Annotated Bibliography of Reports:

Supplement No. 3

1 July 1970 - 30 June 1971

Naval Aerospace Medical Research Laboratory
Naval Aerospace Medical Institute

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Annotated Bibliography of Reports:

Supplement No. 3

1 July 1970 - 30 June 1971

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30 June 1971

Naval Aerospace Medical Research Laboratory
Naval Aerospace Medical Institute
Naval Aerospace Medical Center
Pensacola, Florida 32512

FOREWORD

Documents published at the Naval Aerospace Medical Research Laboratory (NAMRL), Naval Aerospace Medical Institute (NAMI), since 1 July 1970 are included in this third annual supplement to the annotated bibliography of reports dated 30 June 1968. That bibliography is DDC accession number AD 674 914; the first supplement is AD 691 415, and the second supplement is AD 710 764.

All numbered reports have been approved for public release; distribution is unlimited. Requests for copies should be directed to the National Information Service (NTIS), Springfield, Virginia 22151. Requests for reprints of open literature documents should be addressed to the author.

Catherine F. Kasparek
Christine E. Turner

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Navy Department

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+ Denotes studies performed jointly with and supported by the United States Army Aeromedical Research Laboratory, Fort Rucker, Alabama.

Study supported by the Naval Air Systems Command.

Work Unit

MR005.01-0097B.2
NAMRL-1124
(AD 720 682)

A Technique for Producing Calisthenic Behavior in a Rhesus Monkey. 12/1/70

J. de Lorge

Abstract:

A rhesus monkey was trained to perform a calisthenic task to obtain food and signals contiguous with food. The task was designed to produce continuous high effort behavior from the animal for long durations. The frequency of food reinforcements and related signals was varied to measure concomitant effects on exercise.

Exercise was satisfactorily maintained for up to 3 hours. A reduction in the frequency of food reinforcement by 50 percent reduced exercise responding by less than 25 percent. Removal of signals associated with the absence of food had no significant effects and presentation of signals similar to the food-associated signal lowered the exercise response rate.

Work Unit

MR005.01.01-0120B.4
NAMRL-1119
(AD 722 318)

Evidence for a Test of Dynamic Otolith Function Considered in Relation to Responses From a Patient With Idiopathic Progressive Vestibular Degeneration. 10/1/70

A. Graybiel, C. W. Stockwell, and F. E. Guedry, Jr.

Abstract: A patient is described who possessed residual otolith function, but whose loss of canal function was complete for the horizontal and nearly complete for the vertical canals. A clear (but abnormal) nystagmus response was elicited during rotation about an Earth-horizontal axis, confirming the conclusion, based on animal experiments, that this response depends upon the otolith system. This test appears to measure dynamic otolith function and therefore provides a useful supplement to other vestibular tests.

MR005.01.01-0120B8GG.5
NAMRL-1128
(AD 722 317)

Idiopathic Progressive Vestibular Degeneration in a Young Man: Loss of Vestibular Servation Not the Basis for Detection. 3/2/71

A. Graybiel, C. R. Smith, F. E. Guedry, Jr., E. F. Miller II, A. R. Fregly, and D. B. Cramer

Abstract: This report presents the case of a young man, TI, who experienced episodes of dizziness and demonstrated the rare combination of bilateral loss of nonacoustic function with retention of normal hearing. Persistent dizzy spells first appeared in childhood and were usually mild, but, on rare occasions, he was handicapped by brief severe attacks of vertigo. TI was nearly 26 years of age before these episodes were shown to be of vestibular origin; yet, during the preceding years he never complained of symptoms attributable to loss of function, as distinct from perturbed vestibular function. At that time residual function was substantial in the otolith organs but minimal and nil in the vertical and horizontal canals, respectively. When last seen at age 29, even otolith function was lost; this was associated with the gradual disappearance of dizzy spells. The diagnosis, idiopathic progressive vestibular degeneration, was made by exclusion. The notable conclusion to be drawn from

this patient was not the fact that he had dizzy spells of vestibular origin, but the fact that loss of vestibular function per se was not incompatible with leading a life regarded by himself, his family, and friends as normal.

Work Unit

MF12.524.004-5001D.61
NAMRL-1120
(AD 717 941)

The Application of College and Flight Background Questionnaires as Supplementary Noncognitive Measures for Use in the Selection of Student Naval Aviators. 10/6/70

R. M. Bale and R. K. Ambler

Abstract: The need for supplementary background information in the selection of student naval aviators has become increasingly evident. Recent exit interviews with students who have voluntarily withdrawn from training indicate that factors unrelated to mental or physical ability (such as attitude toward the military) often entered into their decisions. This study utilized a multiple correlation approach to demonstrate that the inclusion of noncognitive college and flight background information would enhance the sensitivity of the selection process, thus reducing the attrition rate. The initial results confirmed this hypothesis and these findings were upheld by crossvalidation. Implementation of the suggested technique would have reduced the attrition rate by 4.5 percentage points for the crossvalidation sample. Therefore, it is recommended that this technique be incorporated as a management tool at the primary selection level.

MF12.524.002-5001D.62
NAMRL-1125
(AD 718 326)

State and Trait Anxiety in Student Naval Aviators. 12/4/70

S. F. Bucky, C. D. Spielberger, and R. M. Bale

Abstract: The State-Trait Anxiety Inventory (STAI) was administered to aviation officer candidates (AOC's) during their routine entrance aviation physical examination at the Naval Aerospace Medical Institute. The STAI yields two scores: A-State, which is an index of anxiety at a given moment, and A-Trait, which is an index of a general level of anxiety proneness. The STAI was administered twice, once, with standard instructions and then with instructions to respond "as if you had just made your first landing on an aircraft carrier."

It was hypothesized that given with its usual instructions, AOC's would be lower in A-Trait and higher in A-State than a control group of 253 previously tested male college students. The second administration was expected to result in elevated A-State scores with no change in A-Trait.

The results of the first administration of the test confirmed the initial hypothesis. The second administration, however, resulted in a reversal of the expected findings; that is, both A-State and A-Trait scores were significantly lower than the scores obtained during the initial administration of the test.

The results are discussed in terms of the subjects' level of state and trait anxiety as well as their apparent test-taking attitudes.

MF12.524.002-5001D.63
NAMRL-1126
(AD 718 848)

Replacement Air Group Performance as a Criterion for Naval Aviation Training. 12/8/70

R. M. Bale, G. M. Rickus, Jr., and R. K. Ambler

Abstract: The current criterion for prediction of performance of student naval aviators is the dichotomy of success versus failure in undergraduate flight training. This criterion has enabled the Naval Air Training Command to make reasonable estimates of the probability of an applicant or student completing flight training. However, a costly attrition problem exists among those aviators who completed undergraduate flight training but were not successful in the replacement air group (RAG), or postgraduate phase of instruction. This study employed a multiple correlation analysis to examine the possibility of utilizing RAG completion as an advanced criterion variable. Undergraduate training grades were found to significantly predict RAG completion. These findings were crossvalidated on an equivalent sample. Had the proposed weighting system been employed, the attrition rate of the cross-validation sample would have been reduced by 33.8 percent.

Work Unit

MF12.524.002-5012DX5X.1
NAMRL-1132
(AD 727 614)

State and Trait Anxiety in the Student Naval Aviator Who Voluntarily Withdraws From Flight Training.

4/12/71

S. F. Bucky and C. D. Speilberger

Abstract:

The purpose of the present study was to determine whether student aviators who voluntarily drop out of the naval aviation training program (DOR's) respond differently to measures of state and trait anxiety from the way in which a group of entering aviation officer candidates (AOC's) and a group of male college students respond.

It was predicted that DOR's would be: 1) lower in A-State though higher in A-Trait when compared to entering AOC's; 2) similar in A-State and lower in A-Trait when compared to male college students.

The State-Trait Anxiety Inventory (STAI) was given to a group of 36 DOR's and 134 entering AOC's tested at the Naval Aerospace Medical Institute. Male undergraduates (N = 253) were tested at the Florida State University during a regular class period of their introductory psychology course.

The results indicate that DOR's are: 1) lower in A-State and similar in A-Trait when compared to entering AOC's; and 2) similar in A-State and lower in A-Trait when compared to the male college students.

Although significant differences between entering AOC's and DOR's were observed, the ultimate usefulness of the STAI in predicting DOR's must await further investigation.

Work Unit

MF12.524.002-5012DX5X.2
NAMRL-1127

The California Psychological Inventory Given to Incoming AOC's and DOR's With Normal and "Ideal" Instructions. 1/11/71

S. F. Bucky

Abstract:

The present study was conducted in order to determine whether 1) the California Psychological Inventory (CPI) would be able to discriminate between incoming aviation officer candidates (AOC's) and other students who voluntarily dropped out of the flight program (DOR's); and 2) if not, whether changing the set so as to ask the subjects to take the test "as they would like to be" would help make the discrimination.

The CPI was administered to 95 AOC's and 51 DOR's with instructions to take the test with its normal instructions. Another group of 173 AOC's and 32 DOR's took the test with "ideal" instructions.

The results showed that entering AOC's and DOR's obtained almost identical scores during the normal administration of the test, but with the "ideal" instructions, AOC's obtained significant elevations on 11 of 18 scales; whereas, only 2 scales were significantly elevated for the DOR group. The results suggest that the CPI should be investigated as a possible aid in the prediction of the DOR.

Work Unit

MF12.524.002-5013DX5X.1
NAMRL-1130
(AD 723 796)
(Prepared for Naval Air Test Center)

Selected Bivariate Anthropometric Distributions Describing a Sample of Naval Aviators — 1964. 3/10/71

W. F. Moroney

Abstract:

Previous anthropometric surveys presented means, standard deviations, ranges, and percentiles as descriptors of the anthropometric features of aviator populations. These reports were limited to a consideration of each variable independently. However, designers also need knowledge of the interaction between variables in order to determine what proportion of the potential operator population their design decisions will eliminate. This report extends data previously collected from 1549 naval aviation personnel by presenting bivariate tables that illustrate the relationship between selected variables.

Twenty-one tables were prepared which contained selected interactions between the following variables: bideltoid diameter; buttock-knee length; eye height, sitting; functional reach; head height; knee height, sitting; sitting height; shoulder height, sitting; standing height; and thigh circumference. Means, standard deviations, ranges, regression equations, standard error of estimate, and percentile levels were also presented for each variable.

MF12.524.002-5013DX5X.2
NAMRL-1134

Early Aptitude-Achievement Discrepancies as Predictors of Later Voluntary Withdrawal From Naval Aviation Training. 6/7/71

R. E. Doll

Abstract:

During recent years there has been a marked increase in the drop-on-request (DOR) rate among aviation officer candidates (AOC's). This type of attrition has been exceedingly difficult to predict because of a lack of good measures of motivation. This study examines the hypothesis that any substantial discrepancy between aptitude and achievement may well be a product of motivation and that scores based on such discrepancies may be useful in identifying potential DOR's. Quadrant

analysis of two independent samples showed the high aptitude-low achievement quadrant to have a higher DOR rate than any other quadrant. It is recommended that this type of analysis be incorporated as a secondary selection tool upon completion of the environmental indoctrination stage of training.

Work Unit

MF12.524.004-5001B.8
NAMRL-1113
(AD 715 625)

Lighting Factors Affecting the Visibility of a Moving Display. 8/7/70

R. D. Gilson and R. H. Elliott

Abstract: Compensatory tracking performance was shown to be substantially degraded by oscillation of the visual display at 1.0 Hz and 2.0 Hz. The severity of this decrement was significantly altered by changes in both the color and the intensity of the display illumination. Performance was significantly better with red light illuminating the display at 0.05 mL than with blue light at the equivalent luminance. This improvement in performance was similar in magnitude to that found for an increase in broad-band illumination of the display where luminance was increased from one-half log unit below to one-half log unit above 0.05 mL. Visual mechanisms that may have been responsible for these findings are suggested and practical considerations of instrument lighting are discussed.

MF12.524.004-5001B.9
NAMRL-1115
(AD 716 767)

Reliability and Validity of the Brief Vestibular Disorientation Test Compared Under 10-rpm and 15-rpm Conditions. 8/14/70

R. K. Ambler and F. E. Guedry, Jr.

Also published in Aerospace Med., 42:186-189, 1971

Abstract: A brief Vestibular Disorientation Test (BVDT) was developed that involves observer assessment of subjects' reactions produced by head movements in a rotating chair. Reliability of observers has been demonstrated, and significant validation and cross-validation coefficients have been reported for criteria of pass versus various types of separations from pilot training. It has also been established that the BVDT score significantly augmented the multiple correlation of existing aviation selection variables with the same criteria. The purpose of this study was to determine if reliability, validity, and augmentation of correlation could be obtained with less disturbance to the subject than that caused by the 15-rpm speed of rotation used thus far in the BVDT. Reduced disturbance and aftereffects are desired because the BVDT is now envisioned as becoming part of the entering flight physical, and procedures that might

either impair performance on the other tests or require recovery periods must be held to a minimum. The BVDT procedure used here was identical to two previous studies except that a speed of 10-rpm was used instead of 15-rpm. Subjects were 157 flight students who were tested within the first four days of reporting for training. Retesting of 72 of the subjects was conducted 9 weeks later. The test-retest and rater reliability coefficients obtained were not quite so high as for those who had the 15-rpm procedure, but they were of acceptable magnitude. The validity coefficients were approximately the same as those obtained for 15-rpm, and significant augmentation of the existing selection battery and cost effectiveness was demonstrated. It was concluded, therefore, that the 10-rpm BVDT was a feasible procedure. It was also concluded that, because the mean score for the 10-rpm group was lower than the mean for either of the two 15-rpm groups used previously, subject disturbance had been reduced.

MF12.524.004-5001BX5G.10
NAMRL-1123
(AD 717 596)

Comparison of Tracking Task Performance and Nystagmus During Sinusoidal Oscillation in Yaw and Pitch. 10/29/70

A. J. Benson and F. E. Guedry, Jr.

Also published in Aerospace Med., 42:593-601, 1971

Abstract: Sinusoidal torsional oscillation (0.04 Hz, peak angular velocity ± 60 to ± 159 deg/sec) degraded subjects' performance of a compensatory tracking task because inappropriate nystagmic eye movements impaired visibility of the display. Responses to angular oscillation in yaw and pitch were compared. During angular motion in the pitch-forward direction the nystagmus frequency and slow phase velocity, and the consequent performance decrement, were significantly greater than during the pitch-back half cycle. No such asymmetry was found during oscillation in yaw where the nystagmus measures and error scores were similar to those obtained in the pitch-back half cycle. The poorer suppression of vestibular nystagmus during pitch-forward motion is attributed to the higher frequency and smaller amplitude of downbeating nystagmus. Angular oscillation in pitch induced motion sickness more rapidly than a comparable yaw-axis stimulus. This was probably caused by differences in the dynamic response of vertical and lateral

canals and the greater mismatch of canal and gravi-receptor signals during oscillation in pitch.

MF12.524.004-5001BX5G.11
NAMRL-1129
(AD 726 172)

Nystagmus Responses During Rotation About a Tilted Axis. 3/9/71

C. W. Stockwell, G. T. Turnipseed, and F. E. Guedry, Jr.

Abstract: A persistent horizontal nystagmus response is elicited when a man is rotated at constant velocity about an Earth-horizontal axis. This response comprises two components: a directional bias and a cyclic modulation of the bias level. Observations were made of the effects of three stimulus variables: rate of initial acceleration, rate of steady rotation, and angle of tilt of the rotation axis. Bias and cyclic modulation were affected differently by stimulus variables, especially by rate of steady rotation, suggesting the presence of two separate response mechanisms. Previous experiments indicate that both mechanisms depend upon the otolith system, although the possibility of a semicircular canal contribution remains. Thus it is reasonable to conclude that these response components provide a means of assessing the dynamics of otolith-regulated responses.

MF12.524.004-5001BX5G.12
NAMRL-1131
(AD 726 173)

Nystagmus and Visual Performance During Sinusoidal Stimulation of the Vertical Semicircular Canals. 3/10/71

F. E. Guedry, Jr., and A. J. Benson

Abstract: Men were positioned on their sides and oscillated sinusoidally (0.04 Hz, peak velocity ±90 deg/sec) about an Earth-vertical axis. Initially, nystagmus slow phase velocity was about equal during the forward- and backward-pitch halves of the stimulus cycle in darkness; but when subjects tracked a dimly illuminated aircraft instrument, slow phase velocity during forward pitch was about ten times that during backward pitch. Consequently, tracking errors were much greater during forward pitch. Change in luminance level from 0.01 ft-L to 1.0 ft-L produced small, statistically significant decrements in slow phase velocity and substantial improvements in tracking performance. Following this part of the experiment, nystagmus was again recorded

in darkness. There was a differential decline in slow phase velocity, the slow-phase-down response showing significantly greater decline. Stimulus-response phase relations were also altered for the slow-phase-down response, but were unaltered for the slow-phase-up response. It is proposed that interactions between eyelid and eyeball movements caused different frequencies of upbeating and downbeating nystagmus which, in turn, produced different visual suppression of slow phase velocity in the two halves of the stimulus cycle. The asymmetric visual suppression may have contributed to the asymmetric habituation of the two reactions.

MF12.524.004-5001BX5G.13
NAMRL-1133

Effects of Alcohol Ingestion on Tracking Performance During Angular Acceleration. 5/18/71

W. E. Collins, R. D. Gilson, D. J. Schroeder, and F. E. Guedry, Jr.

Abstract:

Most studies of the effects of alcohol on human performance have dealt with static (absence of motion) situations. However, the addition of whole-body motion, involved in such activities as piloting an aircraft, might well cause impairments not usually produced in static situations. The present study examined some of the effects of alcohol ingestion on visual tracking performance (eye-hand coordination) during angular acceleration. After practice and baseline tests of tracking performance in both static (stationary) and dynamic (whole-body angular acceleration) conditions, ten subjects received orange juice that contained 2.0 ml of 100-proof vodka per kilogram of body weight; another ten drank orange juice with a few drops of rum extract added. Tests, conducted 1, 2, 4, 8, and 10 hours after drinking, were in total darkness except for the visual display, which was illuminated to a recommended level for cockpit instruments.

Static tracking errors for alcohol subjects were significantly higher than those of control subjects only at the 4-hour session. However, alcohol subjects made significantly more dynamic tracking errors than controls during the 1-, 2-, and 4-hour sessions. These data suggest that eye-hand coordination may show little or no impairment following alcohol ingestion in a static situation, yet may be seriously degraded during motion.

Work Unit

MF12.524.005-5016B.5
NAMRL-1108
(AD 715 107)

Orientation-Error Accidents in Regular Army UH-1 Aircraft During Fiscal Year 1967: Relative Incidence and Cost. 8/25/70

W. C. Hixson, J. I. Niven, and E. Spezia

Abstract:

This report is the first in a longitudinal series of reports dealing with the magnitude of the pilot disorientation/vertigo accident problem in Regular Army UH-1 helicopter operations. Incidence and cost data presented for fiscal year 1967 include a total of 50 major and minor orientation-error accidents (15 of which were fatal), resulting in 38 fatalities, 88 nonfatal injuries, and a total UH-1 aircraft damage cost of $7,542,177.

MF12.524.005-5016B.6
NAMRL-1109

Major Orientation-Error Accidents in Regular Army UH-1 Aircraft During Fiscal Year 1967: Accident Factors. 10/20/70

W. C. Hixson, J. I. Niven, and E. Spezia

Abstract:

This report is one of a longitudinal series of reports dealing with the pilot disorientation/vertigo accident problem in Regular Army UH-1 helicopter operations. Individual case history data extracted from the USABAAR master aircraft accident files are presented on 44 UH-1 major orientation-error accidents that occured during fiscal year 1967. Summary data listings involving a variety of operational and pilot-related accident factors are presented for each of the 44 cases. The listings are arranged to distinguish between those factors and events present before takeoff, i.e., the initial conditions associated with a given accident, and those that occurred or were manifested during the actual airborne phase of the accident flight.

Work Unit

MF12.524.005-7008B.1
NAMRL-1118
(AD 718 327)

A Technique for Optimal Fitting of Flight Helmets. 9/30/70

J. W. Greene

Abstract: Although flight helmets selected for Navy use may possess exceptionally good noise attenuation qualities, maximum attenuation may not always be realized when the helmet is worn, particularly if the helmet does not fit. The lack of a standardized procedure for fitting flight helmets often results in a poor compromise that sacrifices noise exclusion for comfort. A procedure that involves the use of a noise source and an automatic recording audiometer has been developed as an aid in the fitting process. The noise source allows the aviator to detect acoustical leakage around his ears so that a better fit can be effected. Masked hearing threshold levels obtained with the helmet's earphones can be used to demonstrate improved performance. Such a procedure would appear to be feasible for implementation at the squadron or air-group level.

Work Unit

MF12.524.005-7011B.1
NAMRL-1110
(AD 716 766)

A Progress Report on the Naval Aviators' Speech Discrimination Test. 6/29/70

J. W. Greene

Abstract:

Six years have elapsed since the Naval Aviators' Speech Discrimination Test (NASDT) was first used to provide an objective basis for granting waivers to senior aviators who fail to meet the pure-tone hearing standards but who experience no hearing difficulties in their working environment. While the NASDT is normally administered only to aviators whose hearing falls below current standards, the test is also being administered to groups of student aviators and participants in the Pensacola "Thousand Aviator" Study.

From an analysis of the data that have been obtained to date, it appears that the NASDT has fulfilled its original purpose and has led to a more realistic and practical evaluation of the hearing of senior naval aviators. Pearson product-moment correlations calculated between NASDT scores and hearing threshold levels reflect the inability of the pure-tone audiogram to provide a valid evaluation of the ability to hear speech in the presence of aircraft noise. In-flight and laboratory test data currently being obtained will, hopefully, lead to a more efficient functional test of an aviator's hearing capabilities in his operational environment.

MF12.524.005-7011BX5X.2
NAMRL-1121
(AD 716 768)

The Effect of Earplugs on Passenger Speech Reception in Rotary-Wing Aircraft. 10/27/70

C. E. Williams, J. R. Forstall, and W. C. Parsons

Abstract:

Direct person-to-person speech communication is sometimes required in rotary-wing aircraft where high levels of noise make the use of hearing protective devices desirable. The question arises as to what effect earplugs would have on the intelligibility of speech in rotary-wing aircraft.

Intelligibility test data obtained in flight as well as in a simulated flight situation indicate that the use of earplugs in rotary-wing aircraft will improve the reception of direct person-to-person speech communication. Moreover, their use will afford protection against the deafening, fatigue, and annoyance effects of the hazardous noise present in rotary-wing aircraft.

Work Unit

MF12.524.010-5001B.45
NAMRL-1112
(AD 711 316)

Nuclear Emulsion Recordings of the Astronauts' Radiation Exposure on the First Lunar Landing Mission Apollo XI. 6/29/70

H. J. Schaefer and J. J. Sullivan

Abstract:

Ilford G.5 and K.2 emulsions in radiation packs carried by the astronauts on Apollo XI in their space suits were analyzed for identifying the various components of the radiation field in space and determining the total mission dose. In terms of dose equivalents, trapped protons in the radiation belt, disintegration stars in tissue, galactic heavy primaries, electrons, and neutrons contribute in that order to a total mission dose of 201 millirad or 402 millirem. In this exposure, the high-ZE particles with LET values up to 3600 kev/micron tissue constitute a radiobiologically unknown quantity since it is generally agreed upon that microbeam effects in tissue cannot be measured adequately with conventional dosimetric units. Assuming that the effects in question are limited to nuclei of Z = 22 and higher, one arrives at a total mission flux of 76 nuclei/cm^2 measured on the body of the astronaut; this cannot be properly assessed in its biological significance.

Work Unit

M4312.01-5001B.2
NAMRL-1122
(AD 717 130)
(Reprinted February 1970 from 13th Stapp Car Crash Conf., 1969, by Society of Automotive Engineers, Inc.)

Living Human Dynamic Response to $-G_x$ Impact Acceleration. II. Accelerations Measured on the Head and Neck. 10/28/70

C. L. Ewing, D. J. Thomas, L. M. Patrick, G. W. Beeler, and M. J. Smith

Abstract:

A methodical investigation and measurement of human dynamic response to impact acceleration was conducted as a Joint Army-Navy-Wayne State University investigation. Details of the experimental design were presented at the Twelfth Stapp Car Crash Conference in October 1968.

Linear accelerations were measured on the top of the head, at the mouth, and at the base of the neck. Angular velocity was also measured at the base of the neck and at the mouth. A redundant photographic system was used for validation. All data were collected in computer-compatible format and data processing was by digital computer. Selected data in a stage of interim analysis on 18 representative human runs of the 236 human runs completed to date are presented.

Review of the data indicates that peak accelerations measured at the mouth are higher than previous estimates. The time relationship of the peak resultant mouth accelerations to the peak sled acceleration for this particular accelerator and restraint system is described. The maximum peak resultant mouth acceleration was 47.8 G and the peak mouth angular velocity on another run exceed 30 rad/sec, on nominal 10 G, 250 G/sec runs with no evidence of unconsciousness or neurological deficit attributable to the acceleration.

Representative plots of the human dynamic response are presented, discussed, and compared. A first-order linear regression analysis for the peak mouth resultant acceleration and the peak mouth angular velocity obtainable from the peak sled acceleration is presented. Important similarities discovered in the time phasing of the human dynamic response to impact accelerations are presented and discussed.

NAMI Reports Listed in Previous Bibliography That Have Subsequently Been Published in Journals

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