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1983 BOOK

NAVAL
RESEARCH
LABORATORY
WASHINGTON, D.C. 20375

INDEX ON BACK COVER

Report Documentation Page

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This document has been prepared as a reference source of factual information about the Naval Research Laboratory. It shows data as of the end of FY 1982.*

The Naval Research Laboratory has a continuing need for physical scientists, mathematicians, engineers, and support personnel. Vacancies are filled without regard to age, race, creed, color, sex, or national origin. Information concerning current vacancies will be gladly furnished upon request. Address all such inquiries to the Civilian Personnel Office (Code 1800), Naval Research Laboratory, Washington, D.C. 20375.

*Data made available after 30 September and the time of going to press are indicated by (¶).

REVIEWED AND APPROVED
March 1983

John A. McMorris II

(Reviewing Officer)

To: Distribution list for NRL 1983 Fact Book

The following erroneous data appeared on p. 9:

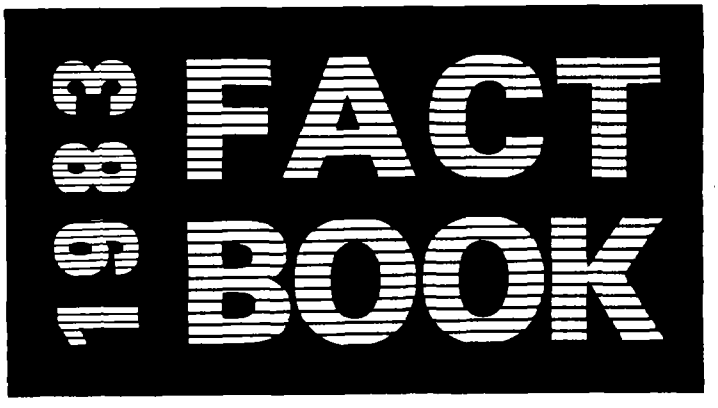
Annual Civilian Turnover Rate (percent)

	1978	1979	1980	1981	1982
Research Divisions	5.4	6.1	11.3	12.6	14.5
Nonresearch Areas	8.0	12.7	13.5	9.2	13.8
Entire Laboratory	6.4	8.7	12.2	10.9	14.2

The corrected data are as follows:

Annual Civilian Turnover Rate (percent)

	1978	1979	1980	1981	1982
Research Divisions	5.4	6.1	13.5	8.0	7.22
Nonresearch Areas	8.0	12.7	11.3	10.9	8.25
Entire Laboratory	6.4	8.7	12.2	9.1	7.63



NAVAL RESEARCH LABORATORY
WASHINGTON, D.C. 20375

CONTENTS


DEPARTMENT OF THE NAVY
NAVAL RESEARCH LABORATORY
DEPARTMENT OF THE NAVY
NAVAL RESEARCH LABORATORY

Mission . . .

To conduct a broadly based multidisciplinary program of scientific research and advanced technological development directed toward new and improved materials, equipment, techniques, systems, and related operational procedures for the Navy. In fulfillment of this mission, the Naval Research Laboratory:

Initiates and conducts scientific research of a basic and long-range nature in scientific areas of special interest to the Navy.

Conducts exploratory and advanced technological development deriving from or appropriate to the scientific program areas.

Within areas of technological expertise, develops prototype systems applicable to specific projects.

Performs scientific research and development for other naval commands and, where specially qualified, for other agencies of the Department of Defense and, in defense-related efforts, for other Government agencies.

Upon request from appropriate naval commands, assumes responsibility as the Navy's principal R&D center in areas of unique professional competence.

Serves as the principal activity for the Navy and its contractors in providing accurate calibration, test, and evaluation services on acoustic transducers and materials; in providing a service whereby an inventory of calibrated standard acoustic transducers are maintained for issue; and in performing research and development to advance the state-of-the-art of acoustic measurements and standard transducers.

Performs research and development on sonar transducers and related acoustic materials.

Furnishes scientific consultative services for the Navy and, where specially qualified, for other agencies of the Department of Defense and, in defense-related efforts, for other Government agencies.

Provides to the Navy determinations of performance characteristics of developmental and prototype devices through limited engineering test and evaluation services.

Introduction to NRL . . .

The Naval Research Laboratory (NRL) was officially established on July 2, 1923, as the Naval Experimental and Research Laboratory. NRL still occupies its original site on the banks of the Potomac River in the southwest sector of Washington, D.C. Over the past 60 years, the facility has grown from a modest beginning of five buildings and a few hand-picked scientists representing two major research areas—radio and underwater sound. Indeed, the Laboratory is often referred to as the Navy's corporate research laboratory, a designation confirming the breadth of NRL's research mission. Current resources include a Main Laboratory expanded to some 52.2 hectares (129 acres), about 20 field sites, more than 400 buildings and structures, and a full-time permanent work force in the neighborhood of 3200.

The overall management of the Laboratory is under the direction of a Naval Commanding Officer and a civilian Director of Research. The internal structure of the Laboratory consists of five management support divisions and five directorates, each headed by an Associate Director of Research. The Technical Services Directorate includes five major divisions and detachments, and the four Research Directorates are comprised of 15 research divisions and one detachment.

Current Research . . .

The following 10 headings represent broad fields of NRL research. Underneath each are more specific topics that are being investigated for the benefit of the Navy and other sponsoring organizations. Some details of this work are given in the *NRL Review*, published annually. More specific details are published in reports on individual projects provided to sponsors and presented when feasible as papers for professional societies or their journals.

Computer Science and Artificial Intelligence
- Standard Computer Hardware, Development Environments, Operating Systems, and Runtime Support Software
- Methods of Specifying, Developing, Documenting, and Maintaining Software
- Techniques for Naval Needs

Device Technology
- Integrated Optics
- Radiation-Hardened Electronics
- Microelectronics
- MM Wave Technology
- Hydrogen Masers for GPS

Directed Energy Technology
- High-Energy Lasers
- Chemical Lasers
- Laser Propagation
- High-Power Microwave Sources
- Charged-Particle Devices

Electronic Warfare
- Decoys (RF and IR)
- Repeaters/Jammers, EO/IR Active Countermeasures
- EW/C^3CM System Concepts

Enhanced Maintainability, Reliability, and Survivability Technology
- Coatings
- Lubricants and Greases
- Water Additives and Cleaners
- Fire Safety
- Laser Hardening
- Satellite Survivability

Environmental Effects on Naval Systems
- Marine Environment
- Meteorological Effects on Electrooptical System Performance
- Air Quality in Confined Spaces
- Electromagnetic Background in Space
- Solar Activity
- Ionospheric Behavior

Information Management
- Antijam Communication Links
- Network Architectures
- Combat Management Information Systems

Materials
- Material Processing
- Advanced Alloy Systems
- Rapid Solidification Technology

High-Temperature Materials
Laser Fabrication and Processing
Ceramics and Composite Materials

Surveillance and Sensor Technology
Imaging Radars
Target Classification/Identification
Towed Acoustic Arrays
Underwater Acoustic Propagation
Electromagnetic Sensors-Gamma Ray to RF Wavelengths
SQUID for Magnetic Field Detection

Undersea Technology
Autonomous Vehicles
Bathymetric Technology
Anechoic Coatings

Mobile Research Platforms

SEA: In 1971, NRL began using the newly constructed oceanographic research vessel, the USNS Hayes, a 3475-metric ton catamaran. In recent years, cost for the ship's operations escalated making it increasingly difficult to obtain sponsor usage of the Hayes. In FY83 the Military Sealift Command (MSC) per diem costs are expected to exceed $20K per day. At this time, operating funds for the USNS Hayes have not been identified for FY83. NRL continues to use a mix of Pool Auxiliary General Oceanographic Research Ships (AGORS) for at-sea research programs.

Three four-engine turboprop P-3A "Orion" aircraft

One four-engine turboprop P-3B "Orion" aircraft

Three of the "Orion" aircraft are especially configured for scientific support. The ASW suites have been completely removed and the interiors have been converted for research project installations.

The fourth "Orion" is in fleet ASW configuration.

Patents and Papers

In breaking new ground during many of these projects, NRL scientists and engineers developed many improved devices and techniques. For such innovations, Laboratory researches were awarded 43 patents during 1982. And since its founding, they have received 2895 patents.

The practical results of work on the projects listed above and on others that are undertaken in response to sponsor requests are made known and available not only to various Navy units, but also to the Army, Air Force, the Defense Advanced Research Projects Agency, the Defense Nuclear Agency, and other Federal organizations. Moreover, NRL's research is reported to the scientific community in hundreds of presentations, journal articles, and reports every year. During the year ending September 30, 1982, NRL staff members were responsible for 830 journal articles, 262 Memorandum Reports, 97 Formal Reports and 1037 presentations. There were 207 papers authored by NRL staff members which appeared in conference proceedings.

Major Facilities and Capabilities

(Listed Alphabetically by Organizational Unit)

Acoustics Division

- Large tank instrumented for investigating acoustic echo characteristics of targets
- Tank 9.1 m (30 ft) in diameter by 6.7-m (22-ft) deep for precise studies of transducer and other underwater devices
- Multichannel Programmable Digital Data Processing System: a system of DEC computers, high-speed array processors, and peripherals for up to 256 channels. Designed for acoustic surveillance array processing

Aerospace Systems Division

- Hypervelocity Gun ranges
- Navigation Technology Satellite tracking stations
- Digital Image Processing Laboratory

Chemistry Division

- Submicron Analytical Facility
- Langmuir Blodgett Film Facility
- Chemical Diagnostic Facility
- Surface Diagnostic Facility
- Tribology Facility
- Paint and Coating Facility
- Mechanical and Chemical Characterization of Polymers Facility
- Surface Cleaning Facility
- Alternate and Petroleum-Derived Fuels Facility
- Combustion Research Facilities
- High-Temperature Chemistry Facility
- Fire Research Facilities

Chesapeake Bay Detachment (CBD, Chesapeake Beach, MD)

- Radar Experimental Test Site, which includes a variety of radars; ancillary equipment for test and evaluation of equipment, concepts and techniques; and over-water ranges
- Tactical Electronic Warfare Test Site
- Communications facilities for transmission to and from land, sea, and air
- Hypervelocity gun for ballistics research
- Ship Motion Simulator with 11-metric-ton (12-ton) payload capacity
- Fire Test Facility for fire extinguishment research
- Boat Services

Condensed Matter and Radiation Sciences Division

- Helium-3 Dilution Refrigerator
- 75-MeV Sector-Focusing Cyclotron
- 60-MeV Linear Electron Accelerator (Linac)
- 5-MV Positive Ion Van de Graaff Accelerator
- Ion Implantation Facility
- 2-MV Electron Van de Graaff Accelerator
- Cobalt-60 source

Electronics Technology Division

- Microelectronics Processing Facility
- Electron Beam Lithography System
- Electron microscope and electrooptical analytical devices
- High Resolution Scanning Electron Microscope/Scanning Transmission Electron Microscope
- Crystal-growing facilities including Molecular Beam Epitaxy
- High-Field Magnet Facility
- A variety of electronic testing and analysis facilities

Engineering Services Division

- Mechanical, electronic, and project engineering and design
- Manual and computer-aided design and drafting
- Shops for machining, sheet metal, welding, casting, plating, plastics, printed circuits, electronic assembly, and other fabrication services
- A wide variety of testing and repair capabilities

Environmental Sciences Division

- Waldorf Annex (lower site). This facility is instrumented for continuous recordings of atmospheric-electricity, micro-meteorologic, and lightning-flash data, and is utilized for numerous investigations into environmental phenomena
- Balloon Launch and Tracking Facility (at CBD). Includes a shelter for inflating balloons and two GMD radiosound receiving and tracking units
- Gas Chromatography Facility
- Electrophysiological Laboratory
- Neurophysiological Laboratory
- Closed aquarium system for culturing marine borers
- 30.5-m (100-ft) wave tank for studying dynamics of wind waves and their interactions with long waves; uses microwave doppler spectrometry and optical and photometric techniques
- Towed Thermistor Chain: an array of temperature sensors and/or other sensors used in oceanographic research

Health Physics Staff

- X-Ray and Gamma-Ray Irradiation Facility

Information Technology Division

- Microwave Space Research Facility
- Satellite Communications Antenna Facility
- Computer Architecture Simulation and Evaluation Facility
- HF Modem and Channel Simulation Facility
- HF Antenna Range

Laboratory for Computational Physics

- Computational Physics Laboratory
- Remote job entry terminal to T.I. ASC System—Class VI Parallel/Pipeline Computer
- Dicomed D-38 Design Station and available Dicomed Microfilm Recorder
- Graphics and file edit terminals and hard copy units

Laboratory for Structure of Matter

- Two x-ray diffractometers
- Electron diffractometer

Marine Technology Division

- Computer-aided Experimental Stress Analysis
- Shock and Vibration Laboratory
- Wave Channel: a 30-m channel with fan and mechanical wave-maker instrumented for the study of wave generation and wave effects
- Water tunnel: a large blow-down water channel with a 15-m long test section for acoustic and flow-induced vibration studies of towed line arrays and flexible cables
- Tow channel: a 20-m dual carriage tow channel with variable stratification for studies of geophysical flows and wakes

Material Science and Technology Division

- High-Level Radiation Laboratory
- Computerized Mechanical Test Laboratory
- Electron microscopes and other microanalytical equipment
- High-energy Laser Test Facility

Optical Sciences Division

- Electron-beam, electron-beam sustained, and UV preionized laser devices with spectroscopic and other diagnostic equipment
- Reactive-lens and short-pulse excitation apparatus for kinetic mechanisms investigations
- Optical Warfare Laboratory
- Mobile, High Precision Optical Tracker
- Facilities for synthesis and characterization of optical glass compositions and for the fabrication of optical fibers
- Hybrid optical/digital image processing facility
- Facilities for fabrication and testing integrated optical devices
- Optical probes laboratory to study viscoelastic, structural and transport properties of molecular systems
- Computer IR/EO Technology/Systems Simulation Center
- Kilojoule Laser Research Facility
- 15 Gigawatt glass laser facility for X-ray laser pumping research

Beam lines at the National Synchrotron Light Source, Brookhaven for extensive materials characterization

Focal Plane Array Evaluation Facility

Plasma Physics Division

Gamble I and II High-Voltage Pulsed Power Generators

PHAROS II Two-Beam Neodymium-Glass Laser and Target Facility

1000-J NRL CO_2 Laser

Public Works Division

Construction, engineering, repair, and other services to maintain and improve NRL's physical facilities

Radar Division

Antenna Measurement Laboratory

MADRE Over-the-Horizon Radar (at CBD); Sea-Echo HF Radar Facility (at San Clemente, CA)

Radar Area Measurement System

Radar Research and Development Activity (at CBD)

Versatile C-, X-, and K_a-band Monopulse precision tracking radar systems (at CBD)

IFF Ground Station

Interpretation Facility for Synthetic Aperture Radar (SAR)

Airborne APS-116 Radar with SAR Processing

Recording and Control System for Airborne Adaptive Array Research

AUTEC Instrumentation Radar (at Andros, Bahama Islands)

Research Computation Division

Texas Instruments Advanced Scientific Computer, an extremely large, fast, and powerful computational system particularly well suited for scientific usage including vector calculations

Off-Line Graphics Capability via TID's DICOMED

DEC-10 Timesharing Computer

PDP-11 Media-to-Media Transfer Facility

Space Science Division

E. O. Hulburt Center for Space Research

26.0-m (85-ft) radio telescope (at Maryland Point)

Other antennas for radio astronomy

Space Systems Division

Anechoic Chambers

Thermal Vacuum Chambers

Spin Balance Facility

Acoustics Facility

Vibration Facility

Clean-Room Facilities

Satellite Tracking & Command Facility

Supply Division

Acquisition, storage, distribution, and disposal of materials and equipment required by the Research Directorates

Tactical Electronic Warfare Division

Mobile Infrared Signature Measurement and Simulation Facility

Mobile ESM Laboratory

Hybrid RF/IR Missile Seeker Simulation Facility

Central Target Simulation Facility for developing, testing, and evaluating EW systems and techniques, using real-time, hardware-in-the-loop models

RF Simulation Laboratory and signal simulators

Radar Cross Section Measurement Facility (at CBD)

Search Radar ECM simulator

Tactical EW Environment Simulator

Technical Information Division

Editorial, graphic, photographic, composition, and printing services; public affairs; technical library; exhibit and presentation support, and computer graphics services

Underwater Sound Reference Detachment (Orlando, FL)

2.8-hectare (7-acre) lake with a large pier and instrumentation for underwater acoustic studies

Anechoic tank for simulating ocean depths up to 700 m (2297 ft)

Smaller pressure vessels for simulating depths to 7000 m (22,966 ft)

Field station at Bugg Spring with floating platform and instrumentation for acoustic measurements

Military and Civilian Personnel

Military Personnel Attached to NRL as of end of FY 82

Officers	Authorized	On Board
Captain	3	3
Commander	8	7
Lieutenant Commander	8	8
Lieutenant	13	14
Lieutenant (Junior Grade)	1	0
Ensign	0	0
Warrant Officer	3	0
Total	36	32
Enlisted	107	101

All Full-Time Civilians on Board as of end of FY 82

Senior Executive Service		28
Classification Act (GM/GS)		2586
Scientific and Professional	1363	
Technical Supporting	505	
General Administrative & Clerical	718	
Federal Wage System		522
Wage Grade (WG)	433	
Apprentices (WT)	18	
Printing & Lithographic Service (WI)	11	
Supervisory Wage Grade (WS)	39	
Supervisory Planners & Estimators (WN)	2	
Planners, Estimators, etc. (WD)	17	
Leaders (WL)	2	
Total		3136

Annual Civilian Turnover Rate (percent)

	1978	1979	1980	1981	1982
Research Divisions	5.4	6.1	11.3	12.6	14.5
Nonresearch Areas	8.0	12.7	13.5	9.2	13.8
Entire Laboratory	6.4	8.7	12.2	10.9	14.2

Highest Academic Degrees Held by Permanent Employees as of end of FY 82

Bachelors	510
Masters	326
Doctorates	670

Fiscal Information

NRL FUNDING BY MAJOR SPONSOR

SPONSOR	FY 1982 Actual Millions of Dollars	FY 1982 Percent	FY 1983 Estimated Millions of Dollars	FY 1983 Percent
R&D Program				
ONR	71.3	26.0	77.8	24.8
CNM	1.6	0.6	3.0	1.0
NAVELEX	54.7	19.9	64.5	20.5
NAVAIR	23.3	8.5	28.3	9.0
NAVSEA	24.8	9.0	28.0	8.9
Other Navy	56.9	20.7	76.1	24.2
Total Navy	232.6	84.7	277.7	88.4
Other DOD	23.8	8.7	20.4	6.5
Non-DOD	11.7	4.3	12.7	4.1
Total R&D Program	268.1	97.7	310.8	99.0
Non-R&D Program	2.5	0.9	3.1	1.0
Capital Improvement	3.8	1.0	1	
Total Funds	274.4	100.0*	314.0	100.0

BUDGET BY COST ELEMENT (Millions of Dollars)

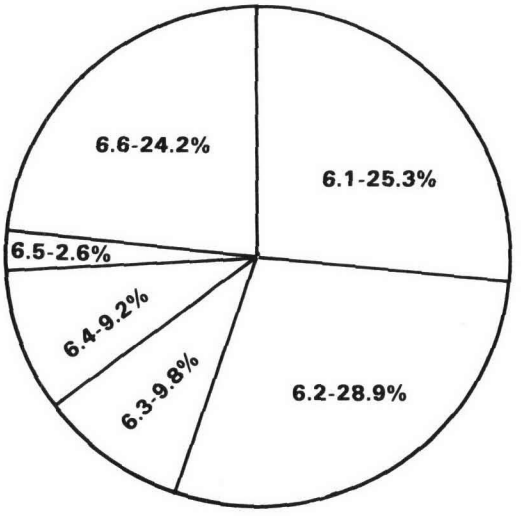
Purpose	FY 1982	FY 1983
Salaries and wages	116.5	124.3
Contracts and procurements	123.8	145.0
Materials, supplies	18.1	19.8
Other costs	16.0	24.9
TOTAL	274.4	314.0

CAPITAL PROPERTY

Type or Class	Acquisition Value as of end of FY 82 ($K)
Class 1 (Land)	353
Class 2 (Buildings and improvements)	93,007
Class 3 (Equipment over 1.0 K)	48,245
Class 4 (Industrial production equipment)	17,346
Class 5 (Minor property)	9,440
Class 0 (Sponsor-owned equipment)	41,032
Total Capital Property	209,423

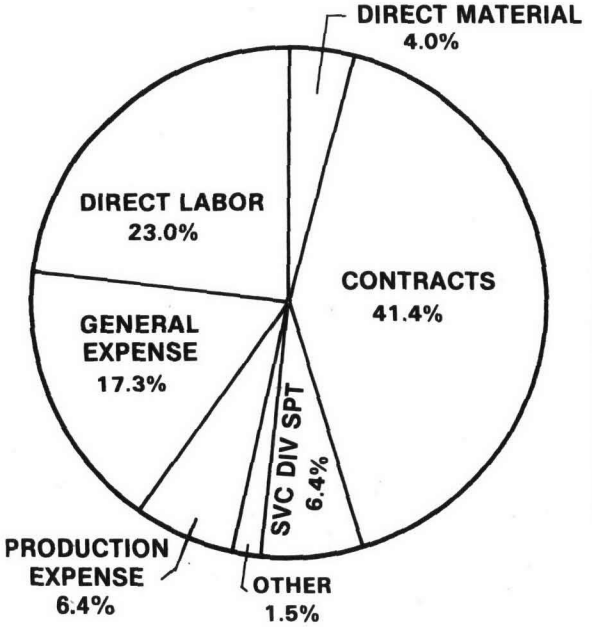
*Rounded to 100%

RDT&E, N FUNDS BY CATEGORY
PLANNED OBLIGATIONS FY 1983



	(MILLIONS)
6.1 RESEARCH	64.4
6.2 EXPLORATORY DEVELOPMENT	73.6
6.3 ADVANCED DEVELOPMENT	25.0
6.4 ENGINEERING DEVELOPMENT	23.3
6.5 MANAGEMENT & SUPPORT	6.7
6.6 OPERATIONAL SYSTEMS DEVEL.	61.5
TOTAL	254.5

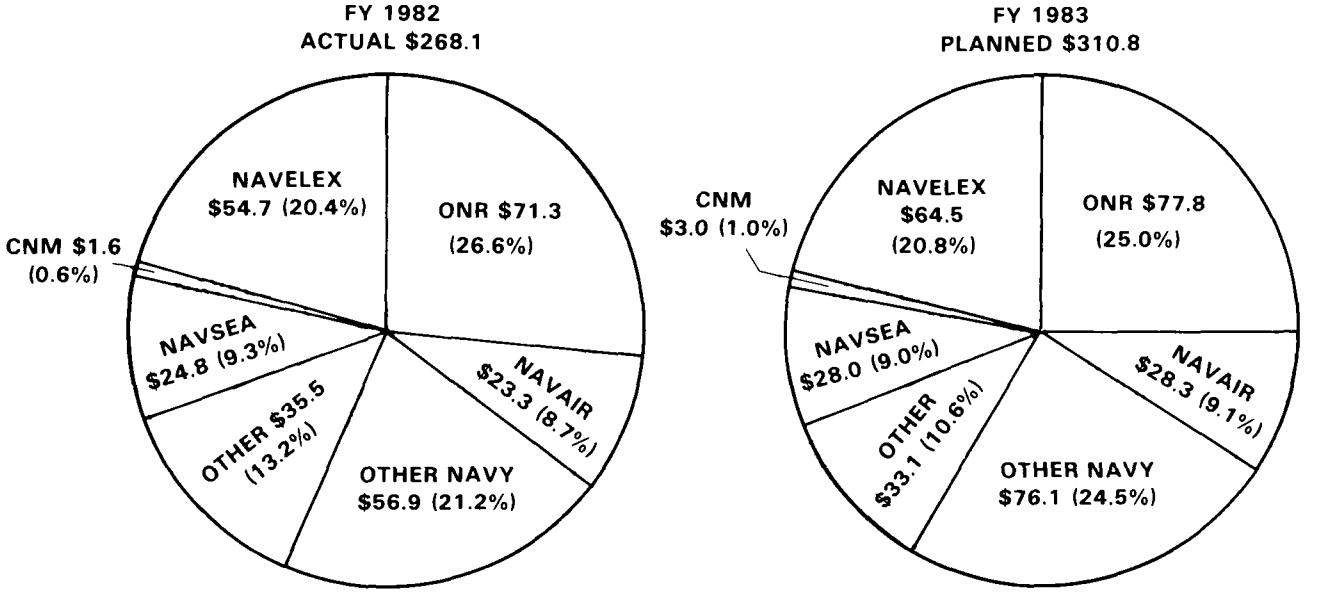
DISTRIBUTION OF R&D OBLIGATIONS
FY 1983 PLAN



	(MILLIONS)
DIRECT LABOR	$ 71.5
DIRECT MATERIAL	12.3
CONTRACTS	128.6
SERVICE DIVISION SUPPORT	19.8
OTHER	4.8
APPLIED OVERHEAD:	
PRODUCTION EXPENSE	19.9
GENERAL EXPENSE	53.9
TOTAL	310.8

SOURCES OF R&D FUNDS

(IN MILLIONS)



ONR	- OFFICE OF NAVAL RESEARCH
NAVELEX	- NAVAL ELECTRONIC SYSTEMS COMMAND
NAVSEA	- NAVAL SEA SYSTEMS COMMAND
CNM	- CHIEF OF NAVAL MATERIAL
NAVAIR	- NAVAL AIR SYSTEMS COMMAND

R&D PROGRAM
FUNDS BY TYPE

(IN MILLIONS)

TYPE OR PURPOSE OF FUNDS	FY 82		FY 83	
	ACTUAL	PERCENT	PLANNED	PERCENT
RDT&E, N				
6.1 RESEARCH	$ 60.0	22.4	$ 64.4	20.7
6.2 EXPLORATORY DEVELOPMENT	62.0	23.1	73.6	23.7
6.3 ADVANCED DEVELOPMENT	17.6	6.6	25.0	8.0
6.4 ENGINEERING DEVELOPMENT	16.5	6.2	23.3	7.5
6.5 MANAGEMENT & SUPPORT	7.0	2.6	6.7	2.2
6.6 OPERATIONAL SYSTEMS DEVEL.	43.3	16.1	61.5	19.8
SUBTOTAL	206.4	77.0	254.5	81.9
OPN	12.5	4.7	11.0	3.5
O&MN	11.8	4.4	10.5	3.4
OTHER	37.4	13.9	34.8	11.2
TOTAL	268.1	100.0	310.8	100.0

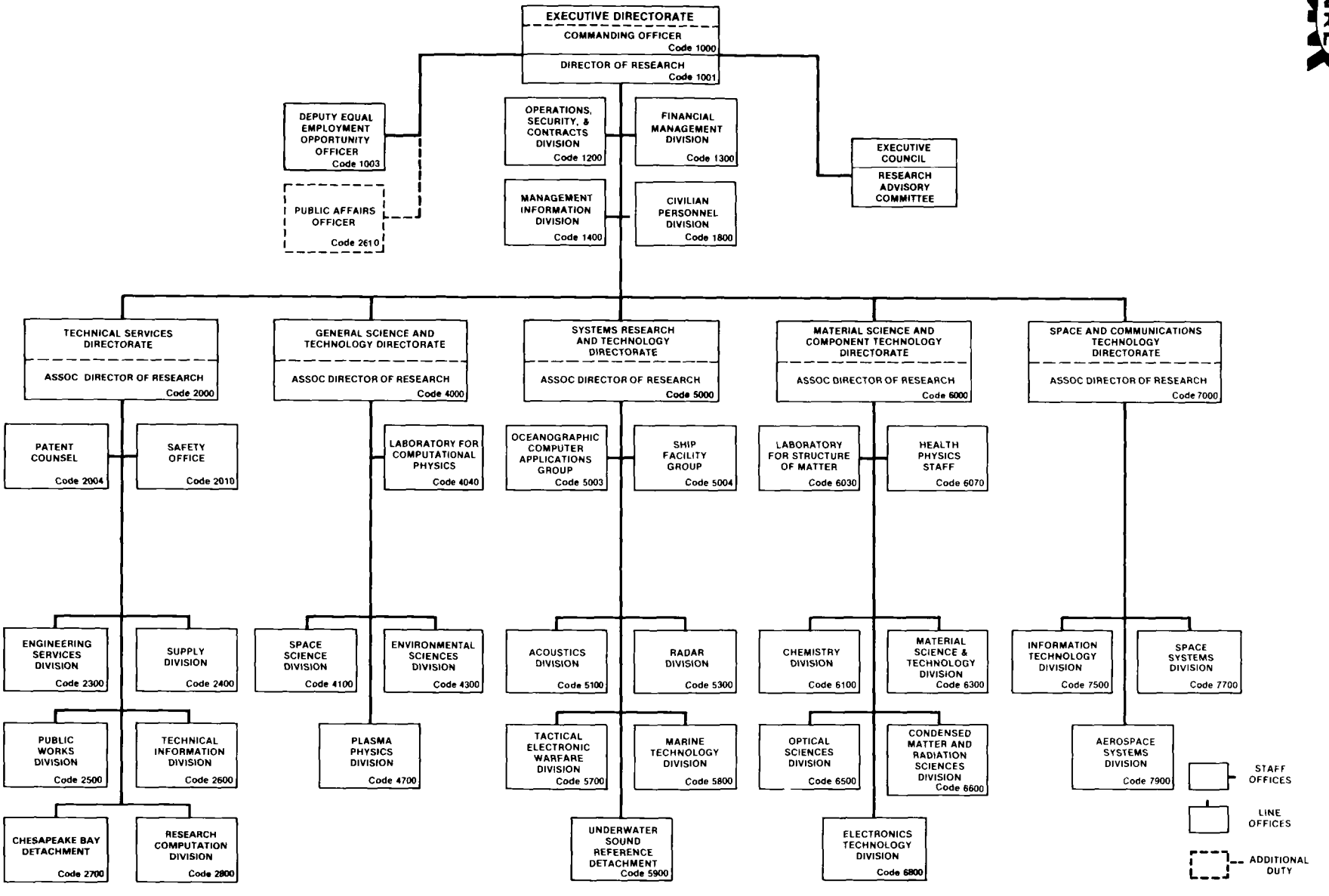
NRL Sites and Facilities

Station and Location	Acreage			Buildings and Structures
	Navy Title	Easement or Purchase	Permit or Lease	
District of Columbia				
NRL	129.23		1.29	154
Cyclotron Building Site, Bolling AFB			5.24	1
Virginia				
Radio Research Site, Coast Guard Radio Station, Alex.			55.40	
Atmospheric Monitoring Facility, Big Meadows Util. Area, Shenandoah Nat'l Park			NA[1]	
Maryland				
NRL Flight Support Detachment, NAS Patuxent River			[2]	
Chesapeake Bay Det., Chesapeake Beach[3]	167.90			183
Multiple Research Site, Tilghman Is.	2.00			12
Dock Facility, Fishing Ck., Ches. Bay			0.60	5
Theodolite Station, North Beach			0.29	1
NRL Waldorf Annex, Waldorf[3]	23.94	35.16		37
Radio Astronomy Observatory, Md. Pt.	24.30		197.88	13

[1]NA (not applicable)—Indicates an insignificant area,frequently just a location for instruments.
[2]Site or equipment used by NRL under an intraservice (Navy) or interservice agreement.
[3]Also included in list of "Major Facilities and Capabilities."

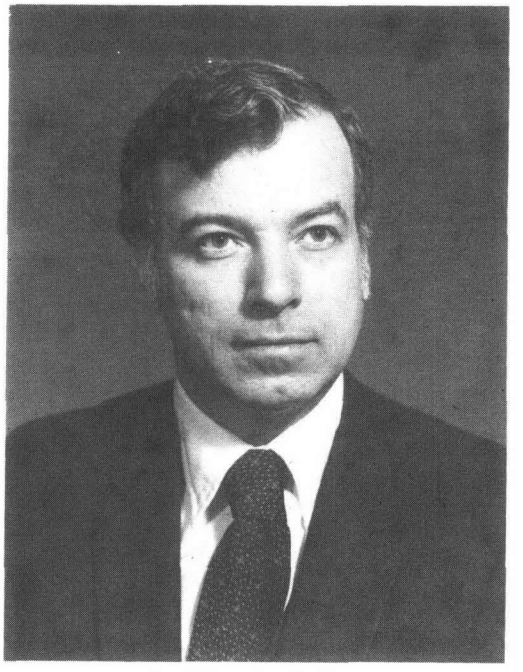
Station and Location	Acreage			Buildings and Structures
	Navy Title	Easement or Purchase	Permit or Lease	
Radio Antenna Range				
USAF Receiver Site, Brandywine			22.98	
Free Space Antenna Range, Pomonkey	14.12	28.40		13
Satellite Tracking Facility, Blossom Point			135.57	
Florida				
Underwater Sound Reference Det., Orlando[3]	10.46			31
USRD, Leesburg Facility, Bugg Spring[3]			65 0	9
Totals:	371.95	63.56	484.25	459

NAVAL RESEARCH LABORATORY



The Executive Directorate

Captain J. A. McMorris II, USN



Dr. Timothy Coffey

The Commanding Officer and Director of Research share executive responsibility for the management of the Naval Research Laboratory; however, in accordance with Navy requirements, the Commanding Officer is responsible for the overall management of the Laboratory and exercises the usual functions of command including compliance with legal and regulatory requirements, liaison with other military activities as well as the general supervision of the quality, timeliness, and effectiveness of the technical work and of the support services.

The Commanding Officer delegates line authority and assigns responsibility to the Director of Research for the technical program, its planning, conduct, and staffing; evaluation of the technical competence of personnel; liaison with the scientific community; selection of subordinate technical personnel, and exchange of technical information and the effectiveness of the NRL mission.

Within the limits of Navy requirements, the Commanding Officer and the Director of Research share authority and responsibility for the internal management of the Laboratory. The Commanding Officer retains all authority and responsibility specifically assigned to him by higher authority.

The mission of the Laboratory is carried out by the four science and technology directorates supported by the Technical Services Directorate and the Executive Directorate. In addition, the Laboratory's operating staffs provide assistance in their special fields to the Commanding Officer and the Director of Research. The operating staffs are listed on the following pages of this publication.

Commanding Officer

Captain John Allen McMorris II, USN, was born in New York, N.Y. on April 7, 1935. Upon graduation from the United States Naval Academy in June 1957 (3rd in a class of 848), he reported to the USS *Alfred A. Cunningham* (DD 752) for duty with the Pacific Fleet. In December 1958, he was reassigned to the commissioning crew of the USS *Morton* (DD 948), where he subsequently served as Division Officer, Command Duty Officer, and Sea Detail and General Quarters OOD.

In June 1960, he was ordered to the Massachusetts Institute of Technology, where he was awarded the degrees of Master of Science (Naval Architecture and Marine Engineering) and Naval Engineer in June 1963, and Doctor of Science (Electrical Engineering) in June 1965. He was designated an Engineering Duty Officer in June 1963.

In June 1965, he was transferred to the Naval Ship Systems Command, where he managed the Submarine Surveillance Equipment Program and, subsequently, various surface force reconnaissance efforts. In August 1969, he was reassigned to the Naval Electronics Laboratory Center, serving first as a Deputy Department Head and then directing the NELC Planning Office.

In September 1972, he returned to Washington, D.C., spending a year in DDR&E (Navigation and Position Location Systems), two years with the Assistant Secretary of the Navy (Installation and Logistics) (Special Assistant for Telecommunications), and one year with PM-4.

From August 1976 to August 1978, he was assigned to the Special Communications Project Office, Naval Electronic Systems Command (Deputy Project Manager for Technical Direction). In August 1978, he became Deputy and Assistant Chief of Naval Research. Captain McMorris assumed his present duty as Commanding Officer of the Naval Research Laboratory on September 4, 1981.

Captain McMorris has been awarded the Legion of Merit, the Meritorious Service Medal, the Navy Commendation Medal, and the National Defense Service Medal. He is a member of the IEEE, and a designated Weapons Systems Acquisition Manager.

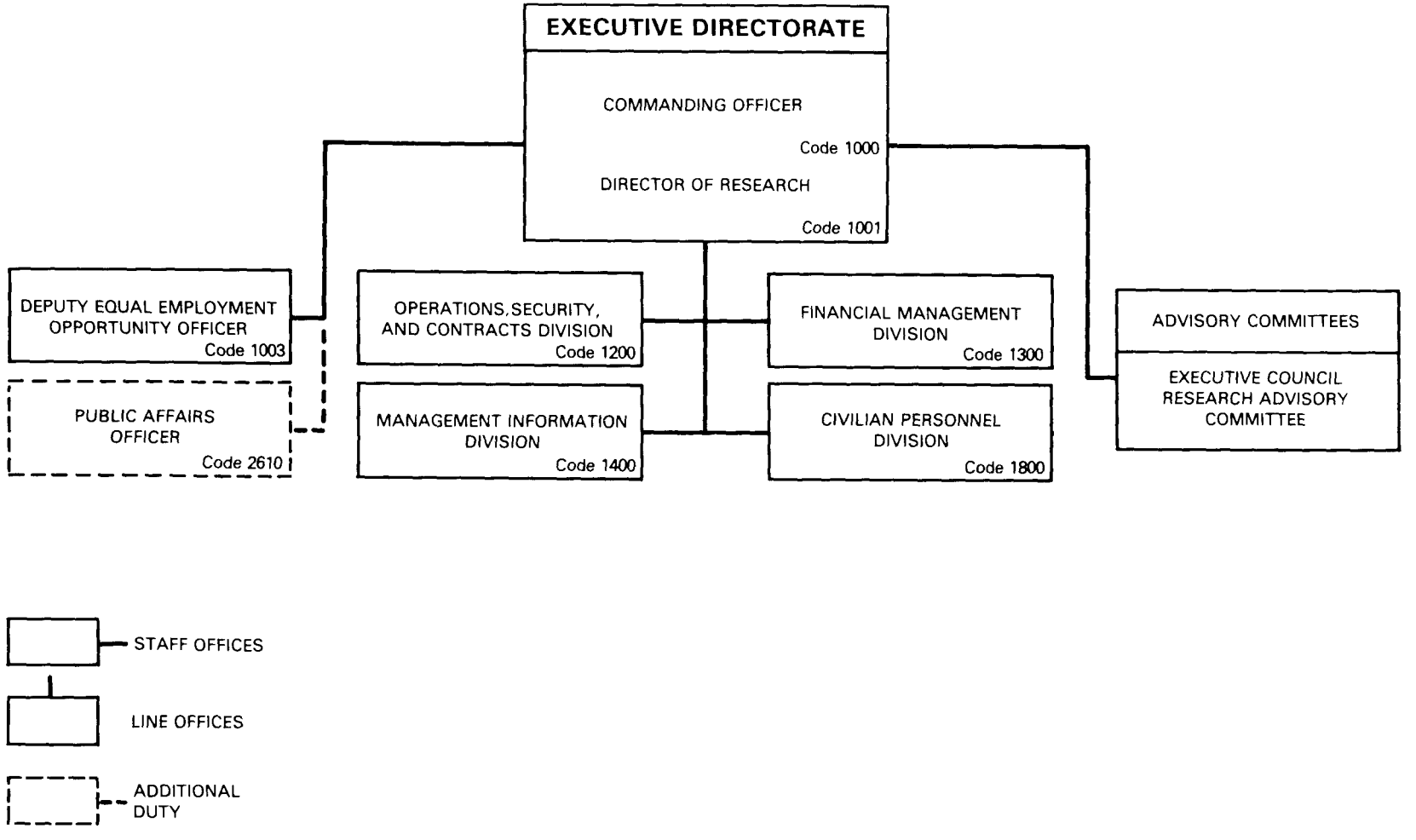
Director of Research

Dr. Coffey [redacted]. He graduated from the Massachusetts Institute of Technology in 1962 with a B.S. degree in electrical engineering. He obtained his M.S. (1963) and Ph.D. (1967), both in physics, from the University of Michigan.

During his graduate career, Dr. Coffey worked as a research assistant at the University of California (1963-64), a research physicist at the Air Force Cambridge Research Laboratories (1964-65), and a teaching fellow and research assistant in physics at the University of Michigan (1965-66). As a scientific consultant for EG&G, Inc. (1966-71), he was involved in investigations in theoretical and mathematical physics.

Dr. Coffey came to the Naval Research Laboratory in 1971, as Head of the Plasma Dynamics Branch, Plasma Physics Division. In this position, he directed research in the simulation of plasma instabilities, the development of multidimensional fluid and magnetohydrodynamic codes, and the development of computer codes for treating chemically reactive flows. In 1975, he was named Superintendent, Plasma Physics Division; he was appointed Associate Director of Research for General Science and Technology on January 1, 1980. On November 28, 1982, he was named Director of Research.

Dr. Coffey is recognized as an authority on the theory of nonlinear oscillations and has played a major role in the national program on high-altitude nuclear effects. The author or co-author of over 70 publications and reports, he has made several fundamental contributions to the theory of electron beam-plasma interaction and to the understanding of plasma processes in the earth's ionosphere.


EXECUTIVE DIRECTORATE
COMMANDING OFFICER
Code 1000
DIRECTOR OF RESEARCH
Code 1001
DEPUTY EQUAL EMPLOYMENT OPPORTUNITY OFFICER
Code 1003
PUBLIC AFFAIRS OFFICER
Code 2610
OPERATIONS, SECURITY, AND CONTRACTS DIVISION
Code 1200
MANAGEMENT INFORMATION DIVISION
Code 1400
FINANCIAL MANAGEMENT DIVISION
Code 1300
CIVILIAN PERSONNEL DIVISION
Code 1800
ADVISORY COMMITTEES
EXECUTIVE COUNCIL RESEARCH ADVISORY COMMITTEE
STAFF OFFICES
LINE OFFICES
ADDITIONAL DUTY

Key Personnel

Name	Title	Code
CAPT J.A. McMorris II, USN	Commanding Officer	1000
Dr. T. Coffey	Director of Research	1001
Ms. Sol del Ande Eaton	Dep. Eq. Empl. Op. Officer	1003
Mr. J.W. Gately, Jr.	Public Affairs Officer	2610
CAPT J. B. Morris, USN	Chief Staff Officer	1200
Mr. R.W. Steinbeck	Comptroller	1300
Dr. A.H. Aitken	Head, Management Information Division	1400
Mr. D.J. Blome	Head, Civilian Personnel Division	1800
Mr. A.B. Bligh	Head, Research Computation Division	2800
Mr. J.D. Brown	Associate Director of Research for Technical Services	2000
Dr. T. Coffey *	Associate Director of Research for General Science and Technology	4000
Mr. R.R. Rojas	Associate Director of Research for Systems Research and Technology	5000
Dr. A.I. Schindler	Associate Director of Research for Material Science and Component Technology	6000
Dr. B. Wald	Associate Director of Research for Space and Communications Technology	7000

DEPUTY EQUAL EMPLOYMENT OPPORTUNITY OFFICER

Basic Responsibilities


Ms. Sol del Ande Eaton

The Deputy Equal Employment Opportunity Officer serves as the personal representative of the Commanding Officer of the Naval Research Laboratory. As such, the Deputy is responsible for planning, developing, directing, and evaluating the Federal Women's Program, the Hispanic Employment Program, and the full implementation of Public Law 92-261, Executive Orders, Department of the Navy directives, and related statutes and orders. The Deputy advises the Commanding Officer and key management officials about employment policies and practices that may be barriers to employment or advancement to applicants or employees, and makes recommendations on effective methods to remove those barriers, so that those whom the laws were designed to protect from discrimination will be able to seek and secure employment, and embark on their career goals on an equitable basis.

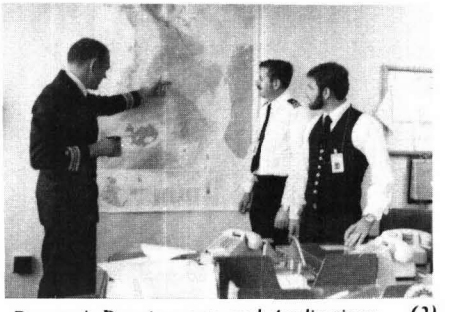
The Deputy is the responsible manager for the EEO Program at NRL and the administrator of the complaint processing system. He or she is responsible for planning and implementing EEO training for supervisors and for conducting surveys and studies relating to NRL's Affirmative Action Program Plan; acts as ex-officio member of the EEO committee and trains and assists EEO counselors in settling initial complaints of alleged discrimination. Members of the EEO staff include: the Federal Women's Program Manager (FWPM) Gwen VanHoosier, the Hispanic Employment Program Manager (HEPM) Dr. Albert W. Saenz, and Equal Opportunity Assistant, Gloria Rogers.

*Acting

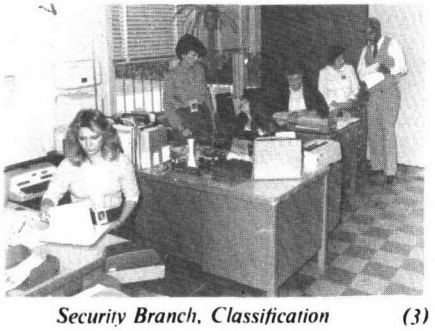
Operations, Security, and Contracts Division

- **FLIGHT DETACHMENTS**
- **CONTRACT STAFF SERVICES**
- **PERSONNEL AND PHYSICAL SECURITY**
- **PROCUREMENT SERVICES**

Operational Services *(1)*

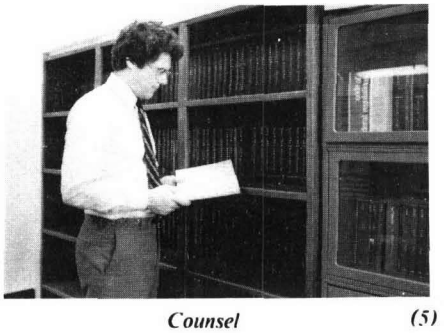


Research Requirements and Applications *(2)*



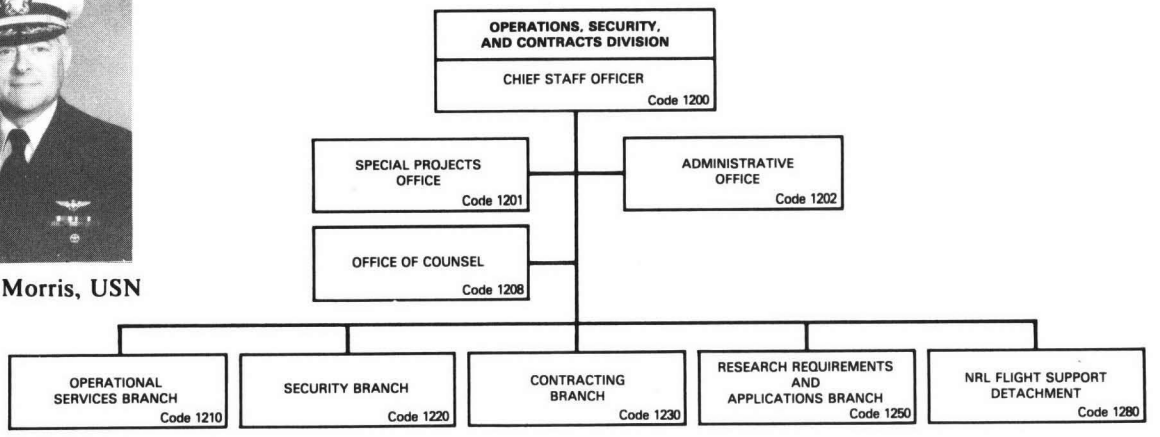
Security Branch, Classification Management and Control *(3)*

Contracts *(4)*



Counsel *(5)*

CAPT J.B. Morris, USN



Basic Responsibilities

The Operations, Security, and Contracts Division provides a military staff to the Commanding Officer and to the Director of Research, Naval Research Laboratory, for the purpose of direct research support and assisting in the military aspects of the management of the Laboratory. The staff is the liaison with DOD and Navy Commands and activities and the operating forces of the Navy in support of NRL research and development operations and the coordination of the military applications of the scientific work of the Laboratory. Direct research support is provided through operation of four multiengine Laboratory aircraft. In addition the staff obtains and coordinates such additional air, surface, and subsurface services as are required. The Operations, Security, and Contracts Division is also responsible for information, physical, personnel, communications, and ADP security.

The Division provides major procurement services which include consultant/advisory contract staff services, administration and monitoring of contract performance, legal counsel and services in the field of procurement, business and commercial law, civilian personnel law, and government regulations and laws which affect the Laboratory.

Key Personnel

Name	Title
CAPT J.B. Morris, USN	Chief Staff Officer
CAPT F.K. Duffey	Special Projects Coordinator
Ms. M.L. Bond ¶	Administrative Officer
Mr. K.E. Nelligan	Legal Counsel
CDR W.D. McClellan, USN	Operational Services Officer
Mr. J.R. Gallagher	Communications/Message Center
Mr. M.B. Ferguson	Head, Security Branch
Mr. F. Washington	Head, Classification Management and Control Section
Mr. W.C. Bryan	Head, Special Security Office/Special Activities Office
Mr. R.E. Abercrombie	Head, Personnel and Physical Security Section
Mr. T. Arnold	Head, Contracting Branch
LT. M.A. Neil	Deputy Head, Contracting Branch
Vacancy	Head, Contract Section #1
Mr. S.C. Toleman	Head, Contract Section #2
Mrs. V.H. Dean	Head, Contract Section #3
CDR L.W. Snyder, USN	Head, Research Requirements and Applications Branch
CDR D.P. Glanzman, USN	Head, OIC, NRL Flight Support Detachment

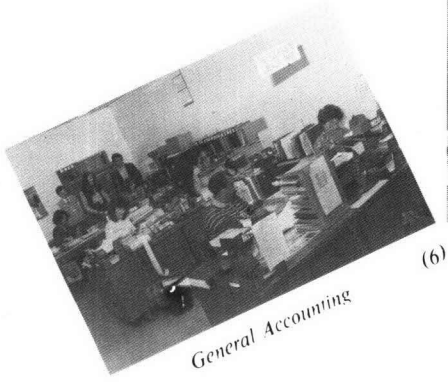
Civilian Personnel

Full-Time Permanent: 102
Military: 131

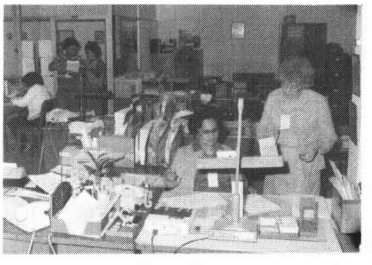
¶ See footnote inside front cover

Financial Management Division

- GENERAL ACCOUNTING
- COST ACOUNTING
- SYSTEMS ACCOUNTING
- DISBURSING
- BUDGET
- INTERNAL REVIEW

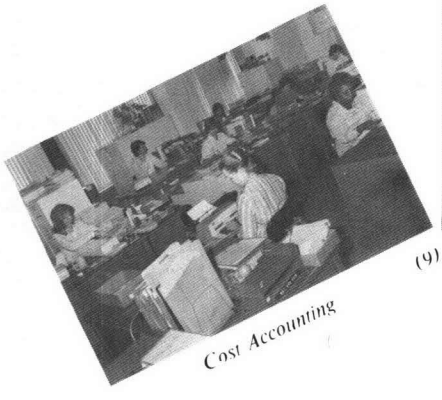


General Accounting (6)



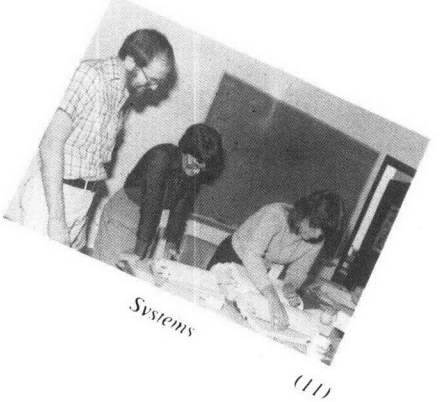
Payroll (7)

Fiscal Section (8)

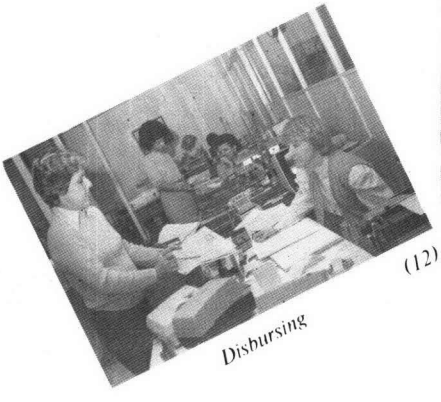


Cost Accounting (9)

Secretaries (10)



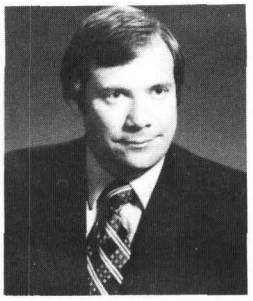
Systems (11)



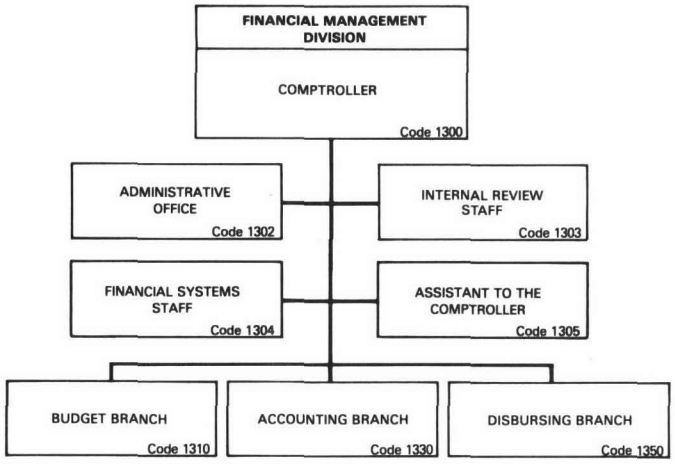
Disbursing (12)

Budget (13)

Internal Review (14)



Mr. R. W. Steinbeck



Basic Responsibilities

The Comptroller is the financial adviser to the Commanding Officer, the Director of Research and other officials of the Laboratory, and administers the financial program of the Laboratory.

The Financial Management Division provides service to the Laboratory in budget formulation and funds administration, program and budget analysis, accounting and reporting, and disbursing. In addition, it provides internal review and control services to protect the integrity of the Laboratory's financial operations.

Key Personnel

Name	Title
Mr. R.W. Steinbeck	Comptroller
Mrs. Aileen Sullivan ¶	Administrative Officer
Mr. J.A. Gordon	Head, Internal Review Staff
Mr. T.J. Santmyer	Head, Financial Systems Staff
Mr. E.S. York	Assistant to the Comptroller
Mr. D.M. Johnson	Head, Budget Branch
Mr. M.C. Mills	Head, Accounting Branch
Mr. A.E. Thomas	Head, Disbursing Branch

Civilian Personnel

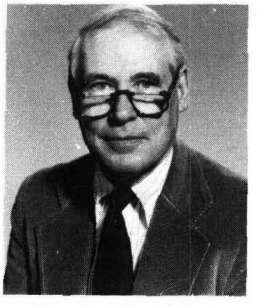
Full-Time Permanent: 71

¶See footnote inside front cover

Management Information Division

Basic Responsibilities

The Management Information Division provides support to the Commanding Officer and the Director of Research in all aspects of Command and general management as well as technical direction and management. Specific functions include: (1) organizational surveys and analysis; (2) program documentation; (3) Laboratory position management; (4) Laboratory directives; (5) integrated management information systems; (6) financial and resource analysis; (7) technical program review; (8) facilities allocation and space management; (9) program coordination; (10) direct technical support to the Director of Research through individual or small group study efforts on selected technical projects and (11) technical support by management of scientific projects and programs which do not logically fit into the mission of one of the research divisions or require the combined efforts of two or more research divisions.



Dr. A. H. Aitken

Key Personnel

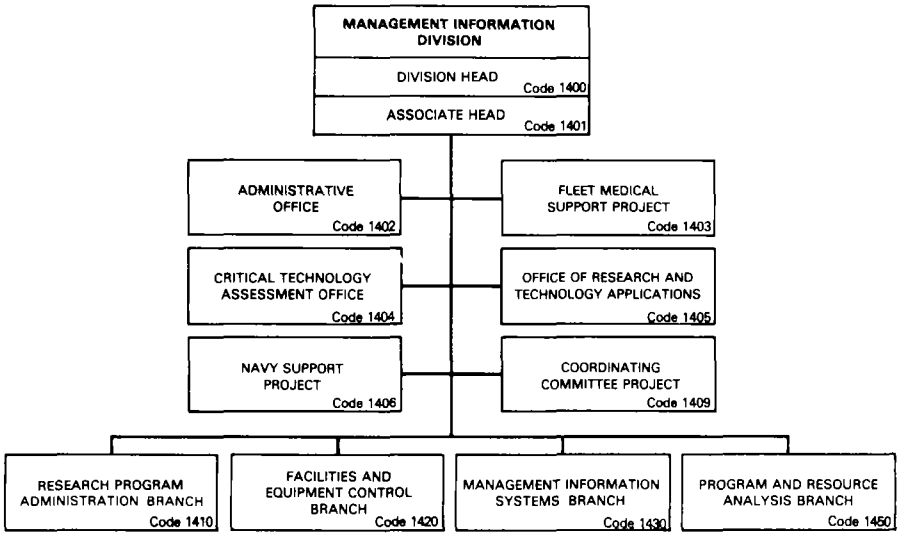
Name	Title
Dr. A.H. Aitken	Head, Management Information Division
Mrs. B.A. Maag	Administrative Officer
Mr. L.M. Winslow	Head, Critical Technology Assessment Office
Mr. E.M. Man, Jr.	Head, Research Program Administration Branch
Ms. C. Gardinier	Head, Facilities and Equipment Control Branch
Mr. R.L. Guest	Head, Management Information Systems Branch
Dr. S. Teitler	Head, Program and Resource Analysis Branch

Civilian Personnel

Full-Time Permanent: 81

Total Estimated R&D Funding

Fiscal Year 1983: $1,950,000


MANAGEMENT INFORMATION DIVISION
DIVISION HEAD
Code 1400
ASSOCIATE HEAD
Code 1401
ADMINISTRATIVE OFFICE
Code 1402
FLEET MEDICAL SUPPORT PROJECT
Code 1403
CRITICAL TECHNOLOGY ASSESSMENT OFFICE
Code 1404
OFFICE OF RESEARCH AND TECHNOLOGY APPLICATIONS
Code 1405
NAVY SUPPORT PROJECT
Code 1406
COORDINATING COMMITTEE PROJECT
Code 1409
RESEARCH PROGRAM ADMINISTRATION BRANCH
Code 1410
FACILITIES AND EQUIPMENT CONTROL BRANCH
Code 1420
MANAGEMENT INFORMATION SYSTEMS BRANCH
Code 1430
PROGRAM AND RESOURCE ANALYSIS BRANCH
Code 1450

Civilian Personnel Division

- PERSONNEL OPERATIONS
- EMPLOYEE DEVELOPMENT
- EMPLOYEE RELATIONS

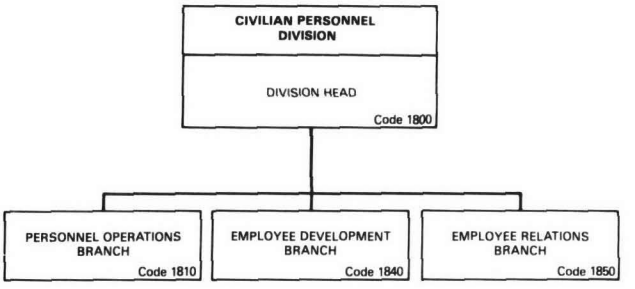
Employee Orientation Programs *(15)*

Employee Relations Administration *(16)*

Personnel Actions, Records and Reports *(17)*

Audiovisual Aids for Support of Training Programs *(18)*

Mr. D.J. Blome



Director of Civilian Personnel

The Director of Civilian Personnel (ONR Code 102MP) of the Consolidated Civilian Personnel Office (Headquarters, ONR, NRL, and Naval Ocean Research & Development Activity) is Mr. F.D. Wallace. His office is located at the Office of Naval Research, Ballston Towers #1, 800 North Quincy Street, Arlington, VA 22217. The on-site NRL Division Head is Mr. D.J. Blome.

Basic Responsibilities

The Civilian Personnel Division administers the Laboratory's personnel program, which includes selection, development, promotion, utilization, appropriate recognition, and employee counseling and services for all civilian personnel.

Key Personnel

Name	Title
Mr. F.D. Wallace	Director of Civilian Personnel (ONR Code 102MP)
Mr. D.J. Blome	Head, Civilian Personnel Division
Mr. D.J. Blome	Head, Personnel Operations Branch
Mr. A.H. Sass	Head, Employee Development Branch
Mr. F. Carter	Head, Employee Relations Branch

Civilian Personnel

Full-Time Permanent: 50

The Technical Services Directorate

The Associate Director of Research for Technical Services is a Senior Executive who reports to the Commanding Officer and the Director of Research of NRL. The primary responsibilities of the position are the supervision, coordination, and control of the administrative and technical service operations required in support of the work of the Research Directorates.

The Associate Director of Research for Technical Services is responsible for:

Directing and coordinating the service divisions and detachment of the Laboratory (Engineering Services, Supply, Public Works, Technical Information, Research Computation, and Chesapeake Bay) and also the staff functions (Safety Office, Administrative Office, and Patent Counsel) so that services rendered are responsive to the mission of the Laboratory and efficient in the use of personnel and funds.

Participating in the planning of the scientific program and following the progress of the scientific efforts of the Laboratory to ensure that timely Directorate decisions support the scientific program without the need for detailed guidance by the Director of Research.

Recommends short- and long-range organization plans for the technical services areas to best serve and advance the research mission; advising on and participating in allocation of resources to meet the technical services mission and support research.

Making recommendations to the Commanding Officer and the Director of Research of NRL on matters requiring their attention, decision, or other action; acting for them in the approval of designated actions; ensuring adequate support to them on administrative actions, correspondence, reports, and similar matters.

The Associate Director of Research for Technical Services keeps in constant touch with the Director of Research to ensure that the technical service units of the Laboratory are providing appropriate support to the scientific divisions and detachment; coordinates with the Director of Research in the planning and carrying out of administrative actions affecting the organizations and personnel of the Research Directorates; and maintains a close working relationship with the Chief Staff Officer and staff to ensure provision of technical services in operations conducted by the Chief Staff Officer. The Associate Director of Research for Technical Services also has direct "line" authority over the heads of special staff and service divisions of the Technical Services Directorate.

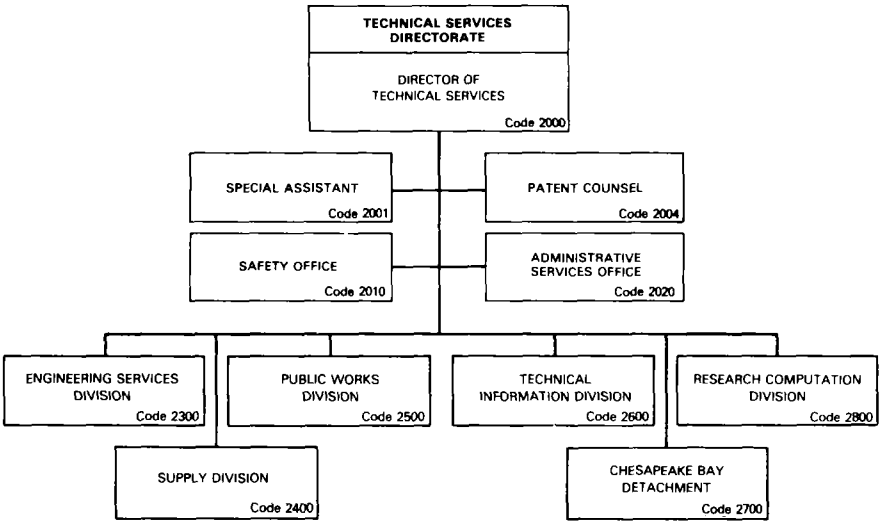
Associate Director of Research for Technical Services

Mr. Jack D. Brown

Mr. Brown [redacted], [redacted]. He graduated from Michigan State University in 1943, with a BS Degree in Physical Chemistry. He was called to active duty in the U.S. Army in 1943, and remained on active duty until he joined the Naval Research Laboratory March 1, 1971.

Mr. Brown served as Associate Superintendent of the Plasma Physics Division NRL from 1971 to 1981, when he was assigned duties as Director Technical Services. In addition to his regular duties, he has been responsible for organization and operation of a number of Laboratory-wide multidisciplinary study efforts on non-accoustic ASW and anomalous geophysical phenomena.

During his military service, Mr. Brown was designated an Atomic Energy Specialist and engaged in research and teaching in long-range detection of nuclear explosions, development and testing of nuclear weapons and the effects of nuclear explosions in space. During this period he planned or served as technical director for nuclear effects tests in space, underground and over open ocean. He also organized and coordinated major geophysical expeditions to observe solar eclipses and polar cap ionospheric events. From 1952-1953, he served as a guest scientist at the National Bureau of Standards where he investigated the infrared emissivity of metals at cryogenic temperatures.



Key Personnel

Name	Title	Code
Mr. J.D. Brown	Associate Director of Research for Technical Services	2000
Mr. G.R. Reed III	Special Assistant	2001
Dr. W.T. Ellis	Patent Counsel	2004
Mr. H.C. Kennedy, Jr.	Safety Officer	2010
Mrs. L.V. Dabney	Head, Administrative Office	2020
Mr. J.D. Brown*	Engineering Services Officer	2300
CDR J.R. McGraa, SC, USN	Supply Officer	2400
CDR J.W. MacLaughlin, CEC, USN	Public Works Officer	2500
Mr. E.E. Kirkbride	Head, Technical Information Division	2600
Vacancy	Chesapeake Bay Detachment Officer	2700
Mr. A.B. Bligh	Head, Research Computation Division	2800

*Acting

OFFICE OF PATENT COUNSEL

Basic Responsibilities

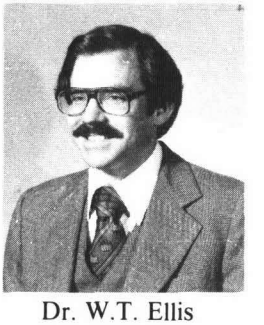
The Office of Patent Counsel provides services concerning inventions, patents, patent royalty charges, trademarks, copyrights, technical data rights, computer software licensing and other related matters. Patent applications are prepared, filed and prosecuted on NRL inventions of significance to the Federal government. The patent counsel serves as consultant and adviser on patent and data clauses in research and development and procurement contracts, claims of patent or copyright infringement involving NRL, and the provisions in interagency agreements relating to inventions, patents, trademarks, copyrights, and related matters. Assistance is provided to the research directorates through state-of-the-art searches in the patent literature pertinent to particular research problems.

Key Personnel

Name	Title
Dr. W.T. Ellis	Patent Counsel

Civilian Personnel

Full-Time Permanent: 5



Dr. W.T. Ellis

SAFETY OFFICE

Basic Responsibilities

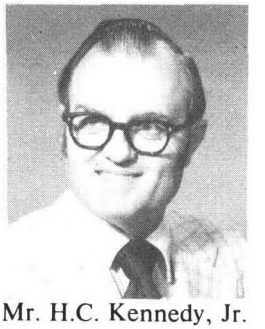
The Safety Office administers the Laboratory's safety and health program except in the fields of microwave and radiological safety. Its responsibilities include inspection, training, and education. It also conducts accident investigations, prepares directives, provides accident prevention information, directs the activities of safety representatives and committees, reviews hazardous experiments, and guides management in matters of safety.

Key Personnel

Name	Title
Mr. H.C. Kennedy, Jr.	Head, Safety Office

Civilian Personnel

Full-Time Permanent: 4



Mr. H.C. Kennedy, Jr.

Administrative Services Office

Basic Responsibilities

The Administrative Services Office provides staff support to administrative officials of the Laboratory in the areas of travel management, records and correspondence management, files management, mail and messenger service, forms management, design and analysis, report management analysis and control, and directives control for all components of the Laboratory. The office also provides for the NRL code directory control, the administration of the Laboratory parking facilities, and management of the Administrative Paperwork Reduction Program. In addition, the office conducts direct routine administrative correspondence with other units of the Navy, DoD, and other governmental and civilian agencies.

Key Personnel

Name	Title
Mrs. L.V. Dabney	Head, Administrative Services Office
Mrs. C. Schmitt	Administrative Officer
Mrs. L.T. Warder	Head, Records and Correspondence Management Branch
Mr. J.L. Poole	Head, Mail and Messenger Branch

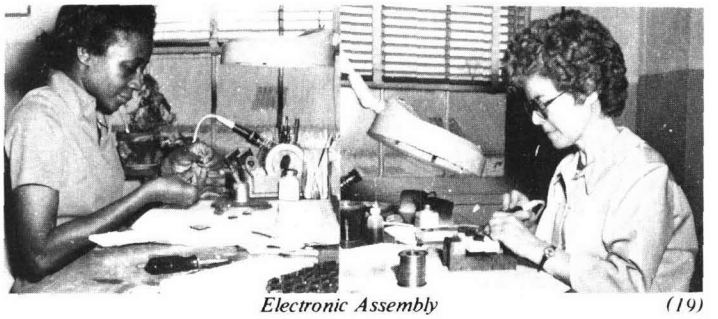
Mrs. L.V. Dabney

Civilian Personnel

Full-Time Permanent: 31

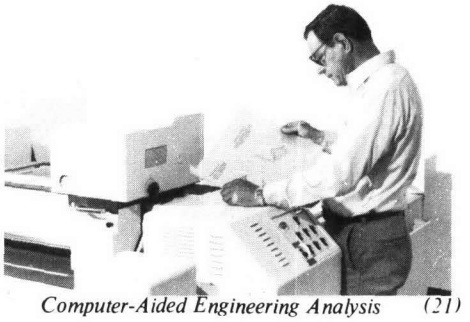
Engineering Services Division

- MECHANICAL ENGINEERING AND DRAFTING
- ELECTRONIC ENGINEERING
- QUALITY ASSURANCE ENGINEERING
- INDUSTRIAL SERVICES



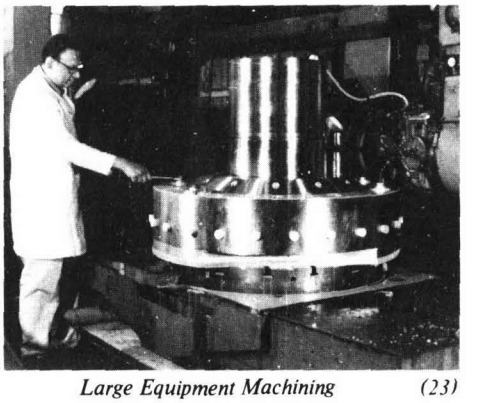
Electronic Assembly *(19)*

Machine and Sheet Metal Shop *(20)*

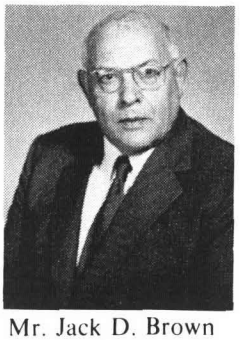


Computer-Aided Engineering Analysis *(21)*

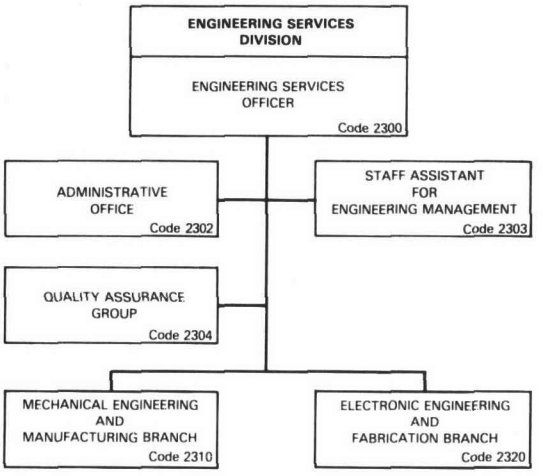
Quality Assurance Testing *(22)*



Large Equipment Machining *(23)*



Mr. Jack D. Brown



Basic Responsibilities

The Engineering Services Division provides the engineering, design, fabrication, assembly, and test of experimental research equipment in support of the Laboratory's research efforts.

Key Personnel

Name	Title
Mr. J.D. Brown*†	Engineering Services Officer
Mrs. A. Cox	Administrative Officer
Mr. M.A. Shimkus¶	Staff Assistant for Engineering Management
Mr. Q.A. Blush	Quality Assurance Group
Mr. J.L. Leizear	Head, Mechanical Engineering and Manufacturing Branch
Mr. J.E. Vrancik	Head, Electronic Engineering and Fabrication Branch

Civilian Personnel

Full-Time Permanent: 186

*Acting
†Additional duty
¶See footnote inside front cover

Supply Division

- **STAFF SERVICES**
- **AUTOMATED INVENTORY MGT. SYSTEM**
- **PURCHASING**
- **RECEIPT CONTROL**
- **MATERIAL**
- **TECHNICAL**

Computer System used for Material Procurement *(24)*

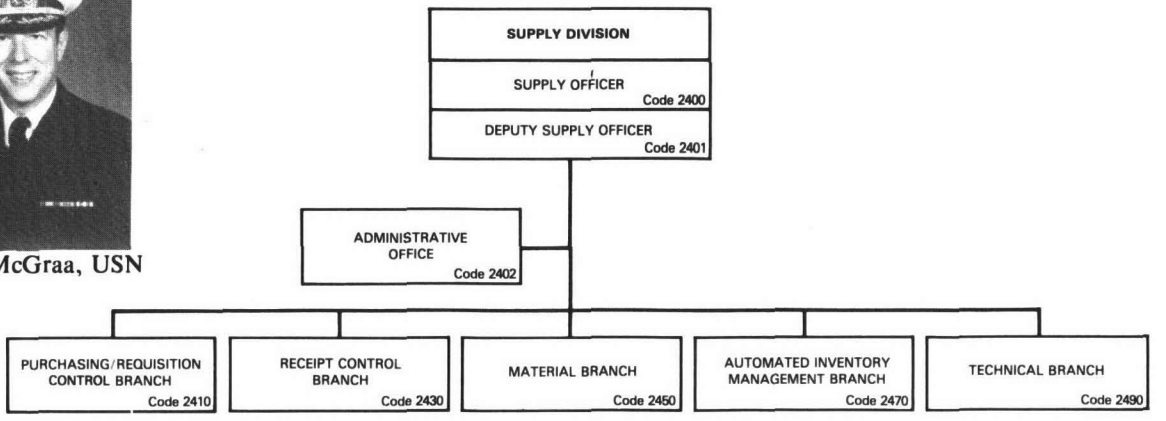
Off-Loading and Delivery of Compressed Gases *(25)*

Inspection of Incoming Material *(26)*

Processing Incoming Procurement Requests *(27)*

Administration, and Management *(28)*

CDR J.R. McGraa, USN



Basic Responsibilities

The Supply Division provides logistical functions to the Laboratory and its field activities, including the operation of supply issue stores; procurement of equipment, material, and contractual services; receipt, inspection, and delivery of material and equipment; packing, shipping, and traffic management; and disposal of excess and unusable property. In addition, the Division offers technical services to the research directorates in the development of specifications for a complete procurement package; and guidance in the performance stages of contractual services.

During FY 1982, the Supply Division processed 40,000 purchasing actions, which totaled approximately $25,000,000. Inventory in the seven retail stores and bulk warehouse averaged $1,500,000 and 10,000 line items.

Key Personnel

Name	Title
CDR J.R. McGraa, SC, USN	Supply Officer
Mr. S. Georgeadis	Deputy Supply Officer
Mr. A.W. Medley, Sr.	Head, Administrative Office
Vacancy	Head, Purchasing/Requisition Control Branch
Mr. R.G. McLemore	Head, Receipt Control Branch
Mr. G. George	Head, Material Branch
Mrs. E.I. Woodland	Head, Automated Inventory Management Branch
Mr. A.E. Dean	Head, Technical Branch

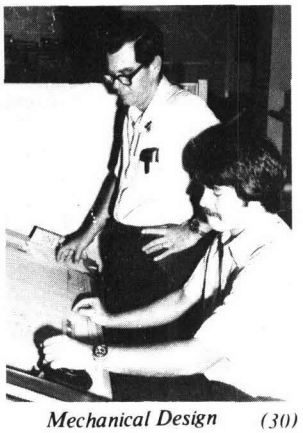
Civilian Personnel

Full-Time Permanent: 127
Military: 2

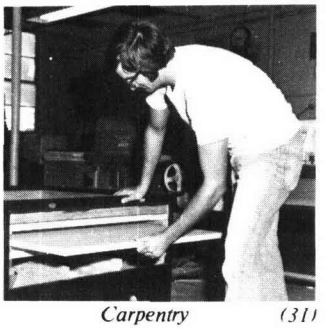
Public Works Division

- ENGINEERING
- MAINTENANCE, UTILITIES, AND TRANSPORTATION
- MAINTENANCE CONTROL
- ADMINISTRATION
- CONTRACTS

Motor Winding Shop (29)

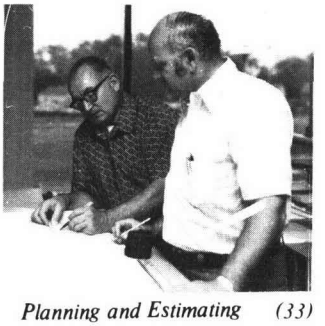


Mechanical Design (30)



Carpentry (31)

Administrative (32)



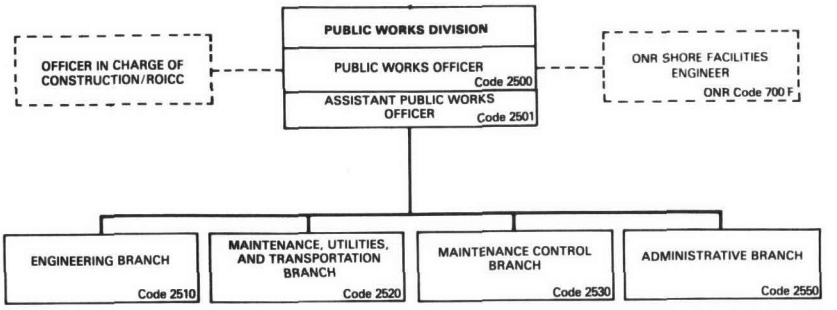
Planning and Estimating (33)

Civil and Architectural Design (34)

Transportation Services (35)

Contracts (36)

CDR J.W. MacLaughlin,
CEC, USN



Basic Responsibilities

The Public Works Division is responsible for the physical plant of NRL. This includes: (a) responsibility for the design, construction, maintenance, and repair of public works and utilities; (b) responsibility for the operation of these public works and utilities in accordance with the technical standards of the Naval Facilities Engineering Command; and (c) supporting the scientific program of the Laboratory by the construction, repair, and alteration of experimental and test equipment. In addition, the Division obtains required approvals for work for which the Division is responsible from the Chesapeake Division of the Naval Facilities Engineering Command; the Office of Naval Research; the Secretary of the Navy; and other authorities as appropriate.

The Public Works Division also supports the Office of Naval Research for Facilities Coordination and supports the Officer in Charge of Construction/Resident Officer in Charge of Construction on all Naval Facilities Engineering Command and certain research and development contracts at NRL.

Key Personnel

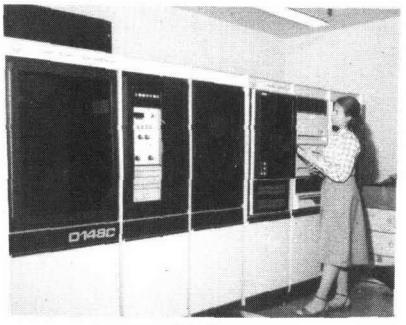
Name	Title
CDR J.W. MacLaughlin, CEC,USN	Public Works Officer/Officer in Charge of Construction/ROICC/ONR Shore Facilities Engineer
LT D. Branigan, USN	Assistant Public Works Officer
Mr. K.C. Perri	Head, Engineering Branch
Mr. L.P. Carpenter	Head, Maintenance, Utilities, & Transportation Branch
Mr. J.P. Kosker	Head, Maintenance Control Branch
Mrs. B.R. Brown	Head, Administrative Branch

Civilian Personnel

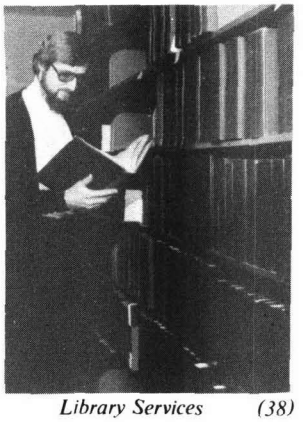
Full-Time Permanent: 339
Military: 2

Technical Information Division

- **INFORMATION SERVICES**
- **TECHNICAL LIBRARY**
- **PUBLICATIONS**
- **PHOTOGRAPHIC**

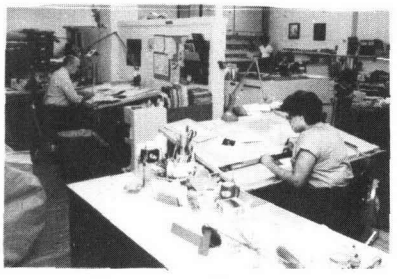


DICOMED Computer *(37)*



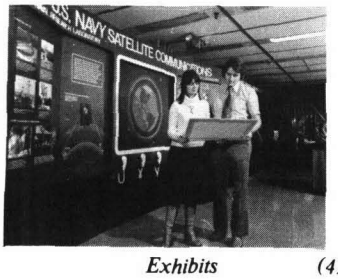
Library Services *(38)*

Data Gathering *(39)*

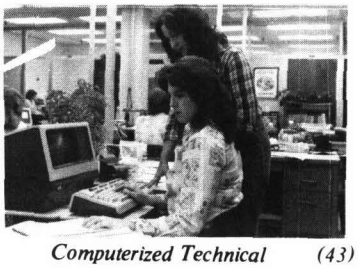


Presentation Support *(40)*

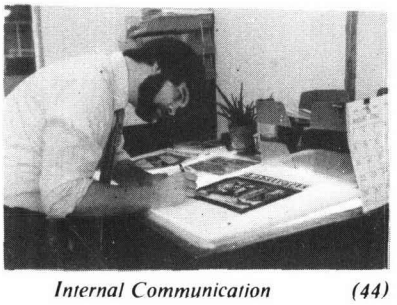
Printing and Reproduction *(41)*



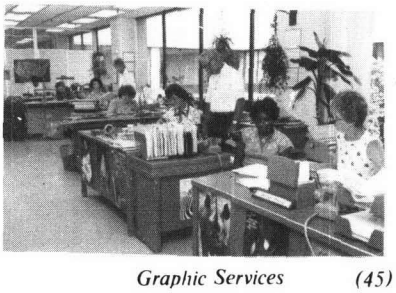
Exhibits *(42)*



Computerized Technical Composition *(43)*

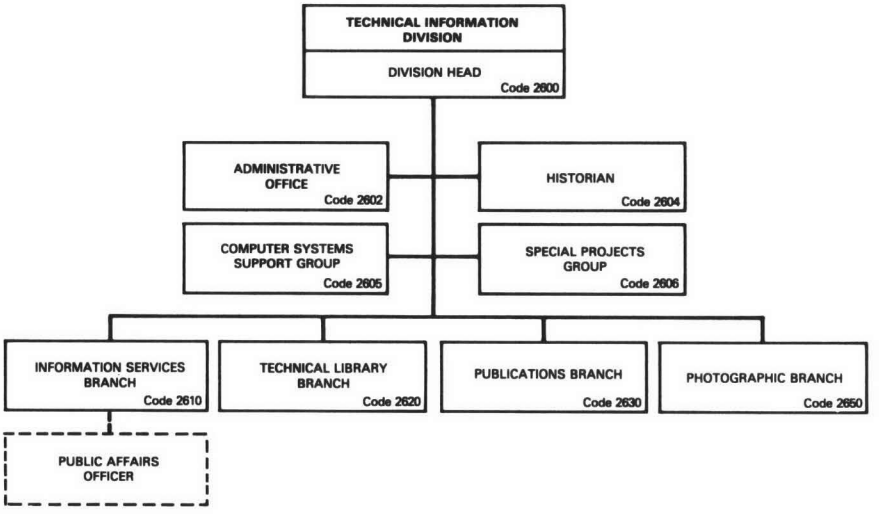


Internal Communication *(44)*



Graphic Services *(45)*

Mr. E.E. Kirkbride

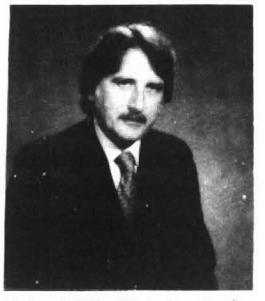


Basic Responsibilities

The function of the Technical Information Division is to provide centralized support to the Laboratory, and sometimes the Office of Naval Research in the collection, retention, processing, publishing, presenting, and distribution of information in many forms to many audiences.

The following are the specific ways the Technical Information Division supports the Laboratory: by providing a full range of Library services, editing and publishing of periodicals and reports, administrative printing services, scientific and general photographic services, illustration and visual aid services, scientific composition, special projects graphics, auditorium and meeting support, collection and maintenance of historical data, exhibits construction and showing, video and film production services, management of public and internal information programs, (Labstracts, NRL's biweekly newspaper) and conducting Freedom of Information Act activities as required by law.

The Public Affairs Officer advises the Commanding Officer and staff on all public affairs matters including external and internal relations; serves as the Commanding Officer's principal assistant in public affairs matters; supervises the Laboratory's public affairs programs, and serves as the focal point for Laboratory implementation of the Freedom of Information Act. These responsibilities are carried out by the Information Services Branch.



Mr. J.W. Gately, Jr.†

Key Personnel

Name	Title
Mr. E.E. Kirkbride	Head, Technical Information Division
Mrs. C. Uffelman	Administrative Officer
Dr. J.A. Pitts	Historian
Mr. J. Lucas	Head, Computer Systems Support Group
Ms. N. Monacelli	Head, Special Projects Group
Mr. J.W. Gately, Jr.	Head, Information Services Branch and Public Affairs Officer†
Mr. P. Imhof	Head, Technical Library Branch
Mr. S.R. Smith	Head, Publications Branch
Mr. W.B. Connick	Head, Photographic Branch

Civilian Personnel

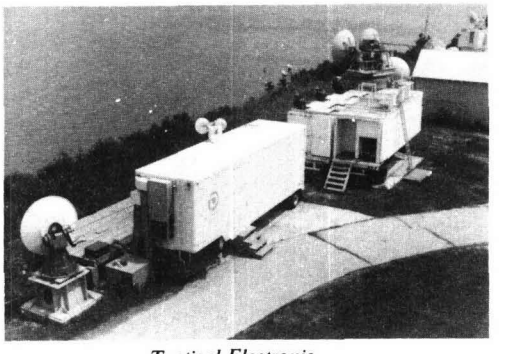
Full-Time Permanent: 120

†Additional duty

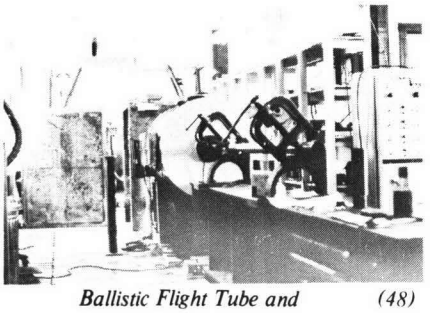
Chesapeake Bay Detachment

- ADMINISTRATIVE
- SECURITY
- OPERATIONS
- MAINTENANCE AND SUPPORT

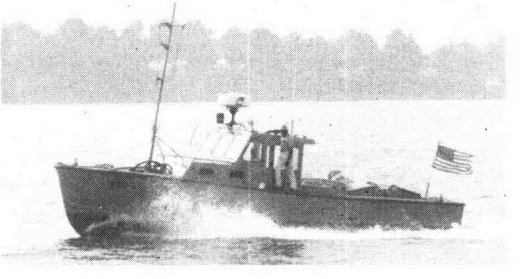
Fire Test Facility (46)



Tactical Electronic Warfare Vans (47)



Ballistic Flight Tube and Target Chamber (48)



Landing Craft Personnel Launch (LCPL) (49)

Tilghman Island Test Facility (50)

Research Division Representatives

Optical Sciences Division
Mr. C. Gott, Field Experiments Representative

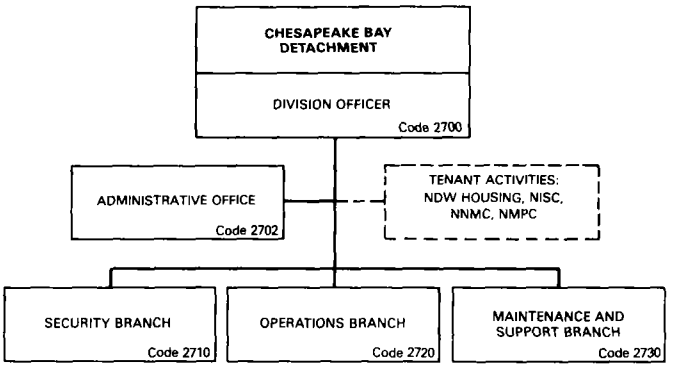
Radar Division
Mr. M. Lehman, Radar Division Representative
Mr. M. Siegert, Target Characteristics Branch
Mr. P. Ward, Search Radar Branch
Mr. M. Lehman, Radar Techniques Branch

Tactical Electronic Warfare Division
Mr. V. J. Kutsch, Tactical Electronic Warfare Division Representative

Material Science and Technology Division
Mr. C. J. Skowronek, Ballistic Range Facility

Space Systems Division
Mr. P. T. Boltz, Impact Vulnerability Staff Representative

Fire Test Facility
Dr. H. W. Carhart



Basic Responsibilities

The Chesapeake Bay Detachment operates and maintains an independent military facility for NRL research. It has a variety of shops, plant facilities, and specialized equipment used in support of the variety of NRL research and development projects which can best be carried out there.

The Physical Plant

Located in a relatively clear area away from congestion and industrial interference, the main site, at Randle Cliff, Maryland, covers 68.1 hectares (167.9 acres) containing 183 structures of various sizes and types of construction, six of which are major laboratory buildings. There is over 86 m (282 ft.) of usable dock space with a controlling water depth of 2.1 m (7 ft.), located 3.2 km (2 mi.) north of the main site in Chesapeake Beach. Off-site facilities include the Tilghman Island Facility, located directly across the Bay from CBD at a range of 16.25 km (10 mi.).

Research watercraft available at CBD include 17-m (56-ft.) landing craft, one Jack-up-Barge, and one 11-m (36-ft.) patrol boat and an 8-m (26-ft.) motor boat. These are used in support of research projects and for transportation to off-site facilities.

Key Personnel

Name	Title
Vacancy	Officer in Charge
Mrs. M.J. Hamor	Administrative Officer
Mr. W.S. Kratz	Security Officer
BMC M.R. Fisher	Operations Officer
Mr. R.G. Trott	Facilities Manager and Head, Maintenance and Support Branch†

Civilian Personnel

Full-Time Permanent: 42
Military: 2

Research Computation Division

Basic Responsibilities

The Research Computation Division (RCD) provides for the operation and maintenance of the Laboratory's central computer facilities for the benefit of all divisions and detachments of the Laboratory; provides system software support services for its computers; and provides a variety of user support and applications programming services. The RCD also provides appropriate ADP technical logistic support services for NRL; identifies ADP requirements and may secure and administer contractual ADP support services; and supports the Navy Laboratory Computing Committee and the Navy Laboratory Computer Network. The Head of the RCD provides the principal support to the Director of Research in ADP management and planning and is, by additional duty assignment, the ONR Special Assistant for ADP Coordination.

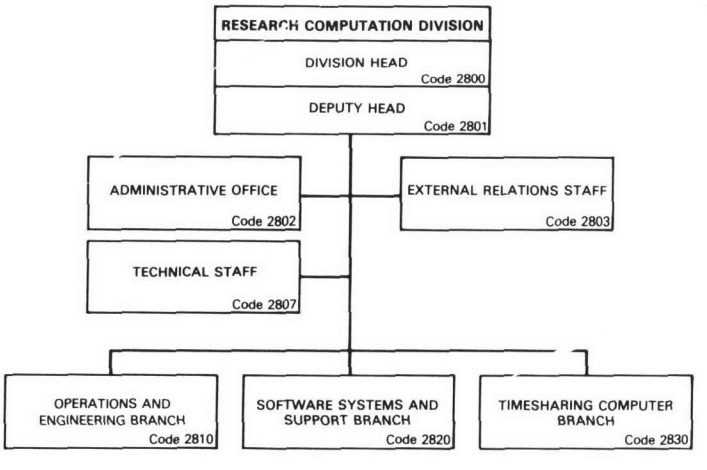
Key Personnel

Name	Title
Mr. A.B. Bligh	Head, Research Computation Division
Ms. D.E. Gossett	Deputy Head
Ms. B.M. Thomas	Administrative Officer
Mr. J.B. Smith	External Relations Staff
Vacancy	Head, Technical Staff
Mr. A.B. Bligh*	Head, Operations Branch
Mr. G.J. Flenner	Head, Software Systems and Support Branch
Mr. E.L. Aiken	Head, Timesharing Computer Branch

Mr. A. B. Bligh

Civilian Personnel

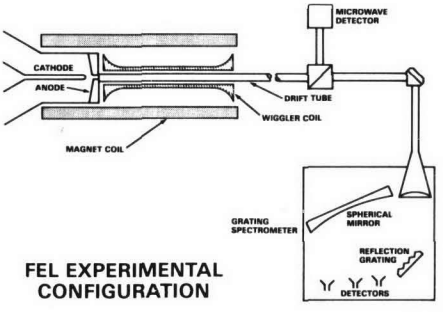
Full-Time Permanent: 46



*Acting

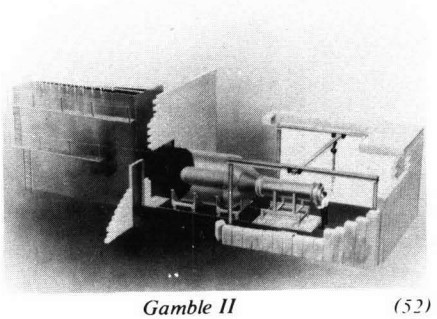
General Science and Technology Directorate

The Navy's operational effectiveness depends upon its ability to keep pace with rapidly developing technologies. This Directorate contributes to this requirement by maintaining capabilities and conducting research in the forefront of oceanographic, atmospheric, ionospheric, space and plasma physics. Areas of particular interest involve studies of the marine environment, modeling of atmospheric processes, experimental and theoretical studies of the ionospheric and space environments, nuclear weapons effects simulation, pulse power and directed energy devices.

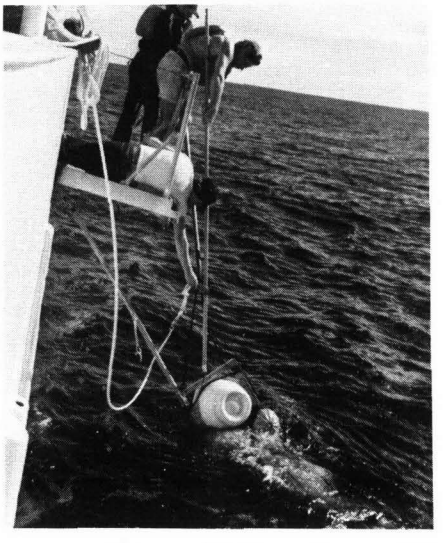


FEL EXPERIMENTAL CONFIGURATION

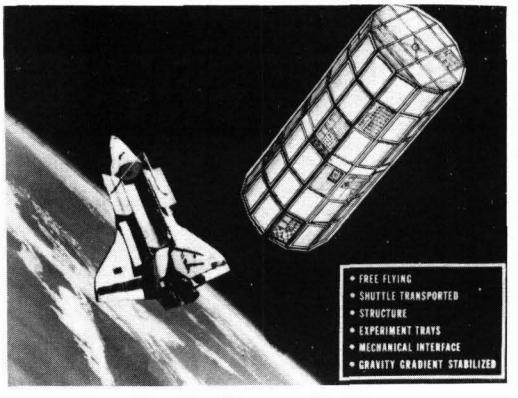
(51)



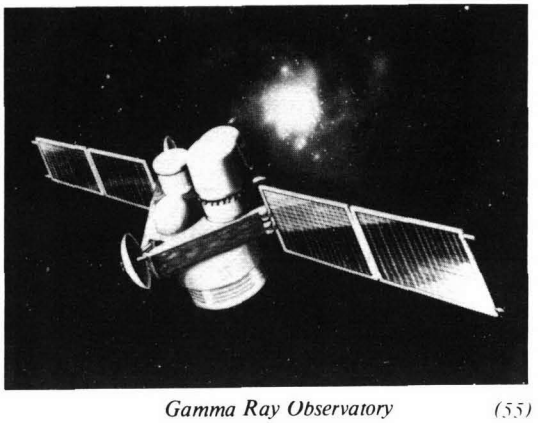
Gamble II *(52)*



Oceanographic Research *(53)*

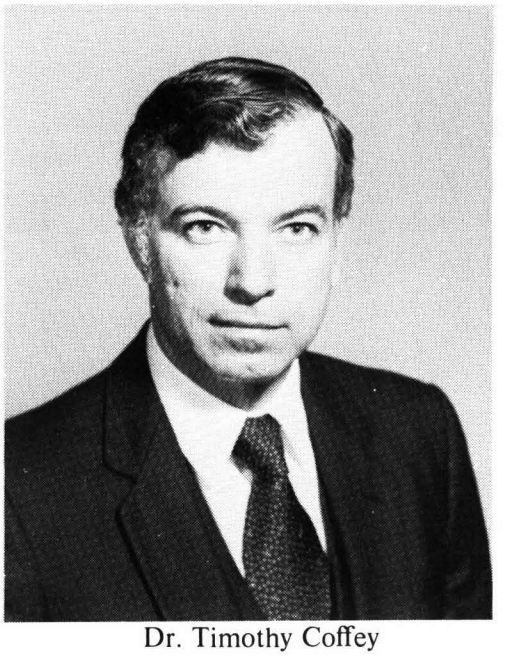


Long Duration Exposure Facility *(54)*

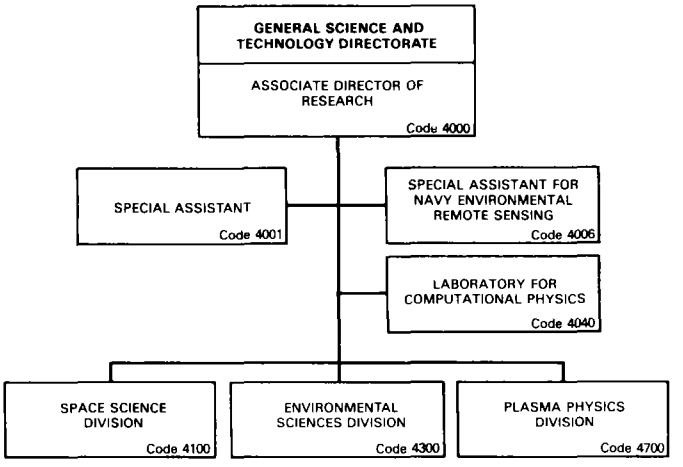


Gamma Ray Observatory *(55)*

Associate Director of Research for General Science and Technology



Dr. Timothy Coffey



Key Personnel

Name	Title
Dr. T. Coffey*¶	Associate Director of Research for General Science and Technology
Mrs. M. Oliver	Special Assistant
Dr. V.E. Noble	Special Assistant for Navy Environmental Remote Sensing
Dr. J.P. Boris	Chief Scientist, Laboratory for Computational Physics
Dr. H. Gursky	Superintendent, Space Science Division
Dr. C. H. Cheek*	Superintendent, Environmental Sciences Division
Dr. S. Ossakow	Superintendent, Plasma Physics Division

*Acting
¶See footnote inside front cover

Space Science Division

Research Activity Areas

X-Ray Astronomy
X-ray emission studies of astronomical objects, e.g., binaries, supernova remnants, black hole candidates, quasars and galaxy clusters.

Ultraviolet Measurements
Ultraviolet astronomy, ultraviolet measurements and theoretical modeling of planetary atmospheres and the space environment, development of electronic imaging devices and UV instrumentation.

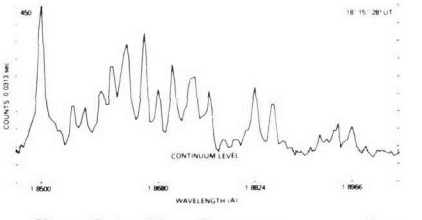
Solar Physics
Ultraviolet solar spectroscopic and spectroheliographic research.
XUV spectroradiometry.
Shuttle spacelab solar research.

Ionospheric Effects
Ionospheric plasma diagnostics.
Laboratory simulation of space plasma interactions.
Solar terrestrial relationships and radio propagation media.
Radio scintillation effects.
Ionospheric modification.

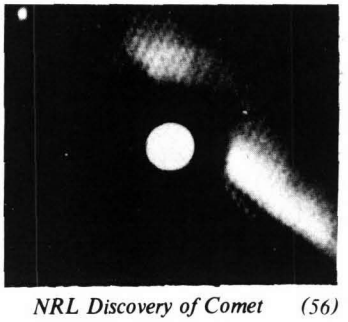
Radio & IR Astronomy
Galactic and extragalactic radio and infrared astronomy.
Very Long Baseline Interferometry (VLBI).
Intergalactic gas and dust.
Atmospheric radiation.
Astrometry.

Gamma and Cosmic Ray Astrophysics
Observational and theoretical investigations of gamma-ray and X-ray emissions from celestial sources, monitoring high-energy solar flare activity, development and evaluation of gamma-ray sensor systems for application in space.

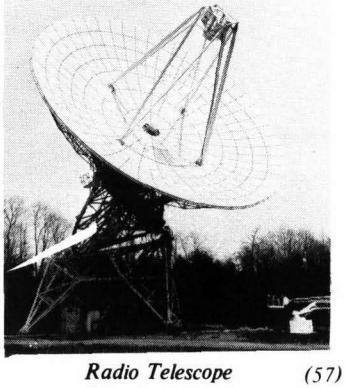
Solar Terrestrial Relationships
Solar X-ray and EUV.
Spectroscopy & plasma diagnostics.
Physics of the solar atmosphere.
Solar terrestrial investigations.



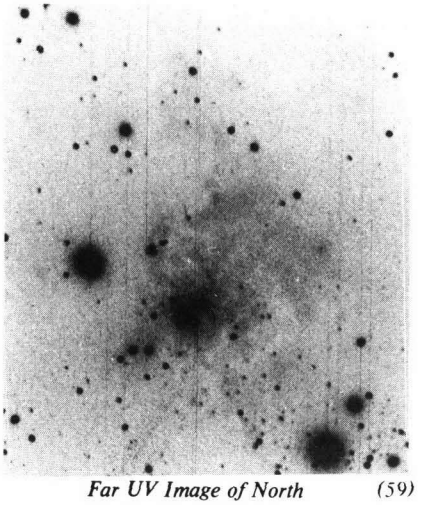
X-ray Solar Flare Spectrum (58)



NRL Discovery of Comet Colliding with the sun (56)

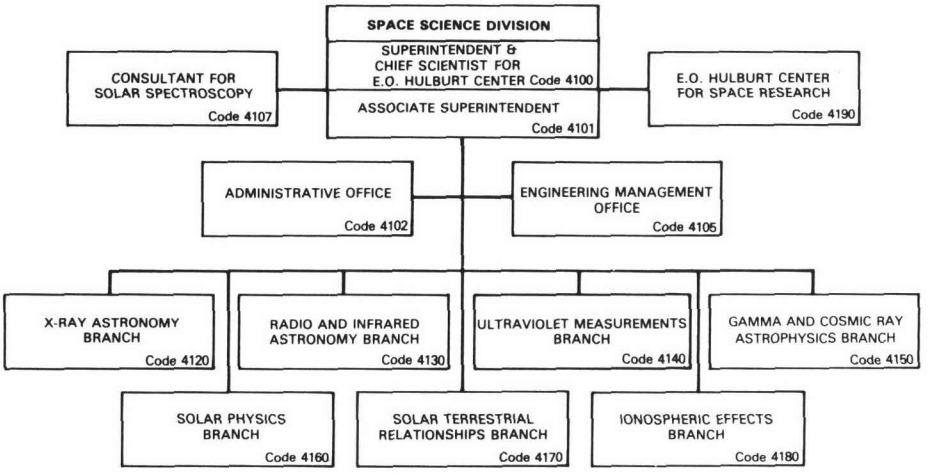


Radio Telescope Maryland Point (57)



Far UV Image of North American Nebula (59)

Dr. H. Gursky



Basic Responsibilities

The Space Science Division conducts research in the fields of astronomy and astrophysics, solar-terrestrial physics and atmospheric science. Satellites, rockets and ground-based facilities are used to obtain information on radiation from the sun and celestial sources, and to study the behavior of the ionosphere and high atmosphere. Radio telescopes are used for astronomical observations and atmospheric sensing. Research results are of importance to radio communications, to utilization of the space environment, and to fundamental understanding of natural radiation and geophysical phenomena. The Superintendent also acts as Chief Scientist of the E.O. Hulburt Center for Space Research, created to provide research opportunities in space science to appointees from universities.

Key Personnel

Name	Title
Dr. H. Gursky	Superintendent
Dr. P. Mange	Associate Superintendent
Mrs. C.J. Marks	Administrative Officer
Mr. W. Ewen	Engineering Management Officer
Dr. R. Tousey	Consultant (Emeritus)
Dr. H. Gursky†	Chief Scientist, E. O. Hulburt Center for Space Research
Dr. H. Friedman	Chief Scientist (Emeritus) E. O. Hulburt Center for Space Research
Dr. H. Gursky*	Head, X-Ray Astronomy Branch
Dr. K.J. Johnston	Head, Radio & Infrared Astronomy Branch
Dr. G.R. Carruthers	Head, Ultraviolet Measurements Branch
Dr. J.D. Kurfess	Head, Gamma and Cosmic Ray Astrophysics Branch
Dr. G.E. Brueckner	Head, Solar Physics Branch
Dr. G.A. Doschek	Head, Solar Terrestrial Relationships Branch
Dr. J.M. Goodman	Head, Ionospheric Effects Branch

Civilian Personnel

Full-Time Permanent: 107

Total Estimated R&D Funding

Fiscal Year 1983: $14,150,000

*Acting
†Additional duty

Environmental Sciences Division

Staff Activity

Nonacoustic ASW

Research Activity Areas

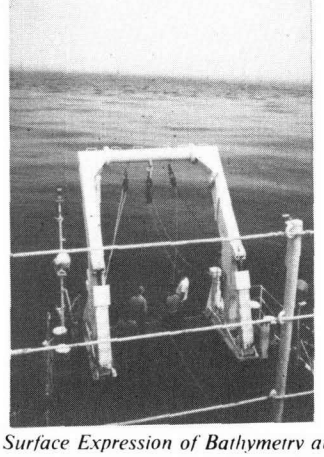
Surface Wave Group
- Wind wave and their interactions
- Air-Sea interaction
- Remote sensing

Ocean Dynamics
- Nonacoustic submarine warfare
- Mesoscale, fine-structure, micro-structe variability
- Mixed layer and thermocline applications
- Sea-truth for remote sensing

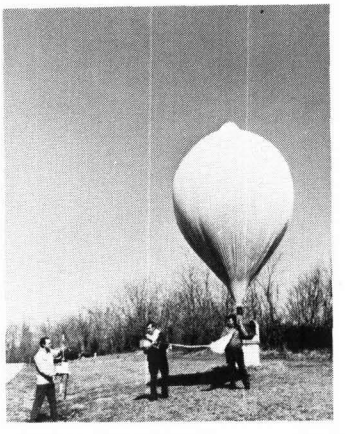
Atmospheric Physics
- Marine boundary layer meteorology
- Aerosol and cloud physics
- Atmospheric electricity
- Electro-optics meteorology

Environmental Chemistry
- Physical chemistry of seawater
- Dissolved gases in seawater
- Marine aerosols
- Interface Chemistry

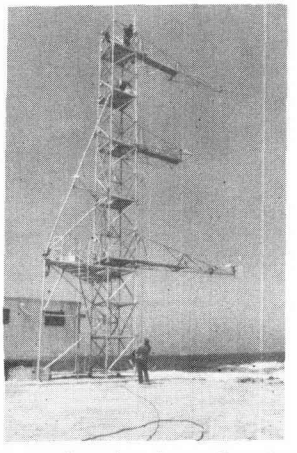
Environmental Biology
- Biodegradation of naval materials
- Bioluminescence
- Chemosensing
- Fouling of submerged surfaces



Surface Expression of Bathymetry at Phelps Bank Nantucket Shoals, Ma. (60)

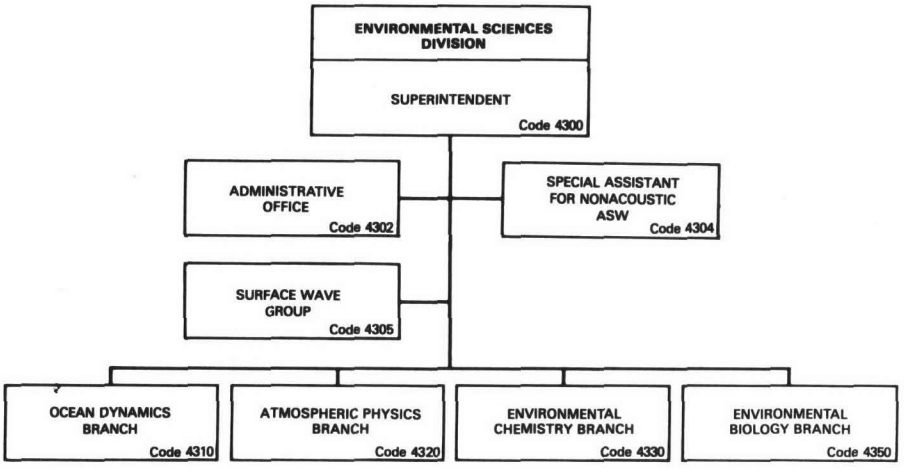


Balloon Launching for Atmospheric Research (61)



Marine Boundary Layer Experiment at San Nicolas Island, Ca. (62)

Dr. C. H. Cheek



Basic Responsibilities

The Environmental Sciences Division conducts basic and applied research in support of environmentally related requirements of the Navy. Problems in environmental chemistry and biology, ocean dynamics, and atmospheric physics are studied to gain a better understanding of the Navy's operational media. This knowledge is applied to Navy problems in submarine warfare, surveillance, weather prediction, degradation of materials, and prediction of oceanic and atmospheric phenomena affecting naval capabilities.

Key Personnel

Name	Title
Dr. C.H. Cheek*	Superintendent
Mrs. A. Coats	Administrative Officer
Dr. G.R. Valenzuela*	Head, Surface Wave Group
Mr. E.E. Rudd	Head, Ocean Dynamics Branch
Dr. L.H. Ruhnke	Head, Atmospheric Physics Branch
Dr. C.H. Cheek	Head, Environmental Chemistry Branch
Dr. D.W. Strasburg	Head, Environmental Biology Branch

Civilian Personnel

Full-Time Permanent: 66

Total Estimated R&D Funding

Fiscal Year 1983: $6,200,000

*Acting

Plasma Physics Division

Research Activity Areas

High-Power Electromagnetic Radiation
- Application of high-current relativistic electron beams to microwave and millimeter wave generation
- Electron and ion accelerators

Experimental Plasma Physics
- Electron beam plasma interactions
- Plasma channels in air
- Experimental study of plasma chemistry

Laser Plasma
- Laser-plasma interaction
- Laser fusion
- Plasma diagnostics
- Large glass laser facility

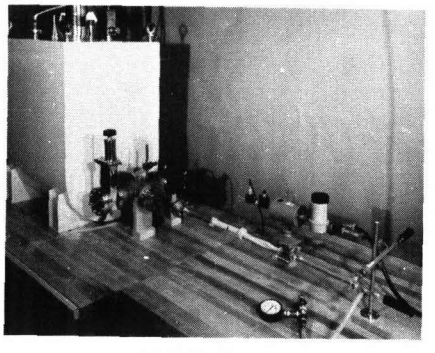
Plasma Radiation
- Radiation transport
- X-ray laser modeling
- Atomic structure and processes
- Radiation hydrodynamics

Advanced Accelerators
- Modified Betatron
- Autoaccelerator
- Collective Particle Accelerator

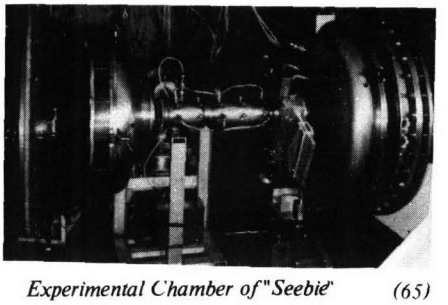
Plasma Technology
- Production of intense relativistic electron beams
- Electron beam propagation and focusing
- Experimental research in high-power exploding wires
- Generation of intense ion beams
- Inductive energy storage

Geophysical and Plasma Dynamics
- Theoretical and numerical simulation of atmospheric, ionospheric, and magnetospheric phenomena
- High-altitude nuclear weapons effects on the ionosphere
- Solar-terrestrial relations
- Atmospheric-ionospheric-magnetospheric coupling

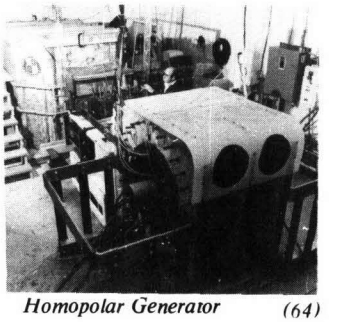
Plasma Theory
- Numerical simulation of high-density plasmas
- Theoretical study of nonlinear plasma dynamics
- Production and propagation of high-energy charged particle beams



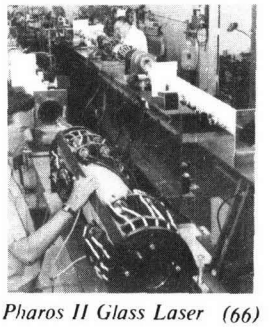
NRL 35-GHz Gyrotron (63)



Experimental Chamber of "Seebie" (65)

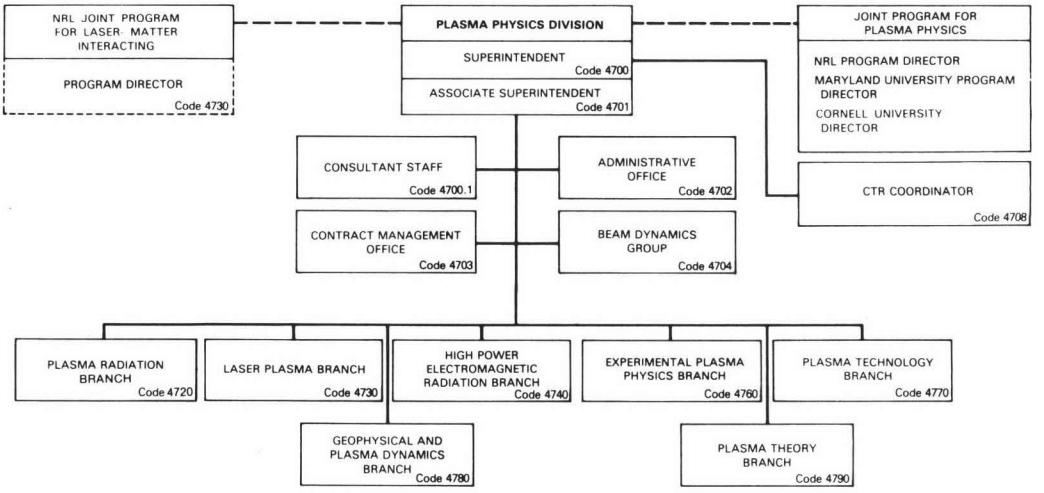


Homopolar Generator (64)



Pharos II Glass Laser (66)

Dr. S. Ossakow



Basic Responsibilities

The Plasma Physics Division conducts a broad program in basic and applied research in plasma physics, electron beams, atomic physics and laser physics. The effort of the Division is concentrated on a few closely coordinated theoretical and experimental programs. Considerable emphasis is placed on large-scale numerical simulations related to plasma dynamics, ionospheric, magnetospheric, and atmospheric dynamics, and the effects of high-altitude nuclear weapons on the atmosphere, thermonuclear plasma confinement, atomic physics and relativisitic electron beam propagation. Areas of experimental interest include: relativistic electron beams, laser-matter interaction, thermonuclear fusion, electromagnetic wave generation, the generation of intense ion beams, advanced accelerator development, inductive energy storage, and the interaction of charged particle beams with the atmosphere.

Key Personnel

Name	Title
Dr. S. Ossakow	Superintendent
Mr. I. Vitkovitsky ¶	Associate Superintendent
Dr. W. Ali	Consultant
Dr. M. Friedman	Consultant
Ms. T. Mason	Administrative Officer
Vacancy	Contract Management Office
Dr. C. Kapetanakos	Head, Beam Dynamics Group
Dr. A. Robson	Coordinator, CTR Program
Dr. J. Davis	Head, Plasma Radiation Branch
Dr. S. Bodner	Head, Laser Plasma Branch
Dr. V. Granatstein	Head, High-Power Electromagnetic Radiation Branch
Dr. A. Robson	Head, Experimental Plasma Physics Branch
Mr. I. Vitkovitsky	Head, Plasma Technology Branch
Dr. S. Ossakow†	Head, Geophysical and Plasma Dynamics Branch
Dr. P. Sprangle	Head, Plasma Theory Branch

Civilian Personnel

Full-Time Permanent: 97

Total Estimated R&D Funding

Fiscal Year 1983: $20,300,000

† Additional duty
¶ See footnote inside front cover

Laboratory for Computational Physics

Basic Responsibilities

The Laboratory for Computational Physics is responsible for the research leading to and the application of advanced numerical simulation techniques which are relevant to Navy, DOD, and other programs of national interest. The specific objectives of the Laboratory for Computational Physics are: to develop and maintain a state-of-the-art computational physics capability in fluid dynamics and related fields of physics, to perform analyses and computations on specific relevant problems using these capabilities, and to transfer this numerical technology to new and ongoing projects through cooperative programs with the research divisions and detachments at NRL and elsewhere. Areas of current interest include: studies of the hydrodynamic stability of imploding systems, solution of fluid dynamic flows which involve free surfaces for naval hydrodynamics and other applications, studies of combustion dynamics and reactive flow modeling in which convection and turbulent mixing may be important, modeling of ionospheric and heliospheric dynamics and chemistry, and pursuit of advanced numerical techniques for general application.

Dr. J. P. Boris

Key Personnel

Name	Title
Dr. J.P. Boris	Chief Scientist, Laboratory for Computational Physics
Mrs. C.A. Rulapaugh¶	Administrative Officer
Dr. D.L. Book	Senior Scientist
Dr. E.S. Oran	Senior Scientist

Civilian Personnel

Full-Time Permanent: 11

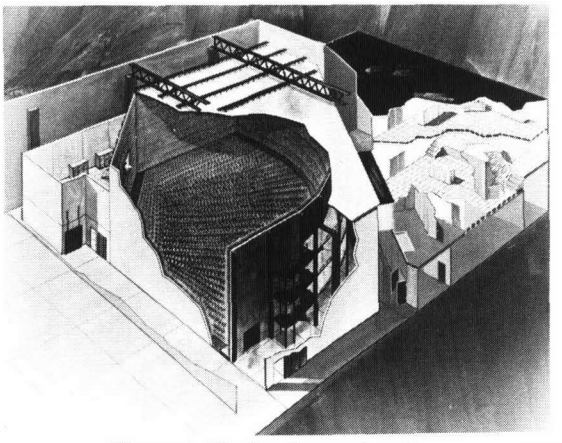
Total Estimated R&D Funding

Fiscal Year 1983: $1,600,000

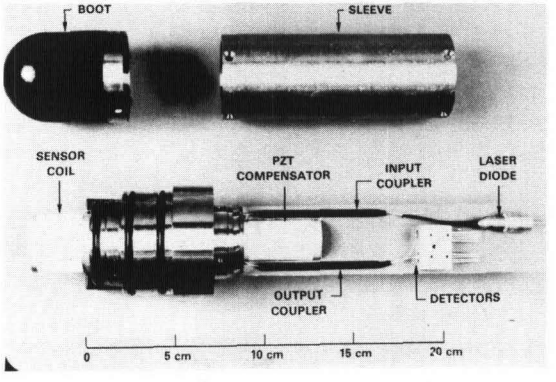
¶See footnote inside front cover

Systems Research and Technology Directorate

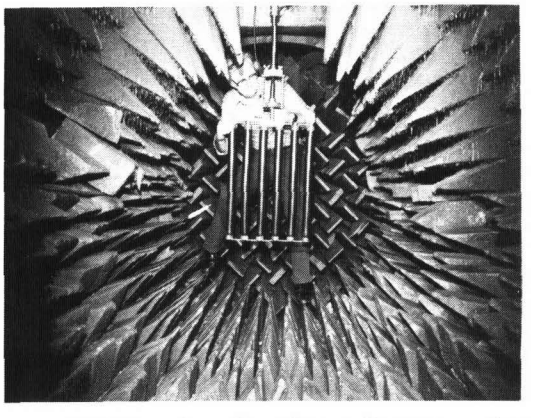
The Systems Research and Technology Directorate performs basic research and development in support of major generic Navy systems. The emphasis is on radar systems, electronic warfare systems, and undersea warfare systems. The Directorate conducts an extensive experimental program in the field using both ship and aircraft platforms to support the above activities. Programs in ocean engineering, environmental factors, and calibration and standards for underwater acoustic devices are pursued in support of the R&D for Navy systems.



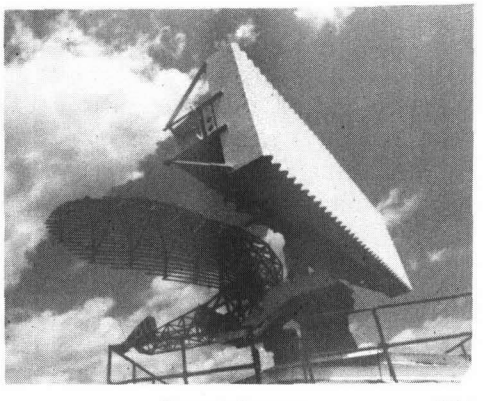
Electronic Warfare Research and Development Laboratory (67)



Fiber Optic Brassboard Hydrophone (68)

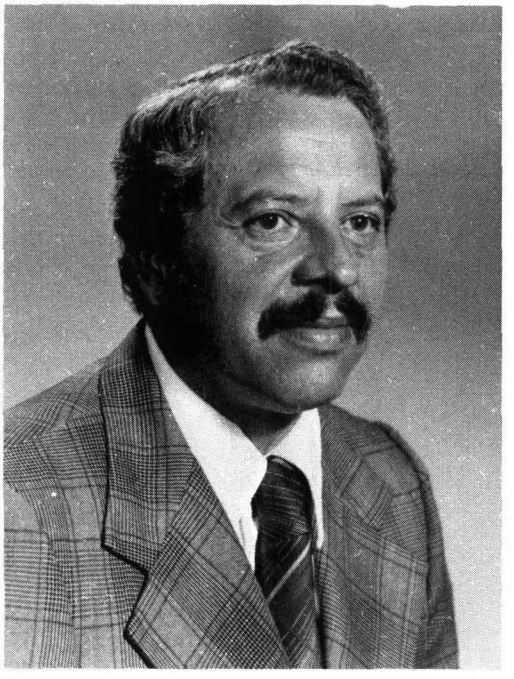


F-43 Plane Array Transducer in Drained Anechoic Tank (69)



Senrad Antenna (70)

Associate Director of Research for Systems Research and Technology



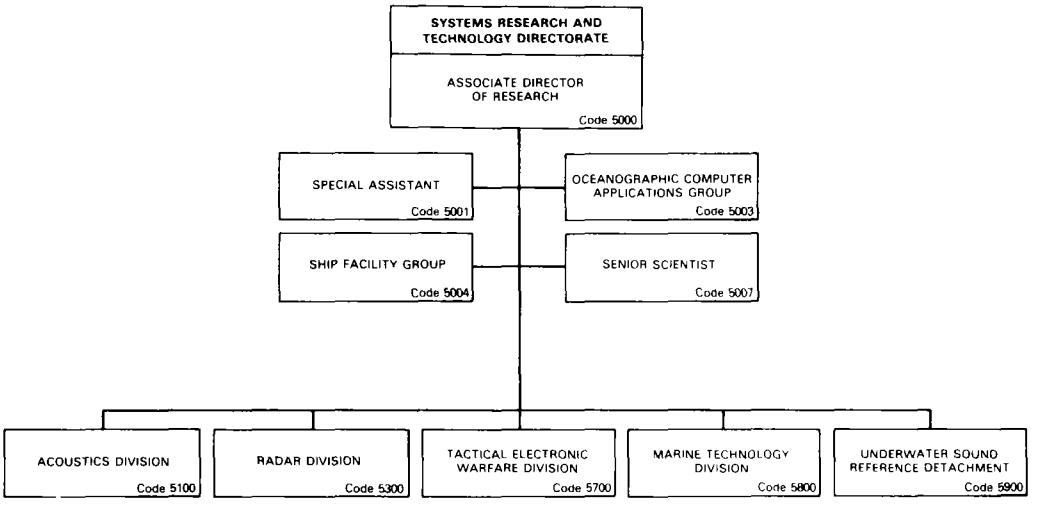
Mr. Richard R. Rojas

Mr. Rojas [redacted]. He attended the College of the City of New York, where in 1952, he received a BEE degree. In 1961, he received a MEE degree from Drexel Institute of Technology, Philadelphia. Further graduate studies in mathematics and engineering were taken at the University of Pennsylvania, Philadelphia.

From 1952 to 1960, Mr. Rojas was a project engineer in the Missile Department at Philco Corporation where he participated in the TALOS, TERRIER, and TARTAR missile fuze programs, and the Terrier missile guidance project. While at Philco, he received a company achievement award for his work on the design of specialized missile test equipment. From 1960 to 1969, he was manager of the Hydroacoustics Department at the Magnavox General Atronics Corporation. At General Atronics he was active in the area of signal processing techniques as applied to sonar, communication systems, and seismic detection systems. In 1969, he joined the Naval Research Laboratory as Head of the Advanced Undersea Surveillance Program. In this capacity he was responsible for directing an experimental and theoretical program whose purpose was to evaluate and develop advanced surveillance systems for the Navy. Mr. Rojas served as Associate Director of Research and Director of Oceanology from 1977 until 1980 when he assumed control of the newly established Systems Research and Technology Directorate. Mr. Rojas also was on the graduate teaching staff at the Pennsylvania State University.

Mr. Rojas' research interests are centered on signal processing and the physics of underwater acoustic propagation, ambient noise, and reverberation.

Mr. Rojas is a member of the Acoustic Society of America, Sigma Xi, the Institute of Electrical and Electronics Engineers, and a charter member of the Marine Technology Society.



Key Personnel

Name	Title
Mr. R.R. Rojas	Associate Director of Research for Systems Research and Technology
Vacancy	Special Assistant
Mr. D. Steiger	Head, Oceanographic Computer Applications Group
Mr. L.G. Galli	Head, Ship Facility Group
Dr. L.B. Wetzel	Senior Scientist
Dr. J.C. Munson	Superintendent, Acoustics Division
Dr. M.I. Skolnik	Superintendent, Radar Division
Mr. L.A. Cosby	Superintendent, Tactical Electronic Warfare Division
Dr. R.T. Swim	Superintendent, Marine Technology Division
Dr. J.E. Blue	Superintendent, Underwater Sound Reference Detachment

Ship Facility Group

Basic Responsibilities

The Ship Facility Group is responsible for coordinating, maintaining, and providing ship services, sea-going facilities, and specialized expertise in the area of navigation, communication, explosives, and deck handling common to and required by the at-sea experiments of research divisions and detachments under the Associate Director of Research for Systems Research and Technology.

Key Personnel

Name	Title
Mr. L.G. Galli	Head, Ship Facility Group

Mr. L. G. Galli

Civilian Personnel

Full-Time Permanent: 13

Senior Scientist: 1

Total Estimated R&D Funding

Fiscal Year 1983: $2,225,000

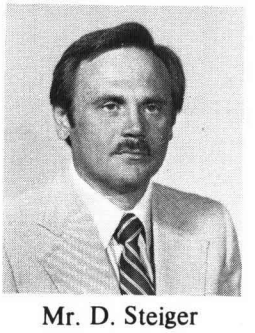
Oceanographic Computer Applications Group

Basic Responsibilities

The Oceanographic Computer Applications Group designs, develops, operates, and maintains oceanographic computer systems that assist researchers in the automatic acquisition, processing, display and retention of data acquired in the field and at the Laboratory. The Group prepares mathematical models and performs oceanographic research in areas where computer expertise is required for solutions.

Key Personnel

Name	Title
Mr. D. Steiger	Head, Oceanographic Computer Applications Group



Mr. D. Steiger

Civilian Personnel

Full-Time Permanent: 7

Acoustics Division

Staff Activities

FOSS Program Management
- Coordination of Acousto-Optic Program

Special Programs Management
- Active Acoustic Surveillance Technology
- Shallow Water Coordinator

Research Activity Areas

Acoustic Media Characterization
- Geophysical and oceanographic parameters that influence underwater acoustics

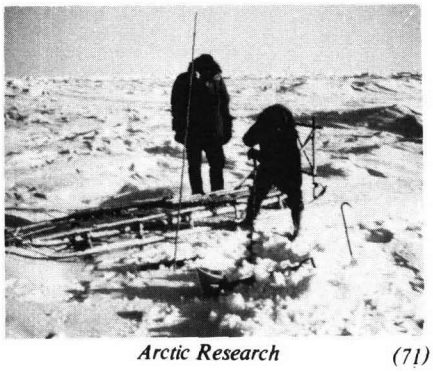
Applied Ocean Acoustics
- Shallow-water acoustics
  - Mode analysis
  - Models of signal and noise fields
- Airborne underwater acoustics
  - Bottom-limited acoustics
- Arctic underwater acoustics
  - Propagation
  - Noise
- Spectral estimation

Physical Acoustics
- Reflection, diffraction, scattering by bodies
- Target strength modeling
- Schlieren visualization
- Fiber-optic acoustic sensors
- Acoustics of coatings

Systems Engineering and Advanced Concepts
- Systems studies
- Surveillance system concepts and evaluation
- Advanced measurements technology
- Special projects
- Engineering research and development
- Signal Processing

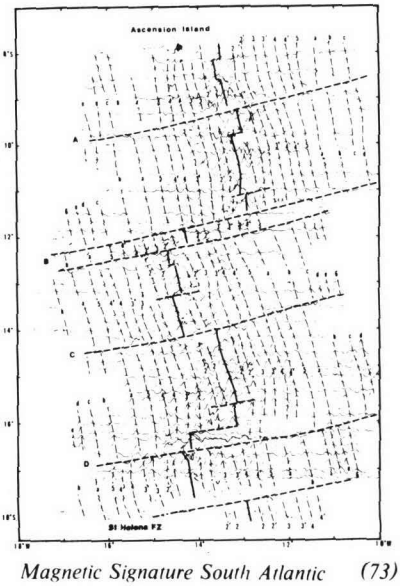
Software Systems Development
- Tactical computers
- Tactical support software
- Signal processors

Large Aperture Acoustics
- Propagation, coherence, and wave-front behavior
- Large-scale spatial and temporal integration
- Array deformation
- Ambient noise measurements and modeling
- Low-frequency monostatic and bistatic reverberation

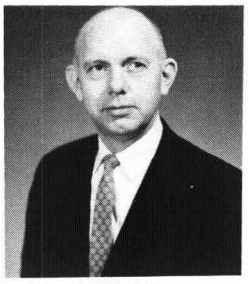


Arctic Research *(71)*

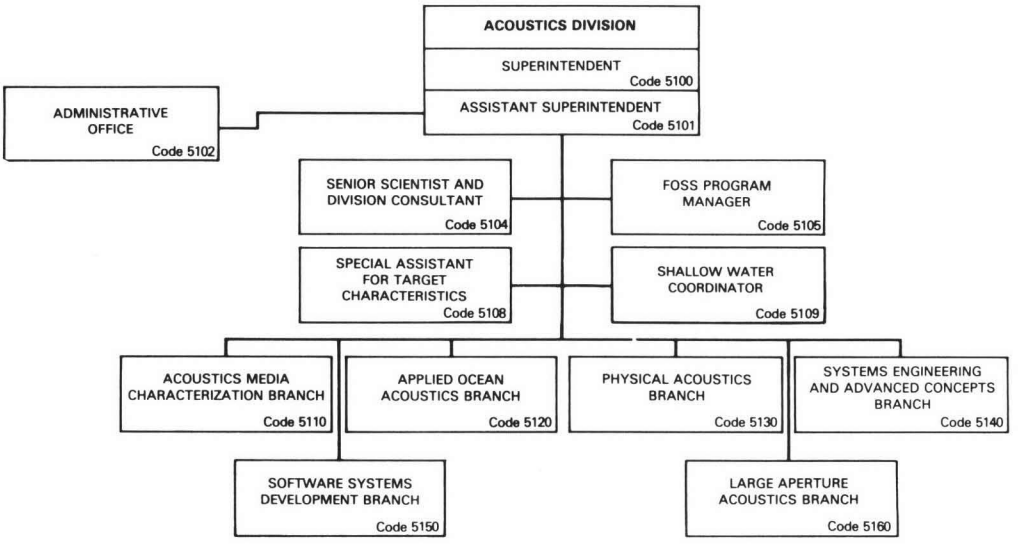
Shallow Water Measurements *(72)*



Magnetic Signature South Atlantic *(73)*



Dr. J. C. Munson



Basic Responsibilities

The Acoustics Division has major responsibilities for basic and applied R&D in the Navy's Undersea Warfare programs. Program work includes propagation, noise and scattering, environmental prediction, surveillance system concepts, systems analysis, acoustic research engineering, radiation and transduction, target echo characteristics and physical acoustics. The Division conducts theoretical and experimental research programs in ocean acoustics; develops models of the interaction of acoustic energy with the ocean environment and with structures; and conducts experiments in the deep ocean, in acoustically shallow water and in the Arctic. The Division carries out theoretical and experimental research and development in computer configuration, computer operating systems, software and human interface requirements for computers and in Naval applications. It also manages, as well as participates in, the Fiber Optic Sensor System (FOSS) program. The Division program is heavily oriented toward R&D in support of undersea surveillance, but it also supports other missions. Collaboration and cooperation with other parts of the Laboratory and with other laboratories, both U.S. and foreign, is an integral part of the total Division program. The Division also participates in major groups formulating the Navy's ASW program and renders consultative services to the Navy, the Department of Defense, other government agencies, and private contractors.

Key Personnel

Name	Title
Dr. J.C. Munson	Superintendent
Mr. B.G. Hurdle	Assistant Superintendent
Mrs. N.J. Beauchamp	Administrative Officer
Dr. S. Hanish	Senior Scientist and Division Consultant
Mr. J.E. Donovan	Head, FOSS Program Office
Dr. W.G. Neubauer	Special Assistant for Target Characteristics
Mr. C.R. Rollins	Manager, Active Acoustic Surveillance Technology
Dr. A.I. Eller	Shallow Water Coordinator
Mr. H.S. Fleming	Head, Acoustics Media Characterization Branch
Dr. W.B. Moseley	Head, Applied Ocean Acoustics Branch
Dr. J. Bucaro	Head, Physical Acoustics Branch
Mr. M. Potosky	Head, Systems Engineering & Advanced Concepts Branch
Mrs. E.E. Wald	Head, Software Systems Development Branch
Dr. B.B. Adams	Head, Large Aperture Acoustics Branch

Civilian Personnel

Full-Time Permanent: 122

Total Estimated R&D Funding

Fiscal Year 1983: $15,100,000

Radar Division

Staff Activities

Systems Research
Conceptual studies
of new radar systems

Research Activity Areas

Radar Analysis
- Automatic detection and tracking
- Radar systems simulations
- Airborne weapon systems simulation
- Target signature modeling

Radar Techniques
- High-frequency over-the-horizon radar
- Signal processing
- Sea scatter

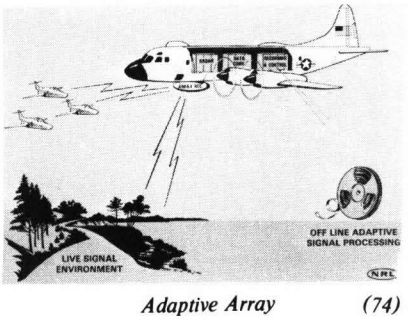
Search Radar
- Shipboard Surveillance Radar Techniques (SENRAD)
- Shipboard radar
- Precision tracking techniques
- Directed Mirror Antenna Radar (DMAR)

Target Characteristics
- Radar counter-countermeasures
- Adaptive signal processing
- Shipboard radar concept
- Target signature analysis
- Reliable/Available radar

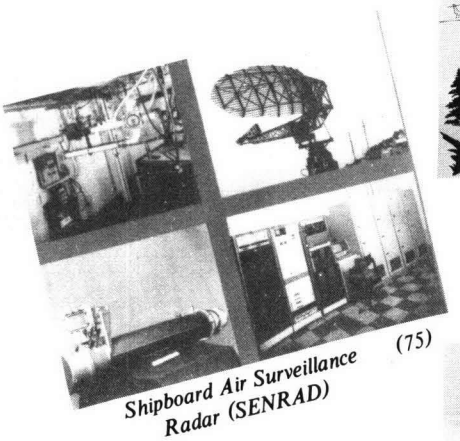
Identification Systems
- Mark XII IFF improvements
- NATO Identification System (MK, XV, IFF)
- Future identification technology

Airborne Radar
- Airborne early-warning radar
- Moving target indication
- Synthetic aperture radar (SAR)
- Electromagnetic propagation
- Microwave radiometry

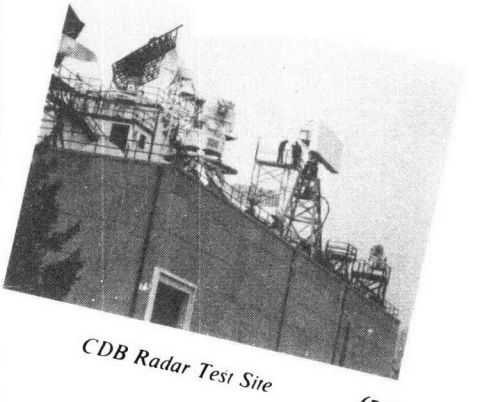
Electromagnetics
- Microwave antenna research
- Adaptive array research
- Electromechanical design



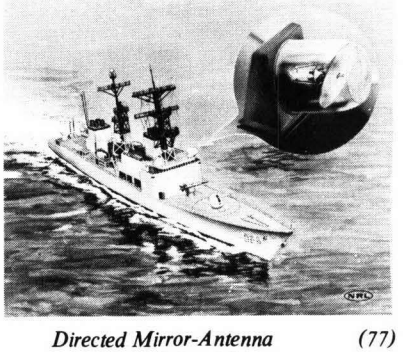
Adaptive Array (74)



Shipboard Air Surveillance Radar (SENRAD) (75)

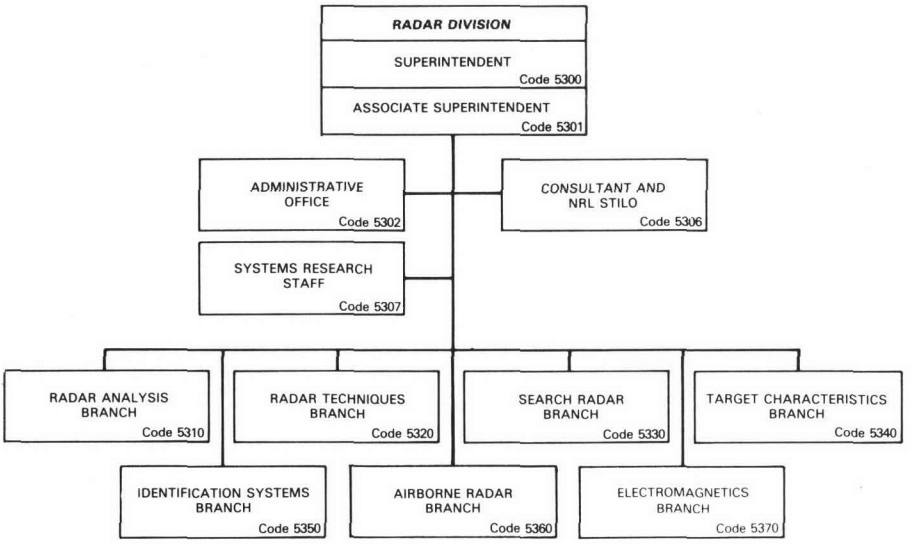


CDB Radar Test Site (76)



Directed Mirror-Antenna Radar (DMAR) (77)

Dr. M. I. Skolnik



Basic Responsibilities

The Radar Division conducts research on basic physical phenomena of importance to radar and related sensors, investigates new engineering techniques applicable to radar, demonstrates the feasibility of new radar concepts and systems, performs related systems analysis and evaluation of radar, and provides special consultative services. The emphasis is on new and advanced concepts and technology in radar and related sensors which are applicable to enhancing the Navy's ability to fulfill its mission.

Key Personnel

Name	Title
Dr. M.I. Skolnik	Superintendent
Mr. I.D. Olin	Associate Superintendent
Mrs. A.G. Dunn	Administrative Officer
Mr. H. Bress	Consultant and NRL STILO
Dr. M.I. Skolnik†	Head, Systems Research Staff
Dr. G.V. Trunk	Head, Radar Analysis Branch
Mr. J.M. Headrick	Head, Radar Techniques Branch
Dr. C.L. Temes	Head, Search Radar Branch
Mr. S.K. Meads	Head, Target Characteristics Branch
Mr. C.M. Veronda	Head, Identification Systems Branch
Mr. T.L. apRhys	Head, Airborne Radar Branch
Mr. J.P. Shelton	Head, Electromagnetics Branch

Civilian Personnel

Full-Time Permanent: 124

Total Estimated R&D Funding

Fiscal Year 1983: $15,500,000

†Additional duty

Tactical Electronic Warfare Division

Staff Activities

Long-Range EW Planning
- Long-range Navy EW research and development planning
- R&D resource requirements

Lead Laboratory Coordinating
- EW Program Liaison
- Program reference center
- Navy Electronic Warfare Advisory Group (NEWAG)
- Navy 5 yr. EW Plan

Central Target Simulator Program
- Develop and operate CTS Facilities
- Hardware-in-the-loop modeling

Effectiveness of Naval EW Systems (ENEWS)
- EW effectiveness
- Simulation analysis and measurement
- Research and development support

Special Project Group
- Vulnerability analyses
- Special countermeasures
- Threat signal analysis

Counter C^3 I
- Battle Group C-C^3 systems concepts
- C-C^3 exploratory R&D requirements

Special Facilities Development Group
- Long-range facility planning
- Facility update and modernization
- Interactive facility integration

Research Activity Areas

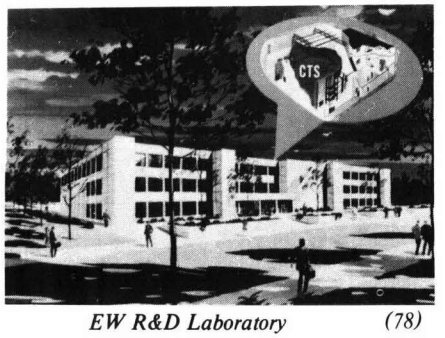
Ships Electronic Warfare Systems
- Ships systems development
- Jamming technology
- Deception techniques
- EW antennas
- Threat simulators

Off-Board Countermeasures
- Expendable technology
- Expendable devices
- Off-board systems
- Decoys

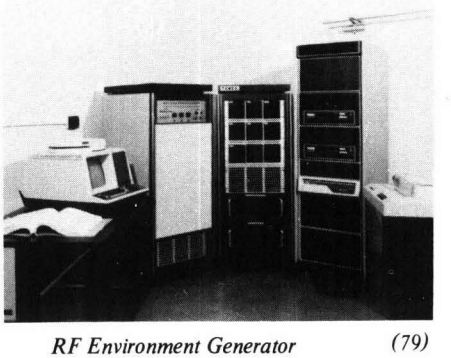
Electronic Warfare Support Measures
- Intercept systems and direction finders
- RF signal simulators
- Systems integration
- Command and control interfaces
- Signal processing

Airborne Electronic Warfare Systems
- Air systems development
- Penetration aids
- Power source development
- Jamming and Deception

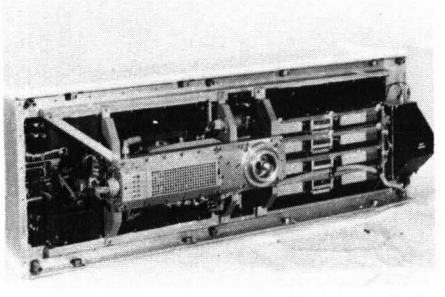
Advanced Techniques
- Analysis and modeling simulation
- New EW techniques
- Experimental systems
- EW concepts



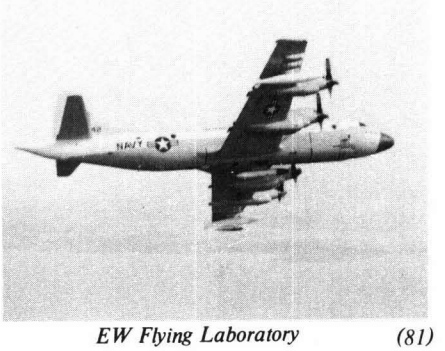
EW R&D Laboratory (78)



RF Environment Generator (79)

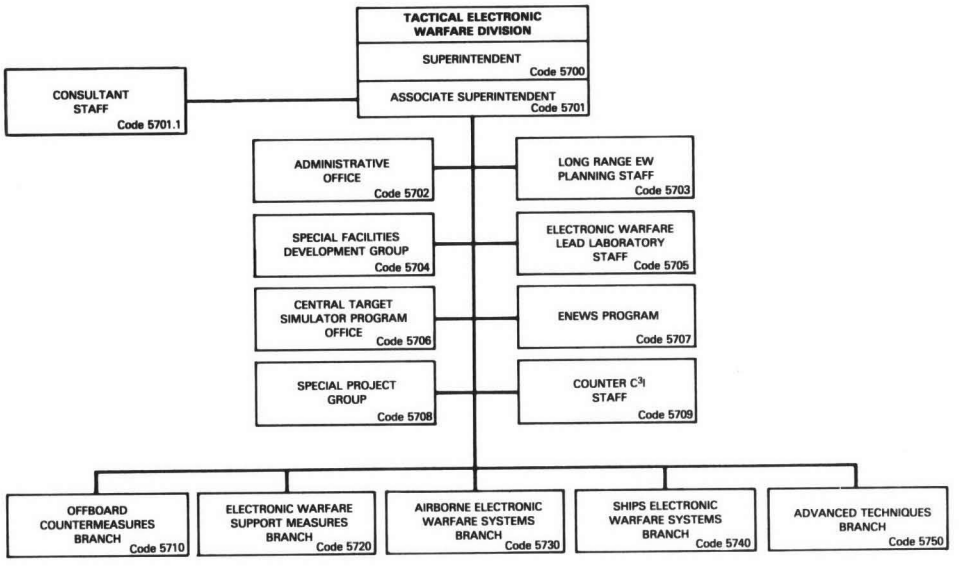


EW Systems Development (80)



EW Flying Laboratory (81)

Mr. L.A. Cosby



Basic Responsibilities

The Tactical Electronic Warfare Division is responsible for research and development in support of the Navy's tactical electronic warfare requirements and missions. These include electronic warfare support measures, electronic countermeasures, and supporting counter-countermeasures, as well as studies, analyses and simulations for the determination and improvements of the effectiveness of these systems.

Key Personnel

Name	Title
Mr. L.A. Cosby	Superintendent
Dr. G.P. Ohman	Associate Superintendent
Dr. G.P. Ohman†	Head, Consultant Staff
Mrs. H.B. Nenno	Administrative Officer
Mr. C. Hoffman	Head, Long-Range EW Planning Staff
Mr. H.M. Suski	Head, Special Facilities Development Group
Mr. R.L. Aberg	Head, Electronic Warfare Lead Laboratory Staff
Mr. A.A. Di Mattesa	Manager, Central Target Simulator Program
Mr. D.F. Grady	Manager, ENEWS Program
Mr. N.J. Lesko	Manager, Special Project Group
Mr. L.O. Sweet	Head, Counter-C^3 I Staff
Dr. J.A. Montgomery	Head, Offboard Countermeasures Branch
Mr. H.W. Zwack	Head, Electronic Warfare Support Measures Branch
Mr. E.E. Koos	Head, Airborne Electronic Warfare Systems Branch
Mr. H.E. Crecraft	Head, Ships Electronic Warfare Systems Branch
Dr. G.E. Friedman	Head, Advanced Techniques Branch

Civilian Personnel

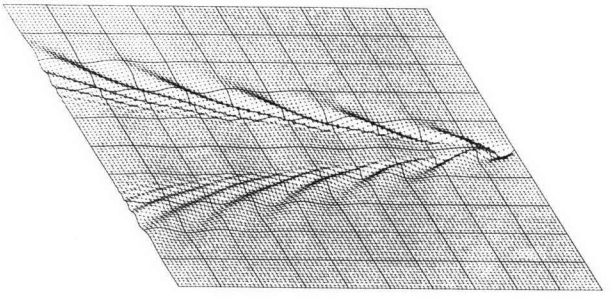
Full-Time Permanent: 178

Total Estimated R&D Funding

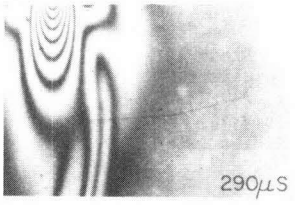
Fiscal Year 1983: $43,300,000

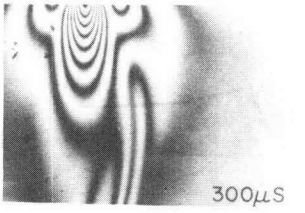
†Additional duty

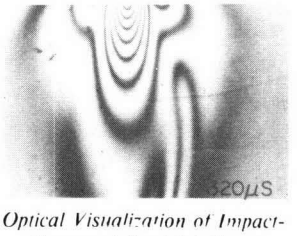
Marine Technology Division



Computer-Generated Kelvin Wake (82)







Optical Visualization of Impact-Generated Rayleigh Wave (85)

Wind-Wave Tank (83)

Underwater Shock Test (84)

Staff Activities

Shock and Vibration Information Center
Special Applications Group

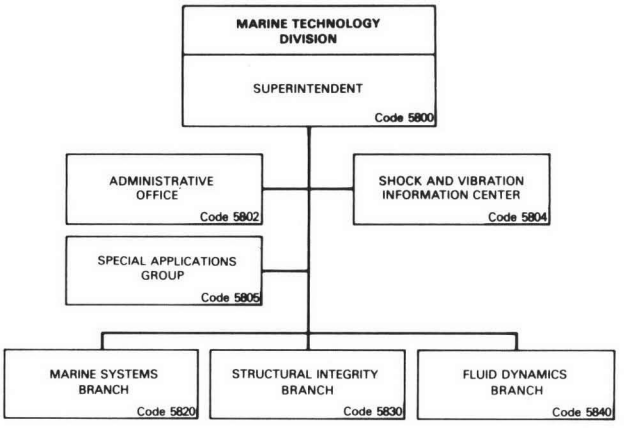
Research Activity Areas

Fluid Dynamics
- Fluid-structure interactions
- Flow-generated noise studies
- Boundary layer hydrodynamics
- Wake Hydrodynamics

Marine Systems
- Autonomous vehicle development
- Vehicle stability, control, and navigation
- Sensor research and development
- Adaptive sensor and control systems

Structural Integrity
- Failure mechanisms in advanced structural materials
- Reliability analysis and failure modes of components and systems
- Advanced techniques for nondestructive evaluation
- Ship and submarine shock protection
- Component response to shock and vibration

Dr. R. T. Swim



Basic Responsibilities

The Marine Technology Division conducts research and development programs to provide the technology base for marine engineering. The goal is to establish principles and systematic procedures for the design of marine systems and structures and for the performance of marine operations. In the Staff Activities, the Shock and Vibration Information Center provides services for engineers nationwide, and the Special Applications Group provides engineering support to the division and to other naval activities.

Key Personnel

Name	Title
Dr. R.T. Swim	Superintendent
Mrs. A.G. Branham	Administrative Officer
Mr. H.C. Pusey	Head, Shock and Vibration Information Center
Mr. G.O. Thomas	Head, Special Applications Group
Mr. H.A. Johnson	Head, Marine Systems Branch
Vacancy	Head, Structural Integrity Branch
Dr. R.A. Skop	Head, Fluid Dynamics Branch

Civilian Personnel

Full-Time Permanent: 63
Military: 49

Total Estimated R&D Funding

Fiscal Year 1983: $8,700,000

Underwater Sound Reference Detachment

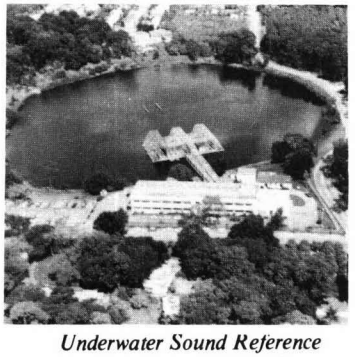
Research Activity Areas

Measurements
- Calibration theory and accuracy
- Measurement methods
- Standard calibration services
- Sonar transducer test and evaluation
- Transduction and radiation theory
- Nonlinear acoustics

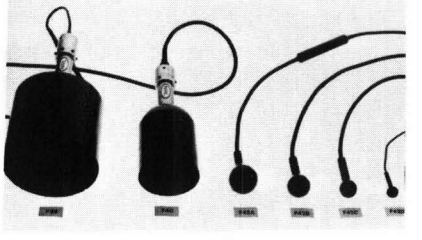
Acoustical Systems
- Computerized data reduction
- Computation services
- Digital systems
- Analog systems
- Signal analysis

Transducer
- Acoustic materials
- Acoustic material measurements
- Electroacoustic standards
- Acoustic sources
- Specialized electroacoustic transducers
- Standard loan services
- Transduction
- Transducer reliability

Leesburg Facility-Calibration Range *(86)*



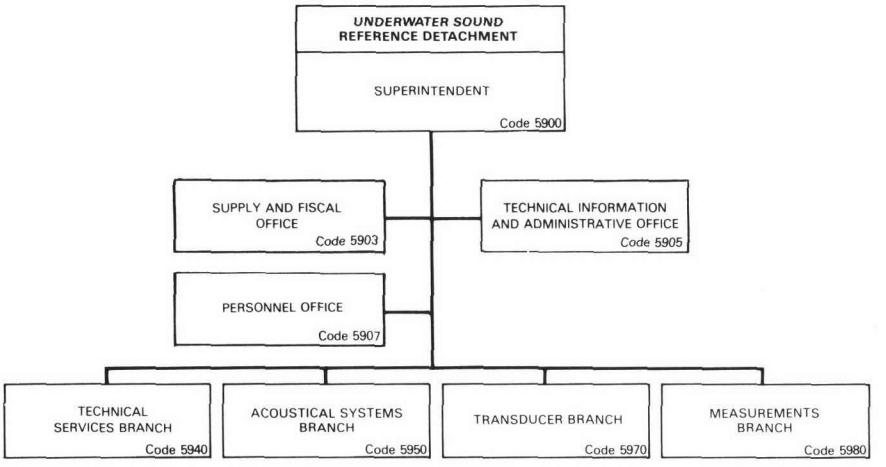
Underwater Sound Reference Detachment (USRD) Orlando, Florida *(87)*



USRD Standard Transducers *(88)*

Constant Beamwidth Transducer *(89)*

Dr. J. E. Blue



Basic Responsibilities

The Underwater Sound Reference Detachment is the focal point in the Navy for standardization in the science and technology of underwater sound measurements. Its research and development program is aimed at expanding the state of the art and providing Navy in-house expertise. Reference calibration measurements in a large complex of specialized facilities and calibrated standard transducers are available to all naval activities and contractors in support of undersea warfare programs. The Detachment also provides expertise in nonlinear acoustics, nearfield arrays and measurements, radiation theory, and underwater electroacoustic sensors.

Key Personnel

Name	Title
Dr. J.E. Blue	Superintendent
Mr. H.F. Bowman*	Head, Supply and Fiscal Office
Ms. D.A. Pieper	Head, Technical Information and Administrative Office
Ms. M.S. Lutman	Head, Personnel Office
Mr. G. Woods	Head, Technical Services Branch
Mr. J.D. George	Head, Acoustical Systems Branch
Mr. R.W. Timme	Head, Transducer Branch
Dr. A.L. Van Buren*	Head, Measurements Branch

Civilian Personnel

Full-Time Permanent: 89

Total Estimated R&D Funding

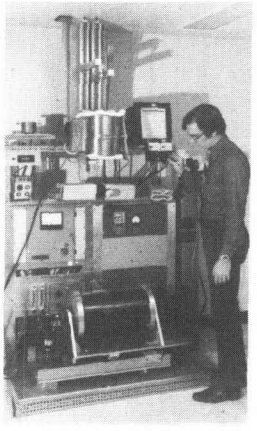
Fiscal Year 1983: $5,400,000

*Acting

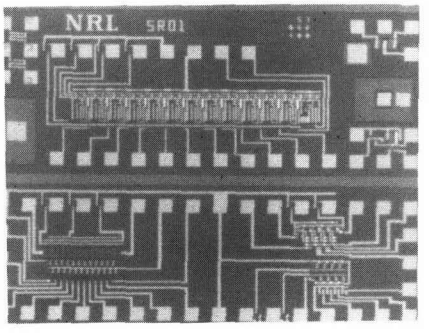
Material Science and Component Technology Directorate

The Material Science and Component Technology Directorate carries out a multidisciplinary research program whose objectives are the development of new improved materials, the generation of new concepts associated with materials behavior, and the development of advanced components based on these new and improved materials and concepts. Theoretical and experimental research is carried out to determine the origins of materials behavior and to develop procedures for modifying these materials to meet important Navy needs such as fire suppression. The program includes investigations of a broad spectrum of materials including insulators, semiconductors, metals and alloys, optical materials, polymers, plastics, and composites which are used in important naval devices, components, and systems. New techniques are developed for producing, processing, and fabricating these materials for important naval applications.

The limits of performance of these materials and components under deleterious conditions such as those associated with the marine environment, neutron or directed energy beam irradiation, or extreme temperatures and pressures, are established.

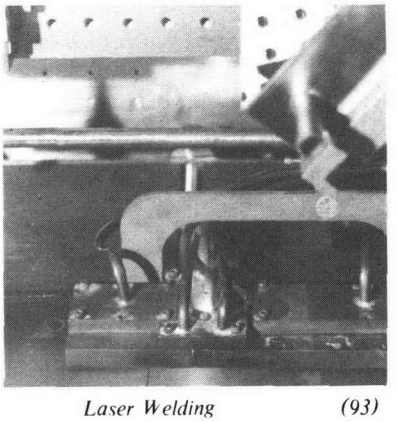


Optical Fiber (90)

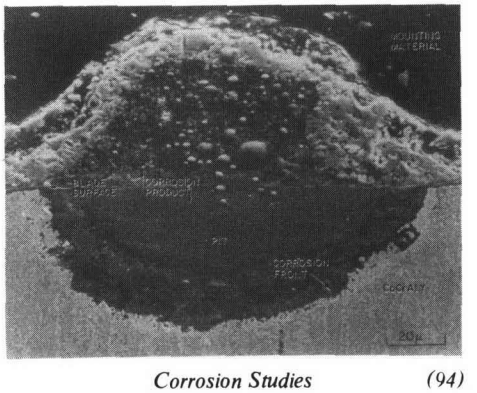


Microelectronics (91)

Ion Implanted Bearings (92)



Laser Welding (93)



Corrosion Studies (94)

Associate Director of Research for Material Science and Component Technology

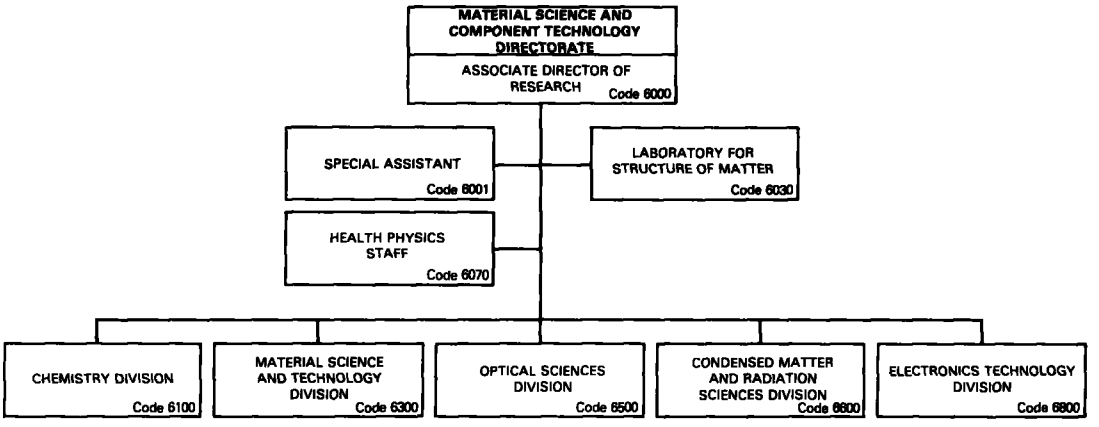
Dr. Albert I. Schindler

Dr. Schindler [redacted]. He received the degrees of B.S. (1947), M.S. (1948), and D.Sc. (1950), all in physics, from Carnegie Institute of Technology.

He came to the Naval Research Laboratory in 1951, and as Head, Metal Physics Branch, Metallurgy Division, conducted and directed research on the physical properties of metallic alloys. Dr. Schindler has authored or coauthored over 90 papers in solid state physics on topics including electron transport properties and galvanomagnetic effects in alloys, electronic specific heat of transition metals, and irradiation effects in magnetic materials. In this latter area, he holds several patents. He has been an Adjunct Professor of Physics at Howard University, and has supervised thesis research there as well as at Catholic University, the University of Maryland, and American University. During a sabbatical year, Dr. Schindler was a visiting scientist at Imperial college of Science and Technology in London, England.

For his distinguished research Dr. Schindler has received numerous awards, including the E.O. Hulburt Award presented in 1956, 1966 Award for Scientific Achievement presented by the Washington Academy of Sciences, and the Navy Award for Distinguished Achievement in Science (1975). In 1982 he received the rank of Meritorious Executive in the Senior Executive Service.

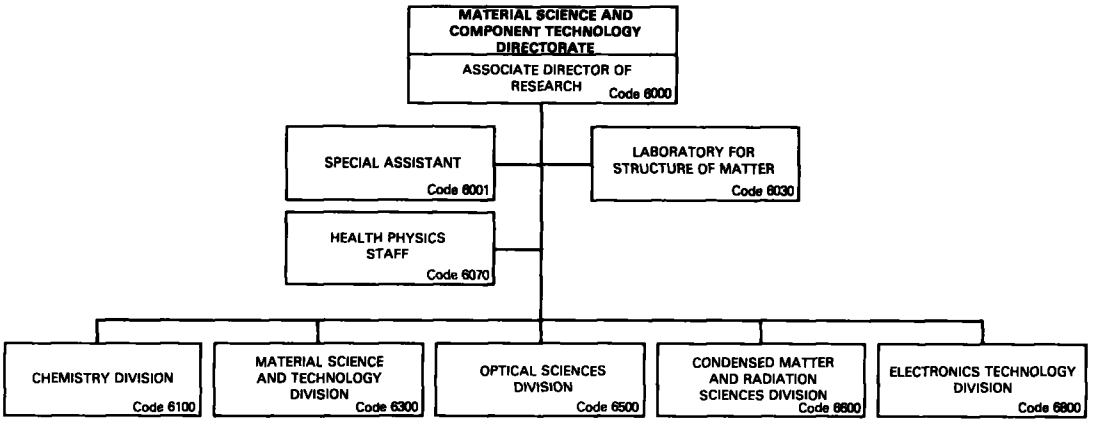
Dr. Schindler is a Fellow of the American Physical Society and of the Washington Academy of Sciences. He also is a member of the Philosophical Society of Washington and of Sigma Xi, for which he served as a member of the Board of Directors from 1974 to 1976.



Key Personnel

Name	Title
Dr. A.I. Schindler	Associate Director of Research for Material Science and Component Technology
Mr. R. Nekritz	Special Assistant
Dr. B.J. Faraday	Project NEWBOY Program Manager
Dr. J. Karle	Chief Scientist, Laboratory for Structure of Matter
Mr. J.N. Stone	Head, Health Physics Staff
Vacancy	Superintendent, Chemistry Division
Dr. B.B. Rath*	Superintendent, Material Science and Technology Division
Dr. T.G. Giallorenzi	Superintendent, Optical Sciences Division
Dr. J.T. Schriempf	Superintendent, Condensed Matter and Radiation Sciences Division
Vacancy	Superintendent, Electronics Technology Division

*Acting



Key Personnel

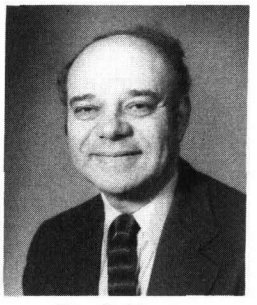
Name	Title
Dr. A.I. Schindler	Associate Director of Research for Material Science and Component Technology
Mr. R. Nekritz	Special Assistant
Dr. B.J. Faraday	Project NEWBOY Program Manager
Dr. J. Karle	Chief Scientist, Laboratory for Structure of Matter
Mr. J.N. Stone	Head, Health Physics Staff
Vacancy	Superintendent, Chemistry Division
Dr. B.B. Rath*	Superintendent, Material Science and Technology Division
Dr. T.G. Giallorenzi	Superintendent, Optical Sciences Division
Dr. J.T. Schriempf	Superintendent, Condensed Matter and Radiation Sciences Division
Vacancy	Superintendent, Electronics Technology Division

*Acting

Laboratory for Structure of Matter

Basic Responsibilities

The Laboratory for Structure of Matter carries out experimental and theoretical investigations of the atomic, molecular, glassy, and crystalline structures of materials. The methods of x-ray, electron, and neutron diffraction are used in a broad program of structure studies which can form the basis for understanding and interpreting the results of research investigations in a wide variety of scientific disciplines. Applications are made to device materials and other substances whose chemical and physical properties are of interest.



Dr. J. Karle

Key Personnel

Name	Title
Dr. J. Karle	Chief Scientist, Laboratory for Structure of Matter

Civilian Personnel	**Total Estimated R&D Funding**
Full-Time Permanent: 12	Fiscal Year 1983: $950,000

Health Physics Staff

Basic Responsibilities

The Health Physics Staff provides a Laboratory-wide protection program for the possession and use of all sources of ionizing and microwave radiation. The Staff performs technical monitoring, evaluation, and research to assure that NRL radiological and microwave operations are safe and in compliance with federal, state, and Navy regulations. It provides employees with the instructions, instruments, assistance, and controls needed to carry out their radiological protection responsibilities.

Mr. J. N. Stone

Key Personnel

Name	Title
Mr. J.N. Stone	Head, Health Physics Staff
Mr. T.L. Johnson	Head, Research & Technical Support Section
Mr. R.B. Luersen	Head, Survey & Analysis Section

Civilian Personnel

Full-Time Permanent: 14

Total Estimated R&D Funding

Fiscal Year 1983: $90,000

Chemistry Division

Staff Activity
Fire Protection and Damage Control
Program Office

Research Activity Areas

Chemical Diagnostics
- Optical diagnostics of chemical reactions
- Kinetics of gas phase reactions
- Chemical lasers and energy transfer
- Trace analysis
- Atmosphere analysis and control

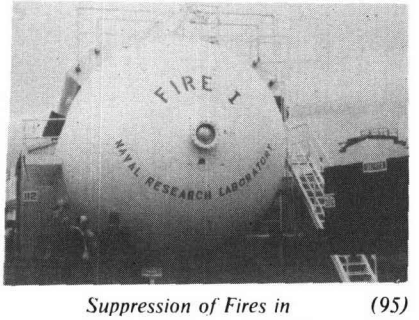
Polymeric Materials
- Synthesis of unique polymers
- Functional organic coatings
- High-strength composites
- Polymer characterization
- Adhesion and structural adhesives

Inorganic & Electrochemistry
- Fundamental electrode reactions
- Solution chemistry
- Electroactive polymers
- Trace metal analysis
- Synthesis and characterization of novel inorganic compounds

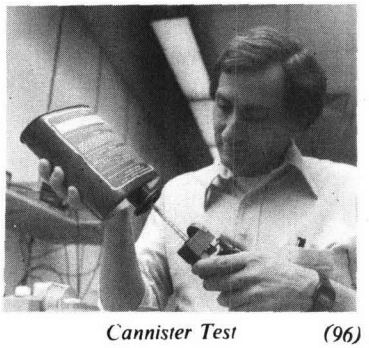
Inorganic & Electrochemistry (cont'd)
- Corrosion prevention
- High Temperature Chemistry
- Homogeneous Catalysis
- Theoretical chemistry

Surface Chemistry
- Tribology
- Surface properties of materials
- Surface analysis (electron, mass, vibrational)
- Graphite and carbon materials
- Microchemical detectors
- IR/RF Decoy materials
- Surface modification
- Synchrotron radiation induced chemistry

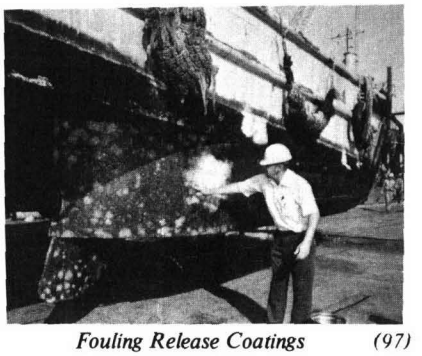
Combustion & Fuels
- Distillate fuels research
- Auto-oxidation and combustion dynamics
- Fire suppression
- Personnel protection in fires
- Modeling and scaling of combustion systems
- Chemical and biological defense
- Synthetic fuels



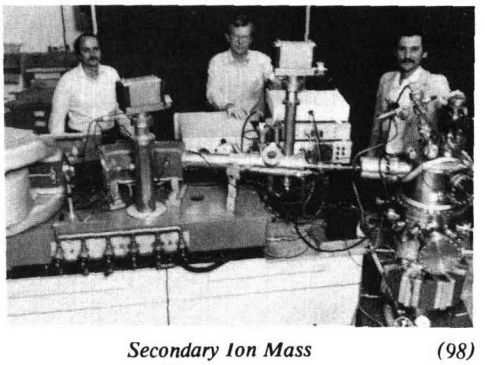
Suppression of Fires in Enclosed Spaces—NRL's 10,000 cu. ft. Facility *(95)*



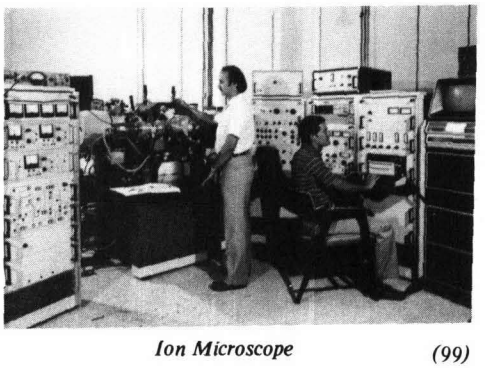
Cannister Test *(96)*



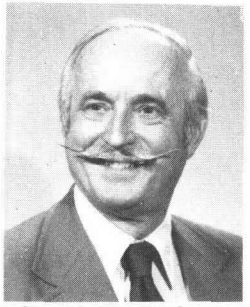
Fouling Release Coatings *(97)*



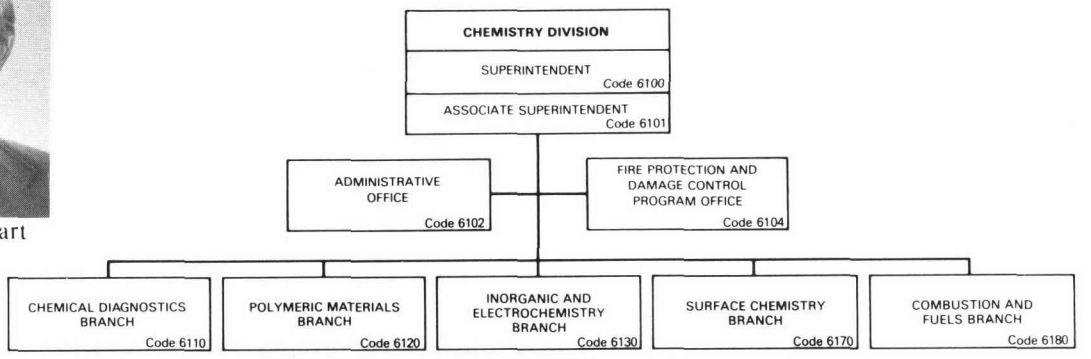
Secondary Ion Mass Spectrometer *(98)*



Ion Microscope *(99)*



Dr. H. W. Carhart



Basic Responsibilities

The Chemistry Division conducts basic and applied research and development studies in the broad fields of chemical diagnostics, polymeric materials, inorganic and electrochemistry, surface chemistry and combustion, and fuels chemistry. Specialized programs within these fields include organic composite materials, surface cleaning formulations, coatings, adhesives, dynamics, laser chemistry, electroactive polymers, tribology, physical and chemical characterization of surfaces and theory of surfaces, submarine atmosphere analysis and control, corrosion, solution chemistry, personnel protection, fire suppression, and the chemistry and physics of synfuels.

Key Personnel

Name	Title
Dr. H.W. Carhart*	Superintendent
Dr. D.L. Venezky	Associate Superintendent
Mrs. B.L. Russell¶	Administrative Officer
Vacancy	Administrative Assistant
Dr. H.W. Carhart†	Head, Fire Protection and Damage Control Program Office
Dr. A.B. Harvey	Head, Chemical Diagnostics Branch
Dr. W.B. Fox	Head, Polymeric Materials Branch
Dr. D.L. Venezky†	Head, Inorganic & Electrochemistry Branch
Dr. J.S. Murday	Head, Surface Chemistry Branch
Dr. H.W. Carhart	Head, Combustion and Fuels Branch

Civilian Personnel

Full-Time Permanent: 110

Total Estimated R&D Funding

Fiscal Year 1983: $16,000,000

*Acting
†Additional duty
¶See footnote inside front cover

Material Science and Technology Division

Staff Activity

Laser Materials-Application Center

Failure Analysis and Fractography Staff

Research Activity Areas

Environmental Effects
- Microstructural characterization
- Weldability of advanced alloys
- Thermomechanical effects
- Micromechanisms of crack growth
- Novel fabrication and processing
- Corrosion science of advanced alloys
- Stress corrosion cracking
- Surface protection and inhibitors
- Corrosion mechanisms
- Marine corrosion and cathodic protection

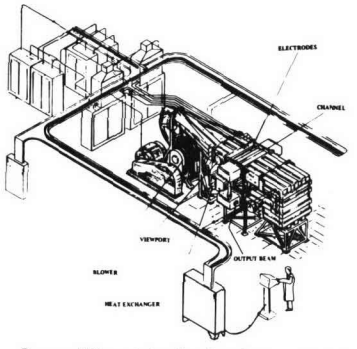
Physical Metallurgy
- Phase transformations
- Crystalline defect states
- Microstructural effects on properties
- Elasticity, plasticity, mechanical phenomena
- Laser welding
- Alloy development
- Laser surface processing
- Ion implantation
- Small angle neutron scattering

Ceramics
- Processing and fabrication
- Microstructural characterization
- Strength and fracture behavior
- Thermostructural applications
- Ceramics for electronic, piezo-electric, optical, and other nonmechanical applications

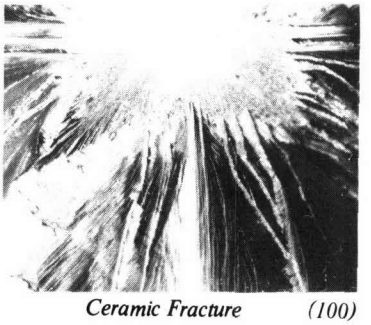
Composite Materials
- Physical, mechanical, and failure characterizations
- Fabrication and processing techniques
- Mechanical and failure analyses
- High-temperature structural and ordnance applications

Mechanics of Materials
- Subcritical crack growth and fracture
- Environmental effects
- Failure-safe design parameters
- Metallurgical optimization for high-strength metals
- Fatigue criteria
- Fracture criteria
- Computational mechanics
- Fracture mechanics
- Structural mechanics

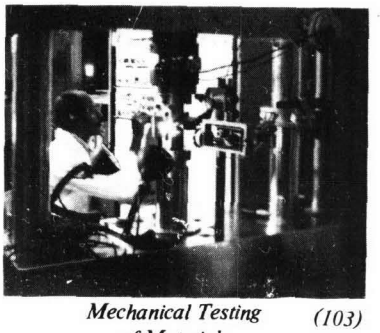
Thermostructural Materials
- Elevated temperature behavior of materials
- Influence of environment on high-temperature materials
- Basic mechanisms of radiation damage
- Criteria for improved structural design using high-temperature materials



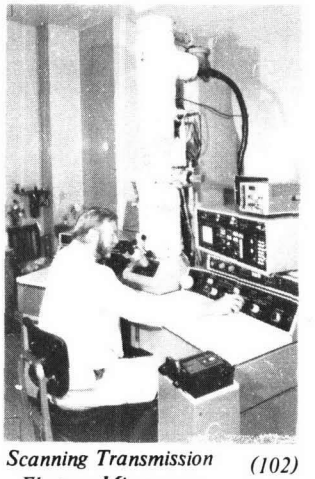
Laser Materials-Application Center *(101)*



Ceramic Fracture *(100)*

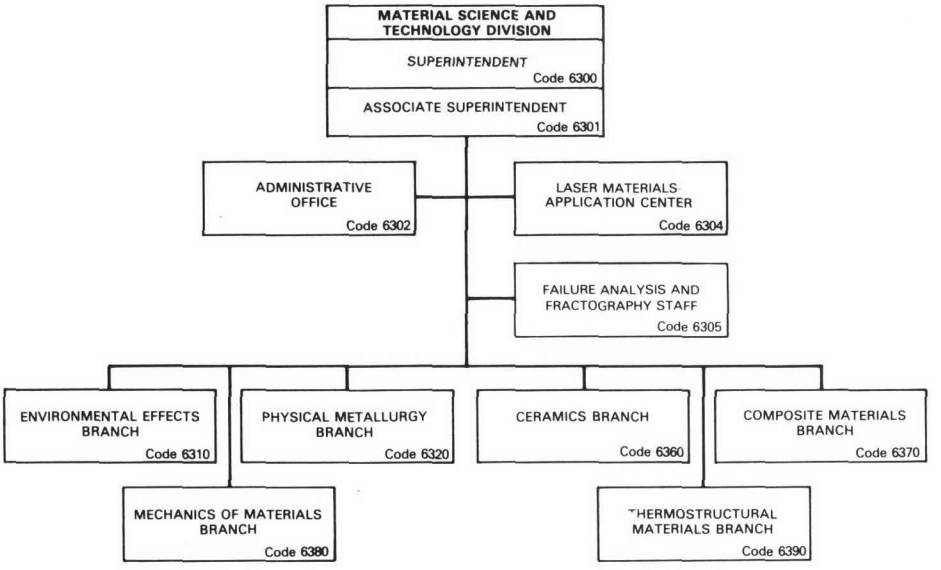


Mechanical Testing of Materials *(103)*



Scanning Transmission Electron Microscope *(102)*

Dr. B. B. Rath



Basic Responsibilities

The Material Science and Technology Division conducts basic and applied research and engages in exploratory and advanced development of materials technology having substantive value to the Navy. R&D programs encompass the intrinsic behavior of metals, alloys, ceramics, glasses, and composites; the fabrication of naval structures and devices from these materials; and the effects of projected military service environment on the performance and reliability of these materials. Program objectives include achieving fundamental understanding of the mechanical and physical properties of materials; identifying composition, processing, and microstructural factors to produce improved materials; and developing criteria for the selection, design, certification, and life-cycle management of materials in naval vehicles and systems. This diversity of programs is carried out by interdisciplinary teams of material scientists, metallurgists, ceramists, physicists, chemists, and engineers, using the most advanced testing facilities and diagnostic techniques.

Key Personnel

Name	Title
Dr. B.B. Rath*	Superintendent
Mr. R.J. Goode	Associate Superintendent
Mrs. E Wray	Administrative Officer
Mr. R.L. Stegman	Head, Laser Materials-Application Center
Mr. C.D. Beachem	Head, Failure and Fractography Analysis Staff
Dr. A.J. Sedricks	Head, Environmental Effects Branch
Dr. B.B. Rath	Head, Physical Metallurgy Branch
Mr. R.W. Rice	Head, Ceramics Branch
Dr. S.C. Sanday	Head, Composite Materials Branch
Dr. F.J. Loss	Head, Mechanics of Materials Branch
Mr. L.E. Steele	Head, Thermostructural Materials Branch

Civilian Personnel

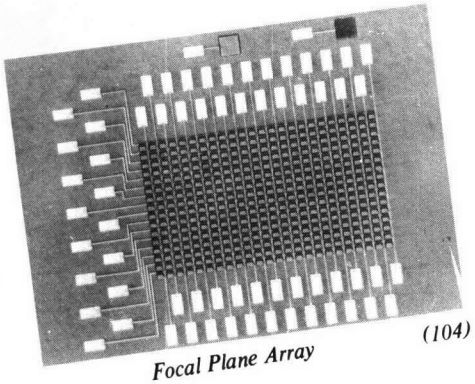
Full-Time Permanent: 103

Total Estimated RD Funding

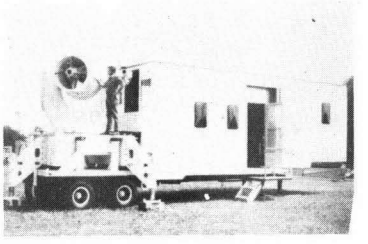
Fiscal Year 1983: $13,000,000

*Acting

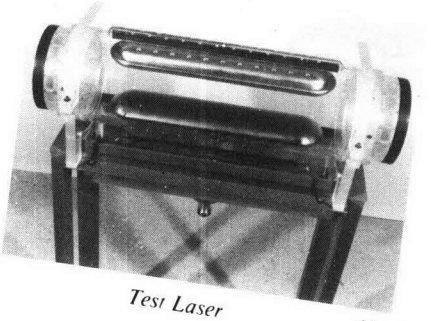
Optical Sciences Division



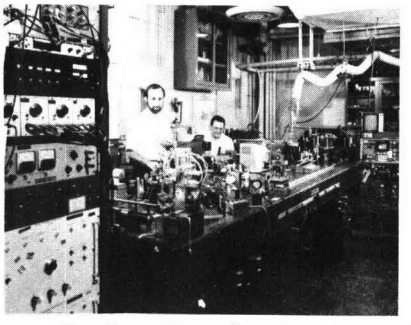
Focal Plane Array (104)



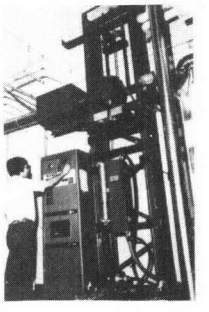
High Precision Tracker and Trailer (105)



Test Laser (106)



Fast-Pulsed Laser Spectroscopy (107)



Fiber Draw Facility (108)

Staff Activities

Program analysis and development
Special systems analysis
Technical study groups
Technical contract monitoring
Theoretical studies

Research Activity Areas

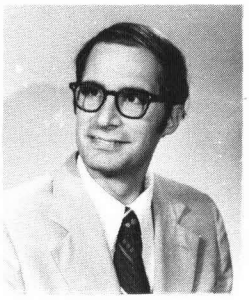
Optical Probes
- Laser-matter interactions
- Molecular optics
- Photophysical processes
- Nonlinear optical phenomena
- Ultraviolet and soft x-ray interactions
- Electronic properties of materials
- Electronic applications
- Optical instrumentation
- Synchrotron radiation
- Interferometry

Applied Optics
- Optical image and information processing
- Optical characterization of military targets
- Optical technology
- Ultraviolet component development and UV countermeasures
- Atmospheric optics
- Propagation studies

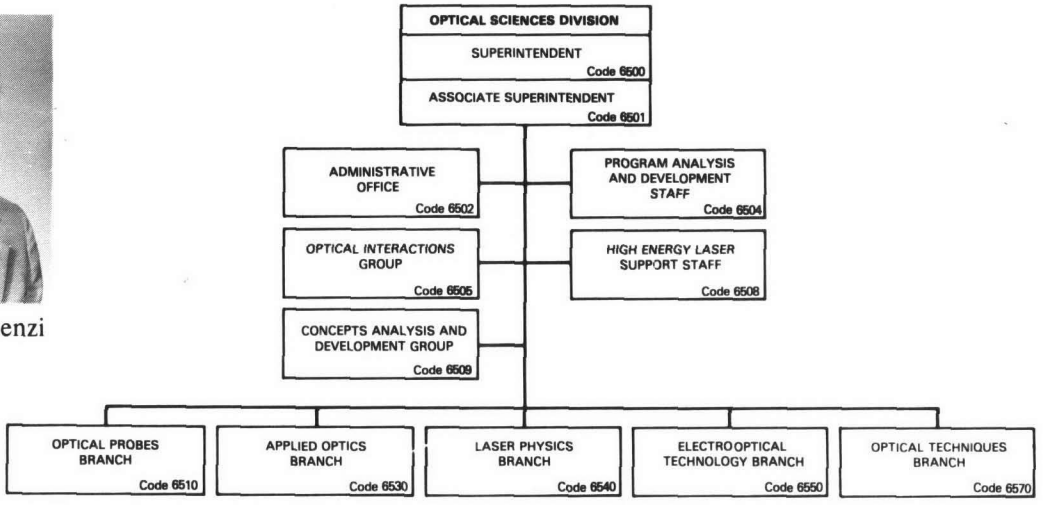
Laser Physics
- Molecular laser physics
- Chemical laser physics
- Laser chemical kinetics
- Electrically driven lasers
- Laser-induced reactions
- Laser materials diagnostics
- Non linear frequency conversion

Electro-optical Technology
- Optical and IR countermeasures
- Detection signal processing studies
- Optical seeker studies
- Solid state laser development
- Optical imager development
- Optical interactions in semiconductor systems

Optical Techniques
- Picosecond light pulses
- Nonlinear effects in materials
- Optical waveguides
- Radiation-induced defects
- Optical properties: fibers, windows, data processing materials
- Surface properties
- Optical control of solid state electronic devices



Dr. T. G. Giallorenzi



Basic Responsibilities

The Optical Sciences Division carries out a variety of research, development, and application-oriented activities in the generation, propagation, detection, and use of radiation in the wavelength region between near-ultraviolet and far-infrared wavelengths. The research, both theoretical and experimental, is concerned with discovering and understanding the basic physical principles and mechanisms involved in optical devices, materials, and phenomena. The development effort is aimed at extending this understanding in the direction of device engineering and advanced operational techniques. The applications activities include systems analysis, prototype system development and exploitation of R&D results for the solution of optically related military problems. In addition to its internal program activities, the Division serves the Laboratory specifically and the Navy generally as a consulting body of experts in optical sciences. The work in the Division includes studies in quantum optics, laser physics, optical waveguide technologies, laser-matter interactions, atmospheric propagation, optical technology, holography, optical warfare, optical data processing, optical systems, optical materials, radiation damage studies, optical materials fabrication, optical recording materials, and optical diagnostic techniques. A significant portion of the effort is devoted to developing, analyzing, and using special optical materials. Various field measurement programs on optical problems of specific interest are also conducted.

Key Personnel

Name	Title
Dr. T.G. Giallorenzi	Superintendent
Mr. J.M. McMahon	Associate Superintendent
Ms. M. Stewart	Administrative Officer
Dr. J.C. Kershenstein	Program Analysis & Development Staff
Mr. J.M. McMahon	Program Analysis & Development Staff
Dr. J.M. Schnur	Program Analysis & Development Staff
Dr. R.A. Patten	Program Analysis & Development Staff
Dr. A.F. Milton	Program Analysis & Development Staff
Dr. R.C. Elton	Head, Optical Interactions Group
Mr. D. France	Head, High Energy Laser Support Staff
Dr. J.C. Kershenstein†	Head, Concepts Analysis and Development Group
Dr. M.N. Kabler	Head, Optical Probes Branch
Dr. R.A. Patten	Head, Applied Optics Branch
Dr. N. Djeu	Head, Laser Physics Branch
Dr. A.F. Milton	Head, Electrooptical Technology Branch
Dr. H. Taylor	Head, Optical Techniques Branch

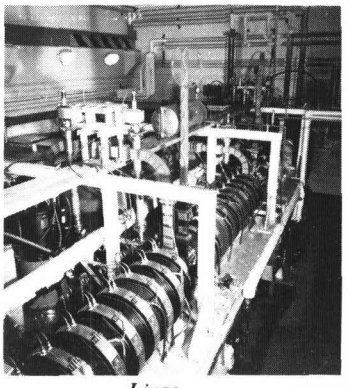
Civilian Personnel

Full-Time Permanent: 121

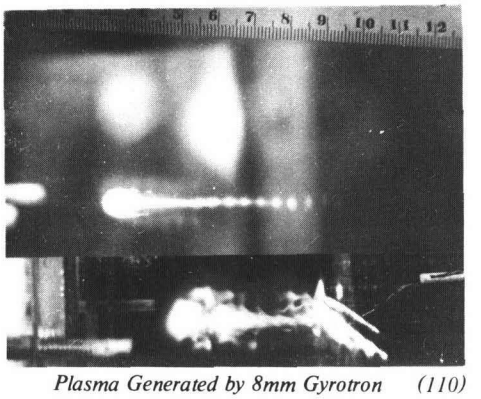
Total Estimated R&D Funding

Fiscal Year 1983: $25,500,000

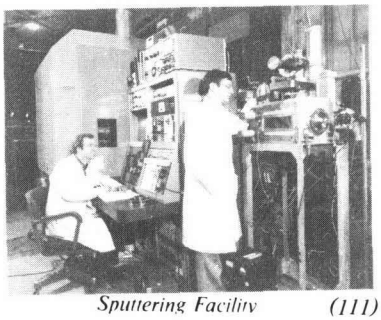
Condensed Matter and Radiation Sciences Division



Linac *(109)*



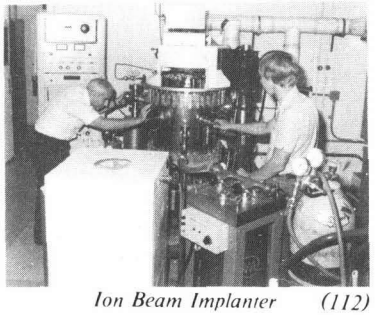
Plasma Generated by 8mm Gyrotron Radiation *(110)*



Sputtering Facility *(111)*

Staff Activities

Radiation effects studies
Ion-solid interactions
Radiation theory
X-ray optics
Radar absorbing materials



Ion Beam Implanter *(112)*

Research Activity Areas

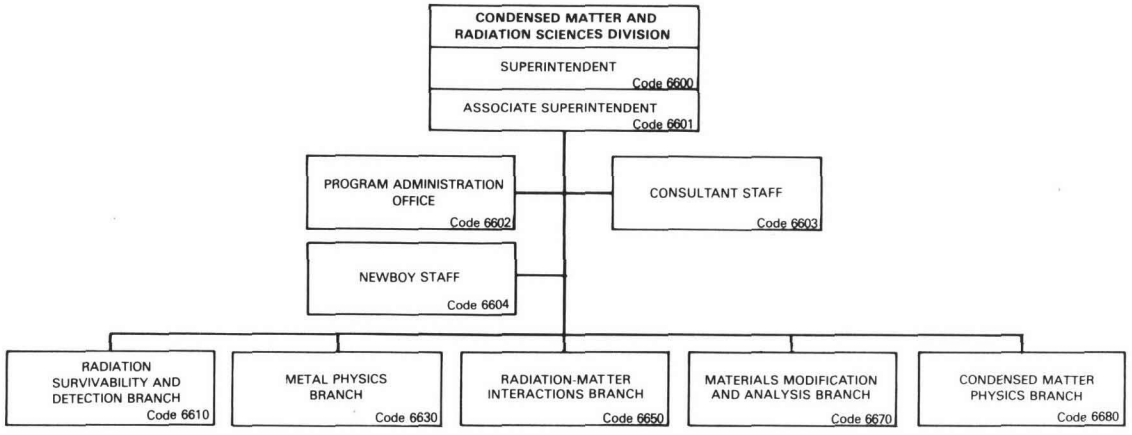
Radiation Survivability & Detection
- Radiation detection
- Space radiation belts
- Ionizing and laser radiation vulnerability
- Hardening of satellite components
- Radiation vulnerability
- Device testing in radiation beams
- 75 MeV cyclotron
- 60 MeV electron linac
- 2 MV electron Van de Graaff
- Cobalt-60 radiation source

Metal Physics
- Electronic and transport properties
- Magnetic/materials
- Multilayer structures
- Thin film science
- Superconductivity

Condensed Matter Physics
- X-ray sources, optics, and detectors
- X-ray analysis of materials
- Plasma spectroscopy
- Synchrotron radiation applications
- X-ray lithography
- Radiation effects in microelectronics
- Condensed matter theory

Radiation—Matter Interactions
- Target damage from MeV electron beams
- Radiation transport calculations
- Energetic radiation applications
- Molecular collisions
- Interaction of EM radiation with electron beams
- Radiation curing of polymers

Materials Modification and Analysis
- Surface analysis by Ion beam techniques
- Radiation effects from high-energy charged-particle beams
- Crystal studies by channeling techniques
- Modification of surfaces by ion implantation
- Sputtering by high-energy ions
- Theory of ion-solid interactions
- 5-MV Van de Graaff
- Two 200-kV ion implantation systems



Basic Responsibilities

The Condensed Matter and Radiation Sciences Division conducts a broad program of basic and applied research on the fundamental properties of materials and on the interactions of various types of radiation with matter. Physical properties of matter, including pure metals, alloys, crystals, semiconductors, superconductors, lower dimensional materials, liquids, and plasmas, are investigated theoretically and experimentally as well as by various radiation probes. Damage produced by radiation, ranging from laser and x-ray beams through charged and neutral particle beams in the megavolt region, is studied. Techniques to utilize radiation for beneficial modification of materials are also developed. Radiations of military significance are studied and simulated in the laboratory by various radiation facilities maintained and operated by the Division primarily for DOD users.

Dr. J. T. Schriempf

Key Personnel

Name	Title
Dr. J.T. Schriempf	Superintendent
Dr. E.A. Wolicki	Associate Superintendent
Mr. D.F. France	Head, Program Administration Office
Dr. A.W. Saenz	Consultant (Radiation Theory)
Dr. J.W. Butler	Consultant (Ion Beam Applications)
Dr. B.J. Faraday	Program Manager, Project NEWBOY Program Office
Dr. K.W. Marlow	Head, Radiation Survivability & Detection Branch
Dr. D.U. Gubser	Head, Metal Physics Branch
Dr. J.B. Aviles	Head, Radiation-Matter Interaction Branch
Dr. F.A. Smidt	Head, Materials Modification and Analysis Branch
Dr. D.J. Nagel	Head, Condensed Matter Physics Branch

Civilian Personnel

Full-Time Permanent: 98

Total Estimated R&D Funding

Fiscal Year 1983: $12,500,000

Electronics Technology Division

Research Activity Areas

Semiconductors
- Solid state theory
- Electrical and optical characterization of materials
- Impurity and defect studies
- Structural and electronic properties of amorphous semiconductors
- Electrical, optical, and magneto-optical studies of semiconductor surfaces and interfaces

Magnetism
- Resonance in magnetic materials and semiconductors
- Spin-ordered magnetic phenomena and quantum electronics
- Magnetic properties of amorphous materials and metallic glasses
- Magneto-optics for ring laser gyros

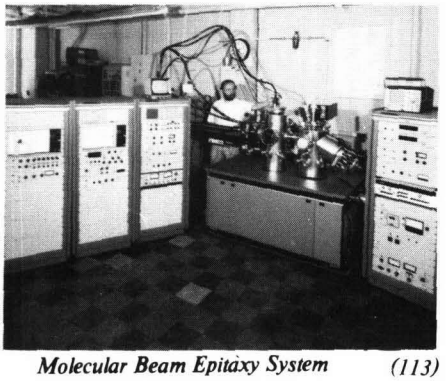
Surface Physics
- Surface and interface physics
- Cathode research and development
- Processing research for submicron electronics
- Characterization and growth of semiconductor, metal, and insulator films and surfaces
- Thermionic energy conversion
- Field emission arrays

Microwave Technology
- Surface acoustic waves
- Microwave and millimeter-wave integrated circuits
- Microwave solid state sources
- Microwave ferrimagnetic and ferromagnetic components
- Millimeter-wave and submillimeter-wave device research
- Superconducting devices

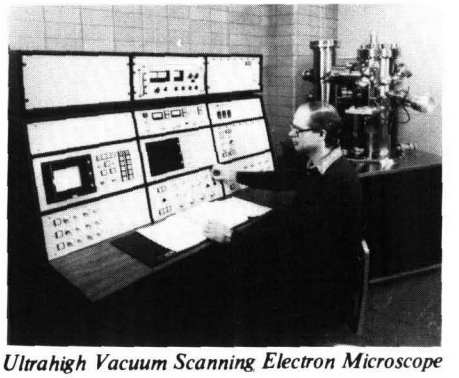
Solid State Devices
- Ion implantation technology
- High- and low-power devices for energy conversion
- Field effect transistor reliability and failure analysis
- MIS failure physics, radiation vulnerability and hardening
- High-frequency microwave devices
- Integrated circuit technology

Electronic Material Technology
- Preparation and development of magnetic, dielectric, optic, and semiconductor materials
- Optical components and coatings
- Molecular beam epitaxy
- Metal organic chemical vapor deposition

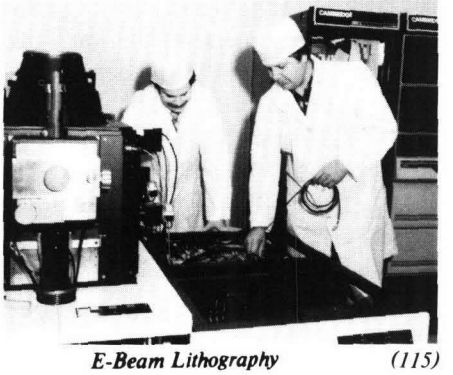
Microwave and Millimeter Wave Tube Technology
- Microwave and millimeter power amplifier research and development
- Amplifier theory and analysis
- Supportive technology development
- Tube fabrication
- Manufacturing technology



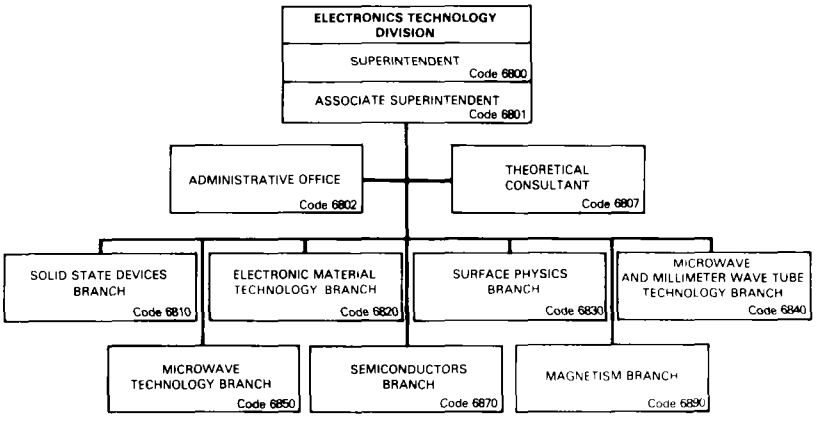
Molecular Beam Epitaxy System *(113)*



Ultrahigh Vacuum Scanning Electron Microscope *(114)*



E-Beam Lithography *(115)*



Basic Responsibilities

The Electronics Technology Division carries out programs of basic and applied research and development in the fields of electronic properties of solid materials, materials development, surface physics, microwave techniques, microelectronic devices research and fabrication, highpower microwave generation, and basic research in electronic materials, especially semiconductors, and in magnetism and cryoelectronics. The activities of the Division couple device research both to basic materials investigations and to systems research and development needs.

Key Personnel

Name	Title
Vacancy	Superintendent*
Vacancy	Associate Superintendent
Mrs. M.H. Grimes	Administrative Office
Dr. K.L. Ngai	Theoretical Consultant
Dr. J.E. Davey	Head, Solid State Devices Branch
Mr. H. Lessoff	Head, Electronic Material Technology Branch
Dr. R.F. Greene	Head, Surface Physics Branch
Dr. R.K. Parker	Head, Microwave and Millimeter Wave Tube Technology Branch
Dr. L.R. Whicker	Head, Microwave Technology Branch
Dr. S.G. Bishop	Head, Semiconductors Branch
Dr. G.T. Rado	Head, Magnetism Branch

Civilian Personnel

Full-Time Permanent: 133

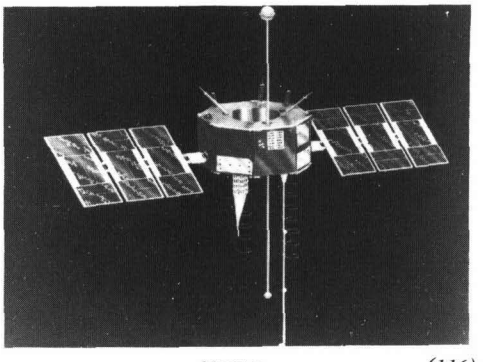
Total Estimated R&D Funding

Fiscal Year 1983: $21,500,000

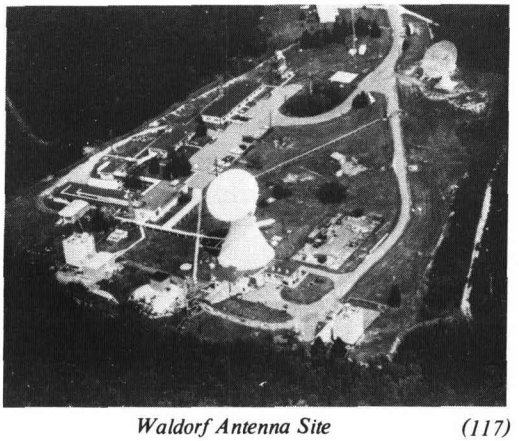
*Duties performed on a rotational basis among branch heads.

Space and Communications Technology Directorate

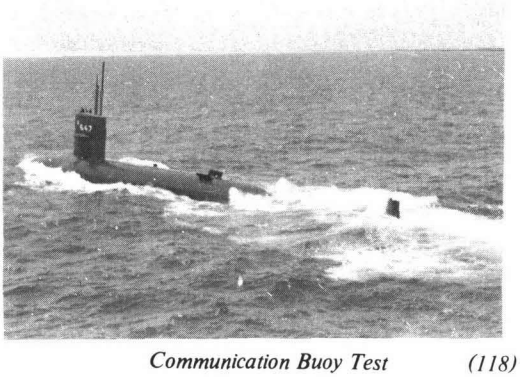
This directorate conducts basic and applied research to improve naval capabilities in communications, navigation, detection, surveillance, environmental sensing and combat management. It also is responsible for research and development in the systems, sensors, techniques, instrumentation, and phenomenology of communications, command and control, signal exploitation, and information processing. Work in these fields is supported by theoretical studies and analyses, as well as by experimental development and flight of payloads. Special facilities for building and testing complete spacecraft are available for on-orbit evaluation of space concepts and techniques.



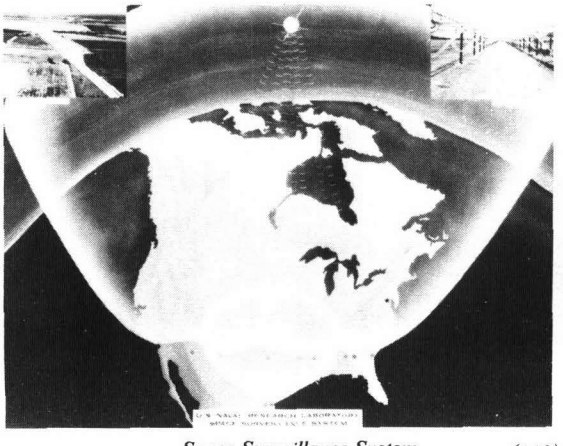
NTS-2 *(116)*



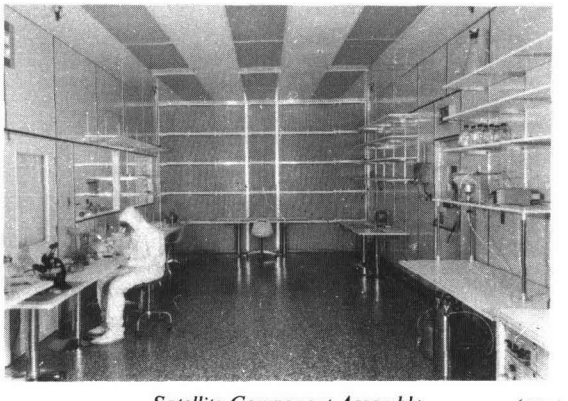
Waldorf Antenna Site *(117)*



Communication Buoy Test *(118)*



Space Surveillance System *(119)*



Satellite Component Assembly Clean Room *(120)*

Associate Director of Research for Space and Communications Technology

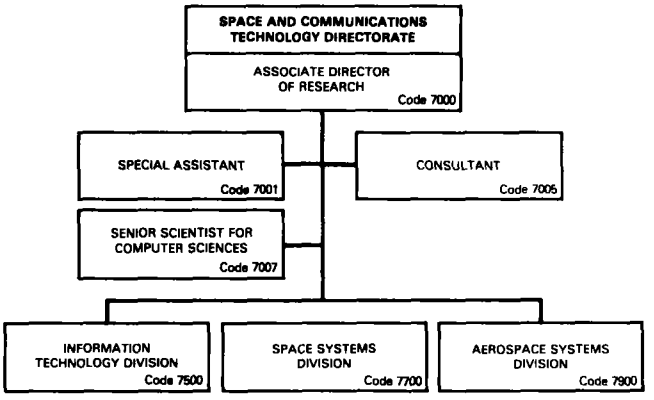
Dr. B. Wald

Dr. Wald [redacted] He received the degree of A.B. in physics from Bowdoin College in 1953, and of Ph.D. in electrical engineering from the University of Maryland in 1967.

He came to the Countermeasures Branch of the Radio Division of the Naval Research Laboratory in 1953, where he developed intercept receivers and computers for simulating their performance. From 1957 to 1962, he led a group exploring the application of digital technology to direction finding and signal intercept. From 1962 to 1967, he was in charge of the development of the automation of the Bulls Eye target location system.

In 1967, he founded the Information Systems Branch, NRL's first computer science activity. In 1972, he became Superintendent of the Communications Sciences Division, and became acting Director of Space and Communications Science and Technology in 1979. He was appointed to his present position on January 1, 1980.

Dr. Wald is a member of the Institute of Electrical and Electronic Engineers and the Association for Computing Machinery, and has served these societies in editorial, conference organization and refereeing roles. He has taught for the University of Maryland and the George Washington University, and has lectured at the Naval War College. He has served as an associated member of the Defense Science Board and was twice awarded the Navy's Meritorious Civilian Service Award.



Key Personnel

Name	Title
Dr. B. Wald	Associate Director of Research for Space and Communications Technology
Miss K. DeAngelis	Special Assistant
Dr. J.W. Schwartz	Consultant
Mr. Y.S. Wu	Senior Scientist
Dr. J.R. Davis	Superintendent, Information Technology Division
Mr. P.G. Wilhelm	Superintendent, Space Systems Division
Dr. R. LeFande	Superintendent, Aerospace Systems Division

Information Technology Division

Research Activity Areas

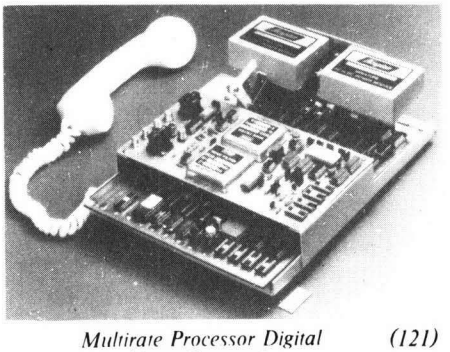
Navy Center for Applied Research in Artificial Intelligence
- Natural Language for Automated Message Processing
- Multisensor Information Integration
- Expert Systems for Decision Aids and Consultation

Communication Systems Engineering
- Network design
- Secure communication systems
- Speech processing
- Modulation, coding, and waveform design

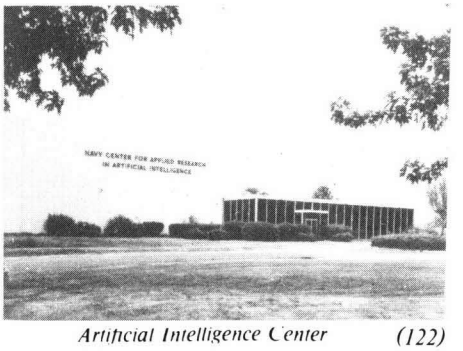
Transmission Technology
- Submarine communication technology
- Communication system architecture
- Communication antenna/propagation technology
- Satellite communications system technology

Integrated Warfare Technology
- Combat management information system analyses
- Command information system design
- Communication, command, and control countermeasures
- Signal processing for high-frequency intercept system

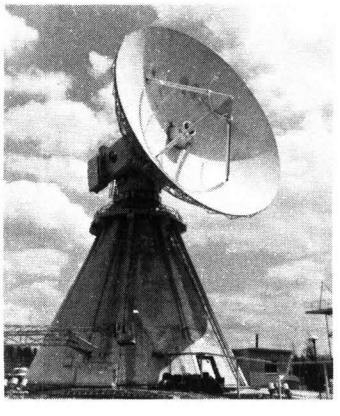
Computer Science and Systems
- Software engineering
- Information theory
- Message processing technology



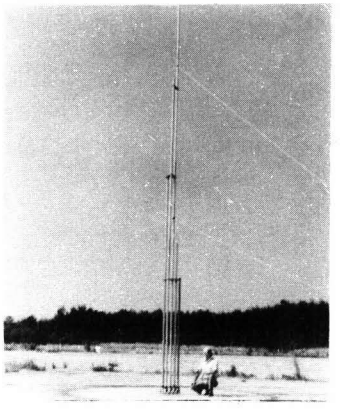
Multirate Processor Digital Voice Terminal *(121)*



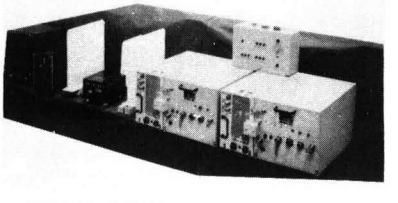
Artificial Intelligence Center *(122)*



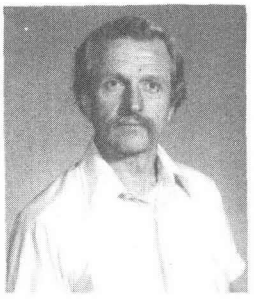
Microwave Space Research Facility *(123)*



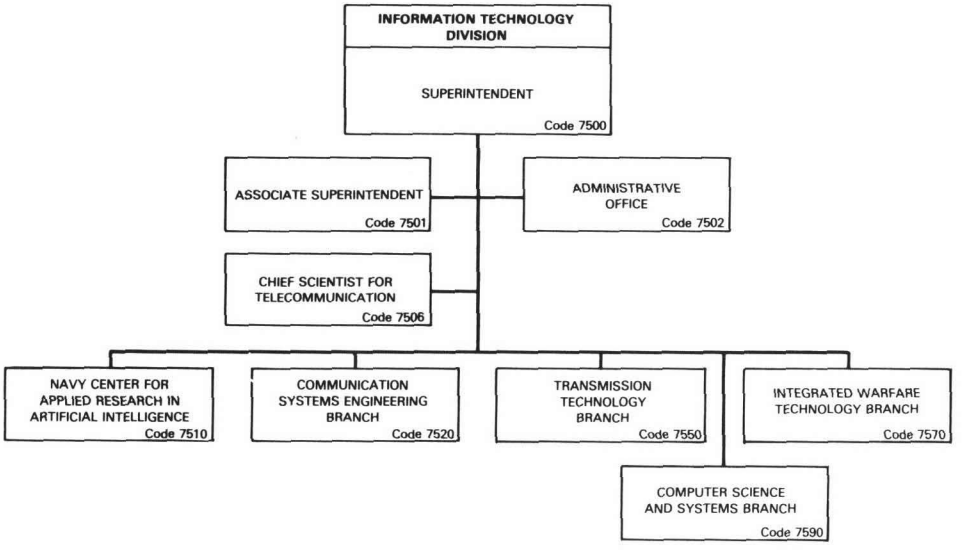
HF Wideband Monopole Transmitting Antenna *(124)*



AN/ALQ-149 Communication Jammer *(125)*



Dr. J. R. Davis



Basic Responsibilities

The Information Technology Division conducts research and development programs in the collection, transmission, and processing of information in order to provide a basis for improvement in the conduct of military operations. The organization of the Division is directed toward addressing the technologies and subsystems necessary to support a combat management information system.

Key Personnel

Name	Title
Dr J.R. Davis	Superintendent
Mr. W.D. Long	Associate Superintendent
Mrs. C.E. Holt	Administrative Officer
Mr. D.I. Himes	Chief Scientist for Telecommunication
Dr. J.E. Franklin	Administrator, Navy Center for Applied Research in Artificial Intelligence
Mr. E.L. Kline	Head, Communication Systems Engineering Branch
Mr. D.I. Himes	Head, Transmission Technology Branch
Dr. L.H. Moffett	Integrated Warfare Technology Branch
Mr. S.H. Wilson	Head, Computer Science and Systems Branch

Civilian Personnel

Full-Time Permanent: 147

Total Estimated R&D Funding

Fiscal Year 1983: $17,000,000

Space Systems Division

Staff Activities

RF Systems
- Spacecraft Communication Designs
- Spacecraft-to-Earth Link Studies & Analyses
- Experimental Communication Systems for both Earth & Satellite

Research Activity Areas

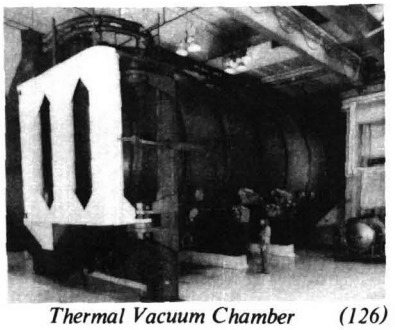
Electrical Systems and Spacecraft Integration
- Advanced Space Concepts
- Spacecraft Power Systems
- On-Orbit Spacecraft Maintenance
- Aerospace Systems Fabrication
- Quality Assurance & Reliability
- Attitude Control Sensors

Terrestrial Systems
- Advanced Data Collection System Design
- Software for Collection System Control
- Satellite Ground Station Design
- Fleet-Deployed Satellite Systems

Mechanical Systems
- Spacecraft Structural Design
- Attitude Control Systems
- Thermal Control Systems
- Launch Vehicle Integration
- Spacecraft Environmental Testing
- Mechanical Systems Testing

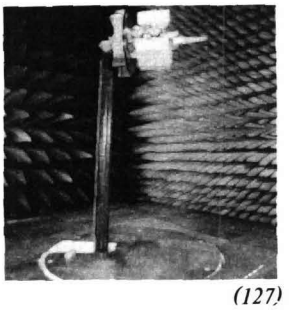
Systems Engineering & Analysis
- Space System Studies
- Error Budget and Development
- System Performance Simulation & Modeling
- Space Systems Technical Evaluation
- Operations Analyses
- System Testing

Digital Systems
- Spaceborne Signal Processors
- Spacecraft Command & Telemetry Systems
- Spacecraft Data Management Systems
- Spacecraft Engineering & Integration
- Satellite Communications Encoders
- Computer-Controlled Ground Test for Automatic Spacecraft Checkout
- Data Acquisition and Processing for On-Orbit Engineering at the NRL Blossom Point Satellite Tracking & Command Facility

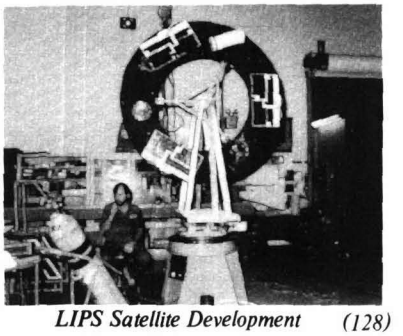


Thermal Vacuum Chamber *(126)*

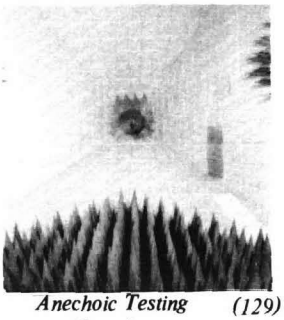
Electronic Equipment Testing in Anechoic Chamber



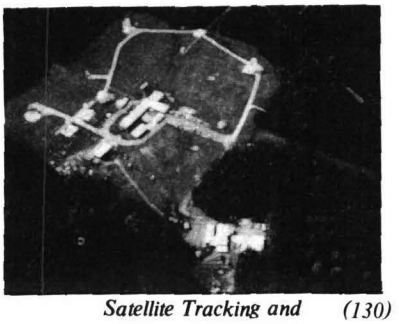
(127)



LIPS Satellite Development *(128)*

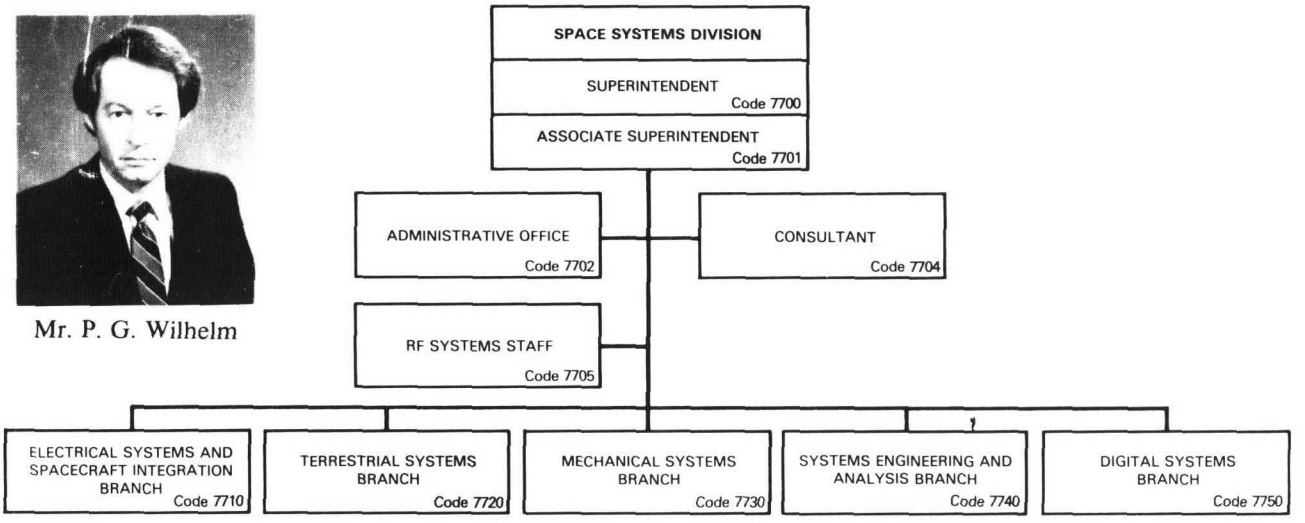


Anechoic Testing Chamber *(129)*



Satellite Tracking and Command Facility *(130)*

Mr. P. G. Wilhelm



Basic Responsibilities

The Space Systems Division develops or supports the development of spacecraft and of systems using these spacecraft. Activities include the understanding and clarification of requirements; the recognition and prosecution of promising research and development; the analysis and testing of systems to quantify their capabilities; the development of operational concepts exploiting new technical capabilities; the system engineering that allocates design requirements to subsystems; and the engineering development and initial operation, for test and evaluation purposes of selected spacecraft subsystems and systems. The Division assists system acquisition managers of major space systems. The Division provides management support and acts as a focal point for activities conducted within numerous NRL divisions as well as providing technical representation and system engineering. In this role, technology transfer is a major goal and motivates a continuous search for new technologies and capabilities and the development of prototypes demonstrating the integration of such technologies.

Key Personnel

Name	Title
Mr. P.G. Wilhelm	Superintendent
Mr. F.V. Hellrich	Associate Superintendent
Mrs. L.P. Harding	Administrative Officer
Mr. R.D. Mayo	Consultant
Dr. L.E. Hearton	Head, RF Systems Staff
Mr. J.G. Winkler	Head, Electrical Systems and Spacecraft Integration Branch
Mr. T.W. Fisher	Head, Terrestrial Systems Branch
Mr. R.T. Beal	Head, Mechanical Systems Branch
Mr. L.M. Hammarstrom	Head, Systems Engineering and Analysis Branch
Mr. R.E. Eisenhauer	Head, Digital Systems Branch

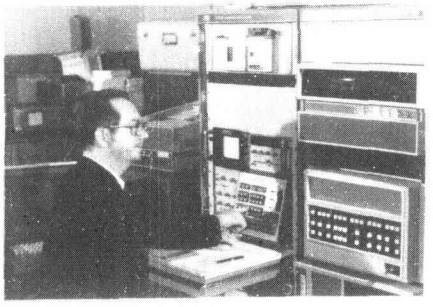
Civilian Personnel

Full-Time Permanent: 135

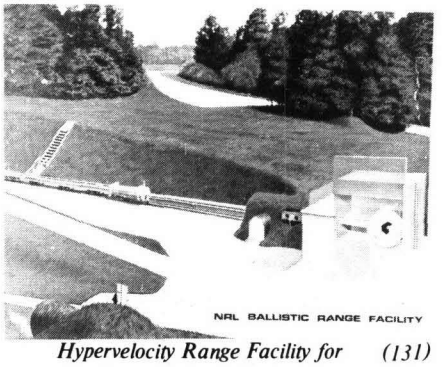
Total Estimated R&D Funding

Fiscal Year 1983: $45,000,000

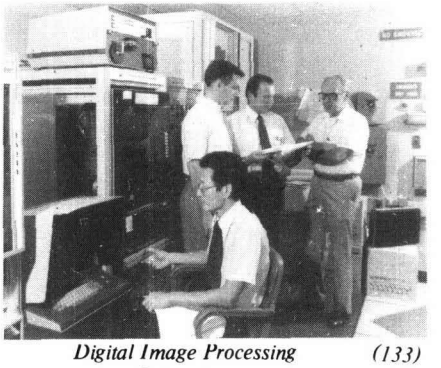
Aerospace Systems Division



Spectral Analysis Using Fourier Analyzer *(132)*



Hypervelocity Range Facility for Space Defense Studies *(131)*



Digital Image Processing Laboratory *(133)*

Staff Activities

Special Programs Office
- Program direction (advanced development)
- Research analyses (in-house/contracted)
- Analyses integration and system feasibility determination
- Price estimating

Research Activity Areas

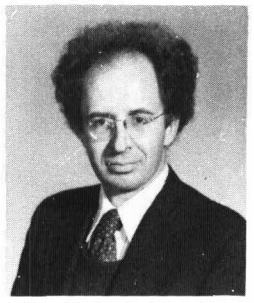
Advanced Systems
- Satellite system R&D
- Astrodynamics
- Foreign technology assessment
- Optical signal processing
- Applied mathematics
- Electromagnetic systems research

Systems Research
- Image processing research
- Radiative transfer
- Potential theory applications
- Space mission analysis
- Military OR methods
- Formula manipulation on computers

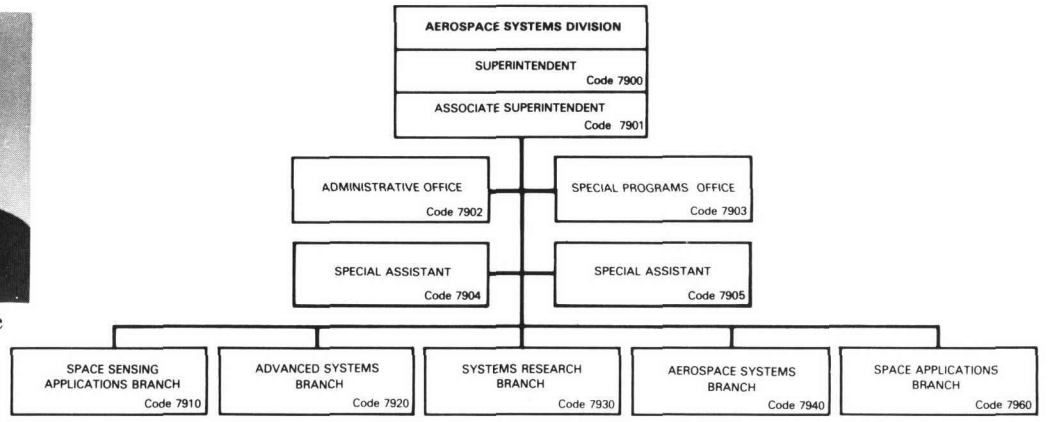
Aerospace Systems
- Ocean surveillance
- Electromagnetic scatter research
- Propagation research
- Satellite system research
- Data systems
- Automatic computations
- Hypervelocity impact research

Space Applications
- Navigation systems
- Satellite tracking
- Geodesy systems
- Time synchronization
- System analysis
- Hydrogen maser
- Frequency standard develop

Space Sensing Applications
- Development of sensors and algorithms for theater level surveillance
- Effects of terrestrial and ocean backgrounds for space-based surveillance
- Definition of surveillance system performance requirements.



Dr. R.A. LeFande



Basic Responsibilities

The Aerospace Systems Division is the Navy's principal activity conducting basic and applied research in theater level surveillance and space warfare and in the related areas of physical science and device technology. A wide variety of disciplines including electronics, electronic warfare, radar, optical, infrared, microwave and radar imaging, digital and optical signal processing, orbital mechanics, communications, navigation, and information sciences are pursued separately and as elements of a holistic approach to aerospace systems.

Key Personnel

Name	Title
Dr. R.A. LeFande	Superintendent
Mr. B.C. Dodson	Associate Superintendent
Mrs. Ann McDaniel	Administrative Officer
Mr. L.E. Earl*	Head, Special Programs Office
Vacancy	Special Assistant
Mr. J.H. Trexler	Special Assistant
Dr. V.E. Noble	Head, Space Sensing Applications Branch
Dr. K.T. Alfriend	Head, Advanced Systems Branch
Dr. A.F. Petty	Head, Systems Research Branch
Mr. H.O. Ankenbruck	Head, Aerospace Systems Branch
Mr. C.A. Bartholomew	Head, Space Applications Branch

Civilian Personnel	**Total Estimated R&D Funding**
Full-Time Permanent: 114	Fiscal Year 1983: $22,000,000

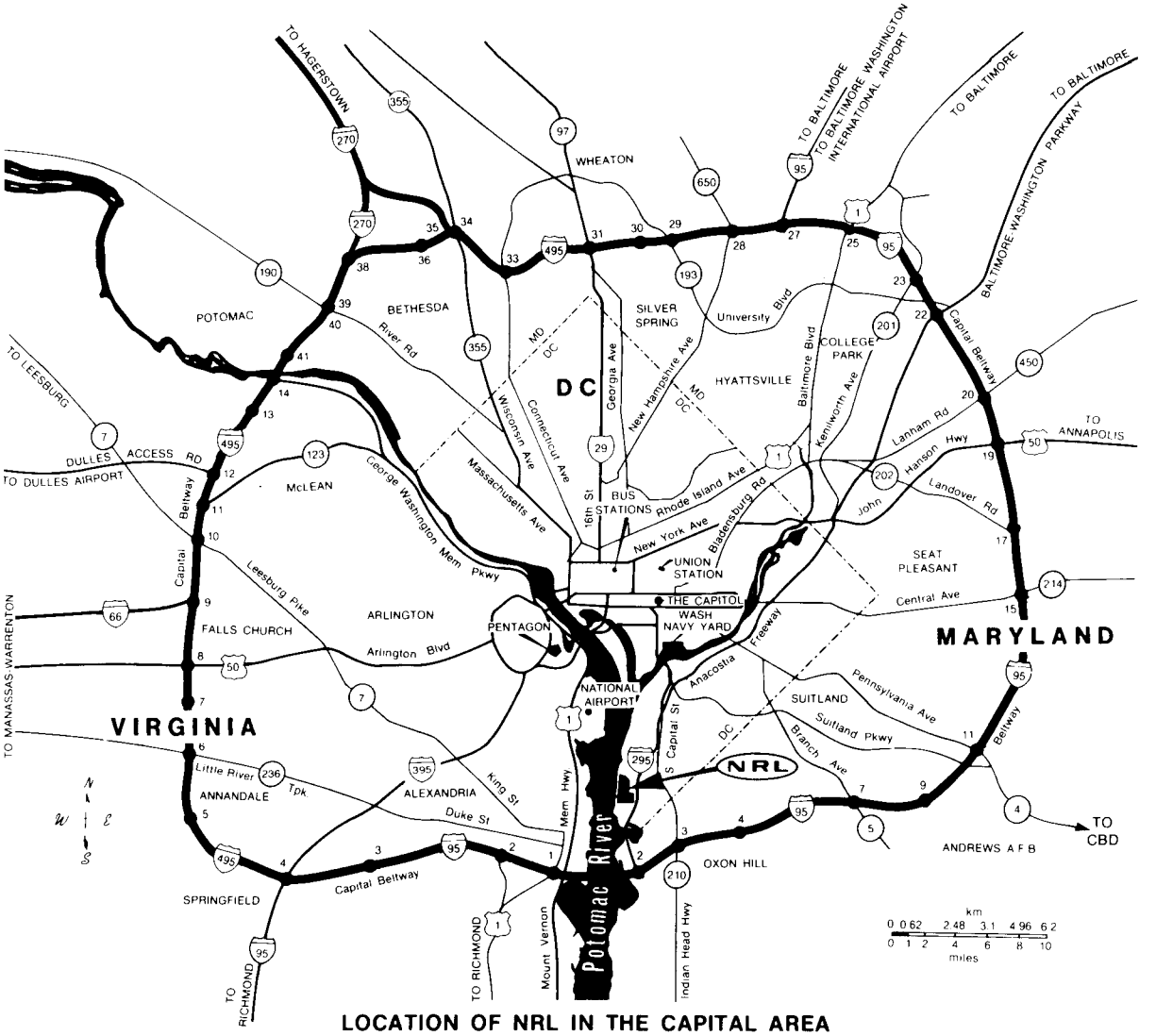
*Acting

General Information

Awards Received by Civilian Employees in FY 1982

Government Awards	Number
Meritorious Executive Award, Senior Executive Service	2
Senior Executive Bonus Award	4
E.O. Hulburt Annual Science Award (local NRL Award)	1
Navy Award for Distinguished Achievement in Science	6
Navy Captain Robert Dexter Conrad Award	1
Navy Distinguished Civilian Service Award	2
Navy Meritorious Civilian Service Award	3
Navy Superior Civilian Service Award	3
Nongovernment Awards	
Sigma Xi Award in Applied Science	1
Sigma Xi Award in Pure Science	1

Location of NRL



LOCATION OF NRL IN THE CAPITAL AREA

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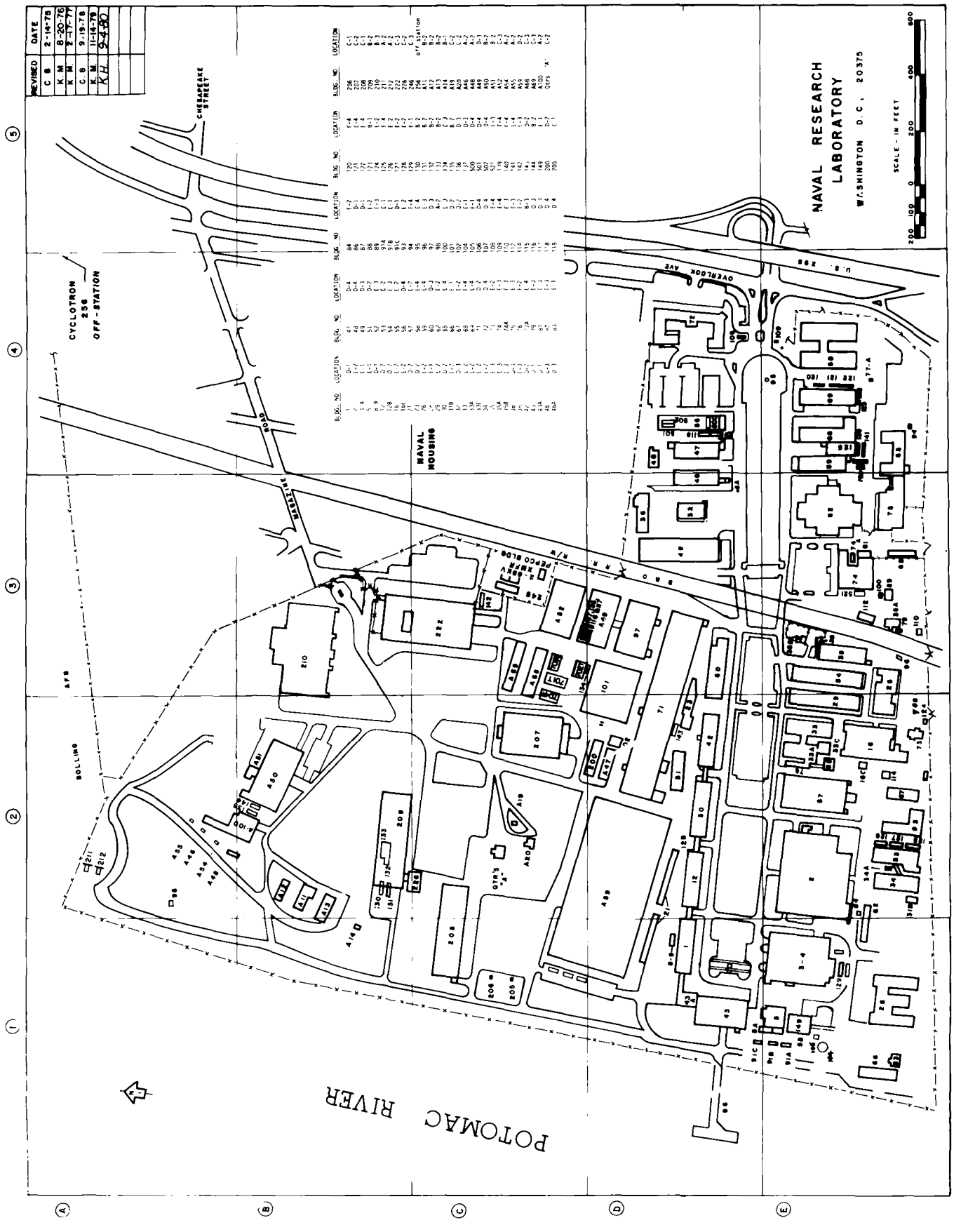
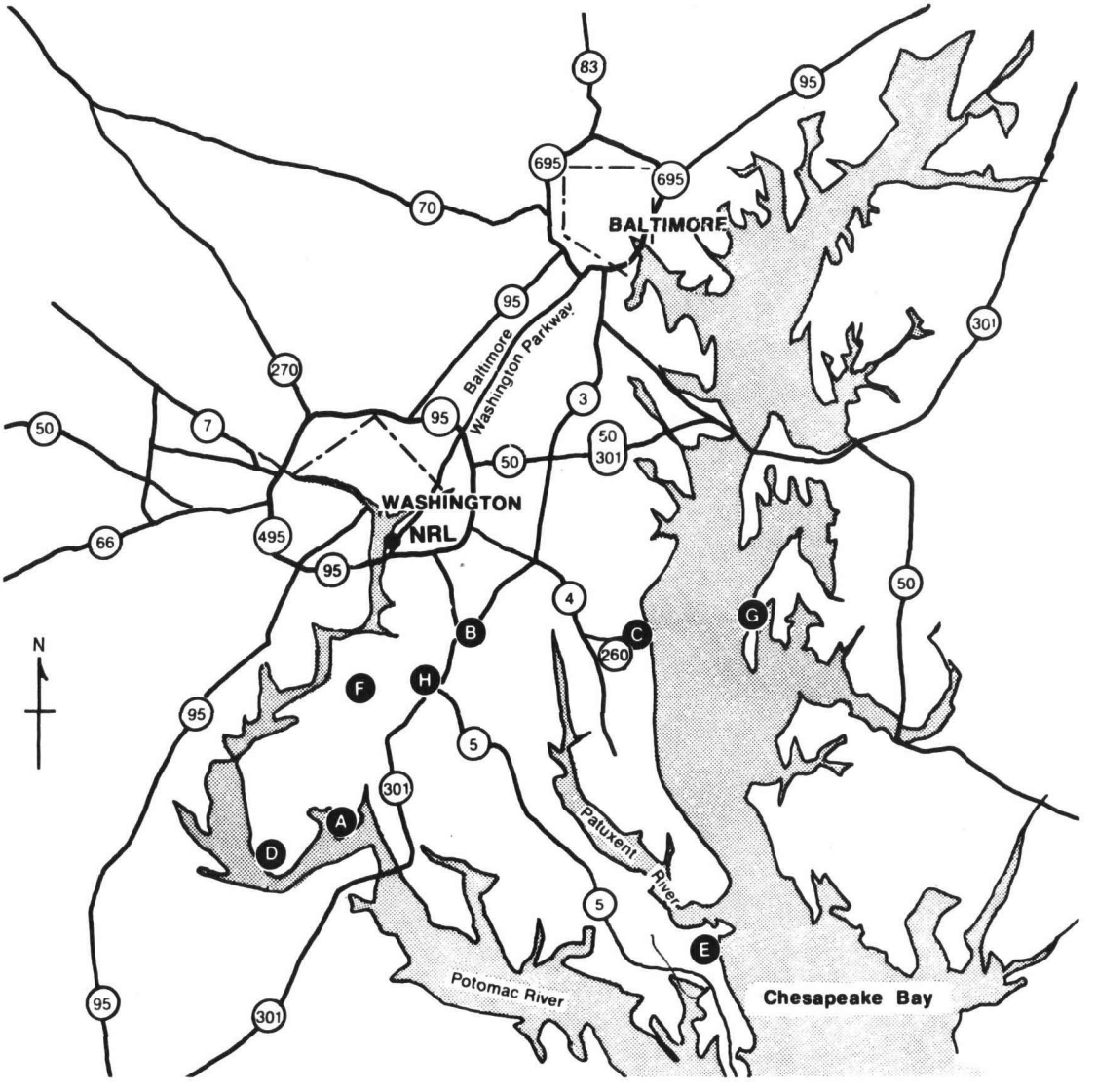
Location of Buildings at Main Site



Location of Principal Field Stations



Approximate driving distance from NRL (in miles)

A — Blossom Pt., MD	40	E — Patuxent River Naval Station	64
B — Brandywine, MD	23	F — Pomonkey, MD	25
C — CBD (Chesapeake Bay Detachment)	40	G — Tilghman Island	110
D — Maryland Point Observatory	45	H — Waldorf Radio Site, MD	20

The Underwater Sound Reference Detachment is located at Orlando, Fla.

Key Personnel

Code	Office and Incumbent		Ext.
	EXECUTIVE DIRECTORATE		
1000	Commanding Officer	CAPT J.A. McMorris II	73403
1001	Director of Research	Dr. T. Coffey	73301
1003	DEEO Officer	Ms. S.A. Eaton	72486
2610	Public Affairs Officer	Mr. J.W. Gately, Jr.	72541
1200	Chief Staff Officer	CAPT J.B. Morris	73621
1220	Head, Security Branch	Mr. M.B. Ferguson	73048
1300	Comptroller	Mr. R.W. Steinbeck	73405
1400	Head, Mgt. Info. Div.	Dr. A.H. Aitken	73405
1800	Head, Civ. Pers. Div.	Mr. D.J. Blome	73421
1810	Personnel Operations	Mr. D.J. Blome	73421
	TECHNICAL SERVICES DIRECTORATE		
2000	Assoc. Dir. Res. for Tech. Services	Mr. J.D. Brown	72879
2004	Patent Counsel	Dr. W.T. Ellis	73428
2010	Safety Officer	Mr. H.C. Kennedy, Jr.	72249
2020	Head, Administrative Services Office	Mrs. L.V. Dabney	73858
2300	Engineering Services Officer	Mr. J.D. Brown*†	72879
2400	Supply Officer	CDR J.R. McGraa	73446
2500	Public Works Officer	CDR J.W. MacLaughlin	73371
2600	Head, Tech. Info. Div.	Mr. E.E. Kirkbride	73388
2700	Chesapeake Bay Detachment Officer (Tel. No. is Area Code 303-257-4000)	Vacancy	
2800	Head, Res. Comp. Div.	Mr. A.B. Bligh	72751
	RESEARCH DIRECTORATES		
4000	Assoc. Dir. Res. for General Sci. & Tech.	Dr. T. Coffey*	73324
4040	Head, Lab. for Computational Physics	Dr. J.P. Boris	73055
4100	Space Science Div. Supt.	Dr. H. Gursky	76343
4300	Environmental Sciences Div. Supt.	Dr. C.H. Cheek*	72974
4700	Plasma Physics Div. Supt.	Dr. S. Ossakow	72723
	SYSTEMS RESEARCH AND TECHNOLOGY DIRECTORATE		
5000	Assoc. Dir. Res. for Systems Res. & Tech.	Mr. R.R. Rojas	73294
5100	Acoustics Div. Supt.	Dr. J.C. Munson	73482
5300	Radar Div. Supt.	Dr. M.I. Skolnik	72936
5700	Tactical Elec. Warfare Div. Supt.	Mr. L.A. Cosby	76278
5800	Marine Technology Div. Supt.	Dr. R.T. Swim	73314
5900	Underwater Sound Reference Det. Supt.	Dr. J.E. Blue	
	(Area Code 305-859-5120)		
	MATERIAL SCIENCE AND COMPONENT TECHNOLOGY DIRECTORATE		
6000	Assoc. Dir. Res. for Mat. Sci. & Component Tech.	Dr. A.I. Schindler	73566
6030	Head, Lab. for Structure of Matter	Dr. J. Karle	72665

*Acting
†Additional duty

MATERIAL SCIENCE AND COMPONENT TECHNOLOGY DIRECTORATE (CONT'D)

6070	Head, Health Physics Staff	Mr. J.N. Stone	72232
6100	Chemistry Div. Supt.	Dr. H.W. Carhart*	73026
6300	Mat. Sci. & Tech. Div. Supt.	Dr. B.B. Rath*	73566
6500	Optical Sciences Div. Supt.	Dr. T.G. Giallorenzi	73171
6600	Condensed Matter & Radiation Sciences DiV. Supt.	Dr. J.T. Schriempf	72931
6800	Electronics Tech. Div. Supt.	Vacancy*	73525

SPACE AND COMMUNICATIONS TECHNOLOGY DIRECTORATE

7000	Assoc. Dir. Res. for Space & Comm. Tech.	Dr. B. Wald	72964
7500	Information Technology Div. Supt.	Dr. J.R. Davis	72903
7700	Space Systems Div. Supt.	Mr. P.G. Wilhelm	72073
7900	Aerospace Systems Div. Supt.	Dr. R.A. LeFande	73468

MISCELLANEOUS

Emergency, Officer on Duty (outside working hours)	73523
Medical Clinic	73592
Information, Naval Research Laboratory	73200
AUTOVON, Incoming 29-(Ext.)	
IDS, Incoming 19-(Ext.)	
Direct in Dialing (Area Code 202) 76-(Ext.)	

Mailing Address: The Naval Research Laboratory
4555 Overlook Avenue, S.W.
Washington, D.C. 20375

*Duties performed on a rotational basis among branch heads.

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*Obtain from Division or Branch

1983 FACT BOOK STAFF

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