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**1983**



*576260*  
**NAVAL  
RESEARCH  
LABORATORY**  
WASHINGTON, D.C. 20375

INDEX ON BACK COVER

| Report Documentation Page                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                    |                                     |                                                                      | Form Approved<br>OMB No. 0704-0188                  |                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------|------------------------------------|
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| 1. REPORT DATE<br><b>MAR 1983</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                    | 2. REPORT TYPE                      |                                                                      | 3. DATES COVERED<br><b>00-00-1983 to 00-00-1983</b> |                                    |
| 4. TITLE AND SUBTITLE<br><b>NRL Fact Book</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                    |                                     |                                                                      | 5a. CONTRACT NUMBER                                 |                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    |                                     |                                                                      | 5b. GRANT NUMBER                                    |                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    |                                     |                                                                      | 5c. PROGRAM ELEMENT NUMBER                          |                                    |
| 6. AUTHOR(S)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                    |                                     |                                                                      | 5d. PROJECT NUMBER                                  |                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    |                                     |                                                                      | 5e. TASK NUMBER                                     |                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    |                                     |                                                                      | 5f. WORK UNIT NUMBER                                |                                    |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)<br><b>Naval Research Laboratory, 4555 Overlook Avenue<br/>SW, Washington, DC, 20375</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                    |                                     |                                                                      | 8. PERFORMING ORGANIZATION<br>REPORT NUMBER         |                                    |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |                                     |                                                                      | 10. SPONSOR/MONITOR'S ACRONYM(S)                    |                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    |                                     |                                                                      | 11. SPONSOR/MONITOR'S REPORT<br>NUMBER(S)           |                                    |
| 12. DISTRIBUTION/AVAILABILITY STATEMENT<br><b>Approved for public release; distribution unlimited</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                    |                                     |                                                                      |                                                     |                                    |
| 13. SUPPLEMENTARY NOTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |                                     |                                                                      |                                                     |                                    |
| 14. ABSTRACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                    |                                     |                                                                      |                                                     |                                    |
| 15. SUBJECT TERMS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                    |                                     |                                                                      |                                                     |                                    |
| 16. SECURITY CLASSIFICATION OF:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    |                                     | 17. LIMITATION OF<br>ABSTRACT<br><br><b>Same as<br/>Report (SAR)</b> | 18. NUMBER<br>OF PAGES<br><br><b>111</b>            | 19a. NAME OF<br>RESPONSIBLE PERSON |
| a. REPORT<br><b>unclassified</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | b. ABSTRACT<br><b>unclassified</b> | c. THIS PAGE<br><b>unclassified</b> |                                                                      |                                                     |                                    |



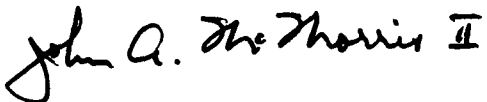
This document has been prepared as a reference source of factual information about the Naval Research Laboratory. It shows data as of the end of FY 1982.\*

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.

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

REVIEWED AND APPROVED  
March 1983

A handwritten signature in black ink, reading "John A. McMorris II". The signature is written in a cursive style with a large initial "J" and a stylized "M".

(Reviewing Officer)

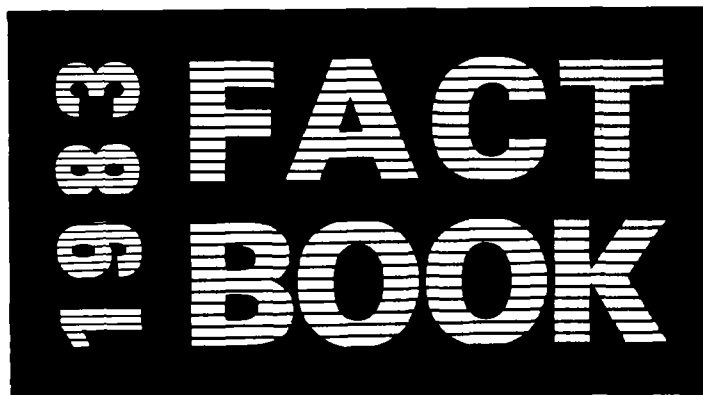
To: Distribution list for NRL 1983 Fact Book

The following erroneous data appeared on p. 9:

|                    | Annual Civilian Turnover Rate (percent) |             |             |             |             |
|--------------------|-----------------------------------------|-------------|-------------|-------------|-------------|
|                    | <u>1978</u>                             | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>1982</u> |
| 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) |             |             |             |             |
|--------------------|-----------------------------------------|-------------|-------------|-------------|-------------|
|                    | <u>1978</u>                             | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>1982</u> |
| 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

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## 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<sup>3</sup>CM 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

Undersea Technology  
Autonomous Vehicles  
Bathymetric Technology  
Anechoic Coatings

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

## **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<sub>2</sub> 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<sub>a</sub>-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           | <u>3</u>   | <u>0</u> |
| 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)

|                    | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>1982</u> |
|--------------------|-------------|-------------|-------------|-------------|-------------|
| 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                          |             | FY 1983                             |             |
|---------------------|----------------------------------|-------------|-------------------------------------|-------------|
|                     | Actual<br>Millions<br>of Dollars | Percent     | Estimated<br>Millions<br>of Dollars | 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          | <u>56.9</u>                      | <u>20.7</u> | <u>76.1</u>                         | <u>24.2</u> |
| Total Navy          | 232.6                            | 84.7        | 277.7                               | 88.4        |
| Other DOD           | 23.8                             | 8.7         | 20.4                                | 6.5         |
| Non-DOD             | <u>11.7</u>                      | <u>4.3</u>  | <u>12.7</u>                         | <u>4.1</u>  |
| 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 | <u>3.8</u>                       | <u>1.0</u>  | <u>1</u>                            | <u>    </u> |
| 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                | <u>16.0</u> | <u>24.9</u> |
| TOTAL                      | 274.4       | 314.0       |

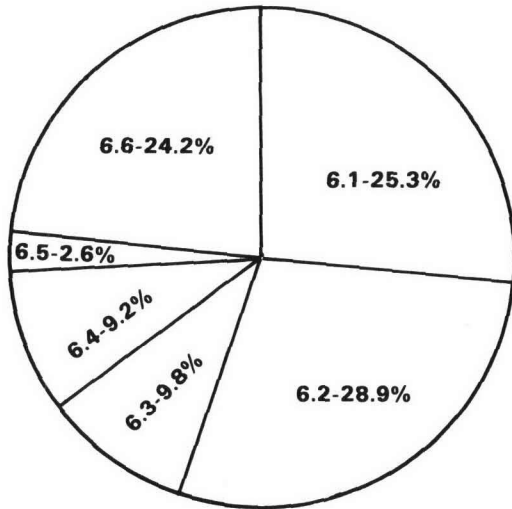
### CAPITAL PROPERTY

| 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)         | <u>41,032</u>                              |
| Total Capital Property                    | 209,423                                    |

\*Rounded to 100%

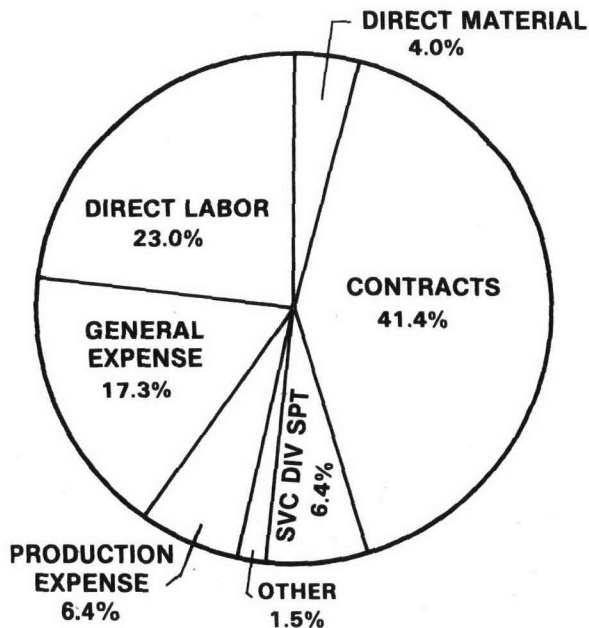


**RDT&E, N FUNDS BY CATEGORY  
PLANNED OBLIGATIONS FY 1983**



|                                | (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         |
| <b>TOTAL</b>                   | <b>254.5</b> |

**DISTRIBUTION OF R&D OBLIGATIONS  
FY 1983 PLAN**



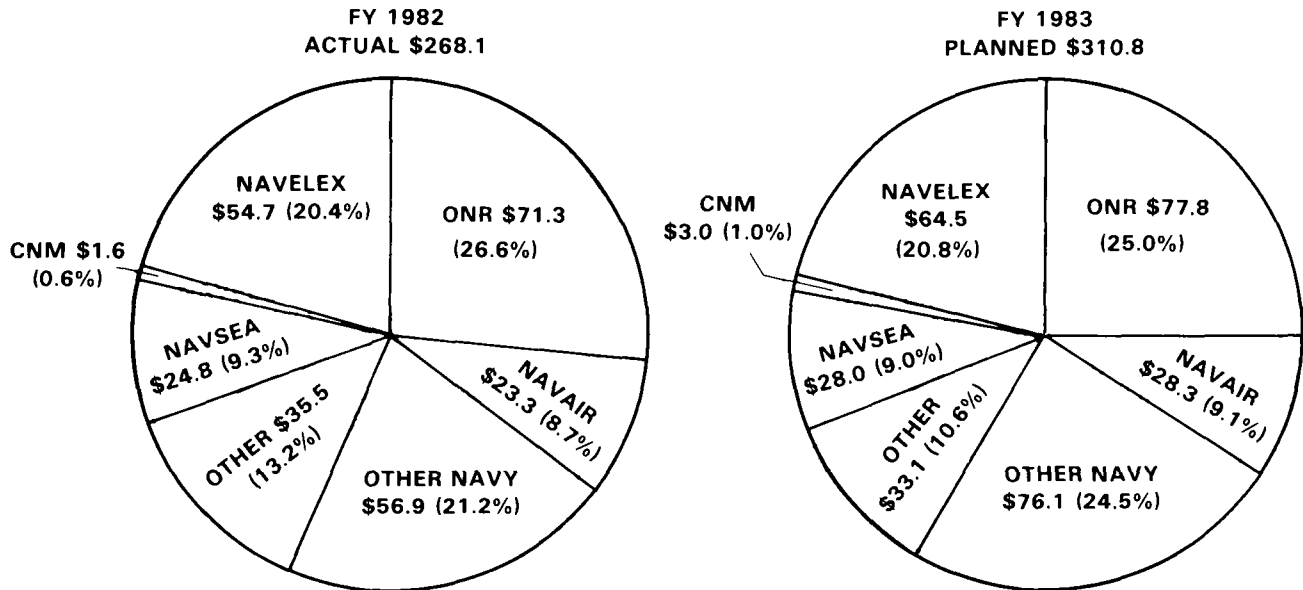
|                          | (MILLIONS)   |
|--------------------------|--------------|
| DIRECT LABOR             | \$ 71.5      |
| DIRECT MATERIAL          | 12.3         |
| CONTRACTS                | 128.6        |
| SERVICE DIVISION SUPPORT | 19.8         |
| OTHER                    | 4.8          |
| APPLIED OVERHEAD:        |              |
| PRODUCTION EXPENSE       | 19.9         |
| GENERAL EXPENSE          | 53.9         |
| <b>TOTAL</b>             | <b>310.8</b> |





## 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 |
| <b>RDT&amp;E, N</b>            |         |         |         |         |
| 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    |
| <b>SUBTOTAL</b>                | 206.4   | 77.0    | 254.5   | 81.9    |
| <b>OPN</b>                     | 12.5    | 4.7     | 11.0    | 3.5     |
| <b>O&amp;MN</b>                | 11.8    | 4.4     | 10.5    | 3.4     |
| <b>OTHER</b>                   | 37.4    | 13.9    | 34.8    | 11.2    |
| <b>TOTAL</b>                   | 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 |                          |
| <u>District of Columbia</u>                                                    |            |                      |                 |                          |
| NRL                                                                            | 129.23     |                      | 1.29            | 154                      |
| Cyclotron Building Site, Bolling AFB                                           |            |                      | 5.24            | 1                        |
| <u>Virginia</u>                                                                |            |                      |                 |                          |
| Radio Research Site, Coast Guard Radio Station, Alex.                          |            |                      | 55.40           |                          |
| Atmospheric Monitoring Facility, Big Meadows Util. Area, Shenandoah Nat'l Park |            |                      | NA <sup>1</sup> |                          |
| <u>Maryland</u>                                                                |            |                      |                 |                          |
| NRL Flight Support Detachment, NAS Patuxent River                              |            |                      | 2               |                          |
| Chesapeake Bay Det., Chesapeake Beach <sup>3</sup>                             | 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 <sup>3</sup>                                        | 23.94      | 35.16                |                 | 37                       |
| Radio Astronomy Observatory, Md. Pt.                                           | 24.30      |                      | 197.88          | 13                       |

<sup>1</sup>NA (not applicable)—Indicates an insignificant area, frequently just a location for instruments.

<sup>2</sup>Site or equipment used by NRL under an intraservice (Navy) or interservice agreement.

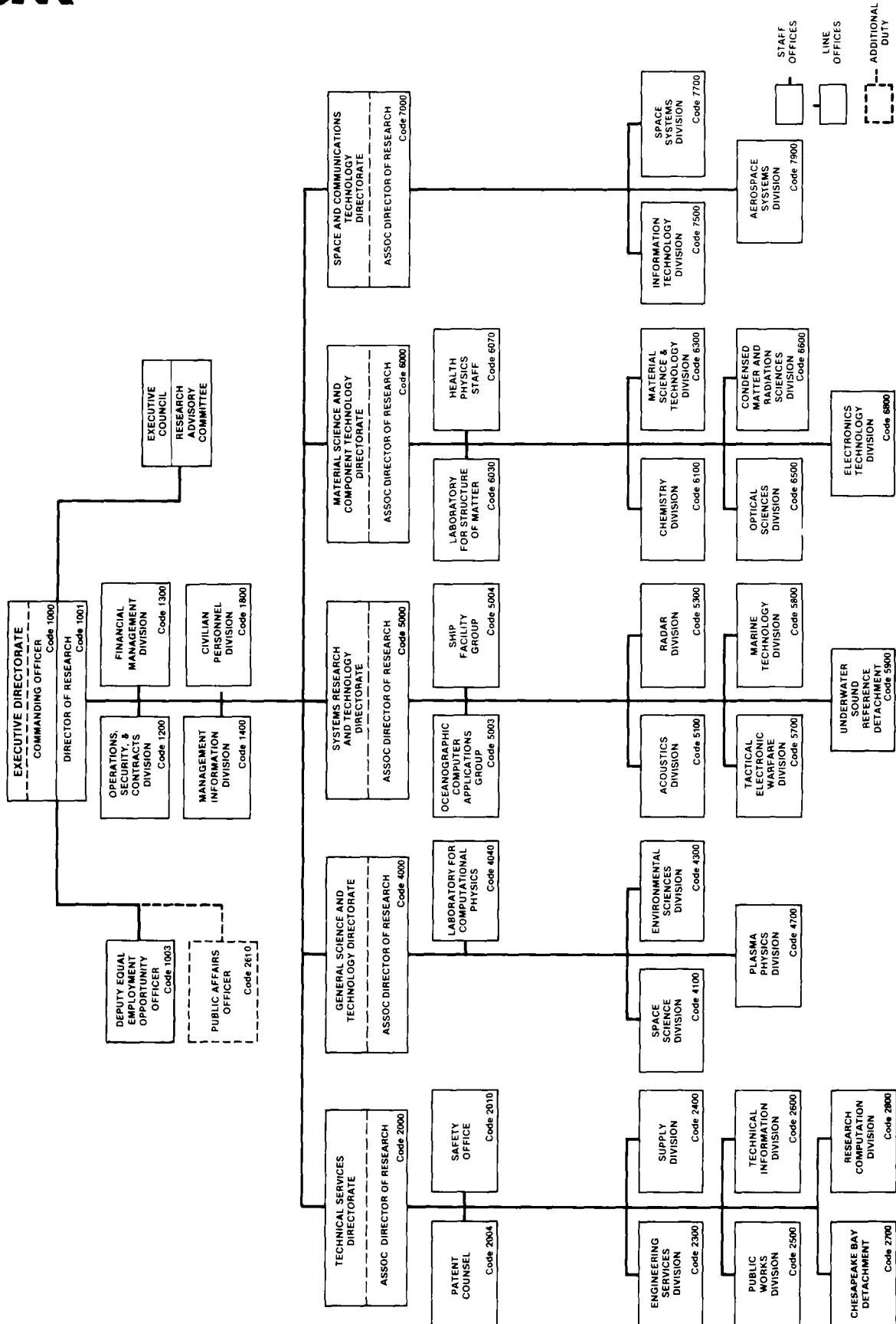
<sup>3</sup>Also included in list of "Major Facilities and Capabilities."



| Station and Location                                        | Acreage    |                      |                 | Buildings and Structures |
|-------------------------------------------------------------|------------|----------------------|-----------------|--------------------------|
|                                                             | Navy Title | Easement or Purchase | Permit or Lease |                          |
| Radio Antenna Range<br>USAF Receiver Site,<br>Brandywine    | 14.12      | 28.40                | 22.98           | 13                       |
| Free Space Antenna<br>Range, Pomonkey                       |            |                      |                 |                          |
| Satellite Tracking<br>Facility, Blossom<br>Point            |            |                      | 135.57          |                          |
| <u>Florida</u>                                              |            |                      |                 |                          |
| Underwater Sound<br>Reference Det.,<br>Orlando <sup>3</sup> | 10.46      |                      |                 | 31                       |
| USRD, Leesburg<br>Facility, Bugg<br>Spring <sup>3</sup>     |            |                      | 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.

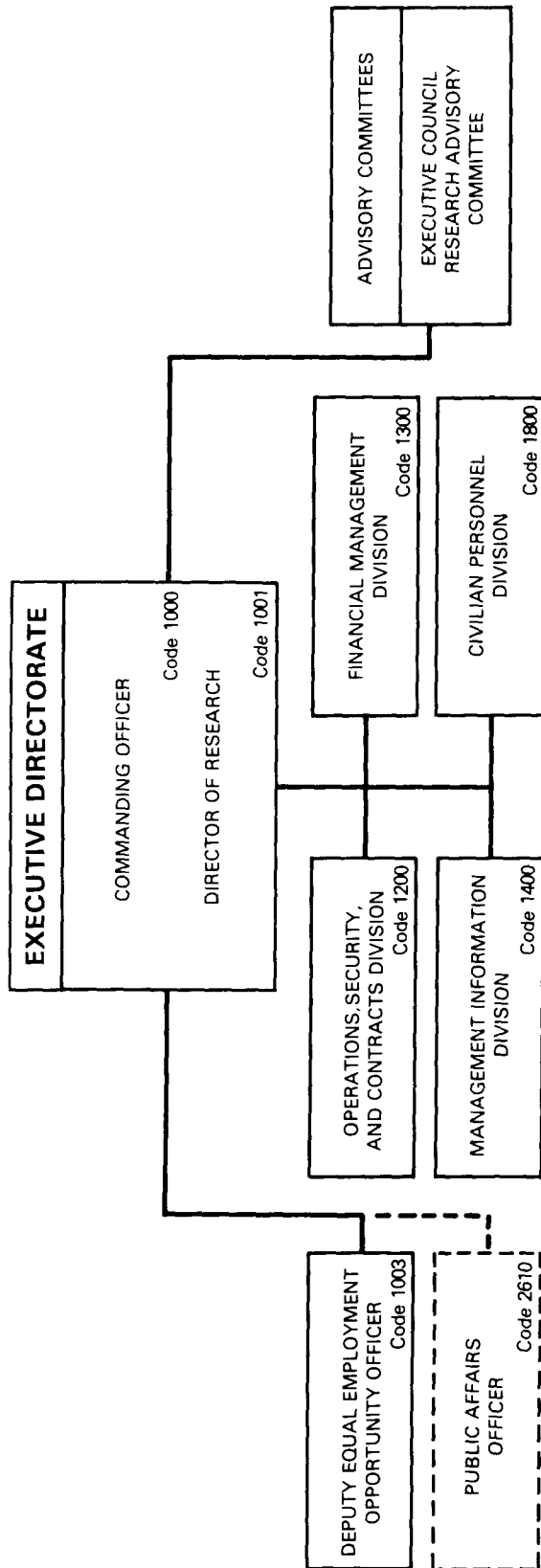
## Director of Research

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.



### Key Personnel

| <u>Name</u>                | <u>Title</u>                                                                       | <u>Code</u> |
|----------------------------|------------------------------------------------------------------------------------|-------------|
| 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<br>Technical Services                           | 2000        |
| Dr. T. Coffey *            | Associate Director of Research for<br>General Science and Technology               | 4000        |
| Mr. R.R. Rojas             | Associate Director of Research for<br>Systems Research and Technology              | 5000        |
| Dr. A.I. Schindler         | Associate Director of Research for<br>Material Science and Component<br>Technology | 6000        |
| Dr. B. Wald                | Associate Director of Research for<br>Space and Communications<br>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.

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\*Acting



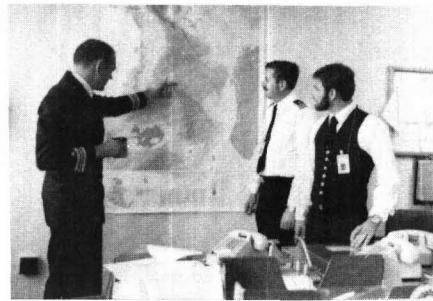
# Operations, Security, and Contracts Division

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



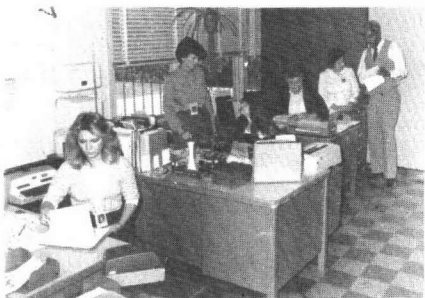
*Operational Services*

(1)



*Research Requirements and Applications*

(2)



*Security Branch, Classification  
Management and Control*

(3)



*Contracts*

(4)

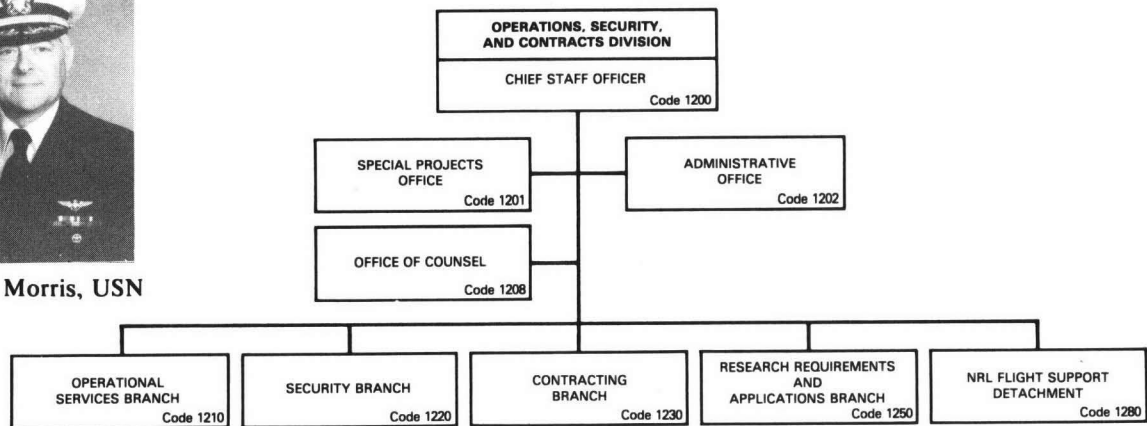


*Counsel*

(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 multi-engine 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

| <u>Name</u>             | <u>Title</u>                                            |
|-------------------------|---------------------------------------------------------|
| CAPT J.B. Morris, USN   | Chief Staff Officer                                     |
| CAPT F.K. Duffev        | 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

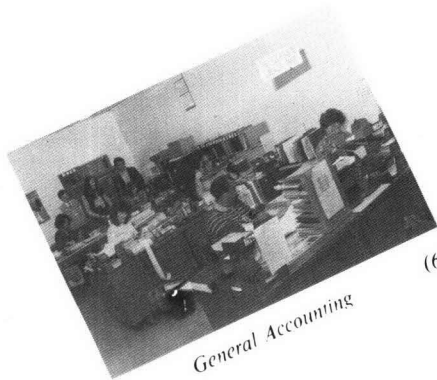
Full-Time Permanent: 102

Military: 131

¶ See footnote inside front cover

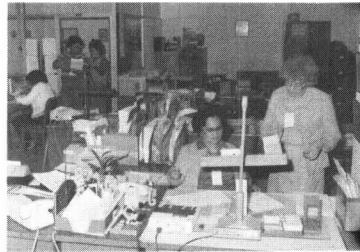
# Financial Management Division

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



*General Accounting*

(6)



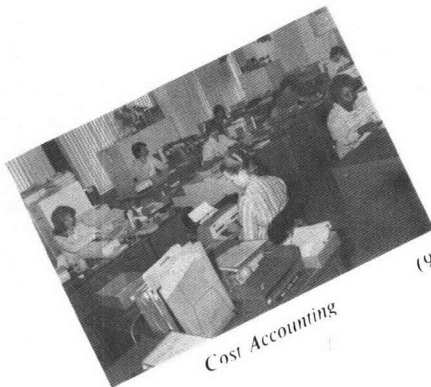
*Payroll*

(7)



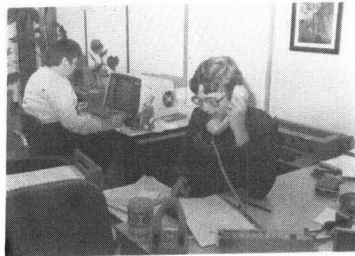
*Fiscal Section*

(8)



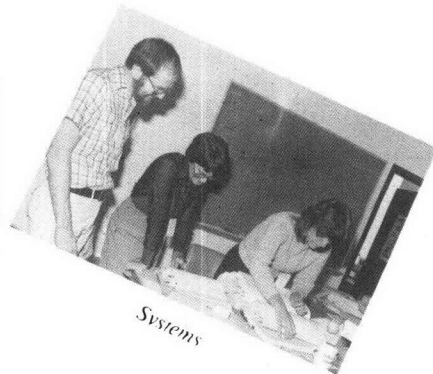
*Cost Accounting*

(9)



*Secretaries*

(10)



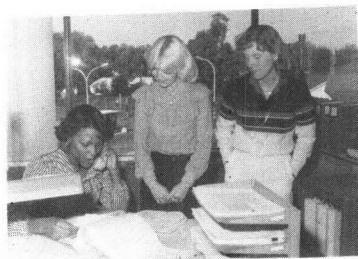
*Systems*

(11)



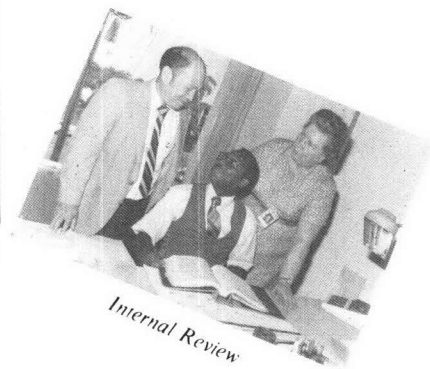
*Disbursing*

(12)



*Budget*

(13)

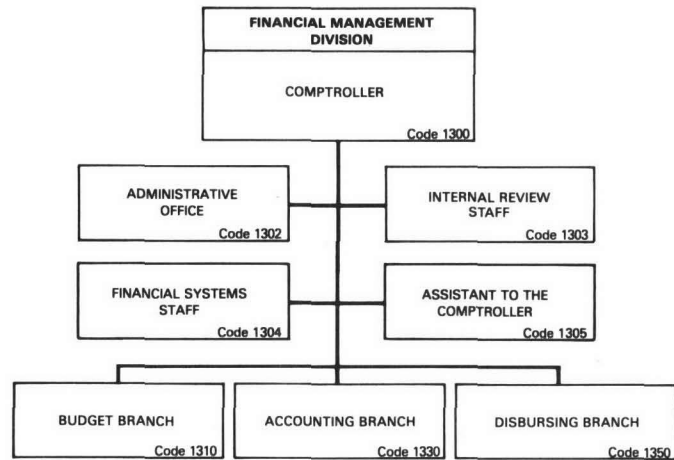


*Internal Review*

(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

| <u>Name</u>            | <u>Title</u>                  |
|------------------------|-------------------------------|
| 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

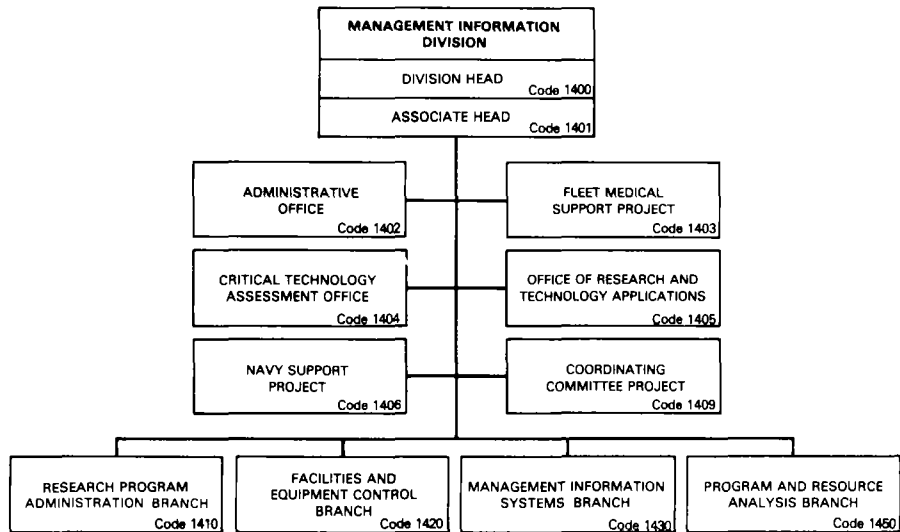
| <u>Name</u>       | <u>Title</u>                                  |
|-------------------|-----------------------------------------------|
| Dr. A.H. Aitken   | Head, Management Information Division         |
| Mrs. B.A. Maag    | Administrative Officer                        |
| Mr. L.M. Winslow  | 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



# Civilian Personnel Division

- PERSONNEL OPERATIONS
- EMPLOYEE DEVELOPMENT
- EMPLOYEE RELATIONS



*Employee Orientation Programs* (15)



*Employee Relations Administration* (16)



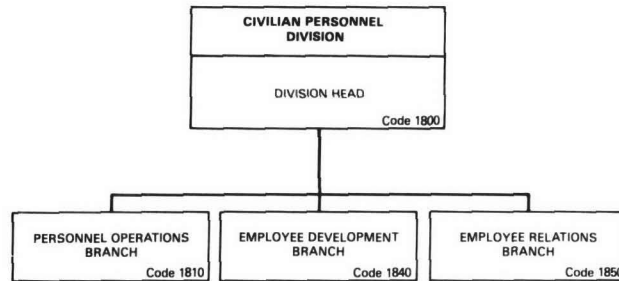
*Personnel Actions, Records and Reports* (17)



*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

| <u>Name</u>      | <u>Title</u>                                       |
|------------------|----------------------------------------------------|
| Mr. F.D. Wallace | Director of Civilian Personnel<br>(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

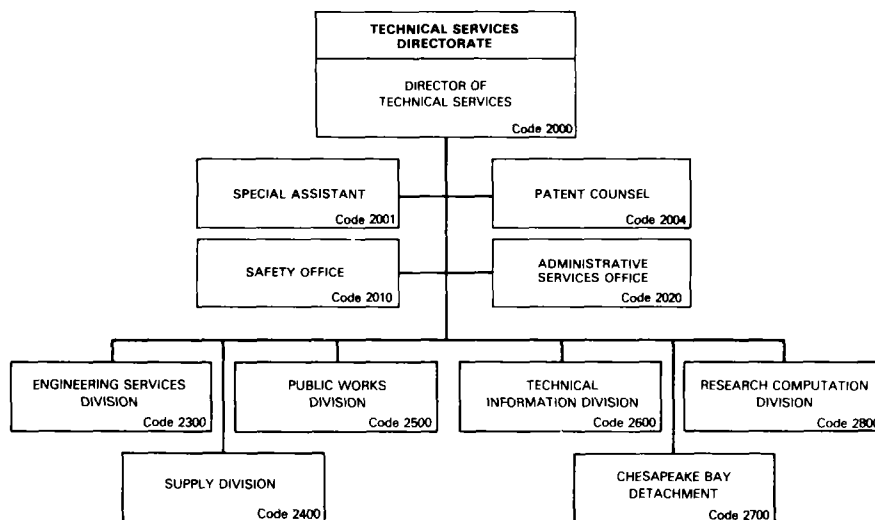


Mr. Jack D. Brown

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-acoustic 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

| <u>Name</u>                    | <u>Title</u>                                             | <u>Code</u> |
|--------------------------------|----------------------------------------------------------|-------------|
| Mr. J.D. Brown                 | Associate Director of Research<br>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<br>Division                   | 2800        |

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\*Acting

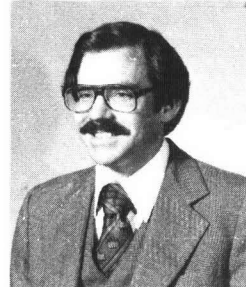
## OFFICE OF PATENT COUNSEL

### 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

| <u>Name</u>    | <u>Title</u>   |
|----------------|----------------|
| Dr. W.T. Ellis | Patent Counsel |



Dr. W.T. Ellis

### Civilian Personnel

Full-Time Permanent: 5

## 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

| <u>Name</u>           | <u>Title</u>        |
|-----------------------|---------------------|
| Mr. H.C. Kennedy, Jr. | Head, Safety Office |



Mr. H.C. Kennedy, Jr.

### Civilian Personnel

Full-Time Permanent: 4

# 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

| <u>Name</u>      | <u>Title</u>                                          |
|------------------|-------------------------------------------------------|
| Mrs. L.V. Dabney | Head, Administrative Services Office                  |
| Mrs. C. Schmitt  | Administrative Officer                                |
| Mrs. L.T. Warder | Head, Records and Correspondence<br>Management Branch |
| Mr. J.L. Poole   | Head, Mail and Messenger Branch                       |



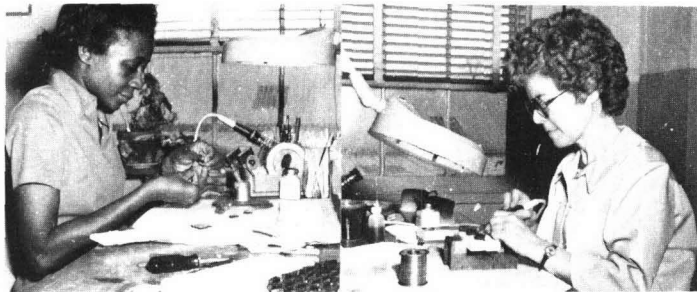
Mrs. L.V. Dabney

## Civilian Personnel

Full-Time Permanent: 31

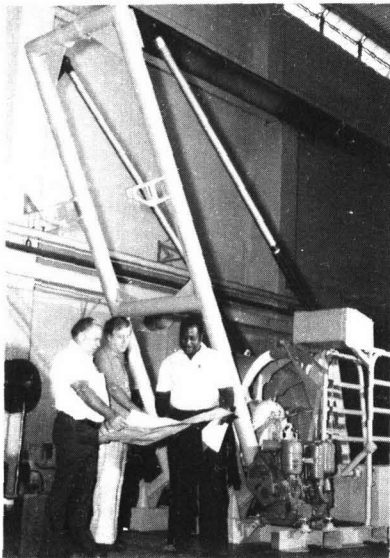
# Engineering Services Division

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



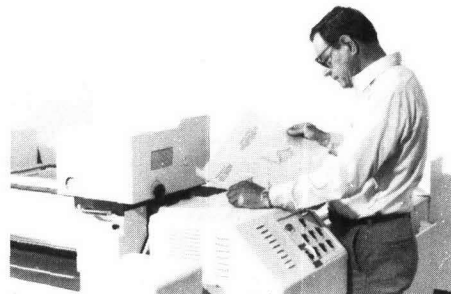
*Electronic Assembly*

(19)



*Machine and Sheet Metal Shop*

(20)



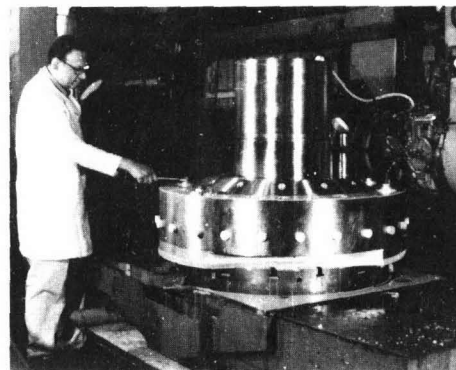
*Computer-Aided Engineering Analysis*

(21)



*Quality Assurance Testing*

(22)

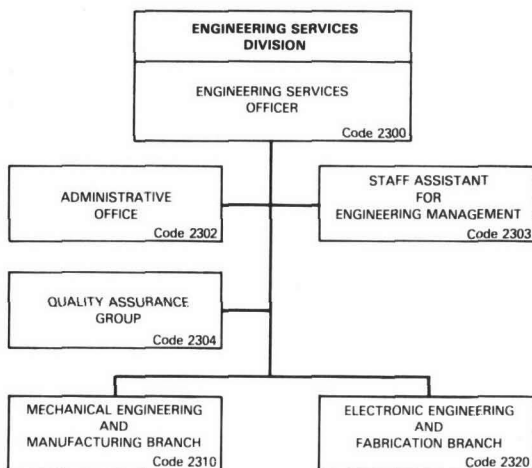


*Large Equipment Machining*

(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

| <u>Name</u>       | <u>Title</u>                                          |
|-------------------|-------------------------------------------------------|
| 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)



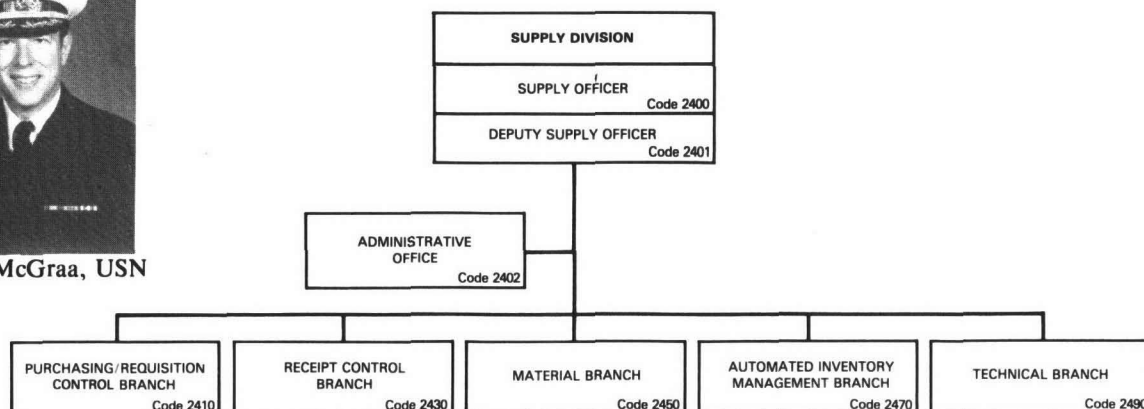
*Processing Incoming Procurement Requests* (27)



*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

| <u>Name</u>              | <u>Title</u>                                   |
|--------------------------|------------------------------------------------|
| 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<br>Management Branch |
| Mr. A.E. Dean            | Head, Technical Branch                         |

### Civilian Personnel

Full-Time Permanent: 127  
Military: 2

## Public Works Division

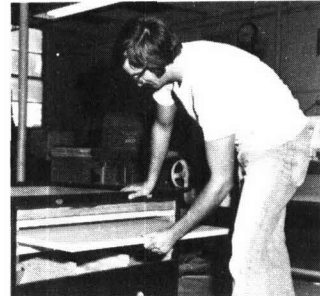
- ENGINEERING
- MAINTENANCE, UTILITIES, AND TRANSPORTATION
- MAINTENANCE CONTROL
- ADMINISTRATION
- CONTRACTS



*Motor Winding Shop* (29)



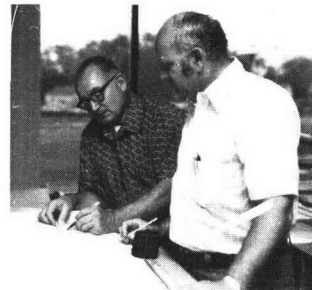
*Mechanical Design* (30)



*Carpentry* (31)



*Administrative* (32)



*Planning and Estimating* (33)



*Civil and Architectural Design* (34)



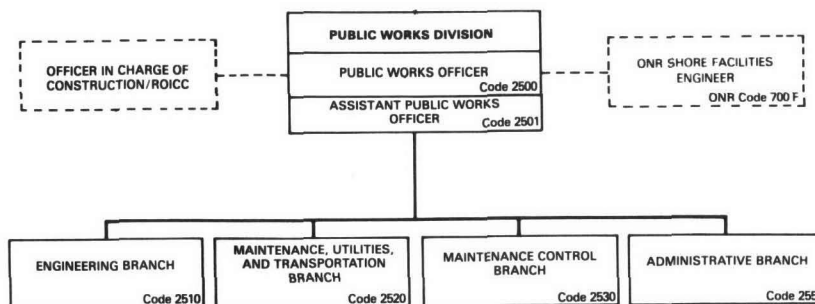
*Transportation Services* (35)



*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

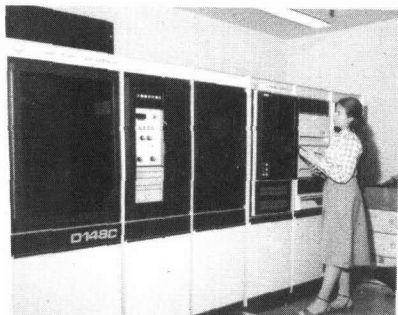
| <u>Name</u>                      | <u>Title</u>                                                                                     |
|----------------------------------|--------------------------------------------------------------------------------------------------|
| CDR J.W. MacLaughlin,<br>CEC,USN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

### Civilian Personnel

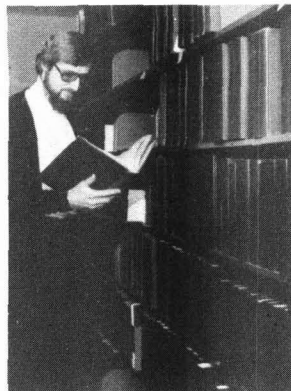
Full-Time Permanent: 339  
Military: 2

# Technical Information Division

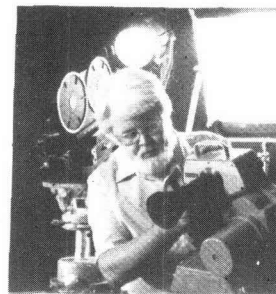
- INFORMATION SERVICES
- TECHNICAL LIBRARY
- PUBLICATIONS
- PHOTOGRAPHIC



*DICOMED Computer* (37)



*Library Services* (38)



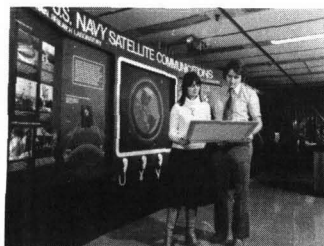
*Data Gathering* (39)



*Presentation Support* (40)



*Printing and Reproduction* (41)



*Exhibits* (42)



*Computerized Technical Composition* (43)



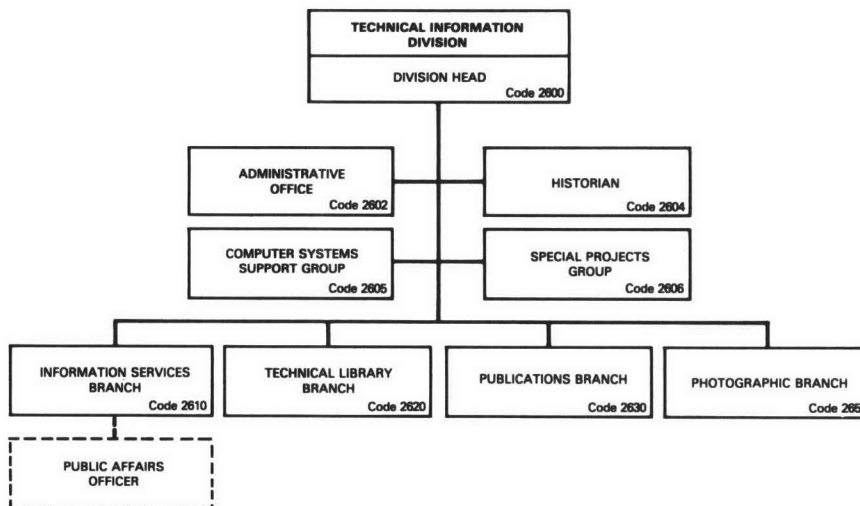
*Internal Communication* (44)



*Graphic Services* (45)



Mr. E.E. Kirkbride

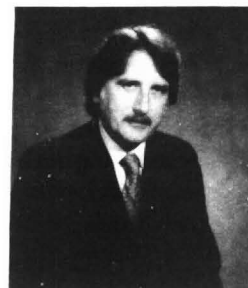


### Basic Responsibilities

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, (Lababstracts, 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

| <u>Name</u>          | <u>Title</u>                                                  |
|----------------------|---------------------------------------------------------------|
| 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

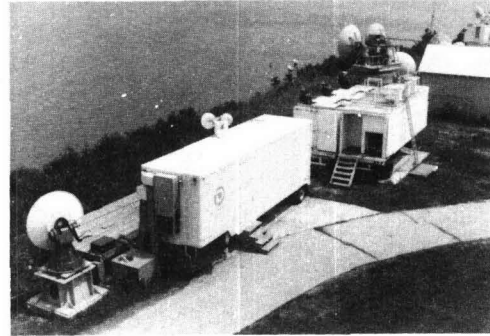
† Additional duty

# Chesapeake Bay Detachment

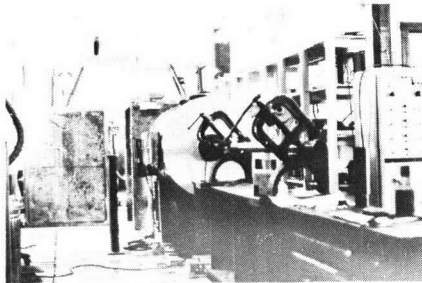
- ADMINISTRATIVE
- SECURITY
- OPERATIONS
- MAINTENANCE AND SUPPORT



*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

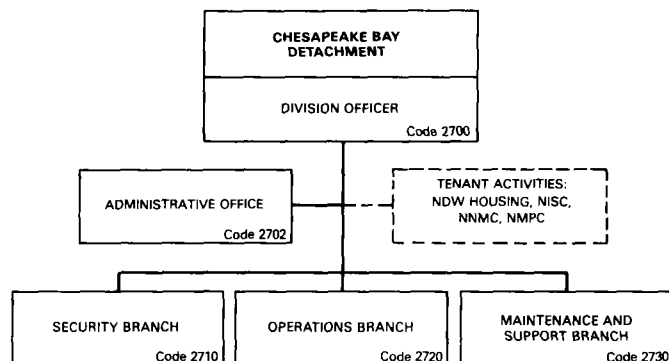
Mr. C. J. Skowronek, Ballistic Range Facility

### 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

| <u>Name</u>     | <u>Title</u>                                                                |
|-----------------|-----------------------------------------------------------------------------|
| 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<br>Head, Maintenance and Support Branch <sup>†</sup> |

### 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

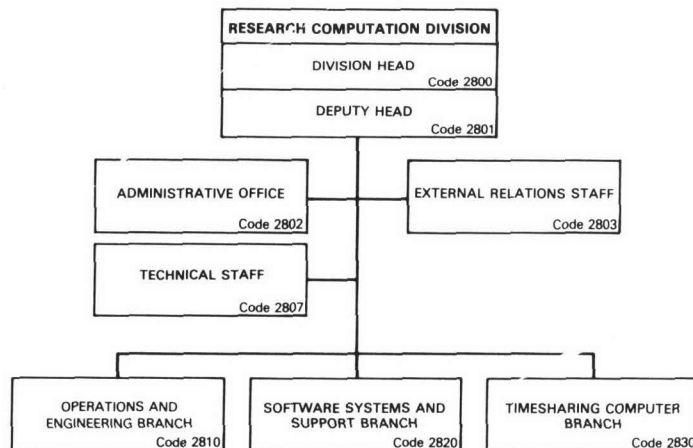
| <u>Name</u>      | <u>Title</u>                              |
|------------------|-------------------------------------------|
| Mr. A.B. Bligh   | Head, Research Computation Division       |
| Ms. D.E. Gossett | Deputy Head                               |
| Ms. B.M. Thomas  | Administrative Officer                    |
| 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

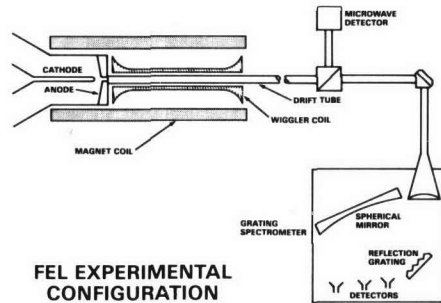
Full-Time Permanent: 46



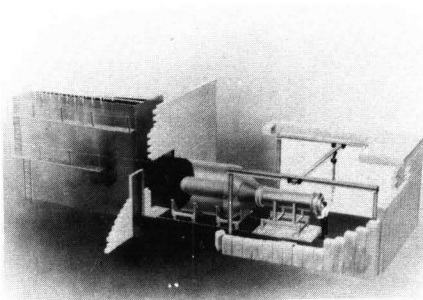
\*Acting

# 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.

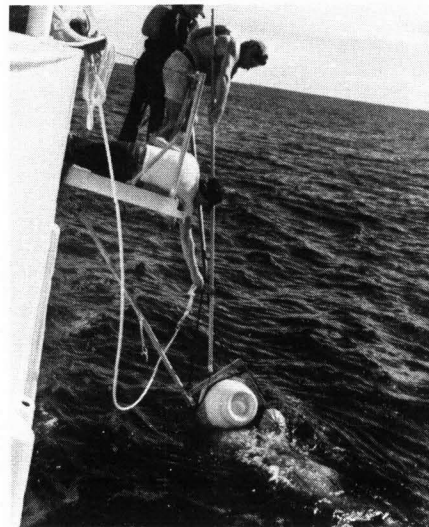


(51)



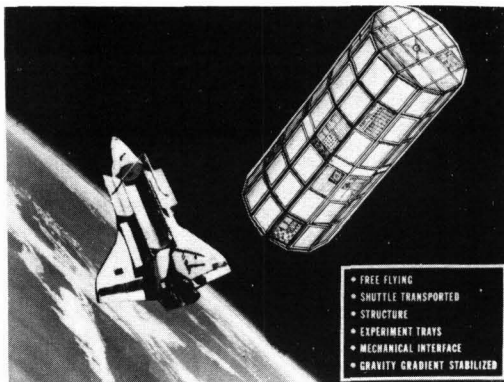
*Gamble II*

(52)



*Oceanographic Research*

(53)



*Long Duration Exposure Facility*

(54)



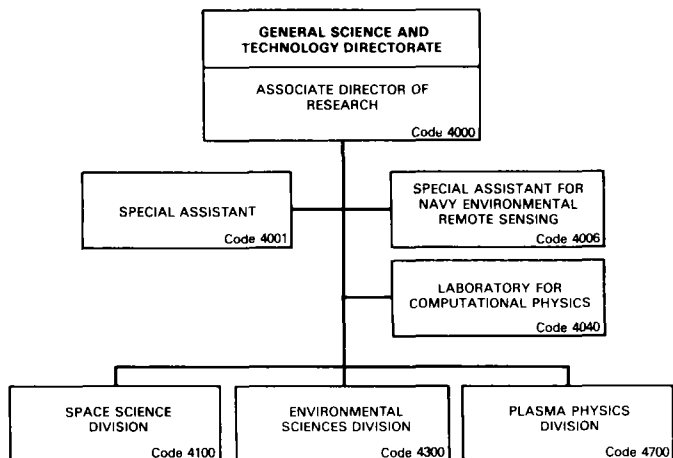
*Gamma Ray Observatory*

(55)

**Associate Director of Research  
for General Science and Technology**



Dr. Timothy Coffey



### Key Personnel

| <u>Name</u>      | <u>Title</u>                                                      |
|------------------|-------------------------------------------------------------------|
| 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                           |

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\*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

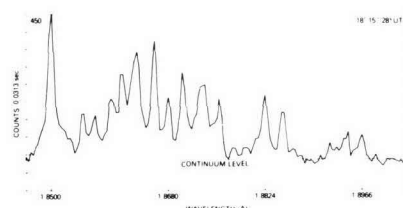
Galactic and extragalactic radio and infrared astronomy.  
Very Long Baseline Interferometry (VLBI).  
Intergalactic gas and dust.  
Atmospheric radiation.  
Astrometry.

### 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

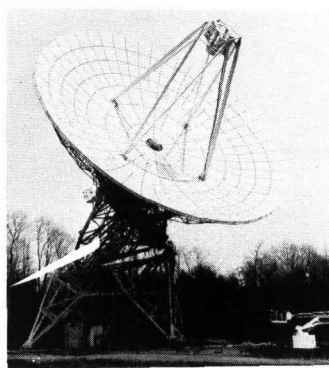
Solar X-ray and EUV.  
Spectroscopy & plasma diagnostics.  
Physics of the solar atmosphere.  
Solar terrestrial investigations.



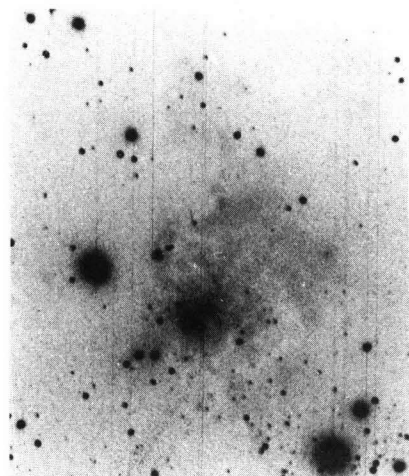
*X-ray Solar Flare Spectrum* (58)



*NRL Discovery of Comet Colliding with the sun* (56)



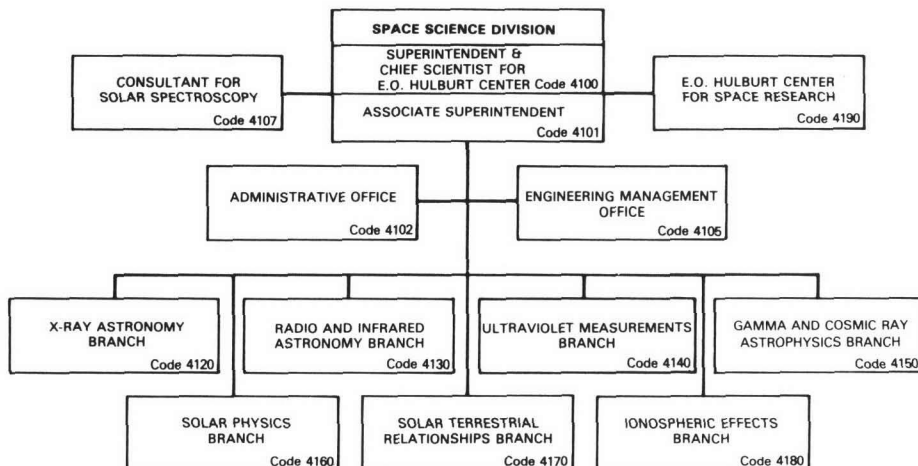
*Radio Telescope Maryland Point* (57)



*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

| <u>Name</u>         | <u>Title</u>                                                          |
|---------------------|-----------------------------------------------------------------------|
| 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<br>for Space Research           |
| Dr. H. Friedman     | Chief Scientist (Emeritus) E. O. Hulburt Center<br>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<br>Relationships Branch                       |
| Dr. J.M. Goodman    | Head, Ionospheric Effects Branch                                      |

### Civilian Personnel

### Total Estimated R&D Funding

Full-Time Permanent: 107

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-  
structure variability  
Mixed layer and thermocline  
applications  
Sea-truth for remote sensing

### Atmospheric Physics

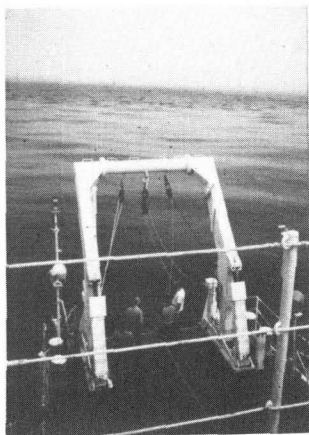
Marine boundary layer meteorology  
Aerosol and cloud physics  
Atmospheric electricity  
Electro-optics meteorology

### Environmental Chemistry

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

### Environmental Biology

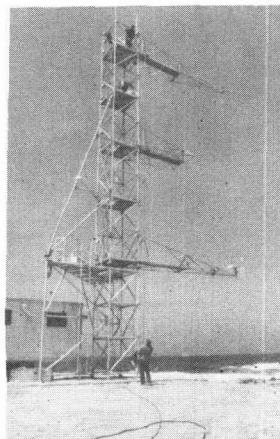
Biodegradation of naval  
materials  
Bioluminescence  
Chemosensing  
Fouling of submerged surfaces



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



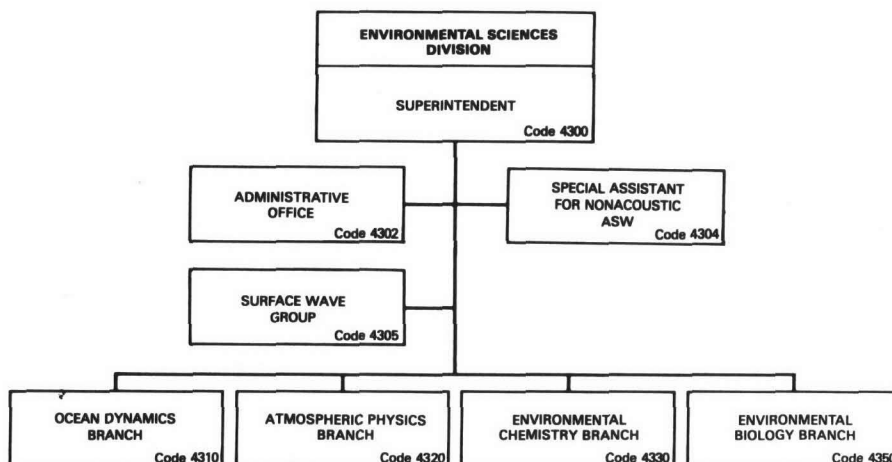
*Balloon Launching for  
Atmospheric Research* (61)



*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

| <u>Name</u>          | <u>Title</u>                         |
|----------------------|--------------------------------------|
| 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

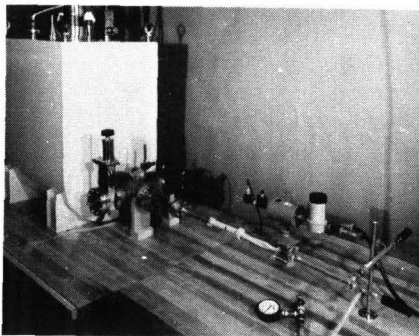
Production of intense relativistic electron beams  
Electron beam propagation and focusing  
Experimental research in high-power exploding wires  
Generation of intense ion beams  
Inductive energy storage

### Geophysical and Plasma Dynamics

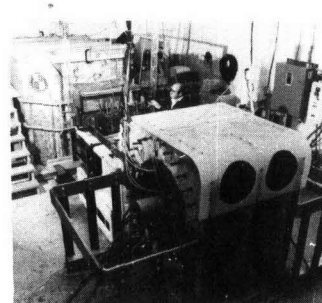
Theoretical and numerical simulation of atmospheric, ionospheric, and magnetospheric phenomena  
High-altitude nuclear weapons effects on the ionosphere  
Solar-terrestrial relations  
Atmospheric-ionospheric-magnetospheric coupling

### Plasma Theory

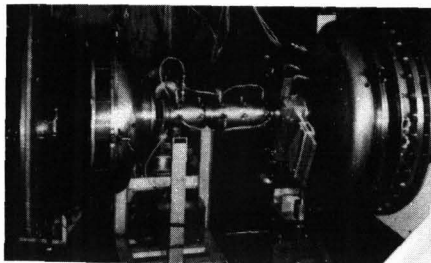
Numerical simulation of high-density plasmas  
Theoretical study of nonlinear plasma dynamics  
Production and propagation of high-energy charged particle beams



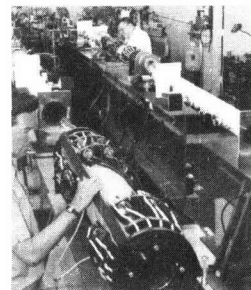
*NRL 35-GHz Gyrotron (63)*



*Homopolar Generator (64)*



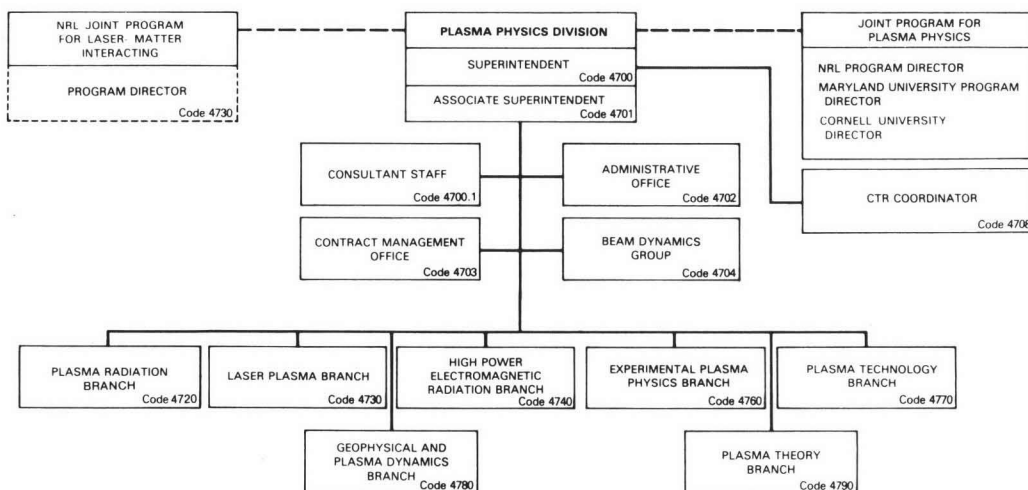
*Experimental Chamber of "Seebie" (65)*



*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 relativistic 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

| <u>Name</u>          | <u>Title</u>                                      |
|----------------------|---------------------------------------------------|
| 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. Kapetanakis   | 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

| <u>Name</u>          | <u>Title</u>                                          |
|----------------------|-------------------------------------------------------|
| 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                                      |

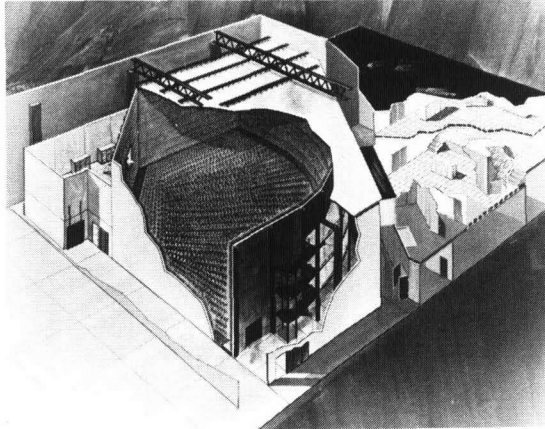
|                           |                                        |
|---------------------------|----------------------------------------|
| <b>Civilian Personnel</b> | <b>Total Estimated R&amp;D Funding</b> |
|---------------------------|----------------------------------------|

|                         |                               |
|-------------------------|-------------------------------|
| Full-Time Permanent: 11 | Fiscal Year 1983: \$1,600,000 |
|-------------------------|-------------------------------|

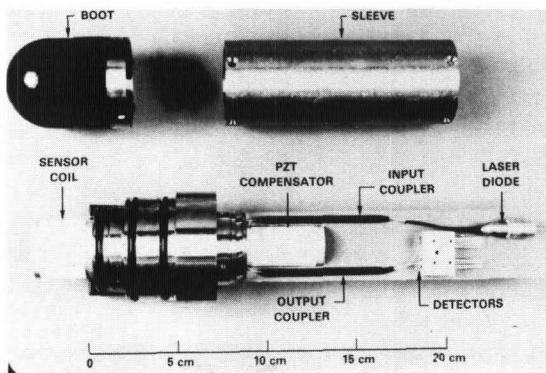
¶ See footnote inside front cover

## Systems Research and Technology Directorate

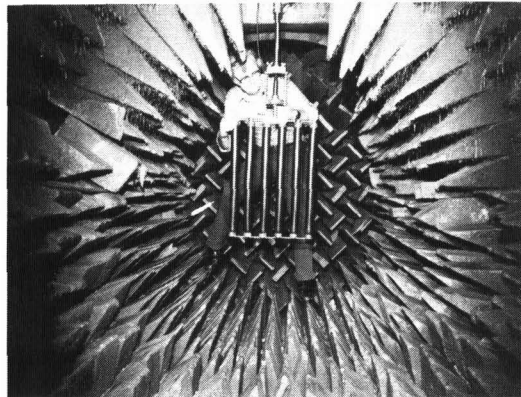
The Systems Research and Technology Directorate performs basic research and development in support of major generic Navy systems. The emphasis is on radar systems, electronic warfare systems, and undersea warfare systems. The Directorate conducts an extensive experimental program in the field using both 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.



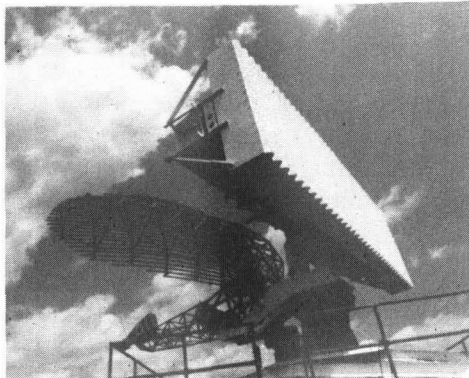
*Electronic Warfare Research and Development Laboratory* (67)



*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**



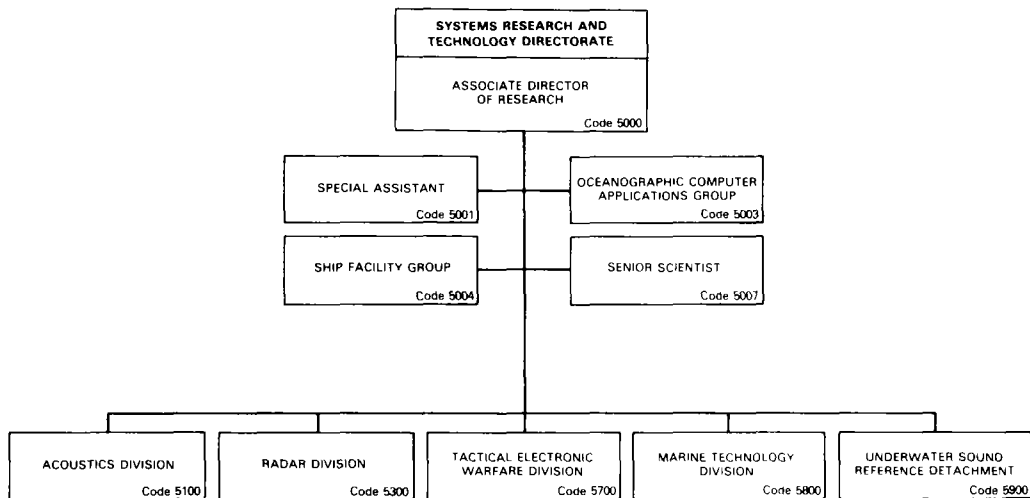
Mr. Richard R. Rojas

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

| <u>Name</u>      | <u>Title</u>                                                       |
|------------------|--------------------------------------------------------------------|
| 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

| <u>Name</u>    | <u>Title</u>              |
|----------------|---------------------------|
| Mr. L.G. Galli | Head, Ship Facility Group |



Mr. L. G. Galli

| Civilian Personnel      | Total Estimated R&D Funding   |
|-------------------------|-------------------------------|
| Full-Time Permanent: 13 | Fiscal Year 1983: \$2,225,000 |
| Senior Scientist: 1     |                               |

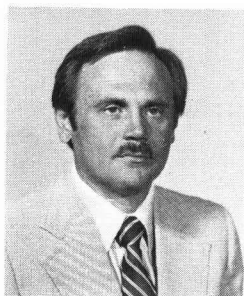
# Oceanographic Computer Applications Group

## 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

| <u>Name</u>    | <u>Title</u>                                    |
|----------------|-------------------------------------------------|
| 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



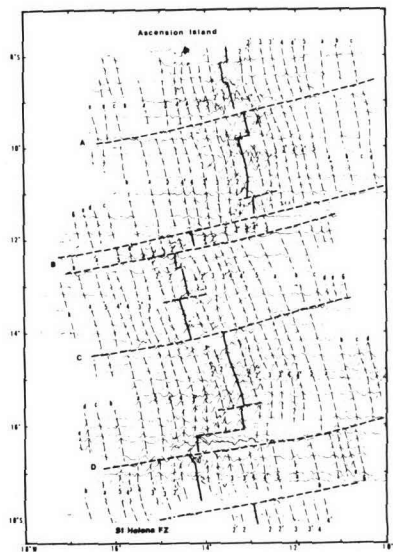
Arctic Research

(71)



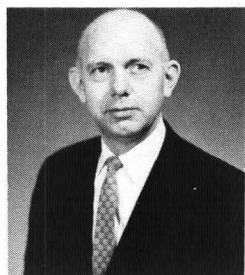
Shallow Water  
Measurements

(72)

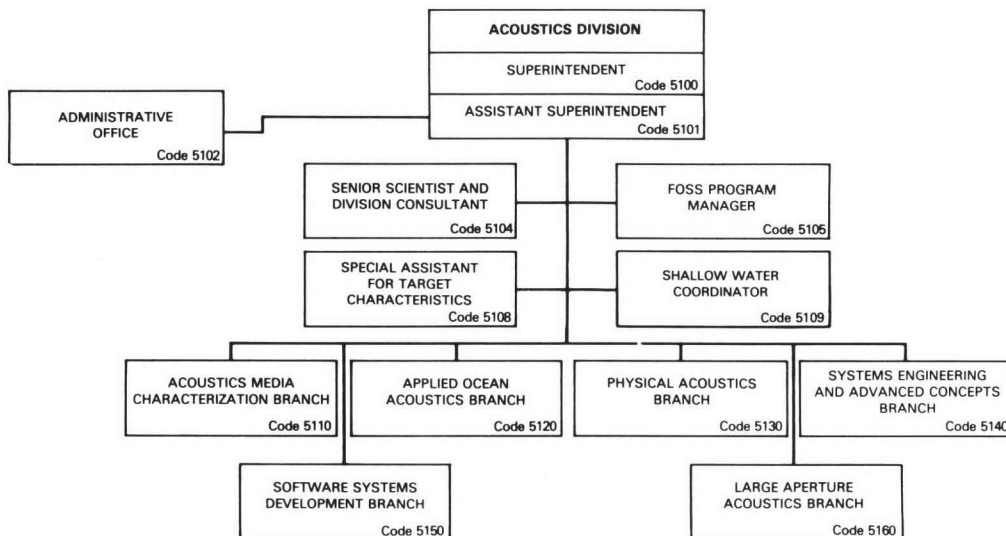


Magnetic Signature South Atlantic

(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

| <u>Name</u>         | <u>Title</u>                                         |
|---------------------|------------------------------------------------------|
| 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

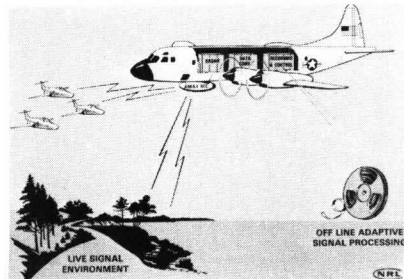
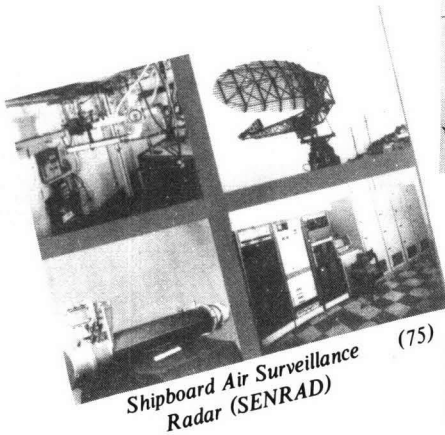
Mark XII IFF improvements  
NATO Identification System (MK, XV, IFF)  
Future identification technology

### Airborne Radar

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

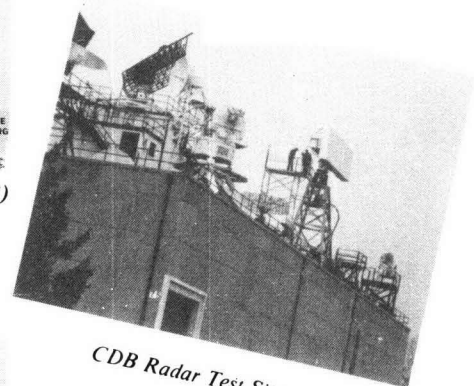
### Electromagnetics

Microwave antenna research  
Adaptive array research  
Electromechanical design



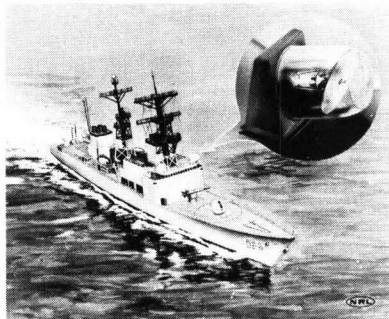
*Adaptive Array*

(74)



*CDB Radar Test Site*

(76)

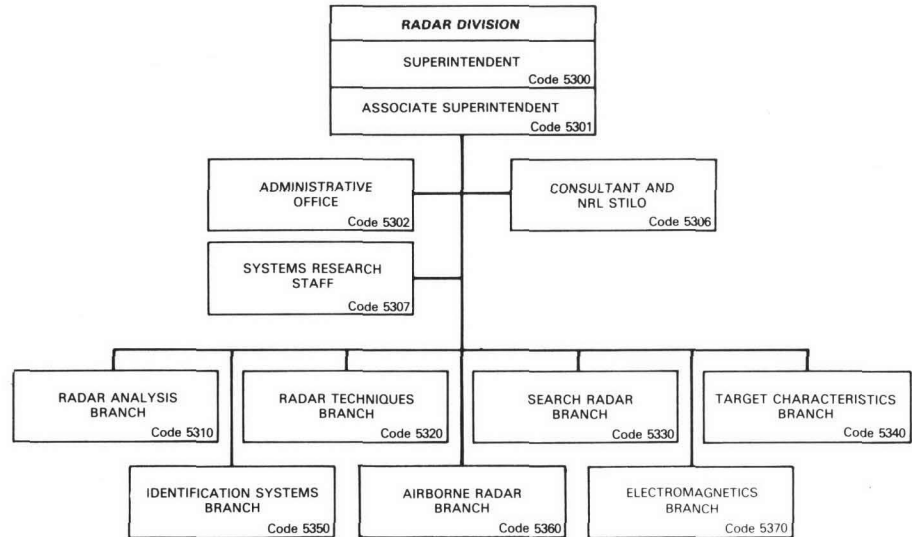


*Directed Mirror-Antenna  
Radar (DMAR)*

(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

| <u>Name</u>       | <u>Title</u>                        |
|-------------------|-------------------------------------|
| 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<sup>3</sup> I

Battle Group C-C<sup>3</sup> systems concepts  
C-C<sup>3</sup> 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

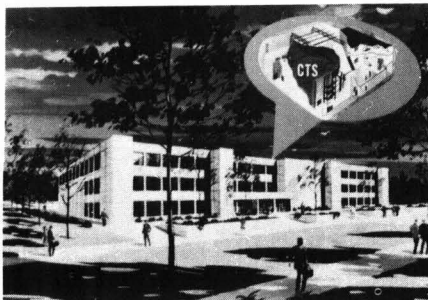
Intercept systems and direction finders  
RF signal simulators  
Systems integration  
Command and control interfaces  
Signal processing

### Airborne Electronic Warfare Systems

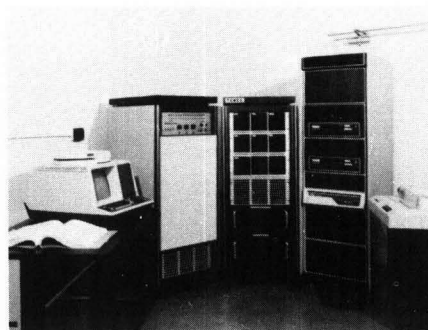
Air systems development  
Penetration aids  
Power source development  
Jamming and Deception

### Advanced Techniques

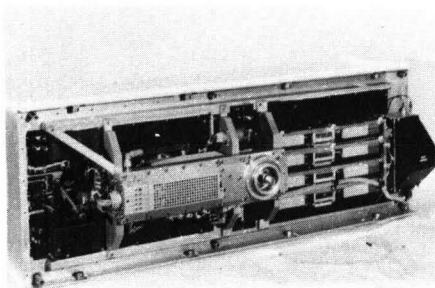
Analysis and modeling simulation  
New EW techniques  
Experimental systems  
EW concepts



*EW R&D Laboratory* (78)



*RF Environment Generator* (79)



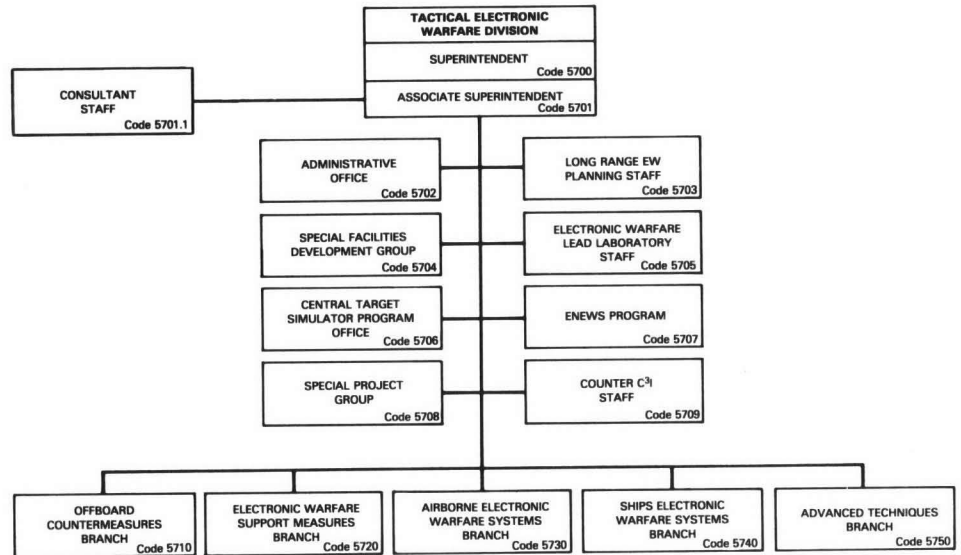
*EW Systems Development* (80)



*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

| <u>Name</u>         | <u>Title</u>                                     |
|---------------------|--------------------------------------------------|
| 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-C³ 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

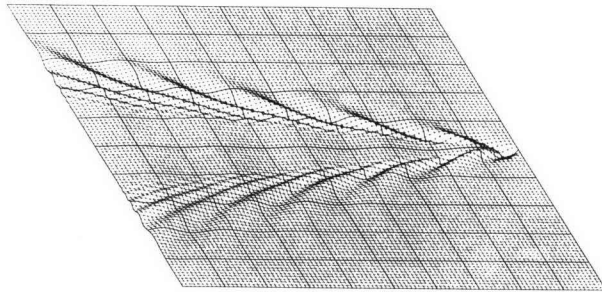
### Total Estimated R&D Funding

Fiscal Year 1983: \$43,300,000

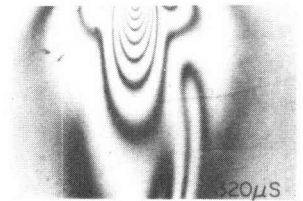
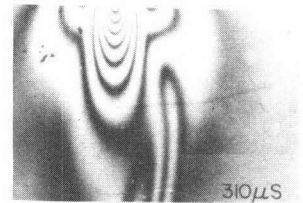
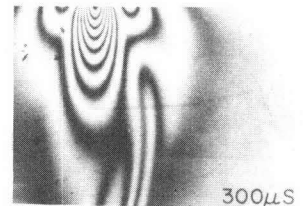
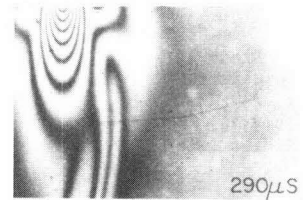
†Additional duty



# 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

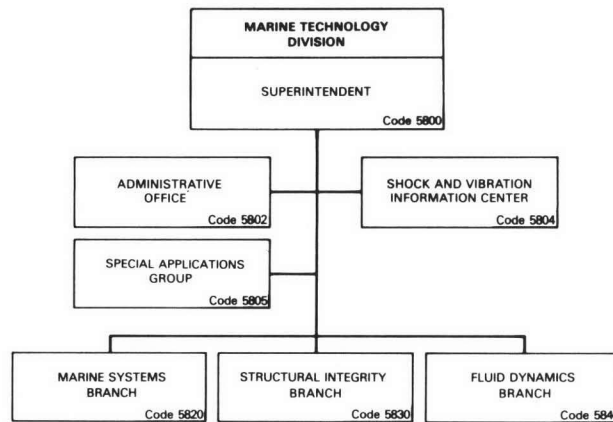
- Autonomous vehicle development
- Vehicle stability, control, and navigation
- Sensor research and development
- Adaptive sensor and control systems

### 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

| <u>Name</u>       | <u>Title</u>                                 |
|-------------------|----------------------------------------------|
| 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

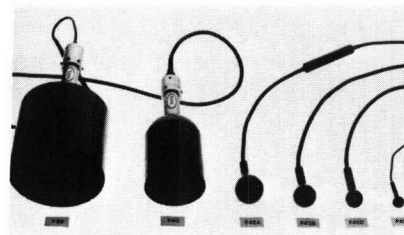


*Leesburg Facility-  
Calibration Range* (86)



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

(87)



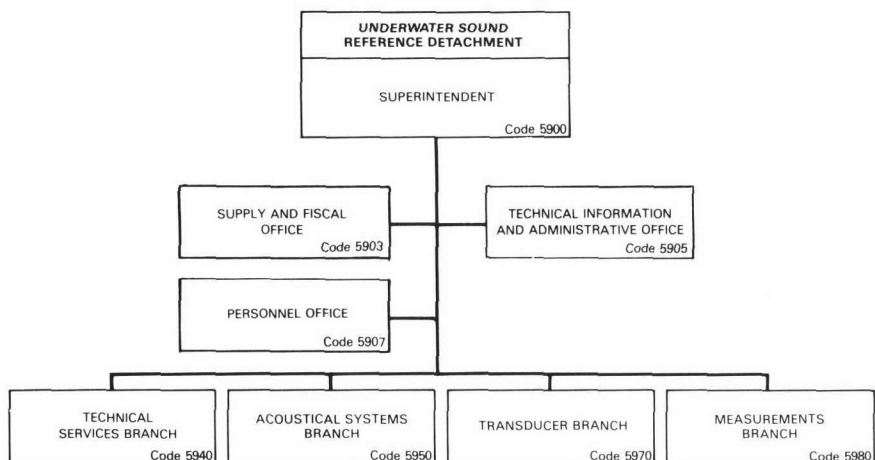
*USRD Standard Transducers* (88)



*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

| <u>Name</u>               | <u>Title</u>                                          |
|---------------------------|-------------------------------------------------------|
| 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                             |
| <b>Civilian Personnel</b> | <b>Total Estimated R&amp;D Funding</b>                |
| Full-Time Permanent: 89   | Fiscal Year 1983: \$5,400,000                         |

\*Acting



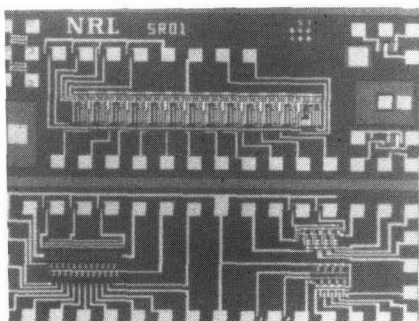
## Material Science and Component Technology Directorate

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.

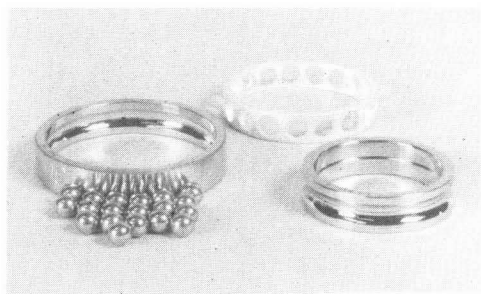
The limits of performance of these materials and components under deleterious conditions such as those associated with the marine environment, neutron or directed energy beam irradiation, or extreme temperatures and pressures, are established.



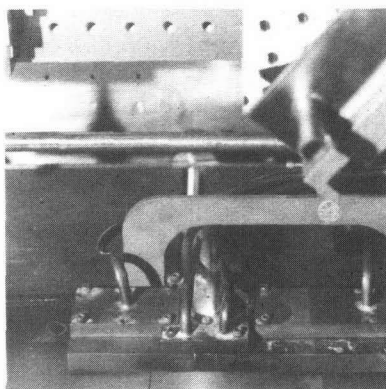
*Optical Fiber* (90)



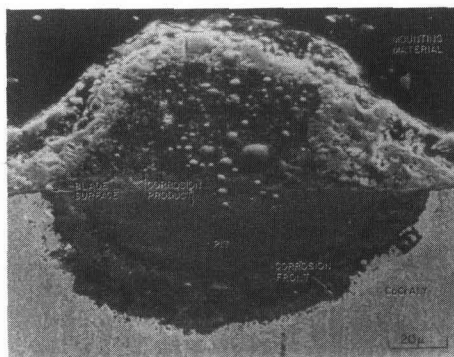
*Microelectronics* (91)



*Ion Implanted Bearings* (92)



*Laser Welding* (93)



*Corrosion Studies* (94)

## **Associate Director of Research for Material Science and Component Technology**



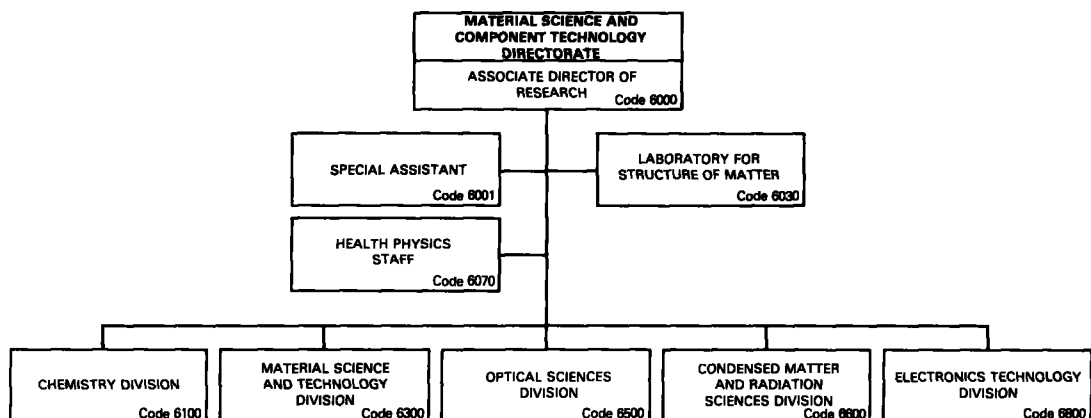
Dr. Albert I. Schindler

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.

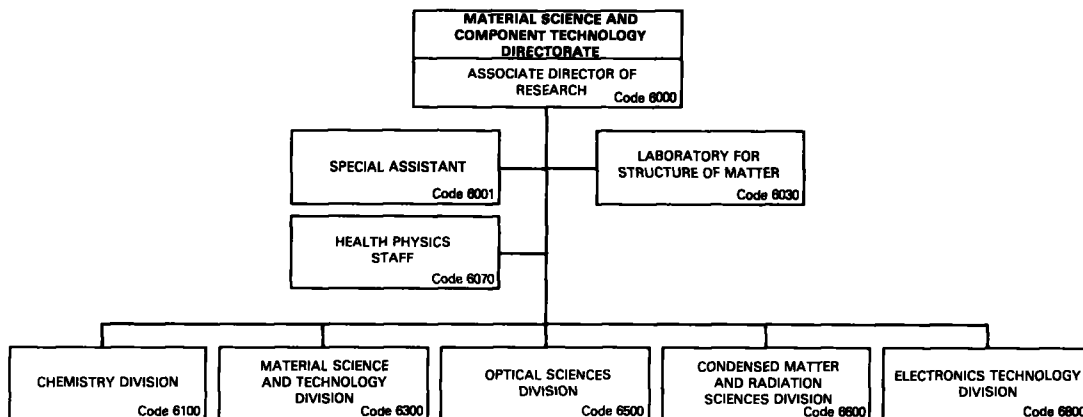
Dr. Schindler is a Fellow of the American Physical Society and of the Washington Academy of Sciences. He also is a member of the Philosophical Society of Washington and of Sigma Xi, for which he served as a member of the Board of Directors from 1974 to 1976.



### Key Personnel

| <u>Name</u>          | <u>Title</u>                                                                 |
|----------------------|------------------------------------------------------------------------------|
| 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

| <u>Name</u>          | <u>Title</u>                                                                 |
|----------------------|------------------------------------------------------------------------------|
| 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                              |

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\*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

| <u>Name</u>      | <u>Title</u>                               |
|------------------|--------------------------------------------|
| 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

## Total Estimated R&D Funding

Full-Time Permanent: 14

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

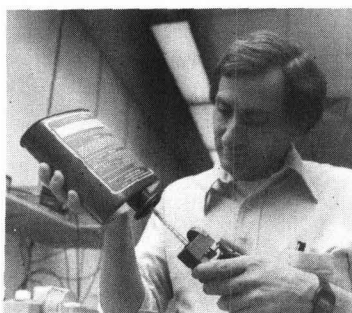
- Tribology
- Surface properties of materials
- Surface analysis (electron, mass, vibrational)
- Graphite and carbon materials
- Microchemical detectors
- IR/RF Decoy materials
- Surface modification
- Synchrotron radiation induced chemistry

### Combustion & Fuels

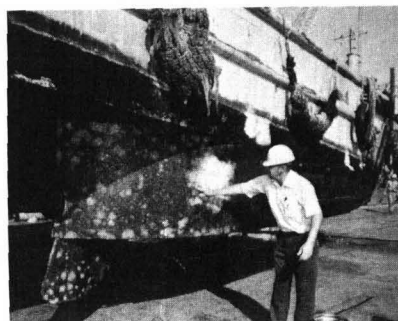
- Distillate fuels research
- Auto-oxidation and combustion dynamics
- Fire suppression
- Personnel protection in fires
- Modeling and scaling of combustion systems
- Chemical and biological defense
- Synthetic fuels



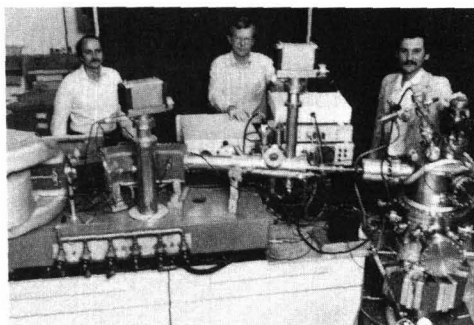
Suppression of Fires in  
Enclosed Spaces—NRL's  
10,000 cu. ft. Facility (95)



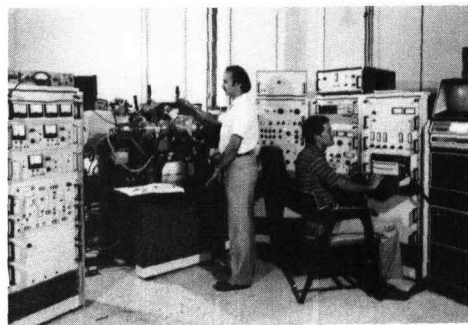
Cannister Test (96)



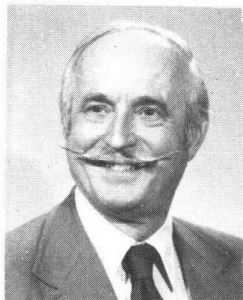
Fouling Release Coatings (97)



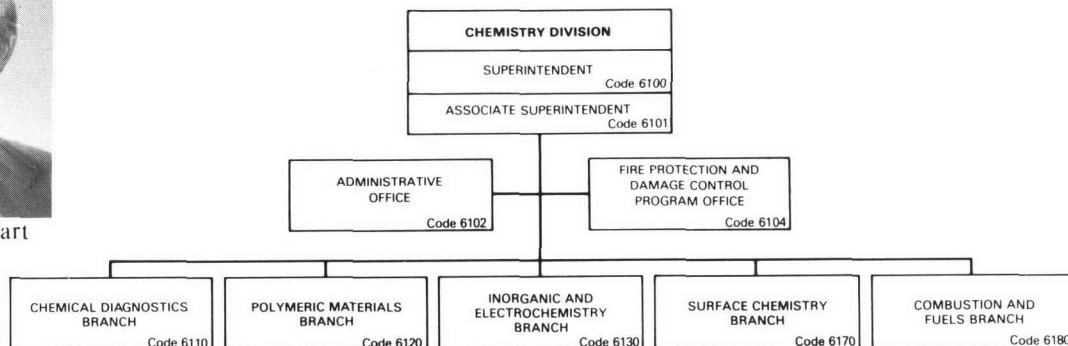
Secondary Ion Mass  
Spectrometer (98)



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

| <u>Name</u>        | <u>Title</u>                                            |
|--------------------|---------------------------------------------------------|
| 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

### Total Estimated R&D Funding

Full-Time Permanent: 110

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

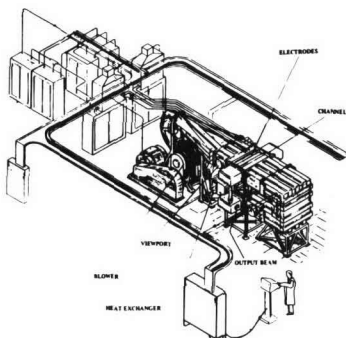
- Physical, mechanical, and failure characterizations
- Fabrication and processing techniques
- Mechanical and failure analyses
- High-temperature structural and ordnance applications

### Mechanics of Materials

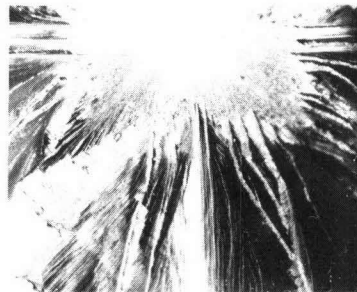
- Subcritical crack growth and fracture
- Environmental effects
- Failure-safe design parameters
- Metallurgical optimization for high-strength metals
- Fatigue criteria
- Fracture criteria
- Computational mechanics
- Fracture mechanics
- Structural mechanics

### Thermostructural Materials

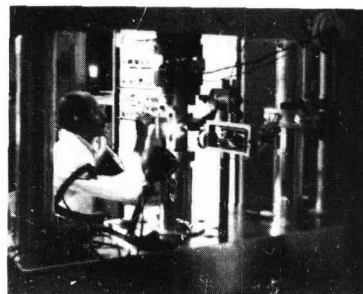
- Elevated temperature behavior of materials
- Influence of environment on high-temperature materials
- Basic mechanisms of radiation damage
- Criteria for improved structural design using high-temperature materials



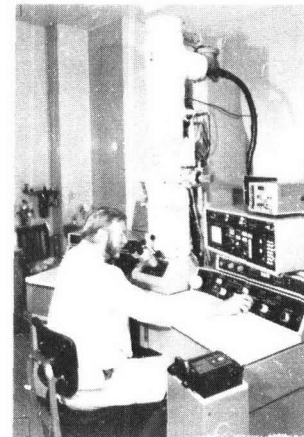
*Laser Materials-Application Center (101)*



*Ceramic Fracture (100)*



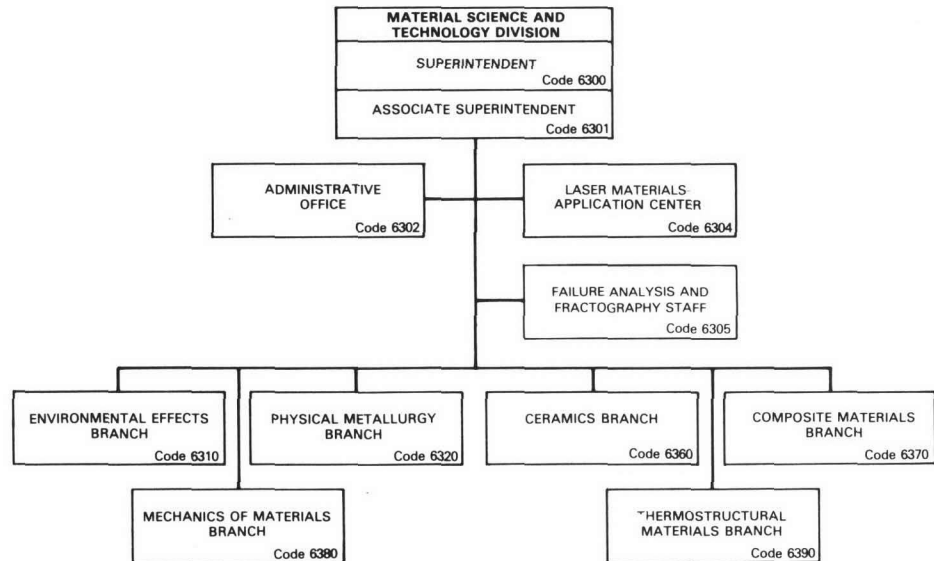
*Mechanical Testing of Materials (103)*



*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

| <u>Name</u>       | <u>Title</u>                                  |
|-------------------|-----------------------------------------------|
| 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

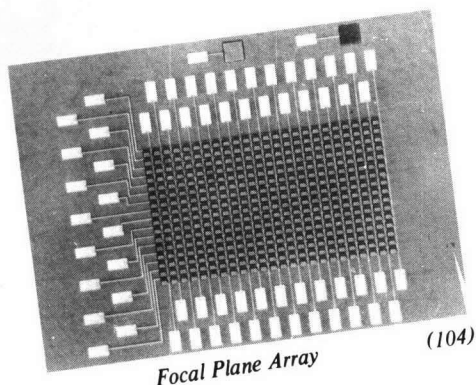
Full-Time Permanent: 103

### Total Estimated RD Funding

Fiscal Year 1983: \$13,000,000

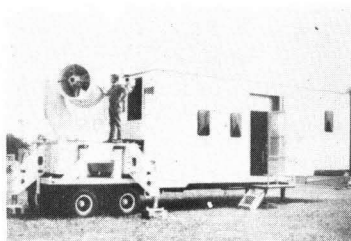
\*Acting

# Optical Sciences Division



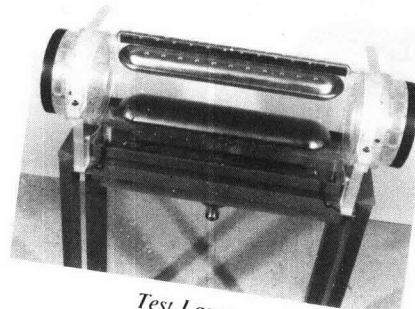
*Focal Plane Array*

(104)



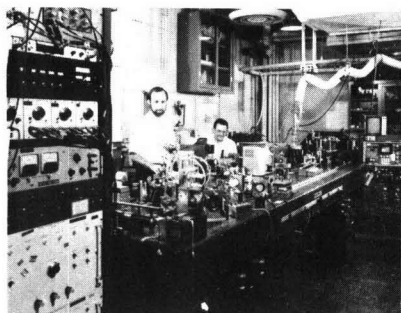
*High Precision Tracker and Trailer*

(105)



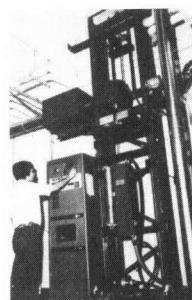
*Test Laser*

(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

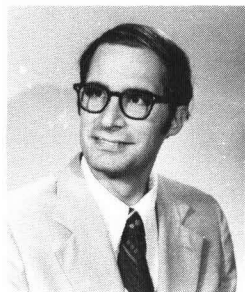
Electrically driven lasers  
Laser-induced reactions  
Laser materials diagnostics  
Non linear frequency conversion

### Electro-optical Technology

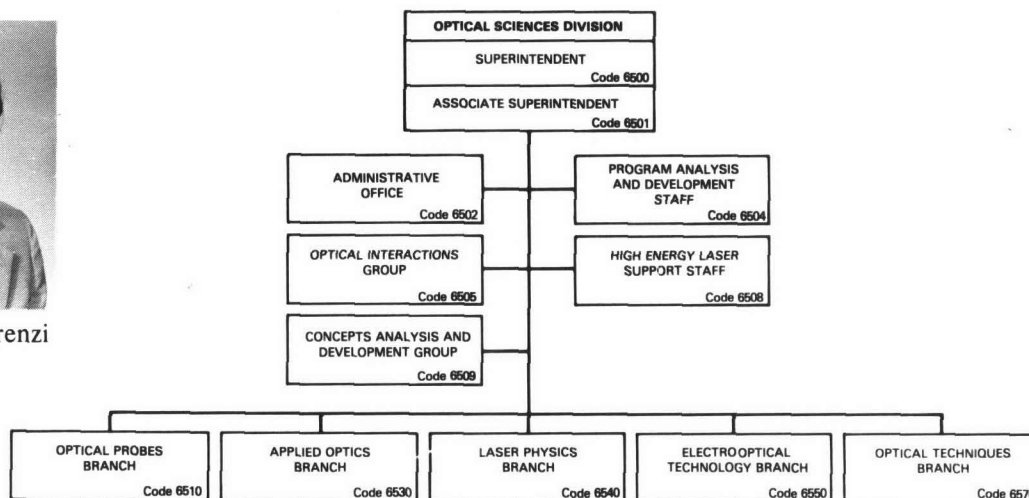
Optical and IR countermeasures  
Detection signal processing studies  
Optical seeker studies  
Solid state laser development  
Optical imager development  
Optical interactions in semi-conductor systems

### 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

| <u>Name</u>            | <u>Title</u>                                  |
|------------------------|-----------------------------------------------|
| 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

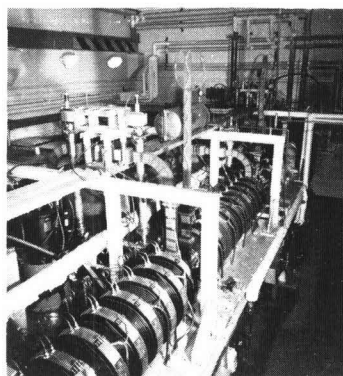
### Total Estimated R&D Funding

Full-Time Permanent: 121

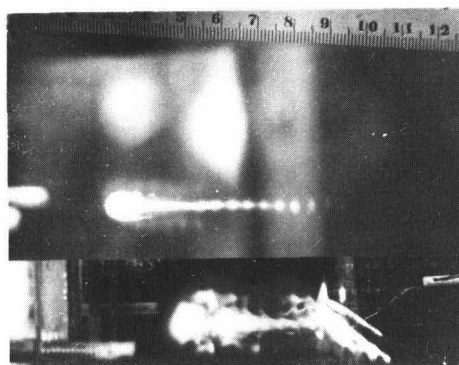
Fiscal Year 1983: \$25,500,000



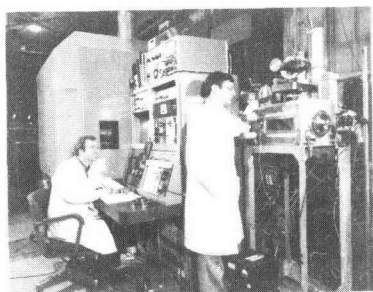
# Condensed Matter and Radiation Sciences Division



Linac (109)

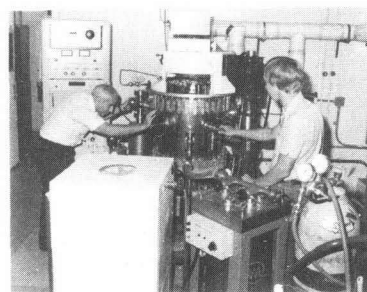


Plasma Generated by 8mm Gyrotron Radiation (110)



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

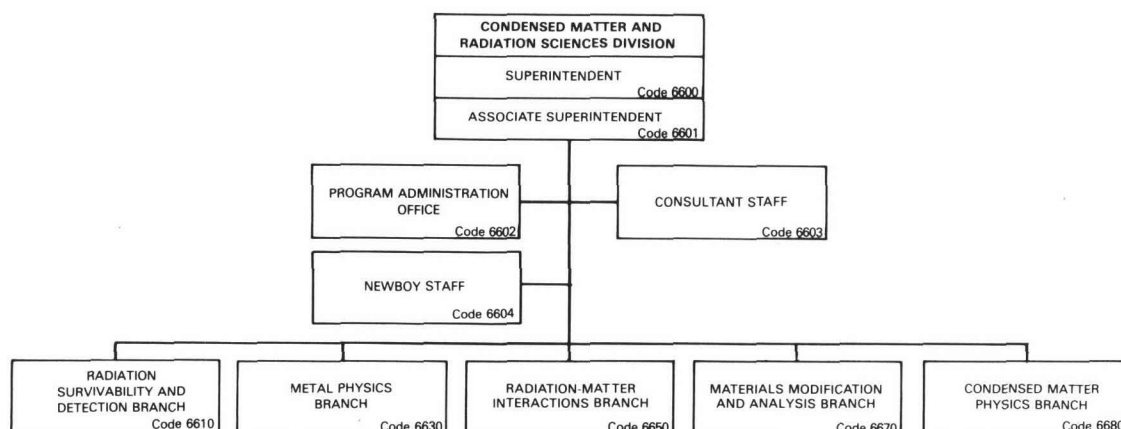
### Radiation—Matter Interactions

- 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

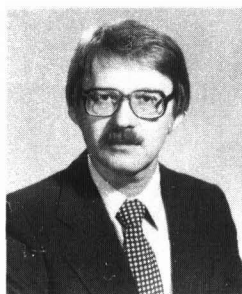
- Surface analysis by Ion beam techniques
- Radiation effects from high-energy charged-particle beams
- Crystal studies by channeling techniques
- Modification of surfaces by ion implantation
- Sputtering by high-energy ions
- Theory of ion-solid interactions
- 5-MV Van de Graaff
- Two 200-kV ion implantation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

| <u>Name</u>        | <u>Title</u>                                     |
|--------------------|--------------------------------------------------|
| 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

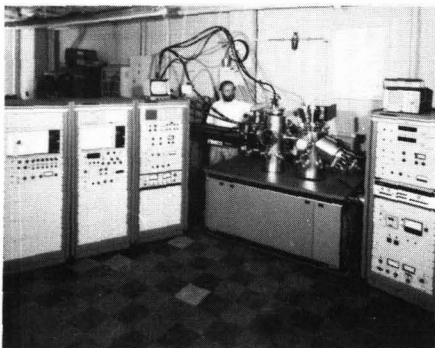
Field effect transistor reliability and failure analysis  
MIS failure physics, radiation vulnerability and hardening  
High-frequency microwave devices  
Integrated circuit technology

### Electronic Material Technology

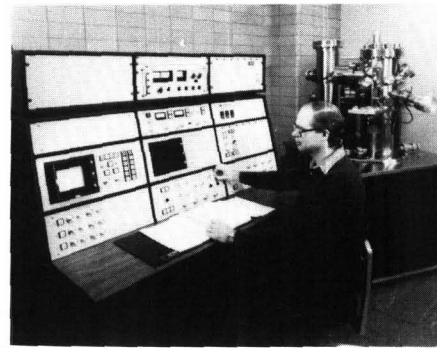
Preparation and development of magnetic, dielectric, optic, and semiconductor materials  
Optical components and coatings  
Molecular beam epitaxy  
Metal organic chemical vapor deposition

### Microwave and Millimeter Wave Tube Technology

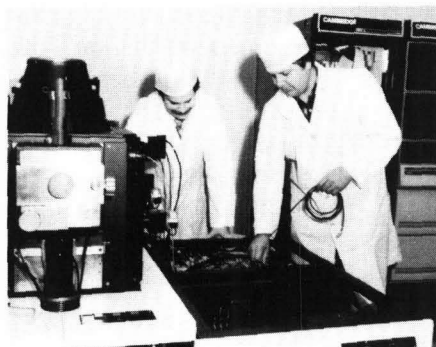
Microwave and millimeter power amplifier research and development  
Amplifier theory and analysis  
Supportive technology development  
Tube fabrication  
Manufacturing technology



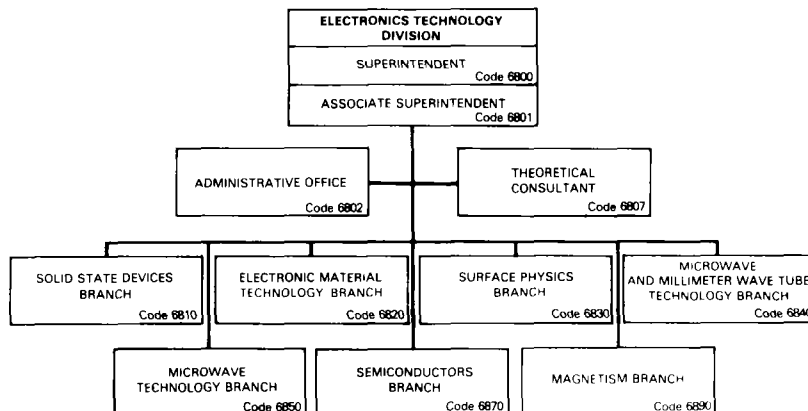
*Molecular Beam Epitaxy System (113)*



*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

| <u>Name</u>      | <u>Title</u>                                                  |
|------------------|---------------------------------------------------------------|
| 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<br>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

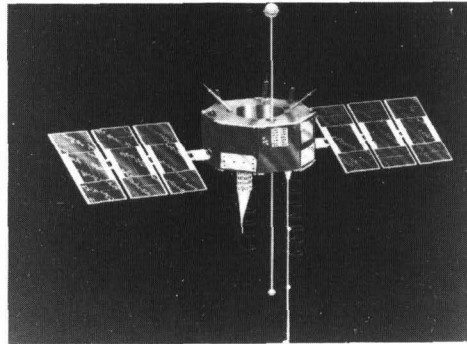
Fiscal Year 1983: \$21,500,000

\*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.



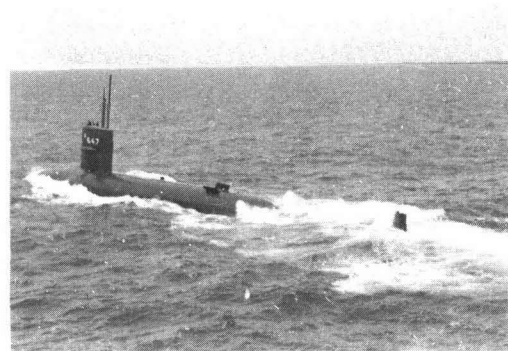
*NTS-2*

(116)



*Waldorf Antenna Site*

(117)



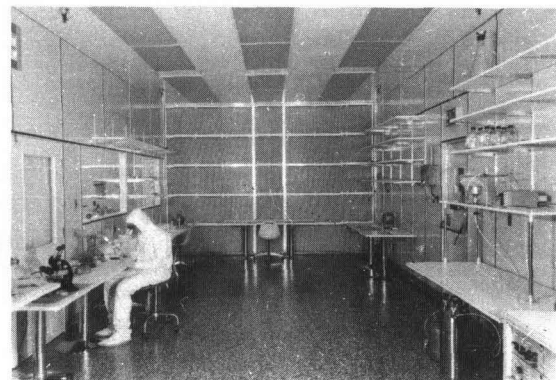
*Communication Buoy Test*

(118)



*Space Surveillance System*

(119)



*Satellite Component Assembly  
Clean Room*

(120)

## **Associate Director of Research for Space and Communications Technology**



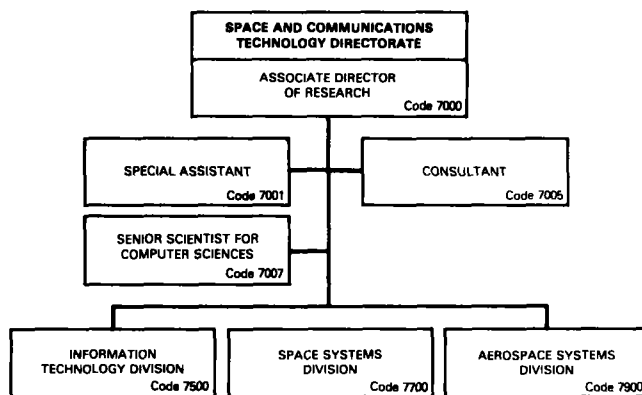
Dr. B. Wald

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**

| <u>Name</u>       | <u>Title</u>                                                              |
|-------------------|---------------------------------------------------------------------------|
| Dr. B. Wald       | Associate Director of Research for<br>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<br>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

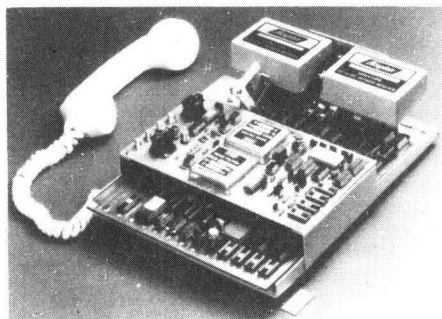
Submarine communication technology  
Communication system architecture  
Communication antenna/propagation technology  
Satellite communications system technology

### Integrated Warfare Technology

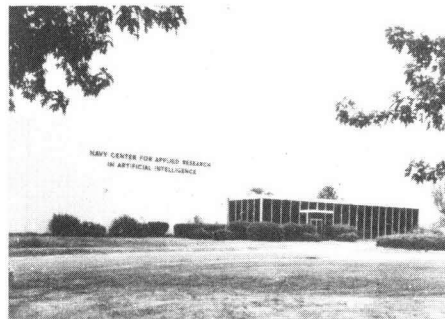
Combat management information system analyses  
Command information system design  
Communication, command, and control countermeasures  
Signal processing for high-frequency intercept system

### Computer Science and Systems

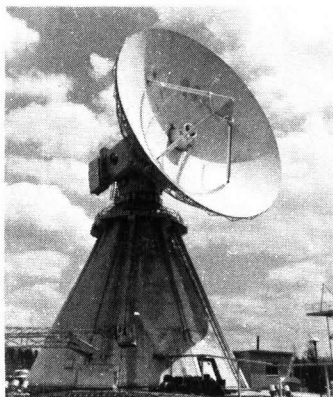
Software engineering  
Information theory  
Message processing technology



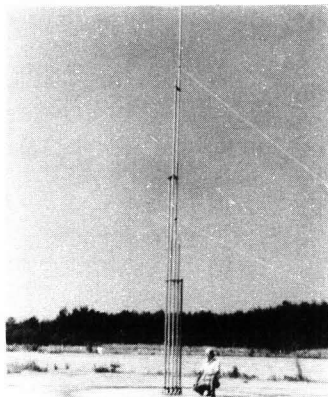
*Multirate Processor Digital Voice Terminal* (121)



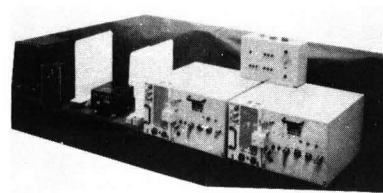
*Artificial Intelligence Center* (122)



*Microwave Space Research Facility* (123)

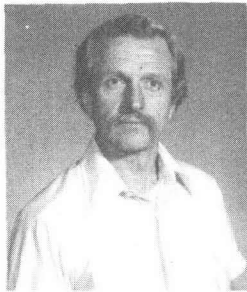


*HF Wideband Monopole Transmitting Antenna* (124)

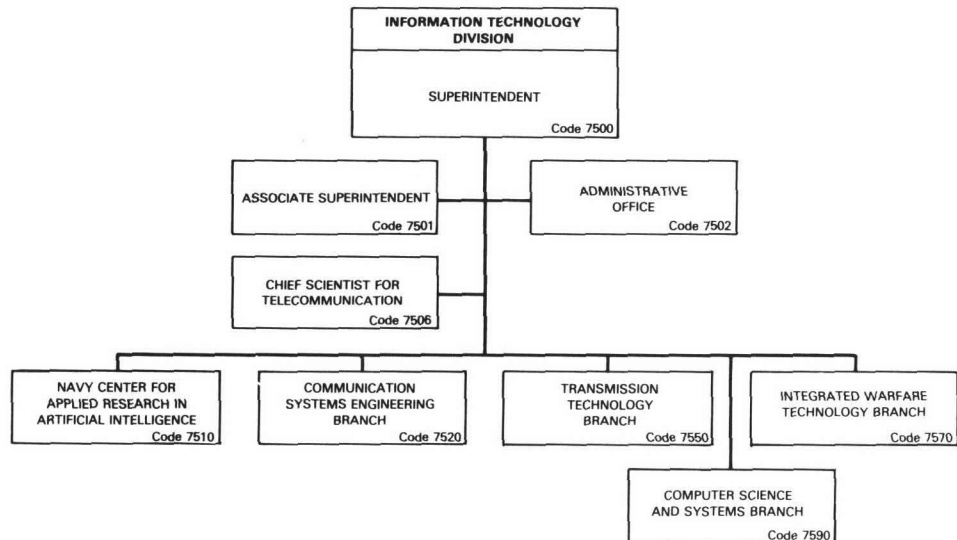


*AN/ALQ-149 Communication Jammer* (125)





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

| <u>Name</u>       | <u>Title</u>                                                               |
|-------------------|----------------------------------------------------------------------------|
| 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       | Total Estimated R&D Funding    |
|--------------------------|--------------------------------|
| Full-Time Permanent: 147 | 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

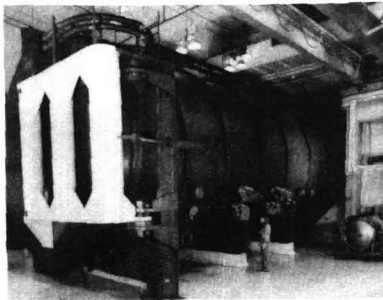
Spacecraft Structural Design  
Attitude Control Systems  
Thermal Control Systems  
Launch Vehicle Integration  
Spacecraft Environmental Testing  
Mechanical Systems Testing

#### Systems Engineering & Analysis

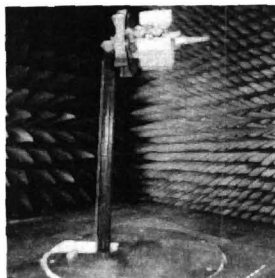
Space System Studies  
Error Budget and Development  
System Performance Simulation &  
Modeling  
Space Systems Technical Evaluation  
Operations Analyses  
System Testing

#### Digital Systems

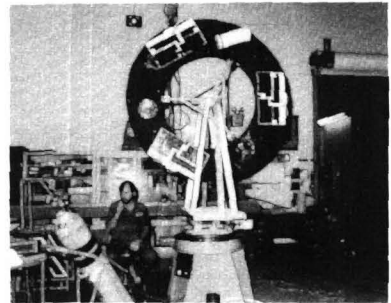
Spaceborne Signal Processors  
Spacecraft Command & Telemetry  
Systems  
Spacecraft Data Management Systems  
Spacecraft Engineering & Integration  
Satellite Communications Encoders  
Computer-Controlled Ground Test  
for Automatic Spacecraft Checkout  
Data Acquisition and Processing for  
On-Orbit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



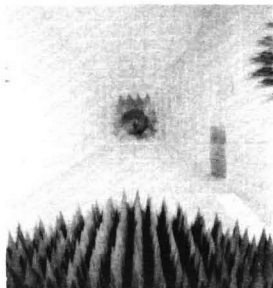
*Thermal Vacuum Chamber* (126)



*Electronic Equipment Testing  
in Anechoic Chamber* (127)



*LIPS Satellite Development* (128)



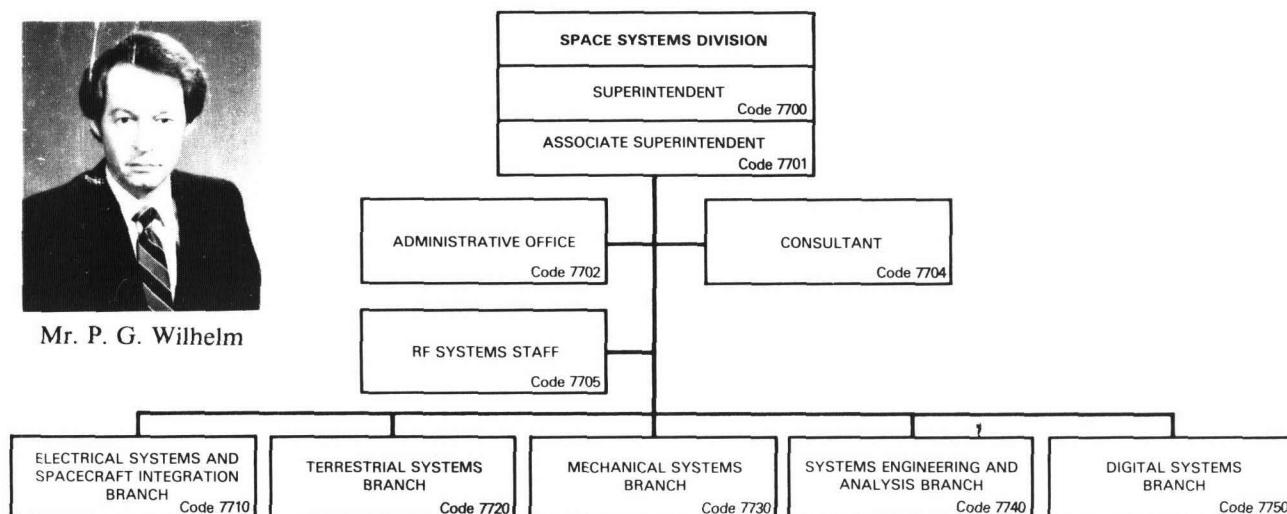
*Anechoic Testing  
Chamber* (129)



*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

| <u>Name</u>          | <u>Title</u>                                               |
|----------------------|------------------------------------------------------------|
| 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

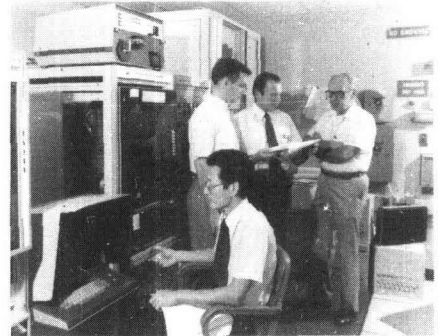
# Aerospace Systems Division



*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

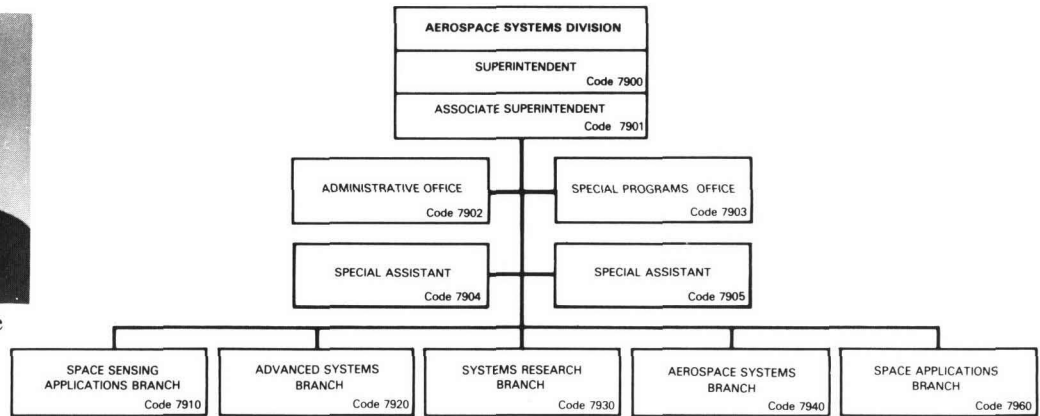
- Navigation systems
- Satellite tracking
- Geodesy systems
- Time synchronization
- System analysis
- Hydrogen maser
- Frequency standard develop

### 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

| <u>Name</u>               | <u>Title</u>                            |
|---------------------------|-----------------------------------------|
| 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         |
| <b>Civilian Personnel</b> | <b>Total Estimated R&amp;D Funding</b>  |
| Full-Time Permanent: 114  | Fiscal Year 1983: \$22,000,000          |

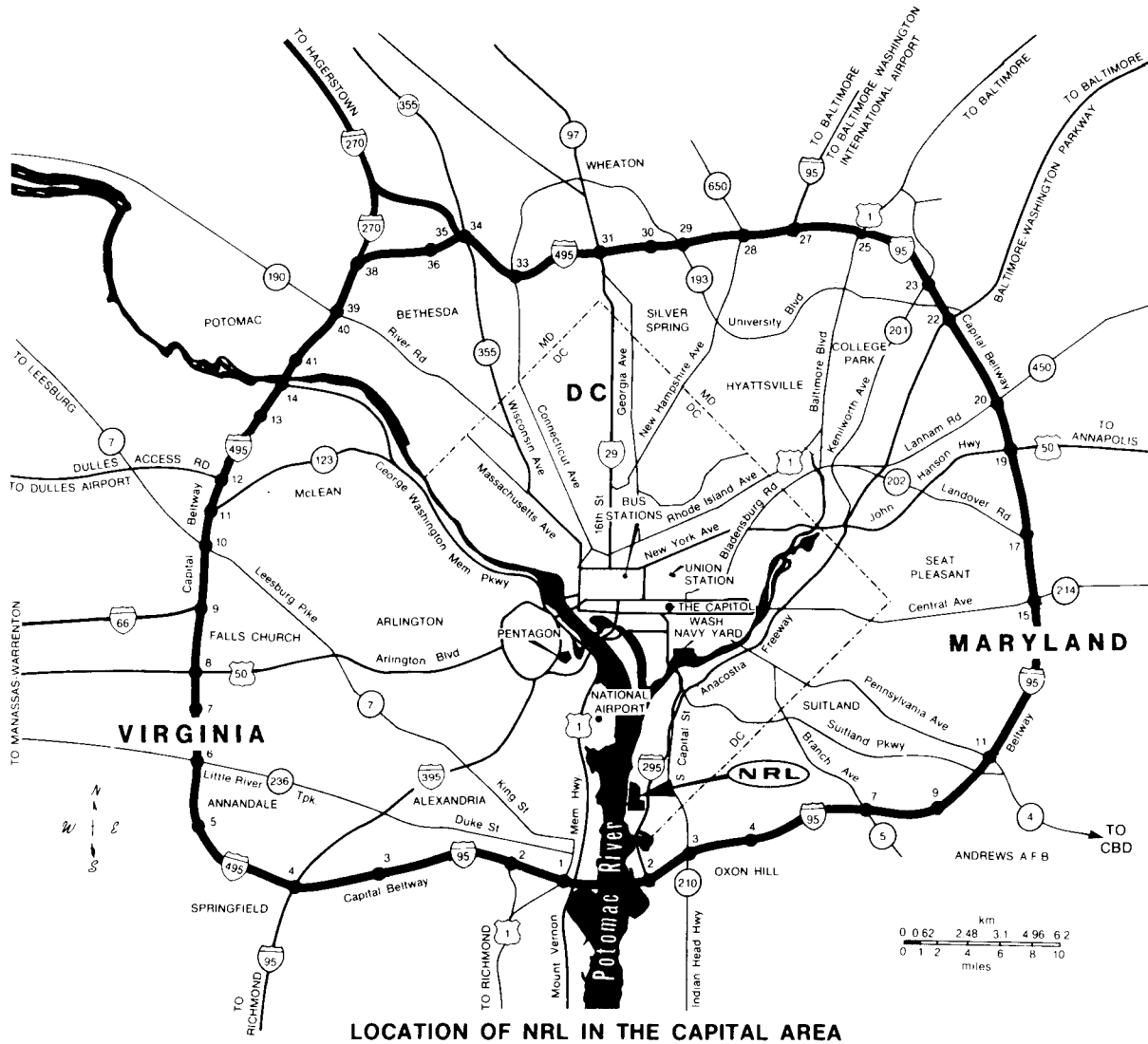
\*Acting

## General Information

### Awards Received by Civilian Employees in FY 1982

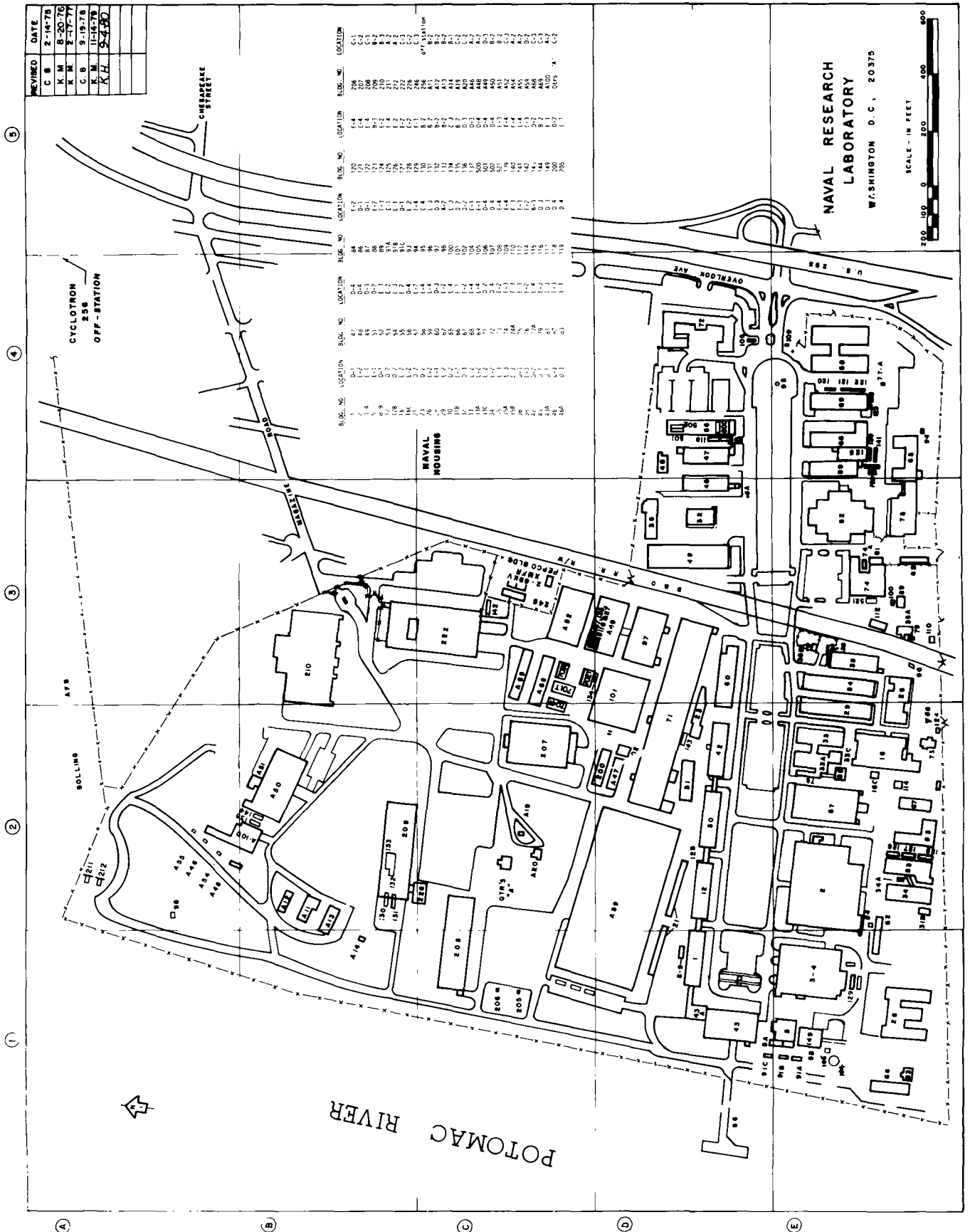
| <u>Government Awards</u>                              | <u>Number</u> |
|-------------------------------------------------------|---------------|
| Meritorious Executive Award, Senior Executive Service | 2             |
| Senior Executive Bonus Award                          | 4             |
| E.O. 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             |
| <u>Nongovernment Awards</u>                           |               |
| Sigma Xi Award in Applied Science                     | 1             |
| Sigma Xi Award in Pure Science                        | 1             |

# Location of NRL



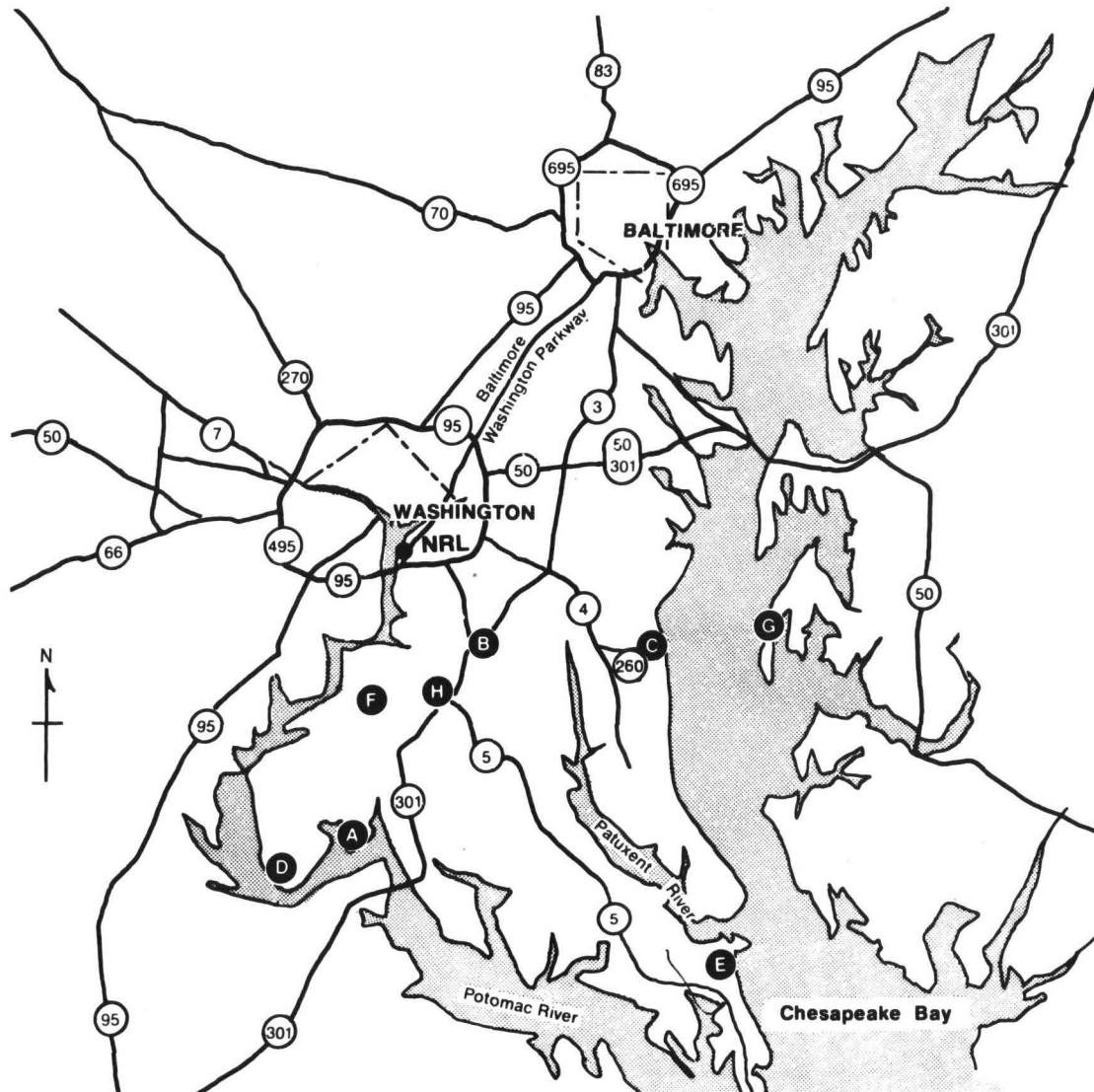
LOCATION OF NRL IN THE CAPITAL AREA

# 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

| <u>Code</u>                                                  | <u>Office and Incumbent</u>                                               | <u>Ext.</u>                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------|
| <b><u>EXECUTIVE DIRECTORATE</u></b>                          |                                                                           |                             |
| 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        |
| <b>TECHNICAL SERVICES DIRECTORATE</b>                        |                                                                           |                             |
| 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 |
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