

AD-A247 185



NAVAL BIODYNAMICS LABORATORY

2

1989 AND 1990  
COMMAND HISTORY

July 1991

NAVAL BIODYNAMICS LABORATORY  
P. O. Box 29407  
New Orleans, LA 70189-0407



DTIC  
SELECTE  
MAR 5 1992  
S B D

Approved for public release; distribution is unlimited.

Prepared for

Naval Medical Research and Development Command  
Bethesda, MD 20889-5044

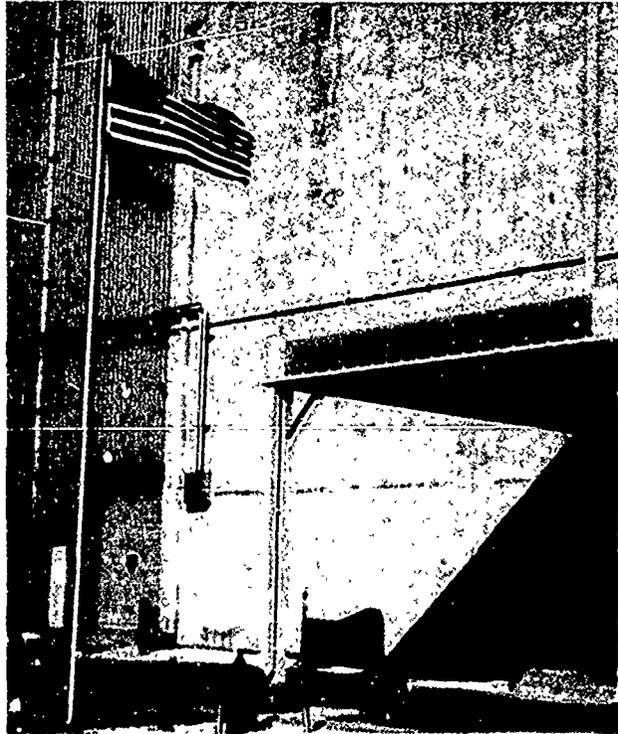
92-05021

**Approved and Released by:**

*Douglas W. Call*

**DOUGLAS W. CALL  
Captain, Medical Service Corps  
United States Navy  
Commanding Officer**

## **COMMANDING OFFICER'S STATEMENT**



The years 1989 and 1990 were very productive ones for the Naval Biodynamics Laboratory (NAVBIODYNLAB). With well-defined Command Goals as guidance and dedicated daily teamwork, we completed several significant research efforts. The results of these studies were published in numerous in-house and open literature reports. In addition, our personnel spoke widely on our mission and accomplishments at local, national and international meetings. We were pleased to open our Laboratory to many visitors as well and our Command capabilities were highlighted in a four-part Television news special report in November 1989 on WDSU-TV, the local NBC affiliate.

Our goal to increase and diversify our funding sources was realized through reimbursable projects we conducted for the U.S. Army and U.S. Coast Guard. Our productive professional collaborations with faculty members at the University of New Orleans, Tulane University and Louisiana State University were expanded, thus augmenting our scientific capacity.

Funding shortfalls combined with personnel transfers and the resulting loss of productivity made it impossible to achieve all of our 1989-90 goals. However, there were many noteworthy achievements as outlined in this Command History.

Our plans for 1991 are ambitious and we are optimistic about our continuing ability to execute our assigned Navy mission.

## TABLE OF CONTENTS

INTRODUCTION .....	1
MISSION AND FUNCTIONS .....	4
1989/1990 TOTAL FUNDING .....	5
TOTAL PERSONNEL .....	6
ORGANIZATION CHART .....	7
OFFICE OF THE COMMANDING OFFICER .....	8
EXECUTIVE OFFICER .....	9
CHIEF SCIENTIST .....	9
COMMAND CHIEF PETTY OFFICER .....	9
RESEARCH DEPARTMENT .....	18
HUMAN FACTORS DIVISION .....	20
MATHEMATICAL SCIENCES DIVISION .....	31
DATA SYSTEMS DIVISION .....	32
BIOMEDICAL SUPPORT DEPARTMENT .....	32
VETERINARY RESOURCES DIVISION .....	32
TECHNOLOGY DEPARTMENT .....	33
BIOINSTRUMENTATION DIVISION .....	36
ENGINEERING DIVISION .....	36
RESEARCH SUPPORT DEPARTMENT .....	37
RESEARCH PRESENTATIONS 1989 .....	38
PROFESSIONAL MEETINGS ATTENDED IN 1989 .....	40

RESEARCH PRESENTATIONS 1990 .....	46
PROFESSIONAL MEETINGS ATTENDED 1990 .....	49
NAVAL BIODYNAMICS LABORATORY PUBLICATIONS 1989 .....	55
NAVAL BIODYNAMICS LABORATORY PUBLICATIONS 1990 .....	57
CONFERENCES HOSTED 1990 .....	59
OFFICE OF NAVAL RESEARCH (ONR) ASEE SUMMER FACULTY RESEARCH PROGRAM 1990 .....	60
DISTINGUISHED VISITORS 1989 .....	61
DISTINGUISHED VISITORS 1990 .....	64
PARTNERSHIPS IN EDUCATION .....	68
OTHER ACTIVITIES .....	69
NAVBIODYNLAB PERSONNEL IN ACTION .....	71
MILITARY AWARDS .....	76
SAILOR OF THE YEAR - 1989/1990 .....	77
REENLISTMENTS 1990 .....	82
RETIREMENTS 1990 .....	82
CIVILIAN AWARDS .....	83

DTIC  
COPY  
INSPECTED  
6

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification:	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

## LIST OF FIGURES

NASA MICHOU D ASSEMBLY FACILITY, NEW ORLEANS, LA .....	2
1989 TOTAL FUNDING .....	5
1990 TOTAL FUNDING .....	5
TOTAL PERSONNEL .....	6
ORGANIZATIONAL CHART .....	7
DOUGLAS W. CALL, CAPT, MSC, USN .....	8
HUMAN RESEARCH VOLUNTEERS (HRVs) .....	10
HORIZONTAL ACCELERATOR .....	12
VERTICAL ACCELERATOR .....	13
SHIP MOTION SIMULATOR .....	15
SHIP MOTION SIMULATOR CONTROL STATION .....	16
MOTION DESENSITIZATION CHAIR .....	17
NAVBIODYNLAB ENGINEER DESIGNING FIBERGLASS HELMET .....	19
CUSTOMIZED, FORM-FITTING FIBERGLASS HELMET DESIGNED BY NAVBIODYNLAB ENGINEER .....	19
SHIP MOTION SIMULATOR CAB .....	21
SHIP MOTION SIMULATOR IN OPERATION .....	22
SUBJECT IN MOTION DESENSITIZATION CHAIR .....	23
INSIDE VIEW OF THE ROTATING DRUM OF THE MOTION DESENSITIZATION CHAIR .....	25
U.S. COAST GUARD 41-FT UTILITY BOAT .....	26
SUBJECT PERFORMING A FOUR-CHOICE REACTION TIME TASK ABOARD A COAST GUARD 41-FT UTILITY BOAT .....	27

<b>SUBJECT PERFORMING A MEMORY AND SEARCH TASK ABOARD A COAST GUARD 41-FT UTILITY BOAT .....</b>	<b>27</b>
<b>AFT VIEW OF U.S. COAST GUARD 41-FT UTILITY BOAT .....</b>	<b>28</b>
<b>U.S. COAST GUARD 47-FT MOTOR LIFEBOAT .....</b>	<b>29</b>
<b>FULL-SCALE MOCK-UPS OF ENCLOSED AND OPEN STEERING STATIONS OF THE 47-FT MOTOR LIFEBOAT .....</b>	<b>30</b>
<b>EVALUATION OF INFLATABLE AIR BAGS ON THE AH-1 AND AH-64 HELICOPTERS .....</b>	<b>34</b>
<b>DR. MILDRED NOTO, PRINCIPAL OF SCHAUMBURG ELEMENTARY SCHOOL SERVES AS "CO" OF NAVBIODYNLAB FOR A DAY .....</b>	<b>68</b>
<b>MS. LESLIE HILL, WDSU TV CHANNEL 6 NEWS .....</b>	<b>69</b>
<b>NAVBIODYNLAB PERSONNEL IN ACTION .....</b>	<b>71</b>
<b>FEDERAL BUSINESS ASSOCIATION DISTINGUISHED SERVICE AWARD (TECHNICAL) 1989 .....</b>	<b>75</b>
<b>NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND SAILOR OF THE YEAR 1989 .....</b>	<b>75</b>
<b>NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND SENIOR ENLISTED LEADERSHIP AWARD 1990 .....</b>	<b>75</b>
<b>HM2 EDWIN TAYLOR, USN .....</b>	<b>77</b>
<b>HM2 JOSEPH CATYB, USNR .....</b>	<b>77</b>
<b>REENLISTMENTS 1990 .....</b>	<b>82</b>
<b>RETIREMENTS 1990 .....</b>	<b>82</b>
<b>FAREWELL .....</b>	<b>87</b>

# 1989 AND 1990 COMMAND HISTORY

---

## INTRODUCTION

### HISTORY

The Naval Biodynamics Laboratory (NAVBIODYNLAB) was established as the Naval Aerospace Medical Research Laboratory Detachment (NAMRLD) in April 1971 by the Bureau of Medicine and Surgery (BUMED). NAMRLD was a detachment of the Naval Aerospace Medical Research Laboratory which is located at the Naval Air Station, Pensacola, Florida. The initial purpose of the Detachment was to study human response to impact acceleration. In 1975, the mission was expanded to include human response to vibration, ship motion, and human performance. NAVBIODYNLAB was designated a separate command by the Secretary of the Navy in February, 1980, and officially established by CPNAV NOTICE 5450 on 28 February 1980.

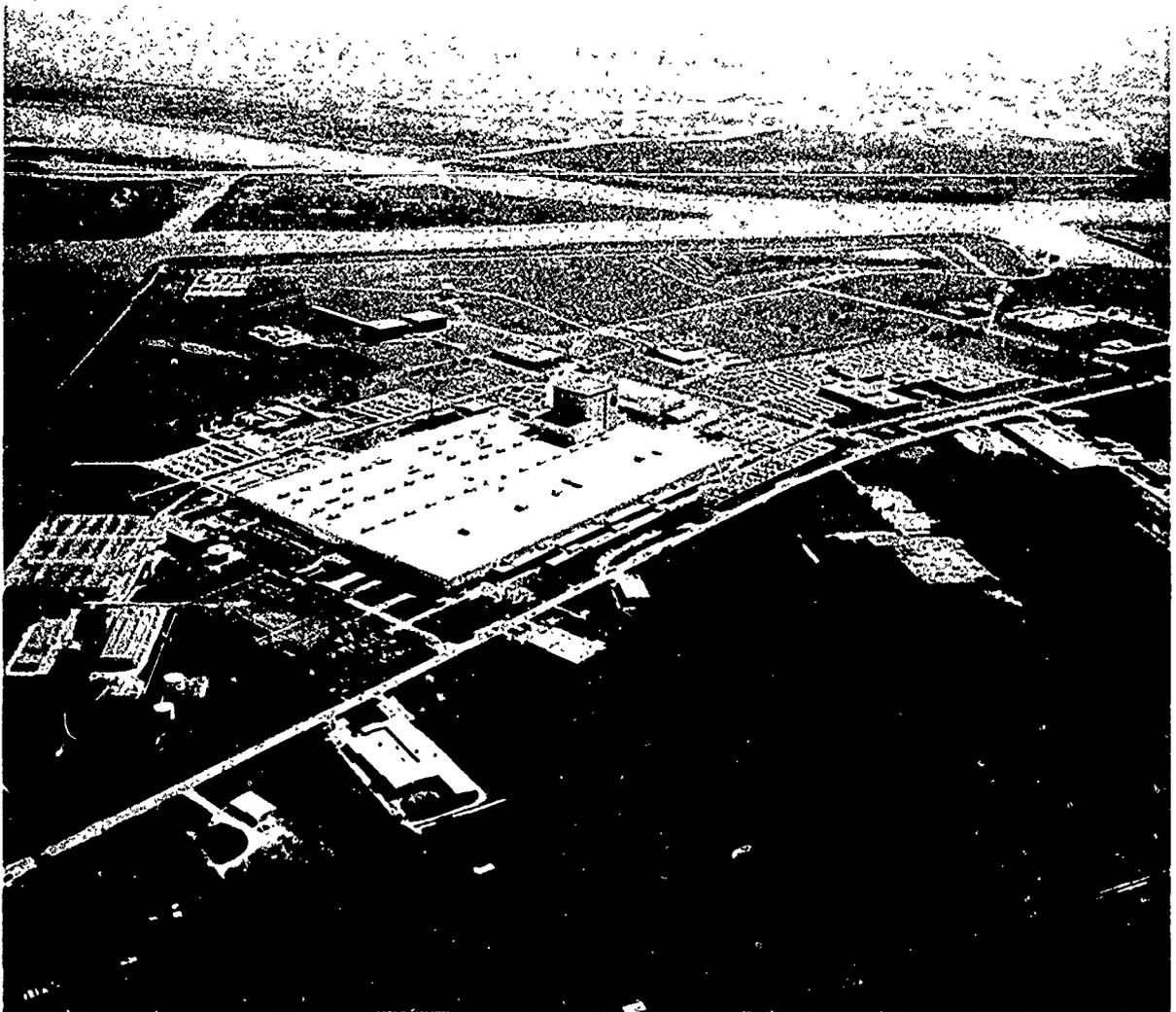
Captain Channing L. Ewing, MC, USN was the first Officer in Charge of the Laboratory. Commander Robert S. Kennedy, MSC, USN became the Officer in Charge in December of 1976, and was relieved by Captain James E. Wenger, MC, USN in August 1979. Captain Wenger became the first Commanding Officer when the Laboratory was designated a command in August 1980. Captain Loys E. Williams, MC, USN assumed command in 1982 and was relieved by Captain Robert J. Biersner, MSC, USN in August of 1984. Captain Biersner served until April 1987 and was succeeded by Commander Don M. Herron, MSC, USN. Captain Douglas W. Call, MSC, USN became Commanding Officer in May 1987.

### *NASA Michoud Assembly Facility*

NAVBIODYNLAB leases its facilities from the National Aeronautics and Space Administration (NASA) Michoud Assembly Facilities. The NASA Michoud Assembly Facility in eastern New Orleans, boasts a long and colorful history. The King of France deeded the original 35,000 acre site to Antoine Michoud, a Louisiana soldier and statesman, in 1763. The land, located some 15 miles northeast of central New Orleans served as a source of timber for building and repairing ships, and as a rich hunting ground for trappers and fur traders. In later years, the fertile, low-lying fields were used to grow sugar cane, and for almost 100 years the sprawling plantation was owned and operated by the Michoud family.

**NAVAL BIODYNAMICS LABORATORY**

---



**NASA Michoud Assembly Facility, New Orleans, LA.**

## ***1989 and 1990 Command History***

---

With the outbreak of World War II, large tracts of land with deep-water access were needed for defense related construction. The U. S. Maritime Commission acquired one thousand acres of the former Michoud Plantation for building Liberty Ships. In 1942, plans for the tract were changed and a contract was issued for constructing 1200 plywood cargo airplanes at the new Michoud facility. By October 1943, the main production facility, encompassing 43 acres under one roof, was completed and aircraft construction began. Two years later, with the war drawing to an end, Michoud was closed after completing two airplanes and placed in the inventory of the War Assets Administration. Later, the New Orleans Dock Board acquired the tract from the federal government through a lease/purchase agreement to serve as an industrial development complex. With the outbreak of fighting in Korea, the Michoud site was reclaimed by the federal government and in late 1951 was reopened under direction of the U.S. Army Ordnance Department to build 12-cylinder air-cooled engines for Sherman and Patton tanks. As the Korean conflict diminished, engine production was reduced and the Michoud facility closed again in July 1953.

In 1961, NASA acquired the Michoud facility from the Department of Defense to serve as a final assembly point for the manufacture of large space launch vehicles which could be transported by barge to the launch site at Cape Canaveral, FL. The first Apollo mission to the moon in July 1969 was powered by a Michoud built Saturn 1C booster.

In 1973, Martin Marietta Aerospace was awarded a contract to design, develop and manufacture nine external propellant tanks for the Space Shuttle. The external tank, which provides some 1.6 million pounds of propellant for the Shuttle's three main engines, is the only Space Shuttle component that is not recovered for reuse. Recently, Martin Marietta was awarded contracts to produce fifty-nine of the 154 foot long, 28-foot diameter tanks, and thus continues to support the Space Shuttle project.

Today, the 883-acre Michoud facility contains one of the largest production buildings in the nation, a vertical assembly building for stacking external tank components, as well as, pneumostatic and systems test buildings and administrative offices. Some 3,700 Martin Marietta employees work at the Michoud Assembly Facility, with an annual payroll exceeding \$130,000,000. Employment by other federal agencies at Michoud increases total employment at the facility to nearly 5,000 people.

# **NAVAL BIODYNAMICS LABORATORY**

---

## **MISSION AND FUNCTIONS**

### **MISSION**

The mission of the Naval Biodynamics Laboratory is to be the principal Navy activity to conduct biomedical research on the effects of mechanical forces (motion and impact) on naval personnel as encountered in ships and aircraft, to establish human tolerance limits for these forces, and to develop methods and techniques to protect personnel from the damaging effects of such forces.

### **FUNCTIONS**

- ▶ To determine the kinematic, dynamic, physiological and performance effects of mechanical forces on Navy and Marine Corps personnel.
- ▶ To determine mechanisms underlying the biomedical effects of mechanical forces.
- ▶ To develop and evaluate methods for the prevention and treatment of the damaging effects of mechanical forces.
- ▶ To determine specifications for subsequent development of manikins that replicate human responses to impact acceleration.
- ▶ To develop, construct and validate a family of anthropomorphic manikins and other human analogues, including mathematical models.
- ▶ To develop a standardized test battery for assessing human performance under a variety of environmental stressors including, but not limited to, mechanical forces.
- ▶ To perform other research, development, testing and evaluation functions prescribed by higher authority which is consistent with the mission of the Command.

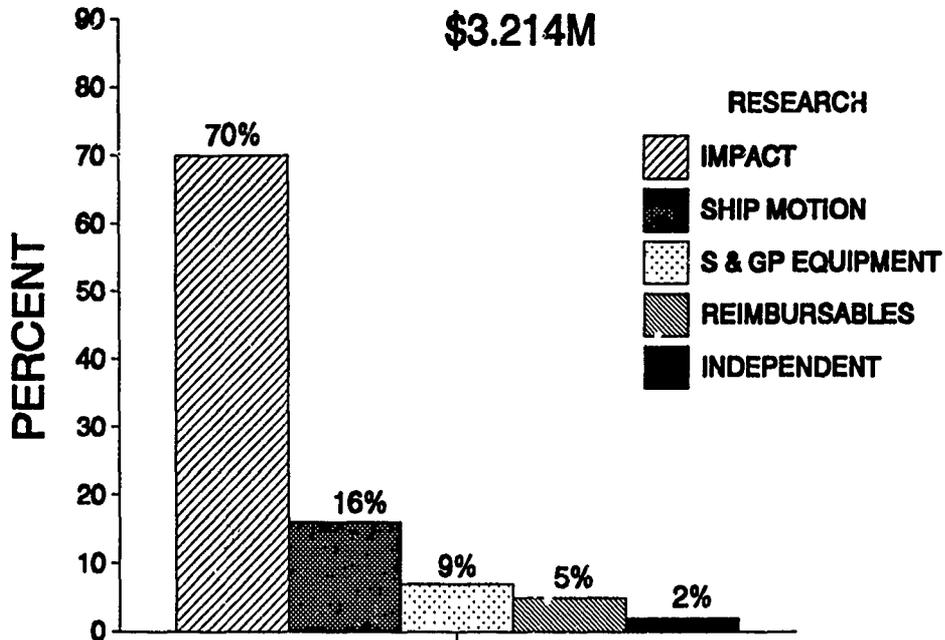
### **COMMAND RELATIONSHIPS**

NAVBIODYNLAB is under the command of Naval Medical Research and Development Command (NAVMEDRESDEVCOM) and receives primary support from the Chief, Bureau of Medicine and Surgery, Washington, DC.

1989 and 1990 Command History

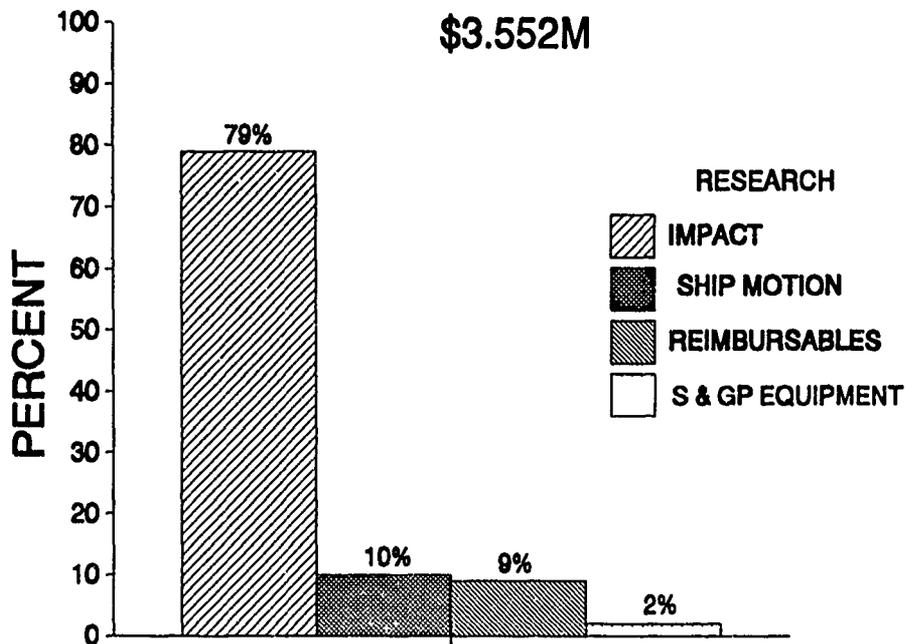
# 1989 TOTAL FUNDING

\$3.214M



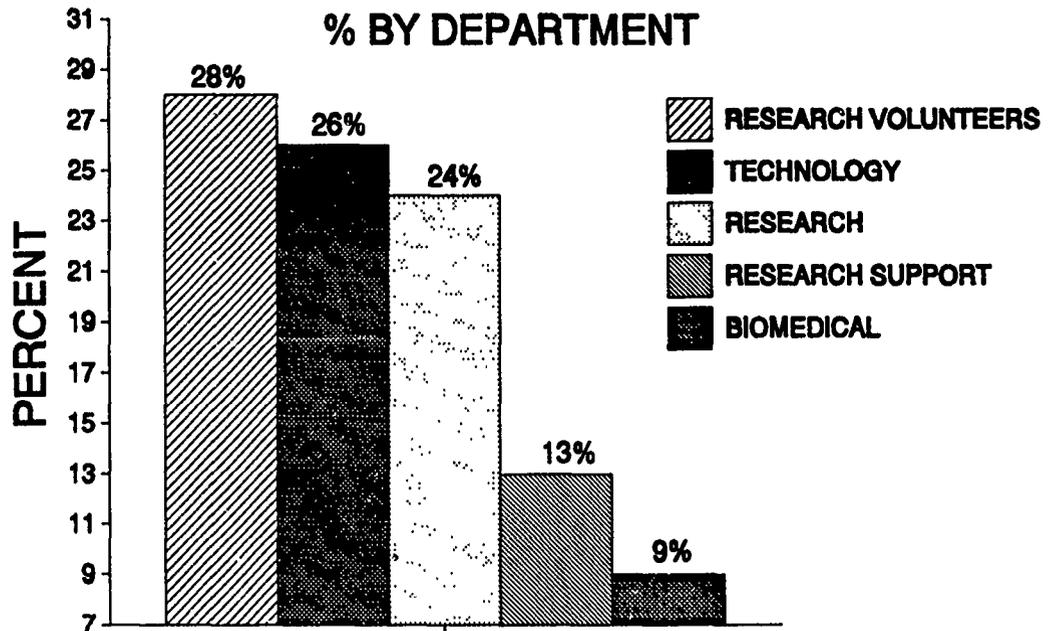
# 1990 TOTAL FUNDING

\$3.552M

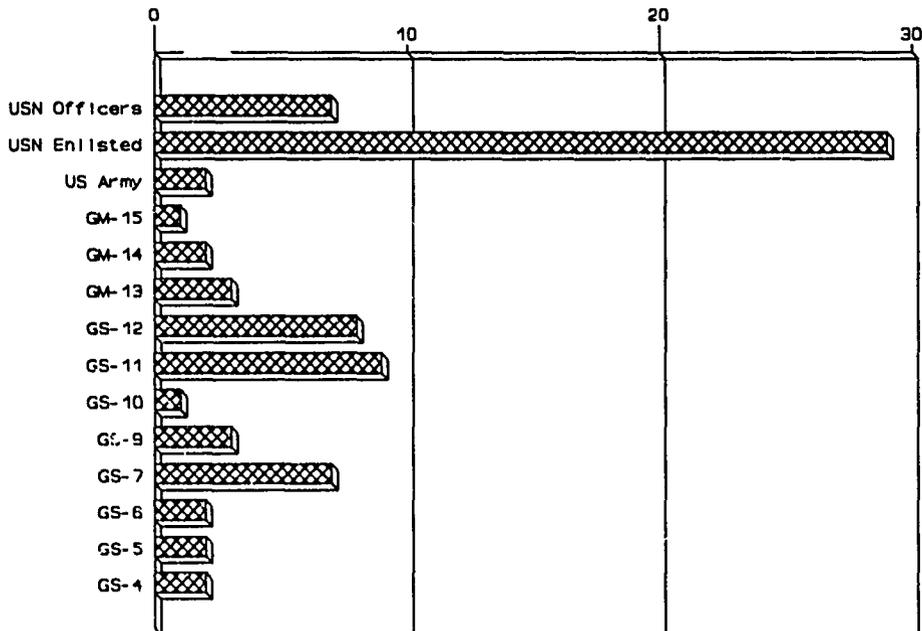


NAVAL BIODYNAMICS LABORATORY

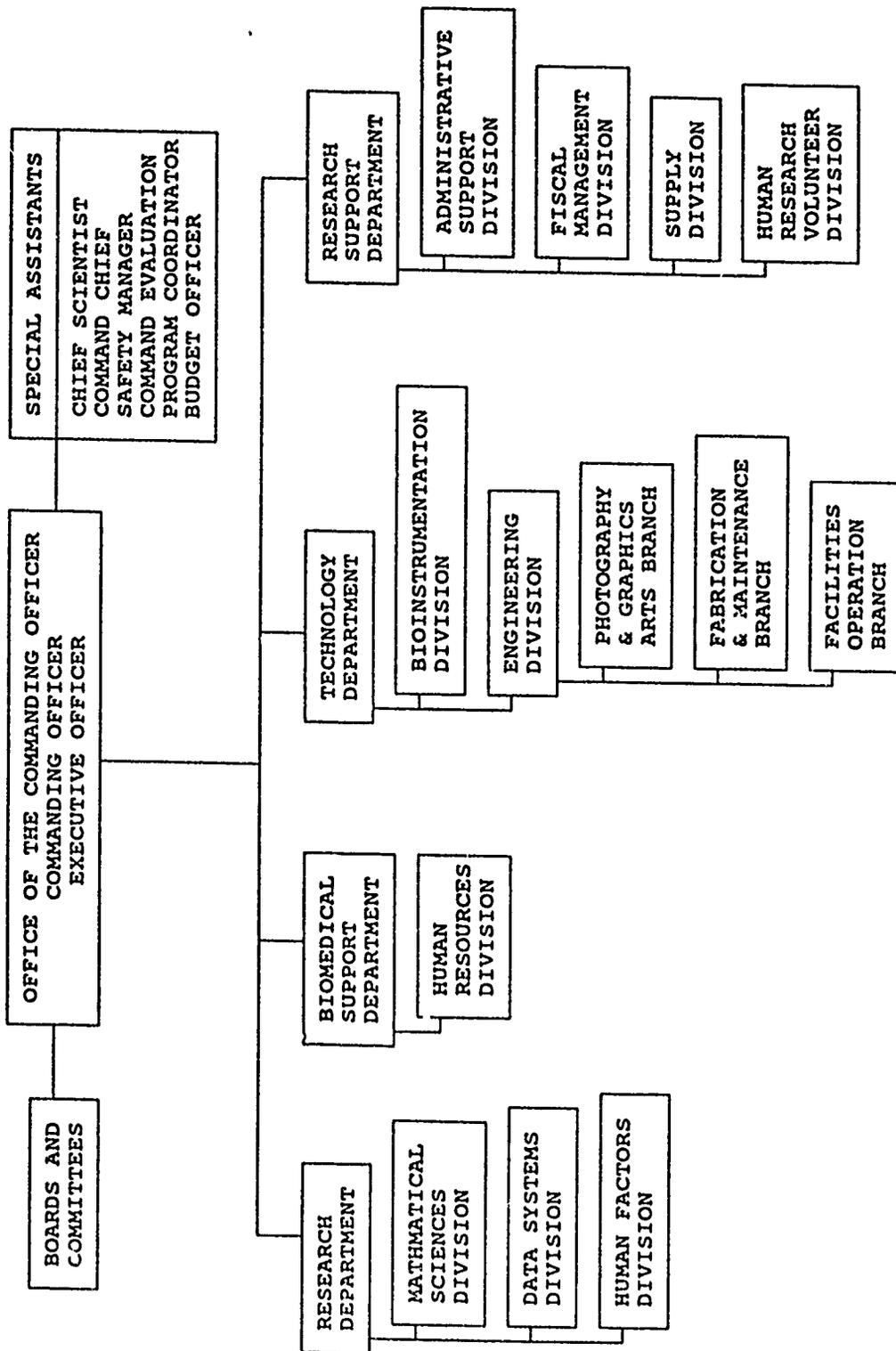
TOTAL PERSONNEL



PERSONNEL GRADE/RANK BREAKDOWN



# ORGANIZATION CHART NAVAL BIODYNAMICS LABORATORY



## NAVAL BIODYNAMICS LABORATORY

---

### COMMANDING OFFICER

Captain Douglas W. Call, Medical Service Corps, United States Navy, graduated from Ferris State College, Big Rapids, Michigan, with a B.S. degree in Science Teaching in 1964. He was commissioned in September 1968, after earning a Ph.D. in Anatomy from the University of Louisville, Louisville, Kentucky. He has held several assignments in research, test, and evaluation of aviation life support systems, as well as serving in aviation physiology training billets since designation as a Naval Aerospace Physiologist in 1969. Captain Call is also a qualified Naval Test Parachutist and has completed 190 free-fall parachute jumps in support of Navy RDT&E programs. The author of several scientific papers, Dr. Call has made numerous presentations at national and international meetings. A Fellow of the Aerospace Medical Association, he was certified in Aerospace Physiology by the Aerospace Medical Association in 1983. He has served as President of both the Aerospace Physiologist Society and the SAFE (Survival and Flight Equipment) Association. He was Editor of the SAFE Journal, a quarterly aviation life support and safety publication from 1979-1985.



**Douglas W. Call, CAPT, MSC, USN**

From 1982 to 1987, he served as Head, Aircrew Systems Department, Naval Air Test Center, Patuxent River, Maryland. His department was responsible for all human factors developmental testing and evaluation of every new or modified aircraft or life support system being introduced into the Navy and Marine Corps. In May 1987, he assumed command of the Naval Biodynamics Laboratory. Captain Call's awards include the Meritorious Service Medal, the Navy Commendation Medal, the National Defense Medal, and numerous citations and honors from professional and service organizations.

### OFFICE OF THE COMMANDING OFFICER

The Laboratory is directed by the Office of the Commanding Officer (OCO). The office is composed of the Commanding Officer, Executive Officer, Chief Scientist, Command Chief Petty Officer, Safety Manager, Command Evaluation Program Coordinator and support personnel. The Commanding Officer is under the military control of the Commanding Officer, Naval Medical Research and Development Command, and is responsible for the command, organization, and management of the Laboratory to conduct its mission in the most effective and economical manner possible. The Commanding Officer is a member of the Navy Medical Department.

## ***1989 and 1990 Command History***

---

### **EXECUTIVE OFFICER**

The Executive Officer is responsible to the Commanding Officer for the routine management of the Command. All orders originating from the Executive Officer are considered as coming from the Commanding Officer. The Executive Officer serves as the direct line supervisor for the departments, manages and facilitates the editorial review of reports and speeches, and exercises fiscal authority as granted by the Commanding Officer. He assumes overall responsibility for Command civilian personnel matters and coordinates the submission of the Command history. The Executive Officer is a member of the Navy Medical Department.

### **CHIEF SCIENTIST**

The Chief Scientist (CS) serves as principal advisor to the Commanding Officer on the status, plans, and direction of the Command scientific program. The CS organizes and maintains program documentation which provides maximum information to the Commanding Officer to assist him in managing long range programs and assure the flexibility to initiate prompt research and development efforts in response to line identified fleet problems. The CS maintains liaison and coordination with the Director of Research and Development at the Naval Medical Research and Development Command. The CS is responsible for internal review and management of all research work unit proposals.

### **COMMAND CHIEF PETTY OFFICER**

The Command Chief Petty Officer assists the Commanding Officer and the Executive Officer in matters pertinent to the morale and welfare of enlisted personnel and their dependents. He performs duties as directed to ensure that policies and programs pertaining to enlisted personnel are disseminated, and maintains open lines of communication between the Command and members of the enlisted community.

### ***Boards and Committees***

*Committee for the Protection of Human Subjects.* Reviews all scientific proposals submitted by and to the Command involving human subjects to determine that the risks to the subjects are within the guidelines established by the Secretary of the Navy, and that the desired benefits require the use of human subjects. The committee also ensures that the health, rights and welfare of the subject are protected. The committee is chaired by the Executive Officer.

*Animal Care and Use Committee.* Reviews all scientific proposals submitted by the Command involving animal use to determine that the risk to the animals is outweighed by the benefits and the knowledge gained. The committee ensures that the health and treatment of the experimental animal meets established standards. The committee is chaired by the Executive Officer.

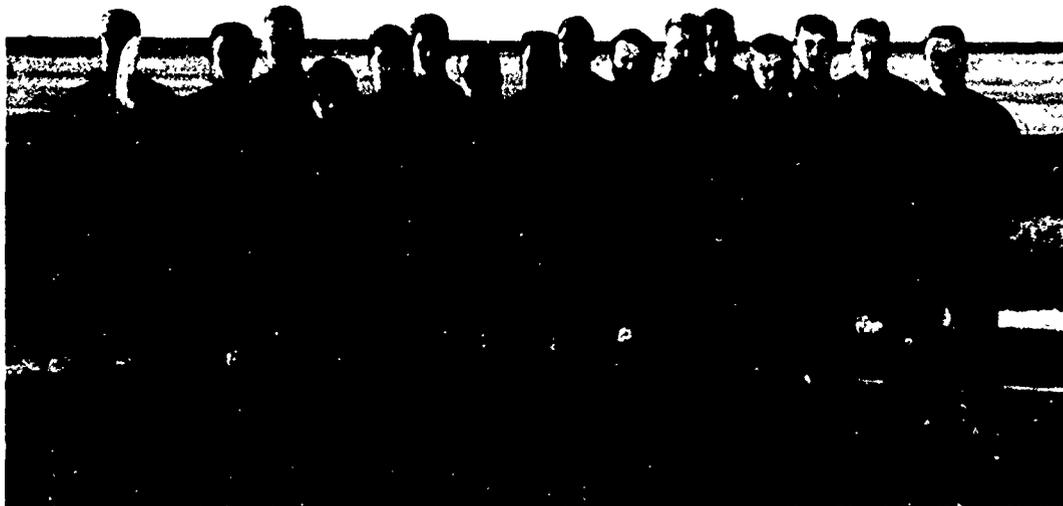
## NAVAL BIODYNAMICS LABORATORY

**Safety Committee.** The Safety Committee provides instruction and guidance for Command personnel who could be exposed to hazardous conditions. The committee reviews scientific proposals dealing with the use of potentially hazardous materials and advises the Commanding Officer on the Command Safety Program and the Navy Occupational Health and Safety Program. The committee is chaired by the Executive Officer.

**Controlled Substances Inventory Board.** This committee reviews Command custodial records for accuracy and detail to ensure adequate accountability of controlled substances. The committee inventories the records of departments holding controlled substances, and monitors the usage of controlled substances. The board is chaired by a commissioned officer designated by the Commanding Officer.

### **Human Research Volunteers**

NAVBIODYNLAB has twenty-one billets for Human Research Volunteers (HRVs). HRVs for the Laboratory are recruited from the Recruit Training Command in Orlando, Florida. All HRVs are junior enlisted male personnel who have completed Apprenticeship Training. The normal tour length as an HRV is eighteen months. HRVs must meet rigorous mental and physical standards. Naval Biodynamics Laboratory Instruction 3900.ID establishes the safety standards that research projects must meet to utilize HRVs. Every project involving HRVs must be reviewed by the Naval Biodynamics Laboratory Committee for the Protection of Human Subjects. The committee exercises protocol review and recommends approval, modification or disapproval of the project to the Commanding Officer. Final approval authority is vested in the Surgeon General, Bureau of Medicine and Surgery via the Commanding Officer of Naval Medical Research and Development Command. The HRVs are followed on a long term basis to determine if there are any lasting performance, physiological or medical effects due to impact acceleration exposure. This research is conducted as a case study using the protocol established for the Command's Air Crew Impact Injury Prevention Program. When not involved as subjects in experiments, the HRVs work in all Command Departments thus greatly augmenting the efficiency of the Laboratory.



**Human Research Volunteers (HRVs).**

## ***1989 and 1990 Command History***

---

### ***Facilities***

The Naval Biodynamics Laboratory houses several unique motion devices. Among these devices are the horizontal accelerator, vertical accelerator, ship motion simulator, motion desensitization chair and visual drum.

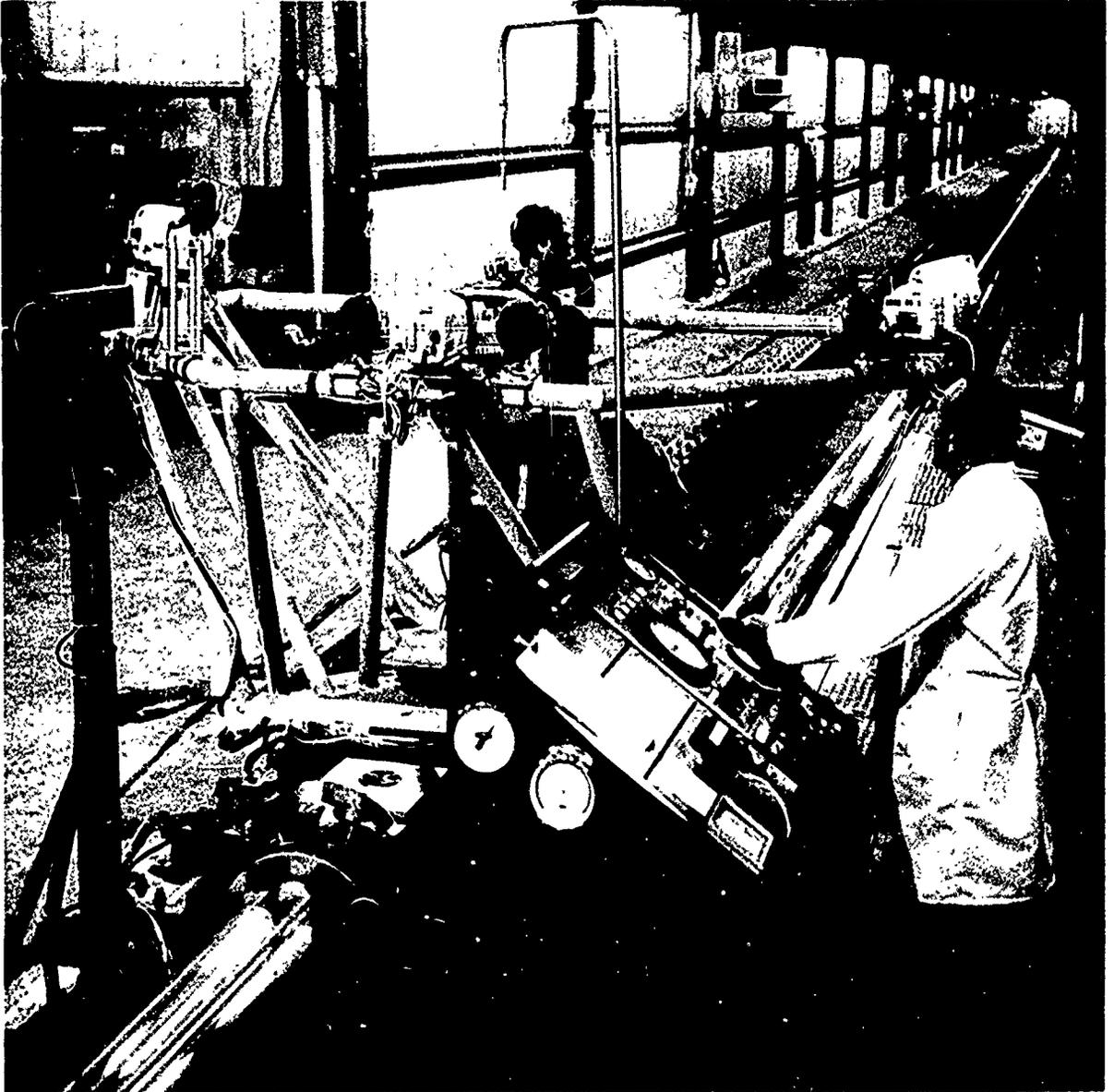
***Horizontal Accelerator.*** A 700 foot, enclosed, environmentally controlled horizontal acceleration test track has been in operation at NAVBIODYNLAB since 1972. The track incorporates a thrust accelerator with a control console and several sleds. On the horizontal accelerator, the sled is accelerated along the track with a Bendix 12 inch Hyge system capable of generating 225,000 lbs of thrust. The sled is decelerated by friction forces ranging from 2 to 4 meters per second squared. Dry nitrogen, provided by NASA, delivers the needed pressure to trigger the sled. Three sleds are currently in use, a Z axis sled, a omnidirectional sled capable of rotating 360 degrees, and a utility sled used for animal research. Several important safety systems are in place to protect HRVs, technicians, and equipment. All the safety systems work independently and triggering one will automatically shutdown the system.

HRVs are given non-injurious impact accelerations. During these tests, angular and linear displacements, velocities, and accelerations of selected body segments are measured by man-mounted transducers in three dimensions. Physiological data including somatosensory evoked potential, EEG and ECG are recorded and analyzed. Mechanisms of central nervous system injury have been derived from similarly instrumented primates.

Currently, acceleration data are collected by a Hewlett-Packard 9000/220 computer and analyzed by an Hewlett Packard 9000/835 computer. High speed instrumentation cameras record the motions of HRVs. A computer based photodigitizing system scans the film with automatic pattern recognition algorithms, determines the changing X and Y position of photo targets mounted on the HRV during the acceleration, and writes the results to magnetic tape. The analysis combines the measured photographic and inertial data with sensor position and alignment, sensor calibration, camera position and alignment, camera optical calibration, photo target position, and standard anatomical coordinate systems based upon X-rays of each HRV. Motion of the HRV is determined independently from photographic and inertial data, and the results are compared for agreement as a final check of data integrity.

**NAVAL BIODYNAMICS LABORATORY**

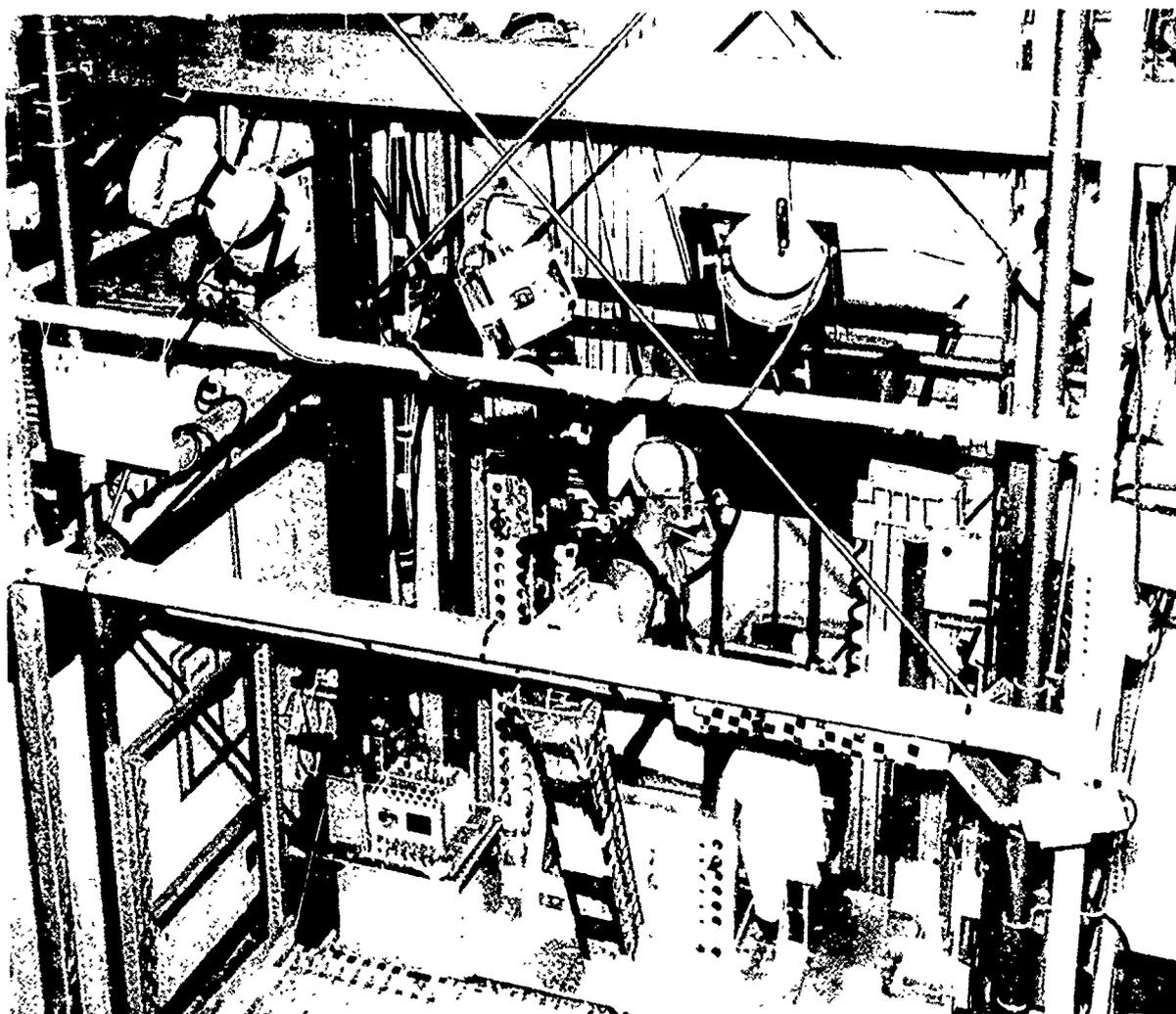
---



**Horizontal Accelerator.**

## ***1989 and 1990 Command History***

***Vertical Accelerator.*** The Command's Impact Research Program is designed to investigate the effects of indirect impact forces on the head and spine, and their potential for producing injury. NAVBIODYNLAB studies human response to impact using a nitrogen powered vertical accelerator which propels a restrained HRV or manikin on an instrumented sled along 42-ft vertical track. The HRVs are initially exposed to low levels of acceleration which are increased in increments of a single "G" within a well established safety range. Before, during, and after each sled run, a physiological data acquisition system is used to collect and analyze physiological measurements and to medically monitor and provide information concerning human response to impact. Although numerous +G<sub>z</sub> (or axial impact) experiments have been conducted on supine HRVs using the horizontal accelerator, the vertical accelerator allows a more realistic investigation of the biomechanical effects of forces similar to those produced by an aircraft ejection seat. In addition, the vertical accelerator force can be regulated to produce different onset thrusts. The vertical accelerator has been used to simulate forces encountered aboard Navy ships during underwater explosions.



**Vertical Accelerator.**

## NAVAL BIODYNAMICS LABORATORY

---

**Ship Motion Simulator.** A unique facility that complements the Laboratory is the ship motion simulator (SMS). The SMS is capable of simulating ship motions in weather conditions of up to sea state five with three degrees of freedom - heave, pitch and roll. The SMS is driven by a hydraulically powered piston, the motion of which is controlled by modulating the hydraulic flow via a servovalve-controlled actuator.

The moving system, consisting of the cab and the carriage, is guided along rails attached to a support tower. It carries a double yoke and trunnion system, operated under similar but independent control, that permits roll and pitch motions to be superimposed, singly or in combination, upon the vertical translational (heave) oscillation. The hydraulic power is delivered by combinations of up to four drive pumps located in a separate building.

A 900 gallon-per-minute hydraulic pump provides a heave acceleration of +2.0 g(z) to -0.92 g(z), a velocity of plus or minus 17 feet per second and a displacement of plus or minus 11 feet. A second high pressure, low volume hydraulic pump powers pitch and roll actuators that permit accelerations of plus or minus 150 degrees per second/second, with a rate of plus or minus 25 degrees per second and a displacement of plus or minus 15 degrees. The descent of the carriage during the heave downstroke is gravitational and limited by friction to approximately 0.9 g. Numerous fail-safe features are in place to prevent the cab and support from falling or crashing including feedback transducers that transmit position information to the control system. Should any of these numerous safety interlocks be triggered, the system automatically shuts down.

Emergency shutdowns can be automatically or manually executed if pumps become overheated, valves become stuck, or system monitors fail. HRVs and researchers also have the capability to shutdown the system by pressing emergency stop buttons located in the motion cab and at the control console.

The SMS is supported by an AST/286 microcomputer and a Hewlett-Packard 6942A Microprogrammer. Selected motion data are loaded via the microcomputer into the 6942A, format required to drive the SMS. The microcomputer is also used for digitization, storage, and subsequent analysis of motion and or other data from the SMS.

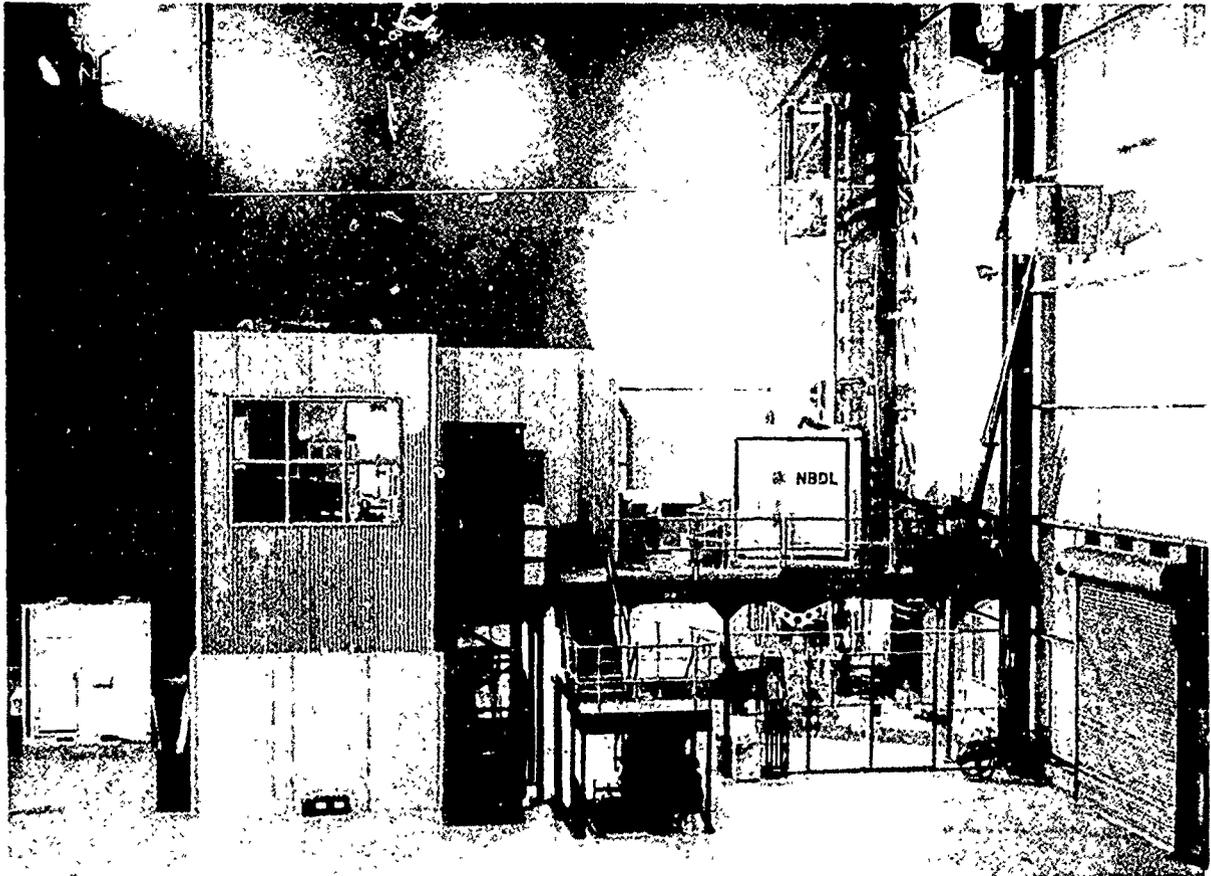
A dedicated 14-channel, proportional bandwidth FM analog tape recorder is available for data collection and/or playback into the SMS. Data are collected via accelerometers and rate sensors which are placed at various points in a ship's hull. The direction of placement determines the type of motion recorded, i.e., heave, pitch or roll. Mathematical formulas can be used to calculate motion effects at any point in the ship. Usually only a portion of the recorded motion is used and it is repeated continuously to create a smooth motion profiles. Sinusoidal or simulated at sea motion synthetic drive signals can also be generated via three dedicated Hewlett-Packard 3314 Arbitrary Function Generators.

The SMS can accommodate a total payload of 5000 pounds, including the moving cab and up to three HRVs. The SMS cab is an 8-ft cube with the forward top edge truncated to accommodate forward pitch motion adjacent to the tower. In its standard configuration, the air-conditioned cab is windowless; however, view ports can be installed if necessary.

HRVs are continuously observed at the control station by means of closed-circuit TV; two-way communication is conducted via an audio system. The cab can be fitted with up to

*1989 and 1990 Command History*

---



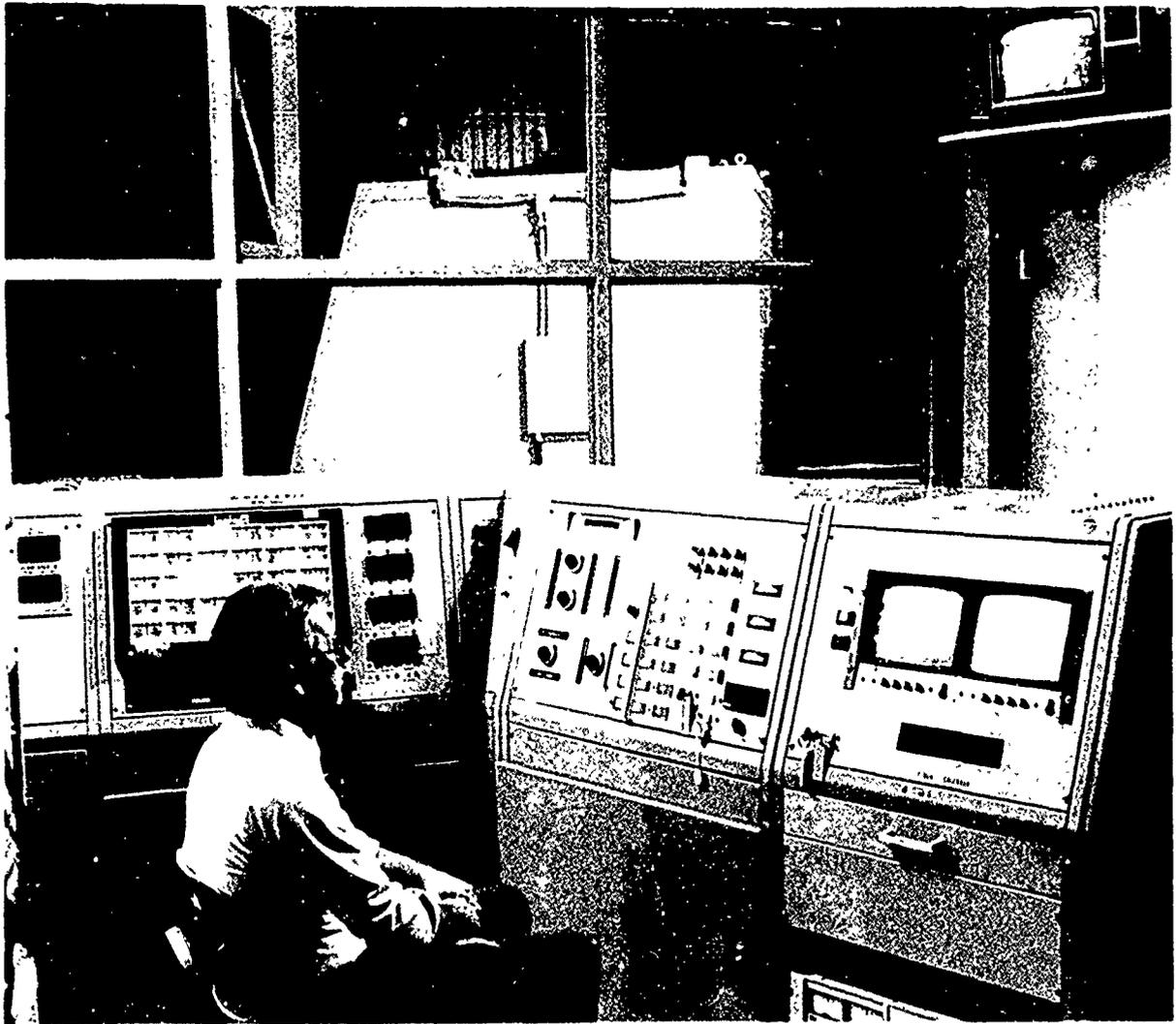
**Ship Motion Simulator.**

## NAVAL BIODYNAMICS LABORATORY

---

three forward-facing seats with safety harnesses and with parallel, facing bench type workstations equipped with video display terminals and other performance test apparatus. HRVs can stop a testing session at any point by activating a safety switch on their console. The cab is also equipped with biomedical instrumentation to monitor: ECG, EEG, respiration, pallor, and other physiological measurements.

In conjunction with the moving cab, a fixed, dimensional replica of the motion cab is available. The static cab's test station is identical in equipment and configuration. The interiors of both have been carefully matched in terms of painting, lighting, air-conditioning, experiment equipment, and other relevant variables. The static cab is frequently used for baseline training and testing prior to testing in the motion cab.

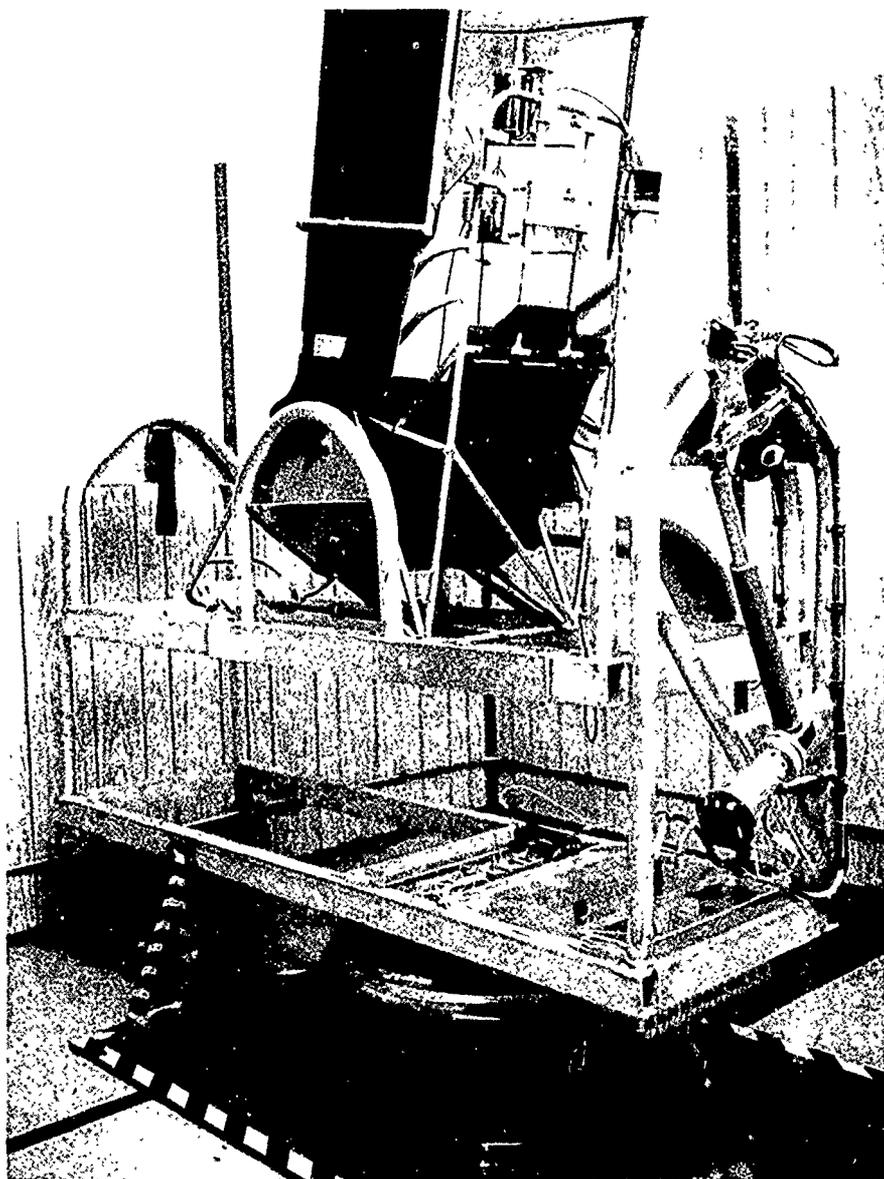


Ship Motion Simulator Control Station.

## ***1989 and 1990 Command History***

---

***Motion Desensitization Chair.*** A three-axis/tilt/rotation chair capable of producing a myriad of motions is used to desensitize subjects to motion environments. This device combined with a cognitive/behavioral training program has been used to successfully treat subjects suffering from intractable motion sickness. These subjects include HRVs, Navy and Air Force pilots, and students from the University of New Orleans. In addition to the Motion Desensitization Chair, a Visual Rotation Drum designed to create coriolis simulation is housed at the University of New Orleans. This device is used in conjunction with the aforementioned cognitive/behavioral training program to alleviate the effects of motion sickness.



**Motion Desensitization Chair.**

# NAVAL BIODYNAMICS LABORATORY

---

## RESEARCH DEPARTMENT

### *Department Mission and Functions*

The Research Department designs, plans, conducts and analyzes all experiments involving impact acceleration and platform motion required to meet program goals and Navy needs and requirements. The Department is responsible for: specifying requirements for biomedical instrumentation and biomedical data; assisting other departments in evaluating and interpreting analytical, numerical and statistical data; evaluating physiological and pathological injury models; and critically evaluating protective standards derived from the impact and motion database. The Department has three divisions--Human Factors, Mathematical Sciences and Data Systems.

*Work Unit.* 63216N M0097.001 "Determination of Human Dynamic, Injury, and Performance Response to Impact Acceleration and Development of Validated Manikin Components."

**Principal Investigator:** Marc S. Weiss, Ph.D.

The Naval Biodynamics Laboratory is investigating the human head and neck response to whole body linear accelerations to further define the dynamic responses of these anatomical segments to impact forces; determine the relationship between the dynamic and physiological responses and injury potential; and to develop validated computer models of human head and neck biodynamic and physiological responses to impact.

*Significant Accomplishments and Research Findings.* Two +Z impact acceleration series of animal experiments were completed in FY-89. Injury limits were established using the same seat and restraint system on both the horizontal and vertical accelerators.

The vertical accelerator was man-rated on 8 February 1990. The first series of manned tests using this device began on 22 February 1990. The initial series of impact experiments on the vertical accelerator using HRVs was successfully completed. There were **111 human experiments**, of which 34 included the collection of somatosensory evoked potential (SEP) data in addition to the standard inertial and photographic data. Six HRVs completed the series to the 12g level, and three of these were SEP subjects.

The Laboratory investigated the neurophysiological effects of impact acceleration on primates and humans. The goals of this research were to compare human neurophysiological data with non-human primate data and to establish impact injury thresholds for properly restrained personnel. These thresholds enabled engineers to design safer cockpits, emergency egress systems and work environments. The research focused on the use of somatosensory evoked potentials to assess the integrity of the central nervous system of humans undergoing impact acceleration.

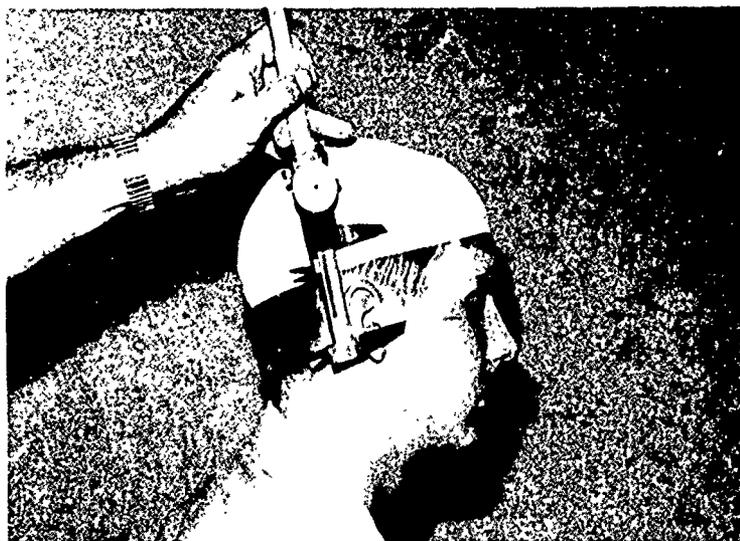
Human Research Volunteers were fitted with customized, form-fitting fiberglass helmets for the series of added head mass experiments on the vertical accelerator. The added head mass simulates helmet mounted devices such as night vision goggles. Specifically, the experiments investigate the effects of added head mass and shifts in head center-of-gravity as produced by helmet-mounted systems used in aviation environments.

## ***1989 and 1990 Command History***

---



**NAVBIODYNLAB Engineer designing fiberglass helmet.**



**Customized, Form-fitting Fiberglass Helmet designed by NAVBIODYNLAB Engineer.**

Experiments were completed in mid-November 1990 on a new type of angular rate sensor that has the potential of greatly simplifying the acquisition and analysis of angular inertial data during impact experiments. A side-by-side evaluation of arrays of these and conventional linear accelerometers was performed using the horizontal accelerator. Sixty-five experiments were conducted in a variety of configurations. These sensors will form the basis of a new, portable data acquisition system which will be useable at other facilities.

# NAVAL BIODYNAMICS LABORATORY

---

## HUMAN FACTORS DIVISION

### *Division Mission and Functions*

The Human Factors Division designs, conducts and analyzes experiments on the interactions of human operators and military operational environments, and uses the data generated from these experiments to develop human factors engineering standards and specifications for military systems. The Division also conducts in-house and field projects on motion and its effects on performance, and develops and validates techniques to reduce the adverse effects of motion on humans in the military environment.

The Division is responsible for determining the effects of the inertial environment on the operability of military weapons platforms. It assumes overall responsibility for the operation of the SMS and formulates plans for use of this device. The coordination of air and sea field projects falls under the authority of the Division. The Human Factors Division also performs research in conjunction with other governmental and non-governmental organizations. The Division focuses on identifying the effects of low frequency oscillatory motion on human operator performance in combat systems operations. Areas of special interest are cognitive and psychomotor performance during adverse conditions and biodynamic stress on board naval vessels.

*Work Unit.* 61152N M0096.002. "Basic Studies of the Transfer of Adaptation to Rotary Combat Systems Simulation."

*Principal Investigator:* Tommy R. Morrison, LCDR, MSC, USN

*Associate Investigators:* Thomas G. Dobie, M.D.; Schuyler C. Webb, LT, MSC, USNR

It is well known that continued exposure to motion environments leads to adaptation, but it is not clear whether such changes are specific to the particular type of motion experienced. This investigation sought to evaluate the extent of transfer between real motion and visually-induced apparent motion.

*Significant Accomplishments and Research Findings.* The data collection for this study was completed. The direction of motion was varied and two factors, mode of exposure and direction of rotation, were examined in a cross-adaptational design. Thirty-two subjects were pre- and post-tested on a measure of disorientation after active bodily rotation and visually-induced self-vection. Two groups received ten consecutive trials of active bodily rotation for four consecutive days. Two other groups received ten consecutive trials of visually-induced self-vection in a rotating drum for four consecutive days. Data analyses revealed that during the exposure phase, dizziness and self-vection increased over trials for the groups exposed to the drum, while dizziness remained unchanged over trials for the groups exposed to bodily rotation. Repeated exposure to bodily rotation resulted in improved walking performance over trials and days. Subjects exposed to bodily rotation exhibited increased tolerance to visually-induced self-vection; however, exposure to visually-induced self-vection did not result in greater tolerance to bodily rotation.

*Work Unit.* 63706N M0096.002. "Protection of Naval Personnel from Motion Sickness and Other Adverse Motion Effects."

*Principal Investigator:* Tommy R. Morrison, LCDR, MSC, USN relieved by F. Douglas Holcombe, LCDR, MSC, USN

*Associate Investigator:* Thomas G. Dobie, M.D.

## *1989 and 1990 Command History*

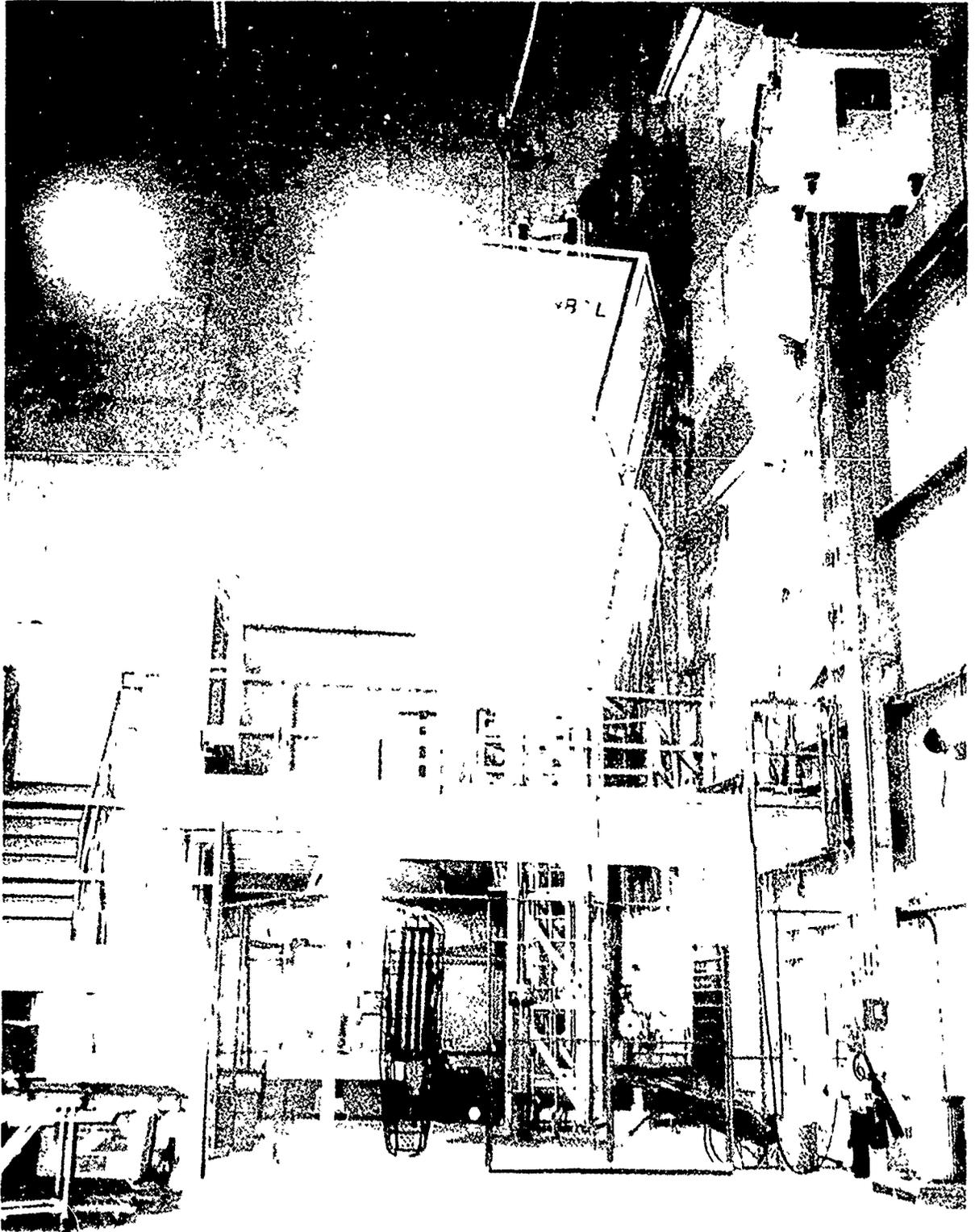
---

The objective is to investigate, develop, and test methods to enhance crew performance in operational naval environments, both in the air and at sea. The primary goal is to enhance operational capability by reducing the adverse effects of ship motion; i.e., biomechanical interference with required job tasks, motion-induced fatigue and motion sickness. These factors reduce short and long term work efficiency and thus degrade combat capability. Accomplishing the program's objectives requires a multi-disciplinary approach which includes research and development efforts in the areas of both motion sickness and human factors. The motion sickness research thrust includes the systematic progression of experiments to produce motion sickness intervention techniques that can be used by U. S. Navy personnel at sea and in the air.



**Ship Motion Simulator Cab.**

## NAVAL BIODYNAMICS LABORATORY



Ship Motion Simulator in operation.

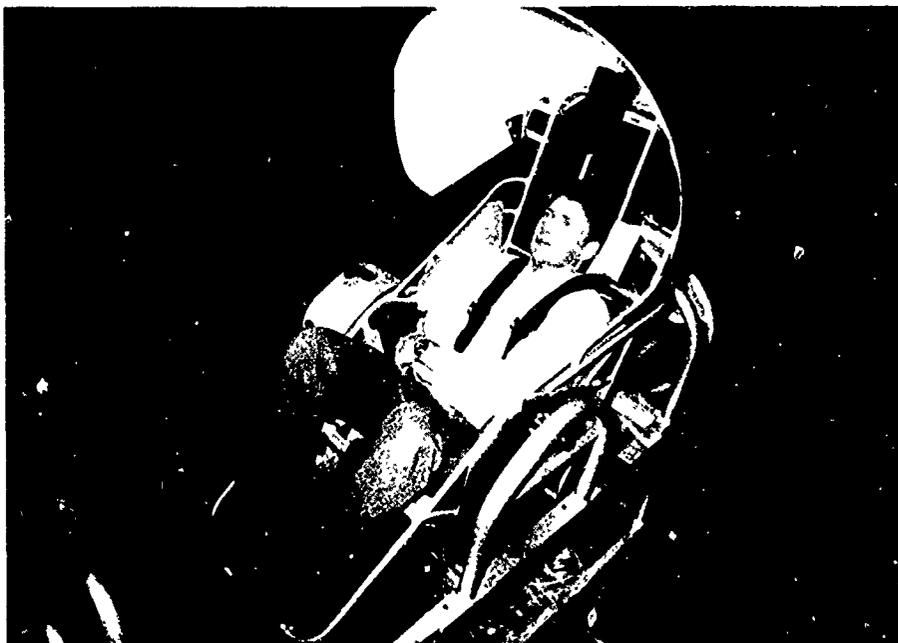
## ***1989 and 1990 Command History***

---

***Significant Accomplishments and Research Findings.*** The SMS was configured and programmed to produce motion that accurately matched motion characteristics of Navy FFG-7 Class Frigates. This motion calibration procedure for the SMS was documented in NAVBIODYNLAB technical report Closing the Loop: Or Can the Ship Motion Simulator Simulate Ship Motion? The SMS was equipped and programmed to present various performance assessment tests to support this research study. Additionally, the interiors of the SMS and a static cab (where baseline testing was conducted) were reconfigured to physically match each other.

This study measured performance under roll stabilized versus non-roll stabilized motion conditions. The purpose of this experiment was to determine if improved crew performance would result under conditions with approximately 50% less roll (i.e., the roll stabilized condition). The SMS was programmed to produce these two motion conditions. Twelve HRVs were run, data were collected and analysis performed. Findings indicated: (1) no discernable performance changes due to different motion conditions were detected using the Unified Tri-Service Cognitive Performance Assessment Battery (UTC-PAB) performance tests; (2) no significant differences in motion sickness responses to the motion conditions occurred; and (3) HRVs were able to accurately rate differences between the two motion conditions. An abstract was approved for presentation by the Aerospace Medical Association in May 1990, and the results were published.

A second research study within this work unit was to investigate the effectiveness of an anti-motion sickness training program. An instructional manual and training video were produced for use in this program. The optimal number of training sessions required to achieve program effectiveness and ensure cost-effective training management is currently being investigated. With regard to this program, several aircraft pilots from the U. S. Navy and U. S. Army successfully completed the motion-desensitization program at the University of New Orleans. Presently, this program is undergoing validation. Validation will involve a new 3-axis/tilt/rotation chair designed to permit (1) enhanced programmable control of velocity and acceleration motion profiles involving interrelated vestibular and optokinetic stimulations, and (2) cognitive performance measures during stimulus presentation.



**Subject in Motion Desensitization Chair.**

## NAVAL BIODYNAMICS LABORATORY

---

A pilot study was conducted to investigate the effects of subject self-confidence on responses to active vestibular stimulation. Elicited responses were balance and dizziness estimates. Data analysis is currently underway.

Details were developed for the Canada-United Kingdom-United States (CANUKUS) joint ship motion research program. The proposed program research emerged from interested members of NATO Naval Armament Group Information Exchange Group-Six (IEG/6) Sub Group 5 on Seakeeping. This two-year program has reached the final proposal stage for funding by each of the three sponsoring countries. The first year (April 1991-March 1992) includes an investigation of ship-motion effects as determinants of motion-induced interruptions (MII) of task performance. The second year plan (April 1992-March 1993) investigates the effects of ship motion on cognitive task performance. All data collection will take place at NAVBIODYNLAB's facilities. Elements of the current NAVBIODYNLAB ship motion research program will be executed simultaneously with the CANUKUS program within FY91.

**Work Unit.** Reimbursable, (MIPR) No. 90MM0526. "Exploring the Utility of Micro SAINT Models: Predictive Simulation with the CIWS Loading Operation Models Under Normal and MOPP IV Conditions."

**Principal Investigator:** F. Douglas Holcombe, LCDR, MSC, USN

The objectives of this research were to (a) identify improved procedures for loading the Close-In Weapon System (CIWS) with a three-man crew, (b) evaluate the impact of different manning levels (two-man through six-man teams) on CIWS loading times, and (c) predict changes in CIWS loading times when the crew changes from wearing MOPP (Mission Oriented Protective Posture) IV gear to wearing standard-issue (shirtsleeve) clothing.

**Significant Accomplishments and Research Findings:** This project is being accomplished by a contract to Battelle Memorial Institute, Columbus, OH. The contract effective start date was 1 March 1990.

The nature of the CIWS loading task was analyzed and described in terms of the human abilities involved in the task. These abilities were then weighted using a paired-comparison methodology. Currently, this task classification scheme is being compared and matched to task descriptors in a computer database.

Reevaluation of the categories was done using the Abilities Assessment Manual, which aided researchers in more clearly defining each category of abilities. The diagrams provided in the manual were used interactively for each of the 29 CIWS activity elements. Paired comparisons were used to develop relative ranking values for the human abilities for each activity element. Tasks were extracted from the a different database which has similar human abilities and ranking for each CIWS loading element, as well as, the appropriate Task Time Multipliers (TTM). As a function of this, task time increased in MOPP IV condition.

A modified version of the Manual for Ability Requirements Scales (MARS) was obtained. This pre-publication version contained selected human abilities, along with expanded definitions of those abilities and rating scales to assist in the application of the MARS system to the CIWS task elements. Efforts were initiated to utilize the material provided in the taxonomy. The CIWS task elements were categorized both in terms of the abilities needed, and the importance of each ability to each task element.

## ***1989 and 1990 Command History***

---

***Work Unit.*** N00205-89-M-B025, Contract. "Field Testing of Previously Developed Counseling Techniques."

***Principal Investigator:*** F. Douglas Holcombe, LCDR, MSC, USN.

***Associate Investigator:*** James May, Ph.D., Psychology Department, University of New Orleans.

The purpose of this research contract was to assess whether or not motion sickness desensitization training would be more effective with trained counselors as compared to a self-help program.

***Significant Accomplishments and Research Findings.*** This contract effort was done with the University of New Orleans. The results showed that the counselors were effective in increasing clients' levels of tolerance to provocative motion sickness situations. This report concerns the evaluation of a program of instruction aimed at training individuals to counsel clients who were prone to motion sickness. Under a previous contract, unselected volunteers were offered a course of instruction reviewing the cognitive-behavioral approach to help personnel tolerate the deleterious effects of many motion environments. Eleven participants of that course were asked to independently counsel individuals who were prone to motion sickness, using the cognitive-behavioral approach with the aid of reinforcement by visually-induced apparent motion. The subjects were pre-and post-tested by an independent observer using tolerance and motion response as the dependent variables. These test scores were compared to previous data obtained with subjects who had received counseling from an experienced counselor, or had received no such counseling. The results indicated that the newly trained counselor's subjects showed significant pre-post-test tolerance to the motion stimulus, although they did not benefit as much as subjects trained by an experienced counselor. In addition, the trainee's subjects exhibited as much benefit, in terms of post-test symptomatology and magnitude estimates of motion sickness, as did those of the experienced counselor. These data were taken as strong support for the feasibility of training counselors to employ this method of alleviating motion sickness.



**Inside View of the Rotating Drum of the Motion Desensitization Chair.**

## NAVAL BIODYNAMICS LABORATORY

---

**Work Unit.** Reimbursable, (MIPR) No. 251100-9-0013. "Investigation of Fatigue Effects on Performance of U.S. Coast Guard Boat Crew."

**Principal Investigators:** Tommy R. Morrison, LCDR, MSC, USN, Schuyler C. Webb, LT, MSC, USNR, and Thomas G. Dobie, M.D.

The U.S. Coast Guard has identified fatigue as a factor that adversely affects boat crew operational capability and safety. Fatigued boat crews make judgmental errors, they show decreased coordination, reduced attention span, and a lower standard of performance. A high percentage of mishaps have been associated with prolonged operations and crew fatigue.

**Significant Accomplishments and Research Findings.** The Naval Biodynamics Laboratory installed, tested and evaluated test equipment aboard a Coast Guard 41-ft Utility Boat. Twenty U.S. Coast Guard UTB crew members served as research subjects. Five performance tests were selected for this study: a tracking task, a four-choice reaction time task, a memory and search task, a manual assembly task and a two-column addition task. Two sea states were selected, calm and heavy. The results revealed that for the first 8-10 hours underway, crew performance scores improved as underway length of time increased. However, beyond this time, crew performance decreased significantly and continued decreasing until the crew returned to station. A significant increase in fatigue occurred during hour 6 in heavy seas and during hour 14 in calm seas. Following 10 hours of rest, performance and subject measures returned to pre-test levels. A video highlighting the planning and execution of the project was completed. The final report was presented to the U.S. Coast Guard Headquarters and the results were used to support and/or revise the present guidelines for scheduling 41-ft Utility Boat crews.



**U.S. Coast Guard 41-Ft Boat Utility Boat.**

*1989 and 1990 Command History*

---



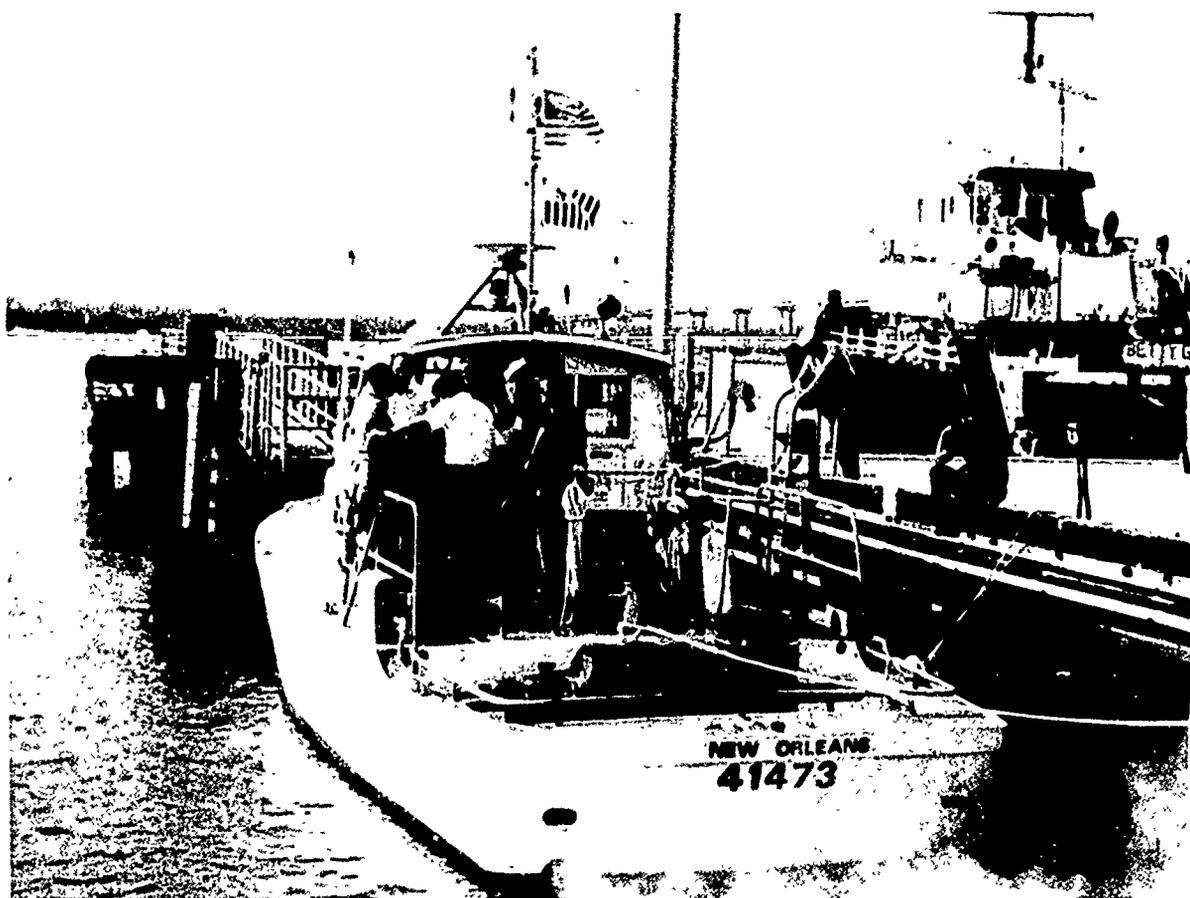
**Subject performing a four-choice reaction time task aboard a Coast Guard 41-Ft Utility Boat.**



**Subject performing a memory and search task aboard a Coast Guard 41-Ft Utility Boat.**

**NAVAL BIODYNAMICS LABORATORY**

---



**Aft View of U.S. Coast Guard 41-Ft Utility Boat.**

## ***1989 and 1990 Command History***

---

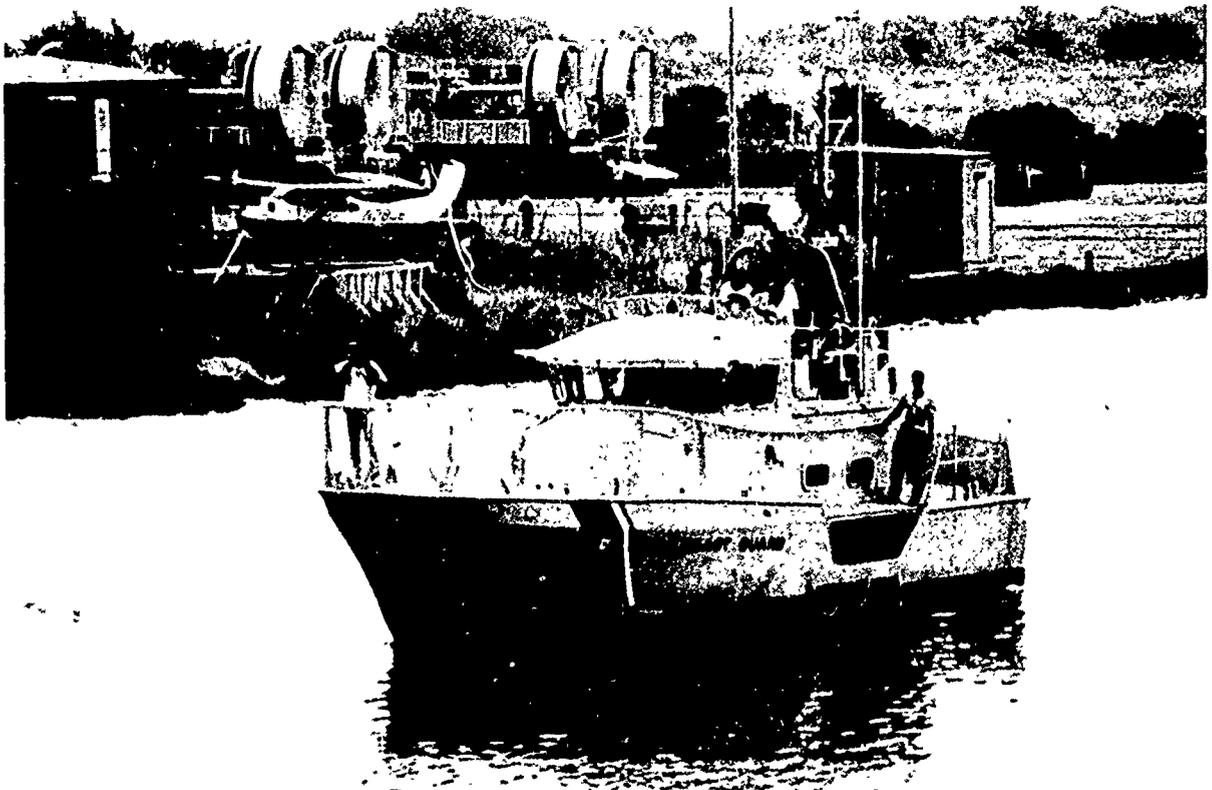
***Work Unit Reimbursable.*** (MIPR) No. 2890500E10K94. "Human Factors Assessment of the U.S. Coast Guard (USCG) 47-ft Motor Lifeboat (MLB)."

***Principal Investigator:*** F. Douglas Holcombe, LCDR, MSC, USN

***Associate Investigator:*** Schuyler C. Webb, LT, MSC, USNR

The U.S Coast Guard contracted NAVBIODYNLAB to determine the human factors design deficiencies of their 47-ft prototype Motor Lifeboat.

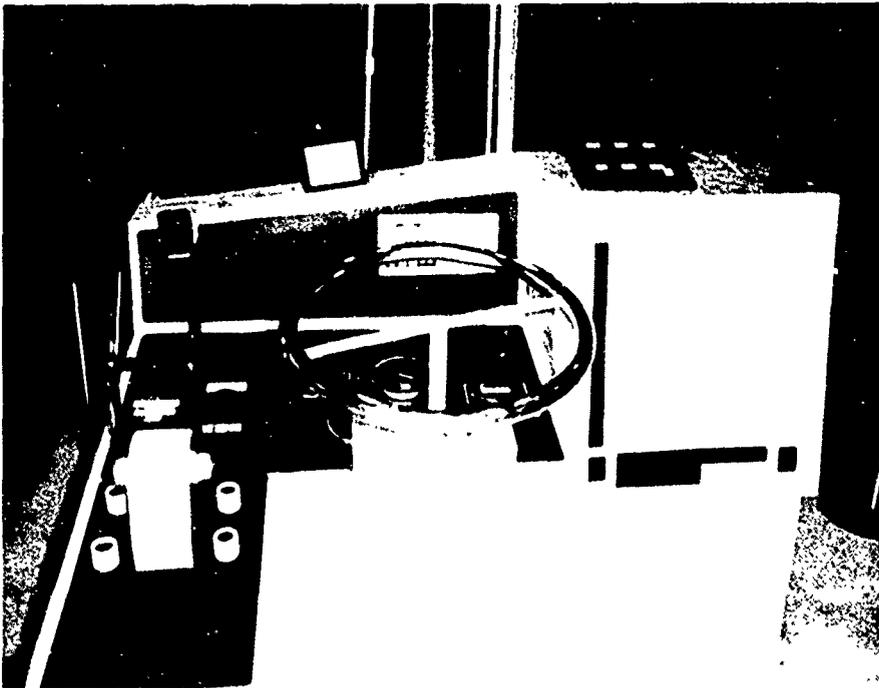
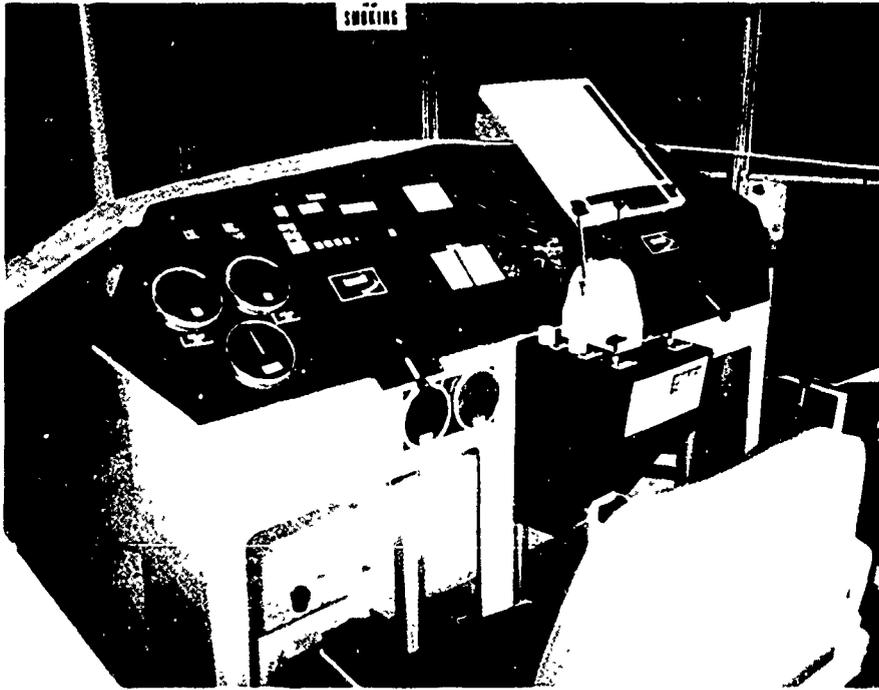
***Significant Accomplishments and Research Findings.*** A reimbursable project to investigate fatigue and task performance in USCG 47-ft MLB crews was expanded to include a human factors engineering study of the boat's workspace, habitability, and instrumentation and controls. Efforts to conduct this study began with on-site inspections at Cape Disappointment, WA in November 1990. A human factors engineering test and evaluation protocol was followed to evaluate the equipment and workspace configuration of the prototype vessel. A preliminary report was delivered to USCG Research and Development Center in December. This report summarized safety and ergonomic design problems and deficiencies found during the evaluation. Recommendations for optimal arrangement and configuration of equipment, displays, and controls within the open and closed steering stations of the boat was prepared. A full-scale mock-up of the two spaces was constructed at NAVBIODYNLAB and used to evaluate each recommendation.



**U.S. Coast Guard 47-Ft Motor Lifeboat.**

## NAVAL BIODYNAMICS LABORATORY

---



Full-scale mock-ups of enclosed and open steering stations of the 47-ft Motor Lifeboat.

## **1989 and 1990 Command History**

---

### **MATHEMATICAL SCIENCES DIVISION**

#### ***Division Mission and Functions***

The Mathematical Sciences Division conducts original scientific work in the area of biodynamics and mathematical sciences, and supports other departments in the development and use of analytical, numerical and statistical procedures to analyze research data.

**Work Unit.** Navy/ASEE Summer Faculty Research Program Final Report. "Finite Element Model of the Head and Neck During Impact Acceleration I."

**Principal Investigators:** Marc S. Weiss, Ph.D., and Salvatore J. Guccione, Jr., Ph.D.

**Associate Investigators:** Ronald C. Anderson, Ph.D., Biomedical Engineering Department, Tulane University and Richard T. Hart, Ph.D., Biomedical Engineering Department, Tulane University

**Significant Accomplishments and Research Findings.** During the summer of 1990, the American Association for Engineering Education (ASEE) provided support for a 10 week summer research project. Dr. Anderson and Dr. Hart gathered data from the nuclear magnetic resonance output covering the anatomical structure of the human vertebrae in an effort to produce a biofidelic model. Particular attention was paid to the first and second cervical vertebrae. Nuclear magnetic resonance output data was converted to analog data which was refigured via computer to matrix form for analysis in the CRAY Super Computer system in Pennsylvania. This analysis resulted in a three dimensional computer model of the cervical spine and head.

**Work Unit.** 00205-90-M-D146, Contract. "Assessment and Evaluation of the Naval Biodynamics Laboratory X-Ray Anthropometry System."

**Principal Investigators:** Marc S. Weiss, Ph.D., and Salvatore J. Guccione, Jr., Ph.D.

**Associate Investigator:** Cliff Mugnier, M.S., Civil Engineering Department, University of New Orleans

The major objectives sought for this research were to define the system accuracy and to provide guidance for improvements in the procedures, methodology and accuracy of the X-Ray Anthropometry system used at the Naval Biodynamics Laboratory.

**Significant Accomplishments and Research Findings.** The existing X-Ray Anthropometry System was found to be based on an undetermined solution with undocumented FORTRAN code. Laboratory procedures were enhanced to accommodate state-of-the-art photogrammetric software, rigorous least squares adjustments were introduced, and system accuracy is now determined with error propagation analysis.

**Work Unit.** N00205-90-M-D005, Contract. "Evaluation of the Anthropometry System."

**Principal Investigators:** Marc S. Weiss, Ph.D., and Salvatore J. Guccione, Jr., Ph.D.

**Associate Investigator:** Michael E. Pittman, Ph.D., Physics Department, University of New Orleans

## NAVAL BIODYNAMICS LABORATORY

---

*Significant Accomplishments and Research Findings.* After examining the X-Ray digitization process and its associated errors, a photogrammetric package consisting mainly of GIANT (General Integrated Analytical Triangulation) and pre-process programs was brought in. These were extensively modified and new routines written to suit NAVBIODYNLAB's experimental needs.

### DATA SYSTEMS DIVISION

#### *Division Mission and Functions*

The Data Systems Division specifies, acquires, develops, maintains and operates systems and procedures used for collecting, reducing and analyzing data related to the impact and motion research programs.

*Significant Accomplishments and Research Findings.* Data system's personnel developed new software to process old Electronics Associates Incorporated (EAI) system sensor data tapes. In addition, new software was developed to process anthropometric data. The Data Systems Division also implemented a Command software library which streamlined access and availability of Command software.

### BIOMEDICAL SUPPORT DEPARTMENT

#### *Department Mission and Functions*

The Biomedical Support Department provides professional and technical support for all biodynamic experiments using HRVs and animals. It provides professional advice and control in experiments using HRVs and in the selection of HRVs for experimental purposes. The Department selects and schedules the use of HRVs in all experiments as required by the principal investigators. The Department also provides medical support for all HRVs used within the Laboratory's scientific programs. The Department provides hematology, pathology, and X-Ray services for all HRVs used in scientific experimentation and is also responsible for the long-term follow-up for all HRVs.

*Significant Accomplishments and Research Findings.* The X-Ray facility, which is essential for clinical and anthropometric needs, was updated. The original system was 25 years old and no longer maintainable. It was replaced with a newer system obtained from a local Navy medical facility.

Long-term follow-up of HRVs is conducted every 3 to 5 years by the Biomedical Department. To date, no significant adverse reactions to impact acceleration from former HRVs have been reported. In addition, Biomedical Department personnel actively participate in the Laboratory's research efforts. A number of significant articles documenting the response to head and neck impact acceleration have been produced by the Department's physicians.

### VETERINARY RESOURCES DIVISION

#### *Division Mission and Functions*

The Veterinary Resources Division is responsible for maintaining the animal support capability for animal use in laboratory experiments. The Division supports and/or initiates projects involving animals to evaluate various physiological parameters to supplement clinical and pathological data from human experimental efforts. The procurement, housing, feeding and maintenance of adequate

## ***1989 and 1990 Command History***

---

numbers of animals to support laboratory needs is the responsibility of the Division. The Division ensures that necropsies are performed on all animals dying of natural causes or from experimental exposure. They obtain evaluation and documentation of pathological findings and perform and/or manage animal pathology analyses as required to supplement human experiments. The Division provides animal models for scientific experiments, and monitors, as well as documents, clinical results of animal experiments.

In addition, the Division is responsible for all phases of animal and veterinary equipment procurement, facilities, planning and maintenance. The Division is also responsible for routine or special animal husbandry. It ensures compliance with all federal laws and DOD regulations regarding animal welfare, and maintain a zoonosis control program.

*Significant Accomplishments and Research Findings.* During FY-89 the Veterinary Resources Division was actively involved in executing and completing the +Z Acceleration Project, using 28 rhesus macaques. The animals were surgically prepared between September 1988 and January 1989. The acceleration tests began in January 1989, and were completed in July 1989. Pathology services were accomplished by the contracted Veterinary Services of Maryland Medical Laboratories. Final gross necropsies were completed in August 1989, and the histopathology by January 1990. In mid-1990, the decision was made to discontinue animal research. The process of relocating animals and equipment began.

### **TECHNOLOGY DEPARTMENT**

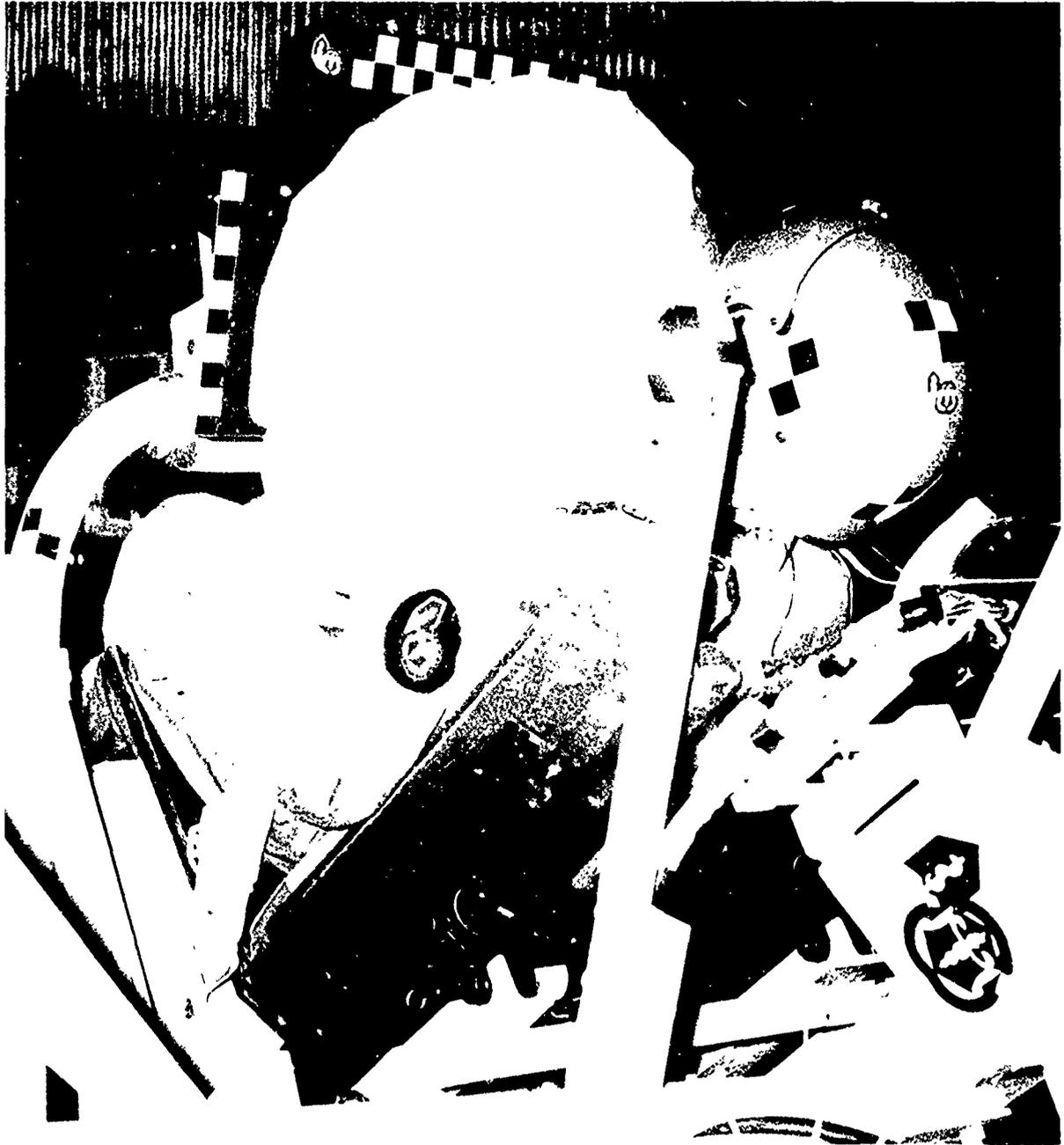
#### ***Department Mission and Functions***

The Technology Department oversees the activities of its two component divisions, Bioinstrumentation and Engineering. The Department provides Electrical and Mechanical Engineering support for experimental requirements as specified by other departments, researchers, and the Chief Scientist. This support consists of mechanical design and fabrication of experimental devices; design and construction of electrical/electronic systems for device motion control, photographic systems, and acquisition of inertial and physiological data. The Department also installs and maintains the Laboratory's personal computer systems and supervises new facility construction and repair or renovation of existing facilities.

*Work Unit.* MIPR No. 89-04, Reimbursable. **"Evaluation of Inflatable Air Bags in Preventing Head Strikes on the AH-1 Attack Helicopter Telescopic Sighting Unit (TSU) and the AH-64 Attack Helicopter Optical Relay Tube (ORT) During a Simulated Crash."**

*Principal Investigator:* Mr. William H. Muzzy, III

A reimbursable project for the U.S. Army Aeromedical Research Laboratory (USAARL), FT Rucker, Alabama was completed in 1989. A universal single seat testing fixture was designed and fabricated for fixed and energy absorbing helicopter seats. The Laboratory successfully demonstrated the utility of an in-house designed and fabricated deformable dummy face insert to identify potential injury sources during simulated aircraft mishaps. By combining high speed motion picture photography with specially instrumented Hybrid III dummies, NAVBIODYNLAB developed a useful evaluation technique to employ in future studies.



Evaluation of Inflatable Air Bags on the AH-1 and AH-64 Helicopters.

## ***1989 and 1990 Command History***

---

***Significant Accomplishments and Research Findings.*** Preliminary evaluation of the performance of modified standard and dual sensing inertial reels by the U.S. Army Aeromedical Research Laboratory personnel at NAVBIODYNLAB indicated that an improved reel might reduce the strike envelope. However, the flexion of the crewmember's body and the inherent stretch in the restraint straps could still result in the head striking the Telescopic Sighting Unit (TSU) or Optical Relay Tube (ORT) with sufficient force to cause injury or death. When faced with a similar problem, the automotive industry developed rapidly deploying air bags to prevent the head from striking the steering wheel. Thus air bags were mounted below the TSU on the AH-1 Cobra test fixture and beneath the ORT on the AH-64 Apache test fixture. Tests simulating a 35 degree, 25g impact with the ground were run with either a pre-inflated bag or a crash activated bag. Several tests were conducted to determine the proper position and angle for the air bag, as well as, compensate for the AH-64 Apache's energy absorbing seat and shear bolts on the ORT prior to each test series.

Instrumentation in the Hybrid III dummy's head and chest indicated the air bag kept acceleration levels well within human tolerance limits. There were no detectable deformation to the frangible face inserts on any of the air bag runs. All faces were visibly damaged in tests using only the harness and inertia reel. Head accelerations were above the criterion for brain injury at the higher g levels without air bags.

This feasibility study demonstrated the air bag's great potential to reduce the lethality of the attack helicopter's cockpit. These experiments demonstrated NAVBIODYNLAB's capability to perform credible simulations of such crash events.

***Work Unit Reimbursable Contract B1AE. "Design, Manufacture and Installation of a Head Rest and Mount for a Linear Actuator."***

***Principal Investigator:*** Mr. William H. Muzzy, III

***Significant Accomplishments and Research Findings.*** The Naval Biodynamics Laboratory Technology Department designed, fabricated and installed a head rest and programmable actuator system on the Naval Aerospace Medical Research Laboratory's subject chair on their Coriolis acceleration platform. The head rest provides lateral and vertical adjustability for enhanced subject safety and comfort. The programmable actuator system provides a roll component to the subject's rotational motion.

***Work Unit.*** Summer ASEE/Navy Contract N00205-90-M-B506. ***"Design and Implementation of a Vestibular Test Platform and Optokinetic Drum."***

***Principal Investigator:*** Mr. Gilbert C. Willems

***Associate Investigator:*** John Cullen, Ph.D., Department of Bio-engineering, Louisiana State University

## **NAVAL BIODYNAMICS LABORATORY**

---

*Significant Accomplishments and Research Findings.* The broad objective of this contract was to design a device that could be used to study the effects of motion (and perceived motion) on the processing of sensory information. In addition, the device was to function as an "adequate stimulus" for studies of motion sickness.

Design of the subject chair and pitch/roll gimbals was completed. Fabrication of these units is currently underway. Design of the optokinetic drum was completed. Electrical linear actuators with controllers were purchased to provide rotation about the X (roll) and Y (pitch) axes of the vestibular test platform. Safety recommendations were made and incorporated into the design. The chair design provided the capability for several different physiological measures. The design also includes a small desk top-type table attached to the arms to accommodate a visual display terminal and various manipulation devices.

### **BIOINSTRUMENTATION DIVISION**

#### ***Division Mission and Functions***

This Division provides instrumentation designs for human and human surrogate impact acceleration and platform motion experiments. The Division is responsible for installing, operating, and maintaining complete data acquisition (analog and digital) systems employed in the experiments conducted by the Department, and provides electronic/electrical operation and maintenance support for the Laboratory's experimental devices such as accelerators, shakers and SMS. It is also responsible for the configuring of field data measuring and acquisition systems for use aboard ship or at other field locations.

*Significant Accomplishments and Research Findings.* The Hewlett-Packard 9000/345 upgrade for the 9000/220 data acquisition system was procured and delivered. This upgrade streamlined the data acquisition process, and provided analysis capability not previously available. It allowed automation of a number of functions, such as, checklist generation.

Additionally, the omnidirectional sled was completely overhauled electrically and electronically. It was updated to accommodate the new generation of inertial signal conditioning packages. The sled was tested in a series of dummy experiments designed to evaluate a new type of angular rate transducer.

### **ENGINEERING DIVISION**

#### ***Division Mission and Functions***

The Engineering Division provides design, operation and maintenance support for the mechanical facilities and equipment of the Laboratory. It operates and maintains linear acceleration systems including camera mounts. It operates and maintains the platform motion facilities and the SMS. The Division develops, adapts and modifies specialized cameras (such as high speed photometric movie cameras) to specific experimental situations involving high acceleration and oscillatory motion. The Division also supports the Laboratory by maintaining and operating well-equipped machine and woodworking shops.

*Significant Accomplishments and Research Findings.* The rebuilt Fiberglass and Woodworking Shops were outfitted and fully operational by mid-year 1989. This state-of-the-art facility meets all OSHA requirements for removal of hazardous fumes, particulates, etc.

To expedite processing of camera film generated from impact experiments, in-house film processing equipment was purchased and installed. NAVBIODYNLAB purchased the last working 16mm/35mm

## ***1989 and 1990 Command History***

---

processor film in the New Orleans area. A custom-made air-conditioned building was designed and built exclusively for the reconditioned film processor. The first production process was completed on 31 May 1990.

### **RESEARCH SUPPORT DEPARTMENT**

#### ***Department Mission and Functions***

The Research Support Department provides administrative services and support to all Departments of the Command. It coordinates administrative and clerical support services for the Command and provides coordination with other departments concerning administrative and financial matters. The Research Support Department has four divisions: Administrative Support, Fiscal Management, Supply, and Human Research Volunteer.

*Significant Accomplishments.* A new bar-coding system was implemented by the Supply Division to provide this Command and its headquarters with a complete description, location, value and actual count of all equipment at the Laboratory. The Naval Telecommunications System's Plant and Minor Property Accounting System (PMP) was installed on a computer to assist in the accounting of plant and minor property. Bar codes were used to expedite accounting and inventory operations. Once an item is received, the bar code tags are placed on the equipment before it is distributed for use. This system proved itself very effective by providing supply personnel with tight control of equipment and inventory.

The Fiscal Division gained the capacity to enter the Authorized Accounting Activity (AAA), in Charleston, South Carolina in FY88. The computers are connected via modems, thus providing on-line computer processing. Once transactions are input they immediately impact accounting records. These computers allow control over status of funds, input obligations, and the processing of suspended items on a daily basis. In addition, civilian time cards can be inputted and certified electronically. This development saves mailing costs and time delays.

The Laboratory's travel instructions were rewritten to encompass the Personnel Support Activity's (PSA) guidelines. These new instructions outlined the procedures for submitting travel forms in a simple, step-by-step format. In addition, a training representative from PSA instructed Command personnel on the various nuances of travel claim submission. The staff also participated in a two-day workshop given by the Naval Support Activity, New Orleans, LA, designed to instruct personnel on proper travel claim procedure. These programs resulted in more efficient and accurate travel claim submission.

## **NAVAL BIODYNAMICS LABORATORY**

---

### **RESEARCH PRESENTATIONS 1989**

- Call, D. W., "Human Factors Research at the Naval Biodynamics Laboratory." Presented at the University of New Orleans, Department of Psychology/Engineering, 5 April 1989.**
- Call, D. W., "Current Impact, Acceleration and Ship Motion Programs at the Naval Biodynamics Laboratory." Presented at the University of Louisville, School of Medicine, 31 May 1989.**
- Call, D. W., "Sources of Injury During Emergency Egress and Recovery." Presented at the U.S. Air Force Academy, Colorado, Springs, CO, 20 October 1989.**
- Call, D. W., "Mission and Capabilities of the Naval Biodynamics Laboratory." Presented at the IEP ABC-17 Warship Operability Workshop, Dartmouth, Nova Scotia, Canada, 7-9 November 1989.**
- Call, D. W. and Dobie, T. G., "Ship Motion and Human Factors Research at the Naval Biodynamics Laboratory." Presented at the Defence Research and Development Liaison Office Staff, Canadian Embassy, Washington, DC, 23 June 1989.**
- Call, D. W. and Dobie, T. G., "Ship Motion and Human Factors Research at the Naval Biodynamics Laboratory." Presented to personnel from the Naval Sea Systems Command and the David Taylor Research Center, Washington, DC, 23 June 1989.**
- Dobie, T. G., "Effectiveness of Procardia as an Antimotion Sickness Drug." Presented at the Medical Research Council, Royal Naval Personnel Research Committee/Ship Motion Subcommittee, London, England, 5 September 1989.**
- Dobie, T. G. and May, J. G., "Parametric Studies of Factors Influencing Visually Induced Motion." Presented at the 60th Annual Scientific Meeting of the Aerospace Medical Association, Washington, DC, 10 May 1989.**
- Matson, D. L., "Evoked Potential in Impact Acceleration Research." Presented at the Physics Department Seminar Series, University of New Orleans, New Orleans, LA, 1 February 1989.**
- Matson, D. L., "Somatosensory Evoked Potentials During +Z Impact Acceleration." Presented at the 60th Annual Scientific Meeting of the Aerospace Medical Association, Washington, DC, 9 May 1989.**

## ***1989 and 1990 Command History***

---

**Matson, D. L., "Biomedical Monitoring Techniques." Presented to CAPT R. D. McKinzie (OPNAV-505) and University of New Orleans Engineering Faculty, New Orleans, LA, 31 July 1989.**

**Muzzy, W. H., III, "A Review of NBDL Whole Body Vibration Program." Presented at the U. S. Army Aeromedical Research Laboratory, Ft. Rucker, AL, 3-7 September 1989.**

**Muzzy, W. H., III, Gilbert, N. S., and Grunsten, R. C., "Reconfigured Lap Restraint Offers Tolerance Increase in +G<sub>z</sub> Acceleration." Presented at the Proceedings of the 26th Annual SAFE Symposium, Las Vegas, NV, December 1989.**

**Watkins, T. A. and Guccione, S. J., "Consistent Statistical Model for Human Kinematic Response to Impact Acceleration." Presented at the Seventeenth International Workshop on Human Subjects for Biomechanical Research at the 33rd STAPP Car Crash Conference, Washington, DC, 4-7 October 1989.**

**Webb, S. C., "MMPI and Demographic Profiles of Enlisted Navy Males in a Biodynamics Research Program: A Comparison of Program Completers and Non-Completers." Presented at the Fifth Annual Conference on Military Medicine, Bethesda, MD, 5-6 October 1989.**

**Weiss, M. S., "Testing EEG Data for Statistical Normality." Presented at the IEEE Engineering in Medicine and Biology Society 11th Annual International Conference, Seattle, WA, 8-12 November 1989.**

**Weiss, M. S., Guccione, S. J., and Watkins, T. A., "A Kinematic/Dynamic Model for Prediction of Neck Injury During Impact Acceleration." Presented at the AGARD Meeting, Munich, Federal Republic of Germany, 24 April 1989.**

**Weiss, M. S., Guccione, S. J., and Watkins, T. A., "Statistical Modelling of Human Kinematic Response to Impact Acceleration." Presented at the 60th Annual Scientific Meeting of the Aerospace Medical Association, Washington, DC, 9 May 1989.**

**Weiss, M. S., Muzzy, W. H., III, and Call, D. W., "Helmet Weight and Aircrew Injury Potential." Position paper presented to the Naval Medical Research And Development Command, Bethesda, MD, 23 July 1989.**

## **NAVAL BIODYNAMICS LABORATORY**

---

### **PROFESSIONAL MEETINGS ATTENDED IN 1989**

**Black, R., attended the Navy Occupational Health and Preventive Medicine Workshop, Norfolk, VA, 11-16 March 1989.**

**Black, R., attended Systems Safety and Human Factors Engineering Course, Bloomington, IN, 3-13 April 1989.**

**Bolin, F. E., attended Introduction to Safety Standards Course, Pensacola, FL, 26-30 March 1989.**

**Call, D. W., attended the Advanced Technology Demonstration Briefing, Washington, DC, 25 January 1989.**

**Call, D. W., attended the Annual FAILSAFE (Naval Aerospace Physiology) Conference, NAS, Pensacola, FL, 14-16 February 1989.**

**Call, D. W., attended meetings at Pentagon and Naval Medical Research and Development Command, Washington, DC, 19-22 March 1989.**

**Call, D. W., attended meetings at the University of New Orleans, Department of Psychology/Engineering, 5 April 1989.**

**Call, D. W., attended the Tri-service Advisory Research Panel Meeting, Wright Patterson AFB, Dayton, OH, 12-14 April 1989.**

**Call, D. W., attended the briefing on Mission of Naval Dental Research Institute/Protective Face Shield Project, Great Lakes, IL, 19-22 April 1989.**

**Call, D. W., attended the Naval Aviation in Space Symposium, Pensacola FL, 4-6 May 1989.**

**Call, D. W., attended the Aerospace Medical Association Meeting, Washington, DC, 8-11 May 1989.**

**Call, D. W., attended meetings at the University of Louisville, School of Medicine, 31 May 1989.**

**Call, D. W., attended the Army-Navy Research Program on Aircrew Head Injury, Washington, DC, 21-23 June 1989.**

## ***1989 and 1990 Command History***

---

- Call, D. W., attended meetings at the Defence Research and Development Liaison Office Staff, Canadian Embassy, Washington, DC, 23 June 1989.
- Call, D. W., attended meetings at the Naval Sea Systems Command and the David Taylor Research Center, Washington, DC, 23 June 1989.
- Call, D. W., attended meetings at the Naval Medical Research And Development Command, Bethesda, MD, 23 July 1989.
- Call, D. W., attended the Tri-services Aeromedical Research Panel Meeting, Wright Patterson AFB, Dayton, OH, 25-27 July 1989.
- Call, D. W., attended the Senior Officer Course in Military Justice, NAS, Pensacola, FL, 24-29 September 1989.
- Call, D. W., attended the Human Factors Society Annual Meeting, Denver, CO, 15-22 October 1989.
- Call, D. W., attended meetings at the U.S. Air Force Academy, Colorado, Springs, CO, 20 October 1989.
- Call, D. W., attended the IEP ABC-17 Warship Operability Workshop, Nova Scotia, Canada, 7-9 November 1989.
- Call, D. W., attended the NAVMEDRSCHDEVCOM Commanding Officer's Conference, Honolulu, HI, 3-8 December 1989.
- Catyb, J. J., Emergency Medical Technicians Certification Course, Pensacola, FL, 8-28 January 1989.
- Connerly, B., attended the American Association for Laboratory Animal Science Annual Meeting, Little Rock, AR, 29 October-2 November 1989.
- DeJoie, B., attended the Small Purchase/Schedule Contracts Course, Fort Worth, TX, 12-16 March 1989.
- DeJoie, B., attended the Financial Training Conference, Charleston, SC, 25-28 April 1989.
- Dobie, T. G., attended the 60th Annual Scientific Meeting of the Aerospace Medical Association, Washington, DC, 10 May 1989.

## **NAVAL BIODYNAMICS LABORATORY**

---

**Dobie, T. G., attended the Ship Motion Research Planning Meeting, Washington, DC, 21-24 June 1989.**

**Dobie, T. G., attended meetings at the Defence Research and Development Liaison Office Staff, Canadian Embassy, Washington, DC, 23 June 1989.**

**Dobie, T. G., attended meetings at the Naval Sea Systems Command and the David Taylor Research Center, Washington, DC, 23 June 1989.**

**Dobie, T. G., attended meetings at the Medical Research Council, Royal Naval Personnel Research Committee/Ship Motion Subcommittee, London, England, 5 September 1989.**

**Dobie, T. G., attended the IEP ABC-17 Warship Operability Workshop, Nova Scotia, Canada, 7-9 November 1989.**

**Duncan, C. F., attended the Naval Safety Center East Coast Safety Workshop, Norfolk, VA, 27 October-3 November 1989.**

**Garcia, S., attended the Financial Training Conference, Charleston, SC, 25-28 April 1989.**

**Gilbert, N. S., attended meetings at the 26th Annual SAFE Symposium, Las Vegas, NV, December 1989.**

**Guccione, S. J., attended the AGARD Meeting, Munich, Federal Republic of Germany, 24 April 1989.**

**Guccione, S. J., attended the 60th Annual Scientific Meeting of the Aerospace Medical Association, Washington, DC, 9 May 1989.**

**Guccione, S. J., attended meetings at the 33rd STAPP Car Crash Conference, Washington, DC, 4-7 October 1989.**

**Jupiter, G., attended the MP-VX System Administration for 900 Series 800 Course, Atlanta, GA, 26-30 June 1989.**

**Knouse, D., attended the Series 200/300 Basic Workstation Course, Los Angeles, CA, 12-18 March 1989.**

**Matson, D. L., attended meetings at University of New Orleans, New Orleans, LA, 1 February 1989.**

## ***1989 and 1990 Command History***

---

**Matson, D. L., attended the 60th Annual Scientific Meeting of the Aerospace Medical Association, Washington, DC, 9 May 1989.**

**Matson, D. L., attended meetings at University of New Orleans Engineering Faculty, New Orleans, LA, 31 July 1989.**

**Matson, D. L., attended the 29th Annual Meeting of the Society for Psychophysiological Research, New Orleans, LA, 18-22 October 1989.**

**Mawn, S. V., attended the Advanced Cardiac Life Support Course, New Orleans, LA, 19-21 January 1989.**

**Mawn, S. V., attended the Advanced Trauma Life Support Course, New Orleans, LA, 18-19 February 1989.**

**May, J. G., attended the 60th Annual Scientific Meeting of the Aerospace Medical Association, Washington, DC, 10 May 1989.**

**Morrison, T. R., attended the Joint Working Group for Drug Determined Degradation in Military Performance Level II Task Area Group Workshop, San Antonio, TX, 20-24 February 1989.**

**Morrison, T. R., attended the 33rd Annual Meeting of the Human Factors Society, Denver, CO, 16-20 October 1989.**

**Morrison, T. R., attended the IEP ABC-17 Warship Operability Workshop, Nova Scotia, Canada, 7-9 November 1989.**

**Morrison, T. R., attended the Department of Defense Human Factors Engineering Technical Group meeting, Killeen, TX, 13-16 November 1989.**

**Muzzy, W. H., III, attended the STAPP Conference Advisory Committee Meeting, Detroit, MI, 26-29 February 1989.**

**Muzzy, W. H., III, attended the International Standards Organization Meeting on Side Impact Dummies, Detroit, MI, 5 April 1989.**

**Muzzy, W. H., III, attended the Tri-service Technical Working Group Meeting, San Antonio, TX, 18-19 April 1989.**

## **NAVAL BIODYNAMICS LABORATORY**

---

**Muzzy, W. H., III, attended meetings at the Naval Medical Research And Development Command, Bethesda, MD, 23 July 1989.**

**Muzzy, W. H., III, attended meetings at the U. S. Army Aeromedical Research Laboratory, Ft. Rucker, AL, 3-7 September 1989.**

**Muzzy, W. H., III, attended the 33rd STAPP Car Crash Conference, Washington, DC, 4-7 October 1989.**

**Muzzy, W. H., III, attended the 26th Annual SAFE Symposium, Las Vegas, NV, December 1989.**

**Nesby, S. L., attended the American Society of Primatologists Conference and the Primate Veterinarians Workshop, Mobile, AL, 25-30 August 1989.**

**Nesby, S. L., attended the Spinal Surgery Seminar, Baton Rouge, LA, 10 September 1989.**

**Nesby, S. L., attended the Annual American Association for Laboratory Animal Science, Little Rock, AR, 29 October-2 November 1989.**

**Palmer, J. F., attended the Oxygen Standardization Coordination Meeting, Albuquerque, NM, 9-14 April 1989.**

**Price, N., attended the Hematology and Serology Seminar, Alexandria, VA, 27 September 1989.**

**Taylor, E., attended the Drug and Alcohol Program Advisor Training, Jacksonville, FL, 3-10 June 1989.**

**Teal, B., attended the 40th Annual Meeting of the American Association for Laboratory Animal Science, Little Rock, AR, 29 October-2 November 1989.**

**Washington, E. L., attended the Financial Training Conference, Charleston, SC, 25-28 April 1989.**

**Webb, S. C., attended meetings at the Fifth Annual Conference on Military Medicine, Bethesda, MD, 5-6 October 1989.**

### ***1989 and 1990 Command History***

---

**Weiss, M. S., attended the Advanced Technology Demonstration Briefing at the Pentagon and Naval Medical Research Development Command, Washington, DC, 23-25 January 1989.**

**Weiss, M. S., attended Biodynamics Technical Working Group Meeting, San Antonio, TX, 17-19 April 1989.**

**Weiss, M. S., attended the AGARD Meeting, Munich, Federal Republic of Germany, 24 April 1989.**

**Weiss, M. S., attended the 60th Annual Scientific Meeting of the Aerospace Medical Association, Washington, DC, 9 May 1989.**

**Weiss, M. S., attended the Environment of Executive Decision Making Seminar, Alexandria, VA, 18-23 June 1989.**

**Weiss, M. S., attended meetings at Naval Medical Research And Development Command, Bethesda, MD, 23 July 1989.**

**Weiss, M. S., attended the Naval Medical Research and Development Command's Scientific Advisory Board, Pensacola, FL, 27 August-01 September 1989.**

**Weiss, M. S., attended the IEEE Engineering in Medicine and Biology Society 11th Annual International Conference, Seattle, WA, 8-12 November 1989.**

## **NAVAL BIODYNAMICS LABORATORY**

---

### **RESEARCH PRESENTATIONS 1990**

Call, D. W. and Dobie, T. G., "Naval Biodynamics Laboratory: Human Factors Research Capabilities and Programs." Presented at the Canal de Experiencias Hidrodinamicas de El Padro, Madrid, Spain, 24-26 April 1990.

Call, D. W., "Mission and Capabilities of the Naval Biodynamics Laboratory." Three separate presentations and tours given to a total of 47 scientists and physicians attending the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

Call, D. W., "Ship Motion Effects on Crew Performance." Presented at the Aerodynamic Ship Interface Conference, Naval Air Systems Command, Washington, DC, 21-22 August 1990.

Dobie, T. G., "Naval Biodynamics Laboratory Ship Motion Results." Presented at the Royal Naval Personnel Committee of the Medical Research Council, London, UK, 9 August 1990.

Dobie, T. G., "NAVBIODYNLAB: Capabilities and Programs." Presented at the ABC-17/Netherlands Human Factors Meeting, Brussels, Belgium, 31 October - 1 November 1990.

Dobie, T. G., "The International Ship Motion Project." Presented at the Naval Biodynamics Laboratory Science Seminar, New Orleans, LA, 7 December 1990.

Dobie, T. G. and May, J. G., "Motion Sickness Presentation: A Course of Instruction in Cognitive-Behavioral Counseling." Presented at the 12th Psychology in the Department of Defense Symposium, U. S. Air Force Academy, Colorado Springs, CO, 18-20 April 1990.

Dobie, T. G., May, J. G., Gutierrez, C., and Scott, S., "The Transfer of Adaptation Between Actual and Stimulated Rotary Stimulation." Presented at the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

Guccione, S. J., Jr. and Watkins, T., "A Consistent Statistical Model for Kinematic Response to Impact Acceleration." Presented at the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

## ***1989 and 1990 Command History***

---

**Kaufman, B., "Analysis of the SEP Using the Hilbert Transform." Presented at the IEEE Engineering 12th Annual International Conference, 31 October-4 November 1990.**

**Matson, D. L., "+G<sub>z</sub> Impact Acceleration Experiments: Human Evoked Potentials." Presented at the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.**

**Mawn, S. V., "Epidemiology Data for Cervical Stress Injury." Presented to the Naval Research Advisory Committee on Aviator Physical Stress, Washington, DC, 14 June 1990.**

**Morrison, T. R., Dobie, T. G., Willems, G., Webb S., and Endler, J., "Effect of Roll Stabilization on Human Performance." Presented at the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.**

**Muzzy, W. H., III, "NBDL Impact Research Program Progress Report." Presented at the 1990 Government Agency Seating Systems Meeting, Atlantic City, NJ, 8-11 May 1990.**

**Muzzy, W. H., III, "Effects of Mass Distribution in Head/Neck Response." Presented to the Naval Research Advisory Committee on Aviator Physical Stress, Washington, DC, 14 June 1990.**

**Nesby, S. L., "Careers in Veterinary Medicine." Presented at Cornell University, Biomedical and Technical Association Conference, Ithaca, NY, 2-3 March 1990.**

**Nesby, S. L., "A Career as a Veterinary Technician." Presented at Magnolia Training Institute, New Orleans, LA, 23 March 1990.**

**Nesby, S. L., "Career in Veterinary Medicine and Research Veterinary Medicine" Presented at Dillard University, Mathematics, Engineering, and Physics Conference, New Orleans, LA, 27 March 1990.**

**Nesby, S. L., "Military Veterinary Medicine." Presented to the Southwestern Louisiana Veterinary Association, Fort Polk, LA, 3 April 1990.**

**Nesby, S. L., "Idiopathic Hemolytic Anemia in the Rhesus Monkey." Presented at the American Society of Primate Veterinarians and the Association of Primate Veterinarians, University of California, Davis, CA, 11-16 July 1990.**

## NAVAL BIODYNAMICS LABORATORY

---

Webb, S. C., "ASVAB and Demographic Profiles of Enlisted Navy Males in a Biodynamics Research Program: A Comparison of Program Completers and Noncompleters." Presented at the 12th Psychology in the Department of Defense Symposium, U.S. Air Force Academy, Colorado Springs, CO, 18-20 April 1990.

Weiss, M. S., "Standards for Human and Human Surrogate Impact Testing." Presented at the 120th Acoustical Society of America (Fall) Meeting, San Diego, CA, 26-30 November 1990.

**PROFESSIONAL MEETINGS ATTENDED 1990**

Call, D. W., attended the Tri-service Aeromedical Research Panel Meeting, San Antonio, TX, 9-11 January 1990.

Call, D. W., attended the FAILSAFE Meeting, Naval Aerospace Medical Institute, Pensacola, FL, 22-26 January 1990.

Call, D. W., attended the Annual Naval Aerospace Physiologists Meeting/Head Injury Project Meeting, Pensacola, FL, 23-27 January 1990.

Call, D. W., attended the Time Power Seminar, Baton Rouge, LA, 15 February 1990.

Call, D. W., attended the NATO IEG/6 Ship Design SG/5 Seakeeping Conference, Madrid, Spain, 22-28 April 1990.

Call, D. W., attended meetings at the Canal de Experiencias Hidrodinamicas de El Padro, Madrid, Spain, 24-26 April 1990.

Call, D. W., attended the Tri-service Aeromedical Research Panel Meeting, New Orleans, LA, 12 May 1990.

Call, D. W., attended the 61st Annual Scientific Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

Call, D. W., attended the Aerodynamic Ship Interface Conference, Naval Air Systems Command, Washington, DC, 21-22 August 1990.

Call, D. W., attended the NMRDC Commander's Conference, Bethesda, MD, 29-31 October 1990.

Call, D. W., attended the SAFE Symposium, San Antonio, TX, 12-13 December 1990.

Dejoie, B. B., attended the Statement of Work/Specification Preparation Course, Vienna, VA, 15-18 July 1990.

Dobie, T. G. attended the 12th Psychology in the Department of Defense Symposium, U. S. Air Force Academy, Colorado Springs, CO, 18-20 April 1990.

Dobie, T. G., attended the NATO IEG/6 Ship Design SG/5 Seakeeping Conference, Madrid, Spain, 22-28 April 1990.

## **NAVAL BIODYNAMICS LABORATORY**

---

Dobie, T. G., attended meetings at the Canal de Experiencias Hidrodinamicas de El Padro, Madrid, Spain, 24-26 April 1990.

Dobie, T. G., attended the Headquarters Medical Research Council Meeting, London, UK, 30 April 1990.

Dobie, T. G., attended the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

Dobie, T. G., attended the Royal Naval Personnel Committee of the Medical Research Council, London, UK, 9 August 1990.

Dobie, T. G., attended the ABC-17/Netherlands Human Factors Meeting, Brussels, Belgium, 31 October -1 November 1990.

Endler, J., attended the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

Frances, D. A., attended the 1990 AAAS Annual Computer Simulation for Biomedical Scientists meeting, New Orleans, LA, 15 February 1990.

Garcia, S. S., attended the Practical Comptrollership Course, Monterey, CA, 11-23 March 1990.

Garcia, S. S., attended the Naval Medical Research and Development Command's Financial Conference, Washington, DC, 20-25 May 1990.

Gilreath, P., attended the Fiber Optic Communication Course, Los Angeles, CA, 8-13 January 1990.

Guccione, S. J., Jr., attended the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

Guccione, S. J., Jr., attended the SAFE Symposium, San Antonio, TX, 12-13 December 1990.

Holcombe, F. D., attended the Ship Motion Program Meeting, NAVBIODYNLAB, New Orleans, LA, 2-6 July 1990.

Holland, J. A., attended the Basic Position Classification Course, Dallas, TX, 23 April-4 May 1990.

## ***1989 and 1990 Command History***

---

- Kaufman, B., attended the 1990 Annual Scientific Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.**
- Kaufman, B., attended the IEEE Engineering 12th Annual International Conference, 31 October-4 November 1990.**
- Losh, M. W., attended the IEEE Southeastcon 90 Conference, New Orleans, LA, 1-4 April 1990.**
- Losh, M. W., attended the IEEE Engineering 12th Annual International Conference, Philadelphia, PA, 31 October-4 November 1990.**
- Lotz, M., attended the Time Power Seminar, Baton Rouge, LA, 15 February 1990.**
- Matson, D. L., attended the International Joint Conference on Neural Networks, Washington, DC, 15-19 January 1990.**
- Matson, D. L., attended the American Association for Advancement of Science Annual Meeting, New Orleans, LA, 15-20 February 1990.**
- Matson, D. L., attended the Contracting Officer's Technical Representative Course, Pensacola, FL, 19-22 March 1990.**
- Matson, D. L., attended the Biopsychometric Assessment Program Review, Pensacola, FL, 23-25 April 1990.**
- Matson, D. L., attended the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.**
- Matson, D. L., attended the 29th Annual Meeting of the Society for Psychophysiological Research, New Orleans, LA, 18-22 October 1990.**
- Matson, D. L., attended the IEEE Engineering 12th Annual International Conference, Philadelphia, PA, 31 October-4 November 1990.**
- Mawn, S. V., attended the Naval Research Advisory Committee on Aviator Physical Stress, Washington, DC, 14 June 1990.**
- Morrison, T. R., attended the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.**

## **NAVAL BIODYNAMICS LABORATORY**

---

Muzzy, W. H., III, attended the STAPP Car Crash Conference, Detroit, MI, 26-28 February 1990.

Muzzy, W. H., III, attended the 1990 Government Agency Seating Systems Meeting, Atlantic City, NJ, 8-11 May 1990.

Muzzy, W. H., III, attended the 1990 Annual Scientific Meeting of Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

Muzzy, W. H., III, attended the Naval Research Advisory Committee on Aviator Physical Stress, Washington, DC, 14 June 1990.

Nesby, S. L., attended meetings at Cornell University, Biomedical and Technical Association Conference, Ithaca, NY, 2-3 March 1990.

Nesby, S. L., attended meetings at Magnolia Training Institute, New Orleans, LA, 23 March 1990.

Nesby, S. L., attended Dillard University, Mathematics, Engineering, and Physics Conference, New Orleans, LA, 27 March 1990.

Nesby, S. L., attended meetings at the Southwestern Louisiana Veterinary Association, Fort Polk, LA, 3 April 1990.

Nesby, S. L., attended the American Society of Primate Veterinarians and the Association of Primate Veterinarians, University of California, Davis, CA, 11-16 July 1990.

Prell, A., attended the 1990 Annual Scientific Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

Price, N., attended the Mississippi and Louisiana Societies for Medical Technology Meeting, Jackson, MS, 18-21 April 1990.

Rendin, R., attended the Shore Station Command Course, Falls Church, VA. 15 Oct-02 Nov 1990.

Scott, S., attended the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.

Teal, B., attended the Texas Branch American Association for Laboratory Animal Science Meeting, Austin, TX, 15-19 May 1990.

## ***1989 and 1990 Command History***

---

- Vitellaro, A., attended the Budget Execution Course, Denver, CO, 4-9 June 1990.
- Webb, S. C., attended meetings at Oakland, CA; USAF Academy, Colorado Springs, CO; San Francisco, CA; Orlando, FL, 5 April-10 May 1990.
- Webb, S. C., attended the 12th Psychology in the Department of Defense Symposium, U.S. Air Force Academy, Colorado Springs, CO, 18-20 April 1990.
- Webb, S. C., attended the 61st Annual Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.
- Webb, S. C., attended the Annual National Naval Officers Association (NNOA) Conference, New Orleans, LA, 10-15 July 1990.
- Weiss, M. S., attended the Technical Working Group on Biodynamics, Pensacola, FL, 22-26 January 1990.
- Weiss, M. S., attended the International Standards Organization Meeting, Chairman, Impact Working Group, Milan, Italy, 26-30 March 1990.
- Weiss, M. S., attended the NAVBIODYNLAB: Capabilities and Programs Meeting with Professor Diego Liberati, Milan Polytechnical Institute, and the International Standards Organization, Milan, Italy, 26-30 March 1990.
- Weiss, M. S., attended the AGARD meeting, Tours, France, 2 April 1990.
- Weiss, M. S., attended the Annual Biopsychometric Assessment Program Review, Pensacola, FL, 24-25 April 1990.
- Weiss, M. S., attended the 1990 Annual Scientific Meeting of the Aerospace Medical Association, New Orleans, LA, 13-17 May 1990.
- Weiss, M. S., attended the 1st NRAC panel meeting on Aviator Physical Stress, Bethesda, MD, 17-18 May 1990.
- Weiss, M. S., attended the 3rd Navy Independent Research/Independent Exploratory Development Symposium, Laurel, MD, 19-21 June 1990.
- Weiss, M. S., attended the Naval Research Advisory Committee (NRACC) Summer Study Program, San Diego, CA, 16-27 July 1990.

## **NAVAL BIODYNAMICS LABORATORY**

---

**Weiss, M. S., attended the Technical Working Group on Biodynamics,  
Warminster, PA, 25-27 September 1990.**

**Weiss, M. S., attended the 120th Acoustical Society of America (Fall) Meeting,  
San Diego, CA, 26-30 November 1990.**

**White, J., attended the Fiber Optic Communication Course, Los Angeles, CA,  
4-9 June 1990.**

**Willems, G. C., attended the 61st Annual Meeting of the Aerospace Medical  
Association, New Orleans, LA, 13-17 May 1990.**

**Willems, G. C., attended the 18th International Workshop on Human Subjects for  
Biomechanical Research, Orlando, FL, 4 November 1990.**

**NAVAL BIODYNAMICS LABORATORY PUBLICATIONS  
1989**

- Dobie, T. G., "Teaching the Right Stuff— The Heart of the Matter." *Aviation, Space, and Environmental Medicine*, Vol 60, pp. 195-196, February, 1989.
- Dobie, T. G., May, J. G., Dunlap, W. P., and Anderson, M. E., "Reduction of Visually-Induced Motion Sickness Elicited by Change in Illumination Wavelength." *Aviation, Space, and Environmental Medicine*, Vol. 60, pp. 749-754, August 1989.
- Dobie, T. G., May, J. G., Fisher, W. D., and Bologna, M. S., "An Evaluation of Two Main Elements of Cognitive-Behavioral Therapy as a Method of Training Resistance to Visually-Induced Motion Sickness." *Aviation, Space, and Environmental Medicine*, Vol. 60, pp. 307-314, April 1989.
- Gilbert, N. S., Mawn, S. V., Guccione, S. J., and Bolin, F. E., *Fabrication and Application of a Standardized T1/T2 Mount*. Report No. NBDL-89R001, Naval Biodynamics Laboratory, New Orleans, LA, December 1989.
- Grunsten, R. C., Gilbert, N. S., and Mawn, S. V., "The Mechanical Effects of Impact Acceleration on the Unconstrained Human Head and Neck Complex." *Contemporary Orthopaedics*, Vol. 18, No. 2, pp. 199-202, February 1989.
- Hirsch, A. E., Shiabani, S. J., Nguyen, T. T., Willems, G. C., and Muzzy, W. H., III, *Response of Seated and Standing Manikin During Shock Trials on U.S.S. MOBILE BAY (CG 53) and U.S.S. ROOSEVELT (CVN 71)*. Report No. NBDL-89R005 (NTIS No. AD A212586), Naval Biodynamics Laboratory, New Orleans, LA, May 1989.
- Matson, D. L., *Human Short Latency Somatosensory Evoked Potentials in Impact Acceleration Research: Equipment, Procedures and Technologies*. Report No. NBDL 89R002, Naval Biodynamics Laboratory, March 1989.
- May, J. G., "Field Testing of Motion Sickness Counseling Program." University of New Orleans, New Orleans, LA, 20 December 1989.
- Muzzy, W. H., III, Gilbert, N. S., and Grunsten, R. C., "Reconfigured Lap Restraint Offers Tolerance Increase in +G<sub>z</sub> Acceleration." *Proceedings of the 26th Annual Symposium SAFE Association*, March 1989.

## NAVAL BIODYNAMICS LABORATORY

---

- Muzzy, W. H., III and Prell, A. M., *Photo Reference Target Array Scheme*. Report No. NBDL-89R004 (NTIS No. AD A210963), Naval Biodynamics Laboratory, New Orleans, LA, 1989.
- Watkins, T. A. and Guccione, S. J., Jr., "A Consistent Statistical Model for Human Kinematic Response to Impact Acceleration." *Seventeenth Annual International Workshop on Human Subjects for Biomechanical Research*, Society of Automotive Engineers, Warrendale, PA, pp. 117-132, 1989.
- Weiss, M. S., "Testing EEG Data for Statistical Normality." *Proceeding of the 11th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, The Institute of Electrical and Electronics Engineers, Ind., New York, NY, pp. 704-705, 1989.
- Weiss, M. S. and Guccione, S., "A Kinematic/Dynamic Model for Prediction of Neck Injury during Impact Acceleration." *Aerospace Medical Panel Symposium*, Advisory Group for Aerospace Research and Development Conference Proceedings, CP-471, pp. 11-1-11-5, April 1989.
- Weiss, M. S., Matson, D. L., and Mawn, S. V., *Guidelines for Safe Human Exposure to Impact Acceleration: Update A*. Report No. NBDL-89R003, Naval Biodynamics Laboratory, New Orleans, LA., 1989.
- Willems, G. C., *Closing the Loop - or Can the Ship Motion Simulator Simulate Ship Motion?* Report No. NBDL-89R007, Naval Biodynamics Laboratory, New Orleans, LA, 1989.

**NAVAL BIODYNAMICS LABORATORY PUBLICATIONS  
1990**

- Cullen, J., *Design and Implementation of a Vestibular Test Platform and Optokinetic Drum*, Navy Contract #N00205-1990-M-B506, Naval Biodynamics Laboratory, New Orleans, LA, 18 August 1990.
- Dobie, T. G. and May, J. G., "Generalization of Tolerance to Motion Environments." *Aviation, Space, and Environmental Medicine*, Vol. 61, pp. 707-711, August 1990.
- Dobie, T. G. and May, J. G., "Motion Sickness Prevention: A Course of Instruction in Cognitive-Behavioral Counseling." *Proceedings of the Twelfth Symposium Psychology in the Department of Defense, Department of Behavioral Sciences and Leadership*, United States Air Force Academy, Colorado Springs, CO, pp. 87-91, 1990.
- Dobie, T. G., May, J. G., Gutierrez, C., and Scott, S., "The Transfer of Adaptation Between Actual and Simulated Rotary Stimulation." *Aviation, Space, and Environmental Medicine*, Vol. 61, pp. 1085-1091, December 1990.
- Gluck, G. S. and Mawn, S. V., *The Potential Implications of Congenital Cervical Synostosis (Klippel-Feil Syndrome) on Naval Service* submitted to Military Medicine; 1990.
- Guignard, J. C. and McCauley, M. E., "The Accelerative Stimulus for Motion Sickness." In George H. Crampton (Ed.), *Motion and Space Sickness*, CRC Press, Inc., Boca Raton, FL, pp. 123-152, 1990.
- Hart, R. L. and Anderson, R. C., Final Report: *Finite Element Model of the Head and Neck During Impact Acceleration I*. 1990 U.S. Navy/ASEE Summer Faculty Research Program, Naval Biodynamics Laboratory, 21 May-27 July 1990.
- Holcombe, F. D., Webb, S., and Swenson, E., *Human Factors Assessment of the USCG 47-ft MLB: Preliminary Evaluation of Ergonomic and Safety Deficiencies*. Naval Biodynamics Laboratory, December 1990.
- Kaufman, B., Sahakian, A. V., and Myklebust, J. B., "Analysis of the SEP Using the Hilbert Transform." *Proceedings of the Twelfth Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. The Institute of Electrical and Electronics Engineers, Inc., New York, NY, Vol 12, No. 2, pp. 887-888, 1990.
- Lotz, M., *Physiology Data Acquisition System Description*. Naval Biodynamics Laboratory, NBDL 90R004, New Orleans, LA, October 1990.
- M-Squared Systems, Inc. *Assessment and Evaluation of the Naval Biodynamics Laboratory X-Ray Anthropometry System*. Contract N00205-90-M-D146, Naval Biodynamics Laboratory, New Orleans, LA, 14 June 1990.

## NAVAL BIODYNAMICS LABORATORY

---

- Matson, D., *Human Short-latency Somatosensory Evoked Potentials on Impact Acceleration Research: Equipment, Procedures and Techniques*. Report No. NBDL-89R001. Naval Biodynamics Laboratory, New Orleans, LA, October 1990.
- Muzzy, W. H., III and Willems, G., "Evaluation of Head Stroke Envelope and Restraint Harness Inertia Reel for the Front Seat of the AH-1 and AH-64 Helicopter." [Letter to Commander, U.S. Army Aeromedical Research Laboratory, FT Rucker, AL]. 5 January 1990.
- Pittman, M.E., *Evaluation of the Anthropometry System*. Contract N00205-90-M-D005, Naval Biodynamics Laboratory, New Orleans, LA, 14 June 1990.
- Riemer, T. E., Weiss, M. S., and Losh, M. W., "Discrete Clipping Detection by Use of a Signal Matched Exponentially Weighted Defferentiator." *IEEE Proceedings Southeastcon' 90*, Piscataway, NJ, pp.245-248, 1990.
- Weiss, M. S., Guccione, S. J., Jr., and Watkins, T. A., A Kinematic/Dynamic Model for Prediction of Neck Injury During Impact Acceleration. *AGARD Conference Proceedings No.471*, North Atlantic Treaty Organization Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine, France, pp. 11:1-6, 1990.
- Bibliography of Scientific Publications of the Naval Biodynamics Laboratory: 1980-1990*. Report No. NBDL-90R005 (NTIS No. AD A229030), Naval Biodynamics Laboratory, New Orleans, LA, December 1990.

**CONFERENCES HOSTED 1990**

*AXIAL (+Z) ACCELERATION: A REVIEW  
31 JANUARY - 1 FEBRUARY*

This conference reviewed results from a series of impact experiments conducted at NAVBIODYNLAB. Dr. Leon Kazarian, an engineer from the U.S. Air Force Armstrong Aeromedical Research Laboratory, Wright-Patterson Air Force Base, Ohio and Dr. Charles McLeod, a veterinary pathologist, Maryland Medical Laboratory, were guest speakers. Dr. Kazarian reviewed the Air Force experimental spinal injury data and Dr. McLeod and NAVBIODYNLAB scientists presented the NAVBIODYNLAB research results. Over 40 scientists attended the Conference and extensive discussion and comparison of data followed the formal presentations.

*EXTRAPOLATION OF HUMAN KINEMATIC RESPONSE TO  
INJURIOUS ACCELERATION LEVELS  
24 MAY - 25 MAY*

This two-day Conference was hosted by the Mathematical Sciences Division. The conference analyzed the past history of human and animal responses to safe acceleration levels, and procedures for extrapolating the human kinematic response to injurious levels were reviewed and discussed, resulting in several recommended approaches.

*ABC-17 MEETING  
15 OCTOBER - 16 OCTOBER*

A meeting with the American, British, Canadian, and Dutch members of NATO Information Exchange Group/6 Sub-group 5 was held at NAVBIODYNLAB to discuss an international collaborative research effort on the effects of ship motion on physical and mental performance. Dr. Ross Graham from the Defence Research Establishment, Atlantic, Canada; Dr. C.J.E Wientjes, Institute of Perception TNO, Netherlands; Mr. Eric Baitis, Mr. Bill Myers and Ms. Cheryl Bennett, from David Taylor Research Center discussed the capabilities of the Command's ship motion simulator (SMS) with NAVBIODYNLAB personnel. Initial plans were made for a joint program to study effects of motion induced interruptions on crew performance aboard ship.

NAVAL BIODYNAMICS LABORATORY

---

**OFFICE OF NAVAL RESEARCH (ONR) -  
ASEE SUMMER FACULTY RESEARCH PROGRAM  
1990**

The 1990 ONR-ASEE Summer Faculty Research Program was outstanding. Ten university faculty members and one graduate student were selected for summer research appointments. The 11 individuals, their university affiliation, and research abstract titles were as follows:

- Dr. Ronald C. Anderson, Tulane University, New Orleans, LA, *Finite Element Model of the Head and Neck During Impact Acceleration I.*
- Dr. John Cullen, Jr., Louisiana State University, Baton Rouge, LA, *Design and Implementation of a Vestibular Test Platform and Optokinetic Drum.*
- Dr. Richard T. Hart, Tulane University, New Orleans, LA, *Finite Element Model of the Head and Neck During Impact Acceleration I.*
- Mr. Mark Losh, University of New Orleans, New Orleans, LA *Enhancements to REPANL (Revised Evoked Potential Analysis).*
- Dr. James E. May, University of New Orleans, New Orleans, LA, *Motion Sickness Counseling Program.*
- Mr. Cliff Mugnier, University of New Orleans, New Orleans, LA, *Enhancements to X-Ray Anthropometry Procedures.*
- Dr. Michael Pittman, University of New Orleans, New Orleans, LA, *Enhancements to X-Ray Anthropometry Procedures.*
- Dr. Terry Riemer, University of New Orleans, New Orleans, LA, *Enhancements to REPANL (Revised Evoked Potential Analysis).*
- Dr. Edwin Russo, University of New Orleans, New Orleans, LA, *Linage Model to Compute Neck Forces and Torques During Impact Acceleration.*
- Dr. Terry Watkins, University of New Orleans, New Orleans, LA, *Statistical Modeling of Head/Neck Kinematics.*
- Mr. Robert Wildzunas, University of New Orleans, New Orleans, LA, *Analysis of Coast Guard Data on 41-Ft Utility Boat Project.*

***DISTINGUISHED VISITORS 1989***

The Laboratory hosted many distinguished visitors in 1989 and 1990. Visitors included noted scientists from the academic, military and business communities both national and internationally, as well as, other distinguished guests. These meetings have served to strengthen the liaisons between the Naval Biodynamics Laboratory and these communities.

Dr. Nahib Alem  
U. S. Army Aeromedical Research Laboratory  
FT Rucker, AL

MAJ John Barson, MC, USA  
U.S. Army Aeromedical Research Laboratory  
FT Rucker, AL

Ms. Mary C. Baquet  
WWL TV-4  
New Orleans, LA

CAPT Wayne Becker  
U.S. Coast Guard Research and Development Center  
Groton, CT

Dr. Cameron Camp  
University of New Orleans  
New Orleans, LA

Dr. D. Clemmer  
Tulane University  
New Orleans, LA

Dr. John N. Crisp  
University of New Orleans  
New Orleans, LA

Dr. Channing Ewing  
Snell Memorial Foundation  
New Orleans, LA

LT Pete Graham  
Chief of Naval Reserve  
New Orleans, LA

HMCM W. M. Griffith  
Force Master Chief  
Naval Medical Command  
Washington, DC

## NAVAL BIODYNAMICS LABORATORY

---

Dr. Ronald Heslegrave  
Defence and Civil Institute of Environmental Medicine  
Ontario, Canada

Dr. F. K. Hilton  
University of Louisville  
Louisville, KY

Dr. D. E. Holness  
Canadian Embassy  
Washington, DC

Ms. Terry Jagoe  
Naval Air Development Center  
Warminster, PA

Dr. Kenneth Kennedy  
Universal Energy Systems  
Dayton, OH

Dr. Catherine King  
University of New Orleans  
New Orleans, LA

Dr. Lee  
LSU School of Veterinary Medicine  
Baton Rouge, LA

Ms. Gina Liggett  
Tulane University  
New Orleans, LA

Dr. Julliette Loup  
University of New Orleans  
New Orleans, LA

CAPT Robert McKenzie  
Chief of Naval Operations (OP-505)  
Washington, DC

Dr. Charles McLeod  
Maryland Medical Laboratory  
Baltimore, MD

CDR Kenneth Meyer  
Naval Medical Center  
Corpus Christi, TX

## *1989 and 1990 Command History*

---

Mr. Cliff Mugnier  
University of New Orleans  
New Orleans, LA

Dr. Jay Pollack  
University of Dayton  
Dayton, OH

Dr. W. Renehan  
University of Louisville  
Louisville, KY

Dr. Terry Riemer  
University of New Orleans  
New Orleans, LA

Dr. Douglas Rosene  
Boston University  
Boston, MA

Dr. Strain  
LSU School of Veterinary Medicine  
Baton Rouge, LA

Dr. Lisa Turner  
University of New Orleans  
New Orleans, LA

Mr. Gene Turnipseed  
Naval Air Aerospace Medical Research Laboratory  
Pensacola, FL

Dr. C. Wagner  
University of Louisville  
Louisville, KY

Dr. M. Wiegand  
University of Louisville  
Louisville, KY

**NAVAL BIODYNAMICS LABORATORY**

---

***DISTINGUISHED VISITORS 1990***

Dr. Ronald C. Anderson  
Tulane University  
New Orleans, LA

MAJ Alexandra Bakarich  
Keesler Air Force Base  
Biloxi, MS

Mr. Erich Baitis  
David Taylor Research Center  
Bethesda, MD

Ms. Cheryl Bennett  
David Taylor Research Center  
Bethesda, MD

Dr. Bruce Bowman  
University of Michigan  
Ann Arbor, MI

Dr. William F. Clardy  
School of Aerospace Medicine  
Brooks Air Force Base  
San Antonio, TX

MAJ William Cline  
U. S. Army Medical Research Institute of Infectious Diseases  
FT Detrick, MD

Dr. Jim Corwin  
University of New Orleans  
New Orleans, LA

CAPT Charles Dunkle  
Naval Regional Data Automation Center  
New Orleans, LA

LTC Edmond J. Enloe, Jr.  
U. S. Army Medical Research Institute of Infectious Diseases  
FT Detrick, MD

Mr. Budd Goodwin  
Burke, Morial Cassibry, Fraishe and Pizza Law Firm  
New Orleans, LA

## *1989 and 1990 Command History*

---

Dr. Ross Graham  
Defence Research Establishment Atlantic  
Dartmouth, N.S. Canada

Dr. John Guignard  
Guignard Biodynamics  
New Orleans, LA

Ms. Leslie Hill\*  
WDSU TV-6  
New Orleans, LA

GSGT L. J. King  
3rd Battalion 23rd Marine  
New Orleans, LA

Mr. John Knight  
Naval Regional Data Automation Center  
New Orleans, LA

LCDR Edward Marcinik  
Naval Military Personnel Command  
Health and Physical Readiness  
Washington, DC

CDR Jim McGinnis  
U. S. Coast Guard Headquarters  
Washington, DC

CWO3 Jake Miller  
U. S. Coast Guard Headquarters  
Washington, DC

Mr. Dave Motherway  
U. S. Coast Guard Research and Development Center  
Groton, CT

Mr. Bill Myers  
David Taylor Research Center  
Bethesda, MD

Dr. Mildred Noto\*  
Schaumburg Elementary School  
New Orleans, LA

LT Pano Papalekas  
Naval Medical Clinic  
New Orleans, LA

## **NAVAL BIODYNAMICS LABORATORY**

---

**Ms. Bonnie Paulson  
Keesler Air Force Base  
Biloxi, MS**

**LT Mark Reis  
NAS Medical Clinic  
New Orleans, LA**

**CPT David Ruble  
U. S. Army Medical Research Institute of Infectious Diseases  
FT Detrick, MD**

**CAPT L. W. Shivertaker  
Naval Medical Research and Development Command  
Bethesda, MD**

**Dr. Mathias Siebel\*  
University of New Orleans  
New Orleans, LA**

**Dr. Dennis Smith  
Desmatics, Inc.  
State College, PA**

**Mr. Eric Swensen\*  
U. S. Coast Guard Research and Development Center  
Groton, CT**

**Dr. Louis Tijerina  
Battelle Memorial Institute  
505 King Ave.  
Columbus, OH**

**Ms. Delia Treaster  
Battelle Memorial Institute  
505 King Ave.  
Columbus, OH**

**HMCM Trembly  
Naval Medical Research and Development Command  
Bethesda, MD**

**Ms. Roberta Withnall  
Naval Personnel Research Centre  
United Kingdom**

## ***1989 and 1990 Command History***

---

**Dr. Kees Weintjes  
Institute of Perception  
Amsterdam, the Netherlands**

**CAPT James Woody\*  
Commanding Officer  
Naval Medical Research and Development Command  
Bethesda, MD**

\* 1989 and 1990 visitors.

## NAVAL BIODYNAMICS LABORATORY

---

### PARTNERSHIP IN EDUCATION

A key issue concerning many Americans today is the quality of education in the public school system. For the past four years, the NAVBIODYNLAB has taken an active role in helping improve the quality of education at a local elementary school. Through the New Orleans Public Schools' Partnership In Education Program, NAVBIODYNLAB has adopted the Henry C. Schaumburg Elementary School in East New Orleans.

This partnership has included tutoring students, performing maintenance projects at the school on weekends and inviting students to the Command to learn more about what awaits them in the working world. These volunteer actions have helped improve the academic performance of the students and also greatly increased their individual self-esteem. Our sailors provide strong role models from varied cultural backgrounds and instill in the students a concern for their school, community and nation.

Each April during "seat-swap" day, the Principal of Schaumburg School, Dr. Mildred Noto, and the Commanding Officer of NAVBIODYNLAB exchange positions for a day to get a better idea of ways to improve the partnership.

WWL TV Channel 4, a local CBS affiliate, featured the NAVBIODYNLAB-Schaumburg Team in one of their prime-time television broadcasts lauding the achievements of the Partnership In Education Program. This television program brought many compliments to the Laboratory and made everyone feel very good about their individual efforts to improve the educational experiences for students at Schaumburg School.



**Dr. Mildred Noto, Principal of Schaumburg Elementary School serves as "CO" of NAVBIODYNLAB for a day.**

## ***1989 and 1990 Command History***

---

### **OTHER ACTIVITIES**

In November 1989, Ms. Leslie Hill from WDSU TV-6, a local NBC affiliate, reported on the research done at the Laboratory. The four-day, 4-part documentary aired during the morning and evening news hours. This program described Command research programs, as well as spotlighting various HRVs and Command Scientists. The documentary contained valuable information concerning the role of NAVBIODYNLAB's biomechanical, physiological and psychological research and its application to improving safety in both Navy and civilian operations.



**Ms. Leslie Hill, WDSU TV Channel 6 News.**

### **LABORATORY'S RESEARCH ACCOMPLISHMENT AND CAPABILITIES**

The Naval Imaging Command prepared a public affairs video portraying the research done at the Laboratory. This project was several months in the making and it will be used to advertise the Laboratory's research accomplishments and capabilities.

### **PUBLIC SERVICE RECOGNITION WEEK**

As part of the public relations program, NAVBIODYNLAB participated in the annual Public Service Recognition Week 07-13 May 1990 at the Riverwalk Mall, New Orleans, Louisiana. The Naval Biodynamics Laboratory used displays of photographs, graphs, and videos to describe the Command mission. The booth was manned by both military and civilian personnel who answered questions on how NAVBIODYNLAB research results are applied in both the military and civilian environments.

## **NAVAL BIODYNAMICS LABORATORY**

---

### **SUCCESSFUL COMBINED FEDERAL CAMPAIGN**

In 1989 the Command exceeded its Combined Federal Campaign goal by 6 percent, contributing a total of \$2,236.00. Coordinators were AN Marvin Turpin and Ms. Barbara Bishop.

On 6 November 1990, NAVBIODYNLAB concluded the most successful Combined Federal Campaign ever conducted at the Command. The Command raised \$3,314.00, which exceeded the Command goal by 86 percent. Coordinators were AN Bryon Davis and Ms. Pat McCusker.

### **TOYS FOR TOTS 1989 AND 1990 CAMPAIGNS**

"Toys for Tots" 1989 and 1990 campaigns were the largest in the Command's history. SA Brian Lauterbach and HM3 Issac Joseph coordinated the 1989 event. Toys for Tots 1990 coordinator, AN Byron Davis presented SSGT Gardner of the U.S. Marine Corps with toys for distribution to needy children in the New Orleans area.

### **NAVY BALL 1990**

Forty members of the Naval Biodynamics Laboratory and their guests attended the 1990 Navy Ball. The Ball Fund Raiser Coordinators were HM2 Joseph Catyb and LCDR Carl Duncan.

### **NAVBIODYNLAB RECOGNITION FOR EXEMPLARY SAFETY PROGRAM**

The Naval Biodynamics Laboratory Safety Program was recognized by Mr. Kip Johnson, Safety Officer, NAVMEDRSCHDEVCOM, Bethesda, MD. Mr. Johnson commended NAVBIODYNLAB for its exemplary safety program. Mr. Johnson praised all NAVBIODYNLAB personnel for their part in making the facilities a safer place to work. Mr. Johnson reported that the quality of the safety program exceeded that of other commands. Mr. Black received an official Letter of Appreciation for his work as Safety Program Coordinator.

### **UNIVERSITY OF NEW ORLEANS, COLLEGE OF ENGINEERING ENGINEERING AWARENESS DAY**

The Naval Biodynamics Laboratory participated in the University of New Orleans, College of Engineering, Engineering Awareness Day. The purpose of the two-day event was to expose high school juniors and seniors and college freshmen to engineering by touring UNO labs and facilities and enabling potential engineering students to speak with industrial and governmental representatives and see industrial exhibits and displays.

*1989 and 1990 Command History*

**NAVBIODYNLAB PERSONNEL IN ACTION**

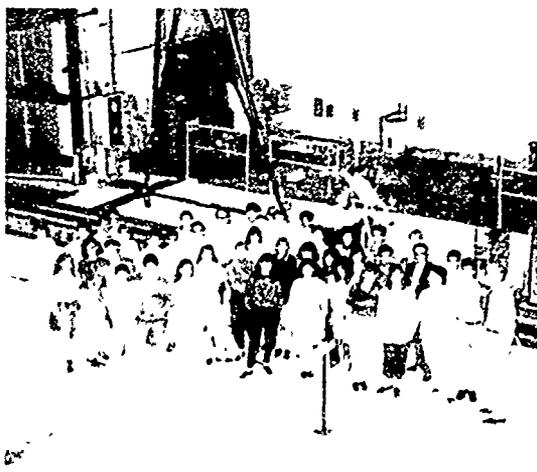


# NAVAL BIODYNAMICS LABORATORY



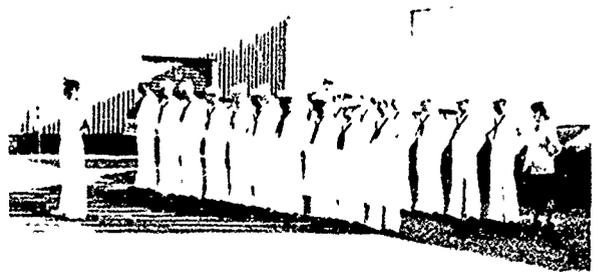
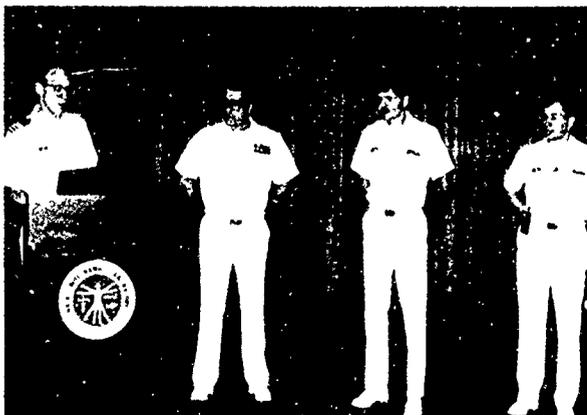
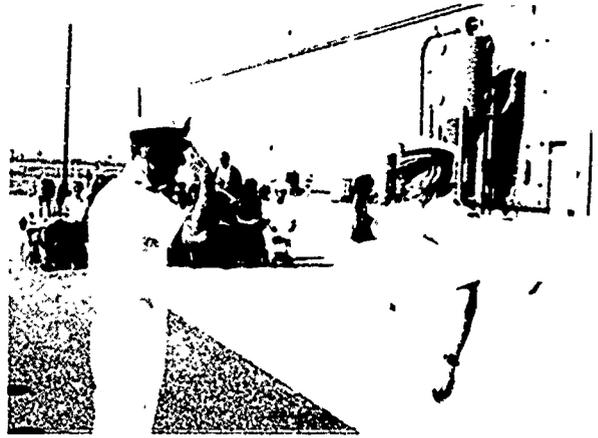
*1989 and 1990 Command History*

---



# NAVAL BIODYNAMICS LABORATORY

---



## 1989 and 1990 Command History

---

### FEDERAL BUSINESS ASSOCIATION DISTINGUISHED SERVICE AWARD (TECHNICAL) 1989

Mr. Bobby Teal received the Federal Business Association Distinguished Federal Service Award (Technical) for his superior performance as Assistant Head of Veterinary Resources Division. Mr. Teal presented ideas that led to the technical development of the animal thoracic vertebral mount. A device which allows animal data collection techniques to parallel human techniques within the impact acceleration program. Mr. Teal was instrumental in arranging the no-cost transfer of research animals from other laboratories thereby saving the Command \$40,000.00.



### NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND SAILOR OF THE YEAR 1989

HM2 Edwin E. Taylor earned the Naval Medical Research and Development Command's Sailor of the Year Award for 1989. HM2 Taylor's superb professionalism as a medical monitor for the Impact and Ship Motion Research Programs and as an Emergency Medical Technician gained him the total confidence of the HRVs and staff. His total dedication to excellence enabled him to revamp two Command programs, Cardia Pulmonary Resuscitation Training and Physical Readiness which resulted in 100% of the military and 90% of the civilian personnel to be certified in Basic Life Support and 70% of the military personnel scoring outstanding or excellent on the Physical Readiness Test.



### NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND SENIOR ENLISTED LEADERSHIP AWARD 1990

YNC Gary L. Linebrink was the first recipient of the Naval Medical Research and Development Command's Senior Enlisted Leadership Award. Chief Linebrink was honored for his outstanding leadership and exemplary service. CAPT James Woody, Commanding Officer, Naval Medical Research and Development presented YNC Linebrink with the award on 22 May 1990 in the presence of the entire NAVBIODYNLAB staff.



**NAVAL BIODYNAMICS LABORATORY**

---

**MILITARY AWARDS**

**NAVY ACHIEVEMENT MEDAL  
1989**

BM3 Michael Anderson  
LCDR Carl Duncan  
MR2 Timothy Myers  
HM1 Edwin Taylor

**1990**

HM2 Joseph Catyb

**NAVY COMMENDATION MEDAL 1989  
LTC Frank Chapple**

**ARMY COMMENDATION MEDAL 1989  
CPT Shanna Nesby**

**GOOD CONDUCT MEDAL 1989  
HM1 Anthony Matthews  
SK1 Edward Washington**

**OUTSTANDING YOUNG MEN OF AMERICA 1989  
HM1 Edwin Taylor**

**LETTERS OF COMMENDATION  
1989**

BM3 Michael Anderson (2); YNC Gary Linebrink;  
HM2 Anthony Matthews; HM2 Edwin Taylor (2); and  
AN Donald Tyer

**1990**

HM2 Joseph Catyb; FN David Doerr; AA Eric Hanson;  
LCDR Tommy Morrison; MR2 Timothy Myers;  
CDR James Palmer; HM1 Edwin Taylor;  
PH3 Marvin Turpin; and YN3 Donald Tyer

*1989 and 1990 Command History*

---

**SAILOR OF THE YEAR  
1989**



**HM2 Edwin Taylor, USN**

**SAILOR OF THE YEAR  
1990**



**HM2 Joseph Catyb, USNR**

# NAVAL BIODYNAMICS LABORATORY

---

## LETTERS OF APPRECIATION 1989

BM3 Kevin Anderson; BM3 Michael Anderson (4);  
HM2 Joseph Catyb (2); AN Hunter Culbertson;  
PN1 Mitchell Earles; PN1 Jeffery Jacobs (2);  
HM3 Issac Joseph (2); SN Kenneth Kramer;  
FN Brian Lauterbach; SN John Malone;  
MR2 Timothy Myers; HM2 Edwin Taylor (2);  
AN Marvin Turpin; SN Edward Wanca (3)

### 1990

BM3 Michael Anderson (2); CAPT Douglas W. Call;  
HM2 Joseph Catyb (2); SN Byron Davis; FN David Doerr;  
FN Michael Fritz (2); AA Eric Hanson; HM3 Isaac Joseph (3);  
SN Kenneth Kramer; FN Brian Lauterbach; FA Jerry Parker;  
SN Brian Perkins; SPC Kathleen Pumphrey; and  
PH3 Marvin Turpin

## SAILOR OF THE QUARTER 1989

1st Quarter - YN3 Donald Tyer  
2nd Quarter - SN Brian Lauterbach  
3rd Quarter - BM3 Michael Anderson  
4th Quarter - HM3 Joseph Catyb

### 1990

1st Quarter - FN David Doerr  
2nd Quarter - AA Eric Hanson  
3rd Quarter - PH3 Marvin Turpin  
4th Quarter - HM2 Joseph Catyb

## PROMOTIONS 1989

SN Kevin Anderson (BM3)	MR3 Timothy Myers (MR2)
BM3 Michael Anderson (BM2)	HM2 Edwin Taylor (HM1)
HM3 Joseph Catyb (HM2)	AN Donald Tyer (YN3)
HM2 Anthony Matthews (HM1)	SK2 Edward Washington (SK1)

## PROMOTIONS 1990

SN Brian Lauterbach (MR3)	SN Tony Mack (BM3)
LT Schuyler C. Webb (LCDR)	

## ***1989 and 1990 Command History***

---

### **OUTSTANDING PERFORMANCE IN PHYSICAL READINESS PROGRAM**

#### **1989**

BM3 Michael Anderson	SA Douglas Archibald	CAPT Douglas W. Call
HM2 Joseph Catyb	FN Emory Dennis	FN David Doerr
SN Steven Huntington	HM3 Isaac Joseph	SA Brian Lauterbach
LCDR Stephen Mawn	AA Chai Mookdasanit	SA Brian Perkins
HM2 Edwin Taylor	AN Marvin Turpin	SN Edward Wanca
	LT Schuyler Webb	

#### **1990**

BM3 Michael Anderson	CAPT Douglas W. Call	SN Byron Davis
FN Emory Dennis	AA Clifton Donaldson	SN Harry Ervin
SA George Ferguson	AA Eric Hanson	HM3 Isaac Joseph
SA Edward Kennedy	SN Kenneth Kramer	FN Brian Lauterbach
LCDR Stephen Mawn	LCDR Tommy Morrison	FN Jerry Parker
SN Brian Perkins	HM1 Edwin Taylor	PH3 Marvin Turpin
YN3 Donald Tyer	LT Schuyler Webb	

### **MILITARY REPORTING 1989**

AR Diaz Alvarez	FR Derrick Flores
AA Bradley Boyd	AA Eric Hanson
AN Micheal Clapp	AA Edgar Hollis
FN Emory Dennis	AR David Nilsen
AA Troy Ennis	FA Jerry Parker

### **DEPARTING 1989**

SN Kevin Anderson - CTT "A" School, Pensacola, FL  
SA Douglas Archibald - Reported to the USS CONSTELLATION (CV 64)  
AN Hunter Culbertson - Reported to USS FORRESTAL (CV 59)  
HM2 Antony Matthews - Reported to DET A 1st FSSG FMF PAC,  
29 Palms, CA  
AR David Nilsen - Discharged  
SN Edward Wanca - Reported to SERVSCOLCOM, Great Lakes, IL

## NAVAL BIODYNAMICS LABORATORY

---

### MILITARY REPORTING 1990

SA John Bacon	SN Gerald Henderson
FN Donovan Bourgeau	LCDR F. Douglas Holcombe
SN David Burdick	FN Eric Noble
SN Sergio Chinchilla	HM1 Harold Powe
FN Bryon Davis	CDR Robert W. Rending
SN Harry Ervin	FA Michael Skaggs
SN George Ferguson	SA Ronald Stevenson
FR David Hearth	SA Kenneth Tedrick

### DEPARTING 1990

AN Diaz-Alvarez, Discharged  
BM2 Michael Anderson - Reported to NAVSUBSCOL, Groton, CT  
SA John Bacon - Reported to NAVFAC, Centerville Beach, CA  
SN David Burdick - Reported to NAVTRASTA, Great Lakes, IL  
FN Emory Dennis - Reported to the USS SPRUANCE (DD 963)  
FN David Doerr - Reported to SERVSCOLCOM, San Diego, CA  
AA Clifton Donaldson - Reported to the USS THEODORE ROOSEVELT (CVN71)  
LCDR Carl Duncan - Retired  
AA Troy Ennis - Reported to NATTC, Millington, TN  
FN Derrick Flores - Reported to the USS JOHN F. KENNEDY (CV 67)  
FN Michael Fritz - Discharged  
AA Eric Hanson - Reported to ATKRON One Four Five  
FN David Hearth - Reported to NAS Adak, AK  
AA Edgar Hollis - Reported to NAS Whiting Field, FL  
SN Steven Huntington - Reported to NAVSUBSCOL  
HM3 Isaac Joseph - Reported to NAVHOSPCORPSCOL, San Diego, CA  
SR Brian Kane - Reported to NAVSTA, Newport, RI  
SN Kenneth Kramer - NAVHOSPCORPSCHOL, Great Lakes, IL  
MR3 Brian Lauterbach - Reported to the USS SAGINAW (LST 1188)  
AA Chai Mookdasanit - Reported to NAVBASE, Mayport, FL  
LCDR Tommy Morrison - Reported to NAMI, Pensacola, FL  
MR2 Timothy Myers - Discharged  
CDR James Palmer - Retired  
FA Jerry Parker - Reported to the USS SAGINAW (LST 1188)  
SN Brian Perkins - Reported to the NAVHOSPCORPSCOL, Great Lakes, IL  
SPC Kathline Pumphrey - Discharged  
SA Ronald Stevenson - Reported to the USS WICHITA (AOR 1)  
HM1 Edwin Taylor - Discharged  
PH3 Marvin Turpin - Discharged

## ***1989 and 1990 Command History***

---

YN3 Donald Tyer - Reported to SERVSCOLCOM, San Diego, CA  
SK1 Edward Washington - Reported to the USS W. S. SIMS (FF 1059)

### **MILITARY TEMPORARY ADDITIONAL DUTY/RESEARCH CLERKSHIPS ACTIVE DUTY FOR TRAINING**

In 1990, two Armed Forces Health Professions Scholarship students participated in clerkships in impact acceleration: ENS Gary S. Gluck, 2-27 April 1990 and ENS John Sanders, 4 June-6 July 1990

ENS Gary Gluck, a fourth year medical student from Michigan State University, performed an in-depth investigation of two former HRVs with congenital defects of the neck. The report resulting from this work, "The Klippel-Feil Syndrome: Implication for Naval Service" has been accepted for publication in Military Medicine.

ENS John Sanders, who had recently completed his second year at Tulane University Medical School, studied several cases of physical disqualification of subjects involving cervical ribs. He also spent some time with Dr. Thomas Dobie in the Human Factors Division, becoming familiar with the research effort in motion sickness.

# NAVAL BIODYNAMICS LABORATORY

---

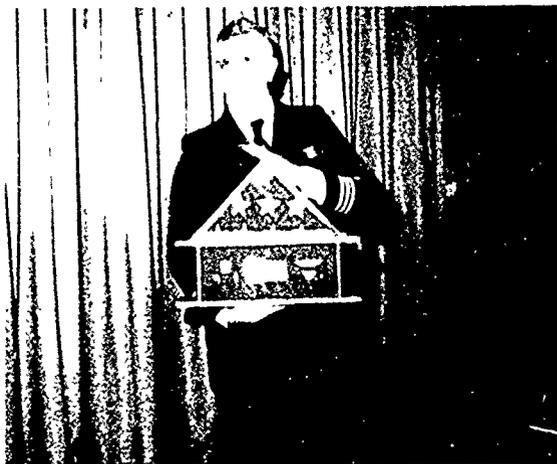
## REENLISTMENTS 1990



**SK1 Edward Washington, USN**

## RETIREMENTS 1990

CDR James F. Palmer served as the Executive Officer of NAVBIODYNLAB from 19 September 1987 to 1 April 1990. During that time, he coordinated the submittal of the Five-Year Research Plan matching fleet needs for impact and ship motion research with Command capabilities. He rewrote the civilian performance standards linking work objectives to the Command mission. He developed a long range facilities improvement plan to ensure future research capabilities. He negotiated an international grant through the Office of Naval Research with Leeds University (United Kingdom) to sustain the Visiting Scientists program, and coordinated Memoranda of Agreement with the University of New Orleans and Tulane University.



**CDR James F. Palmer, MSC, USN**

## ***1989 and 1990 Command History***

---

### **CIVILIAN PERFORMANCE AWARDS 1989**

Mr. Donald Alt	Ms. Barbara Bishop	Mr. Bernell Connerly
Ms. Barbara Dejoie	Ms. Connie Dummitt	Mr. Gary Jupiter
Mr. Les Lorig	Mr. William Muzzy, III	Mr. Nick Price
Mr. Robin Roth	Mr. Mike Suchanek	Dr. Marc Weiss
Mr. Gilbert Willems	Mr. Ronnie Wilson	

### **CIVILIAN PERFORMANCE AWARDS 1990**

Mr. Donald Alt	Ms. Barbara Bishop	Mr. Bernell Connerly
Ms. Barbara Dejoie	Ms. Connie Dummitt	Mr. Gary Jupiter
Mr. David Knouse	Mr. Les Lorig	Mr. Mark Lotz
Ms. Pat McCusker	Ms. Yvette Montgomery	Mr. William Muzzy, III
Mr. Nick Price	Mr. Mike Suchanek	Mr. Bobby Teal
Ms. Angel Vitellaro	Mr. Gilbert Willems	Mr. Ronnie Wilson

### **QUALITY STEP INCREASE 1989**

Mr. Pete Gilreath

### **QUALITY STEP INCREASE 1990**

Mr. Ferris Bolin

### **MERIT PAY AWARD 1989**

Mr. Gary Jupiter  
Mr. William Muzzy, III  
Dr. Marc Weiss  
Mr. Gilbert Willems

### **MERIT PAY AWARD 1990**

Mr. Gary Jupiter  
Dr. Marc Weiss  
Mr. Gilbert Willems

## NAVAL BIODYNAMICS LABORATORY

---

### LETTERS OF APPRECIATION

*1989*

Mr. James Deal

Mr. Gary Jupiter

Mr. Bobby Teal

*1990*

Mr. Donald Alt

Mr. Roger Black

Mr. Mike Buford

Ms. Barbara Dejoie

Mr. Pete Gilreath

Ms. Joan Holland

Mr. George Keen

Mr. Les Lorig

Ms. Pat McCusker

Mrs. James Palmer

Mr. Robin Roth

Ms. Angel Vitellaro

Ms. Jim White

Mr. Robert Wildzunas

### LETTERS OF COMMENDATION

*1989*

Mr. Jim Bartholomew

Ms. Pat Hinson

*1990*

Ms. Barbara Dejoie

Mr. Robin Roth

Mr. William Muzzy, III (2)

### CIVILIAN OF THE QUARTER

*1989*

1st Quarter - Mr. Jim Deal

2nd Quarter - Mr. Bernell Connerly

3rd Quarter - None

4th Quarter - Ms. Angel Vitellaro

*1990*

1st Quarter - None

2nd Quarter - Ms. Barbara Dejoie

3rd Quarter - Mr. Robin Roth

4th Quarter - Mr. Mark Lotz

## ***1989 and 1990 Command History***

---

### **LENGTH OF SERVICE AWARDS**

***1989***

Mr. Ferris Bolin (20)	Mr. Roger Black (20)	Ms. Dorothy Frances (15)
Mr. Sandy Hindman (10)	Mr. Gary Jupiter (15)	Ms. Roseann Labostrie (10)
Mr. James Lambert (10)	Mr. Les Lorig (10)	Mr. William Muzzy, III (15)
Mr. Arthur Prell (10)	Mr. Nick Price (20)	Dr. Marc Weiss (15)
	Mr. Ronnie Wilson (10)	

***1990***

Ms. Patricia Kilgore (15)	Mr. David Knouse (20)	Mr. Bobby Teal (35)
---------------------------	-----------------------	---------------------

### **PROMOTIONS**

***1989***

Ms. Barbara Bishop (GS-12)	Ms. Barbara Dejoie (GS-7)	Ms. Seve Garcia (GS-9)
Ms. Joan Holland (GS-9)	Ms. Pat Kilgore (GS-8)	Mr. Dave Knouse (GS-12)
Ms. Roseann Labostrie (GS-5)	Dr. David Matson (GS-13)	Mr. Nick Price (GS-12)
Ms. Angel Vitellaro (GS-7)		

***1990***

Mr. Franklin Gilreath (GS-12)	Ms. June Gordon (GS-4)	Dr. Sal Guccione (GS-13)
Mr. Robin Roth (GS-9)	Mr. Ronnie Wilson (GS-12)	

# NAVAL BIODYNAMICS LABORATORY

---

## RETIREMENTS

*1989*

Mr. James Bartholomew

*1990*

Ms. Joan Holland

## CIVILIANS

*1989*

### REPORTING

Mr. Jim Guess

Mr. George Keen

Mr. Tony Kirby

Mr. Mark Losh

Ms. Pat McCusker

Ms. Bernice Kaufman

Ms. Ann Gerads

Ms. June Gordon

Mr. Robert Wildzunas

### DEPARTING

Mr. Jim Bartholomew

Mr. Jim Deal

Ms. Pat Hinson

*1990*

Ms. Joan Holland

Mr. Robert Wildzunas

## *1989 and 1990 Command History*

---

### **FAREWELL**

Mr. William H. Muzzy, III served as Head of the Engineering Division of NAVBIODYNLAB from the Laboratory's inception in January of 1971 to July of 1990. Mr. Muzzy supervised the construction of the horizontal and vertical accelerators; vibration facilities; SMS; motion desensitization chair; vivarium; and woodworking, machine and fiberglass shops. Mr. Muzzy served as a member of the research team for both impact accelerations and ship motion simulation programs using HRVs. He served as an expert witness on restraint systems, dummy design and use, and kinematics and dynamics of the human body undergoing impact acceleration. Since 1971, Mr. Muzzy has conducted extensive research into the behavior of occupants under crash conditions. He has conducted dynamic testing using live human subjects, cadavers, primates and anthropomorphic test devices, all with a variety of seats and seat belts. As recognition for his work, he has held a position on the executive board of the STAPP Car Crash Conference for more than a decade. In addition, he has been a prolific contributor to the scientific achievements of NAVBIODYNLAB through numerous journal publications and technical reports, presentations, and participation in various technical panels.



**Mr. William H. Muzzy, III**

# NAVAL BIODYNAMICS LABORATORY

---

