May- June 1956
(Paper, presented before the American Ordnance Association, Watervliet Arsenal, Watervliet, New York, Jan 1956)

ABSTRACT: The propulsion, braking, and instrumentation systems of several high speed linear decelerators designed for the investigation of problems of tolerance to forces incurred in aircraft crashes and during ejection from high-speed aircraft are described. The decelerators include (1) a rocket-propelled sled braked by pressurized gripping units, on which tolerance limits for primates have been established for avarious body positions, and harness configurations developed; (2) a monorail suspended decelerator braked by collision, on which high tolerance limits to impacts of high rate of onset and short duration have been established for hogs, and the comparative vulnerability of body parts to impingement by simulated cockpit components evaluated; and (3) a high performance rocket sled with water brakes, in which human velocities up to 632 mph have been obtained.

1,404

Stapp, J.P., 1958 USAF HIGH ALTITUDE RESEARCH PROGRAM.
(University of Minnesota Parachute Engineering Course)
July 18, 1958.

1,405

Stapp, J.P., R.J. Heymans, & R.M. Stanley 1956 PROGRESS IS STEADY TOWARD SOLUTION OF ACUTE PILOT-ESCAPE PROBLEMS. SAE J. 64(13):44-48, Dec. 1956

ABSTRACT: Considerations of importance in the development of pilot escape devices from disabled aircraft at high speeds and altitudes include the possibility of incapacitation resulting from fear, injury, hypoxia, or tumbling; the necessity for a high escape velocity to avoid collision with aircraft parts and the possibility of attendant spinal injury; the effects of air blast and

acceleration; the necessity for oxygen and perhaps pressure during descent; the danger of injury during parachuting either from enemy action or from impact; and the problem of the storage of survival equipment. It is suggested that a capsule or pod-type ejection device would provide protection against most dangers, but would present serious engineering difficulties, require a greater escape acceleration, and be more susceptible to survivable battle damage (with the necessity for a further escape system).

1,406

Stapp, J.P. & S.T. Lewis 1957 HUMAN FACTORS OF CRASH PROTECTION IN AUTOMOBILES. SAE Transactions 65:488-492

1,407

Stapp, J.P. 1957 HUMAN TOLERANCE FACTORS IN SUPERSONIC ESCAPE J. Aviation Med. 28(1):77-82

1,408

Stapp, J.P. & S.T. Lewis 1957 EXPERIMENTS CONDUCTED ON A SWING DEVICE FOR DETERMINING HUMAN TOLERANCE TO LAP BELT TYPE DECELERATIONS. (Air Force Missile Development Center, Holloman AFB, New Mexico) Tech. Note AFMDC TN 67-1, Dec. 1957. ASTIA AD 135005

1,409

Stapp, J.P. 1957 AUTOMOBILE SEAT BELTS: HEARINGS BEFORE A SUBCOMMITTEE OF THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE, HOUSE OF REPRESENTATIVES (Washington, U.S. Government Printing Office, 85th Congress, 1st Session)

1,410

Stapp, J.P., & D.L. Enfield 1958 EVALUATION OF THE LAP-TYPE AUTOMOBILE SAFETY BELT WITH REFERENCE TO HUMAN TOLERANCE. (Paper, SAE Summer Meeting Chalfonte-Haddon Hall, Atlantic City, N.J., 8-13 June 1958)

1,411

Stapp, J.P., S.T. Lewis, & J.J. Ryan 1958 PRELIMINARY INVESTIGATIONS OF A HYDRAULIC BUMPER AND ROLL-OVER STRUCTURE. (Air Force Missile Development Center, Holloman AFB, New Mexico) Tech. Note AFMDC TN 58-5 ASTIA AD 135007, Feb. 1958.

1,412

Stapp, J.P. 1959 ESCAPE FROM AIRCRAFT.
In Medical Aspects of Flight Safety AGARDograph 30, Pp. 213-221. (New York: Pergamon Press, 1959)

ABSTRACT: Combat mission is the primary basis for design requirements; that safety takes precedence over salvage, in terms of keeping the situations of flight requiring salvage to an absolute minimum; and that the salvage operation be as effective as possible over the entire spectrum of accident probabilities.

1,413

Stapp, J. P. & B. Nutt 1961 CRASH PROTECTION OF AIR TRANSPORT PASSENGERS BY IMPROVED SEAT MATERIALS DESIGN.
Paper, 1961 Meeting of Aerospace Medical Assn., Chicapo, April 24-27.

ABSTRACT: USAF and RAF crash experience data with forward- and aft-facing passenger seats are reviewed. Human tolerance data derived fro quantitative human and animals crash experiments are presented for both forward- and aft-facing seated exposures. A new type of aft-facing seat made with nylon netting in a tubular steel frame is described, in which optimum comfort and protection are combined with minimum weight. Passenger safety requirements of present and future air transports are discussed for both military and civilian operations. Recommendations are made for optimum acceptable protective measures.

1,414

Stapp, J.P., & S.E. Neely 1961 EVALUATION OF HIGH SPEED AND THUNDERSTORM EFFECTS ON USAF EJECTIONS. (Data for this study were compiled from the records of the Deputy Inspector General for Safety, USAF, Norton AFB, Calif., 15 Feb. 1961)

1,415

Stapp, J.P. 1962 AFTER SEAT BELTS.....WHAT?
In Cragun, M.K., ed., The Fifth Stapp Automotive Crash and Field Demonstration, Sept. 14-16, 1961, Pp. 259-263

1,416

Stapp, J. P., J. D. Mosely, & C. F. Lombard 1962 "MEGABOOM" LINEAR WINDBLAST TESTS ON SUBJECTS AND PROTECTIVE EQUIPMENT. (Northrop Space Laboratories, Hawthorne, Calif.) Contract AF 41(657)405, Proj. No. 7930; NSL 62-52; 15 March 1962

ABSTRACT: Rocket sled experiments exposed five chimpanzees and one dummy to windblast up to Mach 1.68. Standard restraints and garments proved inadequate and extensive injuries established the need for improvement. Stagnation pressures up to 42 psi resulted in injuries from violent displacements within inadequate restraints. Stagnation temperature up to 424 degrees F caused second degree burns to exposed body surface. High velocity air penetrated wounds and body apertures, causing extensive trauma. Experimental restraints and garments proved adequate for stagnation pressure of 36 psi and temperature of 336 degrees F. (AUTHOR)

1,417

Stark, & Roth, tr., J.B. Bateman 1945 REVIEW: CATAPULT SEAT Do 335 (Dornier-Werke G. m. b. H., Friedrichshafen a. B., Div. of Research) Research Rept. 3240, Pages A-17206 to A-17240, 23 May 1944. Translated as Appendix 13 to Lovelace, W.R., E.J. Baldes, & V.J. Wulff, The Ejection Seat for Emergency Escape from High Speed Aircraft, ASTIA ATI No. 7245

SUMMARY: The catapult arrangement was used 200 times in all. No important drawbacks were apparent in these tests. The ejection velocity can be significantly improved by greasing the piston. According to wind tunnel measurements at D W (see Research Report No. 138 and investigations at the Heinkel factory, report No. ENB- 88/43) with a total weight of 120 kg. an ejection velocity of about 17 meters per second is necessary in order to insure sufficient clearance of the tail. Such a velocity of ejection requires three compressed air reservoirs each two liters in capacity, a pressure of 120 atmospheres, and a greased piston in the cylinder. In the appendix will be found further theoretical deductions from these experiments made on the ground, from the measurements in the wind tunnel at the Dornier factory and from the measurements made by the Heinkel factory.

The experiments on human subjects showed that the D W- catapult device can also be discharged at 120 atmosphere without endangering the person ejected. The subjects found the seat equipped with arm rests, head cushion, and upholstered back to be very comfortable. It is, however, recommended that the pads along the edges of the arm rests should be raised somewhat in order to prevent the arms from being jerked off the rests. The arm rests probably support a considerable fraction of the body weight and thus make possible ejection with the use of such high reservoir pressures. Dr Wiesehofer, D VL, is still carrying out exact investigations. The position of the operating levers with respect to the arm rests is satisfactory. Injury to the forearm and hand was never produced. It would be a good idea to provide a bumper on the arm rest or on the seat in order to prevent the elbow from jerking back too far when the catapult lever is pulled. From the point of view of its mechanical properties, its mode of action and its physiological effects the D W catapult device fulfills the standards set up. (Author)

1,418

Starkey, D.G. 1959 BASIC HUMAN FACTORS CONSIDERATIONS FOR MAN-MACHINE SYSTEMS. (Chance Vought Aircraft, Inc., Dallas, Texas) CVA E9R-12114.

1,419

Starkey, D. G. 1959 PHYSIOLOGICAL AND PSYCHOLOGICAL CONSIDERATIONS FOR MANNED SPACE FLIGHT. (Chance Vought Aircraft, Inc., Dallas, Texas) CVA Rept. E9R-12349, 1 June 1959, revised 7 July 1959, pp. 87-99

1,420

Stasevich, R.A. 1947 K VOPROSU O BEZOPASNOSTI EKIPAZHA PRI AVARII (Safety of the Crew in Aircraft Crashes)
Tekhnika vozdushnogo flota 5: 18-23

1,421

Stauffer, F.R., & L.B. Cochran 1951 PRELIMINARY STUDIES ON THE EASE WITH WHICH PILOTS CAN GRASP AND PULL THE EJECTION SEAT FACE CURTAIN HANDLES. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. MR005.13-4002. 2.2., 6 Nov. 1951.
See also Project NM001.059.22.02, 8 Nov. 1951. ASTIA ATI 135023

ABSTRACT: Determinations were made of the level of g force at which the average pilot can perform the muscular actions necessary to reach and pull the face-curtain handles, thus simulating the procedure required to actuate the ejection seat firing mechanism. Twelve naval fighter pilots of various physical build were tested on the Pensacola human centrifuge for the ability to actuate the Martin-Baker (model F2h-2) ejection-seat mechanism. The subjects were protected with anti-g suits and exposed to levels of positive radial acceleration about 2.0 g. Above their relaxed black-out tolerance level. The mean black-out level of the subjects' control runs for 10-sec. exposure was 4.7, with a range of 3.3 to 5.8 g. Eleven of the subjects were able to actuate the ejection-seat mechanism at 6.6 g (range of 5.2 to 7.4 g), and within an average time of 4.6 sec. (varying from 2.5 to 8.0 sec.). The failure of the twelfth pilot was attributed to fatigue. The results suggest that most suit-protected pilots should be able to actuate the mechanism at 2.0 g above their control black-out level, providing that the g levels are constant. Proper indoctrination on the effects of g forces is recommended.

1,422

Stauffer, F.R. 1951 CURRENT STUDIES ON DEVELOPMENTAL ANTI-BLACKOUT EQUIPMENT. (Naval School of Aviation Medicine, Pensacola, Fla.) MR005.12-0006.1.2, Feb. 5, 1951

1,423

Stauffer, F.R. 1951 STUDIES ON THE EFFECTIVENESS OF AUTOMATIC SUPINATION IN PROTECTING MAN AGAINST HIGH RADIAL ACCELERATION. (U.S. Naval School of Aviation Medicine., Pensacola, Fla.) Project NM 001 059.02.07. 29 Jan. 1951. ASTIA ATI 108815.

ABSTRACT:

1. Seventeen adult males have been subjected on the Pensacola Human Centrifuge to radial acceleration stresses up to 12 G for five seconds.

2. At the beginning of these exposures the subjects were in a conventional seated position, i.e., subject to positive acceleration effects.

Protection against blackout and associated positive acceleration effects was provided by a changeable seat automatically controlled by G forces acting in the direction head to hips of a seated individual. When the G force exceeded 3.9 G the back rest of the seat rotated backward to place the subject in a modified supine position. The position was maintained until the G force had dropped below 2.7 G at which time the back rest and subject returned to their original positions.

3. The physiological changes during such stresses have been discussed from the standpoint of the practicability of using such a protective device for pilots exposed to positive acceleration in aircraft.

1,424

Stauffer, R.F. & R.E. Kelly A DEVICE FOR THE AUTOMATIC CONTROL BY G-FORCE OF THE POSITION OF THE CONTROLLABLE SUPINE SEAT. SDC PROJECT 9-U-37a. (School of Aviation Medicine, U.S. Naval Air Station, Pensacola, Fla.) Project NM 001 059.02.05

1,425

Steinhoff, , Fehlke, & Buss, tr., J.B. Bateman, & V.J. Wulff 1945 FUNCTIONAL AND FLIGHT TESTS OF THE COMPRESSED AIR EJECTION SEAT INSTALLATION OF THE He 219. (Rechlin Testing Ground) Interim Rept. No. 1, 3 Aug. 1944. Translated as Appendix 11 to Lovelace, W.R., E.J. Baldes, & V.J. Wulff, The Ejection Seat for Emergency Escape from High Speed Aircraft ASTIA ATI 7245

SUMMARY: The function of the compressed air emergency catapult seat installation of the He 219 was tested on the ground and during flight. Forty ejections were made with dummies and three with human beings during flight. The assembly is fit for operation. Maximum permissible ejection pressures determined from the results of ejection experiments on ten human beings on the ground are as follows: For the pilot's seat, 100-105 atm.; For the observer's seat, 85-90 atm. With these pressures it is certain that the tail can be cleared at velocities of flight up to 500 km/h and at any altitude. (Author)

1,426

Stencel Aero Engineering Corp. 1962 RCD-MS SYSTEMS ROCKET CUSHIONING DEVICE APPLIED TO MODULAR SEAT.
(Stencel Aero Engineering Corp., Asheville, N.C.) Rept. No. 2; 3 May - 2 June 1962. ASTIA AD 288 155.

1,427

Stencel Aero Engineering Corp. 1962 RCD-MS SYSTEMS ROCKET CUSIONING DEVICE APLIED TO MODULAR SEAT (Stencel Aero Engineering Corp., Asheville, N.C.) Rept. no. 2, 3 May -2 June 1962, 6 June 1962, Contract NOw 62-0561-c, ASTIA AD-288 155

ABSTRACT: The mock-up studies are progressing on schedule with parallel work being done on mock-up hardware and on system analysis.

1,428

Stencel Aero Engineering Corp. 1962 APPLICATION OF MODULAR RESTRAINT, RECOVERY AND SURVIVAL SYSTEM (MS) TO SPECIFIC EJECTION SEATS. (Stencel Aero Engineering Corp., Asheville, N. C.) Rept. No. 1 for May 1962 - 6 June 1962. Contract NOw 620587. ASTIA AD 288 179.

ABSTRACT: The T2J seat pan is being redesigned for the Modular Seat application and mock-up studies are underway.

1,429

Stencel Aero Engineering Corp. 1962 RCD-MS SYSTEMS ROCKET CUSHIONING DEVICE APPLIED TO MODULAR SEAT (Stencel Aero Engineering Corp., Asheville, N.C.) Rept. no. 1, 3 Apr-2 May 1962, 8 May 1962, Contract NOw 62-0561, ASTIA AD-288 180

ABSTRACT: Analysis of the task requirements has resulted in a revised phasing breakdown. Mock-up studies of a new seat pan have begun to firmly establish the design. Preliminary negotiations with the rocket vendor have been made.

1,430

Stencel Aero Engineering Corp. 1962 MODULAR RESTRAINT, RECOVERY, AND SURVIVAL SYSTEM. (Stencel Aero Engineering Corp., Asheville, N.C.) Final Engng. Rept. Aug. 1962, ASTIA AD 292 761

ABSTRACT: A modular system, consisting of a seat back and bottom with a parachute bridle connected to the structure, provides greatly increased pilot restraint, comfort, and convenience by sue of a combined flight and parachute

harness. The system offers a survival capability which carries full escape automation beyond the point of either land of water. Development of the modular seat included; bridle geometry studies, opening shock studies, para-raft inflation studies, deceleration device development, various special tests, a system test series, and restraint development yielding a superior restraint development yielding a superior restraint system complete with hardware. Operational modes provided for were: automatic water entry with man in inflated raft, seated land touchdown, foot-first land touchdown, over-side bailout, and ditching. Further development, already underway with a rocket cushioning device; and later, the addition of the ballistic parachute should give a more highly refined escape system than any presently in use. (Author)

1,431

Sternick, S., D.T. Stimmel, & I.J. Sattinger 1961 HUMAN REACTION TO MILITARY VEHICLE RIDE (Institute of Science and Technology, University of Michigan, Ann Arbor, Michigan) Report No. 2889-17-F, Jan. 1961. ASTIA AD 250 099

ABSTRACT: The results of an investigation conducted at Willow Run Laboratories (now Institute of Science and Technology), of The University of Michigan, into the effects of ride on both passengers and crewmembers of military ground vehicles are described. A general analysis of these effects is given as a basis for defining the problems associated with vehicle ride and of recommending an experimental program to obtain quantitative information on the effects of ride on comfort and performance. Test techniques and test equipment requirements for comfort tests using the Method of Adjustment and for performance tests using tracking, driving, visual recognition, and information handling tasks are outlined. These tests are based on the use of a vehicle-motion simulator which would subject human beings to prescribed sinusoidal and transient motions. As an example of how the various test phases can be performed, a suggested first year's test program is developed to obtain data on the subjective evaluations of sinusoidal and and nonsinusoidal motions in pitch and roll

1,432

Stewart, G.H. 1949 EJECTION TESTS OF PILOT'S AND SHORAN OPERATOR'S SEATS - MODEL XB-51 (BOMBER) (ENGINEERING TEST REPORT) (Glenn L. Martin Co., Baltimore, Md.) USAF Contr. No. W33-038-ac-14806 Engineering Test Report No. 1034 Dec. 28, 1949 ASTIA ATI 69 365

ABSTRACT: Tests were made of the pilots' and Shoran operators' seats for the XB-51 bomber to establish the structural integrity and functional characteristics

during ejections using the M-1 an T-5 type catapults. One successful ejection of each seat with each type of catapult was required. All ejections were made satisfactorily. The maximum vertical height for the pilots' seat was 59.6 ft (M-1) and 75.1 ft (T-5), while the maximum horizontal distance was 34 ft (M-1) and 35.5 ft with a horizontal distance of 39.3 ft (M-1) and 46.5 ft (T-5). In all ejections, the vertical height was similar to that calculated, but the horizontal distance was considerably smaller, which is believed to be caused by the forward tumbling of the seat, and which will be counteracted somewhat in flight by the air load.

1,433

Stewart, W. K. 1941 PROGRESS NOTE ON THE FRANKS SUIT (National Research Council, Canada) Report #C-2852, 20 December 1941.
Also (RAF Flying Personnel Research Committee) FPRC 390.

ABSTRACT: Comments are made on progress in the design of the Franks Flying Suit in relation to the latex filling units, covering materials, filling shoes, coverage of thighs and other areas.

1,434

Stewart, W. K. 1942 NOTE ON SPENCER ACCELERATION BELT AND LEGGINGS BY FIRM OF SPENCER, U.S.A.
(RAF, Institute of Aviation Medicine, Farnborough) FPRC Rept. #458.

1,435

Stewart, W.K. 1940 AN INVESTIGATION INTO THE EFFECT OF A RECLINING POSTURE ON THE ABILITY TO WITHSTAND HIGH "G" (RAF, Institute of Aviation Medicine, Farnborough) FPRC Rept. No. 212, 10 Dec. 1940.
ASTIA ATI 206318

ABSTRACT: One subject made experimental runs exceeding 5 "g" for 10 to 20 seconds, Peak run was 6 "g" for 6 to 9 seconds. This resulted in unconsciousness when subject was unprotected. When cockpit seat was inclined 45 degrees from vertical and feet raised to level of seat, complete visual protection was obtained.

The venous and arterial hydrostatic levels were reduced only one inch by this maneuver, but the decrease in the leg-thigh and thigh-spine angles promoted venous return. Visual fields were not markedly reduced by this procedure, but tilting sufficient to protect from higher values of "g" would produce definite visual impairment.

1,436

Stewart, W. K. 1940 EFFECT OF RECLINING POSTURE ON ABILITY TO WITHSTAND HIGH G. (RAF, Institute of Aviation Medicine, Farnborough) FPRC Report 212, Dec. 1940.

1,437

Stewart, W.K. 1940 OBSERVATIONS ON THE EFFICIENCY OF ABDOMINAL BELTS IN THE PREVENTION OF BLACKING OUT. (Farnborough) FPRC No. 176. ASTIA ATI 206389

ABSTRACT: All tests conducted in planes by a small number of subjects. (a) Elastic belts do not raise blackout threshold, may shorten period between blackout and unconsciousness. Although they produce a feeling of confidence at low values of "g", they are potentially dangerous.

(b) Pneumatic belts inflated at pressures exceeding 50 mm Hg prevent fastening of Sutton harness. Even pressures of 80 to 100 mm Hg (of therapeutic value according to Armstrong) do not elevate blackout threshold.

(c) Hydrostatic belts are uncomfortably cold even at altitudes as low as 10,000 feet. At 6 "g" belts are a serious hindrance due to increased effective weight. Water does not drain out of belts after exposure to "g" and is very uncomfortable. Hydrostatic belts elevate "g" threshold at least 0.5 "g", but disadvantages outweigh the gain. It is recommended that experiments on belts as anti "g" devices be discontinued.

1,438

Stewart, W.K. 1941 REPORT ON BLACKING-OUT (RAF, Institute of Aviation Medicine, Farnborough) FPRC Report 233, Jan. 1941.

1,439

Stewart, W.K. 1941 EFFECT OF ABDOMINAL COMPRESSION ON ABILITY TO WITHSTAND G: FINAL REPORT. (RAF, Institute of Aviation Medicine, Farnborough) FPRC Report 300, May 1941

1,440

Stewart, W.K. 1941 PROGRESS NOTE ON THE FRANKS SUIT. (National Research Council, Canada) Report #C-2852 F.P.R.C. 390, 20 December 1941

ABSTRACT Comments are made on progress in the design of the Franks Flying Suit in relation to the latex filling units, covering materials, fillinf of shoes, coverage of thighs and other areas.

1,441

Stewart, W. K. 1942 REPORT ON THE COTTON PNEUMODYNAMIC SUIT. (RAF, Institute of Aviation Medicine, Farnborough) FPRC Rept. #407(WAM-982-4), January 19, 1942.

1,442

Steward, W. K. 1942 NOTE ON SPENCER ACCELERATION BELT AND LEGGING. (Inst. Aviation Med., R.A.F., Farnborough) FPRC No. 458, 11 May, 1942.

ABSTRACT: Inflation of Spencer belt to 2 to 2.5 psi raises "g" threshold at least 1 "g" for 5 seconds. Structural failure along knee seams occurred in model tested.

1,443

Stewart, W.K. 1942 INTERIM REPORT ON FRANKS SUIT TRIALS AT NO. 43 SQUADRON ACKLINGTON. (National Research Council, Canada) Report #C-2842, 8 June 1942

ABSTRACT: This progress report describes the difficulties encountered during service trials of the Franks Flying Suit with the above squadron. It is recommended that further trials should be conducted.

1,444

Stewart, W.K. & H.L. Roxburgh 1945 GERMAN OCCUPATION DISARMANENT: AVIATION MEDICAL ASPECTS IN SCHLESWIG-HOLSTEIN
(Flying Personnel Research Committee, Air Ministry, Gt. Britain) FPRC 627, Appendix 14, May 1945.

ABSTRACT: Results of the interrogation of German personnel.
In response to questions about the ejection seat, the Squadron Commander gave the following information:
Experiments were first carried out on a ground test rig at the Heinkel aircraft works. This rig, essentially constructed from inclined rails, would appear to have been similar to the Martin-Baker test rig, and to have a vertical height of at least 10 m.
A compressed air system of propulsion was first investigated and abandoned in favour of an explosive charge.
Accelerations of 4-6 g were first investigated and gradually increased to 14 g which was the acceleration necessary for clearance from the Me. 162.
The duration of the acceleration was not known but the distance of propulsion at ground level was stated to be 10 m. and it is considered that these figures are reasonably consistent with present R.A.F. knowledge. At this acceleration, it was necessary to hold the head back and to place the feet on supports. The Squadron Commander did not himself notice any marked difference between the acceleration values of 6 and 14 g.
The highest of g reached in the tests was 26; a few cases of back injury occurred but these had not been observed by the officer.
He stated that the apparatus had actually been used in emergencies on two to three occasions and he thought that the maximum air speed had been 800 Km/hr. (500 mph). No difficulty had been commented on, either in separating grom the seat or in autorotation after ejection. He could not state whether any masks had been dislodged in the air blast.

1,445

Stewart, W.K. 1946 EJECTION OF PILOTS FROM AIRCRAFT: A REVIEW OF THE APPLIED PHYSIOLOGY. (Air Ministry, Flying Personnel Research Committee) Rept. No. 671, Sept 1946. ASTIA AD 222 472

ABSTRACT: For seat ejection two general stages are envisaged. Firstly, ejection from the aircraft, which in itself is a great advance but implies a conscious pilot for preservation of life; secondly, development of ejection with ancillary automatic mechanism to ensure that an unconscious pilot will avoid severe injury. Cabin jettisoning is of primary importance for very high altitudes or very high speed aircraft and should be thoroughly investigated. If it proves acceptable physiologically, the final provisions for escape should include both jettisoning and ejection, but where this proves impossible in any given case, it should be the function of some central authority or committee to state which system has to be installed.

1,446

Stewart, W.K. & Pekarek 1946 IMPROVED ESCAPE FACILITIES IN FLIGHT FOR PILOTS AND AIRCREWS IN SERVICE AIRCRAFT. (RAF, Ministry of Supply Great Britain) Scientific and Technical Memo, November 1946.

1,447

Stieglitz, W. I. 1952 COCKPIT DESIGN AND SAFETY. Aero Eng. Rev, 11:36-41. Oct. 1952.

1,448

Stieglitz, W. I. 1952 REARWARD FACING SEATS
(National Advisory Committee for Aero. Panel on Aircraft Accident Survival, 10 Dec. 1952)

1,449

Still, E.W. 1960 EQUIPPING MAN FOR A FLIGHT TO THE MOON
Engineering, (London) 189(4907): 634-635, May 6, 1960

ABSTRACT: A review is presented of a paper read before the British Interplanetary Society on April 28, 1960. A resume of the United States Space Program was given, followed by a discussion of the environmental requirements for interplanetary travel and the engineering techniques being developed to meet these requirements. (Aerospace Medicine 31(10): 869, Oct. 1960)

1,450

Stimler, F.J. & R.S. Ross 1960 DROP TESTS OF 16,000-SQUARE-INCH MODEL PARACHUTES VOLUME VIII SUMMARY REPORT
(Goodyear Aircraft Corporation, Akron, Ohio) Contract No. AF33(616)-2310 RDO No. 672-160 AF Technical Report 5867, April 1960. ASTIA AD 240877

ABSTRACT: Parachute model drop-tests program was conducted in the Goodyear Aircraft Corporation airship dock at Akron, Ohio. Twenty-seven different models of the following types with 16,000 sp. in. total canopy area were tested: Solid Flat, Solid Extended Skirt, Solid Spherical, Solid Conical, Airfoil, Exeter Type 12, Guide Surface, Ring Slot, and FIST Ribbon.

An information sheet is provided for each of the parachute models and includes a short statement describing general behavior of the parachute during descent and a basic reference list where more information may be found concerning similar parachutes. The following data are also tabulated for terminal vertical velocities of approximately 10, 15, 25 and 40 feet per second by taking the average value for both the horizontal and vertical types of release: drag coefficient, average glide angle, average and maximum angles of oscillation, logarithmic decrement, and frequency of oscillation.

Curves of drag coefficient vs. vertical descent velocity are presented for each parachute family for comparison purposes. The variation of average angle of attack with vertical velocity is presented for the Solid Flat Circular parachute. The effect of suspension-line ration on the drag coefficient of the Solid 10% Extended Skirt parachute is also given for the range of suspension line ratios of 0.60 to 1.40.

In general most of the parachutes tested showed a decrease in drag coefficient for an increase in vertical descent velocity; however, above a critical vertical velocity the drag coefficient became constant in most cases. Only for the very stable parachutes did the drag coefficient remain approximately constant for the vertical velocity

1,451

Stingely, Norman E. 1957 AEROMEDICAL EVACUATION LITTER PATIENT SAFETY HARNESS. WADD TR 57-6; ASTIA AD 110 695.

ABSTRACT: An aeromedical evacuation litter patient safety harness has been developed by New York University. WADC TR 55-333 "Aeromedical Evacuation Litter Patient Safety Device Study" (AD-104851) which resulted from the above contract has been included as an Appendix to give medical and operational requirements for a satisfactory litter harness, and also to give design data for a harness to fit the standard rigid aluminum pole folding litter. The standard pole litter was determined as not capable of withstanding the required g loads and was therefore modified. The harness developed by New York University was modified to function with the modified litter. The psychotic restraints were deleted from the harness and it is suggested a modification of the standard wrist and ankle restraint be used in conjunction with the harness for psychotic-neurotic patients. The modified harness was dynamically tested to determine the capability of restraining a patient to the litter during controlled crash landing. Dynamic litter tests indicated that the harness would restrain the patient up to at least 7.2 g and that the patient will better withstand the impact force if he is loaded head forward in relation to the aircraft.

1,452

Stoeckel 1942 SPECIAL SEAT AND CONTROLS DESIGNED FOR HIGH ACCELERATIONS. (Sitzanlage Mit Steuerungslinrichtung Fuer Hohe Flugbeschleunigungen) Forschungsbericht Nr. 1549, ASTIA ATI-51067 February 1942

ABSTRACT: The permissible acceleration in pulling out of a dive and with the crew in supine position amounts to 16 g over a period of 3 minutes. Thus, maneuverability of modern high performance airplanes, especially Stukas and fighters, is hardly affected by endurance limits attributable to physiological conditions.

For testing the inclined position of the crew in practical flight, a swivel seat, changeable from normal to supine position, equipped with contorl mechanism was developed and installed with dual control arrangement in the observer's place of a Ju 87

Take-off, landing, and normal flight were effected in normal position and three-dimensional curvilinear flights in supine position. Operation of the swivel seat manually about an axis extending through a point near the eye and fixed with respect to the airplane and a control mechanism which can be swivelled with the seat enable maneuverability of the airplane unaffected by swivelling and acceleration.

1,453

Stoll, A., B. M. Lewis, & D. H. Lewis 1955 MEASUREMENTS TO EVALUATE THE EFFECTIVENESS OF THE FULL PRESSURE HALF SUIT IN APPLYING EXTERNAL PRESSURE TO THE BODY. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5502; 21 March 1955

1,454

Stoll, A. M. 1961 THERMAL PROTECTION CAPACITY OF AVIATOR'S TEXTILES. (Naval Air Development Center, Johnsville, Pa.) Rept. NADC-MA-6120

ABSTRACT: Since the advent of high-speed aircraft and nuclear warfare, the need for protection of personnel from thermal injury has been greatly emphasized. Among the more immediate aviation needs is that for fire-resistant anit-G clothing. With this specific need to the fore, an interim method has been devised for the selection and evaluation of textiles on the basis of their resistance to degradation by thermal irradiation of appropriate intensity and their protective capacity when in contact with living skin. At the present time

although field testing is not yet complete, a satisfactory thermally-resistant anti-G suit appears to have been achieved through this effort. This suit is fabricated of DuPont Experimental Fiber HT-1 in a twill weave and double-layer construction. On the basis of percentage of total body burns indicated by fuel flame exposures of clothed dummies, it has proven superior to a double-layer nylon suit and the regulation fire-retarded cotton coverall over the cutaway anti-G suit. The present method is being modified to yield surface temperature measurements during irradiation to provide for the ultimate goal of devising a thermal protection index based on previously established relationships between these temperatures and the tissue damage resulting from thermal irradiation.

1,455

Stone, I. 1955 HELMET DESIGNED FOR SUPERSONIC BAILOUTS.
Aviation Week, Pp. 33-35, 12 Dec. 1955

ABSTRACT: A new full-face helmet has been developed to afford complete head and face protection for the pilot of today's high-speed aircraft. Retention of the conventional helmet and oxygen mask combination is among the prime requisites for survival in high-speed high-altitude bailouts and other emergencies, pilots say. North American Aviation will be the first to evaluate the new helmet, developed by Protection, Inc. The two firms have been collaborating on the project since the supersonic bailout of NAA test pilot George F. Smith (AW Nov. 14, p. 14). Frequently, windblast has ripped away helmet and oxygen mask, exposing pilots to hypoxia (lack of oxygen) and head and face injuries. Integration of the helmet and mask could eliminate the loss of these components in the face of strong windblast.

1,456

Stone, I., & E. Clark 1956 USAF REVEALS NEW X-2 CRASH DETAILS.
Aviation Week 65(19):26-27, 5 Nov. 1956.

ABSTRACT: New details on the loss of the Bell X-2 rocket research plane and the death of USAF Capt. M.G. Apt are revealed. Apparently high-speed pitching of the aircraft caused the pilot to eject the capsule. There is some indication that blackout due to excessive negative g forces may have prevented the pilot from completing the ejection procedures.

1,457

Stone, M.M. 1954 AUTOMOBILE SEAT BELT ASSEMBLIES. (Davis Aircraft Products

1,458

Stout, F.R. 1948 THE CASE FOR SHOULDER STRAPS.
Flying, Chicago, 42(1):33, 34, 85 Jan. 1948

ABSTRACT: A discussion of the use and the advantages of the shoulder harness in forced landings.

1,459

Stout, G. 1941 TEST OF MODIFIED PILOT SEAT #54642
(Bendix Aviation Corp., Bendix Products Div., South Bend, Ind.)
Report No. 289, ASTIA ATI-112158, 3 February 1941

ABSTRACT: The pilot seat used in the test was modified from the Standard Bendix pilot seat #54642 by the removal of the washer plates at the upper and lower tube support brackets. The bolts which fasten the tube support brackets The bolts which fasten the tube support brackets to the seat formerly were of the counter sunk head type which necessitated that the plates and seat back be machined to match. Since a 1/16" plate was added to the back to improve clearance problems, it appeared that the washers in the front side could be eliminated if button head type screws were used. This modification was made on the seat tested.

1,460

Stout, G.C. 1941 TEST OF BENDIX PILOT SEATS NO. 54761 and 54762
(Bendix Aviation Corp., South Bend, Ind.) Report no. 329,
ASTIA ATI 112 331, 13 August 1941

ABSTRACT: The seat tested was a Bendix pilot seat 54761 which is a seat equipped with Sutton Harness belt attachments. Seat 54762 differs from seat 54761 only by the addition of a parachute pack spacer which does not affect the strength of the seat. Therefore, this test also applies to seat 54762.

1,461

Strand, O. T. 1949 PROTECTIVE HELMET IMPACT TESTING EQUIPMENT. (Wright-Patterson AFB, Ohio) AFTR 5820. ASTIA AD 56 003

ABSTRACT: The apparatus necessary for impact testing of protective helmets is described. Its principle parts are a pendulum, an aluminum head, and recording equipment. Strain gauge accelerometers are mounted in the pendulum and in the head. The recording equipment consists of a dual beam cathode-ray oscilloscope and a high-speed camera using sensitized paper. The method of calibration, frequency response of components and overall frequency response and limitations of equipment are also discussed.

1,462

Strand, O. T. 1950 IMPACT EFFECT OF TWO TYPES OF PROTECTIVE HELMETS. (Wright-Patterson AFB, Ohio) AFTR 6020

1,463

Struthers, J.H. 1948 WIND TUNNEL TESTS OF THE CAPSULE EJECTION FROM A 1/12.775 SCALE MODEL OF THE XP-92 AIRPLANE. (Consolidated Vultee Aircraft Corp., San Diego Div., San Diego, Calif.) ASTIA ATI-49163, February 1957

ABSTRACT: Dynamic pilot capsule ejection tests were conducted on a 1/12.775 scale model of the XF-92 fighter with a ducted fuselage. The tests were made to determine the separation characteristics of the pilot capsule from the model with manual and parachute type release. A range of attitudes in pitch and yaw were tested at a dynamic pressure of 30 lb/sp ft. The investigation indicated separates more satisfactorily at all angles without the parachute than with it. The parachute is needed to stabilize the capsule after it leaves the afterbody.

1,464

Stubbs, R.A. 1951 CHARACTERISTICS OF THE I.A.M. EMERGENCY SEAT PACKS AND SEAT PANS UNDER INITIAL SEAT EJECTION CONDITIONS (Institute of Aviation Medicine, R.C.A.F., Toronto) R.C.A.F. Project No. AMTS 5/51, Report No. 1, Sept. 14, 1951. ASTIA ATI 172 099.

ABSTRACT: An attempt was made to analyze the effect of the Seat Pans placed between the subject and the Seat Pack. It seemed reasonable to assume that the

most desirable material for the construction of a Seat Pan would be one having the lowest rate of spring return to prevent additional peak accelerations to the subject. From the analysis, the rate of spring return of a rectangular disphragm as approximated by the Seat Pans, appeared to be a direct function of the modulus of elasticity of the material. Therefore, Seat Pans were constructed of materials of various moduli. The Seat Pans and Packs were subjected to ejection trails on the ejection test rig at Wright Patterson Air Force Base. The accelerations produced on the Jeection Seat, the Seat Pans, and on one hip and one shoulder of the subject, were measured and recorded.

The amount of measured data obatained from the limited number of ejection trials with one subject, tended to indicate that no significant differences in acceleration existed between the Seat Pans fabricated from aluminum alloy (65ST), magnewium, copper, stainless steel or plastic laminate. The trials carried out with two non-rigid Seat Pans, i.e., water cushions with and without baffles, indicated larger instantaneous accelerations than did the rigid Seat Pans. A trial without a Seat Pan of any type was made without discomfort to the subject. The comments of the subject indicated that the most comfortable Pan under ejection was the plastic laminate. The plastic laminate incidentally had the lowest modulus of all Seat Pans tested. On this limited amount of data, it is suggested that a number of Seat Packs be fabricated with plastic laminate Pans for further ejection trials.

1,465

Stubbs, R. A. 1953 DYNAMIC TRIALS OF ANTI-G VALVES
(RCAF Institute of Aviation Medicine, Canada) Rept. No. IAM 53/1; Encl. 1 to Air Attache, Ottawa, Rept. No. TL 59-56; ASTIA AD-103 483; 6 Feb. 1953

1,466

Stubbs, R. A. 1953 DYNAMIC CENTRIFUGE TRIALS OF ANTI-G VALVES
J. of Aviation Medicine 24(4):334-339 August 1953

ABSTRACT: The role of the Anti-G Valve has changed with the advent of modern, high speed aircraft. A smoother-operating, chatter-free valve is required to alleviate fatigue during normal flight wherein low accelerations are encountered for long periods of time. The valve must be of a non-leak type under acceleration to prevent the high valve temperatures which would exist with a continuous flow. In view of these new requirements for an Anti-G Valve, which were not entirely satisfied by the Clarke M-4 Valve, interest was taken in a new Valve designated tye type M-8, developed by Aro Equipment Corporation, and the United States Air Force. Comparative dynamic trials were then carried out on the Aro and Clarke Valves. The traisl were conducted using G-4A and G-4B type suits in order to determine the effects of incorporating the automatic shut-off valve in the G-4B suit. After the tests, it was agreed that the Aro M-8 valve has some advantages over the Clarke M-4 valve in meeting the Anti-G Valve requirements of a modern, high speed aircraft.

1,467

Stubbs, R.A. 1955 INFLATION SYSTEMS FOR THE ANTI-G SUIT IN PRESSURE BREATHING APPLICATIONS. (Flying Personnel Research Committee, Air Ministry) F.P.R.C. Memo. No. 60, May 1955

1,468

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)

1,469

Summers, J.L. 1958 WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.6 to 1.4 OF SEVERAL EJECTED PILOT-SEAT MODELS (National Advisory Committee for Aeronautics) NACA RM A58E02, September 1958.

ABSTRACT: An experimental investigation was conducted to determine the static longitudinal and lateral directional aerodynamic characteristics of basic and modified versions of a conventional upward ejected pilot-seat combination, a sled-type upward ejected pilot-seat combination, and a downward ejected pilot-seat combination. Modifications to the basic models incorporated flow deflectors for pilot protection and drag reduction and various stabilizing devices. Test Mach numbers varied from 0.6 to 1.4, angles of attack from -28° to $+40^{\circ}$, and angles of sideslip from -16° to $+12^{\circ}$. Reynolds numbers ranged from 0.9 million to 1.8 million based on the projected frontal height of the models.

1,470

Swearingen, J.J. 1949 DETERMINATION OF THE MOST COMFORTABLE KNEE ANGLE FOR PILOTS. (Naval Medical Research Institute, Bethesda, Maryland) Report No. 4, ASTIA ATI-205871, 21 January 1949

ABSTRACT: The mean value for knee angle assumed by small groups of "tall", 'medium", and "short" men, when permitted free choice in the adjustment of brake-rudder pedals, was found to be 110°. The precision of this man is probably adequate for application to cockpit design in view of the individual variation observed. (NMRI Abstract)

1,471

Swearingen, J. J. 1949 DETERMINATION OF THE MOST COMFORTABLE KNEE ANGLE FOR PILOTS. (Civil Aeronautics Medical Research Lab., Civil Aeronautics Administration, Aeronautical Center, Okla. City, Okla.) Project No. BIOTECHNOLOGY 3-48, Rept. No. 1, May 1949

ABSTRACT: The mean value for knee angle assumed by small groups of "tall", "medium", and "short" men, when permitted free choice in the adjustment of brake-rudder pedals, was found to be 110 degrees $\pm$ 4 degrees. The precision of this mean is probably adequate for application to cockpit design in view of the individual variation observed. (AUTHOR)

1,472

Swearingen, J. J., et al. 1949 SPECIFICATIONS FOR HEAD CLEARANCE AND AIRCRAFT DESIGN. (Civil Aeronautics Administration, Oklahoma City, Oklahoma)

1,473

Swearingen, J. J. 1951 DESIGN AND CONSTRUCTION OF A CRASH DUMMY FOR TESTING SHOULDER HARNESS AND SAFETY BELTS.
(Civil Aeronautics Medical Research Lab., Oklahoma City, Okla.) A preliminary Report. April 1951.

1,474

Swearingen, J.J. & D.J. Morrow 1956 MOTIONS OF THE HEAD AND TRUNK ALLOWED BY SAFETY BELT RESTRAINT DURING IMPACT. (Civial 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.

1,475

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.

1,476

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):89-91. 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.

1,477

Swearingen, J.J., E.B. McFadden, J.D. Garner, J.G. Blethrow & 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.

1,478

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 logitudinal 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.

1,479

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

ABSTRACT: The geometry of motion of the head, trunk and appendages was established 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 kinematic data. In addition an analysis of the forces created by body kinematics during forward deceleration sheds new light on seat anchorage problems. (AUTHOR)

1,480

Swearingen, J. J., C. D. Wheelwright & J. D. Garner 1962 AN ANALYSIS OF SITTING AREAS AND PRESSURES OF MAN.
(Civil Aeromedical Research Insititute, Federal Aviation Agency, Oklahoma City, Okla.) CARI Rept. No. 62-1, Jan. 1962. ASTIA AD 271 138.

ABSTRACT: Studies of sitting area on a plane rigid surface for a group of 104 male subjects were made. Area was found to vary with height and weight and to increase with age up to 40 years after which there is a steady decline. Means were 179.4 sq. in. for area and .92 pounds/sq. in. for average pressure. Sitting contact area was found to increase with experimentally applied force of magnitudes up to something less than body weight. Analysis of pressure distribution in the sitting area reveals that nearly half of the body weight is supported on 8% of the sitting area. This high pressure area is under or adjacent to the ischial tuberosities. Over one-thired of the body weight on the sitting area is removed by the addition of a footrest, chair arms, and a slightly sloping seat back. (Author)

1,481

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

1,482

Sweet, Harold S. 1943 MODEL 49 SEAT TESTS.
(Lockheed Aircraft Corp., Burbank, Calif.) ASTIA ATI-49761, January 1943

ABSTRACT: At the request of the Stress Group, a Model 49 crew-compartment berth-seat, cabin side-bench, and cabin berth-seat were tested under flight and crash loadings. The crew compartment berth-seat withstood the test loads satisfactorily. After a number of modifications were made to the cabin side-bench and cabin berth-seat, they also carried the test loads

1,483

Swenson, Wayne A. 1959 A STUDY OF PARACHUTES AND SYSTEMS FOR AIRCRAFT DECELERATION
(Radioplane Company, Van Nuys, California) WADC Technical Report 57-128 January 1959 Contract No AF33(616)-2184 Expenditure Order No. R672-142 ASTIA AD 233185

ABSTRACT: A parachute decelerat on system was installed in a fighter-type aircraft and tested in flight to determine feasibility of operation and usefulness in flight maneuvers. In addition flight test data was gathered to examine the validity of in-flight parachute-airplane theory developed in a previous study contract.

1,484

Sylvester, M. A. 1960 WIND TUNNEL STATIC STABILITY AND FORCE TESTS OF AN AIRPLANE ESCAPE CAPSULE WITH HIGH-DRAG WEDGETYPE FINS AT MACH NUMBERS 1.75 TO 4.00
(Ballistic Research Labs., Aberdeen Proving Ground, Md.) BRL memo. rept. no. 1313; Nov. 1960. ASTIA AD 323 920.

ABSTRACT: Wind tunnel tests were performed on a 1/25 scale model of Lockheed Aircraft Corporation's proposed high speed airplane escape capsule in the

Ballistic Research Laboratories' supersonic wind tunnel. The model escape capsule simulated the entire nose section of a typical supersonic aircraft and was stabilized by thick sweptback wedge-type fins. The aerodynamic characteristics for the capsule, with varying fin parameters, were determined in the Mach number range from 1.75 to 4.00 for angles of attack from -25 to +25 degree and angles of yaw from 0 to 25 degrees. These results are presented and are summarized and discussed at zero angles of attack and yaw and at trim conditions. (U) (Author)

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

T

1,485

Tapley, B. D. 1960 STRESS-STRAIN CHARACTERISTICS OF MATERIALS AT HIGH STRAIN RATES, PART VI, THE PROPAGATION OF PLASTIC WAVES IN FINITE CYLINDERS OF A STRAIN-RATE-DEPENDENT MATERIAL. (University of Texas, Austin, Texas) Rept. SCDC-2156; Aug. 1960; Rep/3955

ABSTRACT: This work seeks to determine indirectly, by studying the propagation of plastic waves, the basic dynamic-stress strain characteristics of materials. It represents the first successful effort to incorporate in the mathematical analysis of plastic wave propagation in bars, a correction for the effects of lateral inertia and shear.

1,486

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

1,487

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.

1,488

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

1,489

Texas University 1955 CUSHIONING FOR AIR DROP, PART I. (Structural Mechanics Research Lab., Texas University, Austin, Texas) Contract No. DA 19-129-qm-150; Continuation of Contract No. DA 11-009-qm-19309; ASTIA AD-71 631; 15 July 1955

ABSTRACT: Work was initiated to (1) survey aerial delivery procedures, (2) analyze data on shock-absorbing systems, (3) design and analyze energy absorbing systems which may be used for cushioning in the air drop of supplies and equipment, (4) perform laboratory tests in the development of energy absorbing sytems, and (5) cooperate in the performance of field tests in which systems are used which laboratory and theoretical studies show to be efficient and economical The drop-test facility was developed to a point of satisfactory operation, and improvements are expected to proceed in parallel with the testing program. Specimens of some representative cushioning materials were subjected to extensive tests in connection with perpendicularly applied impact loads. A direct comparison unit energy absorption with maximum encountered stress and thickness efficiency is presented on a single chart. Auxiliary charts permit rapid solutions of cushioning problems. A comparison of the relative costs of retarders and cushioning show that substantial economics can result from a rational balance between these two methods of energy absorption.

1,490

Theiss, E. C., H. Mileaf, & F. Egan 1961 HANDBOOK OF ENVIRONMENTAL ENGINEERING. (Aeronautical Systems Division, Wright-Patterson AFB, Ohio) ASD TR 61-363; ASTIA AD-272 272

ABSTRACT: This handbook presents to the designer the many facets of environmental engineering as applied to flight vehicle systems and their support equipment. The entire gamut of environments, both natural and induced, as well as their effects and methods of protecting against them are discussed in detail. The environments are considered both separately, and, where the present state of the art permits, in various combinations. The importance of an environmental and an operational analysis during preliminary system design are also covered. Chapter headings from the handbook are: introduction (History and philosophy); Astrophysical facts and environments; Environmental factors and effects; Environmental requirements; Environmental protection; and Environmental testing. (AUTHOR)

1,491

Thomsen, W. 1959 ORTHOPEDIC ASSUMPTION FOR THE CONSTRUCTION OF AUTOMOBILE SEATS
(U.S. Dept Comm.) Tech. Transla. 59-17369
(order from SLA Translation Center , The John Crerar Library, 86 East Randolph St. Chicago 1, Ill.)

1,492

Thomson, F. B. 1943 URINAL FOR USE WITHIN FLYING CLOTHING
(National Research Council, Canada) C-2409; 17 Jan. 1943.

ABSTRACT: A rubber urinal for pilots of aircraft were standing to urinate is impossible and opening of clothing is undesirable has been developed. The urinal worn under the flying clothing allows urination at the normal rate in the sitting position and has been tested and found to function adequately during level flight aerobatics, and acceleration up to 5G.

1,493

Thorson, Alvar 1961 ORGANISATION OF THE SEATBELT CAMPAIGN
International Road Safety and Traffic Review 9:46-48

1,494

Thurlow, S.J. 1958 APPARATUS FOR TESTING PROTECTIVE HELMETS.
(Dept. of Scientific and Ind. Res. Read Res. Lab.) no. RM/3290/SJT, p.40 Aug. 1958

ABSTRACT: The revised British Standard 2001:1956 "Protective Helmets for Motor Cyclists" specifies new performance tests which were devised at the Road Research Laboratory. The note describes in detail the apparatus required for carrying out the tests, which are as follows:

1. Shock Absorption Test
2. Test for Helmet Strength and Resistance to Penetration
3. Test for Flexibility of Peak
4. Test for Attachment of Harness.

1,495

Tiller, P.R. and L.M. Libber 1958 A FIRST APPROACH TO THE USE OF VENTILATING AIR IN THE APH-5 CRASH HELMET Jour. Aviation Med., 29(3): 251, March 1958.

ABSTRACT: A study was conducted to determine the effect of ventilation on the thermal discomfort experienced by pilots wearing the one-piece APH-5 crash helmet in desert and tropical climates. Thermocouple measurements were made of head and helmet temperatures in subjects exposed to simulated tropical and desert conditions, with either the helmet unventilated or ventilated by the suction part of a commercial blower.

1,496

Tilley, A.R. 1941 REPORT OF A MEETING HELD AT THE OFFICE OF THE PRINCIPAL MEDICAL OFFICER, R.C.A.F. HEADQUARTERS IN GREAT BRITAIN, SEPTEMBER 16, 1941. (National Research Council, Canada) Report #C-2904

ABSTRACT: Minutes concern a conference on the manufacture of the Franks Flying Suit by the Dunlop Rubber Company, Manchester.

1,497

Tillman, J.M. 1956 SOME SAFETY CONSIDERATIONS FOR INTERIOR CABIN DESIGN OF NEW AIRCRAFT
(United Air Lines, Flight Safety Department, Sept. 10, 1956)

ABSTRACT: Developments in the science of design requirements for crashworthiness and de-lethalization of passenger transport aircraft have been conducted by many government agencies and private interests.

The purpose of this paper is to assist the United Air Lines DC-8 Coordination Committee members and others concerned by providing a guide summarizing some passenger cabin design requirements which will take advantage of the knowledge now available to the industry.

1,498

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 flights are discussed.

1,499

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)

1,500

Tobin, J.R. 1941 REPORT ON HYDROSTATIC SUIT.
(National Research Council, Canada) Report #C-2833, June 1941

ABSTRACT: Flight tests were made on the Franks Flying Suit in the Battle and Hurricane aircraft. The suit was found to prevent blackout up to 9 G. Notes for further service trials are included.

1,501

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

1,502

Tompkins, R.C. & D.R. Gero 1951 EJECTABLE AIRCRAFT SEAT CAPSULE DEVELOPMENT PROJECT - PROGRESS REPORT NO. 1 - 1 FEB- 1 MARCH 1951
(Goodyear Aircraft Corp., Akron, Ohio GER-2586) March 9, 1951 USN Contr. No. NOA (S)-51-292-c ASTIA ATI 139 544

ABSTRACT: During the past period, all work accomplsihed on the Ejectable Aircraft Seat Capsule was of a preliminary nature. Aeromedical limitations were investigated and evaluated, shell configurations were analyzed, and an aerodynamic program was drawn up and submitted. Two proposals were submitted to BuAer for capsule modification and one for the development of a jato propulsion unit. GAC was advised informally to incorporate armor in the capsule, design the configuration for a back type personal parachute, and to consider only upward ejection. Such considerations are being used for all future design under the assumption that official confirmation is forthcoming. Layouts were made for approximately seven capsules having rotating shells in an attempt to achieve the minimum size enclose. The best of these configurations was selected and the design frozen for use in fabriction of the wind tunnel models and mock-up. The capsule is being designed around the armor plate which will act as the central frame member. All loads will be transmitted into this frame. This report is divided into two sections. Section I discusses the work accomplished in the past period. Section II outlines the work to be accomplished during the next period as well as particular questions which should be answered by BuAer.

1,503

Tompkins, R. C. & D. R. Gero 1951 EJECTABLE AIRCRAFT SEAT CAPSULE DEVELOPMENT PROJECT - PROGRESS REPORT NO. 2 - 1 MARCH - 1 APRIL 1951. (Goodyear Aircraft Corporation, Akron, Ohio) GER-2586, Suppl. #1, April 7, 1951. USN Contr. No. NOA (S)-51-292-c. ASTIA ATI 139 545.

ABSTRACT: The past period was one of transition from preliminary investigation and evaluation to one of formulating working designs. As is the case in any such period, changes had to be made in basic thinking and designs. Such changes will continue to be made for the next several months.

A GAC representative visited the Bureau of Aeronautics and David Taylor Model Basin for the purpose of correlating the design requirements and fabrication of the wind tunnel models.

Slight changes have been made in the basic configuration to provide for better capsule operation and to improve the aerodynamic characteristics of the shell.

This report is divided into two sections. Section I discusses the work accomplished in the past period. Section II outlines the work to be accomplished during the next period as well as a review of existing design problems.

1,504

Tompkins, R.C. & D.E. Gero 1951 EJECTABLE AIRCRAFT SEAT CAPSULE DEVELOPMENT PROJECT - PROGRESS REPORT NO. 3 - 1 APRIL-1 MAY 1951 (Goodyear Aircraft Corp., Akron, Ohio) GER-2586, Supp. No. 2 May 2, 1951 ASTIA ATI 139 541

ABSTRACT: During the past period, the design of the capsule, structural analysis, and flight path calculations began to reach the transition period in which previous assumptions could be reasonably checked for accuracy and practicability. Drawings were released and fabrication started on the wind tunnel models, mockup shells, and seat adjusting guides. Detailed flight path analyses and a transitory analysis were completed for the capsule using a catapult for ejection. These analyses utilized the corrected weight, D.G., C.P., and moments of inertia for the capsule. More detailed calculations must be postponed until finalized information is obtained on the variables used in the calculations. It is apparent that the mockup will serve a very useful function in determining what limits must be held for clearances and pilot comfort.

1,505

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

1,506

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

1,507

Tourin, B. 1958 EJECTION AND AUTOMOBILE FATALITIES. Public Health Reports 73(5):381-391. May 1958.

1,508

Tourin, B. and J. W. Garrett 1960 SAFETY BELT EFFECTIVENESS IN RURAL CALIFORNIA AUTOMOBILE ACCIDENTS. (Crash Injury Res., Cornell Univ., New York) Feb. 1960.

1,509

Tourin, B., & J. W. Garrett 1960 A REPORT ON SAFETY BELTS TO THE CALIFORNIA LEGISLATURE; SUMMARY AND ANALYSIS OF CALIFORNIA HIGHWAY PATROL REPORTS ON OPINIONS ON 54,348 AUTOMOBILE ACCIDENTS. (Results of a joint study by the California Highway Patrol and Automotive Crash Injury Research of Cornell Univ.) Feb. 1960

1,510

Tourin, B., J. W. Garrett 1960 A COMPARISON OF INJURIES TO USERS AND NON-USERS OF SAFETY BELTS. SAFETY BELT EFFECTIVENESS IN RURAL CALIFORNIA. (Highway Patrol and Automotive Crash Injury Research of Cornell Univ.) Feb. 1960

1,511

Townsend, D. E. 1960 SERVICE TEST OF HELMET, COMBAT VEHICLE CREWMAN, T56-6 (U.S. Army Artic Test Board, Fort Greely, Alaska) ATB 2-150; May 31, 1960; DA Project Nr 7-80-05-001. ASTIA AD 238 507.

ABSTRACT: This report describes the experiments concerning the Combat Vehicle Crewman's Helmet, T56-6. Annex A gives the details of the tests. Annex B contains the deficiencies and suggested modifications of the helmet.

1,512

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.

1,513

Tufts U. Inst. 1957 HUMAN ENGINEERING BIBLIOGRAPHY, 1955-1956. (Tufts U. Inst. for Applied Experimental Psychology, Medford, Mass.) (Office of Technical Services, Washington D. C.) PB 131507.

1,514

Turnbow, J. W., & C. C. Steyer 1955 CUSHIONING FOR AIR DROP, PART II AIR DROP COST ANALYSIS. (Structural Mechanics Research Lab., Texas University, Austin, Texas) Contract No. DA 19-129-qm-150; ASTIA AD-87 732; 19 Dec. 1955

ABSTRACT: An investigation was made of properties of cushioning materials and systems used in air drops. A method is presented for analyzing the cost of aerial delivery by parachute, by cushioning, and by a combination of parachute and cushioning. The selection of cushioning materials will be based on the cost per unit energy absorbed, adaptability for use as cushioning material, availability, and ability to function under a wide variety of conditions. General equations of energy absorption costs are derived in terms of air-retarder and cushioning-cost parameters with respect to wide range of conditions pertaining to the parameters and to air-retarder drag coefficients, air density, and ground energy absorption factors. Studies showed that certain cushioning materials can be used with reduced parachute areas to greatly reduce the present cost of delivery. Parachutes are more economical than cushioning for energy absorption at high velocities, but cushioning is more economical in absorbing the remaining energy at velocities less than the optimum. Optimum impact velocities appear to be in the range of 30 to 100 fps. Because of efficient energy dissipation at high velocities retarders should be used to reduce terminal velocities to values near the optimum impact velocity, cushioning should provide the balance of the energy absorption.

1,515

Turnbow, J. W., H. Matlock, & J. N. Thompson 1956 CUSHIONING FOR AIR DROP, PART III, CHARACTERISTICS OF PAPER HONEYCOMB UNDER DYNAMIC LOADING. (Texas University, Austin, Texas, Structural Mechanics Research Lab.) Contract No. DA-19-129-qm-150; ASTIA AD-112 164; 31 Aug. 1956

ABSTRACT: This report is devoted to the presentation and discussion of the dynamic stress-stress-strain curves of seven grades of paper honeycomb and of the associated characteristic values relating to aerial delivery applications. The effects of impact velocity and density of the honeycomb material on the stress-strain characteristics are given. Tabulated values of maximum stress, optimum strain and energy absorption are presented and a comparison of the various honeycomb materials is made on the basis of cost per unit of energy absorbed. As an aid to the understanding of the over air-drop energy-absorption problem, the economic importance of using cushioning materials of a crushable nature, or equivalent energy-absorbing devices, in conjunction with aerial retarders is summarized. The capabilities of paper honeycomb are illustrated further, by the presentation of a cost analysis for the energy-absorption in a typical air-drop. Recommendations for the future study and testing of paper honeycomb as well as other materials and systems potentially even more efficient than honeycomb are discussed.

1,516

Turnbow, J. W. 1957 CUSHIONING FOR AIR DROP, PART VII, CHARACTERISTICS OF FOAMED PLASTICS UNDER DYNAMIC LOADING. (Structural Mechanics Research Lab., Texas University, Austin, Texas) Contract No. DA 19-129-qm-150; ASTIA AD-215 412; 28 March 1957

ABSTRACT: Dynamic stress-strain curves of four foamed plastic materials, including a polyisocyanate-resin suitable for field expansion without the aid of curing ovens or other special equipment, are presented and discussed. Static stress-strain curves are also presented to provide a comparison with the dynamic test results. Additional curves and tables give energy-absorption characteristics, stress levels, and suggested operating limits for the use of these materials in aerial delivery cushioning. Further comparisons of the plastic materials with paper honeycomb are presented with emphasis on cushioning costs and energy absorption capabilities.

1,517

Turnbow, J. W. 1961 U. S. ARMY H-25 HELICOPTER DROP TEST 22 OCTOBER 1960 (Aviation Crash Injury Research, Phoenix, Arizona) AvCIR 2-TR-125, TREC Tech. Rept. No. 60-76, March 1961. ASTIA Doc. No. AD-261 961

SUMMARY: 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 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. (Author)

1,518

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 aircraft 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 25 G, to a tolerable level.

1,519

Turnbow, J.W., V.E. Rothe, G.M. Bruggink & H.F. Roegner 1962 CRASH INJURY EVALUATION: MILITARY TROOP SEAT DESIGN CRITERIA. (Aviation Crash Injury Research, Phoenix, Arizona) TCREC Technical Report No. 62-79, November 1962.

ABSTRACT: This report is made of results of careful analysis of military troop seat deficiencies conducted over a three year period. Available data have been translated into terminology, meaningful to engineering personnel. Utilization of the information presented would produce a seat representative of the current state of the art and greatly reduce incidence of needless injury and death attributable to troop seat failure in survivable-type Army aircraft accidents.

1,520

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

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

U

1,521

U.S. Adjutant General's Office 1958 MILITARY ASPECTS OF SPACE EXPLORATION (Adjutant General's Office, Washington, D.C.) Spec. Bibliography No. 16; June 1958

ABSTRACT: This bibliographic survey was made to throw light on available unclassified literature that points up the military implications of space exploration. The materials are arranged in alphabetical order by title within major and subordinate subject groups. The major groups are miscellaneous; United States space effort; Soviet Russia space effort; satellites, trends and developments (electronics, navigation, orbits, propulsion, guidance control, and telemetry); environmental factors and problems (acceleration, survival, weightlessness); exploration of the moon and Mars; space ships and stations; international and legal aspects; and conferences. conventions, and symposia.

1,522

U.S. Air Force 1947 BACKWARD SEATING EXPERIMENT FOR PASSENGER TRANSPORT AIRCRAFT. (Air Transport Command, Traffic Division) April 1947.

1,523

USAF AMC 1948 ACCESSORIES, PILOT EJECTION SEAT TEST OF. (USAF, Air Material Command, Wright-Patterson AFB, Ohio) Memo. Rept. MCREXE-672-22F

1,524

USAF, AMC 1948 STABILIZATION OF PILOT EJECTION SEAT. (USAF, Air Material Command, Wright-Patterson AFB, Ohio) Memo. Rept. MCREXE-672-22H. 16 July 1948.

1,525

U. S. Air Force 1948 TEST FIRING OF T-7 CATAPULT FOR DOWNWARD SEAT EJECTION. (Aero Medical Laboratory, Wright-Patterson AFB, Ohio) Memorandum Report MCREXD-695-74.1, 11 May 1948.

1,526

U.S. Air Force 1949 STRENGTH REQUIREMENTS FOR SEATS IN USAF AIRCRAFT. (Reference letter, Deputy Chief of Staff, Materiel, Hq USAF, to CG, Air Materiel Command, 14 June 1949.)

1,527

U. S. Air Force 1950 COMPARATIVE AND OPERATIONAL SUITABILITY TEST OF FLYER'S PROTECTIVE HELMETS. Final Report. (Air Proving Ground, Eglin AFB, Florida) Project No. 3506----5, 19 May 1950.

1,528

USAF 1950 SAFETY SHOULDER HARNESS, TYPES G-1,G-2 and G-3 USAF Memorandum Report no. MCREXD-666-25B, 22 Aug., 1950

ABSTRACT: This report deals with the design of a new type or the modifying of the present type shoulder harness in order that the correct fit and adequate strength would be obtained for maximum protection of flying personnel.

1,529

U. S. Air Force 1951 ANALYSIS OF EJECTION SEAT OPERATION IN JET FIGHTER ACCIDENTS. (Medical Safety Division, Directorate of Flight Safety Research) M-37, pp. 1-23, Aug. 1951

1,530

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.

1,531

U.S. Air Force 1952 LIST OF PERSONNEL ATTENDING THE CONFERENCE ON "PROBLEMS OF EMERGENCY ESCAPE IN HIGH SPEED FLIGHT" AT WRIGHT-PATTERSON AFB, OHIO, 29-30 SEPTEMBER 1952.

1,532

U.S. Air Force 1952 USAF MEDICAL FLYING SAFETY REPORT OF EJECTIONS FOR 1952. USAF, Norton AFB, Calif.

1,533

U. A. Air Force 1953 OPERATIONAL SUITABILITY TEST OF THE MARK IV CONTINUOUS-WEAR ANTI-EXPOSURE SUIT.
(Air Proving Ground Command, Eglin Air Force Base, Fla.) July 1953.
ASTIA AD 16 299

SUMMARY: The Mark IV suit which is designed to provide protection to aircraft members in the event of bailing out over water, was tested to determine its suitability for tactical use under arctic and temperate winter conditions. The suit was found to provide adequate protection at -560 F. It does not impose excessive restrictions on the wearer. The Mark IV boots provide foot protection in low temperatures if mild exercise is taken. The suit with a hood is capable of maintaining body comfort for 2 hours in sub-freezing water (28° F.) at air temperatures as low as -40° F. The time required to don the suit is excessive. The inner liners are not correctly sized, and a hood is not provided to protect the head and neck in low temperatures. The material of which the outer garment is made is easily snagged and torn. The Mark IV suit, as tested, is not entirely suitable for use by aircrew members in winter conditions. A report of immersion tests is appended.

1,534

USAF 1953 PRESSURE SUITS: A CHAPTER FROM PHYSIOLOGY OF FLIGHT. (Department of the Air Force, Washington, D.C.) AF Manual No. 160-30, p. 65-79, July 1953

1,535

U.S. Air Force 1954 HUMAN RESCUE EQUIPMENT (CAPSULE TYPE) (Wright Air Development Center, Wright-Patterson AFB, Ohio) Exhibit WCLEH-5-12, Aug. 1954.

1,536

U. S. Air Force 1954 ESCAPE FROM HIGH SPEED AIRCRAFT. (Army Air Forces, Air Materiel Command Engineering Division) 26 Nov. 1954. ASTIA ATI 9213.

ABSTRACT: This report presents the history, current progress, and future plans for escape from high speed aircraft.

1,537

MOTION PICTURE

U. S. Air Force Film Library Center 1955 HUMAN FACTORS IN EJECTION SEAT DESIGN (Air Force Film Library Ctr., St. Louis, Mo.) Film No. 23035, 16 mm, Silent

ABSTRACT: This film is concerning six tests of downward seat ejection using a dummy showing leg restraint devices.

1,538

U. S. Air Force 1955 OPERATIONAL EXPERIENCE WITH EJECTION ESCAPE SYSTEMS FROM 1 JANUARY 1949 THRU 31 DEC. 1954. (Norton AFB, Calif.) Publication 23-55, AFR 190-16, Aug. 1955

ABSTRACT: This report presents an analysis of all (518) ejection seat bailouts from United States Air Force jet fighter and bomber aircraft since the beginning of ejection seat use (1 January 1949) through 31 December 1954. The efforts upon personnel as related to aircraft model, airspeed, altitude, crew training and other factors are presented; specific and general areas of difficulty in the operation of ejection seat and canopy systems are determined; and recommendations are presented for reducing the incidence of unsuccessful and/or accidental ejection. Some typical ejection briefs are included.

1,539

U.S. Air Force 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.

1,540

USAF, WADC, Air Res. & Dev. Comm. 1956 UNITED STATES AIR FORCE PARACHUTE HANDBOOK (Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC technical rept. 55-265, December 1956, ASTIA AD-118 036

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 this 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.

1,541

U. S. Air Force 1957 GENERAL DATA ON SEAT EJECTION. (Office of Inspector General, USAF, Directorate of Flight Safety Res., Norton AF B se, Calif.) 1 Jan. 1957 - 31 Dec. 1957.

1,542

U.S. Air Force 1958 MAJOR ACHIEVEMENTS IN BIODYNAMICS: ESCAPE PHYSIOLOGY AT THE AIR FORCE MISSILE DEVELOPMENT CENTER, HOLLOMAN AIR FORCE BASE, NEW MEXICO, 1953-1958. (Air Force Missile Development Ctr., Holloman AFB, New Mex.) ASTIA AD 201 282

ABSTRACT: A detailed report of work done at Holloman Air Force Base between 1953-1958 on the following subjects: (1) deceleration and windblast experiments on the Holloman track: (2) specialized windblast studies; (3) other work on the escape problem; (4) seats and capsules (conflicting views of escape).

1,543

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; "Supersonci 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.

1,544

U. S. Air Force 1958 GENERAL DATA ON SEAT EJECTION.
(Directorate of Flight Safety Research, Norton Air Force B se, California)
1 Jan. 1958 - 31 Dec. 1958.

1,545

U. S. Air Force 1959 USAF SEAT EJECTION, 1 JAN. 1959 THROUGH 30 JUNE 1959.
(Office of Inspector General, USAF, Directorate of Flight Safety Res., Norton AFB, Calif.)

1,546

U. S. Air Force 1959 SEAT: UPWARD EJECTION, AIRCRAFT.
MIL-S-9497, March 1959.

1,547

U. S. Air Force 1959 SELECTED SEAT RESTRAINT DIMENSIONS.
(Anthropology Section, Aerospace Medical Lab., Wright Air Development Ctr.)

1,548

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.

1,549

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)

1,550

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.

1,551

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 quanitatively evaluated in an effort to determine an optimum attenuator. From the results of this evaluation, it was recommended that an active type system by 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.

1,552

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.

1,553

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.

1,554

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; II. 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.

1,555

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

1,556

U.S.A.F., Aerospace Information Div. 1961 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS
(Science and Technology Branch, Aerospace Information Division) AID Work Assignment No. 22, Report 6 AID Rept. 61-143 October 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.

1,557

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 7 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 topic: Space medicine and biology.

1,558

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 Div., Washington, D.C.) AID Rept. No. 62-191; Nov. 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 from August thru October, 1962.

1,559

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 discussions of data which describe the design elements of

equipment used in space applications, 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)

1,560

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

1,561

USAF Air Technical Intelligence Center. 1952 AIRCRAFT TYPE 29: EJECTIONS BY CATAPULT SEAT.
(Wright-Patterson AFB, Ohio) ASTIA AD 153 353.

1,562

U. S. Air Technical Intelligence Ctr. 1955 PRESSURIZED SUITS (COMBINAISONS PRESSURISEES). (Air Technical Intelligence Ctr., Wright-Patterson AFB, Ohio) Rept. No. ATIC-236836-B, C; Trans. No. F-TS-8803/III; Trans. from l'Air and Aviation; ASTIA AD-105 079; Sept. 1955

1,563

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.

1,564

Armament Research Dept. 1946 PILOT EJECTION, RESULTS OF PHYSIOLOGICAL TESTS AT A.R.D. BALLISTICS (L.P.D.) (Armament Research Dept., White Lea) Note No. 130, Sept. 1946

1,565

Armed Services Technical Information Agency 1959 BIO-ASTRONAUTICS AN ASTIA REPORT BIBLIOGRAPHY (Armed Services Technical Information Agency, Arlington, Va.) Feb. 1959 ASTIA AD 211 775

ABSTRACT: This bibliography covers the literature from 1952-1958.

1,566

Armed Services Technical Information Agency 1962 HUMAN ENGINEERING, AN ASTIA REPORT BIBLIOGRAPHY (Armed Services Technical Information Agency, Arlington, Virginia) May 1962, ASTIA AD-274 800

1,567

U.S. Army 1958 EVALUATION OF THE U. S. NAVY PILOTS PROTECTIVE HELMET. TYPE APH-5.
(Army Aviation Board, Fort Rucker, Ala.) April 1958; Proj. No. AVN 4157.1/58. ASTIA AD 161 095.

1,568

U. S. Army 1960 HIGH ALTITUDE RELEASE, LOW OPENING PARACHUTE DELIVERY OF PERSONNEL. (Quartermaster Field Evaluation Agency, U. S. Army, Quartermaster Research and Engineering Command, Fort Lee, Virginia) Technical Rept. E-49; FEA ABN 5827; June 1960

ABSTRACT: This project was conducted to qualify selected personnel in body stabilization free-fall techniques and to develop their technical competency to participate in engineering design evaluations and engineering tests of developmental parachutes and air delivery equipment. The project included a program of instruction conducted by qualified personnel for the selected group of parachutists. This course included (1) classroom instructions in the theory of stabilized free-fall parachute jumping, (2) theory of parachutes and special equipment, (3) physical training, (4) operation, maintenance, and use of special equipment, (5) physiological training and instructions in proper use of oxygen, (6)

procedures and techniques of exit from U. S. Army aircraft, and (7) a series of qualifying parachute jumps which included both static line release and free-fall manual ripcord release.
The project has qualified personnel to participate in engineering design evaluations and engineering tests of developmental parachutes and air delivery equipment. To maintain this capability, the above course, somewhat modified in scope and emphasis, is being continued. (USA)

1,569

U. S. Army Airborne & Electronics Board 1959 TEST OF PAPERBOARD HONEYCOMB FOR USE WITH THE STANDARD TYPE AERIAL DELIVERY SYSTEM. (Army Airborne & Electronics Board, Fort Bragg, N. C.) Project No. AB 958; ASTIA AD-212 249; 27 Feb. 1959

ABSTRACT: Service tests were made to determine the suitability of paperboard honeycomb for use with the standard-type aerial delivery system.
The paperboard honeycomb was constructed of untreated 80-lb basis weight kraft paper containing ½ in. cells, expanded and double faced. It is available in an expanded and an unexpanded form. In the expanded form a sheet measures 96 by 33 in., and weighs 13.5 pounds. Tests included (1) the determination of physical characteristics, (2) rigging of Army equipment on the current standard-type aerial delivery platforms, (3) loading of rigged loads into appropriate aircraft, (4) functioning as an energy dissipator, (5) ease of derigging, and (6) resistance to the effects of exposure to weather. Representative items of Army equipment rigged and subjected to a static drop and at least 3 drops from aircraft included (1) the 105-mm howitzer (6100-lb gross weight), (2) a ¼-ton trailer (5500 lbs), (3) a 3/4-ton trailer (6500 lbs.), (4) the 3/4-ton M37 truck (8109 lbs), (5) the M29C cargo carrier (6566 lbs), (6) the 76-mm T-124 gun (5162 lbs), (7) the 2-½-ton M34 truck (17,103 lbs), and the ¼-ton M38A1 truck (4089 lbs). As a result of the tests the following conclusions were made: (1) paperboard honeycomb is suitable for use with the current standard-type aerial delivery system in temperate climates, and (2) paperboard honeycomb when used as an energy dissipator with the standard-type aerial delivery system is less resilient and a better energy dissipator than the current standard-type felt shock pad.

1,570

U.S. Army Arctic Test Board 1960 SERVICE TEST MODIFIED TROOP TYPE T-10 PERSONNEL PARACHUTE HARNESS INCORPORATING MODIFIED CAPEWELL CANOPY RELEASE ASSEMBLY
(U.S. Army Arctic Test Board, Fort Greely, Alaska) DA Project Nr 7-87-03-004 ASTIA AD 236476

ABSTRACT: This is a detailed report of the modified troop type-10 personnel parachute harness incorporating modified capewell canopy release assembly. Also included is Annex A through E.

1,571

U. S. Army Arctic Test Board 1960 REPORT OF TEST OF PROJECT NR ATB 3-430 SERVICE TEST OF PARACHUTE JUMPING FROM ARMY AIRCRAFT (H-37) (DA Project Nr 9-38-04-000), 20 May 1960.

ABSTRACT: The purpose of these series of tests was to determine the suitability of the H-37 helicopter for aerial delivery of Army troops, supplies, and equipment under arctic winter conditions. Also, it was necessary to determine safe procedures for parachute jumping from the H-37 helicopter under arctic winter conditions. It was found that the H-37 helicopter, when modified by the installation of the anchor cable assembly described in Sikorsky Drawing S1507-5120-C less the starboard cable, will be suitable for parachute delivery of a maximum of 16 combat equipped parachutists under arctic winter conditions. When so modified, the H-37 helicopter will be suitable for consecutive delivery of standard type aerial delivery containers from the door or from the external cargo hook followed by parachutists from the door under arctic winter conditions. No requirement exists for the starboard anchor cable under arctic winter conditions and the item should be deleted from Sikorsky Drawing S1507-512-C for installation in the H-37 helicopter. The requirement for use of the static line protective shield will be limited and infrequent and therefore the shield should be locally fabricated by using units as required.

1,572

U. S. Army Artic Test Board 1962 REPORT OF TEST OF PROJECT NR ATB 3-262 SERVICE TEST OF PARACHUTE ASSEMBLY, PERSONNEL, FREE-FALL-TYPE, STEERABLE (INTERIM HALO). (US Army Artic Test Board, Fort Greely, Alaska) Project Nr. ATB 3-262, ASTIA AD-277654, 9 June 1962.

ABSTRACT: Tests were conducted in Alaska to determine the suitability of the Parachute Assembly Personnel, Free-Fall-Types, Steerable, (Interim Halo) for Army use under artic conditions. The tests included an inspection of physical characteristics and preoperational deficiencies and another inspection of functional suitability of automatic parachute ripcord release, altimeter, and stop watch. Further tests included investigations of the functional suitability for free-fall parachuting, determination of suitable jump procedures, maintenance and durability and reliability.

1,573

U. S. Army Board for Aviation Accident Research ARMY AVIATION HELMET EXPERIENCE. (United States Army Board for Aviation Accident Research, Report No. HF 4-61

1,574

U. S. Army Board for Aviation Accident Research **HU-1 SEAT FAILURES,** A REPORT OF FOUR CASES. (U. S. Army Board for Aviation Accident Research, Ft. Rucker, Alabama)

1,575

Army Board for Aviation Accident Research 1961 ARMY AVIATION HELMET EXPERIENCE
(Army Board for Aviation Accident Research, Fort Rucker, Ala.)
Rept. no. HF 4-61 1961 ASTIA AD 262 880

ABSTRACT: The purpose of this research was to determine the effectiveness of hard shell helmets for preventing loss of life and injuries during Army aircraft accidents and to summarize comments on helmets in current use. The wearing of hard shell helmets was credited with prevention of head injuries to 265 occupants of Army aircraft during the period studied. Factors of convenience and comfort, particularly heat retaining qualities, constitute major objections to wearing the APH-5 helmet. (Author)

1,576

U. S. Quartermaster Food & Container Institute for the Armed Forces 1958 DYNAMIC PROPERTIES OF ENERGY ABSORBERS FOR USE IN AERIAL DELIVERY.
(Quartermaster Food and Container Institute for the Armed Forces, Chicago)
Rept. No. 10-58; Tech. Rept. No. 175; June 1958. ASTIA AD 219 659.

ABSTRACT: Data on dynamic performance of energy absorbers are required to establish a rational design of packaging for airdrop. Paper honeycomb, empty beer cans, and styrofoam were evaluated under dynamic conditions to determine their energy-absorbing characteristics. A mass of known weight was dropped on the test specimens at velocities up to 59 fps. Force, time and displacement were recorded during impact. The average constant dynamic stress values for the materials were as follows: Grade 2 honeycomb, 3, 140 psf; Grade 3 honeycomb, 8, 890 psf; Grade 6 honeycomb, 4290 psf; styrofoam, 6450 psf; and beer cans, 15,600 psf. The average energy-absorbing values in foot-pounds per square foot per inch of displacement of the material were as follows: Grade 2 honeycomb, 360; Grade 3 honeycomb, 615; Grade 6 honeycomb, 412 styrofoam, 560; and beer cans 1430.

1,577

U. S. Army Quartermaster Research and Engineering Command 1958 REINFORCEMENT OF SUSPENSION FOR PARACHUTISTS SAFETY HELMETS. (Wuartermaster Research and Engineering Command, Natick, Mass.) Textile Engineering Lab. rept. no. 196; May 1958. ASTIA AD 202 466

ABSTRACT: Several suspension slings were made with a stitching system and installed in a parachutists safety helmets. The suspension slings withstood 40 ft-lb in a drop test. Recommendations were made to specify a 3/4 by 3/4 in. box stitch with 6 to 7 stitches/in. of stitch type 301 and nylon thread. This conforms to the requirements of type II, class 1 or 2 Spec MIL-T-7807A.

1,578

U. S. Army 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.) Tech. 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, we_o, 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, Aug. 1961. ASTIA AD 262 197)

1,579

U. S. Army 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) Techn. Rept. E-59; March 1961. ASTIA ATI 61014.

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, Aug. 1961. ASTIA AD 262 197)

1,580

U. S. Army Quartermaster Research & Engineering Command 1961 QUARTERMASTER RESEARCH AND ENGINEERING AIRBORNE TEST ACTIVITY.
(Airborne Test Activity, U. S. Army, Yuma Test Station, Arizona)
Aug. 1961. ASTIA AD 252 197

ABSTRACT: The Airborne Test Activity, a subordinate Engineering Test Activity of the Quartermaster Research and Engineering Command is responsible for the timely accomplishement of that portion of the Air Delivery Equipment Project approved and assinged by Headquarters, Quartermaster Research and Engineering Command and includes (1) Engineering studies, evaluations, surveys, and tests of Army air delivery material, systems and techniques. (2) Development of new and improved test method. (3) Provision of air delivery testing services to other United States Military agencies.

The Activity's end product is a technical report, published by the Activity and distributed by Headquarters, Quartermasters Research and Engineering Command, which presents the results of engineering tests and studies of Final Letter Reports Tentative Evaluations, and bound Technical Reports. This bibliography is a compilation of the Activity's accomplishments during the past fiscal year and contains abstracts of the bound technical reports published and a listing of other reports forwarded. The reports are cross-referenced by test number and title.

1,581

U.S. Army Signal Corps Project Michigan 1961 REPORT: SEVENTH ANNUAL HUMAN FACTORS ENGINEERING CONFERENCE, 3-6 OCTOBER 1961. (U.S. Army Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich.). Pp.81-84; 209-217. ASTIA AD 267 153.
NOTE: See Fedderson. W.E. and McCort F.P.

1,582

U.S. Army Air Force 1941 EJECTION OF PILOT FROM COCKPIT OF PUSHER TYPE AIRPLANES (U.S.AAF, Air Materiel Command, Eng. Div., Aircraft Laboratory) ER EXP-M-587-10 dated 23 July 1941

1,583

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

1,584

U. S. Army Air Forces Board 1944 ANTI-"G" FLYING SUITS---COMPARATIVE TESTS OF THE CLARK AND BERGER MODELS. (Eglin Field, AAF Proving Ground Command) Project No. 3658-C-422.3., 8 Nov. 1944

ABSTRACT: After flight tests by 8 experienced pilots, it was concluded that the Clark coverall suit is superior to the Berger Bros. G-2 model, especially in regard to comfort. The Cornelius Clark valve which supplies the pressure also performs better at altitude than the Berger Bros. valve.
Photographs of the Clark suit and Cornelius Clark valve and drawings of the Berger Bros. valve are included.

1,585

U. S. Army 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.

1,586

U.S. Army Air Force 1945 EVALUATION OF GERMAN PILOT EJECTION SEAT(USAAF, Air Materiel Command, Eng. Div., Aircraft Lab.) RST from TSEAL2L to TSEAL6D, 11 June 1945.

1,587

U.S. Army Air Force Materiel Center 1945 COMPARISON OF THE PROTECTIVE VALUE OF AN ANTI-BLACKOUT SUIT ON SUBJECTS IN AN A-24 AIRPLANE AND ON THE MAYO CENTRIFUGE (Army Air Forces Materiel Center, Mayo Aero Medical Unit) Contract no. W(33-038)ac-9166, October 1945.

ABSTRACT: The experiments to be described in this report are a continuation of studies being carried out in an attempt to determine the applicability of observations made on the human centrifuge to the aviator exposed to positive acceleration in flight. In the experiments to be described the protection afforded against the effects of positive acceleration by an anti-blackout suit was assayed on a series of individuals acting as subjects in an airplane and on a centrifuge. It was found that despite the higher g tolerance of the subjects when in the airplane, the amount of protection afforded by the anti-blackout suit was the same in the airplane as it was on the centrifuge.

1,588

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): Oct. 1946.

1,589

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.

1,596

U. S. Coast Guard 1956 AIRCRAFT EMERGENCY PROCEDURE OVER WATER. (Available through U. S. Govt. Printing Office) CG 306.

I,597

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.

1,598

U.S. Dept. 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, W shington, D.C.) Public Health Service Publication No. 617; Public Health Service Bibliography Series No. 21

ABSTRACT: 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; and extra-terrestrail aspects.

1,599

U.S. Directorate of Research and Development FUNDAMENTALS OF ASTRONAUTICS (Directorate of Research and Development, Headquarters USAF, 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.

1,600

U.S. Federal Aviation Agency 1961 AFT VS. FORWARD FACING SEATS IN TRANSPORT AIRCRAFT.
(ATA Memorandum distributed at the FAA-Industry Conference, Washington, D.C., June 8 and 9, 1961)

1,601

Foreign Tech. Division 1963 DROPPING THE CARGO WITHOUT A PARACHUTE.
(Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio) 15 February 1963. ASTIA AD 400 530
Trans. No. FTD-TT-62-1842 from Przeglad Techniczny, 14:2, 1962

1,602

U.S. House of Representatives 1957 AUTOMOBILE SEAT BELTS (Report on the Special Subcommittee on Traffic Safety of the Committee on Interstate and Foreign Commerce.)
(House of Representatives) House Rept. No. 1275; 1957.
See also Stapp, J. P. 1957 Automobile Seat Belts.

1,603

U. S. House of Representatives 1957 A REPORT OF THE TESTIMONY FROM MEMBERS OF THE CORNELL COMMITTEE FOR TRANSPORTATION SAFETY RESEARCH.
Seat Belt Hearings in the United States House of Representatives, presented April 30, 1957 in a hearing before the Special Subcommittee on Traffic Safety of the Committee on Interstate and Foreign Commerce.)

1,604

National Research Council 1946 HAZARDS OF SEAT BACKS IN AIRCRAFT ACCIDENTS. (Crash Injury Research, National Research Council, Washington, D.C.) 18 October 1946.

1,605

U. S. Navy Department, Bureau of Aeronautics, Washington 1942 REPORT ON RESEARCH PROJECT --- ANTI-BLACKOUT SUIT AND ATTACHMENTS. (Memo from Medical Research Section to Director, Div. Med. Res., Bureau of Medicine and Surgery, 14 Oct. 1942)

ABSTRACT: The physiological basis of anti-"g" suits is discussed and the history of the Navy pulsating pressure suit and early constant pressure suit is given.

1,606

US NASA, Program Office, Mercury/Atlas Launch Vehicle. 1961 MERCURY/ATLAS LAUNCH VEHICLE FACTORY ROLLOUT INSPECTION GENERAL PROCEDURES AND ORGANIZATION--PILOT SAFETY PROGRAM OF THE ATLAS LAUNCH VEHICLE FOR NASA PROJECT MERCURY. Aerospace Corp., El Segundo, Calif. Rept. No. TOR-594 (1101) RP-3 Contract No. AF04 (647)-930, 31 Oct. 1961.

1,607

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.

1,608

U. S. Navy 1947 PILOT'S EQUIPMENT EMERGENCY RELEASE BELT TYPE AND SEAT TYPE. (Medical and Safety Department Aircraft, Fleet Marine Force, Atlantic Marine Corps Air Station Cherry Point, North Carolina) B M&S Research Project X-677 (Av-358-a) Report No. 3, 30 July 1947, ASTIA TIP-U 2998.

ABSTRACT:
1. A prototype of a pilot's equipment emergency release has been developed embodying headset, oxygen, microphone, anti-G suit, and heating suit connections as well as the shoulder straps and safety belt release. All are released with the one simple motion already familiar with pilots; namely, releasing the safety belt.
2. Such a release is desirable for quick escapes because it:
   (1) Quickly disconnects the pilot from all of his plane connections when the safety belt is released,
   (2) reduces escape time 100%.
   (3) prevents equipment entanglements during escapes where the pilot either willfully failed to complete disconnections or did not have time to do so,

(4) Centralizes connections formerly scattered throughout the cockpit thereby making more room in the cockpit, is situated at the waist level where the bulky anti-G and heating suit connections will be the shortest and most out of the way.

(5) Puts pilot's connections in a comfortable out-of-the-way position reducing entanglements and annoyances in flight, and

(6) is easily adaptable to the ejection seat through the use of the seat release, and makes possible the use of oxygen with the initial descent in the ejection seat.

3. These prototypes have been favorably "jumped" tested. (NCAS Abstract)

1,609

U. S. Navy 1949 AN INVESTIGATION OF LAP TYPE SAFETY BELTS AND SHOULDER HARNESSES.
(Naval Aircraft Factory) Rept. M-4851; 1 June 1949.

1,610

USN Special Devices Center 1950 BIBLIOGRAPHY OF HUMAN ENGINEERING REPORTS
(USN Special Devices Center, Port Washington, N. Y.)
NAVEXOS P 530 B, Rev. Nov. 1950.

ABSTRACT: This bibliography categorizes the entries broadly into the following topics and subtopics: learning--training methods, mass training, criterion studies; motor skills--general, positioning reactions, transfer; perception--general, vision, audition; voice communications--general, speech intelligibility, measurement, training; extreme environmental factors; systems analysis--surface, subsurface, aircraft, airships, radar equipment; training devices--general, gunnery, flight; research tools; human engineering in general. (Tufts)

1,611

U.S. Navy Department 1953 PILOTS PROTECTIVE HELMETS, SERVICE EVALUATION OF (Naval Air Test Center, Patuxent River, Maryland) Project TED No. PTR-AE-525032, 30 Jan 1953, ASTIA ATI No. 208 289

ABSTRACT: The purpose of the tests described in this report was to investigate the operational suitability of five types of experimental helmets and to

compare them with the H-3 helmet. The five protective helmets tested were not superior to the H-3 helmet design and were not adopted for service use. The following features would have to be incorporated for acceptable service: a two-piece design; a maxamum weight of two and one-half pounds complete; a minimum of electrical connections; a full vision visor or integral full vision goggles; adjustable sling suspension.

1,612

U.S. Navy 1959 PARTIAL PRESSURE SUIT SEAT PAN REGULATOR ASSEMBLY, FIREWEL COMPANY, TEST AND EVALUATION OF, REPORT # 1, FINAL REPORT. (Naval Air Test Center, U.S. Naval Air Station Patuxent River, Maryland) ASTIA AD-214 716-L, 26 January 1959

ABSTRACT: The partial pressure suit seat pan regulator assembly was installed in an F8U-1 scat pan and flown in that airplane for evaluation.

The seat pan assembly improved the suitability of the partial pressure suit by simplifying the accessories and attachments. The A13-A mask adapter, the inadequate length of the oxygen hose, and the excessive height of the seat pan proved to be unacceptable features.

1,613

U. S. Navy Department 1959 PILOT'S ABILITY TO ACTUATE EJECTION CONTROLS; FINAL REPORT CONCERNING (U. S. Naval Air Development Center, Johnsville, Pa.) TED ADC AE 5205, NM 15 01 12.3, ASTIA AD 257520, 5 Feb. 1959.

ABSTRACT: An investigation was carried out at the Aviation Medical Acceleration Lab. on the ability of pilots to operate ejection controls. This letter report constitutes the final report of this investigation. Earlier work performed at this laboratory related to this investigation was reported in references (b) through (g). The purpose of the present study was two-fold. The first part was to determine the effects of acceleration on a pilot's ability to actuate the ejection controls of two makes of ejection seats, the McDonnell-Stanley ejection seat equipped with an experimental torso-head restraint system and the Martin-Baker G-5 ejection seat equipped with the integrated harness restraint system. The second purpose was to determine the degree to which the Mark V exposure flight suit and Mark IV (Goodrich) and the AX-83 (Arrowhead) lightweight full pressure flight suit impeded a pilot in the actuation of the ejection controls when compared to his performance while wearing the summer flight suit. It may be concluded that little difference exists between the accessibility of the two ejection controls under positive and transverse chest-to-back acceleration which

forced the subject down and back into the seat. But under transverse back-to-chest and leteral accelerations, where the subject was thrown against the harness, the accessibility of the D-ring was markedly decreased. There was no apparent difference in the obstruction offered by the Goodrich and Arrowhead full pressure when they were not inflated. For this reason, the data on the two kinds of suits are combined in enclosure. The average maximum G level at which the subjects were able to operate the ejection controls is shown for both controls under each condition of acceleration. However, the Goodrich is the more flexible of the two suits during ejection.

1,614

U.S. Navy Department 1959 INTERIM EJECTION SEAT STUDY (U.S. Navy, Naval Aviation Safety Center) 1 January to 30 June 1959, ASTIA AD-232431

ABSTRACT: This is a report on ejections from U.S. Navy aircraft for the period 1 January to 30 June 1959.
It is the policy of the Naval Aviation Safety Center to publish a yearly summary of ejections. In order to furnish more current data to interested bureau, agencies, manufacturers, etc., about emergency escapes by ejections, the Naval Aviation Safety Center is publishing an interim report for the six month period. The general format followed in this interim report is a tabular presentation with no interpre tation. The complete analysis of the emergency use of the ejection seat will be published in the yearly summary.

1,615

U.S. Navy 1961 BIBLIOGRAPHY OF HUMAN ENGINEERING REPORTS (U.S. Naval Training Device Center, Port Washington, LI., New York) NAVEXOS P-1491, 15 July 1961. Revised. ASTIA AD 264 953

1,616

U.S. Navy n.d. FLIGHT TESTS OF XF3D-1 ESCAPE SYSTEM PARACHUTE EXPERIMENTAL UNIT. (U.S. Naval Auxiliary Air Station, El Centro, Calif.) Parachute Technical Report No. 5030-49-1

1,617

U. S. Navy Yard 1941 ACCELERATION BELT. (RAF, Institute of Aviation Medicine, Farnborough) FPRC 263 (c), March 1941.

1,618

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.

1,619

U. S. Naval Air Development Ctr. 1957 UNDERWATER ESCAPE PROGRAM F9F4 AEROPLANE LOW LEVEL DROP TESTS AT KEY WEST, AUG. 1957. (Naval Air Development Ctr., Johnsville, Pa.) Rept. No. NADC ED 2720, 25 Sept. 1957.

1,620

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

1,621

U. S. Naval Air Development Ctr. 1958 UNDERWATER ESCAPE PROGRAM. DESCRIPTION OF F86 D-11 LOW LEVEL DROPS AND COMPARISON WITH F9F-4 TEST DROPS, KEY WEST FLORIDA. (Naval Air Development Ctr., Johnsville, Pa.) Rept. NADC ED-5811, March 1958.

1,622

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.

1,623

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

ABSTRACT: An investigation was carried out at the Aviation Medical Acceleration Laboratory to evaluate the torso-head restraint system developed under BuAer research contract No. 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.

1,624

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 e ection 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)

1,625

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)

626

S. Naval Air Test Center 1958 PARTIAL PRESSURE SUIT AND ANCILLARY EQUIPMENT MODIFICATIONS, EVALUATION AND TEST OF.
(Naval Air Test Center, Patuxent River, Md.) Proj. Ted. No. PTR AE-5140: Serial no. ST 33-284; 29 Sept. 1958. ASTIA AD 205 131 L.

627

S. Naval Air Test Center 1959 PILOT'S PROTECTIVE HELMET, TYPE APH-5, *VENTILATION OF.*
(Naval Air Test Center, Patuxent River, Md.) Proj. TED no. PTR AE-5203.13; Serial no. ST33-4; 9 Jan. 1959. ASTIA AD 210 467 L

628

S. Naval Air Test Center 1959 TEST AND EVALUATION OF MK-5 AND MK-6 ANTI-EXPOSURE SUITS AND ESTABLISHMENT OF A PROCEDURE FOR VENTILATING THESE GARMENTS IN VARIOUS TYPES OF AIRCRAFT.
(Naval Air Test Center, Patuxent River, Md.) Rept. no. 2; Proj. no. TED PTR AE-5134; Serial no. ST33-2; 14 Jan. 1959. ASTIA AD 210 794L

629

val Aviation Safety Center 1956 EJECTION SEAT STUDY REPORT FOR AUGUST 1949 - MAY 1956, ON EJECTIONS AND BAILOUTS.
(Naval Aviation Safety Center, Norfolk, Va.)
ASTIA AD 125 052

ABSTRACT: The increasing ejection rate per unit hours flown and an increasing number of these units flown indicated a steady mounting of the frequency of ejections. There is a pronounced relationship between successful ejections and altitude. The relationship between altitude and successful ejection becomes apparent at 5000 ft and ejections become increasingly hazardous as the altitude decreases below this height. The mean altitude at which ejections occur did not increase during the period covered by this study. In terms of mach number, M = 0.70 is the beginning of the critically dangerous zone for ejections. In terms of indicated airspeed only, 400 kn is the beginning of the critically dangerous zone for ejections. Ejecting from the F9F, F7U, and TV model aircraft is significantly more dangerous than ejecting from the F2H and FJ models. Ejections from the swept-wing F9F are no more dangerous than those from the straight wing F9F. Ejections are more dangerous than bailouts with present equipment. No relationship existed between altitude and injury in bailouts (as long as irreducible minimum is observed.) Successful bailouts may be made at lower altitudes than ejections with present equipment. No relationship existed between speed and injuries resulting from bailouts within the speed range in which bailouts are made. The mean speed at which bailouts are made is substantially slower than the mean speed at which ejections are made. Bailing out from the F4U model aircraft is significantly more dangerous than bailing out of AD and SNJ models. (ASTIA)

1,630

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)

1,631

U.S. Naval Aviation Safety Center 1958 INTERIM EJECTION SEAT STUDY. (U.S. Naval Aviation Safety Center, Norfolk, Va., Interim report for 1 Jan. - 30 June 1958) ASTIA AD-211169

ABSTRACT: This is a report on ejections from U.S. Navy aircraft for the period January 1 to June 30, 1958. It is the policy of the Naval Aviation Safety Center to publish a yearly summary of ejections. In order to furnish more current data to interested bureaus, agencies, manufacturers, etc., about emergency escapes by ejections, the Naval Aviation Safety Center is publishing an interim report for the six month period. The general format followed in this interim report is a factual presentation with little or no interpretation. The complete analysis of the emergency use of the ejection seat will be published in the yearly summary.

Sixty-five ejections occurred during the period January 1, 1958 to June 30, 1958. Forty-six ejections were recorded for this same period in 1957. The rate per 10,000 flying hours is 1.27 for the six-month period. This is in contrast to a rate of .98 for the first half of 1957. The fatality rate for the period covered by this report is .21. The fatality rate for the corresponding period of 1957 was also .21.

1,632

U.S. Naval Aviation Safety Center 1960 EJECTION SEAT STUDY (U.S. Naval Aviation Safety Center, Aero-Medical Dept.) Period Covered: 1959 ASTIA AD 238 492

ABSTRACT: A series of tables and graphs stating ejection rates and rate of fatalities, altitudes of ejection, new seat systems and modifications, speed at time of ejection, attitude at time of ejection, and injuries caused by ejection.

1,633

U.S. Naval Aviation Safety Center 1960 EMERGENCY AIRBORNE ESCAPE SUMMARY. A REPORT OF EJECTIONS AND BAILOUTS FOR CALENDAR 1960. (Naval Aviation Safety Center, Norfolk, Va.) ASTIA AD-259 078

ABSTRACT: This summary presents an analysis of emergency airborne escapes occurring during the calendar year 1960. Its purpose is to apprise operators, commands and others of the record of escape system usage as utilized in Naval aircraft. (Author)

1,634

Naval Air Material Center 1960 ENVIRONMENTAL REQUIREMENTS OF SEALED CABINS FOR SPACE AND ORBITAL FLIGHTS (A BIBLIOGRAPHY OF PSYCHOPHYSIOLOGICAL STUDIES RELEVENT TO SPACE AND ORBITAL FLIGHT) (Naval Air Material Center, Air Crew Equipment Lab., Philadelphia, Pa.) Rept. No. ACEL-441; 26 Oct. 1960 ASTIA AD 246 414.

CONTENTS:

A. Bibliographic Reviews
B. Theoretical Articles
C. Physiological
D. Motor Performance
E. Space Flight
F. Undersea Problems
G. Environmental Stresses
H. Dietary Requirements
I. Perceptual Changes
J. Developmental Effects
K. Stimulus-seeking Behavior
L. Psychiatric Implications
M. Forceful Indoctrination
N. Sociological and Prison Studies
O. Applied Research
P. Anecdotal Reports

1,635

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.

1,636

U.S. Naval School of Aviation Medicine 1954 A STUDY OF THE HALF-PRESSURE ANTI-BLACKOUT SUIT. (Naval School of Aviation Medicine, Pensacola, Fla.) Research Report no. NM 001.059.15.03; p. 1-10 20 July 1954

1,637

University of Minn. 1956 REPORT ON RESEARCH ON SAFETY DEVICES FOR GROUND VEHICLES AT HOLLOMAN AF Base. (Automotive Safety Research Project, University of Minn.) Contract AF 29(600)-831, 31 December 1956.

1,638

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)

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

V

1,639

Valentine, G. 1956 DYNAMIC ANALYSIS-EMERGENCY ESCAPE SYSTEMS. (Stanley Aviation Corp., Denver, Colorado) Document No. 451 Contract AF 33(600)32054, 13 July 1956. ASTIA AD 115 879

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; (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.

1,640

Valentine, G. A. 1958 PROPOSAL - ENCAPSULATED SEAT (Stanley Aviation Corporation, Denver, Colo.) Document No. 645, 20 May 1958.

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 sensational performance of the Convair-Fort Worth B-58 airplane.

1,641

Valentine, G.A. 1960 HUMAN FACTOR CONSIDERATIONS IN THE DESIGN OF THE B-58 ESCAPE CAPSULE. (Paper, 31st Annual Meeting of the Aerospace Medical Association, Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 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.

1,642

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

1,643

van der Toorn, L.J. 1961 BIBLIOGRAFIE SCHOK EN TRILLINGWERING IN VERPAKKING (BIBLIOGRAPHY. SHOCK AND VIBRATION ABSORPTION IN PACKAGING (CUSHIONING)) (Technisch Documentatie en Informatie Centrum voor de Krijgsmacht (Netherlands).

ABSTRACT: This bibliography contains abstracts of articles and reports on theory of shock, vibration and damping. Attention is paid to the analysis of mechanical

influences occurring during shipment, storage and operational conditions. Part of the bibliography deals with test methods and measuring equipment. Obtained results are given. Extensive information is gathered on cushioning materials and shock and vibration resistant constructions as used in packaging techniques. I Items on properties of materials are compiled. References on isolators against shock and vibration used for the protection of apparatus aboard ships, aircraft and guided missiles are also included. Literature on air drop operations is presented. A survey is given of prescriptions and military specifications deal ing with the above mentioned subjects. (Author)

1,644

van Schaik, A.C. 1958 LITERATURE SURVEY OF SHOCK RESISTANT MATERIALS FOR AIR DROP OPERATIONS (Technisch Documentatie Centrum voor de Krijgsmacht (Netherlands). Rept. no. TDCK 14220, ASTIA AD-226 676

1,645

van Woerden, J. 1961 SEARCH AND RESCUE - BIBLIOGRAPHY
(Netherlands Armed Services, Technical Documentation and Information Center)
The Hague, May 1961 ASTIA AD 259 360

ABSTRACT: This bibliography contains summaries of reports and articles on search and rescue of survivors of shipwrecks and aircraft-accidents, compiled from the abstract-cards indexes of the Netherlands Armed Services Technical Documentation and Information Centre.
This bibliography is the fifth part of a series of five bibliographies.

1,646

Van Zelm Associates, Inc. 1959 DRAG PARACHUTE RETRACTING SYSTEM.
(Van Zelm Associates, Inc., Baltimore, Md.) Rept. Nos. 151 and 156; WADC Technical Rept. No. 57-57; Contract AF 33(600)30389; ASTIA AD-155 709; Jan. 1959

ABSTRACT: The general problem of a retractable deceleration parachute system has been examined and possible solutions have been studied. These solutions have been evaluated, and the final system configuration has been selected and designed The design incorporates a basic concept of winding a parachute around a revolving drum after retraction through a duct which collapses the parachute and compresses

it to a size which the drum can accommodate. The rewind motor is hydraulically or pneumatically actuated and the control system is largely mechanical with some components being hydraulic or pneumatic. A prototype unit was manufactured for test which weighed 94 pounds, and was installed on a truck. The vehicle was used to conduct a comprehensive testing program, to study the action of the parachute during deployment and retraction, and to evaluate the retraction system. Tests of the retraction system demonstrated that the design meets the requirements of such a device. (AUTHOR)

1,647

Vasboe, M. 1950 ACTUATOR ASSEMBLY — PILOT'S SEAT.
(Boeing Airplane Co., Seattle Div., Washington) 12 July 1950.
ASTIA ATI 99 276.

ABSTRACT: This specification defines a linear actuator assembly to raise and lower the Pilot's and Co-pilot's seat by remote electrical control. This specification states the purchaser's engineering requirements, requirements for furnishing data, and procedures for obtaining approval all of which Vendor agrees to meet when purchase order refers to this specification. Revisions may be made to include other uses or other articles considered acceptable by purchaser's engineering, to change existing requirements when agreeable to both parties, and to correct errors

1,648

Vasil'yev, G. 1959 CABIN OF A SPACE ROCKET (Kabina Kosmicheskoy Rakety)
Trans. of Sovetskaya Aviatsiya (USSR) 1959, 12 Sept., p. 4.
(Office of Technical Services, Washington, D.C.)
Oct. 22, 1959 59-22210

ABSTRACT: Comparisons of the work conditions of deep-sea divers and of pilots in a chamber filled with water show that the ideas of Konstantin Eduardovich Tsiolkovskiy for an anti-g chamber based on the buoyancy principle of Archimedes are well founded. Such a chamber will apparently be a rigid, hermetically sealed cabin built of a durable thin and transparent material. All controls will be inside of it, with hermetically sealed outlets leading outside. Astronauts will fill the chamber with liquid when they expect a greater g-force; during takeoff, braking, landing, and sharp changes in flight direction. Quick removal of water can be accomplished with compressed air.

1,649

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 Tsiolkevskii'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.

1,650

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.

1,651

Vaughan, V.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 74 g for sand landings and about 33 g for water landings. The maximum onset rates of acceleration, also along the X-axis, were about 25,000 g per second for sand landings and about 12,800 g 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 along the X-axis. The maximum accelerations at the center of gravity along the Z-axis were about 25 g for sand landings and about 9 g 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.

1,652

Viggiano, L.R. 1958 TEST OF A FULL SCALE EJECTION SEAT AND DUMMY WITH AND WITHOUT STABILIZING FLAP COMBINATIONS CONDUCTED IN THE MASSIE MEMORIAL WIND TUNNEL. (AMC, Wright-Patterson AFB, Dayton, Ohio) Technical Report No. 5778, ASTIA ATI-55251, August 1958

ABSTRACT: Wind tunnel tests were conducted on a full scale ejection seat with dummy and with and without head flaps to determine its points of stable equilibrium and the magnitude of lift, drag, and side forces at various angles of pitch, yaw and roll. A series of 12 tests was conducted, composed of 4 configurations. The first configuration consisted of tests without flaps at varied angles of pitch, yaw and roll. In the second configuration, plain head flaps were added to the seat. The same head flaps, with an additional set, were used in the third configuration. The magnitude of moment, lift, drag, and side forces was determined at 5° intervals through the range of pitch, yaw, and roll. The pitching range extended from -45° through +135°, whereas the ranges of yaw and roll extended from zero through 90°.

1,653

Virgin, E.W. & J.G. Beerer 1948 REPORT ON GROUND TEST FIRING PILOT'S EJECTION SEAT - AND APPENDIX 1 - MODEL B-45A AIRPLANE (North American Aviation, Inc., Los Angeles, Calif.) Report No. NA-48-600 June 25, 1948 ASTIA ATI 102 200

ABSTRACT: The seat and a dummy were ejected from a nearly complete nose section taken from the production assembly line of the Contractor's Long Beach plant, and set in a stand on the Flight Ramp. The cockpit interior was dientical to that of a finished airplane. Ejection was considered satisfactory. The details covering the ejection are delineated in the discussion portion of this report. Due to the

lack of a net to catch the seat, considerable damage to the seat resulted. Several undesirable features were encountered during ejection, which were attributed to the coupling of the catapult gun to the seat. Forward rotation of the seat upon leaving the guide rails resulted in sufficient frictional drag in the catapult itself to appreciably reduce the ejection velocity. Inertia loads did not remove the oxygen mask from the dummy; however, it was pulled away from his face sufficiently to expose his mouth. Air loads that would occur in flight were not simulated.

1,654

Visconti, Fioravante & Robert J. Nuber 1951 A WIND-TUNNEL INVESTIGATION OF THE STATIC STABILITY CHARACTERISTICS OF A 1/8-SCALE EJECTABLE PILOT-SEAT COMBINATION AT A MACH NUMBER OF 0.8
(National Advisory Committee for Aeronautics, Langley Aeronautical Lab., Langley Air Force Base, Va.) NACA Research Memorandum No. L51H08 Dec. 7, 1951
ASTIA ATI 130 618

ABSTRACT: An investigation was made of a 1/8-scale model of an ejectable pilot-seat combination with and without stabilizing fins. The purpose of this investigation was to determine the static aerodynamic characteristics and the effectiveness of various stabilizing fins at a high subsonic Mach number (0.8).

The results of these tests indicated that the instability of the pilot-seat combination was eliminated by the addition of stabilizing fins. Large changes in the stability characteristics and trim angles resulted from variations in fin position, dihedral, or incidence angles and from small displacements of the center-of-gravity position. The magnitude of the aerodynamic interference that exists about the seat had a large effect on the effectiveness of fins located at moderate distances from the seat.

1,655

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)
Trans. No. FTD-TT-62-1619 Dec. 7, 1962 ASTIA AD 294 537
Original Source: Mediko-Biologicheskiye Issledovaniya (Moskva)

ABSTRACT: Contents include material on the following subjects:
Training cosmonauts in controlling the ship
Life Support in space flight

Microclimatic conditions in a spaceship cabin
Food and water supply
Life 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
Familiarization-training flights on aircraft under weightlessness conditions
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

1,656

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 and 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)

1,657

Voas, R.B. 1963 TRAINING MAN FOR SPACE
Paper: Lectures in Aerospace Medicine, School of Aviation Medicine, Brooks AFB Texas, 4-8 February 1963

1,658

Vodonik, E.J. 1951 THE STATIC TEST OF THE NAVIGATOR'S PILOT'S SEAT AND IMMEDIATE FLOOR STRUCTURE - MODEL B-47B. (Boeing Airplane Co., Wichita Div., Kans.) Report No. WD-105999 ASTIA ATI-103279, February 1955

ABSTRACT: Static tests were conducted in the navigator's, pilot's, and co-pilot's seats, supporting structure, and immediate floor structure. The B-47B seats reinforced as noted in this report satisfactorily complied with the requirements with only a few exceptions. The results indicated that the seats were structurally satisfactory. The deflections and set conditions at limit loads in certain cases could be reduced by reinforcing the parts concerned and reducing tolerances.

1,659

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)

1,660

von Beckh, H.J. 1958 MULTI-DIRECTIONAL G-PROTECTION IN SPACE VEHICLES In: Hecht, F., ed. VIII th International Congress, Barcelona, 1957 (Vienna: Springer, 1958) Pp. 37-46

1,661

von Beckh, H.J. 1958 MULTI-DIRECTIONAL G PROTECTION IN SPACE FLIGHT AND DURING ESCAPE. A THEORETICAL APPROACH. J. Aviat. Med. 29(5): 335-342, May 1958

ABSTRACT: The re-entry phase of orbital and space projects, as well as changes in direction of the flight paths of supersonic atmospheric crafts require

vehicle designs which will be capable of producing appreciable G loads for extended periods of time. Since protection by anti-G suits cannit be greatly increased, this report proposes a device called the "anti-G capsule," which is pivoted about the lateral axis of the craft, and which automatically assumes positions that would render the resultant of all acting accelérations perpendicular to the heart-head line of the occupant. This device would also be designed to serve as an ejection capsule, affording G protection during and after escape from aircraft or space vehicle within the atmosphere.

1,662

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 act ing 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 Ruimtevaartgeneeskunke) (Space Medicine Bibliography) (Technisch Documentatie en Informatie Centrum voor de Krijgsmacht, den Haag, Netherlands) Rept. No. TDCK-16903; ASTIA AD-227 817; Feb. 1959)

1,663

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.

1,664

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 Ctr., Holloman AFB, N. Mex.) AFMDC-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)

1,665

von Beckh, H.J. 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.

1,666

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.

1,667

von Diringshofen, H. 1936 UNTERSUCHUNGEN IM FLUGZEUG ÜBER SEH-UND BEWUSSTSEINNSSTÖRUNGEN DURCH ZENTRIFUGALBESCHLEUNIGUNGEN (Research in the Aircraft Concerning Sight and Consciousness Disturbances Through Centrifugal Accelerations)
Klinische Wochenschrift (Berlin) 15: 877

1,668

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. dtsch. Ges. inn. Med. (Munich) 48: 283-287

1,669

von Diringshofen, H. 1937 KORPERLICHE BEANSPRUNCHUNG DER BESATZUNG IN HOCHWERTIGEN FLUGZEUGEN (Bodily Requirement of the Crew in High Performance Aircraft) Luftwehr. (Berlin) 4:359-366.

1,670

von Diringshofen, H. 1942 DIE WIRKUNG VON FLIEHKRAFTEN AUF DEN BLUTKREISLAUF DES IM FLUGZEUG SITZENDEN MENSCHEN (Effect of Centrifugal Acceleration in Flight on Circulation of Man in Sitting Position)
Luftfahrtmedizin 6: 152-165, 1942

1,671

von Diringshofen, H., 1955 "LONG CHAIR" POSITION FOR FIGHTER PILOTS. J. Aviation Med. 26(6):467-470

SUMMARY: The pilot possibly may tolerate in a long chair position of 45° positive accelerations of long duration up to 8 G without visual disturbances and without essential inconvenience in the air combat because:

1. The reduction of the level difference heart-eyes of about 5 cm. (by bending the head forward to the vertical line) compared with the upright position. Therefore, the lowest blood pressure at heart level for a sufficient blood flow through the eyes is reduced for a tolerance of 7 G at 155 to 170 mm. Hg and of 8 G at 170 to 185 mm. Hg.

2. The considerable improvement of the conditions for the venous blood return from the legs and the abdomen to the heart with a noticeable increase of the pressure in the vena cava caudalis through the intra-abdominal pressure on this vessel.

3. The facilitation of an artificial increase of the intra-abdominal pressure with the aid of an abdominal cuff of an anti-G suit or with something heavy in the abdominal belt.

1,672

Von Gierke, H. E. & R. R. Coermann 1961 THE BIODYNAMICS OF HUMAN RESPONSE TO VIBRATION AND IMPACT. Rev. Med. Aero (Paris) 2:201-203, Dec. 1961.

1,673

Von Gierke, H. E. & R. R. Coermann 1963 THE BIODYNAMICS OF HUMAN RESPONSE TO VIBRATION AND IMPACT. Industr. Med. Surg. 32:30-32, Jan. 1963.

1,674

Vorachek, J. J., F. Milhoan and others 1961 INVESTIGATION OF ESCAPE CAPSULE SYSTEMS FOR MULTI-PLACE AIRCRAFT. PART I. PRELIMINARY INVESTIGATION. (Goodyear Aircraft Corp., Akron, Ohio) WADC TR 57-329, Pt. 1; ASTIA AD 273 625.

ABSTRACT: Findings are summarized of an investigation of 4 escape capsule systems for a hypothetical multi-place aircraft. The aircraft has been assumed to operate in a performance envelope having a maximum equivalent airspeed of 800 knots through an altitude range from sea level to 55,000

ft and a Mach number of 4.0 from 55,000 to 100,000 ft with a flight duration of 30 hr. Four capsule configurations are evaluated: cockpit, nose section, tandem and individual. All the configurations tested provide the required escape potential, necessary crew comfort and access to work areas, and adequate survival potential. The individual capsule concept was the most desirable arrangement of the 4 concepts due to its weight factor, the least effect on aircraft availability, greatest escape potential, least susceptibility to damage, and the most positive separation factor from the aircraft. (Author)

1,675

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)

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 unwieldly 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 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. Aerospace Medicine 32(3):251. March 1961.

1,676

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. 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)

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

W

1,677

Wacholder, B.V. & E. Fayer 1960 STUDY OF INSTRUMENTATION AND TECHNIQUES FOR MONITORING VEHICLE AND EQUIPMENT ENVIRONMENTS AT HIGH ALTITUDE; INSTRUMENTATION 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 that are outside the scope of the present program, such as the 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 a environmental monitoring system for a particular vehicle.

1,678

Waecker, N. J. 1959 DESCRIPTION OF ROCKET CATAPULTS XM8, XM9, XM10, XM12 (Frankford Arsenal, Philadelphia, Pa.) Proj. No. TS1-15; Technical Memo. No. M59-28-1, May 59, ASTIA AD-217 240.

ABSTRACT: The physical and performance characteristics of 3 rocket-assist catapults are presented. Each catapult consists basically to two assemblies, an outer tube assembly, which is mounted to an airframe structure, and a telescoping inside tube assembly, which contains the rocket motor. This inside tube assembly is connected to an ejection seat. During ejection, a booster propellant, located in the inside tube, is ignited and the tube telescopes out of the launcher, carrying the ejection seat and man. The stroke of the telescoping action varies on the different catapults from 34 to 40 inches. Near the end of the stroke, the rocket motor solid propellant is ignited, supplying the necessary thrust for carrying the ejection seat with man clear of the aircraft and into free flight.

1,679

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. 5Nori-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.

1,680

Wahl, N.E., A.A. Whiting 1948 HEAD IMPACT INVESTIGATION- PROGRESS REPORT FOR SEPTEMBER (Cornell Aeronautical Laboratory, Inc. , Buffalo, 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 construction 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 ration 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 wok on various panels is nearing completeion and the next report published will be the final report summarizing all work covered under this contract.

1,681

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.

1,682

Wakeland, H. H. 1962 SYSTEMATIC AUTOMOBILE DESIGN FOR PEDESTRIAN INJURY PREVENTION. (In M. K. Cragun, ed., The Fifth Stapp Automotive Crash and Field Demonstration Conference, Sept. 14 - 16, 1961) Pp. 193-218.

1,683

Walchner, O. & F.M. Sawyer 1958 PARACHUTIST SPIN PROBLEM. (USAF, Wright-Patterson AFB, Ohio) WADC TN-58-261. Sept. 1958.

1,684

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)

1,685

Walchner, O. 1961 PARACHUTIST'S SPIN PROBLEM. In Bergeret, P., ed., Escape and Survival: Clinical & Biological Problems in Aero Space Medicine. (London, New York, Paris: Pergamon Press, 1961) AGARDograph 52. Pp. 10-17

1,686

Wallingford, V.R. 1943 SUBSTITUTION OF STEEL SPRINGS FOR RUBBER SHOCK CORD ON PILOT'S SEAT ADJUSTMENT FOR AT-16 AIRPLANES. (Noorduyn Aviation Limited, Montreal, Canada) Report no. 633, ASTIA ATI-116147, July 1943

ABSTRACT: Tests were conducted substituting steel springs for rubber shock cord on pilot's seat adjustment for AT-16 airplanes. It was found that the difference in weight of 1½ oz. per aircraft for the two installations is considered negligible The use of only twenty-four parts in the spring installation as against sixty-nine used in the shock cord installation means a definite reduction in assembly time and detail manufacturing time and cost. The operation of the seats with the spring installation is satisfactory. Substitution of springs for shock cord in accordance with this report is considered satisfactory.

1,687

Walpole, H.L. 1952 MOCK-UP AND OPERATIONAL LIMIT STUDIES INCLUDING FLOTATION, STRUCTURAL AND FIRING TESTS OF AN EJECTABLE COCKPIT CAPSULE. (Douglas Aircraft Co., El Segundo, Calif.) Report No. ES-16043

1,688

Walsh, D.K. and R.J. Sippel 1961 PUBLICATIONS OF THE JET PROPULSION LABORATORY JULY 1960 THROUGH JUNE 1961. BIBLIOGRAPHY NO. 39-2 (Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California) ASTIA AD-273 324, December 29, 1961

ABSTRACT: JPL Bibliography No. 39-2 is a compilation of official reports of the Jet Propulsion Laboratory released July 1, 1960 through June 30, 1961. Current security classifications are indicated; titles and abstracts given herein are unclassified.

1,689

Walsh, R. H. 1957 AUTOMOTIVE ENGINEERING WITH URETHANE FOAMS Rubber World 136:386

1,690

Ward, J.A. 1959 CANOPY SPILLER FOR TROOP PERSONNEL PARACHUTE ASSEMBLY, TYPE T-10 (Aeronautical Accessories Lab., Wright Air Development Center, Wright Patterson Air Force Base, Ohio) WADC technical rept. no. 59-245, May 1959, ASTIA AD-233 016

ABSTRACT: A device was needed with the Type T-10 parachute to release or

collapse the canopy at ground impact. Eight designs were evaluated and the Air Force Type J-1 selected for modification. The surface of the Type J-1 was smoothed and a duck and felt cover provided to prevent facial abrasions; the release button was enlarged, making operation easier with either hand when wearing mittens or gloves; and an oversized lug was added to the male portion of the release mechanism to prevent malassembly. (Author)

1,691

Ward, J. E. and G. R. Steinkamp 1959 HUMAN ENGINEERING OF THE SEALED SPACE CABIN In: Reports on Space Medicine - 1958 (Air Force School of Aviation Medicine, Randolph AFB, Tex.) Feb. 1959

1,692

Warfield, D. 1950 PROCUREMENT SPECIFICATION - SEAT - PILOT AND CO-PILOT - YH-21 HELICOPTER. (Piasecki Helicopter Corp., Morton, Pa.) Report No. PS-181, ASTIA ATI 96 610, November 1950.

ABSTRACT: This specification covers the design of a pilot or co-pilot seat assembly for use in the YH-21 Helicopter. General configuration and principal dimensions are to be as shown on PHC Drawing L22E4041 which forms a part of this specification. Specification requirements for seats purchased under this specification are included. Applicable specifications and drawings are also a part of this report.

1,693

Waters, M.H. L., D.B. Cobb and V.J. Bonnett 1960 SOME WIND TUNNEL EXPERIMENTS ON THE REEFING OF PARACHUTES (Royal Aircraft Establishment (Gt. Brit.). Technical note no. Mech Eng 329; Nov 1960; ASTIA AD-253 328

ABSTRACT: The results of an investigation in the R.A.E. 24 foot wind tunnel or various methods of reefing parachutes are presented. Of those tried, rigging point reefing was the best and, for this method, measurements were made at constant speed conditions on several parachute designs and for a range of reefing cord lengths. With rigging point reefing it is possible to achieve in the correct design of parachute substantially linear relationship between parachute drag and reefing cord lengths less than approximatley 70% of the parachute periphery. The drag of a reefed parachute with 70% reefing is very little less than that of the fully-opened parachute. If the parachute has a critical speed close to that at which it is tested then the reefed parachute will squid and the linear relationship will not be obtained. The U.S. method of calculating the length of a reefing cord was compared with that proposed in this Note. (Author)

1,694

Watson, M.B.P. 1959 TESTS OF THE AVROCAR IN THE STATIC RIG (Avro Aircraft, Canada) Rept. no. AVRO/SPG/TR 305, ASTIA AD-271 496 December 1959

ABSTRACT: Ground tests were initiated to develop the air-craft to the stage where it could be demonstrated that initial hovering was reasonably safe and that mechanical operation was acceptable for the projected NASA Wind Tunnel Test Program. Effort was made (1) to study the performance of the aircraft, establish the maximum thrust available and make any necessary modification whereby the performance might be improved; (2) to establish the control characteristics and develop the control system to permit satisfactory handling characteristics for the initial hovering trials; and (3) to verify the structural integrity and mechanical operation of the aircraft. (author)

1,695

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) F.P.R.C. Report No. 274, April 1941

1,696

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.

1,697

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, 18.9, 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 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)

1,698

Watts, D. T., Mendelson, E. S., Hunter, H. N. Kornfield, A. T. and Poppen, J. R. 1947 TOLERANCE TO VERTICAL ACCELERATION REQUIRED FOR SEAT EJECTION. J. Aviation Med. 18 (6):554-564.

SUMMARY: 1. 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.

2. 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.

3. 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.

4. 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.

1,699

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)

1,700

Webb Associates 1962 NASA LIFE SCIENCES DATA BOOK
(Webb Associates, Yellow Springs, Ohio)
Contract NASr-89; June 1962

CONTENTS:

I. Environmental Design Ranges
   A. Atmosphere
   B. Force Fields
   C. Temperature
   D. Decompression
   E. Radiation

II. Active Human Exchanges
  A. Energy
  B. Water
  C. Waste
III. Characteristics of Man
  A. Size and Motion
  B. Breathing
  C. Senses

1,701

Webb, M.G. 1957 TEST AND EVALUATION OF ANTI-BLACKOUT EQUIPMENT WHEN USED IN VARIOUS COMBINATIONS
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR17 Jan. 9, 1957

ABSTRACT: An investigation was conducted on the AMAL centrifuge to determine the effectiveness of standard anti-blackout equipment when used in various combinations. Six subjects were tested wearing Z-2 and Z-3 suits with different combinations of other clothing. From the results obtained in this experiment, it is concluded that there is no appreciable difference in the effectiveness of anti-blackout equipment when worn in the combinations tested.

1,702

Webb, M. G. 1957 PILOT'S ABILITY TO ACTUATE COCKPIT CONTROLS UNDER G CONDITIONS (Naval Air Development Ctr., Johnsville, Pa.) Letter Rept. TED ADC AE-6303.1, Serial 2625, 29 Mar. 1957

1,703

Webb, M. G., & R. F. Gray 1958 PRELIMINARY STUDY OF G TOLERANCE OF A SUBJECT IN THE G CAPSULE, PRONE POSITION. (Naval Air Development Ctr., Johnsville, Pa.) Letter Rept. TED ADC AE-1411, Serial 0568, 8 July 1958

1,704

Webb, M. G., Jr. and R. F. Gray 1960 A NEW METHOD OF PROTECTION AGAINST THE EFFECTS OF ACCELERATION ON THE CARDIOVASCULAR SYSTEM. Amer. J. Cardiol. 6:1070-1077, Dec. 1960.

1,705

Webb, P. 1959 HUMAN TOLERANCE AND PROTECTIVE CLOTHING
Annals New York Acad. Sc., 82(3):714-234, 7 Oct. 1959.

1,706

Webb, P. & F.K. Klemm 1959 DESIGN OF VENTILATED CLOTHING (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADC-TR-58-584, March 1959

1,707

Weber, W. C. and W. C. Knerr 1959 UNDERWATER ESCAPE PROGRAM: F8U-1 UNDERWATER CANOPY REMOVAL, FLOODING ORIFICES AND SEAT EJECTION, (U. S. Naval Air Development Center, Johnsville, Pa.) Rept No. 9 Proj. ADC-AE 6307; ASTIA AD230 569.

SUMMARY: This report covers all the underwater tests performed on an F8U-1 aircraft cockpit section by the NADEVCEN. The test work was accomplished at the NAS, Key West, Florida from July through December 1958. These tests evaluated the basic F8U-1 canopy remover system, determined the requirements for underwater canopy removal, evaluated the use of cockpit flooding orifices to reduce the differential pressure on the canopy, and evaluated the ejection seat system as a means of underwater escape from aircraft.

1,708

Webster, A. P. and H. A. Smedal 1950 HIGH ALTITUDE-HIGH VELOCITY FLYING WITH SPECIAL REFERENCE TO THE HUMAN FACTORS. - BARE SKIN HAZARD FROM FROSTBITE IN ESCAPE FROM AIRCRAFT. (Naval Medical Field Research Lab., Camp Lejeune) Proj. NM 006 014.02.02 (Sept. 1950) 1: 131-158.

ABSTRACT: The equation, $t(F_m-F) = C$, was derived to express the relationship between exposure time, t, and exposure temperature, F, in the production of frostbite, where F_m is the maximum exposure temperature just productive of frostbite for an indefinite exposure time and C is the exposure which just produces frostbite. For bare skin, F_m is taken as + 14°F and C as 4860 sec. -°F. Application of free-fall and open-parachute descent conditions gave a jumper's frostbite equation. For a 200-lb. jumper leaving a plane in horizontal flight, the estimated maximum altitude avoid frostbite was 39,600 ft. for freefall. The minimum freefall distance required was 26,980 ft. with a free-fall time of about 100 sec. For open descent all the way, with a 28-ft. nylon parachute, the estimated maximum altitude was 20,910 ft. A chart is presented, for an average jumper in the standard atmosphere, in which 3 regions are shown: dangerous region, for all altitudes at jump above 39,600 ft., and for altitudes above 20,910 ft., where the free-fall distance is not sufficient; safe region, freefall necessary, for altitudes

1,709

Webster, A. P. and H. A. Smedal 1951 HIGH ALTITUDE-HIGH VELOCITY FLYING WITH SPECIAL REFERENCE TO THE HUMAN FACTORS III. BARE SKIN HAZARD FROM FROSTBITE IN ESCAPE FROM AIRCRAFT. J. Aviation Med. 22(2):89-99.

SUMMARY: There are a number of physiological hazards in escape from aircraft flying at high altitudes. One of these hazards is frostbite.

Frostbite is a result of exposure which is composed of two factors: Time and temperature. Hypothesis indicates that the relationship between exposure time, t, and exposure temperature, F, is of the form $t(Fm-F)=C$ where F_m is the maximum exposure temperature just productive of frostbite for an indefinite exposure which just produces frostbite. For bare skin, F_m is taken as $+14^{o}$f., and C as 4,860 sec. - ^{o}F.

Application of free-fall conditions and open parachute descent conditions gives the Jumper's Frostbite Equation

$$\frac{1}{k_{ff}} \sum_{h_j}^{h_o} \rho^{1/2} \Delta h(F_m - F) + 14(F_m - F_1) + \frac{1}{k_{op}} \sum_{h_o}^{h_f} \rho^{1/2} \Delta h(F_m - F) = C$$

Insertion in this equation of selected constants for a 200 pound jumper leaving a plane in horizontal flight and waring a 28 foot nylon parachute, permits solution of the altitude at open parachute, h_o, to avoid frostbite on bare skin. Hence, the free-fall distance is determined, and the free-fall time.

The maximum altitude at jump to avoid frostbite may be determined by insertion of selected constants in the equation. For a 200-pound jumper leaving a plane in horizontal flight, the estimated maximum altitude is 39,600 feet for free-fall. The minimum free-fall distance required is 26,980 feet, with a free-fall time of about 100 seconds. For open descent all the way, with a 28-foot nylon parachute, the estimated maximum altitude is 20,910 feet.

A Frostbite Chart is presented, for an average jumper in the Standard Atmosphere, in which three regions are shown: A Dangerous Region, for all altitudes at jump above 39,600 feet, and for altitudes above 20, 910 feet where the free-fall distance is not sufficient; a Safe Region, Free-Fall Necessary, for altitudes between 29,910 feet and 39,600 feet; and a Safe Region, Immediate Opening, for altitudes below 20,910 feet.
Frostbite equations, tables, and charts are presented for estimating safe regions of escape to avoid the hazard from frostbite.

The maximum altitude at jump to avoid frostbite on bare skin varies only slightly with the weight of the jumper; and only slightly with the usual range of parachute canopies and drag coefficients of jumpers and parachutes.

1,710

Webster, A.P., 1953 HIGH ALTITUDE-HIGH VELOCITY FLYING WITH REFERENCE TO THE HUMAN FACTORS. IV. OPENING SHOCK OF PARACHUTE DESCENTS. J. Aviation Med. 24(2):189-199

SUMMARY: The opening shock of standard American parachutes is shown to increase directly with the fourth power of the velocity (true air speed) of the jumper when the parachute opens; to increase directly with the weight of the jumper; and to increase directly with the mass density of the air, i.e., decrease with increase in altitude. The equation for the opening shock is of the form $P = AW\rho V_o^4$
where P is the opening shock in pounds; W is the weight of the jumper in

pounds; ρ is the mass density of the air in slugs per cubic foot; is the opening velocity in feet per second; G is the opening shock in multiples of g, the acceleration due to gravity; and A is a constant depending on the type of parachute. This constant has been estimated to be 3.964×10^{-6}, 3.441×10^{-6}, and 5.386×10^{-6} for 24-foot nylon, 28-foot nylon and 28-foot silk parachutes, respectively. If the jumper is falling at equilibrium free-fall velocity when the parachute opens, the opening shock may be obtained from the equation $P = BWV_\rho^2$ or $G = BV_f^2$ where V_f is the free-fall equilibrium velocity, and B is a constant depending on the type of parachute. This constant has been estimated to be 0.0488, 0.575, and 0.0785 for 24-foot nylon, 28-foot nylon, and 28-foot silk parachutes, respectively. For a constant G-tolerance criterion, the relation between the velocity and mass density of the air (altitude) is of the form

$$V_o = \left(\frac{C}{\rho}\right)^{1/4}$$

where C is a constant depending on the type of parachute and the value of G selected.

For a 200-pound jumper with a 20 G criterion and a 28-foot nylon parachute, the constant C is estimated to be 5.812×10^6 and for a 30G criterion, 8.718×10^6. Using this latter equation and constants a velocity-altitude tolerance table and chart were prepared showing a SAFE REGION production of 20G or less, a DANGEROUS REGION PRODUCING 30G or more, and BORDERLINE REGION producing between 20 and 30G.

1,711

Weckman, E.L., O.L. Slaughter, and E.H. Wood 1955 MEASUREMENTS TO EVALUATE THE EFFECTIVENESS OF THE FULL PRESSURE HALF SUIT IN APPLYING EXTERNAL PRESSURE TO THE BODY. (Aviation Medical Acceleration, Lab., Johnsville, Pa.) NADC-MA-5502, March 21, 1955

1,712

Weinberg, J. W. 1959 DOUBLE-WALLED FACEPIECES MA-1A ALTITUDE HELMET (Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC Tech Rep. 58-643 ASTIA 212313.

1,713

Weinstock, M. & W. Boaz 1958 INVESTIGATION OF THE PRINCIPLE OF CONTROLLED ACCELERATION OPERATION OF PERSONNEL ESCAPE CATAPULTS. (Pitman-Dunn Laboratories Group, Frankford Arsenal, Philadelphia, Pa.) Memorandum Report No. MR-712, WADC TN 58-372, MIPR 33-600-8-1375A-178, FA Subproject No. C180, OCO Project No. TS1-15, DA Project No. 502-06-001, Oct. 1958. ASTIA AD 207612

ABSTRACT: The Pitman-Dunn Laboratories Division of Frankford Arsenal designed a pressure-sensitive relief valve in compliance with a request by the Wright Air Development Center. The basic project (TS1-15-C180) was aimed at developing a propellant charge for use in the M5 catapult in order to obtain a safe

personnel ejection from an aircraft at runway level; the relief valve was conceived as an alternate means of obtaining this capability. The relief valve maintains the gas at the pressure level required for optimum acceleration of the catapult by venting the excess gases formed during the catapult stroke. In this configuration, the catapult propellant charge must be great enough to produce above-normal operating pressures over the range of operating temperatures, thus insuring, throughout the stroke, an abundant supply of gas for regulation by the relief valve. The test firings demonstrated that the pressure relief valve functioned satisfactorily. The test results established the soundness of the principle of controlled-acceleration operation in personnel escape catapults.

1,714

Weinwurm, G. F. 1959 X-15 WINDBLAST TESTS
(Air Force Flight Test Ctr., Edwards AFB, Calif.) AFFTC-TN-58-42; ASTIA AD-302 802; March 1959

SUMMARY: The X-15 windblast tests performed on the Air Force Flight Test Center High Speed Track are analyzed to supply aerodynamic load information for the seat, and points out a number of deficiencies in the system. These include malfunction of the fin locking mechanism, oscillation of the extended skip flow generator, weakness of the parachute package, tendency of several parts of the seat to puncture the pressure suit, and material failure of the survival garment at a number of points. (ASTIA)

1,715

Weiswurm, K. 1961 EXPERIMENTAL MOUSE CAPSULE WITH LIFE SUPPORTING SYSTEM. Rept. on Equipment for Life Support in Aerospace. (Aerospace Medical Lab., Aeronautical Systems Division, Wright-Patterson AFB, Ohio) ASD TR 61-323, August 1961. ASTIA Doc. No. AD-267 143

ABSTRACT: To determine the basic requirements needed to furnish a sealed atmosphere suitable for sustaining life, a 12-inch sphere housing a mouse cage, 2-week food and water supply, atmosphere control units, and photographic equipment was designed and built for laboratory testing. Several methods of atmosphere control were tested using drierite, calcium chloride, gaseous oxygen, and potassium superoxide. Potassium superoxide in this application performs three functions in a single process-it absorbs carbon dioxide, it absorbs water vapor, and it releases oxygen. It makes possible an atmosphere regeneration system having no fans or other air-circulation devices; thus resulting in higher reliability. Three tests using potassium superoxide, each lasting two weeks, were very successful and demonstrated the advantages of this method. (Author)

1,716

Wells, J. A. 1961 DESIGN STUDY OF THE CAPSULE ESCAPE VEHICLE PARACHUTE RECOVERY SYSTEM HARDWARE. (Space Recovery Systems, Inc., El Segundo, California) Rept. No. SRS 635, Vol. 1, ASD TR 61-178, Vol. 1, October 1961. ASTIA Doc. No. AD-269 124.

ABSTRACT: A detailed evaluation was conducted to determine the characteristics required in a parachute recovery system for an escape capsule ejected from an aircraft having a performance capability of Mach 4 and 100,000 feet altitude. Certain operational parameters such as maximum and minimum deployment velocity and altitude, final rate of descent, capsule weight, and boost rocket thrust were given. Based on this evaluation, a general configuration of the system was established. An industry-wide survey of known sources of recovery system hardware components yielded data that were used in the design and evaluation of several basic types of systems. The most prominent of these were a gas-operated pyrotechnic system and an electric-pyrotechnic system. The gas-operated pyrotechnic system was selected ultimately as the optimum type available currently. A test program was established for qualification of the selected system. (Author)

1,717

Wells, J. A. 1961 DESIGN STUDY OF THE CAPSULE ESCAPE VEHICLE PARACHUTE RECOVERY SYSTEM HARDWARE. Vol. II (Space Recovery Systems, Inc., El Segundo, California) Rept. No. SRS 635, Vol. 2, ASD TR 61-178, Vol. 2, October 1961. ASTIA Doc. No. AD-269 125.

ABSTRACT: This report includes detailed technical charts, illustrations and explanations of the capsule escape vehicle parachute recovery system hardware.

1,718

West, D. R. & J. T. Greenslade 1962 ENGINEERING EVALUATION SEAT SEPARATORS (Central Experimental and Proving Establishment, Canada) CEPE RN 1622, May 1962, ASTIA AD-287 009

ABSTRACT: In conventional jet aircraft such as the T33 or F86, employing a ballistic catapult type of ejection seat, man/seat separation is accomplished by the difference in aerodynamic drag forces and masses of the seat/man. The actual time of separation under these conditions will be a function of the speed at which ejection occurs and the orientation of the seat/man package after ejection. These conditions render the seat/man separation time predictable only within a relatively broad range, and in the low altitude, low forward speed case, a delayed separation could cause a critical collision to occur between the man and seat. The introduction of a man/seat separating device, programmed to separate the crew member positively from his seat at a specific time, will reduce the separation time normally encountered when drag/mass ratio is the controlling factor. This would eliminate the collision probability by providing a safe distance between the man and the seat when parachute deployment occurs. Elimination of delay in speatation will permit an over-all decrease in the escape system's functioning time and thus provide an improvement in height-above-ground recovery capability. Ballistically operated man/seat separator actuators were obtained

on a load-for-test basis from commercial sources. A series of bench tests, static and airborne ejections was done to prove the separator installation for the T33 ejection seat. A feasibility of installation study was done for the F86 aircraft. (AUTHOR)

1,719

Wheelwright, C. D., J. J. Swearingen and J. D. Garner 1959 AN ANALYSIS OF SITTING AREAS AND PRESSURES OF MAN. (CAMR Lab., FAA, Oklahoma City, Oklahoma) Jan. 1959.

1,720

Whillans, M.G. 1942 SPONGE RUBBER ABDOMINAL BELT FOR USE WITH CRASH BOAT CREW TO PREVENT EFFECTS OF JOLTING.
(National Research Council, Canada) 4 Feb. 1942. C-2477

1,721

White, A.E. 1962 DEVELOPMENT AND QUALIFICATION THRUSTER, CARTRIDGE ACTUATED, XM16
(Aeronautical Systems Division, Wright-Patterson AFB, Ohio) ASD-TDR-62-1061
FA Report R-1639 ASTIA AD 402 377

ABSTRACT: The Air Force modification of the B52 aircraft escape system required a device to position leg guards for the protection of personnel ejected downward. It was determined that the T22 thruster being developed by the Frankford Arsenal for positioning the stabilizing dorsal fins of the F103 aircraft escape capsule could, after minor modifications, be used as an interim device to perform this operation. Frankford Arsenal was asked to modify the T22 thruster into a trunnion-mounted, gas-fired device to be designated Thruster, Cartridge Actuated, XM16. In all performance tests specified for the Xm16 Thruster, the unit satisfied military requirements for use in the B52 aircraft escape system.

1,722

White, C. B., P. J. Johnson & H. T. E. Hertzberg 1952 REVIEW OF ESCAPE HATCH SIZES FOR BAILOUT AND DITCHING.
(Wright Air Development Center, ARDC) Tech. Note WCRD 52-81; Sept. 1952.
ASTIA AD 99 784

ABSTRACT: This publication reviews wartime specifications of escape hatches in terms of current and experimental flying equipment. Each of the simulated bail-out and ditching tests was begun by a check of the adequacy of the present hatch sizes by subjects wearing the full flying equipment in present use. The hatch opening, if too small, was then enlarged until it was adequate. The entire procedure was then repeated with the subject wearing experimental arctic clothing,

which is considerably more bulky than present equipment. First the A-1, then the E-1 survival kit was used with each trial. It was found that the present standard sizes of 20 by 31 inches for the side hatch and 20 by 29 inches for the bottom hatch is adequate for use with either the current equipmentor the new experimental heavier clothing, provided no tunnel is involved, or the access area is not obstructed. It was also found that the standard size of the top hatch should be increased to 22 by 22 inches and these should be a step or ledge not more than 45 inches below the lowest edge of the hatch to give additional leverage to shorter crew members.

1,723

White, R. M. n.d. ANTHROPOMETRIC MEASUREMENTS OF 500 ARMY AVIATORS. (Quatermaster Res. and Dev. Ctr., Natick, Mass.) Unpub. data.

1,724

White, S. 1960 PRESENT AND FUTURE PERSONAL EQUIPMENT. Lectures in Aerospace Medicine, 11-15 January 1960 (Conducted at the School of Aviation Medicine USAF Aerospace Medical Center).

1,725

Whiting, A A. et al. 1951 HEAD IMPACT AND HELMET INVESTIGATION (Cornell Aero. Lab., Inc., Buffalo, N.Y.) Rept. No. OG-675-D-5, Contract No. N6ori-11917, 30 April 1951.

1,726

Whitney, R. U. 1956 DEVELOPMENT AND EVALUATION OF NEW CUTAWAY ANTI-G SUIT. Tech. Memo Rept., WCRD 56-34.

1,727

Whittenberger, R. K. 1959 IMPROVED SEAT AND BACK CUSHIONS. (The Goodyear Tire and Rubber Company, Akron, Ohio.) Proj. 7215; Task 71724 WADC TR 59-376. ASTIA Doc. No. AD-233 446.

Abstract: Development of an improved pilot seat and back assembly for the reduction of pilot fatigue is described in detail. The design criteria for these seat and back cushions are included. The study covers both seat design and seating materials; 25 experimental pilot seat cushions and 25 experimental back cushions were produced both contoured and noncontured, as well as foam rubber and polyurethane foam. The results of this study indicate that polyurethane foams of a proper density and compression resistance can be safely

and efficiently used in aircraft pilot seat and back cushions. The combined advantages of lighter weight, solvent resistance, and closer quality control indicate that the polyurethance foams offer a superior body support material. (author)

1,728

Whittingham, P.D.G.V., H. Lundy & F. W. Baskerville 1956 COMPARATIVE TRIALS ON IMMERSION SUITS.
(Inst. Aviation Med., R.A.F., Farnborough) FPRC 977; July 1956.

1,729

Wiant, Harry W. & R. O. Fredette 1956 A STUDY OF HIGH DRAG CONFIGURATIONS AS FIRST STAGE DECELERATORS. (U.S. Air Force) WADC Tech. Note 56-320, July 1956.

1,730

Wiesehofer, H. 1940 UBER FLUGVERSUCHE ZUR FRAGE DER ERTRAGLICHKEIT HOHER BESCHLEUNIGUNGEN BEI LIEGENDER UNTERBRINGUNG DER FLUGZEUGINSASSEN (Question of Tolerance of High Rates of Acceleration by Pilot While Lying Down; Experimental Studies)
Luftfahrtmedizin 4: 145-155

1,731

Wiesenhoefer, H. 1943 FLUGMEDIZINISCHE GRUNDLAGEN ZUM BAN VON SCHLEUDERSITZEN. (Aero-Medical Basis for Construction of Catapult Seats) Oct. 1943. ASTIA ATI 52016

ABSTRACT: A detailed discussion is presented on the aero-medical principles for construction of catapult seats. The main topic of the discussion is the determination of how well the human body is able to withstand the strain connected with high acceleration, and how these stresses can be reduced, and other safety measures are outlined. Numerical tables are given showing the stress resistance of various vertebrae to various stresses. One proposed measure to reduce acceleration is to catapult the seat downward. Results of tests showed that accelerations of 18 to 20 g for a period of 1/10 to 2/10 sec are permissible causing no serious effects to the body.

1,732

Wiesehoefer 1944 SCHLEUDERSITZABECHUESSE MIT MENSCHEN ZUR...FLUGZEUG-MUSTER. (Tolerance of Human Subjects to Acceleration During Catapult Seat Ejection) Oct. 1944. ASTIA ATI 43761

ABSTRACT: Tests were performed with catapult ejection seats with human subjects to determine tolerance to high acceleration. Catapult seats intended for the Do 335 and He 219 fighters were used, at ejection pressures of 60 to 135 atmospheres corresponding to actual flight of both aircraft. Attention is directed to the difference in construction of both assemblies. On the basis of results obtained it is shown that these ejection seats may be used without causing injuries to pilots due to excessive acceleration. It is considered premature to regard accelerations up to 28 g, which have been well tolerated in the tests, as lying invariably below the breaking load of skeletal structures.

1,733

Wiesehofer, H., tr. J.B. Bateman 1945 AVIATION MEDICAL PRINCIPLES FOR THE CONSTRUCTION OF EMERGENCY EJECTION SEATS. (Deutsche Versuchsanstalt fur Luftfahrt, E.V., Berlin-Aldershof) Rept. Rf 301/12, UM 1175(150)2402, 27 Oct. 1943. Translated as Appendix 2 to Lovelace, W.R., E.J. Baldes, & V.J. Wulff, The Ejection Seat for Emergency Escape from High-Speed Aircraft, Aug. 31, 1945. ASTIA ATI 7245

ABSTRACT: Following a review of the dynamic processes occurring in the ejection of the catapult seat, the effects on the human subject resulting from accelerations and air resistance are set forth. The limiting conditions are established under which the thresholds of tolerance of the human body, and particularly of the spinal column, are not exceeded. The procedures for reducing the forces involved and certain safety measures are discussed.

I. Introduction
II. Technical Details of the Ejection Seat.
III. Tolerance Toward Impact-Like Accelerations.
IV. Experiments on Tolerance to Wind Blast.
V. Flight Tests with Catapult Seat in the Ju 87.
VI. Possible Methods of Reducing the Acceleration During Ejection. (Author)

1,734

Wiesohofer, , tr., J.B. Bateman 1945 CATAPULT SEAT EJECTION WITH HUMAN SUBJECTS: TOLERANCE TO ACCELERATION OF PERSONS EJECTED FROM THE Do 335 AND He 219. (Deutsche Versuchsanstalt Fur Luftfahrt, E.V., Berlin-Adlershof) Deutsche Luftfahrtforschung: Investigation and Report No. 1393, 31 Oct. 1944. Translated as Appendix 14 to Lovelace, W.R., E.J. Baldes, & V.J. Wulff, The Ejection Seat for Emergency Escape from High-Speed Aircraft, ASTIA ATI No. 7245

ABSTRACT: The report deals with the effects on human subjects of seat ejection from a stationary mounting using high driving forces.

Using a catapult seat assembly intended for model Do 335, twenty-seven ejections have been performed with ten subjects, using pressures of 60 to 135 atmospheres. Using that intended for model He 219, fourteen ejections have been made with five subjects at pressures of 60 to 90 atmospheres.
Attention is drawn to the differences between the two assemblies; the requirements for each are set forth, and the results of the experiments are discussed. (Author)

1,735

Wilbur, Carl E. 1957 U.S. NAVY OPERATIONAL EXPERIENCE WITH EJECTION SEAT ESCAPE
Journal of Aviation Medicine 28:64-68, Feb. 1957.

ABSTRACT: There are many variables involved in any successful ejection, the principal ones being: (1) the condition of the aircraft, including its altitude and speed; (2) the functioning of the ejection seat mechanism, including separation from the seat and deployment of the parachute; and (3) the reactions of the pilot, including his decision to eject and his ability to complete the required procedure.

It is difficult in each instance of ejection to isolate the variable factors at fault. For this reason, each individual ejection should be considered as an occurrence in itself for purposes of safety study and preventive action. Furthermore, it is not possible in a series of only 177 cases to be on firm statistical ground.

Although the ejection system has been relatively safe in flight, its extra safety factors may have introduced undesirable features into escape under extreme emergency conditions. The seat cannot be fired until the canopy is jettisoned and thus pulls the seat catapult safety pin. This provision prevents premature ejection through a closed or partially opened canopy. However, since in this system failure of the canopy ejection mechanism would mean inability to eject with possible fatal results, a device for altenate removal of the safety pin has been invorporated to allow ejection through the canopy. The remaining major areas for reduction of fatalities lie in increasing the probability of successful escape at low altitudes, and at very high altitudes and speeds.
(The paper presents several graphs and many statistics concerning speed during escape, cause of ejection, and survival rate of ejected pilots)

1,736

Wilcox, B. 1958 THE CALCULATION OF FILLING TIME AND TRANSIENT LOADS FOR A PARACHUTE CANOPY DURING DEPLOYMENT AND OPENING. (Sandia Corp., Albuquerque, N. Mex.) Rept. no. SC4151; ASTIA AD-156428; Feb. 1958

ABSTRACT: Theoretical relations are developed for use in predicting the filling time and transient shock forces developed during the deployment and opening of a parachute canopy. These relations are used to calculated filling times and loads which are compared with measured values obtained from full-scale parachute research flight tests. The comparison is shown to be good.

1,737

Wilder, J.H. 1958 MODEL PARACHUTE TESTS IN VERTICAL WIND TUNNEL AT WRIGHT AIR DEVELOPMENT CENTER (Dayton U. Research Inst., Ohio) WADC Technical rept. no. 58-279, Sep. 1958, Contract AF 33(616)3922, ASTIA AD-204 424

ABSTRACT: The static stability and drag characteristics were determined of certain presently known parachute designs from wind tunnel tests on model parachutes. A special 3-component balance was employed to measure the body fixed components, normal force (force normal to the balance-boom axis), pitching moment and tangential force. The experimental tests were conducted in the 12-ft vertical wind tunnel. Twelve parachute models were tested, and the results indicated that 5 were stable about zero degrees angle of attack, that 1 was possibly stable about zero degrees angle of attack, that 1 was possibly stable at zero degrees angle of attack, and that 1 would not inflate at any air velocity. Those parachutes which were unstable about zero degrees angle or sick were in all cases stable about some other angle. In this study a positive slope of the moment coefficient versus angle of attack curve at a point of zero mement indicates stability. The manner in which a parachute canopy deforms is very important to the stability characteristics of that parachute. Deformation alone is believed to account for 5 points of zero mement for a parachute such as the the 20% porosity ribbon instead of the usual 3 points of zero moment experienced by most designs. Drag coefficients at zero angle of attack resulting from the wind tunnel tests were generally lower than those reported from free-fall drop tests.

1,738

Wilkes, W.H. 1952 ESCAPE FROM MULTIPLACE SUPERSONIC AIRCRAFT. (Paper, Symposium on Problems of Emergency Escape In High Speed Flight, Wright Field, Ohio, Sept. 29-30, 1952)

ABSTRACT: The principal dangers involved in escape from an aircraft at supersonic speeds and high altitudes are as follows: (1) explosive decompression; (2) immobility due to uncontrollable airplane or injury; (3) possibility of collision with the airplane structure such as wings, fin, wheels, etc.; (4) possible high temperatures due to aerodynamic heating of the crewman; (5) extreme horizontal deceleration after entering the airstream; (6) physical harm due to air blast on face and body; (7) lack of oxygen; (8) extreme cold; and (9) inability to open the parachute due to unconsciousness. The implications of these dangers are briefly discussed, in as much as they apply to multiplace bombers operating at altitudes up to 60,000 feet and speeds up to Mach 2.

1,739

Wilkins, R.W. 1944 BIMONTHLY PROGRESS REPORT NO. 17 TO THE CMR-OSRD ON CONTRACT OEMcmr-143. 2 Oct. 1944.

ABSTRACT: An anti-"g" suit has been constructed out of cotton netting which works on the principle of the "Japanese finger trap". Tests at the Wright Field Centrifuge show that it gives a protection of 1/2 to 1 "g". The experimental model is now being strengthened and simplified.

1,740

Wilkins, R. W. 1946 NET SUIT, COMBINED WITH PARACHUTE AND SAFETY HARNESS. (National Research Council, Committee on Aviation Medicine, Washington, D. C.) Special CAM Report, 8 May 1946.

1,741

Williams, D.C. 1959 T33 AIRCRAFT EJECTION SEAT TRIALS LOW LEVEL CASE USING D-RING LANYARD SYSTEM (Royal Canadian Air Force Central Experimental and Proving Establishment) Report No CEPE-1363 March 1959.

1,742

Williams, R.B. & R.J. Benjamin 1960 ANALYSIS OF WEBBING IMPACT DATA AND DETERMINATION OF OPTIMUM INSTRUMENTATION TO BE USED IN CONJUNCTION WITH THE IMPACTING OF WEBBING. (Cook Technological Center, Morton Grove, Ill.) March 1960. ASTIA AD 237 171.

ABSTRACT: Quantities of data have been obtained at Edwards Air Force Base, California, concerning the impact behavior of nylon webbing. The basic aims of this investigation are:

(1) To evaluate and analyze the methods used to obtain data acquired during nylon webbing impact tests conducted at Edwards Air Force Base, California.

(2) To interpret these data and to judge their reliability.

(3) To recommend, if necessary, improved or modified testing methods and instrumentation techniques which would result in obtaining data of greater value in future tests.

Analysis and interpretation of the test data indicated that these data were of intermediate reliability. Certain trends were apparent, but relatively large experimental scatter existed. Possible causes of the scatter were investigated and recommendations were made for improvement of testing methods, equipment, data reduction technique, and data interpretation.

1,743

Willis, J. M. N. 1956 THE EFFECT OF SPRING SUSPENSIONS FOR SEATS ON COMFORT IN HIGH SPEED, LOW LEVEL FLIGHT. (Ministry of Supply, R.A.E., Farnborough,) Departmental Memo No. ME 124

1,744

Wilson, C. L. and M. B. Zinn 1960 MEDICAL PROBLEMS IN TESTING HIGH ALTITUDE PRESSURE SUIT. Aerospace Med. 31:49.

1,745

Wilson, C. L. 1961 OPERATIONAL USE OF THE UNITED STATES AIR FORCE PARTIAL PRESSURE SUIT.
Aerospace Med. 32(9):825-828.

1,746

Wilson, Charles L. 1962 PHYSIOLOGICAL PROTECTION OF THE CSU-4/P HIGH-ALTITUDE PRESSURE SUIT
(6570th Aerospace Medical Research Laboratories, Wright-Patterson Air Force Base, Ohio) AMRL-TDR-62-112 ASTIA AD 291 079

ABSTRACT: The SCU-4/P high-altitude bladder pressure suit was designed mainly for quick donning. Each of 15 subjects who wore the suit ensemble was rapidly decompressed from 282 mm Hg chamber pressure (7.6 km) to 42 mm Hg chamber pressure (19.8 km) in an average of 1.5 seconds and then further to 33.6 mm Hg (21.4 km). All subjects were able to remain at 33.6 mm Hg for 5 minutes without any difficulty. Each of 14 of the subjects was again successfully exposed to the same profile except that one hand was bare and the other hand was protected by an unpressurized leather flying glove. Eight subjects were easily able to remain at 8 to 3 mm Hg chamber pressure (30.6 to 36.7 km) continuously for 120 minutes. One subject wore the CSU-4/P pressure suit ensemble during a special decompression study.

1,747

Wilson, K. G., et al. 1945 SAFETY ADVANTAGE OF REARWARD SEATING IN PASSENGER AIRCRAFT. (Consolidated Vultee Aircraft Corp., San Diego, Calif.) Dec. 1945

1,748

Wilson, R. B. 1960 MAINTAINING THE CONFIDENCE OF THE SPACE CREW IN THEIR LIFE SUPPORT SYSTEM
(Paper SAE National Aeronautic Meeting, Los Angeles, Calif., Oct. 10-14, 1960)
(Society of Automotive Engineers, Inc., New York, N. Y.)
Rep. 244B, Oct. 1960.

ABSTRACT: Detailed data on environmental parameters that must be controlled to maintain healthful conditions in a satellite cabin are presented. A display design that will indicate the condition of these parameters is proposed and suggestions are made for instrumentation design. Ways and means of verifying the validity of the displays are discussed. Emergency backup for the environmental parameters is also provided. (Tufts)

1,749

Wilson, W. 1941 TESTS OF HYDROSTATIC SUIT. (R.A.E., Farnborough) Report #C-2906, 27 June 1941

ABSTRACT: This is a report of flight trials with the Franks Flying Suit in the Spitfire and Hurricane. The chief test pilot at R.A.E. Farnborough recommends that the suit go on to service trial.

1,750

Winfield, B.J.O. 1948 SOME MEDICAL ASPECTS OF PARACHUTE TRAINING. (RAF, Institute of Aviation Medicine, Farnborough) FPRC 674, Dec. 1948.

1,751

Winfield, R. H. & Crichton-Miller, C. 1942 PARACHUTING: BASED ON 11,000 DESCENTS MADE AT RAF RINGWAY. (RAF, Institute of Aviation Medicine, Farnborough) FPRC 445, March 1962.

1,752

Winter, R.S. 1947 PASSENGER SEAT, STRUCTURAL AND VIBRATORY TESTS, MODEL 240 AIRPLANE (Consolidated Vultee Aircraft Corp., San Diego, Calif.) Rept. 4939, May 22, 1947

1,753

Winzen, O. C. 1947 SURVEY OF PARACHUTE PROBLEM IN CONNECTION WITH THE RECOVERY OF THE STRATOSPHERE GONDOLA. (General Mills, Inc. Minneapolis, Minn., 6 June 47); ASTIA AD 134 611.

ABSTRACT: Purpose of this report is to propose and discuss in general terms, illustrated by sketches, six arrangements of parachutes for the emergency recovery of the Stratosphere gondola. Method VI (the use of 8 standard parachutes each suspended by 10 balloons) is considered the most feasible by this Laboratory. However, the choice of the arrangement to be used will be left to the crew of the aerostat. The method or methods selected for consideration will be investigated by mathematical analysis and empirical experimentation. (Author)

1,754

Winzen, O. C. et al 1957 PRESENTATION OF PROJECT MANHIGH PARACHUTE RECOVERY DATA. (Winzen Res. Inc.) Rept. No. 1211-R, May 1957.

1,755

Winzen, O. C., & D. P. Parks 1958 OPERATION MANHIGH II. Jet Propulsion 28:523-532

1,756

Witty, W.W., J.F. Turner 1949 DOUGLAS FLIGHT ENGINEER'S SEAT FOR C-124 (Test Report) March 1949, ATI-74 967

ABSTRACT: The structure of the flight-engineer seat in the C-124 cargo airplane was load-tested. This seat has fore and aft, vertical, and swivel adjustments. Four tests were performed using hydraulic jacks to apply all loads, the magnitude and direction of which were in agreement with USAF Spec 25276-A. All loads were held for a period of one minute or more without causing destruction of the seat structure.

1,757

Wodell, C. H. and W. C. H. Prentice 1945 A NEW SPRING-TYPE SEAT FOR THE B-29 BLISTER SIGHTING POSITION AS AN AID TO GUNNER PERFORMANCE. (Office of Scientific Research and Development) OSRD Report No. 6178, ASTIA ATI-18866, October 1945.

ABSTRACT: To improve the gunner's stance on the pedestal sight in the waist position of the B-29 bomber, a special seat designed to aid the gunner's movement around the horizontal plane of the sight and so prevent the fatigue resulting free kneeling at the eight is investigated. Preliminary ground tests made with this equipment are presented. The proficiency of tracking and framing in the customary kneeling position was compared to that with the use of the seating aid. Results indicate that the tracking scores were better without the seat and that framing scores were better with the seat.

1,758

Wood, E.H., C.F. Code, & E.J. Baldes 1943 THE PROTECTION AFFORDED THE HUMAN BY HYDROSTATIC AS COMPARED TO PNEUMATIC ANTI-G DEVICES. (National Research Council, Committee on Aviation Medicine) CAM # 207, 12 Nov. 1943. ASTIA AD 212 870

ABSTRACT: Nine hundred centrifuge runs were made on 12 subjects to compare the "g" protection afforded by:

a. Immersion in water to xiphoid process.....0.9 "g"
b. FFS containing 4.7 liters water.....0.9 "g"
c. FFS fully inflated with water.....1.5 "g"
d. Water immersion to 3rd rib at sternum..... 1.7 "g"
e. Pneumatic gradient pressure suit..... 1.9 "g"
f. Arterial occlusion suit..... 2.9 "g"

Arterial occlusion (Clark-Wood) suit has 4 pneumatic cuffs, one on each extremity close to the body and an abdominal bladder, which are inflated by "g" -activated valves. All blood vessels are occluded by it.

Conclusion of paper: Pneumatic pressure devices are definitely superior to hydraulic ones in affording "g" protection.

1,759

Wood, E. H., E. H. Lambert, C. F. Code, & E. J. Baldes 1944 FACTORS INVOLVED IN THE PROTECTION AFFORDED BY PNEUMATIC ANTI-BLACKOUT SUITS. (Mayo Clinic) CAM No. 351; 24 Aug. 1944

ABSTRACT: Field tests show that a suit giving 1.5 "g" protection on the centrifuge gives ample protection in aircraft.

(a) Three types of experiments were carried out on FFS, GPS, and AOS. Variation in blackout threshold was determined.
  (1) With leg and abdominal bladders inflated to the same pressure.
  (2) With abdominal bladder pressure only varied, with and without constant pressurization of leg bladders.
  (3) With leg bladder pressure only varied, with and without constant pressurization of abdominal bladders.

(b) In general, as pressure increases, suit protection increases. The most important factor affecting the amount of protection afforded by the suit is the amount of pressure applied to the abdomen and trunk.

(c) Pressurizing leg bladders alone gives very little protection. (Average 0.2 "g"). However, pressurizing abdominal bladder alone gives 50 percent less protection than is afforded by abdominal plus leg bladders.

(d) High pressures in suit, which uniformly give greatest protection, may also cause considerable discomfort. The most important factor is abdominal pressure. Hence the optimum suit pressure is the highest abdominal pressure the subject can stand comfortably. This varies with subject, type, and fit of suit. In general, the larger and more efficient the abdominal and trunk bladders, the lower is the optimum pressure.

(e) Arm bladders are not necessary. When used alone they offer no protection at all although when used with a complete suit they increase protection 0.6 "g".

(f) Recommended pressures for suits are as follows:

FFS.....½ to 1 lb/g
GPS and Mark V AOS.....1 to 2 lb/g

1,760

Wood, E.H., D.M. Clark & E.H. Lambert 1945 AN ANALYSIS OF FACTORS INVOLVED IN THE PROTECTION AFFORDED MAN BY PNEUMATIC ANTI-BLACKOUT SUITS. Fed. Proc. 4:79

1,761

Wood, E.H. & E.H. Lambert 1945 FACTORS INFLUENCING THE EFFICACY OF ANTI-G EQUIPMENT AT PRESENT IN USE. (National Research Council, Division of Medical Sciences) Report No. 442

ABSTRACT: This report reviews the different models of anti-blackout suits which have been developed and considers the major changes made during the process of development.

1,762

Wood, E.H., & E.H. Lambert 1946 THE EFFECT OF ANTI-BLACKOUT SUITS ON BLOOD PRESSURE CHANGES PRODUCED ON THE HUMAN CENTRIFUGE. (Acceleration Lab., Mayo Aero Medical Unit, Rochester, Minn.)

ABSTRACT: Direct arterial pressure (radial artery) was recorded in thirteen men during exposure to positive acceleration with and without anti-blackout suit protection. The procedures used are described in another abstract (see Lambert and Wood).
At the level of the eyes the decrease in blood pressure per g increase in acceleration averaged 32 mm. Hg. systolic and 19 mm. Hg. diastolic without the suit and 20 and 14 mm. Hg. respectively with the suit. At heart level with onset of acceleration, the pressures decreased on the average without the suit 3.0 mm. Hg. systolic and 0.0 mm. Hg. diastolic per delta g, while with the suit these pressures increased 5.0 mm. Hg. per delta g.
The anti-blackout suit increased g tolerance by 1.4 g, 1.5 g, 1.7 g and 1.7 g as determined by visual symptoms, blood content of the ear, ear pulse and blood pressure at eye level, respectively. The protection afforded blood pressure was significantly greater than that afforded vision (P 0.001). This was associated with a tendency for visual symptoms to occur at higher levels of blood pressure with the suit than without it.
Inflation of anti-blackout suits produces an increase in blood pressure at heart level which is most marked during exposure to positive acceleration. This effect is responsible for the increased g tolerance produced.
Federation Proceedings 5(1):116, 1946)

1,763

Wood, E. H., and E. H. Lambert 1952 SOME FACTORS WHICH INFLUENCE THE PROTECTION AFFORDED BY PNEUMATIC ANTI-G SUITS
J. of Aviation Medicine 23(3):218-228, June 1952

ABSTRACT: The purpose of this paper is to present briefly some of the major factors which affect the increase in tolerance to positive acceleration which is afforded to man by pneumatic antiblackout suits. For the sake of brevity and clarity, this is done for the most part by means of photographic records which illustrate, in an objective manner, typical effects of the various factors discussed on arterial blood pressure and other physiologic variables. Such recordings show the results obtained on only one subject; in each instance, however, the effects demonstrated are representative of the results obtained in similar studies carried out on ten or more additional persons.

1,764

Wood, J., C.C. Cain & D. Mahoney n.d. PHYSIOLOGICAL EVALUATION OF THE PARTIAL PRESSURE SUIT. Memo Rept. MCREXD-696-104P. (unpublished)

1,765

Wood, P.W. 1961 LIGHT WEIGHT HIGH ACCELERATION CREW SEAT (Vought Astronautics, Dallas, Texas) Progress Rept. No. 2, AST/EIR-13502, June 1961.

1,766

Wood, P. W. 1961 INVESTIGATION OF A NET CREW SEAT CONCEPT FOR ADVANCED FLIGHT VEHICLES, PART I (Aeronautical Systems Division, Wright-Patterson AFB, Ohio) Report 61-546. Oct. 1961.

1,767

Woodbury, J. 1959 EVALUATION OF LOW LEVEL ESCAPE SYSTEM, ZERO DELAY AIRCRAFT-TO-ACTUATOR LANYARD. (Naval Air Test Center, Patuxent River, Md.) Rept. No. 1; Project TED No. PTR AE-5214; ASTIA AD-267 640; 14 Oct. 1959

ABSTRACT:
1) A flight evaluation was conducted by the Service Test Division to determine the service suitability of a low level escape system, zero delay aircraft-to-actuator lanyard developed by the Naval Parachute Unit, El Centro, California.
2) It is concluded that pilots forget to hook or unhook the lanyard unless specifically reminded by radio at appropriate times during the flight. The hooking and unhooking of the lanyard at the altitudes recommended by the Naval Parachute Unit interferes with other cockpit actions and occasionally requires a head motion which is conducive to vertigo during initial climb after take-off under actual instrument conditions.
3) It is recommended that the lanyard not be accepted for service use. (AUTHOR)

1,768

Woodward, C. et al. 1957 INVESTIGATION, DESIGN AND DEVELOPMENT OF AN F7U-3 EJECTION SEAT ENERGY-ABSORPTION SYSTEM FOR REDUCTION OF CRASH FORCE-LOADS.
(Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pa.) NAMC-ACEL-335, 24 June 1957.

ABSTRACT: Spinal injuries resulting from failure of the nose landing gear during carrier landings caused an investigation of the forces involved and research into a method of reducing these forces.

A simulated crash test determined that forces along the vertical plane of the seat, corresponding to forces in the vertical plane of the spinal

column, were far in excess of the tolerable limits of the human body. An energy-absorption system, consisting of a stainless steel strap with attaching devices, coupled with an energy-absorbing seat cushion, was devised and tested. etc.

1,769

Wurzel, E.M., L.J. Polansky & E.E. Metcalfe 1948 MEASUREMENT OF THE LOADS REQUIRED TO BREAK COMMERCIAL AVIATION SAFETY BELTS AS AN INDICATION OF THE ABILITY OF THE HUMAN BODY TO WITHSTAND HIGH IMPACT FORCES. (Naval Medical Research Institute, Bethesda, Md.) Research Proj. X-630 Rept. No. 12, March 1948.

ABSTRACT: The force required to break aviation safety belts used in private aircraft was determined in order to correlate this force with the trauma recorded in the reports of private aircraft crashes. The force was determined by using a new method of testing which closely simulates the conditions believed to exist in actual aircraft crashes.

The results indicate that in private aircraft crashes man has frequently survived impact loads of 2500 pounds with no sign or symptoms of injury.

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

X

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

Y

1,770

Yale Aero-medical Research Group 1942 PNEUMATIC ANTI-G GARMENTS.
(Flying Personnel Research Committee, Air Ministry)
F.P.R.C. Report No. 423e, July 1942

1,771

York, R.R. 1941 HYDROSTATIC SUITS.
(National Research Council, Canada) Report #C-2839, 8 September 1941

ABSTRACT: This is a personal report of the service trial with the Franks Flying Suit at 74 Squadron, R.A.F., Acklington.

1,772

Young, R.D. 1945 NOTE ON THE FLIGHT PATH OF A MAN EJECTED NORMALLY FROM AN AEROPLANE MOVING AT A HIGH SPEED.
(Royal Aircraft Establishment, Farnborough) Technical Note Aero. 1484, Aug. 1944. Appendix 7 to Lovelace, W.R., E.J. Baldes, & V.J. Wulff, The Ejection Seat from High Speed Aircraft, ASTIA ATI 7245

SUMMARY: Calculations have been made of the flight path of a man ejected normally from an aeroplane moving at speeds (U degrees) of 400 f.p.s., and 800 f.p.s. Ejection velocities ( ) of 20 f.p.s., 50 f.p.s. and 100 f.p.s. in both up and down directions have been considered for each case, and the calculations are sufficiently valid for practical requirements. It is concluded that an upward ejection velocity of about 40 f.p.s. should be sufficient in most cases for the man to clear the aeroplane structure. The initial acceleration on the man required to give him this ejection velocity is estimated to be about 12 1/2 g acting for 1/10th sec.; this is not considered serious. The power required can be readily provided by a few ounces of cordite. (Author)

1,773

Yustein, S.E. & R.R. Winans 1951 REPORT OF INVESTIGATION FOR DEVELOPMENT OF AN IMPACT TEST FOR PROTECTIVE HATS. (Material Lab., Naval Shipyard, Brooklyn, N.Y.) Report NS 181-013, 7 Aug. 1951. ASTIA AD 205 655

ABSTRACT: The object of this investigation is to develop the Brinell impression method as described in reference (f), with a view to its use in drop ball impact tests on protective hats for brand approval and inspection test purposes.

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

Z

1,774

Zabelicky, R. J. 1957 ANTI-BLACKOUT VALVES, MODEL 7050 SCOTT AVIATION CORP., MODEL 7050-2 SCOTT, Models 10050-12800 ARO EQUIPMENT CORP., MODEL 13100 ARO, MODEL 5503, C30, ALAR PRODUCTS, MODEL 14050 ARO; TESTING AND EVALUATION OF.
(U. S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR25 August 15, 1957.

ABSTRACT: Tests on the subject valves are being conducted at AMAL. Endurance tests specified in MIL-V-9370 A (ASG) para. 4. 3. 2. 1 have been made on all valves listed, with the exception of the Scott 7050-2. While complete, data is not yet available, the results of those tests made indicate that the valves tested perform as per specification.

1,775

Zabelicky, R.J. & R.Z. Snyder 1958 ANTI-BLACKOUT VALVE, MODEL 7050 MANUFACTURED BY SCOTT AVIATION CORPORATION; TEST AND EVALUATION OF.
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR37 Jan. 13, 1958

ABSTRACT: This report includes the procedures and results of qualification tests performed on the model 7050 anti-blackout valve, manufactured by the Scott Aviation Corporation, in accordance with the tests required by MIL-V-9370 A (ASG). Conformance to this specification is indicated by compliance with the tests specified in para. 4 and it is recommended that the anti-blackout valve model 7050 be entered on the Qualified Products List.

1,776

Zabelicky, R.J. & R.Z. Snyder 1958 ANTI-BLACKOUT VALVE, MODEL 5503-C20, MANUFACTURED BY ALAR PRODUCTS, INC.; TEST AND EVALUATION OF.
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR39 Feb. 6, 1958

ABSTRACT: This report includes the procedures and results of qualification tests performed on the subject valve in accordance with the tests required by MIL-V-9370 A (ASG). Conformance to this specification is indicated by compliance with the tests specified in para. 4 and it is recommended that the subject valve be entered on the Qualified Products List.

1,777

Zabelicky, R.J. & R.Z. Snyder 1958 ANTI-BLACKOUT VALVE, MODEL 13100, MANUFACTURED BY THE ARO EQUIPMENT CORPORATION; TEST AND EVALUATION OF.
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR40 Feb. 6, 1958

ABSTRACT: This report includes the procedures and results of qualification tests performed on the subject valve, in accordance with the tests required by MIL-V-9370 A (ASG). Conformance to this specification is indicated by compliance with the tests specified in para. 4 and it is recommended that the anti-blackout valve be entered on the Qualified Products List.

1,778

Zabelicky, R. J. & F. Gollub 1958 ANTI-BLACKOUT VALVES: LETTER REPORT CONCERNING TED ADC AE 5100 (SCOTT AVIATION CORP. MODEL 7050), AE 5100.0 (SCOTT AVIATION CORP. MODEL 7050-2), AE 5101 (ARO EQUIPMENT CORP. MODELS 10050 and 12800), AE 5101.1 (ARO EQUIPMENT CORP. MODEL 13100), AE 5102 (ALAR PRODUCTS MODEL 5503-C20), AE 5107 (FIREWEL CO., INC. MODEL 19400), AND AE 5108 (ARO EQUIPMENT CORP. MODEL 4050-1)
(U. S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR45 April 14, 1958.

ABSTRACT: This interim report indicates the status of the subject projects. Tests have been completed on Scott 7050, Alar 5503-C20, and Aro 13100. Endurance and heat tests have been completed on Aro 12800, 10050, and 4050-1 Scott 7050-2, and Firewel 19400.

1,779

Zabelicky, R.J. & F. Gollub 1958 ANTI-BLACKOUT VALVE; LETTER REPORT CONCERNING SCOTT AVIATION CORP., MODEL 7050-2
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR49 April 30, 1958

ABSTRACT: The Scott Model 7050-2 anti-blackout valve has been rejected due to lack of conformance with para. 4.4.1.2 - Trip Acceleration, MIL-V-9370 A (ASG) after having been subjected to the endurance tests specified in para. 4.3.2.1.

1,780

Zabelicky, R.J. & F. Gollub 1958 ANTI-BLACKOUT VALVE; LETTER REPORT CONCERNING ARO EQUIPMENT CORP. MODEL 4050-1.
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR53 May 22, 1958

ABSTRACT: The Aro Model 4050-1 anti-balckout valve has been rejected due to a ruptured diaphragm during endurance tests, in conformance with para. 4.3.2.1 of MIL-V-9370 A (ASG).

1,781

Zabelicky, R.J. & F. Gollub 1958 TEST AND EVALUATION OF ANTI-BLACKOUT VALVE, MODEL 19400 MANUFACTURED BY THE FIREWEL COMPANY
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR55 May 29, 1958

ABSTRACT: The Firewel Model 19400 anti-blackout valve has been rejected due to lack of conformance with para. 4.4.1.2. - Trip Acceleration, MIL-V-9370 A (ASG) after having been subjected to the endurance tests specified in para. 4.3.2.1.

1,782

Zabelicky, R.J. & F. Gollub 1958 ANTI-BLACKOUT VALVE (SCOTT AVIATION CORP. MODEL 7050-2)
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR60 August 13, 1958

ABSTRACT: The Scott Model 7050-2 anti-blackout valve has been rejected due to lack of conformance with para. 4.4.2.1, MIL-V-9370 A (ASG) - Pressure Output, after having been subjected to the endurance tests specified in para. 4.3.2.1.

1,783

Zabelicky, R.J. & F. Gollub 1958 ANTI-BLACKOUT VALVE; LETTER REPORT CONCERNING ARO EQUIPMENT CORP. MODEL 4050-1 (14084-5), SERIAL NO X101
(U.S. Naval Air Development Center, Johnsville, Pa. NADC-MA-LR63) Aug. 19, 1958

ABSTRACT: The Aro Model 4050-1 (14084-5) Serial No. X101 anti-blackout valve has been rejected due to lack of conformance with para. 4.4.2.5 - Recalibration, of MIL-V-9370 A (ASG), after having been subjected to all of the specified individual tests.

1,784

Zabelicky, R. J. & F. Gollub 1958 TEST AND EVALUATION OF ANTI-BLACKOUT VALVE, MODEL 19400, MANUFACTURED BY THE FIREWEL COMPANY.
(U. S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR70 November 12, 1958.

ABSTRACT: The Firewel Model 19400 anti-blackout valve has been rejected due to lack of conformance with para. 4.4.1.2 - Trip Acceleration, of MIL-V-9370 A (ASG) and para. 4.4.2.1 - Pressure Output, after having been subjected to the endurance tests specified in para. 4.3.2.1.

1,785

Zabelicky, R.J. & F. Gollub 1958 ANTI-BLACKOUT VALVE, MODEL 7050-2 MANUFACTURED BY SCOTT AVIATION CORP.; TEST AND EVALUATION OF.
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR69 Nov. 12, 1958

ABSTRACT: This report includes the procedures and results of qualification tests performed on the Scott Model 7050-2 anti-blackout valve in accordance with the tests required by MIL-V-9370 A (ASG). Conformance to this specification is indicated by compliance with the tests specified in para. 4 and it is recommended that the valve be entered on the Qualified Products List.

1,786

Zabelicky, R.J. & F. Gollub 1959 ANTI-BLACKOUT VALVE, MODEL 4050-1, MANUFACTURED BY ARO EQUIPMENT CORP.; TEST AND EVALUATION OF
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR93 Oct. 9, 1959

ABSTRACT: This final report includes the procedures and results of qualification tests performed on the Model 4050-1 anti-blackout valve manufactured by the Aro Equipment Corp. in accordance with the tests required by MIL-V-9370 A (ASG). Conformance to this specification is indicated by compliance with the tests specified in para. 4 and it is recommended that the valve be entered on the Qualified Products List.

1,787

Zabelicky, R.J. & F. Gollub 1959 ANTI-BLACKOUT VALVES, MODELS 10050 AND 12800, MANUFACTURED BY THE ARO EQUIPMENT CORP.; FINAL REPORT ON TEST AND EVALUATION OF.
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR94 Oct. 9, 1959

ABSTRACT: This report includes the procedures and results of qualification tests performed on Models 10050 and 12800 anti-blackout valves, manufactured by the Aro Equipment Corp. in accordance with the tests required by MIL-V-9370 A (ASG). Conformance to this specification is indicated by compliance with the tests specified in para. 4 and it is recommended that the anti-blackout valves be entered on the Qualified Products List.

1,788

Zabelicky, R.J. & R.Z. Snyder 1961 TEST AND EVALUATION OF ANTI-BLACKOUT VALVE MODEL 19400, MANUFACTURED BY THE FIREWEL COMPANY
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-L6043 Jan. 3, 1961

ABSTRACT: This report includes the procedures and results of qualification tests performed on Model 19400 anti-blackout valve, manufactured by the Firewel

Company in accordance with the tests required by MIL-V-9370 A (ASG). Conformance to this specification is indicated by compliance with the tests specified in para. 4 and it is recommended that the anti-blackout valve be entered on the Qualified Products List.

1,789

Zeigen, R. S., M. Alexander, E. Churchill, et al. 1960 A HEAD CIRCUMFERENCE SIZING SYSTEM FOR HELMET DESIGN
(Wright Air Development Division, Aerospace Medical Division, Wright-Patterson Air Force Base, Ohio) Project 7222, Task 71749 WADD TR 60-631. December 1960 ASTIA AD 251939

ABSTRACT: A system for the sizing and design of rigid and semi-rigid helmets based on a single key kimension, head circumference, is described. Anthropometric data largely obtained in the 1950 survey of Air Force flying personnel were analyzed. The three sizing programs discussed in terms of tabular data are also referred to in terms of headforms or three-dimensional representations of these data. These programs are a Six-Size Program based on mean values, a Three-Size Program based on mean values, and a Six-Size Program for helmet liner problems.

This report includes an account of the historical development of sizing systems, programs, and resultant headforms in the Air Force; a detailed statement concerning the designed rationale and statistical concepts used; comprehensive tables needed by the designer for all sizing programs discussed; a statement as to sculpturing techniques and problems; and a comment on preliminary validation results and on the overall design-material-sizing concept.

Appendices include a glassary of significant terms, descriptions of selected head and face dimensions, a detailed discussion of statistical concepts and formula referred to in the report and tables of comparative Four- and Six-Size Programs based on the key dimensions head length head breadth.

1,790

Zeller, A. F. 1957 PSYCHOLOGIC FACTORS IN ESCAPE.
J. Aviation Med. 28:90-95, Feb. 1957.

ABSTRACT: The ejection sequence begins with perception of the situation, involves a decision as to the action to be taken, and is followed by the initiation of the action. It can serve as a vehicle which can be used to analyze the various steps of the entire ejection procedure in terms of the important psychologic variables which affect the individual's behavior during this procedure.

The first step in the decision to initiate the ejection procedure is dependent upon recognition of the emergency. One other consideration which is important in the decision to eject in multi-place aircraft is adequate knowledge by other crew members of the action being taken by the pilot.

Difficulties during ejection include unfailiarity with ejection equipment and loss of consciousness or perspective after ejection. The general feeling of confidence a pilot has in the basic equipment which he is flying and in his ejection equipment can be spoiled by adverse criticisms.

One of the best preparations for an ejection should be an actual previous ejection in which the pilot has been successful. Somewhat less critical training experience is obtained from the ejection tower, demonstrations and lectures. One other over-all factor associated with ejection escape is the pilot's total flying experience. This to a great extend reflects his background and maturity as a pilot.

1,791

Ziegler, J. E. 1952 A NEUROSURGICAL AND MULTIPLE PURPOSE MONKEY CHAIR. J. Lab. & Clin. Med. 40:484-485

1,792

Ziegler, R. B., N. M. Burns, J. Lazo, & E. C. Gifford 1960 THE ROLE OF A FLEXIBLE COCKPIT IN HUMAN ENGINEERING RESEARCH. (Paper, 31st Annual Meeting of the Aerospace Medical Association, Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 1960)

RESTRAINT, PROTECTION, AND EMERGENCY ESCAPE SYSTEMS

ANONYMOUS

1,793

Anon. AIR CARGO AND TROOP SEAT EQUIPMENT. (Oro Manufacturing Co., Adrian, Michigan)

1,794

Anon. ESCAPE BY PARACHUTE AT HIGH SPEEDS
(Air Technical Intelligence Center, Wright-Patterson AFB, Ohio)
F-TS-7321-RE, ASTIA ATI 160 665

ABSTRACT: With flight speeds of 500 km per hour, it has become necessary to find a way to enable the occupants of a plane to bail out without being thrown against the airplane's superstructure. A gas explosion is the simplest source of energy to react quickly and powerfully in seat ejection. However, the combustible mixture has to be proportioned to produce a force that will push the piston fast enough to eject the seat yet without exceeding a speed the human body can endure. The experiments on seat ejection and a description of the ejection seat are presented in this report.

1,795

Anon. n.d. STATIC AND DYNAMIC TESTS OF A TYPICAL TRANSPORT PILOT'S SEAT INSTALLATION FOR A 40 G CONDITION. (Naval Air Material Center) Rept. No. ASL NAM 24102, Part II and Part I

1,796

Anon. 1943 EFFICIENCY THROUGH COMFORT Flight :646-7 Dec. 9, 1943

1,797

Anon. 1943 SOLE CONSIDERATIONS ON STRATOSPHERE FLIGHT (Einiges Ueber Den Stratosphaerenflug) (Air Documents Division, T-2 AMC, Wright Field, Ohio) F-TS-2029-RE, ASTIA ATI 19023

ABSTRACT: The advantages of stratospheric flights and its effect upon aircraft and personnel are reviewed. Airborne personnel can operate safely without ocygen up to an altitude above 6 km. Operation in altitudes above 12 km is considered very dangerous; thus, pressurized suits and cabins are employed. Heating and airing of the cabin are discussed.

1,798

Anonymous, 1944 CATAPULT SEAT IN THE TA. 154
(Focke-Wulf, Report No. 20.009, Part 2. 1944)
R.A.E. Translation No. 54,

1,799

Anonymous, 1944 SEAT EJECTION EQUIPMENT FOR THE DO. 335
(Dornier Report 3240. June 1944)
R.A.E. Translation No. 55

1,800

Anon. 1944 THE SHOULDER HARNESS.
Air Surg. Bull., 1(10):8-9

ABSTRACT: When the seat belt alone is used many fractured skulls and cervical injuries result from belly landings since the flyers head is thrown forward against the cowling or other seat. The shoulder harness prevents forward motion. In 234 cases of crash landings in which the personnel wore shoulder harnesses, 175 were uninjured, 40 were hurt and 3 killed. In a group of 16 not using the harness, all were injured and one died.

1,801

Anon. 1945 ANTI-G SUIT FOR FIGHTER PILOTS.
Flight and Aircraft Engineer, 47(1881):37, Jan. 1945.

ABSTRACT: As early as 1945, Americans at Wright Field developed the Berger G-2 suit, consisting of 5 air cushions for the stomach, thigh and calves, to protect pilots against effects of excessive "positive g" during violent maneuvers. A short note about experiments and some particulars added.

1,802

Anon. 1945 THE G-SUIT: NOTES FROM THE AIR SURGEONS OFFICE. J. Aviation Med. 16:45-46

ABSTRACT: The earliest workable G suits were developed by the Canadian and the Australian air forces, followed closely by the U.S. Navy. The AAF, experimenting with the Navy suit, modified and adapted it after extensive tests on the centrifuge at the Aero Medical Lab., Wright Field, and evolved the present suit now standard for the AAF.

The G-3 suit consists of a series of 5 air bladders positioned over the f soft tissue areas of the calves, thighs, belly. When inflated, the air bladders tense the inelastic cloth of the suit, exerting pressure upon the body to keep the blood from flowing downward rapidly and to force it back toward the heart.

The suit makes use of the "exhaust" compressed air from the aircraft's vacuum instrument pump connecting to the pump through a light-weight value which also supplies air pressure to the jettisonable gas tanks. This valve automatically inflates the suit in two seconds when the G force exceeds 2 G and empties it when the G force returns below two, giving the suit a pressure of 1 pound per square inch per G above 2 G. The flier needs only to plug the suit into the air line when he gets into the cockpit. The rest is automatic.

Although theoretically, the suit offers an extra tolerance of 1.9 G, fighter pilots wearing the suit have never reported a complete blackout, regardless of the violence of any combat maneuver experienced.

1,803

Anon. 1945 SUMMARY OF REPORTS ON THE DESIGN AND TESTING OF CATAPULTING PILOT'S SEAT IN THE SWEDISH J-21 AIRPLANE. (Kungl. Flygforvaltningen Materielavdelningen, Stockholm)
Translated as Appendix 19 to Lovelace, W. R., E. J. Baldes, & V. J. Wulff, The Ejection Seat for Emergency Escape from High Speed Aircraft, ATI No. 7245

1,804

Anon. 1946 ANNOTATED BIBLIOGRAPHY ON HUMAN FACTORS IN ENGINEERING DESIGN. (U.S. Navy, BuMed & Surg.) February 1946

1,805

Anon. 1946 DESIGN DATA FOR PILOT EJECTION SEAT AND CATAPULT-APPENDIX 3 (Wright-Patterson Air Force Base, Ohio) M.R. TSEAC11-4534-7-2, Add. 1. 1 May 1946. ASTIA ATI 12725

ABSTRACT: This publication lists the specifications that must be met by the designer of the pilot ejection seat and catapult.

1,806

Anon. 1946 IMPACT ABSORPTION MATERIAL
All American Aviation Magazine. 24 May 1946.

1,807

Anon. 1946 INTERNAL VIBRATIONS EXCITED IN THE OPERATION OF PERSONNEL EMERGENCY ESCAPE CATAPULTS
(Frankford Arsenal, Philadelphia, Pa.) Memo. Rept. No. Mr-340 Nov. 26, 1946
ASTIA AD 51 792

1,808

Anon. 1947 AEROMEDICAL RESEARCH
Abstract: Bulletin of U. S. Army Medical Dept. 7(3):256-257, Mar. 1947

ABSTRACT: Brigadier General Malcolm C. Grow, the Air Surgeon, has stated the problem of aeromedical research by reviewing some of the projects we must accomplish within the near future. The object of research in aviation medicine is to keep pace with aircraft design. Jet and rocket propulsion permit us to reach altitudes hitherto impossible with reciprocating engines, and they create urgent problems of human physiology which we must solve if these aircraft are to be manned. The first of these has to do with acceleration and deceleration. Pilot escape at high speeds is another problem. Intense temperatures is still another problem to be solved by aviation medicine personnel. (CARI)

1,809

Anon. 1947 CRASH INJURY RESEARCH--Reverse Seating in Transport Aircraft & The Case for the Backward-Facing Seat.
(National Research Council, 2101 Constitution Ave. Wash. 25, D.C.)

1,810

Anon. 1948 MEASUREMENT OF THE LOADS REQUIRED TO BREAK COMMERCIAL AVIATION SAFETY BELTS AS AN INDICATION OF THE ABILITY OF THE HUMAN BODY TO WITHSTAND HIGH IMPACT FORCES. (Naval Medical Research Institute) Rept. No. 12

1,811

Anon. 1948 PILOT SEAT AFFORDS QUICK 15G EJECTION
Aviation Week, p. 9. Oct 18, 1948

1,812

Anon. 1949 AHEAD OF THE TIMES.
The Aeroplane, 76(1976):444, 22 April 1949

ABSTRACT: Particulars of the P-1 protective helmet, evolved by the Aero-Medical Laboratory at Air Mat. Comm. Weighing only 2 lb., the P-1 helmet offers protection against projectile fragmentation, crashes and injuries while jettisoning.

1,813

Anon. 1949 EJECTION SEAT STUDY REPORT FOR AUG 1949 -MAY 1956 ON EJECTIONS AND BAILOUTS (Naval Aviation Safety Center, Norfolk, Va.)

ABSTRACT: The increasing ejection rate per unit hours flown and an increasing number of these units flown indicated a steady mounting of the frequency of ejections. There is a pronounced relationship between successful ejections and altitude. The relationship between altitude and successful ejection becomes apparent at 5000 ft and ejections become increasingly hazardous as the altitude decreases below this height. The mean altitude at which ejections occur did not increase during the period covered by this study. In terms of mach number, M = 0.70 is the beginning of the critically dangerous zone for ejections. Ejecting from the F9F, F7U, and TV model aircraft is significantly more dangerous than ejecting from the F2H and FJ models. Ejections from the swept-wing F9F are no more dangerous than those from the straight wing F9F. Ejections are more dangerous than bailouts with present equipment. No relationship existed between altitude and in injury in bailouts (as long as irreducible minimum is observed). Successful bailouts may be made at lower altitudes than ejections with present equipment. No relationship existed between speed and injuries resulting from bailouts within the speed range in which bailouts are made. The mean speed at which bailouts are made is substantially slower than the mean speed at which ejections are made. Bailing out from the F4U model aircraft is significantly more dangerous than bailing out of AD and SNJ models.

1,814

Anon. 1949 EMERGENCY EXIT.
Aeronautics, London (trilingual edit.) 31:94, 95, 97, and 98

ABSTRACT: The article deals with the emergency equipment introduced in the early days and with the mechanism of the Martin-Baker ejection seat. Live ejections made at high speed with the Martin-Baker ejection seat between 24-7-1946 and 17-7-1948 are tabulated.

1,815

Anon. 1949 HANDBOOK OF HUMAN ENGINEERING DATA FOR DESIGN ENGINEERS. (Office of Naval Research, Special Devices Center) Tech. Rept. SDC-199-1-1. December 1, 1949

1,816

Anon. 1949 SYNOPSIS OF THE AERO MEDICAL ASPECTS OF JET PROPELLED AIRCRAFT (Aero Medical Lab., Air Materiel Command) January 1949. ASTIA ATI 56134

ABSTRACT: Brief reviews of recent developments and current practices are presented on the following subjects: requirements and equipment, decompression sickness, cabin pressurization, explosive decompression, long term positive and negative acceleration, pilot's pneumatic suit for positive acceleration, cockpit design and temperatures, flight instruments, psychological limitations, sound problems, the ejection seat, protective helmets, wind-blast protection, and vision. Future research will be concerned with protection under emergency conditions in a vacuum, etc.

1,817

Anon. 1950 PILOT EJECTION SEAT BEING TESTED AT SUPERSONIC SPEEDS TO DETERMINE ITS LIMITATIONS. Techn. Data Digest, 15(3):9, March 1950.

ABSTRACT: To find out the speed limitations of the currently used USAF pilot ejection seat, AmC-Northrop Aircraft engineers have created a system which propels an F-89 ejection seat along a track at speeds up to 1100 mph.

1,818

Anon. 1950 SAFETY BELTS AND HARNESS.
National Safety News 60:98, 102, March 1950.

1,819

Anon. 1950 SPECIAL VALVE IN BRITISH G-SUIT.
Aviation Week, 53(8):28 Aug. 21, 1950

ABSTRACT: Hymatic Engng. Corp. and R.A.F. developed an improved "anti-g-valve", to diminish the influence of acceleration forces on human organs, e.g. blood circulation, when maneuvering with high-speed aircraft, now tested in de Havilland Venem and in the Spitfire. The problem of the compressed air supply was solved with this valve.

1,820

Anon. 1951 ESCAPE
Air University Quarterly, 4:37-39, Summer 1951

1,821

Anon. 1951 EXCERPT FROM "THE DANGEROUS SAFETY BELT"
Scientific American, Vol. 184-185, Dec. 1951. P. 36.

ABSTRACT: When an airplane crashes, the safety belt that passengers are required to fasten around their waists may become a deadly hazard. A British physician named Donald Teare examined 28 victims of a crash at the London Airport and found that 16 of them were killed by chest and abdomen injuries resulting from "acute flexion of the body over the safety belt." Eight of the victims had suffered a rupture of the aorta- an extremely rare injury, almost never found except in plane accidents.

One of the two survivors of the crash was the stewardess, who was in the tail of the plane, apparently the safest spot. Teare urged, as many others have proposed, that the passenger seats in planes be arranged to face the rear of the plane. The specific injuries that killed most of the victims of the London crash, he said, might have been avoided if the passengers "had been seated with their backs to the engine and supported by cushioned upholstery."

1,822

Anon. . . 1951 FITNESS FOR DUTY.
Flight, 59(2192):104-107; 25 Jan. 1951

ABSTRACT: Survey of the work of the R.A.F. Institute of Aviation Medicine at Farnborough from 1939 till now. On the improvements of ejector-seats, pressure cabins and air-conditioning, g-suits, pressure waistcoats, ventilated suits and other items of specialized clothing.

1,823

Anon. 1951 HYMATIC ANTI-G VALVE.
The Aeroplane, 81(2101):563, 26 Oct. 1951.

ABSTRACT: The New Hymatic Anti-G valve, when used in conjunction with a special anti-G suit, enables the aircrew to retain their faculties unimpaired under G-loadings as great as the airframe itself will stand.

1,824

Anon. 1951 IMPROVED PILOT SHOULDER HARNESSES WITHSTAND 38.6 G CRASHES
Techn. Dat. Digest, 16:8 Jan. 1951.

ABSTRACT: Designed to provide better protection in case of a crash, the new Air Force shoulder harness features increased strength of webbing and better distribution of forces to the strongest parts of the human body. The latter is accomplished by an inverted "V" crossing the pilot's thighs, which thus absorbs some of the pressure across the upper abdomen encountered with the old harness.

1,825

Anon. . . . 1951 . . . . PROBLEMS OF PILOT EJECTION
The Aeroplane, 80(2071):378-379 March 30, 1951

ABSTRACT: Summary of lecture before Roy. Aero. Soc. on physiological aspects, trajectory and control problems of ejection-seats, which requirements are to be fulfilled.

1,826

Anon. 1951 SERVICING MEMORANDUM (STS-29-3) AND TEST REPORT (UM-29-9.04:RI) FOR SAAB EJECTION SEAT (Swedish) Translated by F.W. Read, Royal Aircraft Establishment, Farnborough Library Translation No. 370. ASTIA ATI 113 968 or AD 26 614.

ABSTRACT: A number of new points of view have emerged concerning the production of ejection seats. Among others, an ejection velocity of about 18 mps is desired together with retention of the earlier max. acceleration and rate of rise of acceleration. This performance agrees with the possibility of safe ejection at max. speed under the influence of the mass inertia forces operating in the line of ejection. Another more recent desirable feature is that the acceleration is balanced so that a high finishing acceleration is obtained, by means of which a better balance is attained by means of inertia forces and aerodynamic forces. The higher limit of flying speed, where there is a risk of breaking up the seat at the end of an ejection, may then be further increased. Concerning the calculations for free trajectory and safe speed se S.A.A.B. report KFB-0-110 and UM-29-9-12. The objectives already mentioned have been allowed for in the test equipment on which these series of tests are being continued. By means of a higher testing railway rig at S.A.A.B. it is now possible to test with Vo values up to 21 m.p.s. The accelerations can, to a certain extent, be influenced by the use of different cordite and throttling than has been so far used, although the dimensions of the pressure chambers which may now be regarded as finalised, can limit the possibilities; even so due allowance must be made for the density of the charge, max. pressure, and dimensions of the cordite etc.

1,827

Anon. 1952 AF REVEALS (T-1) HIGH ALTITUDE PRESSURE SUIT Aviation Week 57(15):17 Oct. 1952

ABSTRACT: In the thin atmosphere above 50,000 ft a flier's lungs must be supercharged in order to function, pure oxygen alone being insufficient. At 63,000 ft in the absence of some sort of pressure suit, blood will "boil" resulting in body expansion to twice normal size and almost instant death. Discarding earlier cumbsersome patterns in pressure suits, the Air Force T-1 combines altitude protection with anti-g suit, crash helmet, earphones, microphones, oxygen mask, goggles, defroster and oxygen bailout bottle. The T-1 is inflated automatically if cabin pressurization is lost. The problem of applying counter pressure to the surface of the body was solved by a new method and pilot's lungs are charged with high-pressure breathing oxygen from the inflated suit and helmet, thus preventing this collapse.

1,828

Anonymous 1952 AIRCRAFT TYPE 29. EJECTIONS BY CATAPULT SEAT
Translated by Air Technical Intelligence Center
Wright-Patterson AFB, Ohio
ATIC-235370; F-TS-8748/III ASTIA AD 153 353

ABSTRACT: This report describes the circumstances leading up to an ejection and the procedures used during several ejections. He also describes the injuries to personnel as a result of ejection.

1,829

Anon. 1952 NEW CAPSULE FOR HIGHSPEED BAILOUT
Aviation Week 57(4):36, July 28, 1952

ABSTRACT: A new escape developed by Douglas Aircraft Co. is discussed. The capsule is expelled clear of the speeding plane by a rocket charge and is stabilized in flight by three rear fins. Forward speed is first slowed by a small auxiliary chute decelerating from 1,100 to 300 feet per second in about 5 seconds, then, at a safe speed, the main chute opens. The capsule is sealed and pressurized for use in atmospheric conditions above 50,000 ft. Fresh air is fed in "by wave motion". Survival gear similar to that carried in Navy life rafts is supplied. A test run under simulated conditions was tolerated well and without discomfort by the test subject.

1,830

Anon. 1952 CHUTE TESTING DUMMY
Canadian Aviation 25(8):62, August 1952

ABSTRACT: The need for a dummy for testing parachutes and ejector seats, that simulates closely the behavior of an unconscious man during a free fall, was realized early in 1951. The requirements were based upon the physique of an average RAF aircrew member, the data being provided in collaboration with the medical department of the Air Ministry and the London University.

To reproduce human behavior during free fall from a great height, it was necessary to discover the weight, center of gravity, and moment of gyration about various axes of all bodily components. This data was obtained from the dissection of about 1200 bodies of the correct size and weight.

The "GQ-Hairlok Dummy Man" consists of a steel skeleton, supporting rubberized hair mouldings which give the correct external shape. The components are assembled by screws. Spring joints minimize the damage from excessive movement. The rubberized hair material which gives the

dummy its outer shape is normally an upholstery filling. Resilient and durable, it is covered by a sectioned canvas suit which takes the place of the human skin. In addition, the dummy wears a flying suit of normal design, patterned with black and white segments to make it easier to see during a fall. (Journal of Aviation Medicine 23(6):631, December 1952)

1,831

Anon. 1952 HEAD-GEAR FOR SAFER FLYING.
Research Reviews NAVEXOS, p. 510, Oct. 1952

ABSTRACT: A comparatively minor head injury can cause a pilot to lose control of his craft with disastrous results. Consequently researchers at the Cornell Aeron. Lab. have been devoting a lot of time to devising protective helmets. Eight different types of helmets were tested and results are given.

1,832

Anon. 1952 HOW MUCH IS GREATER FLIGHT SAFETY WORTH?
American Aviation 15(46):30, May 26, 1952

ABSTRACT: For the air industry, the price of safer flying will be close to half a billion dollars. The alternative is a drastic tightening of government controls. Harry F. Guggenheim, chairman, presented this opinion in the second annual progress report of the Foundation Committee of the Cornell-Guggenheim Aviation Safety Center. Lack of money has resulted in a failure to apply all the information that is already available. Also, traffic ground facilities; until these are adequately provided, far stricter government regulation must be imposed. Mathematical calculations based on the laws of probability are showing great promise in accident analysis, pilot performance studies, weather forecasting, and similar fields. Anti-collision devices are also drawing attention; a combination of airborne and ground-monitored radar continues to look like the best solution at present. Seat strength studies are a promising area of development. The British have advanced fire control by the innovation of suspending a large plastic sphere filled with fire suppressant over the crashed aircraft.

1,833

Anon. 1952 SAFER AIR TRAVEL OUTLOOK BRIGHT
Aviation Week 56(20):21-22, May 19, 1952

ABSTRACT: An exhaustive survey of current aviation safety research by the Guggenheim Aviation Safety Center indicates that recent progress justifies an optimistic view for safer air travel of tomorrow. The United States, Canada and Great Britain together are conducting about 900 individual research projects, costing over $50 million annually, to promote aviation safety. Some samples of advancement in safety work are cited.

1,834

Anon 1952 A SELF-RELEASING SEAT-BELT.
Flight, (London) 61:767, June 27, 1952

ABSTRACT: A coupling device for seat belts so designed as to open up automatically under excess g-loads (under crash conditions) is described. The inventor, Mr. J. R. Stuge Whiting of Great Britain, has applied for patent protection.

1,835

Anonymous 1952 SHOULDER HARNESS SAVES THREE PILOTS
Aviation Week 57(15):15. Oct. 1952.

1,836

Anon. 1953 EJECTION PROCEDURES
Flying Safety, 9(12):14-15

1,837

Anon. 1953 EJECTION SEAT DEVELOPMENT IN SWEDEN.
The Aeroplane, 85(2209):692-694 , Nov. 20, 1953

ABSTRACT: Some information is given about the ejector seats developed by S. A. A. B. in Sweden.

The first dummy ejection was made by S.A.A.B. as early as January 1942 to test their model I ejection seat. A description of this seat is given in the article The Mark II is a special light weight seat (installed weight 70 lb.) which is intended for installation in the Folland Gnat.

The ejection velocities are considerable lower than the British equivalents. A drawing with installation dimensions is given.

1,838

Anon. 1953 INTRODUCING THE BONE-BOX.
Flight, 64(2341):723-724, 4 Dec. 1953

ABSTRACT: The crash helmet reaches the R.A.F.: its purpose and capabilities.

1,839

Anon. 1953 SAVE PILOTS IN CRASHES.
Sci. News Letter, 63(13):206

ABSTRACT: A description of a shoulder harness, seat belt, and gravity reel combination for low-level crashes is given. The safety device was developed by F. E. Weick, director of the Personal Aircraft Research Center at Texas A. and M. College, College Station, Texas.

1,840

Anon. 1953 SUITED FOR SAFETY. Flying Safety, 9 (5):5.

Summary: Notes on the new T-1 altitude suit assembly are given. The suit assembly under research for seven years at the Aero Medical Laboratory at the Air Research and Development Command's Wright Air Development Center has been successfully tested to sustain life at 106,000 ft. in altitude chambers. The assembly includes an anti-g component, communication equipment, oxygen valves and regulators, a protective helmet, a visor with defrosters, and an oxygen bailout cylinder.

1,841

Anon. 1953 SUIT FOR SURVIVAL Flying Safety, 9 (7): 18-19

Summary: A short outline of rules to follow in making the M-4 anti-exposure flying suit watertight is given. The method of donning the suit is described. Accessory equipment and special hints to aid survival in water or in extreme cold are mentioned.

1,842

Anon. (initials only: C.M.L.) 1954 GETTING AWAY WITH IT.
MARTIN-BAKER EJECTION SEATS, MKS 2,3 AND 4.
Flight pp 748-751, 19 November 1954.

1,843

Anon. 1954 HELMET STAYS ON AT MACH 1.04
Modern Plastics, 31(6):100 Feb. 1954

ABSTRACT: Illustrated note on experimental helmet which is fitted to individual pilot by making initial plaster cast of pilot's head; material of helmet is fibrous glass reinforced plastics based on polyester resin; slots are cut into crown to reduce windshock and airlift during bail-out.

1,844

Anonymous Nov. 1954 SAFE TEST EJECTIONS MADE FROM 50 FEET.
Aviation Week 61(20):64.

1,845

Anon. 1954 SAFETY BELT FIRM MAKES PLANE-AUTO BELTS. Flying 55(6):50.

1,846

Anon. 1954 UNDERWATER CANOPY-JETTISON
Flight 66(2387):613

ABSTRACT: M.L. Aviation Co., Ltd., of White Waltham, Berks, has now developed a mechanism, which forces the canopy open even if the aircraft is deeply submerged in water, as in the case of carrier based aircraft missing the carrier deck and hitting the sea. This mechanism can be applied to any clam-shell type of canopy hinged at the rear and secured at the front by an orthodox latch.

1,847

Anon. 1954 THE WELL DRESSED AIRMAN Flight 64(23333):500-501

ABSTRACT: From items of equipment exhibited in the station show at Farnborough it was possible to form a picture of how aircrew of the near future will be dressed and equipped. From the research carried out in Germany during war and in the U.S and Great Britain, 3 methods of pressurization have emerged. The first, cabin pressurization, is already in every day use and is sufficient for present requirements up to 50,000 ft.
The second and third methods of pressurization have therefore emerged. They are known as the partial pressure suit and full pressure suit. The partial pressure suit is a garment which does not cover the whole body - the feet and hands are generally left free. It performs its functions be applying a direct constructive pressure to the body in much the same way as a g-suit and straitjacket which nevertheless allows the pilot full freedom of movement. The full pressure suit is in effect a tailored pressurized cell enclosing the whole body.

1,848

Anon. 1955 DOUGLAS DESIGNS COMPACT LIGHTWEIGHT EJECTION SEAT. Aviation Age, 23(3):50-53, March 1955

ABSTRACT: A new ejection seat has been designed for the A4D-1, which possesses a carrying skin. During ejection, the chair is automatically loosened from the pilot. He possesses no adjustable head or foot rest. The chair and the equipment of the pilot weighs over 50 lbs. less than the comparable installation of the Douglas A2D-1 and F4D1 manufactured for 25 g force and a 40 g crach force. It withstood a dloay of 60 g.

1,849

Anon. 1955 NEW HARNESS LETS YOU MOVE FREELY. Aviation Age 24(5):206-207. Nov. 1955

1,850

Anon. 1955 OPERATIONAL EXPERIENCE WITH EJECTION ESCAPE SYSTEMS FROM 1 JANUARY 1949 THROUGH 31 DECEMBER 1954. (Directorate of Flight Safety Research, Norton Air Force Base, Calif.) 1 Aug. 1955. ASTIA AD 72809

ABSTRACT: Current ejection escape systems provided a means for successful escape from aircraft in a wide range and combination of airspeeds (up to 560 knots), altitudes (500 to 38,000 ft), and attitudes. Improvements in design and maintenance and greater familiarity with the operation of ejection escape equipment reduced fatalities from 27% in 1951 to 21% in 1954. Further reduction was believed obtainable by (1) better training of aircrew, maintenance, and inspection personnel; (2) better design, maintenance, and inspection of ejection escape systems; (3) providing all personnel using ejection seats with both automatic opening lap belts and automatic opening parachutes; and (4) expeditious retrofit of in-service aircraft with improvements which have been approved for ejection escape systems.

1,851

Anon. 1955 PROJECT DETAILS OF TED ADC AE-1407, HUMAN PERFORMANCE LIMITATIONS IN AIRCRAFT CATAPULTING AND ARRESTING. Bureau of Aeronautics letter, AE-14/36 of 17 Oct. 1955.

1,852

Anon. 1955 ROCKING, NOT TUMBLING, IS BAILOUT HAZARD.
Aviation Week 63(26);21-23 26 Dec. 1955

ABSTRACT: Dummy tests on sled mockup of Convair's F-102A give researchers new design data for advanced supersonic ejection system.

1,853

Anon. 1955 TESTS AT FORD PROVIDE PASSENGER-PACKAGING INFORMATION
CEC Recordings, 9(6) Nov. Dec. 1955.

1,854

Anon. 1956 AIRCRAFT EMERGENCY PROCEDURE OVER WATER.
(U.S. Coast Guard, 1956) CG-306

1,855

Anon. . . 1956 . . AIRCRAFT PASSENGER SEATS: SAFETY WITH ACCELERATION OF 9G.
Engineering (London) 181(4693):19- , Jan. 6, 1956

ABSTRACT: A new type of aircraft passenger seat is described designed to withstand an acceleration of 9 g, facing forward or aft. When forward facing, in an emergency landing, the back of seat, which is padded, will fold forward when struck behind.

1,856

Anonymous . . . Dec. 1956 ARDC SLED TESTS EJECTION IMPACT FORCE.
Aviation Week 65(24):81;83.

1,857

Anon. 1956 DEVELOPING THE MARTIN-BAKER EJECTION SEAT.
The Aeroplane 90(2324):141-143

1,858

Anon. 1956 DEVELOPING THE MARTIN-BAKER EJECTION SEAT. The Aeroplane 90(2325):168-171. Feb. 1956.

1,859

Anon. 1956 DOWN, BOY, DOWN Flying Safety 12(2):16-20. Feb. 1956.

1,860

Anon. 1956 EJECTION EQUIPMENT FOR MACH 3
Flight (London) 70(2497):856, Nov. 30, 1956

ABSTRACT: An ejection seat designed by Lockheed Aircraft for downward ejections at speeds up to Mach 3 features: (1) brackets to hold the pilot's helmet steady and to reduce loads on the neck; (2) knee guards to prevent splaying of the legs, with a webbing harness to restrain the arms; (3) automatic straps to prevent flailing of the legs; (4) fins extending beneath and beside the seat to provide stabilization; and (5) an airflow deflector plate forming an "atmosphere capsule" to reduce transverse forces and air blast.

1,861

Anon. 1956 EJECTION SEAT DEVELOPED FOR MACH 3 AFTER ARDC DECIDES ON CAPSULES. Aviation Week, 65(15):72, Oct. 1956

ABSTRACT: A supersonic escape ejection seat has been developed which is designed to permit safe escape limits exceeding 800 kts. at sea level and Mach 3 at altitude. The development comes in the face of a decision by Air Research and Development Command to require escape capsules incorporating protective and survival devices for all new aircraft with performance exceeding 600 knots IAS and 50,000 altitude.

1,862

Anon. 1956 RESCU
Flight (London) 70(2496):808- , Nov. 23, 1956

ABSTRACT: A RESCU rocket-assisted ejection gun was tested by Talco Engineering Company through ejection of dummies from a cockpit section mounted on a rocket-propelled sled. RESCU lifted the ejection seat 124 feet at a sled speed of Mach 0.3, while an M3 telescopic, cartridge-operated gun lifted the seat only 55 feet. At Mach 0.73, RESCU achieved an altitude of 60 feet. It is suggested that the rocket thrust tends to stabilize the seat after ejection and to reduce deceleration forces to a level within endurance limits.

1,863

Anon. 1956 ROCKET-PROPELLED EJECTOR SEAT
Engineering (London) 182(4734):691- , Nov. 30, 1956

ABSTRACT: A rocket-propelled ejector seat is briefly described, designed to permit pilots of Convair TF 102A combat trainer aircraft to escape safely even at emergencies near ground level. The new Rescu Mark 1 seat combines a normal cartridge-actuated catapult with a rocket incorporated in the inner tube and brought into action by the cartridge catapult. Comparative tests with a standard M3 cartridge-actuated ejector seat indicate that rocket-propelled escape systems ensure greater clearance from the aircraft, a reduction in the deceleration rate as the man-seat mass is catapulted in the air, and a greatly increased "on-the-deck" escape probability.

1,864

Anon. 1956 SEAT BELTS Consumer Reports 21(5):212-217, May 1956

ABSTRACT: Consumers Union bought 39 brands of seat belts and put them through a series of tests devised by Cornell Aeronautical Laboratory. All but three of the brands tested were designed for use by one person; the others were of the seat-wide type. Only 13 brands survived CU's initial test series. Among the 26 brands judged Not Acceptable -- two-thirds of those tested -- were the belts offered as optional equipment on Chevrolets, Pontiacs, Studebakers, and Packards; a Sears-Roebuck belt; and two Montgomery Ward belts. Belts were tested for fabric strength, quick-release buckles, and color fastness.

1,865

Anon. 1957 CUSHIONING THE PILOT.
Flight, 71(2518):540

ABSTRACT: Chance Vought uses a 3 ft. long stainless-steel ejection seat-mounting strap interposed between the aircraft structure and the seat. It is designed to stretch several inches thus absorbing heavy-landing loads. A seat cushion consisting of a layer of foam-rubber padding applied to a shaped pad made of rigid foamed plastic which collapses under load, absorbs hard-landing shocks.

1,866

Anon. 1957 THE EJECTABLE SEAT OF THE MARTIN-BAKER MK4.
Aviation Magazine, (238):24,25, 1 November 1957

ABSTRACT: A detailed description of the ejection seat of the Martin-Baker MK4 type is given in this article. The discharge mechanism and the ignition is described. Furthermore, the parachute and the opening of the head parachute are discussed. Several ties are fastened to the chair to prevent the legs from moving around during firing. The ignition is 83 ft/sec the maximum acceleration 20 g. The chair is 40 kilo

1,867

Anon. 1957 OPERATION AND MAINTENANCE INSTRUCTIONS FOR POWDER TYPE STORES CATAPULT (Naval Gun Factory, Washington, D.C.) Rept. no. NGF-T-30-57; NAVORD rept. no. 5519, 16 Sep 1957, ASTIA AD-143 563

1,868

Anon. 1957 SHOCK ABSORBING SEAT REDUCES INJURIES
Aviation Week 66(14):61. April 1957.

1,869

Anon. 1957 TELESCOPING BOOMS STABILIZE SUPERSONIC EJECTION SEAT.
ARDC Newsreview, Oct. 1957, p. 4

1,870

Anon. 1957 TWO GROUND EJECTION SEATS TESTED IN LIVE AND DUMMY RUNS.
Aviation Week, 67(11):88,89 16 September 1957.

ABSTRACT: A 6-picture series illustrating the use of the Martin Baker Mark V ground level ejection seat, demonstrated by a pilot of the R.A.F. who ejected himself out of a Grummon F9F-8T with a speed of 120 Kt on the runway.

1,871

Anon. 1957 TWO NEW ESCAPE SEATS DEVELOPED
Aviation Week 66(17):37 April 1957

1,872

Anon. 1957 U. S. AIR FORCE FULL PRESSURE SPACE SUIT IS LIGHT, PERMITS FREE MOVEMENT. Aviation Week 67(23):29, Dec. 9, 1957.

1,873

Anon. 1958 BANG! YOU'RE ALIVE!
Air Clues, 13(3):66-73 Dec. 1958

ABSTRACT: This article traces the development of ejection seats. The name of the British firm of Martin-Baker is synonymous with ejection seat history and much help has been received from them in writing the article. The many changes in the design of the seats are not detailed and an outline only of the main events is given. The article contains many new facts, and a number of the photographs have not previously been published.

1,874

Anon. 1958 BIBLIOGRAPHY OF UNCLASSIFIED HUMAN ENGINEERING REPORTS, U.S. NTDC NAVEXOS P-1491, Jan. 1, 1958

1,875

Anon. 1958 ENERGY ABSORPTION.
The Project Engineer (The Thermix Corp., April 1958)

1,876

Anon. 1958 MOUSE IN LIQUID SUIT SHOWS HOW MAN MAY SURVIVE STRESS OF GRAVITY IN SPACE TRIPS
Wall Street J. 8 Feb. 1958

1,877

Anon. 1959 AEROMED FACILITY STUDIES SHOCK ABSORBER SEATS FOR JET PASSENGERS Aviation Week 70(21):136- , May 1959

ABSTRACT: This brief article describes a hydraulic shock absorber system whereby passengers in jet transports would be able to survive fairly high impact accelerations. The data from which the proposed system was designed were obtained by Cornell Automotive Crash Injury Research. Two methods of applying the shock absorbers for deceleration are described and seat fitting are indicated.

1,878

Anon. 1959 AIRCREW COMFORT AND SURVIVAL
The Aeroplane, (London), 96(2481):348-350, March 20, 1959.

ABSTRACT: A general discussion is presented of control systems, equipment, and techniques utilized by the Royal Air Force to insure the comfort and survival of its airmen in the newer high speed, high altitude aircraft. General performance capabilities and operating procedures are outlined for cabin pressure control systems, temperature and ventilation control systems, oxygen systems, and pressure suits and helmets. Ejection seats, parachute assemblies, aircraft dinghies, and emergency radio units are also discussed. Names of manufacturers and illustrations of various items of equipment are included.

1,879

Anon. 1959 BACKGROUND TO BELTS: A SUMMARY OF KNOWN FACTS ABOUT A LITTLE-KNOWN BUT VITAL SUBJECT. Motor, (Lond) 115 (2973): 243-7.

1,880

Anon. 1959 ESCAPE FROM SINKING AIRCRAFT.
British Medical Journal (5127):965, 11 April 1959.

ABSTRACT: The serious concern of the Royal Navy, especially, stimulated by a survey showing that up to 1954 30% of aircrew involved in any kind of ditching did not survive, led to research into the practicability of using the ejection seat to escape from submerged aircraft. In aircraft the cockpit canopy may be locked and the pilot strapped tightly into the seat. If the aircraft ditches and sinks before he can open the canopy and climb out, his situation is grave. The canopy is held fast by the differential pressure of the water, which rises by approximately one atmosphere for every 33 ft. (1 0m.) in depth. The pilot will have to wait until the cockpit has "flooded-up" to a differential pressure favorable for jettisoning the canopy. If the rate of sinking is disproportionately greater than the rate of flooding up, the anopy may cave in, or the aircraft sink too deep for successful escape. The physiological reactions to underwater ejection need careful evaluation.

1,881

Anon. 1959 ESTABLISHMENT OF THE CRITERIA FOR THE DESIGN OF A PASSENGER SEAT THAT OFFERS A MAXIMUM OF PROTECTION TO THE OCCUPANT IN A CASE OF A CRASH. (Royal Netherlands Aircraft, Factories Fokker) Rept. No. FS-3A.

1,882

Anon 1959 ILLUSTRATION OF PROJECT MERCURY RESTRAINT HARNESS
Aviation Week Oct. 19 1959 p. 30

1,883

Anon. 1959 MARTIN-BAKER EJECTION SYSTEM HIGH SPEED-HIGH TEST AND EVALUATION (Joint Parachute Test Facility, El Centro, Calif.) Technical rept. no. 2-59, Proj. TED no. ELC AE-5242.2; ASTIA AD 244 200

ABSTRACT: Of the total of twelve test flights conducted, ejection was successful and satisfactory in all firings. Seat-dummy separation was accomplished ten times, the two malfunctions resulting from interference between seat system components and auxiliary test equipment items. The dummy was recovered on nine (of the ten) tests, a hardware malfunction causing the one failure. As a result of the test program, ejection seat function was adjudged satisfactory. As stated by Appendix A, evaluation of the general parachute performance was to be made on the basis of data gathered on the free bailout facility, the maximum performance capability required, and the effect of drogue or other component failure. In addition, the possible use of a 28-foot parachute and/or the integrated torso harness was to be investigated. In this connection, a Bureau of Aeronautics instruction of 9 December 1958 required the employment of the integrated harness on all tests made subsequent to that date. The twelve tests were conducted in three basic phases such that six were made with the standard Martin-Baker 24-foot parachute and harness system, two with the MBA parachute and Naval Parachute Unit integrated harness, and four withPioneer-NPU integraterd harness. Minor malfunctions were frequently encountered, but generally satisfactory results were obtained with all three parachute-harness assemblies. The over-all results of the test program conducted demonstrate the serviceability of the subject ejection system. (Author)

1,884

Anon. 1959 SAFETY AND SURVIVAL EQUIPMENT
Navaer 00-8- T-52, 1959

ABSTRACT: This manual is prepared for the survival officer and the Flight Surgeon as a training guide with general but comprehensive coverage of the various items of safety and survival equipment. The write-ups for most items list some technical features.
The described equipments are:
1. Oxygen equipment
2. Parachutes
3. Safety belts and harnesses
4. Ejection seat
5. Flight clothing
6. Emergency protective clothing

1,885

Anon. 1959 SPACE CRAFT SEATS ARE DESIGNED TO FIT PILOT.
MSV Department General Electric News Jan. 23, 1959, p. 3.

1,886

Anon. 1959 UNDERWATER ESCAPE FROM AIRCRAFT
Instrument Practice, 13(3):293.

ABSTRACT: A series of experiments made by the Ballistic Research Establishment Measuring methods, problems and result.

1,887

Anon. 1959 URETHANE FOAM PROTECTS MISSILE INSTRUMENTS
Electrical Engineering 78(1):282-283, March 1959

ABSTRACT: Urethane foam is used to package sensitive instruments carried in the nose cone of Thor and Atlas missiles. The foam is molded into a sphere no larger than an oversized basketball and withstands impacts up to 45,000 g's. It protects the equipment from vibration and shock from the launching to the time it is ejected and returns to impact with the earth.

1,888

Anon. 1960 B-70 ESCAPE CAPSULE
Flying, 66(4):36 April 1960

1,889

Anon. 1960 EJECTION SEAT STUDY (Naval Aviation Safety Center, Norfolk, Va.) June 1960, ASTIA AD-238 492

ABSTRACT: A statistical analysis is presented showing the degree of personnel injuries sustained during ejection from disabled aircraft. Factors analyzed include altitude, speed, seat systems, attitude, and types of emergency. Ejection frequency and fatality rates per 10,000 hours flying time are also presented. A comparison is made between injuries resulting from ejections and bailouts.

1,890

Anon. 1960 LUNAR JOURNEY
Lancet (London) 1(7134): 117-118, 21 May 1960

ABSTRACT: The physiological problems of orbital and space flight are briefly reviewed, including: (1) the typical aviation stresses of acceleration, low barometric pressure, and temperature and humidity extremes, for which adequate measures of protection are available; (2) prolonged weightlessness, the "breakoff phenomenon," and primary cosmic radiation, about which little is known; and (3) problems of lunar flight which will require further development of existing techniques, such as increased acceleration stress, the mental strain of extended flight, the additional radiation hazard of the Van Allen belts, and the necessity for the provision of large quantities of food and oxygen.

1,891

Anon. 1960 PERSONNEL RESTRAINT DEVICES FOR ADVANCED FLIGHT VEHICLES, PART I. (Goodyear Aircraft Corporation) June 1960

1,892

ANON. 1960 TECO PRODUCING FORM FITTING SEAT FOR 200 PASSENGERS IN JETS. Aviation Daily, 6 Dec. 1960, P. 214

SUMMARY: Describes new "Mason Seat" (after E. Gilbert Mason, President, Teco, Inc.) Form-fitting plastic contour seat with only 70 parts (500 in standard). Has two prototype models, one 19 inches between arms for 1st class, and other 17 inches between arms. Claims will cut maintenance 90%, and costs 30% lower at $350-400 per seat. A first-class double seat, including leg rest, weighs 54 lbs.

The seat incorporates energy absorption and will take loads in excess of 30 Gs. It obtains flexibility by simple forged legs which quick lock to a three-inch tube which universally fits all track tie-downs, including wall mounts. Mason says it can be removed in 5 minutes by 1 man.

Prototype seats have been demonstrated to Boeing, Convair, Douglas, Lockheed and some airlines.

1,893

Anon. 1961 AEROSPACE YEAR BOOK. (1961 Edition)(Wash., D. C.: Amer. Aviat. Pub. Inc., 1961).

1,894

Anon. 1961 AIR FORCE TESTS CONVAIR SUPERSONIC EJECTION SEAT Aviation Week Feb. 13, 1961, 106-107.

1,895

Anon. 1961 AT SUPERSONIC VELOCITY
(Sovetskaya Litva, July 28, 1961, p. 3)
Prepared by: Translation Services Branch, Foreign Technology Division, WP-AFB, Ohio FTD-TT-61-203/1 ASTIA AD 268 072

ABSTRACT: This is an article from the Russian Newspaper Sovetskaya Litva. It discusses the characteristics of ejection seats and how they operate.

1,896

Anon. 1961 DYNA-SOAR EJECTION SEAT AND SURVIVAL SYSTEM
(Boeing Co., Seattle, Wash.)
Rept. no. 10-81000, Rev. B to Rept. no. 10-81000, 15 Sept 1961, AD-269 506L

ABSTRACT: The design, fabrication, performance, and testing requirements for a type of equipment designated Ejection Seat and Survival System is reported. It is designed for pilot escape and survival from the Dyna-Soar glider in instances when a satisfactory landing site cannot be reached or when other conditions made an attempted glider landing impractical. (Author)

1,897

Anon. 1961 INSTRUMENTATION BIBLIOGRAPHY
(Ministry of Aviation, Gt. Brit.) Rept. No. TIL/BIB/50; Jan. 1961; ASTIA AD 253 346

ABSTRACT: This bibliography contains material on the following subjects: general instrumentation; calibration; combustion; electrical and electronic devices; test facilities; accelerometers; computers; displacement measurements; flow measurement and control; pressure and thrust measurement; recording; shock and vibration; strain gauge measurements; temperature measurement; and time measurement.

1,898

Anonymous 1961 MICE-BEARING ROCKET LAUNCHED IN KRAKOW.
Warsaw Polish Home Service.
11:05 GMT 11 April, 1961. (translation).

ABSTRACT: (Text) Two successive rockets of the meteorological type were launched in the Bledowska Desert near Olkusz. One of them carried two white mice in a special container. The first rocket, weighing 10 kilograms and measuring one and a half meters in length, reached the planned altitude of 1,700 meters. The rocket traveled at a speed of 550 kilometers an hour. At a certain time the first stage with the container separated from the rocket and landed with its passengers by a special parachute. The animals felt well after the experiment. The next experiments are to take place in May. The experiments, organized by the experimental aviation and rocket technology circle of the Krakow Aero Club, take place under the auspices of the Polish Astronautical Society and Krakow scientists.

1,899

[illegible] 1961 MTSS. GENERAL HUMAN FACTORS CONSIDERATIONS. VOLUME III. (Martin Co., Denver, Colo Contract AF 33(600)42456, ASD-CR-61-14, Vol. 3; ASD-TR-61-211, Vol. 3; July 1961, ASTIA AD-273 005

1,900

Anon. 1961 SPACESHIP CAPSULE
Vestnik Vozdushnogo Flota, no. 1, 1961, 95.

ABSTRACT: The best solution for protecting man from the effect of overloading and appreciable angular acceleration is an anti-g force detachable capsule. The capsule should be provided with a special device for automatic regulation of the position of the astronaut so that the accelerations originating during the flight will always be in a direction perpendicular to the axis of the human body.

1,901

Anon. 1961 SUPERSONIC EJECTION CAPSULE TESTED.
Aviation Week, Mar. 20, 1961, p. 30.

1,902

Anon. 1962 DYNA-SOAR EJECTION SEAT AND SURVIVAL SYSTEM (Boeing Co., Seattle Wash.) Contract AF 33(657) 7132, ASTIA AD-282 004L

ABSTRACT: Military requirements, specifications, and design are given for the Dyna-Soar ejection seat and survival system.

1,903

Anon. 1963 AIR FORCE ORDER MAKES SEAT BELTS MANDATORY
Aerospace Medicine 32(2):187 Feb. 1963.

ABSTRACT: Final stage has been reached in the Air Force's concerted drive to install seat belts in all passenger-type USAF vehicles, with issuance of technical order No. 36A-1-6.

Effective immediately, all such vehicles anywhere in the world must be provided with government-approved seat belts. The technical order spells out procedures for the procurement, installation, and use of seat belts in Air Force owned or operated vehicles.

Excluded from the mandatory ruling are cranes, fork lifts, farm-type tractors and wreckers, as the order pertains only to ground vehicles which are capable of carrying passengers. These include everything from ambulances to snowplows, buses, cargo and dump trucks, and tractor-trailers.

1,904

Anon. 1963 DROPPING THE CARGO WITHOUT A PARACHUTE
(Translation Services Branch, Foreign Technology Division, WP-AFB, Ohio) FTD-TT-62-1842/1 Feb. 15, 1963 (Polish Periodical, Przeglad Techniczny, Nr. 14, 1962, p. 2) ASTIA AD 400530.

ABSTRACT: A special device for this purpose was designed in the USSR. It is made in form of a sphere consisting of several inflated rubber layers lined with a layer of porous rubber. The sphere may contain various shock-sensitive instruments or glass vessels with medicines which are to be dropped from aircraft.

This device finds an ever increasing application in the Soviet Union in dropping medicines, surgical instruments, spare parts for machines, and other objects on predetermined places.

1,905

Anon. 1963 UP---UP---UP RIDES
The Daily Oklahoman, May 8, 1963

ABSTRACT: Up-up-up rides a 220 lb. dummy in the co-pilot's seat from a B-47 jet bomber during an ejection test Tuesday at Tinker AFB. The air force has given Tinker technicians the job of ironing out problems encountered in the ejection equipment. What takes place when a pilot ejects can be seen in the dummy's ride. He comes out of the plane at lower left, arches over and flies through the air, then lands in a heap. Big difference is, pilots use parachutes to let them down easier. (AUTHOR)